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Local perception on the impacts of biodiversity conservation on livelihood activities in Old Oyo national park, Nigeria

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ABSTRACT: The study examined the socio-economic activities of rural communities in Old Oyo National Park and their perception towards conservation. Ten villages were randomly chosen from the five ranges based on their proximity to the park. A total of one hundred and fifty-two (152) structured questionnaire were administered to obtain information from the local community. The questionnaire was designed to elicit information on the livelihood practices and the impacts of the park on their livelihoods. Data obtained were analyzed using descriptive statistics and inferential statistics. The major occupations of the respondents around the park were farming (25.7%), trading (22.4%), Artisan (19.1%), and Students (12.5%). The results showed that the majority of the respondents were male (69.1%) while 31.9% were female. Many of the respondents (39.5%) experience a loss of right/control over protected resources. The result further revealed that the respondents (28.9%) experienced the loss of traditional access to the park, with serious impact on the livelihood of the respondents. Chi-square analysis showed that there is an association between gender (χ^2 = 1.857 $p<0.05$) and perceived access to natural resources. The result further showed a significant relationship between the respondents' perceived access to the park-related resources and their marital status (χ^2 = 10.184 $p<0.001$), indicating that marital status positively affected their perception of the park resources. It is, therefore, recommended that there should be training on alternative sources of livelihood and also sensitize the communities about the needs for conservation.

Percepção local sobre os impactos da conservação da biodiversidade nas atividades de subsistência no parque nacional de Old Oyo, Nigéria

RESUMO: O estudo examinou as atividades socioeconômicas das comunidades rurais no Parque Nacional Old Oyo e sua percepção em relação à conservação. Dez aldeias foram escolhidas aleatoriamente das cinco faixas com base em sua proximidade com o parque. Um total de cento e cinquenta e dois (152) questionários estruturados foram aplicados para obter informações da comunidade local. O questionário foi elaborado para obter informações sobre as práticas de subsistência e os impactos do parque em seus meios de subsistência. Os dados obtidos foram analisados por meio de estatística descritiva e estatística inferencial. As principais ocupações dos entrevistados no entorno do parque foram agricultura (25,7%), comércio (22,4%), artesão (19,1%) e estudantes (12,5%). Os resultados mostraram que a maioria dos respondentes era do sexo masculino (69,1%) e 31,9% do sexo feminino. Muitos dos entrevistados (39,5%) experimentam uma perda de direito/controle sobre os recursos protegidos. O resultado revelou ainda que os entrevistados (28,9%) vivenciaram a perda do acesso tradicional ao parque, com sério impacto na subsistência dos entrevistados. A análise do qui-quadrado mostrou que há associação entre sexo ($\chi2$ = 1,857 $p<0,05$) e percepção de acesso aos recursos naturais. O resultado mostrou ainda uma relação significativa entre o acesso percebido dos entrevistados aos recursos relacionados ao parque e seu estado civil ($\chi2$ = 10,184 $p<0,001$), indicando que o estado civil afetou positivamente sua percepção dos recursos do parque. Recomenda-se, portanto, que haja treinamento sobre fontes alternativas de subsistência e também sensibilize as comunidades sobre as necessidades de conservação.

Introduction

Protected areas (PAs) are an important part of the worldwide biodiversity protection plan. The management of PAs in tropical developing nations is a major concern because many of them include resources that local residents rely on (Mukul et al., 2010). Non-timber forest products (NTFPs) collection and trading is a well-established forest-based livelihood strategy that has recently been promoted as a potential means for improved conservation and rural livelihoods, even though the sustainability and ecological implications have rarely been tested (Mukul *et al.*, 2010).

There has been a movement toward people-centred conservation, with an exponential increase in literature on local people's perspectives of PAs as a foundation for understanding and evaluating the benefits of conservation actions (Mutanga et al. 2015, 2016; Bennett 2016).

Perceptions are thought to be the path. The impacts of PAs on local livelihoods can be important factors in local communities' perceptions and attitudes toward conservation (Bennett and Dearden, 2014; Clements et al., 2014; Bragagnolo et al., 2016; Abukari and Mwalyosi, 2018a). In the face of the rising human population and diminishing natural resources, it appears that the function of PAs as socio-economic and rural development institutions is becoming increasingly important.

Local people's perspectives of conservation in PAs can be divided into four categories, according to Bennett (2016): social implications of conservation, ecological consequences of conservation, legitimacy of conservation governance, and acceptability of conservation management. This type of classification could be useful for determining which components of conservation policies and management measures are acceptable or undesirable to local residents.

Local residents, for example, may have a favourable attitude toward decisions taken to protect biodiversity in the PA if they perceive the PA's governance in their area is inclusive. As a result, gaining a better knowledge of both PA officials' and local people's perspectives on their connections may be the first step toward identifying sites of tension and charting paths to productive partnerships for natural resources management (Allendorf et al. 2012; Bennett 2016; Mutanga et al. 2016; Thondhlana et al. 2016).

According to Bennett (2016), examining people's views can reveal how they evaluate, understand, and interpret the socioeconomic and ecological implications of conservation. Protected area administrators are sometimes indifferent to the aspirations and desires of the surrounding community, which, if left untreated, might undermine conservation efforts over time.

Local people's support and involvement should be incorporated into PA management, according to Rashid et al. (2013); otherwise, conservation efforts through PAs will be less effective.

The long-term destiny of protected places is determined by the conservation attitudes of local people who live near them. Conservation managers and communities have long been in conflict over resource restrictions and constraints in protected areas. This has negatively impacted the socioeconomic activities and the livelihood of the local people living around the park. It is, therefore, necessary to evaluate the socioeconomic activities of the communities and also their perceptions of conservation. The study aims to determine the impact of biodiversity conservation on the socio-economic activities of the park's neighbouring communities and evaluate the local community's perception of conservation.

Material and Methods

Study Area

Old Oyo National Park is geographically located between North latitudes 8° 10' and 9° 05', and East longitudes 3° 35' and 4° 21', and centred on North latitude 8° 36' 00 and East longitude 3° 57' 05''. The park is Nigeria's fourth largest national park, with a land area of around 2,512 km^2. It is located in Oyo State, southwest of Nigeria, and borders Kwara state on the northeast. It is surrounded by ten (10) Local Government Areas in Oyo State namely: Atisbo (Tede/Ago-Are), Atiba (Oyo), Irepo (Kisi), Oorelope (Igboho) Saki East (Ago-Amodu), Iseyin (Iseyin), Orire (Ikoyi), Itesiwaju (Otu), Olorunsogo (Igbeti), Saki West (Saki) and Kaima Local Government Area in Kwara State (Oladeji *et al.*, 2012). The park has an average rainfall of 1,100 mm per year.

The vegetation is southern Guinea Savannah. However, several botanists have classed the Park's vegetation in various ways, although there are four sub-types in general. Dense woodland and forest outliers may be found in the south-east, mixed open savannah woodland in the centre, outcrop vegetation in the northeast, and riparian grassland and bordering woods can be found in the forest plains and valleys along the Ogun River.

The following are some of the most prevalent plant species found in the Park: *Burkea africana, Vitaleria paradoxum, Combretum molle, Terminalia glaucescens, Kigelia africana, Hymenoccardia acida, Lophira lanceolata, Daniellia oliveri, Mytenus senegalensis, Parinari plyandra, Uapaca togolensis, Afzelia africana, Vitex doniana, Anogeissus leiocarpus, Parkia biglobosa, Lacanoidis cuscupanoides, Lannea schimperi,* etc (Nigeria Park Service, 2010).

Fauna species still found in the park include Western Kob (*Kobus kob*), Roan Antelope (*Hippotragus equines*),Western Hartebeest

(*Alcelaphus buselaphus*), Grimm's Duiker (*Sylvicarpra grimmia*), Red Flanked Duiker (*Cephalopus rufilatus*), Oribi (*Ourebia ourebi*), Water Buck (*Kobus defassa*), Anubis Baboon (*Papio anubis*), Patas Monkey (*Erythrocebus patas*), Green monkey (*Cercopithecus aethiops*), Bush Buck (*Tragelaphus sciptus*), Buffalo (*Syncerus caffer*), Red River Hog (*Potamochoerus porcus*), Warthog (*Phacochoerus aethiopicus*), Lion (*Panthera leo*), etc. The Park is rich in both National and International migratory birds which could be watched by bird Watchers (tourists). Also abundant in the Park are Fishes, Reptiles, Butterflies, Ants, Mushrooms, and Millipedes etc. (Nigeria Park Services, 2010). Old Oyo National Park is divided into five ranges, as shown in figure 1. They are Oyo ile, Marguda, Tede, Sepeteri, and Yemoso Ranges (Oladeji *et al.*, 2012).

Sampling procedure and Data Collection

Primary data were collected from ten (10) local communities in the support zone of Old Oyo National Park based on their proximity to the Park from January – March, 2019. The study areas' selection was through multi-stage random sampling. The Park was divided into ranges based on the Protection and administrative units of the Park. Within Park Ranges were the support zone villages of the Park that were selected for the study. At the time of this study, Old Oyo National Park had five (5) ranges, Ikoyi Ile, Marguba, Oyo Ile, Sepeteri and Tede.

During the data collection phase of this research, standardized questionnaires were administered to the park's support zone communities. Ten per cent of the communities in all the ranges of the park, two villages from each range amounting to 10 communities, were randomly selected from the list of communities within 0 - 10km of the parks' boundaries. Respondents willing to participate were invited for questionnaire administration, resulting in more male than female respondents, also respondents from age 16 and above were interviewed, who are believed to be knowledgeable enough. Thus, the number of households selected was 152, representing ten per cent of the total number of households in all the villages.
The questionnaire was divided into two sections: demographic information on the respondents' livelihood/socioeconomic activities and surrounding people's perceptions and support for the park.

Data Analysis

Data obtained were presented and analysed with descriptive statistics and chi-square analysis. Five independent variables and one dependent variable were measured in this study. The independent variables were gender, education, occupation, marital status and religion, while the dependent variable was participation in park management. The dependent variable perception was measured through five items; these used Likert scale responses.

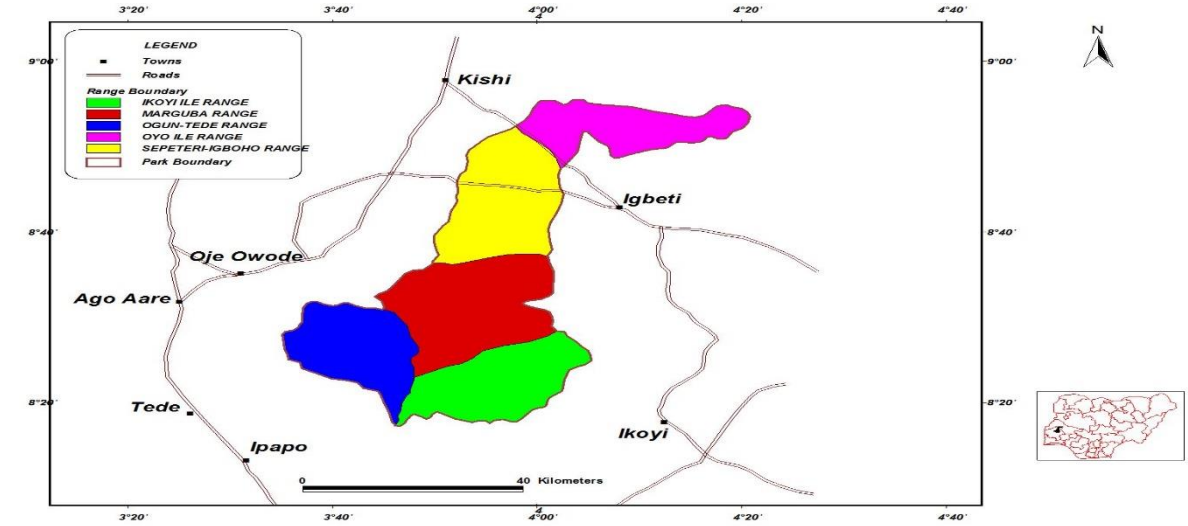

Figure 1. Old Oyo National Park. Source: Ogunjinmi, 2010.

Result and discussion

The Socio-demographic characteristics of the respondents are presented in Table 1. The result revealed that most of the respondents were male (69.1%). This could be attributed to the fact that male household heads exceed female household heads by a substantial margin. Ogunjinmi and Braimoh (2018) in Old Oyo National Park, reported that 64% of the participants in the study were male. Osunsina and Fagbeyiro (2015) in a study carried out in Old Oyo National Park also reported that most of the respondents were male (75%).

Table 1. Demographic characteristics of respondents

Variable		Frequency n = 152	Percentage (%)
Sex	Male	105	69.1
	Female	47	30.9
Age	15-24	30	19.7
	25-54	94	61.9
	55-64	20	13.2
	Above 65	8	5.3
Marital Status	Single	41	27.0
	Married	102	67.1
	Divorced	9	5.9
Tribe	Yoruba	122	80.3
	Hausa / Fulani	20	13.2
	Igbo	10	6.6
Religion	Christian	48	31.6
	Islam	88	57.9
	Traditional	16	10.5
Major Occupation	Farmer	39	25.7
	Civil servant	16	10.5
	Trader	34	22.4
	Student	19	12.5
	Artisan	29	19.1
	Cattle Rearer	8	5.3
	Fisherman	7	4.6
Minor Occupation	Farming	107	70.4%
	Hunting	7	4.6%
	Crafts	38	25.0%
Education	Non-formal education	28	18.4
	Primary education	38	25.0
	Secondary education	58	38.2
	Tertiary	28	18.4
Household Income	Less than 18,000	63	41.5
	18,000 - 40,000	33	21.7
	41,000 - 60,000	24	15.8
	61,000 - 80,000	19	12.5
	80,000 - 100,000	9	5.9
	101,000 Above	4	2.6
Homestead Distance from the Park	Close	54	35.5
	Not too close	70	46.1
	Far	28	18.4
Nativity	Yes	113	74.2
	No	39	25.8

The sampled respondents were in the age group 15-24 years (19.7%) and 25-54years (61.9%). This shows that both young and relatively aged people participated in the study. This is in line with the age distribution in Nigeria in 2008, which revealed that the dominant age group was 15-64 years old and this finding is consistent with Ogunjinmi *et al.* (2012a) and Jacob (2017). Ogunjinmi and Braimoh (2018) also recorded 82.7% of respondents were between the age group 25 -54 years. A high percentage of respondents were married (67.1%) and were predominantly Muslims (57.9%). This is also in line with Ogunjinmi and Braimoh (2018) and Osunsina and Fagbeyiro (2015). The major occupations of the respondents around the park were farming (25.7%), trading (22.4%), Artisan (19.1%), and Students (12.5%). However, most of the respondents (70.4%) indicated that aside from their main occupation they were also involved in farming as a minor occupation, hence making farming the most prominent occupation in the area. This is in line with similar studies by Osunsina (2010), Osunsina and Fagbeyiro (2015), Ogunjinmi et al. (2012b) and Ogunjinmi and Braimoh (2018). Due to the high percentage of local farmers in the park's surroundings, earnings are heavily reliant on farm produce, exacerbating the problem of land scarcity. In such situations, encroachment into the

park for more land becomes almost inevitable. Wahab et al. (2014) indicated heavy dependence on forest resources by local people living around the protected areas.

Also, the result revealed that the residents were majorly Yorubas (80.3%) and they are predominantly farmers (25.7%). This finding is consistent with Osunsina (2010). Some of the respondents had secondary school education (38.2%).However, 19.7% are in the age group of 15 to 24 years, in which some interviewees are attendi ng the medium level. The study shows that the younger respondents have higher educational levels than the older respondents, because the younger respondents have more access to education now, as compared with the older generation. This is in line with a study carried out by Osunsina and Fagbeyiro, (2015) and Ogunjinmi and Braimoh (2018) in Old Oyo National Park. The majority (41.5%) generate household income below ₦18,000 ($42.71) monthly. This clearly demonstrates that most of the respondents are low-income earners and were living below the minimum national wage of ₦18, 000 ($42.71) monthly. According to Kepo (2011), the respondents' level of education influences the sort of employment they do and the amount of money they earn. The result further revealed that the respondents (74.2%) were native to the study area (Table 1).

The result shows that more than half of the respondents (53.9%) stated that conservation issue is very important (Table 2). Barthwal and Mathur (2012) made a similar observation in their study. Most of the respondents (81.6%) agreed that Federal Government is the right body to be in charge of the park and also stated that the National park is good for development (99.3%). This assertion is in accordance with a study carried out in four national parks in Nigeria by Osunsina (2010). The majority (75.7%) of the respondents have knowledge of the conservation awareness programme going on around the park and advocated for local participation (25.7%) as the best way to improve the level of awareness in the study area. This supports the findings of Wahab et al. (2014), who indicated that conservation for sustainable development in protected areas should place a greater emphasis on conservation education programs to enhance park resource management.

Table 2. Respondents' awareness and perception of Conservation

Awareness questions	Frequency	Percentage (%)
How do you see conservation issues		
Important	67	44.1
Very important	82	53.9
Not important	3	2.0
Who should be in charge of conservation		
Federal government	124	81.6
State government	10	6.6
Local government	11	7.2
Others	7	4.6
Is a national park good for development		
Yes	150	99.3
No	1	0.7
Is there any conservation awareness programme		
Yes	115	75.7
No	37	24.3
Involvement in Park Management		
Very involved	54	35.8
Somewhat involved	35	23.2
Not very involved	62	41.1
The level of awareness about the park		
Low	34	22.4
Moderate	63	41.4
High	55	36.2
Purpose of the park		
Recreation	14	9.2
Revenue generation	24	15.8
Conservation of wild resources	80	52.6
Research and education	34	22.4

On the level of awareness about the park, respondents (41.1%) were moderately aware of the park and believed that the purpose of the park is primarily for the conservation of wild resources (52.6%). Main sources of information about the park were diverse, Radio was cited by 44.1% of respondents as a source of information, others obtained their information through verbal and interpersonal relationships (27.6%), local meetings (11.8%), the local newspaper (7.9%) and local TV (6.6%) (Figure 2).

According to Osunsina and Fagbeyiro (2015), a lack of knowledge does not appear to be a major source of negative reactions because the community appears to have access to up-to-date information regarding the Park. However, conservative views regarding the Park may not shift as a result of this, according to a survey conducted by Kepo (2011). According to Mamo (2014), developing a positive perspective does not guarantee behaviour because the majority of the locals exploit the park's natural resources without restriction.

Most of the respondents indicated local participation (40.8%) conservation education (26.9%) and advertisement (17.8%) as ways of improving the level of awareness ((Figure 3). Many authors (Kiss, 1990; Western and Wright (1994) have affirmed that effective long-term conservation of wildlife-protected areas needs the involvement and participation of local people.

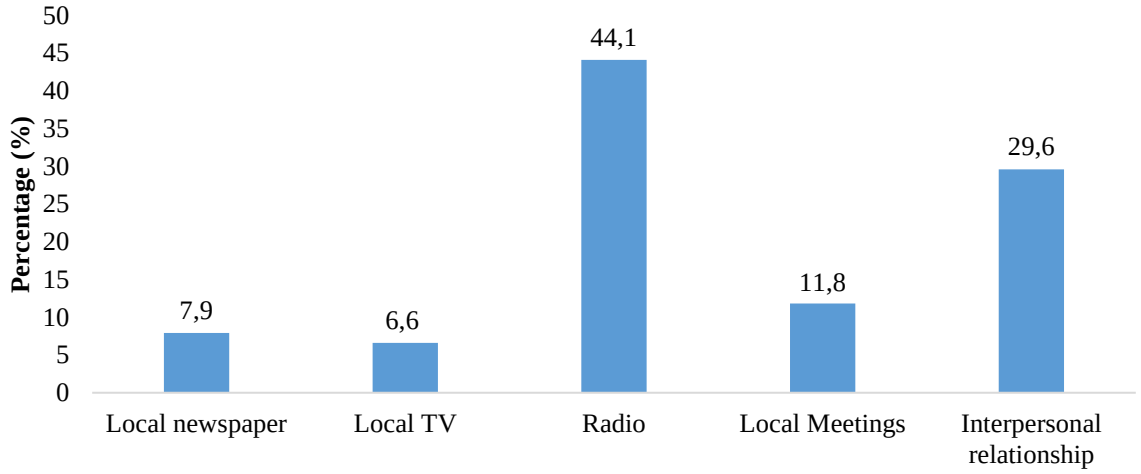

Figure 2. Source of information about the Park

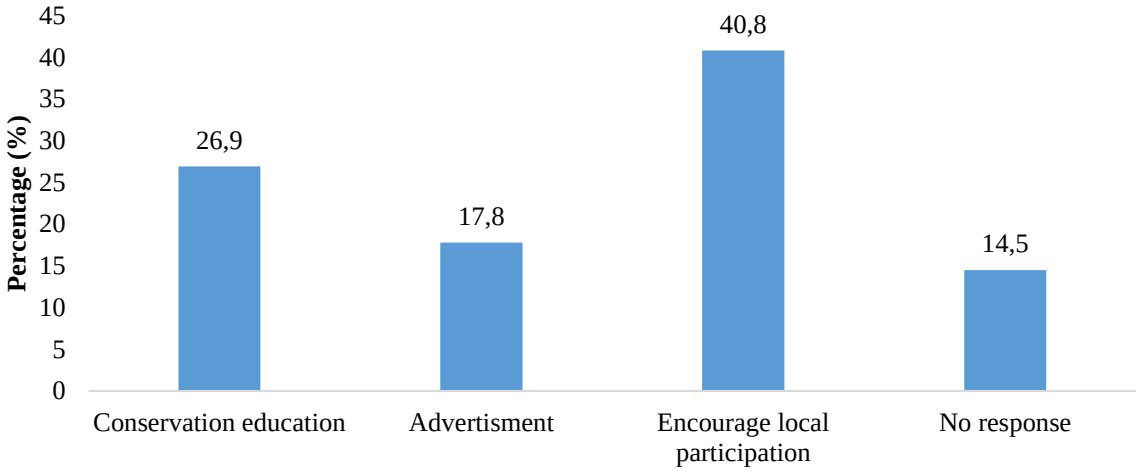

Figure 3. Ways to improve the level of awarenes

The result shows that the majority of the respondent did not experience livestock predation (48.7%), property damage by wildlife (55.3%) and competition for grazing resources (42.4%). Also, some of the respondents (41.4%) indicated that there is no disease transmission from wildlife to livestock while 13.2% indicated that it occurs. The result further revealed that the respondents (28.9%) experienced the loss of traditional access to the park while 28.9% of opinions varied. This is an indication that most of the respondents were denied access due to strict restrictions on park resources. According to Fischer et al. (2011), the establishment of numerous PAs led local communities to relocate from their

original areas of residence, depriving them of access to resources. Many of the respondents (39.5%) experience a loss of right/control over protected resources. The inability of the respondents to access the park resources agrees with studies by Mosetlhi (2012) and Jacob (2017). However, 44.7% of the respondent indicated that there is no loss of farmlands (Table 3).

Table 4 shows the result of the chi-square analysis of the relationship between the socio-economic factors of the respondents and perceived access to natural resources. The result shows that there is an association between gender (χ^2 = 1.857 *p*=0.032) and perceived access to natural resources. Gender plays an important role in natural resource collection and utilization, most especially in rural area. Ogunjinmi et al. (2012c) reported that women are most of the time engaged in household subsistence activities such as the collection of water and non-timber forest products. This shows that women outdo men in terms of their involvement in the harvesting and utilization of natural resources. The result further showed a significant relationship between the respondents' perceived access to the park-related resources and their marital status (χ^2 = 10.184 p=0.006), which means that marital status positively affected their perception of the park resources. This could be because a married individual has more obligations and a greater reliance on the environment. The magnitude of dependence on natural resources is determined by the size of the household. Married respondents may also require more and more frequent access to the park resources. Osunsina (2010) established the relationship between marital status and demand or pressure on the park resources. Larger households tend to require more resources to meet their need.

Table 3: Perception of Park Impacts

Perception Question	SD	D	U	A	SA	M	SD
Livestock predation	26 (17.1)	74 (48.7)	18 (11.8)	25 (16.4)	9 (5.9)	2.45	1.13
Property damage by wildlife	16 (10.5)	84 (55.3)	31 (20.4)	16 (10.5)	5 (3.3)	2.41	0.93
Competition for grazing resources	16 (10.6)	64 (42.4)	41 (27.2)	26 (17.2)	4 (2.6)	2.59	0.98
Disease transmission from wildlife to livestock	17 (11.2)	63 (41.4)	24 (15.8)	28 (18.4)	20 (13.2)	2.81	1.24
Loss of traditional access to the park	11 (7.2)	40 (26.3)	44 (28.9)	44 (28.9)	13 (8.6)	3.05	1.09
Do you experience Loss of control / rights over protected resources	14 (9.2)	36 (23.7)	37 (24.3)	60 (39.5)	5 (3.3)	2.72	1.03
Loss / endangering of life to wildlife	25 (16.4)	59 (38.8)	19 (12.5)	29 (19.1)	20 (13.2)	2.74	1.30
Loss of farmlands	17 (11.2)	68 (44.7)	20 (13.2)	24 (15.8)	23 (15.1)	2.79	1.27

SD-Strongly disagreed, D-Disagreed, U-Undecided, A-Agreed, SA-Strongly Agreed, M-Mean, SD-Standard deviation. The values in parentheses are percentages.

Table 4: Relationship between the social economic factors of the respondents and perceived access to natural resources

Variable	X^2	Df	P-Value	Decision
Gender	1.857	1	0.032*	S
Marital Status	10.184	2	0.006**	S
Religion	1.003	2	0.606	NS
Education	3.520	5	0.620	NS
Occupation	13.413	8	0.098	NS

*P < 0.05 **P<0.01 df - Degree of Freedom S – Significant N-Not Siginificant

Conclusions and recommendations

The study shows that the major socio-economic activity in the study area is farming. Other activities such as hunting, trading and cattle rearing were also practised to meet the socio and economic needs of the people. The study shows that the respondents experienced the loss of traditional access to the park which is an indication that most of the respondents were denied access due to strict restrictions on park resources. The lack of access to park resources has a serious impact on the livelihood of the respondents, who alleged that the park primarily considers the conservation of natural resources more than their well-being. This has very strong implication for conservation as the support and cooperation is not voluntary. Conservation efforts will only work when the local people voluntarily work together with protected area managers to protect the resources in the park.

Despite the impact of the park most of the respondents still showed a positive attitude toward wildlife conservation. Also, despite the respondents' low level of education, they still showed a positive attitude towards wildlife conservation. It is, therefore, recommended that the management of the park should create an alternative source of livelihood to cushion the impact of the park and also sensitize the communities about conservation in the study area. There is also the need to get the local people more involved in the management of the park resources, this would give a sense of ownership.

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