

## Determinants in Bushmeat Harvesting Among Dwellers of Oban Hills Forest Region, Cross River, Nigeria

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### ABSTRACT

*This study assessed the impacts of economic value and taste preferences in harvesting some species of bushmeat in Cross River National Park. Purposive sampling was used to select a sample of the local respondents and study communities. At Ifunkpa community, the most hunted species was Cercopithecus spp. (26.3%), Ekuri community: Thryonomys swinderianus (52.4%). The outcome was slightly different at Esang community:Thryonomys swinderianus (50.0%) was the most hunted animal. In Aking/Osomba community, Cercopithecus spp. (36.8%) had the highest hunting rate. In Ekang, Cercopithecus spp. (33.3%) had the highest hunting percentage. Communities' members' hunted these wildlife species due to their economic value and taste preference. It was also revealed from the study that for every wildlife species hunted in all the five communities for their taste, there was one threatened species. This is evident in Aking/Osomba and Ekang communities (12.5%). Also, for every hunted species of wildlife for economic value, there was one threatened species as in Ekuri community (20.0%) and Aking/Osomba community (16.7%). It is therefore imperative to protect wildlife resources through poverty alleviation and establishment of alternative source of animal protein for the communities adjacent the study area.*

**Keywords:** Bushmeatharvesting, Cross River National Park, Economic value, Taste preference

**INTRODUCTION:** In remote forest areas around tropical and subtropical forests of the world, bushmeat is often the main source of animal protein available and plays an essential role in people's diets especially where livestock husbandry is not a feasible option and wild fish not available. Wild animals constitute a valuable food resource which cannot be easily withdrawn or replaced without causing wide-ranging socio-

economic imbalances. In rural and urban areas where other sources of protein are available, bushmeat is consumed because of a complex combination of prices, taste and tradition that varies across regions (Kumpel, 2006). In several African cities, bushmeat is still the cheapest source of protein and represents a crucial source of meat for the poorest urban households. In Kisangani, Democratic Republic of Congo

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(DRC) and Bangui, Central African Republic (CAR), bushmeat is cheaper than many other alternative sources of protein (Fargeot, 2010) or essentially perceived as 'free' protein as it can be captured rather than purchased (Kumpel, 2006).

In many Southern and East African rural areas, although livestock meat is available, preference for bushmeat is driven by its affordability [Lindsey, P.A.; Romañach, S.S.; Matema, S.; Matema, C.; Mupamhadzi, I. & Muvengwi, J. (2011a); Lindsey, P.A.; Romañach, S.S.; Tambling, C.J.; Chartier, K. & Groom, R. (2011b)]. In North Myanmar, [Rao M.; Htun S.; Zaw T. & Myint, T. (2010)] found that the average cost of livestock meat was significantly higher than the average cost of fish and bushmeat with fish being slightly more expensive than bushmeat. Bushmeat consumption levels often vary according to variations in prices of alternative foods, such as fish [Wilkie, D. S.; Starkey, M; Abernethy, K.; Effa-Nsame, E.; Telfer, P. & Godoy, R. (2005)]. Bushmeat is also preferred because of its taste. In large cities of Equatorial Guinea, Gabon and Cameroon, despite higher prices in comparison to domestic meat, bushmeat is preferred for its taste (Kumpel et al. 2007; Abernethy and Ndong-Obiang, 2010). Analysis of taste choices in Gabon indicate, not only that consumers differentiate bushmeat species from domestic meat, but also that they differentiate among different bushmeat species [Knights, 2008; Schenck, M.; Nsame-Effa, E.; Starkey, M.; Wilkie, D.; Abernethy, K.; Telfer, P.; Godoy, R. & Treves, A.(2006)]. In Nigeria, using a combination of taste tests and questionnaires, cane rat (*Cricetomys emini*) was rated higher than mutton and beef according to sensory quality (Ladele et al. 1996). In Equatorial Guinea, the top three tastiest foods were all fresh fish or bushmeat species followed by frozen mackerel, frozen chicken and frozen pork (Kumpel, 2006). Although, this study does not focus on the economic interplay of bushmeat consumption, utilization and commercialization; it assessed impacts of economic value (financial gain through bushmeat sales) and taste preference in harvesting some species of bushmeat in Cross River National Park.

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**MATERIALS AND METHODS: Location and Description of the Study Area:** Cross River National Park, the first tropical rain or moist forest National Park in Nigeria, is located in Akamkpa Local Government Area of Cross River State, Nigeria. It covers an area of approximately 4000 km<sup>2</sup> and consists of two divisions: *Oban* in the south (3000 km<sup>2</sup>) and *Okwangwo* in the north (approximately 1000 km<sup>2</sup>). The *Oban* Division is centered within latitudes 05°15' and 05°25'N, and longitudes 08°30' and 08°45'E. Cross River National Park is of international importance because of its unique biodiversity and species richness and endemism (Myre et al. 2000). The study was carried out at the Oban Hills Region. The *Oban* Division is contiguous with the Korup National Park, while the *Okwangwo* Division is contiguous with the *Takamanda* Forest Reserve, both in Cameroon. The *Oban* Hill Division of the Cross River National Park was carved out of *Oban* group Forest Reserve in 1991. It could be accessed through the Ikom-Calabar highway. The Oban sector of Cross River National Park is further divided into two corridors: The *Obong/Nsan* corridor and *Oban* corridor. Household economy in *Oban* Division is largely agrarian, although hunting, trapping, and collections of forest products are of importance for subsistence, and to an extent for trade. Economic development is seriously constrained by poor road network and market facilities. The *Oban* Hills area is inhabited predominantly by the *Ejagham* tribe with a few *Ibibio*, *Efiks*, *Calabaris*, and *Ibos*.

The following are the villages where the study was carried out: *Aking/Osomba*, *Ifumkpa*, *Ekuri*, *Esang*, and *Ekan*. These villages have relatively large amount of tropical high forest and also consists primarily of hills and swamps. The terrain is rugged with hills ranging from 100 m to more than 1000 m above sea level. Annual rainfall is estimated to range between 2500 mm and 3000 mm. The vegetation of the Oban Sector is dominated by tropical rainforest at various stages. There are closed canopy, open canopy secondary vegetation, farm fallows, and oil palm plantations. The buffer zone consists of oil palm,

cocoa, cassava, banana, plantain plantations, and maize and cocoyam farms. There are also numerous stone quarries around the buffer zone of the Park.

**Data Collection and Analysis:** Purposive (judgment) sampling method was used to select a sample of the local respondents and study communities (Tongco, 2007). Purposive sampling method was used due to the proximity of these villages to the Park. A total number of 100 respondents from the selected villages were interviewed, all living within a 10,000 m distance from the Park boundary. The method was an interview-administered questionnaire. The questionnaire included both open-ended and fixed-response questions. The questionnaire was used to investigate the respondents' feeding regime, duration of feeding, sources of animal protein, income, species hunting-preference due to taste, as well as species hunting-preference as a result of its economic value. All interviews were conducted with a research assistant. Oral

interviews were carried out during the day in the local language (*Ejagham and Efik*) and/or English. Stakeholders who were considered to have direct influence on the management of the Park were identified and various levels of interaction were carried out. These include households, focus group discussions, village meetings, hunters, staff of the Park, members of non-governmental organizations, and staff of Cross River State Forestry Commission and leaders of the community. Data gathered from the questionnaire were grouped and summed by response category. The responses were recorded on a data sheet and later transcribed into English and entered into a Microsoft Excel 2010 database as well as Statistical Package for Social Sciences version 19 for Windows (IBM SPSS Inc, Chicago, USA). Descriptive statistics were used. Where multiple responses were possible on an open-response question, data are presented as the percentage (%) of respondents giving each response, and may sum to 100%.

**RESULTS**

**Table 1:** Income and Feeding Habits of Respondents in the Study Area

| S/N                                      | Variable | Ifumkpa | Ekuri | Esang | Aking/<br>Osomba | Ekang | Total | %     |
|--|----------|---------|-------|-------|------------------|-------|-------|-------|
| <b>Income (Naira in thousand/Month):</b> |          |         |       |       |                  |       |       |       |
| Low (<10,000)                            |          | 10      | 8     | 9     | 9                | 5     | 41    | 43.6  |
| Medium (<49,000)                         |          | 12      | 6     | 11    | 10               | 5     | 44    | 46.8  |
| High (>50,000)                           | 2        | 1       | 3     |       | 2                | 1     | 9     | 9.6   |
| Total                                    |          |         |       |       |                  |       |       | 100.0 |
| <b>Feeding regime/day:</b>               |          |         |       |       |                  |       |       |       |
| Once                                     |          | 2       | 1     | 3     | 2                | 1     | 9     | 9.4   |
| Twice                                    |          | 10      | 12    | 15    | 6                | 4     | 47    | 49.0  |
| Three times                              |          | 9       | 10    | 8     | 7                | 6     | 40    | 41.6  |
| Total                                    |          |         |       |       |                  |       |       | 100.0 |
| <b>Source(s) of animalprotein:</b>       |          |         |       |       |                  |       |       |       |
| Fish                                     |          | 4       | 7     | 9     | 3                | 4     | 27    | 27.6  |
| Livestock meat                           | 6        | 7       | 5     |       | 6                | 5     | 29    | 29.6  |
| Bushmeat                                 |          | 7       | 8     | 9     | 10               | 8     | 42    | 42.8  |
| Total                                    |          |         |       |       |                  |       |       | 100.0 |

**Bushmeatconsumption:**

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|       |    |    |    |    |    |    |       |
|-------|----|----|----|----|----|----|-------|
| Yes   | 21 | 15 | 18 | 13 | 19 | 86 | 86.0  |
| No    | 8  | 3  | 2  | 0  | 1  | 14 | 14.0  |
| Total |    |    |    |    |    |    | 100.0 |

**Times bushmeatis consumed:**

|              |   |   |    |   |   |    |       |
|--------------|---|---|----|---|---|----|-------|
| Weekly       | 4 | 7 | 3  | 5 | 8 | 27 | 27.8  |
| Fortnightly  | 0 | 1 | 0  | 3 | 0 | 4  | 4.1   |
| Monthly      | 3 | 6 | 0  | 5 | 5 | 19 | 19.6  |
| Occasionally | 7 | 9 | 10 | 5 | 6 | 37 | 38.1  |
| Never        | 0 | 4 | 3  | 0 | 3 | 10 | 10.3  |
| Total        |   |   |    |   |   |    | 100.0 |

**Bushmeat trade by respondents:**

|          |    |    |    |    |    |    |       |
|----------|----|----|----|----|----|----|-------|
| Active   | 12 | 10 | 14 | 8  | 13 | 57 | 59.4  |
| Inactive | 6  | 9  | 7  | 10 | 7  | 39 | 40.6  |
| Total    |    |    |    |    |    |    | 100.0 |

Source: Field Survey

From table 1 above, the study revealed that majority of the communities’ members were medium income (<49,000) earners (n=44; 46.8%). Also, the respondents highest feeding regime per day was twice (n=47; 49.0%), followed by feeding three times per day (n=40; 41.6%). Their main source of animal protein was from bushmeat (n=42; 42.8%). The respondents who claimed they consume bushmeat were higher (n=86; 86.0%) than those who claimed otherwise

(n=14; 14.0%). The times bushmeat was consumed were as follow in descending order: occasional consumption (n=37; 38.1%), weekly consumption (n=27; 27.8%), monthly consumption (n=19; 19.6%) and fortnight consumption (n=4; 4.1%). 59.4% (n=57) of the respondents claimed that bushmeat trade was active in the study area, while (n=39; 40.6%) opined that it was inactive.

**Table 2:** Species Hunting-Preference (due to economic value) in the Studied Communities

| Species                      | Common name                    | Frequency | Percentage (%) |
|------------------------------|--------------------------------|-----------|----------------|
| <b>Ifunkpa Community:</b>    |                                |           |                |
| <i>Tragelaphus scriptus</i>  | Bushbuck                       | 9         | 40.9           |
| <i>Philantomba monticola</i> | Blue Duiker                    | 5         | 22.7           |
| <i>Potamochoerus porcus</i>  | Red River-hog                  | 3         | 13.6           |
| <i>Cercopithecus spp.</i>    | Primates                       | 5         | 22.7           |
| <i>Atherurus africanus</i>   | African brush-tailed Porcupine | 9         | 40.9           |
| <b>Total</b>                 |                                | <b>22</b> | <b>100.0</b>   |
| <b>Ekuri Community:</b>      |                                |           |                |
| <i>Philantomba monticola</i> | Blue Duiker                    | 3         | 16.7           |
| <i>Potamochoerus porcus</i>  | Red River-hog                  | 5         | 27.8           |
| <i>Cephalophus ogilbyi</i>   | Ogilbyi’s Duiker               | 1         | 5.6            |
| <i>Atherurus africanus</i>   | African brush-tailed Porcupine | 7         | 38.9           |
| <i>Manias tricuspis</i>      | Pangolin                       | 2         | 11.1           |
| <b>Total</b>                 |                                | <b>18</b> | <b>100.0</b>   |
| <b>Esang Community:</b>      |                                |           |                |
| <i>Tragelaphus scriptus</i>  | Bushbuck                       | 3         | 13.6           |

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|                                |                                |           |              |
|--------------------------------|--------------------------------|-----------|--------------|
| <i>Cephalophus ogilbyi</i>     | Ogilbyi's Duiker               | 0         | 0.0          |
| <i>Potamochoerus porcus</i>    | Red River-hog                  | 4         | 18.2         |
| <i>Philantomba monticola</i>   | Blue Duiker                    | 2         | 9.1          |
| <i>Atherurus africanus</i>     | African brush-tailed Porcupine | 4         | 18.2         |
| <i>porcus</i>                  | Red River-hog                  | 2         | 9.1          |
|                                | Primates                       | 7         | 31.8         |
| <b>Total</b>                   |                                | <b>22</b> | <b>100.0</b> |
| <b>Aking/Osomba Community:</b> |                                |           |              |
| <i>Philantomba monticola</i>   | Blue Duiker                    | 3         | 15.0         |
| <i>Tragelaphus scriptus</i>    | Bushbuck                       | 2         | 10.0         |
| <i>Atherurus africanus</i>     | African brush-tailed Porcupine | 5         | 25.0         |
| <i>Potamochoerus porcus</i>    | Red River-hog                  | 3         | 15.0         |
| <i>Cercopithecus spp.</i>      | Primates                       | 5         | 25.0         |
| <i>Manias tricuspis</i>        | Pangolin                       | 2         | 10.0         |
| <b>Total</b>                   |                                | <b>20</b> | <b>100.0</b> |
| <b>Ekang Community:</b>        |                                |           |              |
| <i>Atherurus africanus</i>     | African brush-tailed Porcupine | 6         | 33.3         |
| <i>Tragelaphus scriptus</i>    | Bushbuck                       | 2         | 11.1         |
| <i>Philantomba monticola</i>   | Blue Duiker                    | 3         | 16.7         |
| <i>Potamochoerus porcus</i>    | Red River-hog                  | 2         | 11.1         |
| <i>Cercopithecus spp.</i>      | Primates                       | 5         | 27.8         |
| <b>Total</b>                   |                                | <b>18</b> | <b>100.0</b> |

Source: Field Survey, 2013

Table 3: Species Hunting-Preference (due to taste) in the Study Area

| Species                        | Common name                    | Total number hunted | Percentage (%) |
|--------------------------------|--------------------------------|---------------------|----------------|
| <b>Ifumkpa Community:</b>      |                                |                     |                |
| <i>Atherurus africanus</i>     | African brush-tailed Porcupine | 9                   | 23.7           |
| <i>Philantomba monticola</i>   | Blue Duiker                    | 5                   | 13.2           |
| <i>Cercopithecus spp.</i>      | Primates                       | 10                  | 26.3           |
| <i>Cephalophus ogilbyi</i>     | Ogilbyi's Duiker               | 2                   | 5.2            |
| <i>Tragelaphus scriptus</i>    | Bushbuck                       | 1                   | 2.6            |
| <i>Potamochoerus porcus</i>    | Red River-hog                  | 2                   | 5.2            |
| <i>Thryonomys swinderianus</i> | Grasscutter                    | 9                   | 23.7           |
| <b>Total</b>                   |                                | <b>38</b>           | <b>100.0</b>   |
| <b>Ekuri Community:</b>        |                                |                     |                |
| <i>Thryonomys swinderianus</i> | Grasscutter                    | 11                  | 52.4           |
| <i>Atherurus africanus</i>     | African brush-tailed Porcupine | 7                   | 33.3           |
| <i>Tragelaphus scriptus</i>    | Bushbuck                       | 0                   | 0.0            |
| <i>Philantomba monticola</i>   | Blue Duiker                    | 2                   | 9.5            |
| <i>Potamochoerus porcus</i>    | Red River-hog                  | 1                   | 4.8            |
| <b>Total</b>                   |                                | <b>21</b>           | <b>100.0</b>   |
| <b>Esang Community:</b>        |                                |                     |                |
| <i>Thryonomys swinderianus</i> | Grasscutter                    | 7                   | 50.0           |
| <i>Philantomba monticola</i>   | Blue Duiker                    | 0                   | 0.0            |
| <i>Atherurus africanus</i>     | African brush-tailed Porcupine | 3                   | 21.4           |
| <i>Potamochoerus porcus</i>    | Red River-hog                  | 4                   | 28.6           |

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|                                |                                |           |              |
|--------------------------------|--------------------------------|-----------|--------------|
| <b>Total</b>                   |                                | <b>14</b> | <b>100.0</b> |
| <b>Aking/Osomba Community:</b> |                                |           |              |
| <i>Atherurus africanus</i>     | African brush-tailed Porcupine | 3         | 15.8         |
| <i>Thryonomys swinderianus</i> | Grasscutter                    | 5         | 26.3         |
| <i>Tragelaphus scriptus</i>    | Bushbuck                       | 0         | 0.0          |
| <i>Philantomba monticola</i>   | Blue Duiker                    | 0         | 0.0          |
| <i>Manias tricuspis</i>        | Pangolin                       | 3         | 15.8         |
| <i>Cercopithecus spp.</i>      | Primates                       | 7         | 36.8         |
| <i>Cephalophus ogilbyi</i>     | Ogilbyi's Duiker               | 0         | 0.0          |
| <i>Potamochoerus porcus</i>    | Red River-hog                  | 1         | 5.3          |
| <b>Total</b>                   |                                | <b>19</b> | <b>100.0</b> |
| <b>Ekang Community:</b>        |                                |           |              |
| <i>Atherurus africanus</i>     | African brush-tailed Porcupine | 6         | 25.0         |
| <i>Philantomba monticola</i>   | Blue Duiker                    | 1         | 4.2          |
| <i>Cercopithecus spp.</i>      | Primates                       | 8         | 33.3         |
| <i>Manias tricuspis</i>        | Pangolin                       | 5         | 20.8         |
| <i>Potamochoerus porcus</i>    | Red River-hog                  | 0         | 0.0          |
| <i>Thryonomys swinderianus</i> | Grasscutter                    | 4         | 16.7         |
| <i>Tragelaphus scriptus</i>    | Bushbuck                       | 0         | 0.0          |
| <i>Cephalophus ogilbyi</i>     | Ogilbyi's Duiker               | 0         | 0.0          |
| <b>Total</b>                   |                                | <b>24</b> | <b>100.0</b> |

Source: Field Survey

Tables 2 and 3 revealed all the harvested wildlife species due to economic value and taste preference. Communities' members hunt some wildlife species giving preference to their economic value of how much they can get from the sale. Ekang community mostly hunted *Atherurus africanus* (n=6; 33.3%), followed by *Cercopithecus spp.* (n=5; 27.8%) as well as *Philantomba monticola* (n=3; 16.7%). The most hunted species for their economic value in other communities included: Aking/Osomba community- *Atherurus africanus* and *Cercopithecus spp.* (n=5; 25.0%), *Philantomba monticola* and *Potamochoerus porcus* (n=3; 15.0%). Esang community- *Cercopithecus spp.* (n=7; 31.8%), both *Potamochoerus porcus* and *Atherurus africanus* had the same number (n=4; 18.2%) while *Tragelaphus scriptus* had (n=3; 13.6%). Ekuri community- had these: *Atherurus africanus* (n=7; 38.9%), *Potamochoerus porcus* (n=5; 27.8%) and *Philantomba monticola* (n=3; 16.7%). Ifumkpa community- *Atherurus africanus* and *Tragelaphus scriptus* (n=9; 40.9%), *Potamochoerus porcus* and *Cercopithecus spp.* (n=5; 22.7%). However, at Ifumkpa community, the most hunted species due

to taste preference were *Cercopithecus spp.* (n=10; 26.3%), both *Atherurus africanus* and *Thryonomys swinderianus* had the same number (n=9; 23.7%) while *Philantomba monticola* had (n=5; 13.2%). Ekuri community had these: *Thryonomys swinderianus* (n=11; 52.4%), *Atherurus africanus* (n=7; 33.3%) and *Philantomba monticola* (n=2; 9.5%). While Esang community had- *Thryonomys swinderianus* (n=7; 50.0%), *Potamochoerus porcus* (n=4; 28.6%) and *Atherurus africanus* (n=3; 21.4%). Aking/Osomba community recorded the following species- *Cercopithecus spp.* (n=7; 36.8%), *Thryonomys swinderianus* (n=5; 26.3%), while both *Atherurus africanus* and *Manias tricuspis* were same (n=3; 15.8%). Ekanghad *Cercopithecus spp.* (n=8; 33.3%), *Atherurus africanus* (n=6; 25.0%) and *Manias tricuspis* (n=5; 20.8%).

**DISCUSSION:** The average income level among communities' members is low. Although, many local community members perceived hunting as non-money spinning, which makes them engage in other occupations for income generation, some believe that they have achieved

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a lot for their families through hunting and sale of bushmeat. This is further upheld by (Bowen-Jones *et al.* 2002) that bushmeat is considered as a delicacy in urban areas where people are willing to pay a premium for it, while in some areas, especially in the rural areas where they are derived, it is evident that bushmeat contributes little to the diet and more to their income (de Merode, 2004). Also, majority of the respondents feed twice per day. However, this opposes the work of (Obioha *et al.* 2012) which claimed that most of the people feed three times in a day. The respondents' main source of animal protein is from bushmeat. This further deviates from the findings of (Obioha *et al.* 2012) that fish is the major source of animal protein in the area, and closely followed by bushmeat. The respondents who claimed they consume bushmeat are higher than those who claimed otherwise. The work of Obioha *et al.* (2012) reveals that most of the people eat bushmeat. This is in consonance with the findings of this work. Furthermore, Obioha *et al.* (2012) also showed that weekly consumption of bushmeat was more than fortnight consumption. This is also in agreement to the findings of this study. Majority of the respondents claimed that bushmeat trade was active in the study area. Obioha *et al.* (2012) observed that since it is illegal to kill animals in any of the villages around the hills, it may equally be difficult to have an open market where bushmeat from the forest is sold; hence, the assumed inactive trade of bushmeat. One of the traditional Chiefs in the area and a Park Ranger coincidentally agreed that those who may be involved in the sale of bushmeat smuggle them to Calabar City, about 45 kilometres from the study area, due to the fear of arrest by the Forest Commission Law Enforcement agents; therefore, it is a highly secretive business that a family cannot depend on as a major source of income.

Worldwide, one of the greatest threats to persistence of vertebrates in tropical rain forests is unsustainable hunting (Milner-Gulland and Bennet, 2003). Unsustainable hunting is of special concern in the tropical rain forests of west and central Africa, where most of the two-third inhabitants rely on wild animals for protein

(Wilkie, 1999). The number of animals harvested has risen throughout west and central Africa as growing and increasingly sedentary human populations have adopted more efficient hunting techniques, such as wire snares and shotguns and increased their participation in market economies (Fa and Brown, 2009). In this study, two reasons wildlife resources are hunted and harvested were: first, for the economic value (how much can individual species fetch in the market) and second, for the taste preference (consumption). Pangolin is threatened in the study area and in all its range. The reason is not farfetched as observed by (Mahmood *et al.* 2015) that their meat is considered a delicacy and pangolin scales are used in traditional medicine and folk remedies to treat a range of ailments from asthma to rheumatism and arthritis.

**CONCLUSION:** Protecting wildlife resources in the study area should be through poverty alleviation and establishment of different alternatives to animal protein which predisposes the local dwellers to indiscriminate bushmeat harvesting in the study area. The study is relevant in that it raises the consciousness of the local communities as well as the government of Nigeria and the international community on the hunting species preferences of the locals and the need to protect wildlife especially the threatened species within the Oban Hills Sector of Cross River National Park.

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