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EFFECTIVE PROTECTION AGAINST ANTHROPOGENIC ACTIVITIES OF LAND ADJACENT OLD OYO NATIONAL PARK, NIGERIA

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ABSTRACT

The study examined some uncontrolled anthropogenic activities around land adjacent Old Oyo National Park (OONP), Nigeria and suggested measures for its effective management. Proportionate stratified random sampling design was used to select respondents. Data were collected using a combination of structured and open-ended questionnaire as well as participatory methods: Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal Technique (PRAT) at 10% sampling intensity. All generated data were subjected to calculations, descriptive statistics, Pearson's correlation and ANOVA analyses. Pearson correlation results revealed that farming activities were significant (P<0.01). ANOVA of all farming activities was significant at (P<0.05). Hunting activities were significant at (P<0.01). ANOVA of all hunting activities was significant at (P<0.05). The use of fire was significant (P<0.01). Based on the established uncontrolled anthropogenic activities in the study area, there is need to effectively manage the buffer zone of Old Oyo National Park to control human activities within its adjacent land.

Keywords: Buffer zone, Anthropogenic activities, Management, Old Oyo National Park,

INTRODUCTION

The buffer zones are intended to serve direct ecological purposes such as the minimization of the effects of landscape fragmentation and core area diminishment and isolation. Buffer zones aim at controlling human activities within the lands adjacent to a core area by promoting sound management, thus decreasing the potential impacts and diminishing effects of small size. The presence of indigenous people is implicitly permitted within the buffer zones. This is to encourage minimal economic activities and sense of belonging; otherwise the buffer zones would be a totally protected area. What degree of human intervention or activity is then tolerated within a buffer zone? Experience suggests that the success or failure of buffer zones is correlated with the efficiency and ability of reserve planning and zoning in estimating the carrying capacities of the different zones (core areas + buffer zones). The current approach in buffer zone design tends to accept them as areas where a plan of land-use regulations is applied rather than as clearly defined areas that could have legal protection.

A buffer area addresses a specific need for a particular site with particular conservation objectives. Buffer areas may address a number of specific needs. Each buffer area may also contribute to other needs. The best practice is to encourage the management of buffer areas such that they do contribute to other purposes as far as it is feasible given their primary function. The following major management functions for buffer zones can be enumerated: accomplishment of area requirements, correcting the shape of the core area (in order to: minimize the exposed perimeter to outside effects and conserve internal resources more efficiently; facilitate interactions with adjacent

ecosystems and with more distant portions of the landscape and correct the orientation of the long axis of the core relative to flows- such as wind, water, nutrient, and individuals in the landscape), support the direct site management, management of factors that directly affect the ecological conditions on the site, immediate protection purposes, protecting traditional land-use and deflecting threats, mitigation purposes and as an area set aside for manipulative research (Saunders *et al*., 1991).

A buffer zone is an area lying between two or more other protected land area and serving to reduce the possibility of damaging interactions between them (Cunningham, 1996). Nature conservationists distinguish two different ways of approaching the buffer zone issue. For the 'hard-core' conservationists, the buffer zone serves only to avoid negative human impact on the core area. The socio-conservationists see the buffer zone as part of the socio-economic development of the entire area comprising conservation and non-conservation sub-areas. From the conservation point of view, Wind and Prins (1989) reported that buffer zones are areas outside the protected area that are designed to protect parks. While Sayer (1991) defined buffer zone as a zone, peripheral to a national park or equivalent reserve, where restrictions are placed upon resource use or special development measures are undertaken to enhance the conservation value of the area. From the conservation and communities point of view, Wild and Mutebi (1996) defined buffer zone as any area, often peripheral to a protected area, inside or outside, in which activities are implemented or the area managed with the aim of enhancing the positive and reducing the negative impacts of conservation on neighbouring communities on conservation.

The natural environment is still being destroyed at an alarming rate, all over the globe. There is increasing amounts of energy and money invested to arrest this spiral of degradation. In many of the conservation programmes and projects, the zoning principle is applied in order to allow protection to be combined with human use, whereby important areas (often conservation areas and core zones) are surrounded by so-called buffer zones. Buffer zone surrounding Old Oyo National Park (OONP) is under-managed. The defects in its management have led to its loss of status as mildly protected area where a plan of land-use regulations is applied rather than as free area where there is very little or no form of protection. This study therefore highlighted some uncontrolled anthropogenic activities around land adjacent Old Oyo National Park and suggested measures for its effective management.

Data Collection and Analyses

Proportionate stratified (ward by ward) random sampling design was used to select respondents in the course of this study. To remove bias, the selection of respondents cut across such variables as religion, age, occupation, income, ethnicity, educational attainment, nativity, family size and size of farmland. Data were collected using a combination of structured and open-ended questionnaire as well as participatory methods: Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal Technique (PRAT). A minimum of 10% sampling intensity was used in selecting respondents around the Park, which were also randomly selected. The questionnaire was designed to obtain information on socio-economic, anthropogenic activities and livelihood of the support-zone dwellers. The surveyed support-zone communities are shown in figure 1, blow.

Data Analysis

All data collected were subjected to frequencies, percentages, correlation and Analysis of variance (ANOVA) at $P<0.01$ and $P<0.05$.

MATERIALS AND METHOD

Study Area

Old Oyo National Park (OONP) derives its name from the ruins of Oyo-Ile, (Old Oyo) the ancient political capital of Yoruba Empire. The abundance of cultural features in and outside the Park with a combination of ecological and biodiversity sites places the Park in a very unique and advantageous position as a potential tourism destination. The historical sites can be visited from a number of short distant towns including Igbeti, Igboho, Kishi, Sepeteri, etc. OONP is located in the sparsely populated area of Irepo, Olorunsogo, Orelope, Atisbo, Iseyin, Oyo West, Orire, Atiba, Itesiwaju, Shaki East Local Government Areas in Oyo State and Kaima in Kwara State. The Park has a total land mass of 2512 km^2 (making it the fourth largest national park in Nigeria) and is located in the South Western part of Nigeria, specifically Northern part of Oyo State. OONP is geographically located between

latitudes 8°15' and 9°.00'N of the equator and longitudes 3°35' and 4°42'E of the Greenwich meridian. Old Oyo National Park (OONP) is considered as a mixed heritage site with outstanding natural and cultural values that if explored could serve as basis for its enlistment on the UNESCO world heritage list as the first mixed heritage site in Nigeria (Oladeji, 2012).

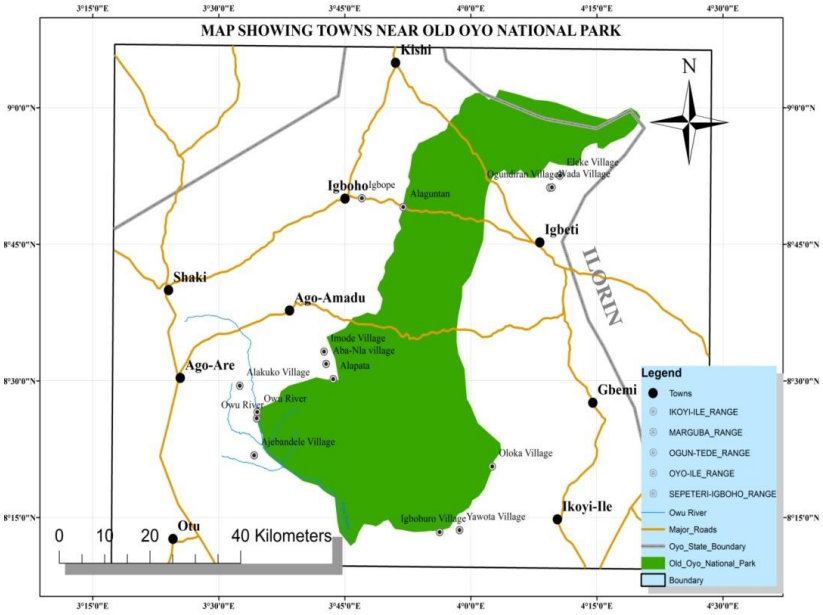

Figure 1: Map of Old Oyo National Park showing the surveyed buffer zone villages
Source: Field Survey, 2016 and 2017

RESULTS

A total of three hundred and twenty-eight (328) were administered to randomly selected households in the purposively selected communities in which three hundred (300) were retrieved: Ajebandele (33; 30), Alakuko (30; 30), Imodi (23; 20), Aba-Nla (23; 20), Alapata (21; 20), Igbope (35; 30), Alaguntan (33; 30), Ogundiran (25; 20), Alada (20; 20), Eleke (22; 20), Oloka (22; 20), Igboburo (20; 20) and Yawota (21; 20) as shown in table 1 below..

Table 1: Distribution of respondents within the Buffer zone of OONP, Nigeria

Ranges	Buffer zone villages	No of respondents based on 10% sampling intensity
Ogun-Tede	Ajebandele	33
	Alakuko	30
Marguba	Imodi	23
	Aba-Nla	23
	Alapata	21
Sepeteri-Igboho	Igbope	35
	Alaguntan	33
Oyo-Ile	Ogundiran	25
	Alada	20
	Eleke	22
Ikoyi-Ile	Oloka	22
	Igboburo	20
	Yawota	21
Total		**328**

The results showed that the maximum age of respondent was 78 years, while the minimum age was 20 years with the mean age of 44. Maximum family size was 20, maximum distance from farm to home and vice-versa was 11000m and maximum length of stay in the village was 78 years. The results also revealed that the maximum annual income was 3.5 Million Naira with the mean annual income being 493,623.33±27,344.32 (NGN), while maximum farm size was 100 hectares with the mean farm size of 22.66±1.25 (Table 2).

Table 2: General demographic and socio-economic information of the respondents

Variables	Minimum value	Maximum value	Mean±S.E
Age (years)	20.00	78.00	44.69±0.62
Family size	0.00	20.00	6.14±0.16
Distance of farm to home (m)	0.00	11000.00	2017.86±85.67
Length of stay in village (yrs)	0.00	78.00	25.56±0.90
Income estimate/year (NGN)	1000.00	3500000.00	493623.33±27344.32
Farm size estimate (ha)	1.00	100.00	22.66±1.25

Source: Field Survey, 2016 and 2017

The results in table 3 revealed that many of the respondents (200; 66.7%) had their farms 3000m away from the park boundary. Also, land acquisition in the study area was basically communal (139, 46.3%) and inheritance (123, 41.0%). Land-use system in the area was mainly on agriculture (181; 60.3%). The commonly used methods for farm clearing were the combination of manual labour and tractor (126; 42.0%) and the use of manual labour only (90; 30.0%).

Table 4 showed that hunting was mainly done (87; 29.0%) at a distance of 2000m away from the park boundary. Traps were the main (50; 16.7%) hunting equipment used in the study area, followed by the use of traps and guns (36; 12.0%) and guns only (19; 6.3%). Hunting was mostly done (93; 31.0%) in both wet and dry seasons. The kill was mainly consumed (67; 22.3%) while it could be sold and consumed had (49; 16.3%). Hunting was mainly done (42; 14.0%) on weekly and fortnightly bases.

In table 5above, the results revealed that many of the respondents (238; 79.3%) set fire and some of the reasons for this were for farmland clearing (166; 55.3%), for farm regeneration (25; 8.3%) and regeneration as well as demarcation of farm boundaries (22; 7.3%). The distance where fire was usually set to park boundary was above 4000m (133; 44.3%), 2000m (62; 20.7%) and 3000m (12; 4.0%). Many of the respondents claimed that fire was usually set once a year (166; 34.0%), while the most preferred season for setting fire was said to be late dry season (94; 31.3%), followed by early raining season (79; 26.3%) and early dry season (46; 15.3%).

Table 3: Respondents information on their livelihood (farming)

Variables	Frequency	Percentage (%)
Farm distance to the park boundary:		
Less than 500m	33	11.00
1000m	9	3.00
2000m	5	1.70
3000m	200	66.70
Above 4000m	30	10.00
No response	23	7.70
Total	**300**	**100.00**
System of land acquisition		
Communal	139	46.30
Inheritance	123	41.00
Private (Leasing/rentage)	15	5.00
No response	23	7.70
Total	**300**	**100.00**
System of land-use		
Agro-forestry	11	3.70
Agro-pastoralism	21	7.00
Pastoralism	9	3.00
Agriculture	181	60.30
Taungya	11	3.70
No response	67	22.30
Total	**300**	**100.00**
Farm clearing methods		
Bush burning	2	0.70
Manual labour	90	30.00
Tractors	6	2.00
Bush burning and manual labour	5	1.70
Bush burning and tractor	15	5.00
Manual labour and tractor	126	42.00
Bush burning, manual labour and tractor	30	10.00
No response	26	8.70
Total	**300**	**100.00**

Source: Field Survey, 2016 and 2017

Table 4: Respondents information on their livelihood (hunting)

Variables	Frequency	Percentage (%)
Distance of hunting area to park boundaries		
Less than 500m	1	0.30
1000m	1	0.30
2000m	87	29.00
3000m	6	2.00
4000m	10	3.30
Above 4000m	12	4.00
No response	183	61.00
Total	**300**	**100.00**
Equipment used for hunting		
Traps	50	16.70
Guns	19	6.30
Traps and guns	36	12.00
Traps, guns, knives and cutlasses	13	4.30
No response	182	60.70
Total	**300**	**100.00**
Preferred season for hunting		
Dry season only	25	8.30
Both dry and wet seasons	93	31.00
No response	182	60.70
Total	**300**	**100.00**
What do you do with the kills?		
Sell	2	0.60
Consume	67	22.30
Sell and consume	49	16.30
No response	182	60.70
Total	**300**	**100.00**
Frequency of hunting		
Daily	3	1.00
Weekly	42	14.00
Fortnightly	42	14.00
Monthly	7	2.30
Rarely	21	7.00
No response	185	61.70
Total	**300**	**100.00**

Source: Field Survey, 2016 and 2017

Table 5: Respondents on the use of fire

Variables	Frequency	Percentage (%)
Do you set fire?		
Yes	238	79.30
No	53	17.70
No response	9	3.00
Total	**300**	**100.00**
Distance between fire set and park boundaries		
Less than 500m	2	0.70
1000m	4	1.30
2000m	62	20.70
3000m	12	4.00
4000m	5	1.70
Above 4000m	133	44.30
No response	82	27.30
Total	**300**	**100.00**
Reasons/purposes for setting fire		
For hunting reasons/purposes	3	1.00
For regeneration purposes	25	8.30
For farmland clearing	166	55.30
For driving away pests and insects	2	0.70
For harvesting/gathering honey	1	0.30
Demarcation of farm boundaries	18	6.00
Clearing farmland and driving pests and insects	1	0.30
Regeneration and farm boundaries demarcation	22	7.30
All of the above	58	19.30
No response	4	1.30
Total	**300**	**100.00**
Frequency of setting fire per year		
Once	102	34.00
Twice	64	21.30
Three times	50	16.60
No response	84	28.00
Total	**300**	**100.00**
Season/period of setting fire		
Early dry season	46	15.30
Late dry season	94	31.30
Early raining season	79	26.30
Late raining season	13	4.30
Early dry season and late dry season	4	1.30
Early raining season and late dry season	4	1.30
No response	60	20.30
Total	**300**	**100.00**

Source: Field Survey, 2016 and 2017

Results in table 6 showed that trees were being felled (223; 74.3%) and this occurred mainly at 3000m (138; 46.0%), followed by 2000m (48; 16.0%) and less than 500m (38; 12.7%). The reasons behind this were mainly for income generation and building structures (164; 54.7%). Other reasons were for income generation only (27; 9.0%) and building of structures (25; 8.3%), as well as for fuel (9; 3.0%).

Table 6: Respondents on illegal felling of trees around the Buffer zone (logging activities)

Variables	Frequency	Percentage (%)
Felling of trees?		
Yes	223	74.30
No	66	22.00
No response	11	3.70
Total	**300**	**100.00**
Distance of trees felling to park boundaries		
Less than 500m	38	12.70
2000m	48	16.00
3000m	138	46.00
No response	76	25.30
Total	**300**	**100.00**
Reasons for felling trees		
For fuel	9	3.00
For income generation	27	9.00
For building structures	25	8.30
For income generation and building structures	164	54.70
No response	75	25.00
Total	**300**	**100.00**

Source: Field Survey, 2016 and 2017

Table 7: Impacts of anthropogenic activities on the Buffer zone around OONP, Nigeria

Variable	Pearson correlation N	1 300
Farming activities	Pearson correlation	0.226**
	Sig. (2-tailed) 0.000	
	N	300
Hunting activities	Pearson correlation	0.219**
	Sig. (2-tailed)	0.000
	N	300
Use of fire		
	Pearson correlation	0.265**
	Sig. (2-tailed)	0.000
	N	300
Logging activities		
	Pearson correlation	0.248
	Sig. (2-tailed)	0.000
	N	300

Source: Field Survey, 2016 and 2017

****** Correlation is significant at the 0.01 level (2-tailed);

***** Correlation is significant at the 0.05 level (2-tailed)

Results in table 7 showed that only logging activities of the respondents was not significant at both (P<0.01) and (P<0.05) levels. Farming activities, hunting activities as well as the use of fire in the study area were all significant at (P<0.01).

Table 7: ANOVA of anthropogenic activities on the Buffer zone around OONP

Variable	Df	F	Significant value
Farming activities	3	13.398	0.021*
Hunting activities	2	36.054	0.000*
Use of fire	2	13.264	0.000*
Logging activities	2	13.786	0.010*

Source: Field Survey, 2016 and 2017

****** Correlation is significant at the 0.01 level (2-tailed);

***** Correlation is significant at the 0.05 level (2-tailed)

Results in the table above showed that all anthropogenic activities in the study area, which included farming, hunting, use of fire as well as logging were significant at (P<0.05) level.

DISCUSSION

Maximum and minimum ages of respondent were 78 and 20 years respectively with the mean age of 44.69±0.62. Maximum family size was 20.00; maximum distance from farm to home and vice-versa was 11000m and maximum length of stay in the village was 78.00 years. The results revealed that age is a determinant factor in choosing livelihood around land adjacent protected areas, reason for a very young age. Having a place, (home) less than or equal to 10-11 kilometers to the forest as well as staying for over twenty gives one a consciousness that the place is his or hers. This notion or belief is engraved in the hearts of support zone dwellers. As a result of this, many illegal activities are done due to staying for a long time in a place as well as having proximity to the source. This was further amplified by Hames (1988) and Alvard (1994) that most hunting and extraction activities occur near human settlements; Begazo and Bodmer (1998) as well as Peres and Lake (2003) claimed that key access points to forests, such as roads or rivers also occur due to proximity. Maximum annual income was 3.5 Million Naira with the mean annual income being 493623.33±27344.32 (NGN), while maximum farm size was 100 hectares with the mean farm size of 22.66±1.25. Correlation analysis revealed that farming activities in all the ranges of the park were significant (P<0.01; 0.226**) at 2-tailed level. While the analysis of variance (ANOVA) of all farming activities was significant at (P<0.05; df=3, F=13.398, p=0.021*). This echoed the belief of the local people being the sole owners of protected and adjacent land areas. This further agreed with the findings of Rao *etal*., (2003), Hurst (1994) in Davies and Brown (2007).

Hunting around and within these distances (especially 2000m) may pose threats on wild animals that roam around the buffer zone. Traps (16.7%) were the frequently used equipment followed by the combination of guns to traps (12.0%). Hunting was done in both wet and dry season, with more of various species being killed and the kill was mainly consumed but could be sold as well. This shows that many of the respondents hunt for alternative source of protein in their diets and doing this throughout the season further confirm this view. Few of them sell the kills which further re-echoed that bushmeat is a delicacy around communities adjacent the protected areas. Generally, correlation analysis revealed that hunting activities in all the ranges in the park were significant (P<0.01; 0.219**) at 2-tailed level. While the analysis of variance (ANOVA) of all hunting activities was significant at (P<0.05; df=2, F=36.054, p=0.000*). This is in consonance with the earlier views of Adedoyin, *et al*., (2016), Lameed *et al*., (2015), Bowen-Jones and Pendry (1999) and Caspary (1999).

However, the use of fire in the study area was high (79.3%). The respondents used fire mainly for clearing farmland, farm regeneration and farm

boundaries' demarcation. These findings agree with the earlier submission of Bowman (1998), van Langeveldt *et al*., (2003) and Bond and Keeley (2005). However, the frequency of setting fire was mainly once (34.0%), while maintaining the approved distance (4000m) of setting fire from the park. The most preferred season for setting fire was during late dry season (31.3%). This may be due to the fact that late dry season fires help opening up of habitats, remove dead wood and rejuvenate grasses. This assertion is in agreement with the view of Bowman (1998) and Yibarbuk *et al*., (2001). The use of fire in the study area was significant ($P<0.01$; 0.265**) at 2-tailed level.

In addition, the findings showed that many of the respondents involved in logging activities (74.3%) were mainly at a distance of 3000mfrom the park boundaries. The main reason behind this nefarious act was for income generation and building of structures (54.7%). Illegal logging activities in the study area was not significant ($P<0.01$) at 2-tailed level. These findings may not be unconnected to the fact that National parks, protected areas, nature reserves are net producers (source area) that supply the buffer or support zones of these areas. The buffer or support zones are the sinks for the fauna, flora and entire biodiversity because their lives depend more or less on these. The proximity of sources to sink areas greatly affects biodiversity sustainability. This submission showed why natural renewable resources around land and area adjacent a protected area is the first point of call when the dwellers are in need. This is further in agreement with the earlier view of Hart and kingdom (2013), that unsustainable use of resources in the conservation and protected forests of west and central Africa, where most of the 2/3 inhabitants rely is a major threat to biodiversity conservation.

CONCLUSION

From the research, it is tempting to believe that landadjacent Old Oyo National Park, Nigeria (that is supposed to be mildly protected) is now left unprotected (against every form of anthropogenic activities which include farming, hunting, fire setting and logging) and thusmaking it a free area. One may ask 'can land adjacent Old Oyo National Park, Nigeria be effectively managed against anthropogenic activities?' The answer may be: "yes". But, land adjacent Old Oyo National Park should first be mildly protected, and then we can start talking about its sustainability. Sustainability is promoted by institutionalization of activities and programmes, as well as capacity building at the government, private sector and community levels. In order to create support and general awareness among the local population, whether indigenous or migrant, these people have had to indicate what they expect and what they were or will be using the buffer zone for. Without their consent and understanding of the importance of a buffer zone, the approach will not be sustainable, but rather be frustrated.

Recommendations

We recommend the followings for the effective management of land adjacent Old Oyo National Park:

- Range headquarters should be situated at least 1-1.5km from the buffer zone, for effective anti-poaching, monitoring and policing.
- Buffer zone should be made 4-5km around the park core boundaries to give room for the support zone dwellers activities.
- However, strict punitive measures should be taken on anyone who transgresses this demarcation.
- The park management should create conservation education and awareness groups in the support zone households as well as starting conservation clubs in primary and secondary schools surrounding all the five ranges.
- Cordial relationship should be maintained between Park management and communities' leaders.
- The support zone dwellers should be allowed to fully participate in management of the park.
- They should also be allowed to benefit from the park resources through mutual understanding.

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