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Bushmeat Utilization in Oban Sector of Cross River National Park: A 'Biodiversity Palaver'

Sunday Adedoyin, Saka Jimoh and James Omifolaji

Additional information is available at the end of the chapter

Abstract

This chapter examines the ecological effects of bushmeat extraction activities/methods and utilization of wildlife resources in the study area. It also highlights the perception of rural dwellers on the abundance of wildlife resources in the past 10 years as well as suggesting solution to this impending danger of depletion. Two different methods were used. The first method being stratified sampling method was used to investigate the activities involved in the extraction and utilization of wildlife resources, while the other method used a questionnaire to investigate the local people's perceptions on the abundance of wildlife resources. Results showed that gunshots were the most used (32.4%) of all the methods of extracting bushmeat in the study area, followed by the use of snares (25.5%). However, 86% ($n = 86$) of the respondents admitted that they consume bushmeat, while only 14% ($n = 14$) claimed otherwise. Buying bushmeat from markets and hunters ranked highest 55% ($n = 33$) among the methods of getting bushmeat in the study area, followed by the method of indirect hunting 30% ($n = 18$). Respondents claimed that bushmeat was occasionally consumed 38.1% ($n = 37$). Furthermore, 88% ($n = 86$) of the respondents agreed that there has been drastic change, while only about 12% ($n = 12$) objected to the marked difference in wildlife abundance in the park in the last 10 years. Note that 53% ($n = 49$) of the respondents agreed that wildlife resources in the study area have been depleted. The perception of the communities' members on the establishment of community-based wildlife management program in the area is significant (0.013*) at 0.05 level. The study revealed high level of hunting activities resulting from the use of unsustainable hunting methods, high demand for bushmeat, and lack of capacity to control hunting in the park. Lack of adequate attention to the role of bushmeat utilization as an important contributor of local livelihoods by development agencies, nongovernmental and intergovernmental organizations, and national governments contributes to the unsustainable hunting of bushmeat in tropical forests. Finally, to achieve the levels of protection necessary, habitat preservation therefore remains the key criterion for any conservation program, for without sufficient quantity and quality of habitat there will be no viable wildlife population to protect.

Keywords: biodiversity, national parks, conservation, bushmeat, hunting

1. Introduction

Forest-living people have few alternative sources of protein and income than bushmeat [1–3]. Thus, hunting of wildlife may be locally intense, and may threaten the entire populations or even species [4]. Over 160 species are endangered in West-Central Africa [5]. Uncontrolled hunting practices are only pushing these species closer to extinction. Overhunting caused the recent extinction of Miss Waldron's red colobus monkey. Several other primate species are soon to follow [6]. Up to date, it is not known exactly how many species have been eradicated and gone into extirpations due to excessive and uncontrolled hunting. However, it is evident that many species will become extinct if hunting pressures continue at their current level.

Nonetheless, the intensity of bushmeat exploitation may fluctuate even locally due to eventual perturbating events: for instance, the spreading of Ebola virus was accomplished by a considerable reduction of bushmeat consumption in West Africa [7]. High bushmeat demand has been recorded for west and central African countries (Liberia [8], Ivory Coast [9], Ghana [10, 11], Cameroon [12], and Gabon [13, 14]) and for the Congo Basin as a whole (e.g. [15–18]). Previous studies have demonstrated that bushmeat consumption is an integral part of the livelihood, both as protein requirement and important source of supplementary income, but it is also of a major sociocultural importance [19]. Overexploitation of various species has been found to be the key reason for forest wildlife declines in Africa [20]. Exploitation as a phenomenon is noted to be on the increase as a result of growing human populations, improved access to undisturbed forests, changes in hunting technology, and scarcity of alternative protein sources [21–23]. Fa et al. [24] subsequently enunciated that bushmeat depletion in the Congo Basin in real existence and supply may lead to 81% drop in less than 50 years, if the current rates of harvest continue, which may further aggravate the dramatic increase in protein malnutrition. It is therefore noteworthy to submit that overexploitation and utilization of wildlife for bushmeat and protein sources in West and Central Africa is a serious palaver which can degenerate to local, national, or worldwide extinctions of targeted species, with saddening ecological and economic consequences. Sustaining different species of wildlife both for future economic and social reasons therefore becomes a vital point of direction if the stability in the ecological system must be sustained.

The Oban hills forest area of Cross River in Nigeria is a very important conservation region with unique biodiversity, with many endangered species being confined to this region. While bushmeat trade and marketing have already been subject to research, the extent to which wildlife resources and bushmeat utilization and extraction as well as the effects on the stability of the ecosystem is yet to be substantiated. This work specifically examined the ecological effects of bushmeat extraction and utilization of wildlife resources on the stability of the ecosystem. It also highlighted the perception of rural dwellers on the abundance (increasing or dwindling) of wildlife resources for the past decades when compared to the present time as well as suggesting solution to this impending danger.

2. 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 was created by Act

Nos. 36 and 46 of 1991 and 46 of 1999, respectively. It covers an area of approximately 4000 km^2 and consists of two divisions: *Oban* in the south (3000 km^2) and *Okwangwo* in the north (approximately 1000 km^2). The *Oban* Division is centered on coordinates 5^{0}25′0″N 8^{0}35′0″E. CRNP is of international importance because of its unique biodiversity and species richness and endemism [25].

The study was carried out at the Oban Hill Sector. 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 collection 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* Hill area is inhabited pre-dominantly by the *Ejagham* tribe with a few *Ibibio*, *Efiks*, *Calabaris*, and *Ibos*. The following are the villages where this study was carried out: *Aking/Osomba*, *Ifumkpa*, *Ekuri*, *Esang*, and *Ekang*. 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 to more than 1000 m above sea level. Annual rainfall is estimated to range between 2500 and 3000 mm. The park is under the control of the Federal Government of Nigeria with a legal instrument promul-gated through Decree No. 46 of 1991 (Act No. 46 of 1991) in the Laws of the Federal Republic of Nigeria. The flora and fauna composition of the Oban hill sector have been described by Schmidt [26], who identified 1303 species of plants, 141 lichens, and 56 mosses, 77 of which are endemic to Nigeria. Fauna biodiversity included 134 mammals, 318 birds, 42 snakes, and over 1266 butterflies. The vegetation of the Oban Sector is dominated by tropical rainfor-est at various stages. There are closed canopy, open canopy secondary vegetation, farm fal-lows, 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.

3. Methods of data collection and analysis

Two different methods were used. The first method was used to investigate the activities involved in the extraction and utilization of wildlife resources while the other method (the use of questionnaire) was used to investigate the local people's perceptions on the abundance of wildlife resources. Oban Sector of Cross River National Park is divided into two (west and east) ranges. Five villages were purposively selected from these two ranges within the Oban Sector–Aking/Osomba (05°25'67″N, 08°38'10″E), Ekang/Esang (05°40'00″N, 08°49'00″E), Ekuri (05°21'25″N, 08°26'24″E), and Ifumkpa (05°31'56″7N, 008°17'30″4E) based on their proximity and being on the periphery of the park. Eight transects of 2 km each were laid in each of the four land-use types (core, buffer, farm fallow, and plantation) in the study locations at 1000 m intervals using a stratified sampling techniques and placed 2000 m apart to avoid ani-mals from being detected on two neighboring transects with effective study area of 64 km^2

[27, 28]. The transects were modified as recommended by Buckland et al. [27] and were traversed for 40 consecutive times to allow for more encounters of activities of wildlife resources extraction and utilization including spent cartridges, match box, used carbide, wire snares, traps, hunting camps, hunters encountered, and gunshots heard within 10 m of both sides of the transects were recorded. Spent cartridges found were collected but wire snares were destroyed. Purposive (judgment) sampling was used as the second method to select a sample of the local respondents and study communities [29]. Purposive sampling was used due to the proximity of these villages to the park. A total number of 100 respondents from the selected villages (Aking, Ekang, Esang, Ekuri, and Ifumkpa) 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 designed to evaluate the perceptions of local people toward wildlife resources abundance within the study area. Education and demographic information, including gender and age, were obtained from each respondent. All interviews were conducted by a research assistant who was the Assistant Range Head. Oral interviews were carried out during the day in the local language (*Ejagham and Efik*) and/or English. The average total response time was approximately 15–25 min. 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 nongovernmental organizations, and staff of Cross River State Forestry Commission and leaders of the community.

4. Data analysis

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). 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%. Pearson moment correlation coefficient and descriptive statistics were also used.

5. Result presentation

Data were generated from five locations–Ifumkpa community 22 (22%), Ekuri community 19 (19%), Esang community 22 (22%), Aking/Osomba community 18 (18%), and Ekang community 19 (19%). The sample comprised of 73 males (73%) and 27 females (27%). About 32% ($n = 32$) of the respondents were <30 years, 54% ($n = 54$) were between 41 and 50 years, whereas 14% ($n = 14$) were older than 51 years. Forty-seven percent ($n = 44$) of the respondents had secondary education, 39.4% ($n = 37$) had primary education, 7.4% ($n = 7$) had NCE/OND education, 4.3% ($n = 4$) were illiterate, whereas 1% ($n = 1$) was neither educated nor illiterate.

The study revealed that 44 (47.0%) of the respondents are principally secondary school certificate holders, 37 (39.4%) are primary school leaving certificate holders, while 7 (7.4%) of the total respondents are diploma and teacher certificate holders while 1 (1.1%) of the respondents are first degree holders. Also, 4 (4.3%) of the respondents do not have formal education.

From **Table 2** it can be seen that gunshots were the most used (32.4%) of all the methods of extracting bushmeat in the study area. This was followed by the use of snares (25.5%). Other activities of extraction include hunters' trails (12.8%), hunters' camps (2.9%), and spent cartridges found (19.5%).

From **Table 3** it can be seen that 86% (n = 86) of the respondents admitted that they consume bushmeat, while only 14% (n = 14) claimed otherwise. Buying bushmeat from markets and hunters ranked highest 55% (n = 33) among the methods of getting bushmeat in the study area, followed by method of indirect hunting 30% (n = 18), which include wire snares, traps, and animal pitfalls. Other methods were through direct hunting 13.3% (n = 8) and as gift 1.7% (n = 1). The respondents claimed that bushmeat is occasionally consumed 38.1% (n = 37) in the study area, which is the highest rate of utilization/consumption. This is followed by weekly utilization/consumption 27.8% (n = 27) of bushmeat while the least utilization rate of bushmeat is fortnightly 4.1% (n = 4).

Figure 2a shows that 88% (n = 86) of the respondents agreed that there has been drastic change while only about 12% (n = 12) objected to the marked difference in wildlife abundance in the park in the last 10 years.

Figure 2b shows that 53% (n = 49) of the respondents agreed that wildlife resources in the study area has been depleted. Note that 36% (n = 33) of the respondents opined that wildlife resources are low while only 11% (10) claimed that there is still high abundance of wildlife resources in the study area.

Table 4 shows the relationship between the communities' members' perception on status of wildlife resources in the study area and the establishment of community-based wildlife management program in the area. The result shows that both variables are significant at 0.05 level (2-tailed).

6. Discussion

6.1. Demographic characteristics of respondents

Table 1 shows that young people participated more (86.0%). It also shows that majority (68.0%) of the respondents have their abode near the forest meaning that they do not have to trek much before getting into the park. This nearness then shows the peoples' dependence on the park resources. However, the result indicated that majority (73.0%) of the respondents are male (**Table 1**). **Figure 1** reveals the educational background of the respondents. Most of the respondents (47.0%) were secondary school leavers, followed by primary school leavers (39.4%). This shows that education influences their attitude and perception toward wildlife resources utilization *vis-a-vis* conservation program. This is further supported by Refs. [31, 32] that local people's knowledge about natural resources conservation are influenced by education and awareness programs, and services and benefits local people receive from conservation-related projects.

S/N	Variable	Frequency	%
1	**Location**		
	Ifumkpa	22	22.0
	Ekuri	19	19.0
	Esang	22	22.0
	Aking/Osomba	18	18.0
	Ekang	19	19.0
	Total	100	100.0
2	**Gender**		
	Male	73	73.0
	Female	27	27.0
	Total	100	100.0
3	**Age**		
	Less than 30 years	32	32.0
	41–50 years	54	54.0
	51 years and above	14	14.0
	Total	100	100.0
4	**Distance of house to the forest**		
	Near	66	68.0
	Far	31	32.0
	Total	97	100.0

Field Survey, 2013

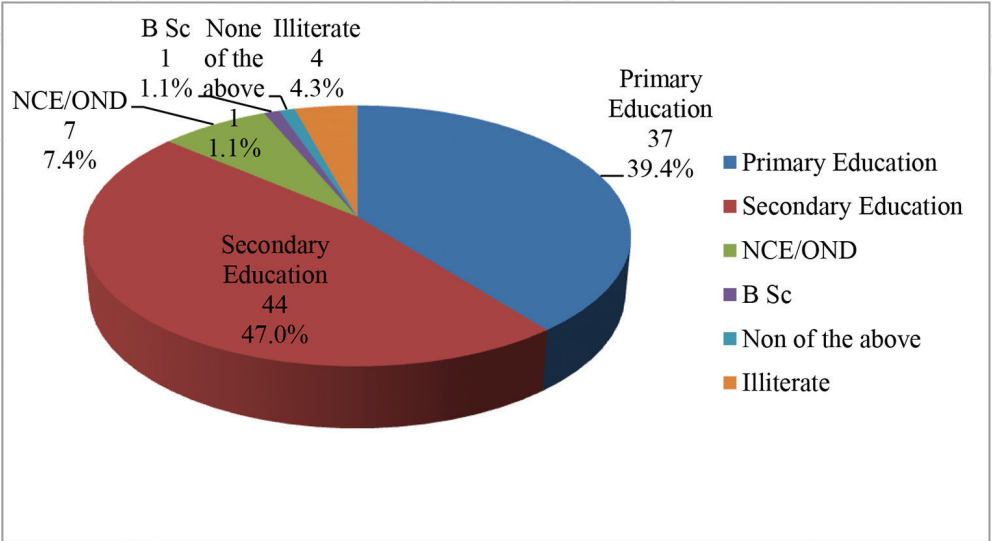**Table 1.** Demographic characteristics of respondents.

Figure 1. Educational level of respondents. Source: Field Survey, 2013.

6.2. Bushmeat extraction activities/methods in the different land-use within the study area

A total of 26 (25.5%) wire snares, 20 (19.5%) spent cartridges, 7 (6.9%) hunters encountered, 33 (32.4%) gunshots, 3 (2.9%) hunters' camps, and 13 (12.8%) were recorded for a total of 64 km of transects walked (**Table 2**). The most pronounced of all the bushmeat extraction activities was the use of guns (32.4%). The next being wire snares (19.5%). Most of the hunters set their wire snares in the rainy season. This is due to poor and very little visibility. Traps were monitored and checked between 2 and 3 days by those who set them, who were indigenes of the selected support zone communities around Cross River National Park villages. The rationale behind checking traps between 2 and 3 days was to reduce the time being invested into the traps checking, especially when quite a number of traps are set. Trap/wire snare setting is rampant during the rainy season. This is because there is less time to consummate hunting expedition. The equipment currently used by communal hunters is unsuitable for rational utilization of wildlife because it does not permit selective hunting. Communal hunters sell part of their bag at moderate prices to intermediaries who in turn supply markets, restaurants, and consumers in both rural and urban areas [33].

Bush-meat extraction activities/methods	Land-use					
	Close canopy	Secondary forest	Farm fallow	Plantation	Total	Percentage
Wire snare	9	1	15	1	26	25.5
Spent cartridges	9	4	7	0	20	19.5
Hunters encounter rate	2	0	5	0	7	6.9
Gunshots heard/guns	15	3	15	0	33	32.4
Number of hunters camp	3	0	0	0	3	2.9
Number of hunting trails	10	3	0	0	13	12.8
Total	**48**	**11**	**42**	**1**	**102**	**100.0**
Adapted from Ref. [30].						

Table 2. Bushmeat extraction activities/methods in the different land-use within the study area.

6.3. The rate of utilization and consumption of bushmeat within the study area

Table 3 shows that 86% (n = 86) of the respondents admitted that they consume bushmeat, while only 14% (n = 14) claimed otherwise. Buying bushmeat from markets and hunters ranked highest 55% (n = 33) among the methods of getting bushmeat in the study area, followed by method of indirect hunting 30% (n = 18), which include wire snares, traps, and animal pitfalls. Other methods were through direct hunting 13.3% (n = 8) and as gift 1.7% (n = 1). The respondents claimed that bushmeat is occasionally consumed 38.1% (n = 37) in the study area, which is the highest rate of utilization/consumption. This is followed by weekly utilization/consumption 27.8% (n = 27) of bushmeat while the least utilization rate of bushmeat is fortnightly 4.1% (n = 4). Most household members claimed that bushmeat is significantly more delicious compared to the domesticated animals. Observations revealed that though hunting is not the major work of most communities' members, but the bushmeat from the games compliment the household nutrition sources. It is the most important source of protein for many families. However, for the household health purposes, some of the body

S/N	Variable	Frequency	%
1	**Bushmeat consumption**		
	Yes	86	86.0
	No	14	14.0
	Total	**100**	**100.0**
2	**Methods of extracting wildlife resources (bush-meat)**		
	Direct hunting	8	13.3
	Indirect hunting	18	30.0
	Buying	33	55.0
	Gift	1	1.7
	Total	**60**	**100.0**
3	**Utilization/consumption rate of bushmeat by the locals**		
	Weekly	27	27.8
	Fortnight	4	4.1
	Monthly	19	19.6
	Occasionally	37	38.1
	Never	10	10.3
	Total	**97**	**100.0**

Field Survey, 2013.

Table 3. The rate of utilization and extraction of bushmeat within the study area .

parts of the hunted animals are useful in preparation of medicinal concoctions. For instance, elephant faces and python fat are medicinal. The fat and oil of python is used as pain reliever and soothing ban, although it is also believed to be harmful and injurious to humans when swallowed. Some animal parts are also significantly important in the traditional sacrifices during healing exercise by the traditional healer. Ref. [34] recorded 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 [35]. Ref. [24] further asserted that the local community members perceive bushmeat as a source of long-term livelihood benefits, hence the uncontrolled and indiscriminate extraction/utilization of wildlife resources in the study study area (**Plate 1** and **Plate 2**). Other hunted wildlife species (according to personal interview with some hunters and communities' members) include the Primates (*Cercopithecus spp*), Drill (*Mandrillus leucophaeus*), *Bushbuck* (*Tragelaphus scriptus*), Pangolin (*Manis tetradactyla*), Red river hog (*Potamochoerus porcus*), and *Grasscutter* (*Thyronomys swinderianus*).

Figure 2a shows that 88% (*n* = 86) of the respondents agreed that there has been drastic change while only about 12% (*n* = 12) objected to the marked difference in wildlife abundance in the park in the last 10 years. This finding is in consonance with Jimoh et al.'s [36] submission that only two species of duiker species remain in the Oban Sector of Cross River National Park

Plate 1. Exhibits of *Atherurus africanus* (African brush-tailed Porcupine) and other animal species. Source: Field Survey, 2013.

Plate 2. Exhibits of *Philantomba* monticola (female blue duiker). Source: Field Survey, 2013.

which were the blue and the Ogilby's duiker. Two other large duiker species known to exist (bay and yellow-backed duikers) were not represented. Absence of these two species suggests that the species might be locally extinct, because other studies [37–39] in the area also recorded only blue and Ogilby's duikers. This is just picking duiker species for instance. The change in wildlife status and population is a menace that needs to be stemmed. Furthermore, **Figure 2b** shows that 53% ($n = 49$) of the respondents agreed that wildlife resources in the study area has been depleted. Note that 36% ($n = 33$) of the respondents opined that wildlife resources are low while only 11% (10) claimed that there is still high abundance of wildlife resources in the study area. Whichever stance the communities' members have toward wildlife population in the study area, there is depletion of wildlife resources in the study site. In consonance with the foregoing, Ref. [40] found in Ipassa Reserve, Gabon that one (bay duiker) out of the three duiker species was being locally depleted. Refs. [41, 42] in their separate studies in Udzungwa Mountains, a protected area in Tanzanian, also reported that the Abbott duiker, though previously recorded, was no longer found in the area. This is a further evidence of wildlife population depletion in Africa [43–45].
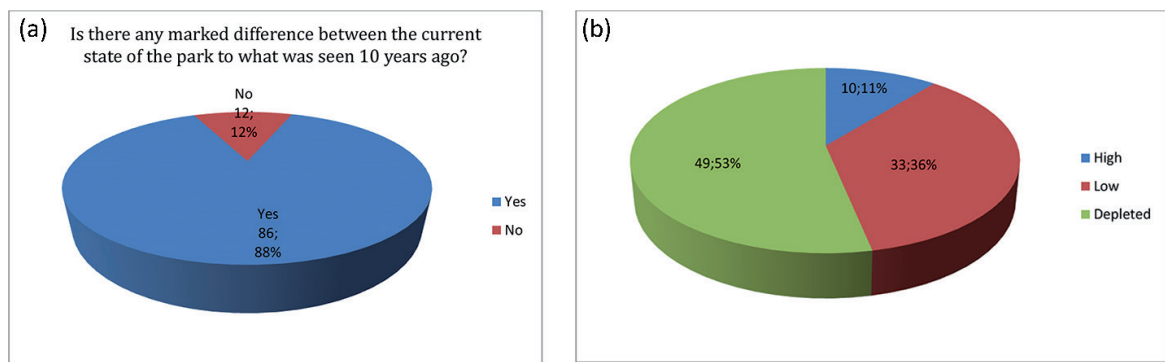

Figure 2. (a) Extent of damage done on fauna resources (bush-meat) by the local people. (b) Categories of change in wildlife resources abundance (status) in the study area. Source: Field Survey, 2013.

6.4. Perceptions of communities' members on status of wildlife and establishment of community-based wildlife management (CBWM)

Table 4 shows the relationship between the communities' members' perception on status of wildlife resources in the study area and the establishment of community-based wildlife management program in the area. The result shows that both variables are significant at 0.05 levels (2-tailed). The communities' members are aware of the dwindling population status of wildlife resources in the study area. This therefore means that for the status of wildlife to stabilize and improve, there is need to have the establishment of community-based management of wildlife resources. According to Roe [46], community wildlife management is a strategy that is based on the assumption that it is possible to improve rural livelihoods, conserve the environment, and promote economic growth. Thus, effective wildlife management models need to be developed to secure bushmeat as resource and make it available for future generations. While wildlife resources in some countries in Africa is communally owned, in most countries, wildlife is a state property and hunting is often illegal, leading to

a situation of low ownership and nonrecognition of user rights by the communities and even criminalization of use in the extreme cases. In order to address this situation, many countries are seeking ways to devolve and cede user rights to communities to create an incentive to invest in the long-term sustainable use of resources [47] in the form of community wildlife management arrangement.

		Perception of communities' members
Perception of communities' members	Pearson correlation	1
	N	70
Wildlife status in the study area	Wildlife status in the study area Pearson correlation	0.760
	Sig. (2-tailed)	0.021[*]
	N	38
Establishment of CBWM program	Establishment of CBWM program Pearson correlation	0.864
	Sig. (2-tailed)	0.013[*]
	N	67

[*]Correlation is significant at the 0.05 level (2-tailed).
Field Survey, 2013.

Table 4. Relationship between the perceptions of communities' members on status of wildlife and est.

7. Conclusion

Given the different positions on bushmeat extraction activities/methods, rate of utilization/consumption of bushmeat, indiscriminate killing of bushmeat, and perception of communities' members on establishment of community-based wildlife management, the study indicated high level of hunting activities resulting from the use of unsustainable hunting methods, high demand for bushmeat, and lack of capacity to control hunting in the park. Large mammals are especially exposed and become easy targets for hunters. Changes in traditional hunting practices through the use of improved hunting technology have decreased the likelihood that hunting will be sustainable. Therefore, protecting wildlife through protected area systems and development of biodiversity and corridors is the method which has the greatest potential to address global concerns regarding wildlife populations in the Oban Sector of Cross River National Park and West Africa at large. Alternatively, sport hunting and ecological tourism could serve as potent weapon in arresting the downward slide of wildlife resources in the park. To be truly effective, these kinds of efforts would have to be done in full collaboration with local communities, addressing issues of access and user rights, enforcement concerns, and lack of adequate data on population dynamics. Finally, to achieve the levels of protection necessary, habitat preservation therefore remains the key criterion for any conservation program, for without sufficient quantity and quality of habitat there will be no viable wildlife population to protect.

Acknowledgements

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