



# Bush meat trade in Makurdi Metropolis; implications for the conservation of wildlife in Nigeria

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## ABSTRACT

*Objective:* To examine how bush meat trading processes could be adapted as a conduit for tackling the threatening disappearance of wildlife resources from their habitat in Nigeria.

*Methodology and results:* Bush meat trade species in Makurdi metropolis were identified, and their sources and channels of trade and profitability determined through participatory market survey techniques. Applying a multistage sampling technique, 179 bush meat traders were identified and their trading activities monitored between February and August, 2010. Data were analysed on Excel and SPSS 14.0 software version. Fourteen bush meat species obtained from protected areas in Bauchi, Cross-River and Taraba states; over 300km away from the metropolis, were identified and 6074 dry bush meat carcasses were traded over the study period. The bush meat trade, channelling from primary suppliers through middlemen to the ultimate consumers was profitable.

*Conclusions and application of findings:* Bush meat is widely consumed in Makurdi metropolis, and the numerous bush meat carcasses traded depicts the existent exploitation pressure on wildlife; and threat to their sustainability. Bush meat supply to Makurdi comes primarily from adjoining protected areas outside the state 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 Makurdi metropolis propels bush meat traders to remain in business. This has increased pressure on wildlife harvests for trade and hence threats to their sustainability. Governments and other development agents should use information supplied here to plan for a sustainable system that will optimize people's livelihoods and also maintain wildlife populations. Providing affordable and acceptable alternative sources of income and protein, promoting selective/exclusive hunting, and controlling access to complicated weapons are recommended policy options.

**Key words:** Bush meat trade, conservation of wildlife, profitability of bush meat, bush meat species, Makurdi metropolis.

## INTRODUCTION

Bush meat is a name for wild animals that are hunted for human consumption. Its supply originates from the forest and the grass lands (Ape Alliance, 1998; Bowen-Jones *et al*, 2003; brown and Williams, 2003; Okiwelu *et al*, 2009). It is estimated that Nigeria has a striking biodiversity. It

is home to gorillas, chimpanzees, baboons, and elephants. The country has 274 mammal species, over 20 species of primates 154 reptiles, 53 amphibians, over 20,000 insects' species, 109 snails' species and 899 species of birds (Happold, 2010). In many communities, including Nigeria,

bush meat constitutes a large proportion of the animal protein being consumed; up to 84% in communities living near the tropical forest (FAO [Food and Agricultural organization of the United Nations]/WHO [World Health Organization] 1992a, b; Pinstrup *et al.*, 2001; Bifarin *et al.*, 2008; Wilkie *et al.*, 2008; Okiwelu, 2009). For many rural populations, bush meat provides a flexible source of income, a direct source of affordable protein with good storage qualities and safety net in times of particular hardships. In fact bush meat has always been a staple in the diet of rural populations of west and central Africa (Bowen-Jones *et al.*, 2003; Fa *et al.*, 2003; Wilkie *et al.*, 2005).

Scholars have also shown that bush meat consumption is deeply rooted in cultural preferences and consumers show more willingness to pay for bush meat than domestic meat (Njiforti, 1996; Trefon & de Maret, 1999; Rose, 2002; Wilkie *et al.*, 2005). Thus Monney, 1994 and Davies, 2002 observed that wild animals are usually superior to domesticated livestock; they make the best use of existing local plants for food and can utilize a wider range of plants. They are therefore more palatable, and also cheaper to manage, than their domesticated counterparts. Their conservation and sustainability is therefore an imperative. The Cross-River Gorilla (2010) observed that some bush meat species have been sold for ritual and fetish uses, souvenirs, and decorative functions, and when captured alive, as pets. Animal parts like Gorilla skull, Lion's head, Buffalos' heads, and the skin, feather and furs of animals have been traditionally kept as trophies in many Nigerian communities. The increasing demands on bush meat for income, vitality and cultural needs have therefore made Bush meat trade a strong emerging economic and livelihood activity for both local and urban people. Although in time past, hunting bush meat was primarily for household consumption as source of protein, there is a paradigm shift from subsistence to commercial hunting for income nowadays (Ape Alliance, 1998; Fa *et al.*, 2002; de Merode *et al.*, 2004; Okiwelu *et al.*, 2009). Its harvesting is further enhanced by the increasing availability of infrastructures and feeder

roads, which makes easy the transportation of bush meat for sale from the forest areas to the cities and other organized settlements (Wilkie and Finn, 1990;). In many locations, the hunters and trappers sell their catch to middlemen who in turn carry them to markets that may be very far away from where the animals were caught (source of supply). Consequently, the phenomenon tends to mask the threatening availability or inadequacy of bush meat supply in many places; giving a wrong impression that there is plenty. Although bush meat trade is socio-economically important, scientists (e.g. Ape Alliance, 1998; de Merode *et al.*, 2003; Fa *et al.*, 2003; Okiwelu *et al.*, 2009) have decried the unsustainable and illegal hunting and harvesting of bush meat for commercial purposes as a serious threat to the populations of these wild animals, including trade in them. Thus, Oates *et al.*, 2000 and Brashares *et al.*, 2001 noted that bush meat extraction in Africa is exceptionally high and West Africa particularly hunts game animals to the extent of local extinction of some animal species. Also, Ape Alliance, 1998 observed with certainty that urban centres are foci for the growing trade in wild animal meat within the geographical region of Central and West Africa. Studies on bush meat trade are therefore important and fundamental to the development of effective conservation policies and sustainable management of wild animals (Bowen-Jones *et al.*, 2003; Samantha *et al.*, 2003; Guy *et al.*, 2004). Such studies will provide the necessary information and entry points in the marketing process, where policy interventions could be targeted to engender sustainable wildlife conservation and hence bush meat trade (Bowen-Jones *et al.*, 2003). However, there is little information from literature about bush meat trade in Nigeria (Ape Alliance, 1998; Bifarin *et al.*, 2008). Similarly, Benue state, which is located in central Nigeria within a transitional belt from the high rain forest of southern Nigeria to the savannah lands of the north, has no such information recorded to her credit. This paper explores the instrumentality of bush meat trade to the planning and sustainable management and conservation of wildlife resources in Nigeria. Thus the paper identifies and

quantifies the bush meat species that are traded in Makurdi metropolis, determines the sources of bush-meat supply and its channels of trade, and also estimates the income and profit from bush

## METHODOLOGY

This study was carried out in Makurdi metropolis, Benue State. Apart from its status as the Headquarter of Makurdi Local Government Area (LGA), Makurdi town also doubles as the state capital of Benue State. The Metropolis, which is situated within the Benue valley on latitude 6°22' and 7°56' to the North and longitude 7°37' and 9°05' east has a total area of 325km<sup>2</sup>. The population of the inhabitants is about 300,317 people comprising 158,838 males and 141,479 females respectively (NPC, 2007). The inhabitants of Makurdi metropolis are predominantly civil servants however; fishing, trading and farming are the prominent occupations of the traditional inhabitants. Other people are involved in burnt bricks production and irrigation farming (vegetables) along the course of River Benue. The selection of Makurdi metropolis for this study was predicated on the flourishing bush meat trade in the metropolis. However, the strategic location of Benue State in the transitional vegetation zone from the rainforest area to the savannah lands was an added criterion. Furthermore, preliminary investigations and personal communication revealed that the supply sources of bush meat to Makurdi cut across the entire length and breadth of Nigeria. Thus the outcomes from the study could perhaps depict bush meat trade in Nigeria and its implications for wildlife conservation. Data were collected between February and August 2010, following detailed pilot study (September – November 2009), using a combination of qualitative and quantitative market survey techniques. The study covered three months of dry season (February-April) and four months of rainy season (May-August). During

## RESULTS

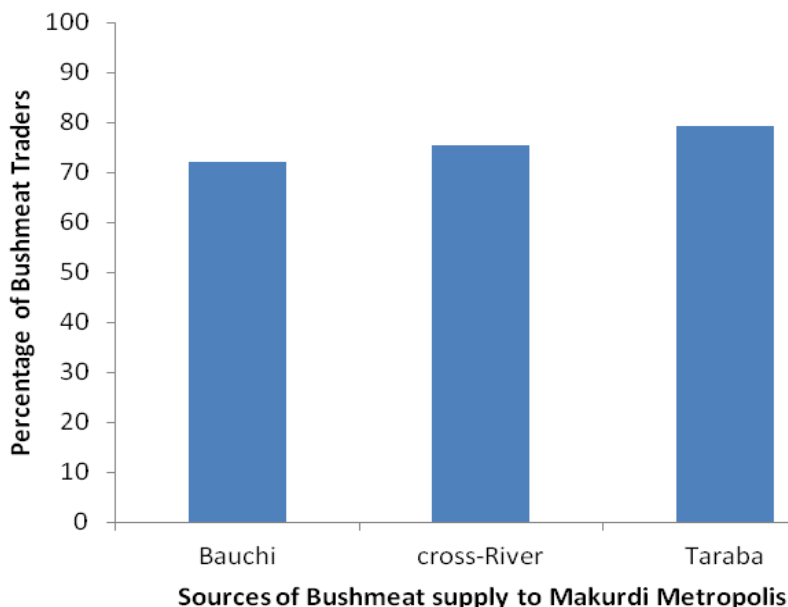
**Sources of bush meat supply to bush meat traders in Makurdi Metropolis:** The result of the study revealed that bush meat traders obtain bush meat from three alternate supply sources namely; Bauchi, Cross River and Taraba states (Figure 1). The proportions of patronage vary from one state to another. A greater proportion (79.3%) of the bush meat traders secured bush meat from Taraba state. This is followed by

meat trade in the metropolis. The outcomes are discussed in the context of their relevance in planning effective wildlife resources conservation and sustainable management.

this period, primary data on bush meat types and sources of bush meat supply, their quantities and channels of distribution were collected using semi-structured questionnaire. The prices of the different bush meat species with the corresponding costs in the trade were also collected to determine profitability in bush meat trade. Two forestry research assistants from the University of Agriculture Makurdi, both of which were trained in market survey techniques during the pilot study, assisted with data collection. Applying a multi-stage sampling technique; four council wards were purposely selected (based on existing markets in which bush meat is sold) out of the eleven in Makurdi metropolis and used for the study. From the selected council wards, five existing markets were identified for data collection. They are High-level, Modern, North Bank, Wadata and Wurukum markets. All these markets operate on a daily basis. An optimum sample size of 179 bush meat traders were identified (out of the 595 bush meat traders in the selected markets) using 30% sampling intensity. The bush meat traders were purposively selected based on their consistent presence in the market and at least two years of trading experience following (Ruiz *et al.*, 2000; Poulton and Poole, 2001). The trading activities of the bush meat traders were monitored twice a week in the market throughout the study period.

Statistical analyses were carried out on EXCEL, and SPSS 14 software version. Gross profit, which is the difference between Gross income and Gross cost, was applied as an estimate of the level of profit made from bush meat trade.

75.4% and 72.1% from Cross River and Bauchi state respectively. The traders interchangeably travel to these locations at designated sites to buy bush meat, usually from unlicensed hunters, poachers, wood harvesters (loggers) and forest products collectors. In Taraba state, the Fulani herdsmen were also identified as suppliers of bush meat to the consuming public including the bush meat traders.



**Figure 1:** Distribution of Bush meat Traders by Sources

**Bush meat species traded in Makurdi metropolis:**

To determine the Bush meat species traded in Makurdi metropolis, personal observations and structured interviews with the bush meat traders and some key informants were carried out. The study identified fourteen (14) bush meat species (Table 1). A total of 6074 dry carcasses of the 14 bush meat species (comprising 10 mammals, and four reptiles) were encountered in the markets during the 7-month study period. African grass rat (*Arvicanthus niloticus*), representing 28.50% of the total bush meat encountered dominated the bush meat trade. Following closely were Grass cutter (*Thryonomis swiderianus*), 20.4%; and the Common gray duiker (*Sylvicapra grimmia*), 18.42% respectively. The Cobra (*Naja nivea*), Patas monkey (*Erythrocebus patas*), spotted hyena (*Crocuta crocuta*), African civet cat (*Civettictis civetta*), and the Nile crocodile (*Crocodylus niloticus*) represented a decimated bush meat trade in Makurdi

markets. The corresponding proportions of these bush meat species out of the total number (6074) encountered over the study period were 0.21%, 0.26%, 0.28%, 0.28%, and 0.28% respectively. The largest quantity of bush meat (1549) was offered for sale in Wadata market during the 7-month study period. This was followed by Wurukum market while High level market recorded the least quantity (754). The quantity of bush meat encountered in the markets probably depended on the number of bush meat traders in that market. It is also worthy to note that the study did not take into cognisance, the weights (biomass) of the different bush meat species traded. This was because the determination of prices was not based on biomass, but on species involved and the quality (degree of dryness or freshness) measured by the buyers' value judgement. Generally, drier bush meats attracted higher prices.

**Table 1:** Bush meat species traded in Makurdi metropolitan markets and their numerical distribution between February and August 2010

Common name	Scientific Name	Number of carcasses available in the Markets					Totals N= 179	Percentage
		High level n= 7	Modern n= 36	North Bank n = 36	Wadata n = 57	Wurukum n = 43		
Common Gray Duiker	<i>Sylvicapra grimmia</i>	108	236	186	331	257	1118	18.42
Grasscutter	<i>Thryonomis swiderianus</i>	112	218	210	386	313	1239	20.40
Rabbit (Lagomorpha)	<i>Sylvilagus brasiliensis</i>	67	128	100	106	86	487	8.02
Bush pig (Forest Hog)	<i>Potamocheorus spp</i>	12	21	11	10	8	62	1.02
Porcupine	<i>Atherurus africanus</i>	156	162	221	246	254	1039	17.11
Patas Monkey	<i>Erythrocebus patas</i>	2	5	3	3	3	16	0.26
Alligator	<i>Alligator mississippiensis</i>	12	42	48	56	23	181	2.98
Nile Monitor Lizard	<i>Veranus niloticus</i>	16	9	24	32	15	96	1.58
Spotted Hyena	<i>Crocuta crocuta</i>	2	3	4	3	5	17	0.28
Fox (wild cat)	<i>Vulpes spp, Felis silvestris</i>	7	6	11	8	9	41	0.68
African Grass Rat	<i>Arvicanthus niloticus</i>	256	336	367	360	412	1731	28.50
Cobra	<i>Naja nivea</i>	1	4	3	2	3	13	0.21
African civet	<i>Civettictis civetta</i>	2	3	6	3	3	17	0.28
Nile crocodile	<i>Crocodylus niloticus</i>	1	4	7	3	2	17	0.28
		754	1177	1201	1549	1393	6074	100.02*

**Note:** 'n' is the sample size of bush meat traders per market, and 'N' is the summation of 'n' values, \*round up effect

The numerical strengths of bush meat species traded within Makurdi market from February to August 2010 (Table 2) revealed that March and April recorded the highest number of bush meat; 1228 and 1281 respectively. Generally, the months of June to August recorded very low quantity of bush meat supply with the month of August recording the least quantity (292). In some months, trade in some bush meat species did not occur. For instance, trade in the bush meat of Alligator (*Alligator mississippiensis*) and the Nile monitor lizard (*Veranus niloticus*) were not encountered for three consecutive months; June, July and August.

**Channel of Bush meat trade and consumption sequence:** The bush meat delivery system in Markurdi metropolitan markets comprises the primary suppliers (hunters, loggers and forest product collectors), village collectors/assemblers of bush meat, bush meat traders and the consumers. The bush meat traders usually travel to any of the states; Bauchi, Cross-River, and Taraba, approximately 350kms to 650kms away, to

purchase bush meat in group from contracted and private hunters. The traders also buy bush meat from loggers and other forest products collectors who in addition to the primary products they collect from the forest, kill straying game. Village assemblers also purchase bush meat from individual hunters from their homesteads and convey same to the local markets where they sell to other consumers including bush meat traders from Makurdi. Bush meat purchased from these sources is conveyed back to Makurdi metropolis by the bush meat traders. As the bush meat traders are on transit, they also purchase bush meat from roadside dealers and add to their bush meat consignments. The Bush meat traders distribute bush meat delivered to Makurdi to the various bush meat markets in the metropolis based on the markets in which they sale. Bush meat supplied to the markets is in turn sold to the restaurants, bars, hotels and cafeteria., where bush meat is widely consumed.

**Table 2:** Monthly numerical strength of Bush meat species traded in Makurdi Metropolis between February and August 2010

<b>Bushmeat Species</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Total</b>	<b>Percentage</b>
Common Gray Duiker	179	189	165	291	105	96	93	1118	18.42
Grass cutter	190	289	300	197	86	90	87	1239	20.40
Rabbit (Lagomorpha)	130	129	101	45	38	23	21	487	8.02
Bush pig (Forest Hog)	14	11	15	5	8	4	5	62	1.02
Porcupine	187	137	279	196	63	96	81	1039	17.11
Patas Monkey	3	-	5	3	2	-	3	16	0.26
Alligator	38	31	50	62	-	-	-	181	2.98
Nile Monitor Lizard	-	24	34	38	-	-	-	96	1.58
Spotted Hyena	-	-	3	8	3	3	-	17	0.28
Fox (wild cat)	4	6	6	9	11	3	2	41	0.68
African Grass Rat	386	405	311	272	201	156	-	1731	28.50
Cobra	-	4	3	3	2	1	-	13	0.21
African civet	2	3	6	4	2	-	-	17	0.28
Nile crocodile	5	-	3	6	-	3	-	17	0.28
<b>Total</b>	<b>1138</b>	<b>1228</b>	<b>1281</b>	<b>1139</b>	<b>521</b>	<b>475</b>	<b>292</b>	<b>6074</b>	<b>100.02*</b>

\*Round-up effect

Some bush meat traders sell directly to household consumers at their homes. A typical channel of bush meat trade in Makurdi metropolis is shown in Figure 2.

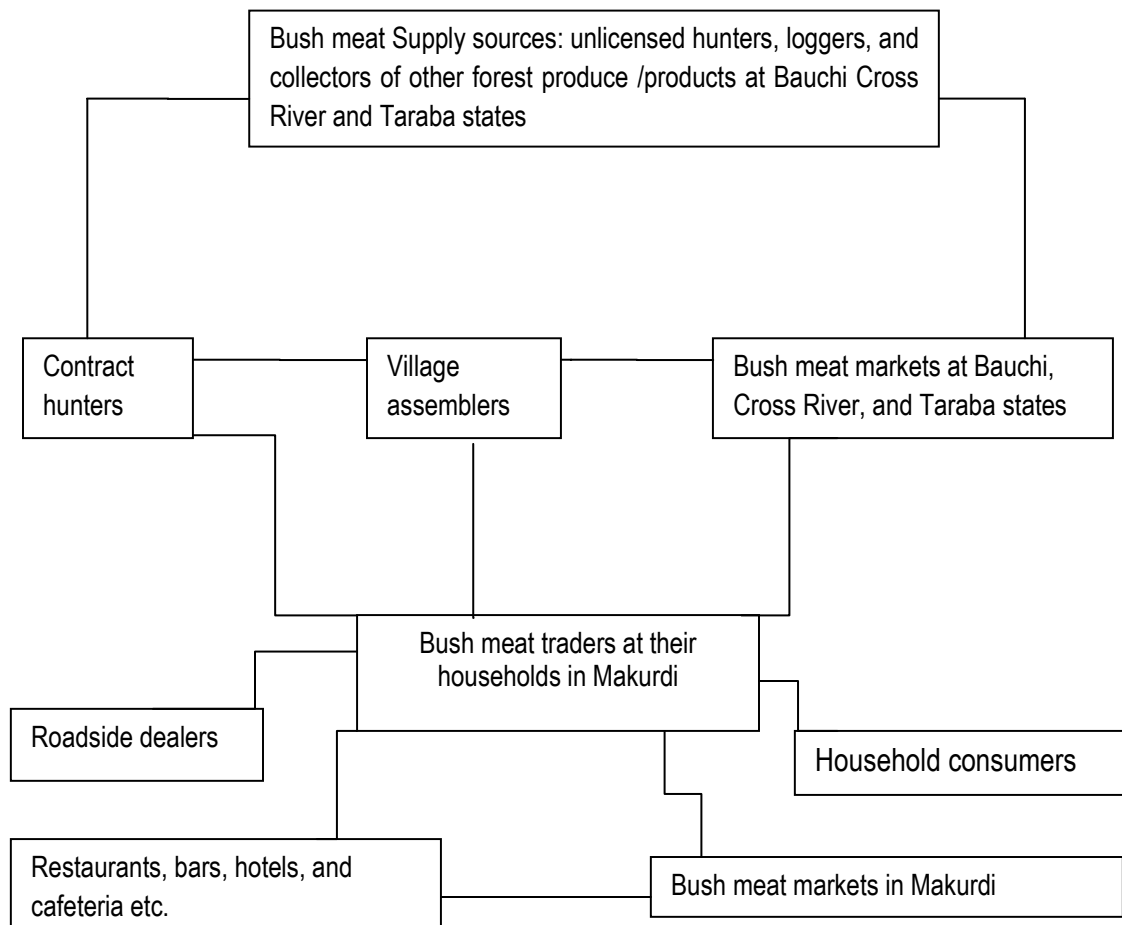


Figure 2: Channel of Bush meat trade and consumption sequence in Makurdi metropolis.

**Profitability of bush meat trade in Makurdi metropolis:** The analyses of bush meat trade in Makurdi metropolis (Table 3) indicate that the trade is profitable. Gross profit per unit of bush meat varied between ₦110.42 (\$0.73) for African grass-rat (*Arvicanthus niloticus*) and ₦1705.84 (11.22), for (*Thryonomis swiderianus*). The Rate of Return on Investment (RORI), which measures the speed at which the capital invested yields income, varies between 14.93 from Bush pig (*Potamocheorus spp*) and 77.94 from African grass rat (*Arvicanthus niloticus*) during the 7-month study period. Gross Ratio (GR) values express inverse relationships with the RORI

values. The higher the GR values the lower the corresponding values of RORI and vice versa. Gross Ratio values for bush meat trade in Makurdi metropolis varied between 0.562 and 0.870; respectively for African grass rat (*Arvicanthus niloticus*) and Bush pig (*Potamocheorous spp*) respectively. From the foregoing, African grass rat recorded the least gross ratio values; indicating that its trade is more efficient in terms of inputs utilization and profitability. Gross ratio measures the entrepreneur’s ability to minimize production costs or increase input utilization efficiency to improve profitability



**Table 3:** Profitability of bush meat trade in Makurdi metropolis during the dry season months (February-April 2010)

<b>Bushmeat Species (A)</b>	<b>Quantity sold (B)</b>	<b>Gross Income (₦)/unit (C)</b>	<b>Gross Cost(₦)/unit (D)</b>	<b>Gross Profit (₦) (E = C – D)</b>	<b>RORI (F=E/D * 100)</b>	<b>Gross Ratio (G=D/C)</b>
Common Gray Duiker	1118	5808.34	4945.84	862.51	17.44	0.852
Grasscutter	1239	6491.67	4785.84	1705.84	35.64	0.737
Rabbit (Lagomorpha)	487	1410.42	1023.34	387.08	37.83	0.726
Bush pig (Forest Hog)	62	9737.50	8472.93	1264.57	14.93	0.870
Porcupine	1039	1200.00	856.25	343.75	40.15	0.714
Patas Monkey	16	3500.00	2733.34	766.66	28.05	0.781
Alligator	181	2762.50	1968.75	793.75	40.50	0.713
Nile Monitor Lizard	96	1000.00	762.50	237.50	31.15	0.763
Spotted Hyena	17	2605.00	1893.75	711.25	37.56	0.727
Fox (wild cat)	41	1256.25	939.59	316.66	33.70	0.748
African Grass Rat	1731	252.09	141.67	110.42	77.94	0.562
Cobra	13	1287.50	850.00	437.50	51.47	0.660
African civet	17	1337.50	937.50	400.00	42.67	0.701
Nile crocodile	17	6316.67	4725.00	1591.67	33.69	0.748

Note: ₦152 is equivalent to \$1; RORI, Rate of Return on Investment.

## DISCUSSION

This study results indicated that bush meat supply to Makurdi metropolis is obtained from Bauchi, Cross-river and Taraba states. The supply of bush meat to Makurdi from these states means that the wildlife population in Benue state has perhaps dwindled abysmally and can no longer withstand the demand level. Consequently, the bush meat traders may have to look outwards if they are to meet with the demand level. The protected areas in these states therefore provide an easy platform in this regard. Cross-River state for instance is the home of the Cross-River National Park (CRNP); and it is one of the richest hotspots of biodiversity deposit in the West African sub-region, and is sharing borders with the Korup National Park of Cameroon (Bisong and Mfon, 2006). Similarly, Yankari Game Reserve in Bauchi, Gashaka Gumti National Park in Taraba state and the Donga valley comprising Buru, Akwabe, Afrobe forests, all have large deposit of biodiversity including the wildlife species. It is however worthy to note that Makurdi metropolis is just but a small bush meat consuming centre compared to the generality of the Benue people. Perhaps, bush meat traders from other states are also going to any of these protected areas to obtain bush meat for their markets, the pressure on the parks will definitely become legion. Whereas the suppliers of bush meat to the traders are usually the illegal unregulated exploiters; unlicensed harvesters, loggers, hunters, and poachers, the increased pressure on the parks for bush meat will threaten the population and sustainability of wildlife resources in the parks (Merode *et. al*, 2003; Fa *et. al*, 2003; Okiwelu *et. al*, 2009). The involvement of the private sector and government machinery in correcting the situation by developing regulatory policies and taking pragmatic measures to ensure their proper implementation is an imperative.

**Bushmeat species traded in Makurdi, their channels and consumption sequence:** The greater number of mammalian species; particularly the African grass rat, grass cutter and the common gray duiker, traded in Makurdi 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, African civet and the Nile crocodile, 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. It could be observed that the bush meat species traded in Makurdi metropolis were supplied by illegal harvesters from protected areas over three hundred kilometers away from Makurdi metropolis. This shows the extent of demand for bush meat by the urban people. This therefore corroborates the earlier assertions (Ape Alliance, 1998; Brown and Williams, 2003; de Merode *et. al*, 2004) that bush meat is a veritable source of protein for both the urban and poor forest-dwelling peoples. The fact that bush meat extraction from these parks is carried out by illegal persons calls for workable strategies to control these illegalities and hence, bush meat sustainability in Nigeria. Since bush meat trade is a continuum with producers on one end and consumers at the other; and in-between the retailers, wholesalers, traders, and hunters; addressing these illegalities would mean examining the channels before identifying the inadequacies to be tackled.

**Profitability of bush meat:** Profit is an unequivocal motivating factor for entrepreneurs to remain in business. The result of this study shows that bushmeat trade in Makurdi metropolis 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; Fa, 2003; Brown and

Williams, 2003). 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.

**Bushmeat trade and implications for wildlife conservation:** 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; Wilkie *et al.*, 2005; Okiwelu *et al.*, 2009). As 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). Results from this research identify policy options and some critical points along the bush meat commodity chain that these policy

interventions are vital to improve conservation and sustainability of wildlife resources. These interventions include the following: At the producers' (hunters & loggers) end, we have illegal producers operating on the parks. 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.

## REFERENCES

- Ape Alliance, 1998. The African bush meat trade- a recipe for extinction. Fauna and Flora International, Cambridge. 74pp
- Bifarin JO., Ajibola, ME., and Fadiyimu, AA. 2008. Analysis of marketing bush meat in Idanre local government area of Ondo State, Nigeria. *African Journal of Agricultural Research* 3, 10:667-671.
- Bisong FE, Mfon P Jnr 2006. Effect of logging on stand damage in rainforest of south- eastern Nigeria. *West African journal of Applied Ecology*, 10: 119-129.
- Bowen-Jones, E., Brown, D., and Robinson, EJZ, 2003. Economic commodity or environmental crises? An interdisciplinary approach to analysing the bush meat trade in central and West Africa. *Area* 35. 4, 390-402
- Brashares, JS., Archase, P., Sam, MK., 2001. Human demography and reserve size, Predict wildlife extinction in West Africa. *Proceeding of the royal society of London series B* 268, 2474-2478.
- Brown D., and A. Williams, 2003. The case for bush meat as a component of development policy; issues and challenges. *International Forestry Review* 5.2: 148-155.
- Cross-River Gorilla, 2010. Bush meat trade Available at: <http://www.crossrivergorilla.org/threats/bushmeat-trade.html>. Downloaded on 24th April, 2010
- Davies G, 2002. Bush meat and international development. *Conservation Biology*. 16: 587-589.
- de Merode E. Homewood K and Cowlshaw C. 2003. 'the value of bush meat and wild foods to rural households living in extreme poverty in the Eastern democratic Republic of Congo' draft, University College London.
- de Merode E. Katherine Homewood and Guy Cowlshaw, 2004. The value of bush meat and other wild foods to rural households living in extreme poverty in Democratic Republic of Congo. *Biological Conservation*. 118, 573-581
- Fa, JE., Dominic Currie, and Meeuwig, J., 2003. Bush meat and food security in the Congo Basin: linkages between wildlife and people's future. *Environmental Conservation* 30, 1: 71-78
- Fa, JE., Peres, CA., Meeuwig, J., 2002. Bush meat exploitation in tropical forests: an intercontinental comparison. *Conservation Biology* 16 (1), 232-237.

- Fa, J.E., 2000. Hunted animals in Bioko island, West Africa: sustainability and future in Robinson J.G. and Bennett EL (eds). *Hunting for sustainability in tropical forests*. Columbia University press, New York. 168-98
- FAO/WHO, 1992a. International conference on nutrition. Final report of the conference. Rome, Italy: Food and Agricultural Organisation of the United Nations: 60pp
- FAO/WHO, 1992b. Major issues for nutrition strategies: Improving household food security. International Conference on Nutrition Theme Paper 1. Rome, Italy: Food and Agricultural Organisation of the United Nations: 35pp
- Guy, C., Samantha, M., Rowcliffe, J.M., 2004. Structure and operation of a bush meat commodity chain in south western Ghana. *Conservation Biology* 18, 139-149.
- Happold, DCD. (2000). Nigerian Mammals. *Nigeria's field* 65: 193-211
- Happold, DCD., 1987. Mammals of Nigeria. New York; Oxford University Press
- Monney KA, 1994. Notable notes on giant African snails. *Snail farming Research. The Italian Snail farming Association*. 5, 7-5
- Njiforti, H.L., 1996. Preferences and present demand for bush meat in northern Cameroon: some implication for wildlife conservation. *Environmental conservation* 23: 149-155.
- Oates, J.F., Abedi-Larty M., Megraw, W.S., Struhsaker, T.T., Whilosides, G.H., 2000. Extinction of West African Red Columbus Monkey: *Conservation Biology* 14, 1526-1532.
- Okiwelu, S.N., N. Ewurum and MAE. Noutcha, 2009. Wildlife harvesting and bush meat trade in River State, Nigeria: species composition, seasonal abundance and cost. *Scientia Africana* 8, 1-8.
- Pinstrup-Andersen, P., Pandya-Lorch, R. and Rosegrant, M.W., 2001. Global food security: A review of the challenges: In: *The unfinished Agenda. Perspectives on overcoming Hunger, poverty, and Environmental degradation*, ed. P. Pinstrup-anderson, and R. Pandya-Lorch, pp 7-17. Washington DC, USA: International Food Policy Research Institute.
- POST, 2005. The bushmeat trade. Post note number 236 February. Available at: [www.parliament.uk/post/home.htm](http://www.parliament.uk/post/home.htm)
- Poulton, C and Poole N., 2001. Poverty and fruit tree research: issues and options paper. DFID Forestry Research Programme, UK. pp 85 – 99.
- Rose, A.L., 2002. Conservation must pursue human-nature biosynergy in the era of social chaos and bush meat commerce. *Cambridge studies in Biological and Evolutionary Anthropology*: 208-239
- Ruiz Perez M., Ndoye O., Eyebe A., and Puntodewo A., 2000. Spatial characteristics of non-timber forest product markets in the humid forest zone of Cameroon: *International Forestry Review* 2. 2: 71 – 83.
- Samantha, M., Guy C., and Rowcliffe, J.M., 2003. Anatomy of a bush meat commodity chain in Takoradi, Ghana. *The Journal of Peasant Studies* 31, 73-100.
- Save the Primates, 2011. Bush meat trade-threat of primate extinction. Save the primate. Available at; <http://www.save-the-primates.org.au/facts-bushmeat-trade.htm>. Downloaded on the internet on 10/12/2011.
- Trefon, T., and P. de Maret, 1999. Snack nature dans les villes d'Afrique Centrale. Pp 559-572 in S. Bahuchert, D. Bley, H. Pagezy, and N. vernazza-Licht, eds. *L'Homme et la Forêt Tropicale*. Editions de bergier, Châteauneuf de Grasse, France (in French).
- Wilkie, D.S., and Finn J.T. 1990. Slash and burn cultivation and mammal abundance in the Ituri forest, Zaire. *Biotopica* 22.1:90-99.
- Wilkie, D.S., Starkey M., Abernethy K, Effa, EN Telfer, P and Godoy, R. 2005. Role of prices and wealth in consumer demand for bush meat in Gabon, Central Africa. *Conservation Biology* 19.1:268-274.