ASSESSMENT OF WILD-ANIMAL CROP RAIDING AND IT'S INFLUENCE ON WILDLIFE CONSERVATION AROUND KAINJI LAKE NATIONAL PARK, NIGERIA

Yaduma, Z. B., S. K. Halidu[1] , K. M. Adelakun[1]*, S. D. Olakunle[2] and N. Mohammed[1]

Department of Forestry and Wildlife Management, Modibbo Adama University of Technology, Yola, Adamawa State, Nigeria; Forestry Research Institute of Nigeria P.M.B. 5056, Jericho Hill, Jericho, Ibadan, Nigeria; [1]Department of Wildlife and Ecotourism Management, Federal College of Wildlife Management of Forestry Research Institute of Nigeria,P.M.B. 268, New Bussa, Nigeria; [2]Department of Wildlife and Ecotourism Management, Ladoke Akintola University of Technology, P.M.B. 4000, Ogbomoso, Oyo State, Nigeria

*Corresponding author: adelakunkehinde@gmail.com

Abstract

This study examined the influence of wild animal crop raiding on wildlife conservation around Kainji Lake National Park, Nigeria. 150 questionnaires were administered to the affected farmers in the villages with farmland within 2 km of the park. The results show that the major occupation in the study area is farming, and 92% of the farmers affirmed frequent raiding of farmed crops, such as maize, rice, sorghum, millet, groundnut, beans, and yam by birds, baboons, monkeys, and rodents. The preventive measures adopted by the farmers include scarecrow (41.33%), watch guarding (20.67%), and trapping (16.67%). It was further confirmed by the majority (mean= 4.65±0.50) of respondents that incidents of crop raiding are a threat to the means of livelihood of affected farmers and consequently contribute to the unemployment menace in the study area. Respondents (mean= 3.83±0.43) confirmed the killing of the marauding wild animal whenever it is spotted to avoid future damage to their farm products. However, this study established from the farmers' opinion that a major benefit attributed to compensation programs may increase the tolerance of wildlife and promote more positive attitudes and support for conservation among the local communities'.

Key words: Crop raiding; Farm products; Wildlife conservation; Marauding animals; Protected area.

INTRODUCTION

Human-wildlife conflict is any instance in which the resource demands of humans and wild animals overlap, spurring competition for food, space, and water and the ensuing tension between people and wildlife conservation authorities (Woodroffe *et al.* 2005). Conflicts between humans and wildlife are the product of socio-economic and political landscapes, and are controversial because the resources concerned have economic value, and the species involved are often legally protected (Treves and Karanth 2003, McGregor 2005). Case studies from across the world demonstrate the severity of the conflict and suggest that greater in-depth analyses of such conflicts are needed in order to avoid watching the problem and undermining the conservation of threatened and potentially endangered species (Distefano 2005).

The frequency of conflicts involving wildlife has grown in recent decades, mainly because of the exponential increase in human populations and the consequential expansion of human activities, leading to altered wildlife distributions due to encroachment and urbanization of once wildlife habitats (Woodroffe *et al*. 2005). These conflicts have given rise to competition between humans and wildlife for space and resources. Wildlife requiring large habitats is often found overlapping with human settlements

and farmlands near protected areas. The conflicts are further heightened when such habitats have been fragmented or reduced in size due to anthropogenic activities, and when their natural food sources are scarce or depleted (Geleta *et al.* 2019). The human-wildlife conflict poses issues to humans, such as injury, disability, collision with vehicles, destruction of livestock, and spread of diseases from wildlife to livestock. Damages to crops, destruction of wildlife and wildlife habitat, and fatal human casualties have also been reported (FAO 2009).

Human-wildlife conflicts can have severe consequences on wildlife population and wildlife conservation efforts by protected areas which rely considerably on support from adjoining local communities who might consider them as destructive pests and threats to their livelihood (Distefano 2005, Kideghesho *et al.* 2007).

One major source of conflict between wildlife and farmers in Nigeria and the world is crop raiding (Warren *et al.* 2007, Hill. 2004, Distefano 2010). Crop raiding has been described as the movement of wild animals from their natural habitat into agricultural land to feed on the crops that humans grow for their own consumption (Sillero-Zubiri and Switzer 2001). The impact of crop raiding on the attitudes of local communities towards protected areas can undermine efforts to gain their support for conservation (Nyhus and Sumianto 2000). Crop-raiding by wild animals is increasingly known to be a source of conflict between animals and humans, especially along the boundaries of protected areas (Gillingham and Lee 2003, Linkie *et al.* 2007, Riley 2007). The conflict is set to increase as Africa's human population keeps growing at a high rate and encroachment of agriculture into land containing wildlife habitats continues (Hill 2000). The losses incurred by farmers may make communities living close to protected areas antagonistic and intolerant towards wildlife, undermining and impeding conservation strategies (Nyhus and Sumianto 2000).

Settlers around Kainji Lake National Park are farmers, and therefore cultivate farm crops on the boundaries and buffer zones of the park (Adelakun *et al.* 2021). When animals raid crops or threaten human life in this farmland, the communities feel that their livelihood and existence are undermined, especially since there is no policy on compensation in the country. This undermines their mutual well-being and increasingly threatens the conservation of many wildlife species involved (Shilongo *et al.* 2018).

In Borgu sector of Kainji Lake National Park, frequent losses of food crops as a result of wild animal raiding activities had been reported by (Ogunjobi and Adeola 2016, Adeola *et al*. 2017, 2022) while Ajayi *et al.* (2019) also reported that there is a substantial economic loss to the agrarian communities in the Zugurma sector of the park as a results of wild animal crop raiding on their farms. However, there is a paucity of knowledge on the influence this conflict could have on the mandate of this protected area. Therefore, this study examined the potential influence caused by wild-animal crop raiding on people's farms and farmers' attitudes towards wildlife conservation to prevent antagonism and intolerance towards Kainji Lake National Park, Nigeria.

MATERIAL AND METHODS

The study area

Kainji Lake National Park is located in the North central part of the country and lies at latitude 9'45 and 10'23 N, and longitude 3'40 and 5'47E. It is made up of two sectors (named Borgu and Zugurma)

situated in Borgu and Kaima/Baruten Local Government Areas of Niger and Kwara State, respectively. It covers a total land area of 5,340.825 sq km (Ayeni 2007).

The climatic features of the park are divided into the wet and dry seasons, which vary from year to year. The dry season extends from November to April. The mean annual rainfall of the park ranges from 900mm to 1500mm, while the mean annual temperature is between 12°C and 37°C. The rainy season starts in May and ends in October, with the highest rainfall record between July and August. The dry season begins in November and goes through early April, and the hottest period is between March and April (Aremu *et al.* 2007). The vegetation of the Borgu sector of the park is transitional between Guinea and Sudan Savannas in the North. As a consequence, it displays a variety of vegetation types that form a mosaic of woodland savanna (Aremu *et al.* 2007), while the wild animal species of Kainji Lake National Park are typical of those large mammals associated with the Guinea savannah of West Africa (Ajayi and Ogunjobi 2015). There are also rich species of reptiles, birds, bats, amphibians, and insects, as well as over 60 fish species belonging to 20 families (Ayeni 2007).

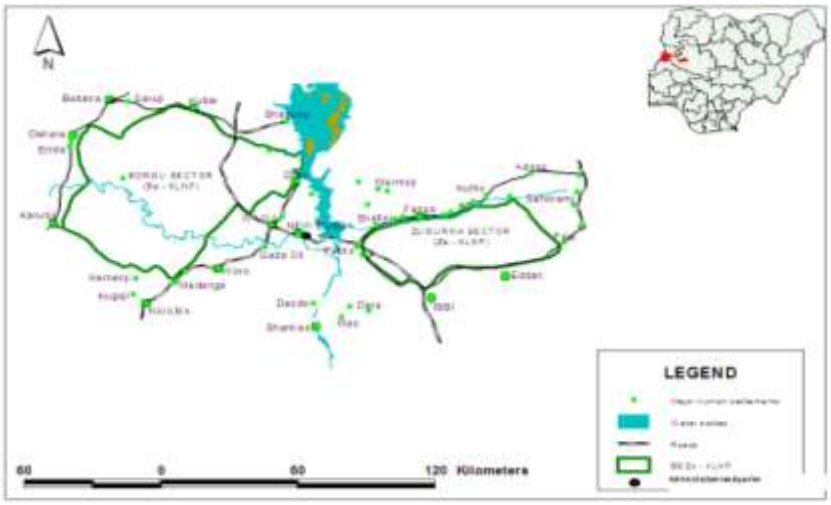

Fig. 1. Map of Kainji Lake National Park showing some surrounding communities (adapted from Ayeni 2007).

Data collection and analysis

Research instrument: Data for this study were collected using a questionnaire (Quantitative), observation, and a library search for information on existing literature (Qualitative).

Sampling techniques and data collection: The administration of the questionnaire for this study was restricted to the villages with farmland within 2 km of Kainji Lake National Park. Ten (10) purposively selected villages, namely Doro, Ibbi, Kemenji, Kpellegi, Kulho, Mulea, Patiko, Tunga Maje, Woro, and Worumakoto, were identified for the survey. Questionnaire and interview methods were used to collect information. Nonprobability snowballing method was used in locating and sampling 150 affected farmers. 15 affected farmers were sampled in each village except in the villages where the targeted farmers were not up to 15. In each community, structured questionnaires were administered randomly to farmers without gender discrimination. The farmers were randomly selected and structured questionnaires were administered among the respondents. All questionnaires administered were

recovered because the researchers waited and retrieved the questionnaires from the respondents on completion.

Table 1. Sample population and sampling size.

Villages	Distance of village to park	Distance of farm to park	No. of expected respondents
Doro	1 Km	1 Km	15
Ibbi	50 M	2 Km	15
Kemenji	2 Km	500 M	15
Kpellegi	100 M	2 Km	15
Kulho	1 Km	2 Km	15
Mulea	50 M	2 Km	15
Patiko	100 M	2 Km	15
Tunga Maje	200 M	1 km	15
Woro	2 Km	1 Km	15
Wuromakoto	2 Km	1 Km	15

Source: Adapted from Osunsina, 2016.

Data processing and analysis

Available data were processed and analysed using Special Package for Social Science (SPSS 17) and interpreted to find the result of the study. After data collection, responses to the questions about livelihoods in the study area were transferred to a master sheet to facilitate tabulation. The analyzed data were then represented in tabular and graphical forms.

RESULTS AND DISCUSSION

Socio-demographic characteristics of the farmers in the study area

The socio-demographic factors of the farmers in the selected community are shown in Table 2; the study shows that farming activities are male-dominated as the majority of farmers in the study area are male (74 %) while female farmers are the minority (26%). This observation is in consonance with Adebowale *et al.* (2021), who had similar findings in agrarian communities around Old Oyo National Park. This result can be justified by the assertion of Twyman *et al*. (2015) that farming activities are dominated mainly by men due to the need to provide food for the family. It was also observed that 49% of these farmers are above 40 year old, 38% are 31-40 year old, and 20-30 year old are the minority, with 13.0%. The educational status in the study area shows that 56% of the respondents had no formal education, while only 4% had post-secondary school education. Most (72.67%) of the farmers interviewed have farms within 5 km of the park and, therefore, are likely to encroach into protected areas. This confirmed that crop damage incidences are highly influenced by the distance between farms and the boundaries of protected areas (Malugu *et al.* 2011). Nyangoma (2010) also reported that most of the people living around protected areas engaged in farming activities. Adelakun *et al.* (2015, 2021) earlier recounted that socio-economic factors, especially farming, have compelled people to abuse the use of Kainji Lake National Parks, and this may result in conflict because of the human overlap with wildlife requirements resulting in costs to both native residents and animals. The majority (69.33%) of respondents affirmed that their major occupation is farming, while 45.34% have been in farming practice for more than 15 years.

Table 2. Socio-demographic characteristics of the farmers in the study area.

Variables		Respondents	Percentage (%)
Gender	Male	111	74.00
	Female	39	26.00
Age Group	20-30	19	12.67
	31-40	57	38.00
	40 and above	74	49.33
Qualification	No Formal Education	84	56.00
	Primary	39	26.00
	Secondary	21	14.00
	Tertiary	6	4.00
Religion	Islam	99	66.00
	Christianity	51	34.00
Proximity of farm to Park	≤5 Km	109	72.67
	>5 Km	41	27.33
Major Occupation	Farmers	104	69.33
	Artisan	9	6.00
	Hunting	10	6.67
	Civil Servant	11	7.33
	Trader	11	7.33
	Any other	5	3.34
Years of farming practice	1 – 5	12	8.00
	6 – 10	26	17.33
	11 – 15	44	29.33
	>15	68	45.34

Source: Field Survey, 2023.

Frequency of wild animal crop-raiding incidents in the study area

The results revealed that 92% of respondents agreed that there is frequent raiding of farmed crops by wild animals in the study area. The recurrent raiding of farmed crops by wild animals in the study area, as established by the farmers, agreed with the report that crop-raiding by wild animals is increasingly known to be a source of conflict between the animals and humans perhaps especially along the boundaries of protected areas (Gillingham and Lee 2003, Linkie *et al.* 2007) while Karanth and Nepal (2012) also found crop raiding to be the most prevalent and persistent form of Human-Wildlife Conflict in the protected areas.

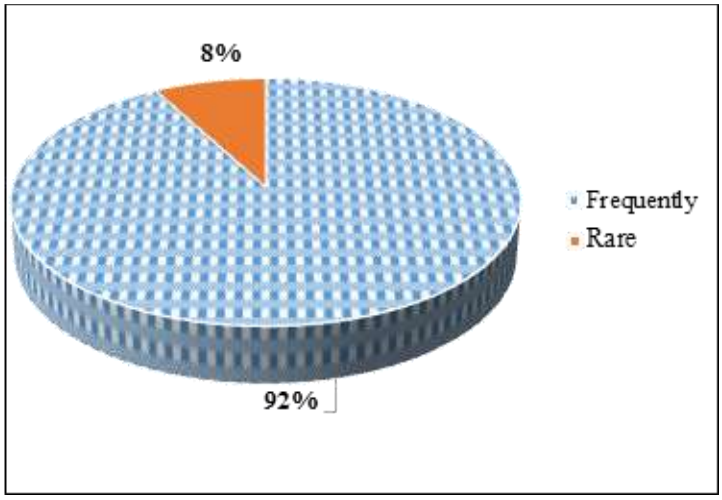

Fig. 2. Frequency of crop-raiding incidents in the study area. Source: Field Survey, 2023.

Wild animals that usually raid a particular crop in the study area

The major crops planted in the area are maize (*Zea mays*), rice (*Oryza sativa*), sorghum (*Sorghum bicolor*), millet (*Pennisetum glaucum*), groundnut (*Arachis hypogaea*), beans (*Phaseolus vulgaris*), yam (*Dioscorea alata*), and soybeans (*Glycine max*). This corroborated the findings of Ajayi *et al.* (2019), who reported similar findings in Zugurma sector of the park. Ogunjobi and Adeola (2016) and Ajayi *et al.* (2019) confirmed that maize is the predominant crop grown in the study area; hence, it is the most raided plant. The animals identified in crop raiding were birds, baboons, monkeys, and rodents, as shown in Fig. 2 and 3. Birds are the most crop-raiding wildlife with the highest frequency of 40%, 33%, 29%, 28%, and 27% recorded for soybeans, rice, beans, sorghum, and millet, respectively, though it doesn't raid on yam in the study area. This agreed with Ogunjobi and Adeola (2016), who observed that primates, rodentia and aves were the most destructive crop raiders around the farmlands in the Borgu sector of Kainji Lake National Park.

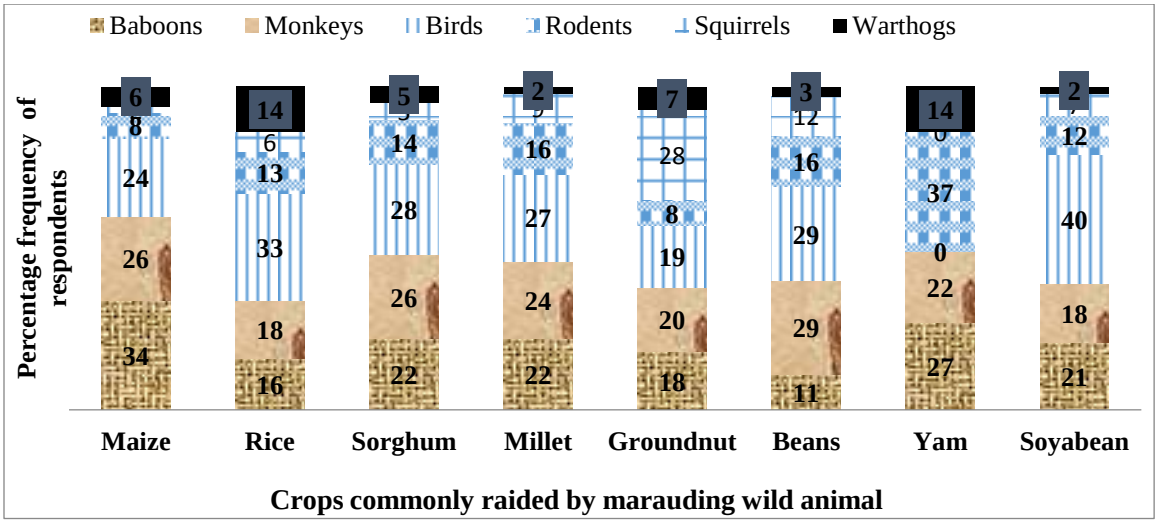

Fig. 3. Percentage frequency of farmers' responses to wild animals that usually raid a particular crops in the study area (Field Survey, 2023).

The primates Baboons (*Papio anubis*) and monkeys (*Cercopithecus* spp.), and rodents including giant rats (*Cricetomys* spp.) as well as cane rats (*Thronomys swinderianus*) are reported to be destructive to all major crops in the study. Muhereza (2017) also observed birds as the highest crop raider wildlife while primates (Baboons and monkeys) and rodents (including giant rats and cane rats) are reported to be destructive to all major crops in the study area around Bwindi Impenetrable National Park, Kenya. He reported that birds were said to destroy mainly the cereal type of crops like maize, millet, and sorghum because birds eat newly planted seeds of cereals. In contrast, baboons destroy almost every type of crops even if they do not eat these but they uproot and leave on the ground.

Preventive methods used in guarding farms against crop-raiding wild animal

Table 3 shows the preventive/control measures adopted by the farmers; scarecrow is the most (41.33%) preventive measure, followed by watch guarding (20.67%) and trapping (16.67%). Only 7% of respondents attest to the hunting of the marauding wildlife. The study agrees with the Hill's (2000)

investigation that the most common measures used by farmers against marauding animals include the design of scarecrows. The adopted preventive measures in the study, have earlier been confirmed as common strategies employed by farmers in protecting their crops from wildlife (Warren *et al.* 2007, Eniang *et al.* 2011, Ogunjobi and Adeola 2016, Magama *et al.* 2018, Geleta *et al.* 2019).

Table 3. Preventive methods used to discourage crop raiding on the farmland.

Methods	Frequency	Percentage (%)
Watch Guarding	31	20.67
Trapping	25	16.67
Scare Crow	62	41.33
Fencing	21	14.00
Hunting	11	7.33
Total	150	100.00

Field Survey, 2023.

Farmers' complaint of wildlife raiding community's farm to park management

The study findings show that most (74%) of the respondents reported incidents of crop raiding to the park management hence, the authority is aware that there are marauding wild animals raiding farms in the study area (Fig. 4). Eniang *et al*. (2011) also confirmed that farmers around Gashaka-Gumti National Park are becoming tired of reporting crop raids to the management of park because nothing positive was done to several complaints of the people.

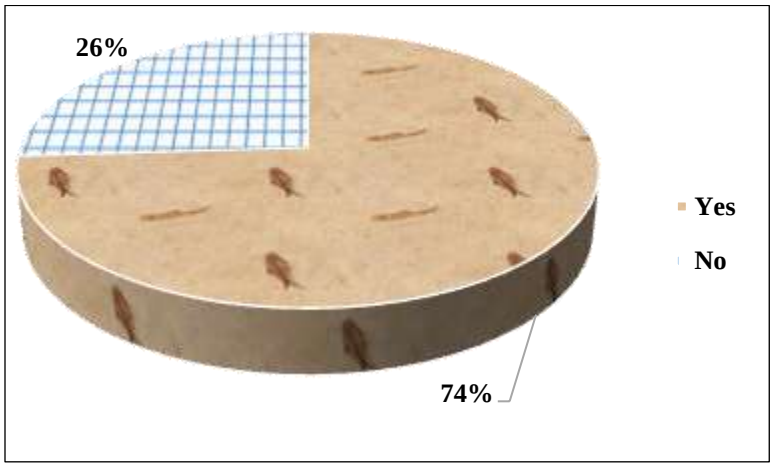

Fig. 4. Farmer's complaint of wildlife raiding community's farm to Park Management in the study area (Field Survey, 2023).

Perceived impact of crop raiding on farmer's livelihood in the study area

From the study, respondents (4.93±0.09) agreed that crops raiding usually lead to low yield as farm products are either eaten or damaged by the marauding wildlife and most respondents (4.45±0.45) lamented that this increases risk of starvation as there is less food due to loss of farm produce. Some farmers (2.78±1.51) also complain that residue from crops is not returned to the soil as fertilizer when eaten by marauding animals, hence contributing to loss of soil fertility. It was therefore confirmed by the majority (4.65±0.50) respondents that incidents of crop-raiding threaten the livelihood of affected farmers and consequently contribute to the unemployment menace in the study area (Table 4). These

situations confirmed that crop raiding undermines food security and tolerance of wildlife within neighboring human communities as earlier reported by Hill and Wallace (2012) also observed in North Sumatra, Indonesia' where it was reported that about 95% of the farmers claimed that wildlife is causing damages to cultivars (Marchal and Hill 2009). These observations were then agreed with those Attia *et al.* (2018), who concluded that crop-raiding is a severe problem as crop-raiding animals can have a devastating impact on the standard of living of peasant farmers whose entire survival is dependent on subsistence agriculture.

Table 4. Perceived impact of crop raiding on farmer's livelihood in the study area.

Variables	Strongly agreed		Agreed		Neutral		Disagreed		Strongly disagreed		Means	Std. Dev.
	F	%	F	%	F	%	F	%	F	%		
Low yield from crop damaged	138	92	12	8	0	0	0	0	0	0	4.93	0.090
Increase risk of starvation as there is less food due to loss of farm produce	94	63	44	29	0	0	12	8	0	0	4.45	0.454
Residue from crops is not returned to soil as fertilizer when they are eaten by marauding animals	20	13	45	30	20	13	12	8	53	35	2.78	1.51
Means of livelihood of farmer's are threatened	91	61	59	39	0	0	0	0	0	0	4.65	0.050
It causes unemployment	38	25	54	36	38	25	13	9	7	5	4.05	0.090

Field Survey, 2023.

Attitude and perception of farmers to wildlife conservation in the study area

From the Table 4, respondents' (4.52±0.41) had the opinion that wild animals are not useful to farmers, with the majority (4.54±0.41) believing that the beneficiaries of these wild animals are the tourists and park management who are benefited from the ecotourism activities. Hence, some farmers (3.83±0.43) confirmed killing of the marauding wild animal whenever it is spotted to avoid future damage to their farm products. The majority of the respondents (4.24±0.36) further agreed that retaliatory efforts have led to a reduction in the wild animals due to indiscriminate killing by farmers in the study area. These results agreed with Hill (2004) and Anthony (2007) that surrounding communities' attitudes towards protected areas are often influenced by existent or perceived damage caused by wildlife. According to Hill and Wallace (2012), crop raiding has a negative impact on the conservation of wildlife in the wild since people dislike the species because of property loss that contributes to food insecurity and poverty, while Eniang *et al.* (2011) observed that crop raiding has become more frequent, severe and serious obstacles to conservation efforts in Africa. However, it was understood that Kainji Lake National Park would not cause major economic loss to the surrounding communities because of its developmental projects in the surrounding communities. This agreed with Ajayi *et al.* (2019), who declared that people around the Zugurma sector of Kainji Lake National Park support conservation.

Measures suggested to prevent farmers-wildlife conflict

Understanding and addressing possible conflict that can arise due to crop raiding is a crucial conservation issue(Hockings and Humle 2009); hence, the farmers in the study area suggested that park authority should endeavor to compensate the victims of wildlife crop raiding as shown in Fig. 5, most

farmers (41.33%) suggested that park authority should endeavor to compensate victims of wildlife crop raiding. This is agreed with Wagner *et al.* (1997) that a significant benefit attributed to compensation programs is that they may increase tolerance of wildlife and promote more positive attitudes and support for conservation among people who live closest to endangered and dangerous animals.

Table 5. Attitude and perception of farmers to wildlife conservation in the study area.

Variables	Strongly agreed		Agreed		Neutral		Disagreed		Strongly disagreed		Means	Std. Dev.
	F	%	F	%	F	%	F	%	F	%		
Wild animals are not useful to us	89	59	44	29	0	0	11	8	6	4	4.52	0.412
Beneficiaries of these wild animals are tourists and park management	68	45	44	29	27	18	0	0	11	8	4.54	0.408
Killing of the marauding wild animal whenever we spot them to avoid future damage.	30	20	50	33	40	27	23	15	7	5	3.83	0.430
There is a reduction in the wild animals due to indiscriminate killing by farmers.	75	50	49	33	12	8	14	9	0	0	4.24	0.362
National Park cause economic loss to the surrounding communities.	6	4	53	34	19	12	12	9	60	42	2.50	1.416

Field Survey, 2023

Respondents (20.67%) believe that employing more rangers will provide job opportunities to the surrounding communities, increase patrol regularity, and consequently reduce the presence of marauding wild animals around and within conflict zones. Many (20%) farmers also recommended that park management should consider fencing park boundaries to confine the movement of wild animals to the protected area. Anthony (2007) and Chaminuka (2010) recounted that poor fence maintenance along the borders of protected areas often directly results in increased permeability of fences and, therefore, intensifies human-wildlife conflict and negative attitudes towards wildlife in neighboring communities. However, the extermination of the marauding wild animals in the study area is an unpopular suggestion because people now understand the impending danger associated with such practice in the study area.

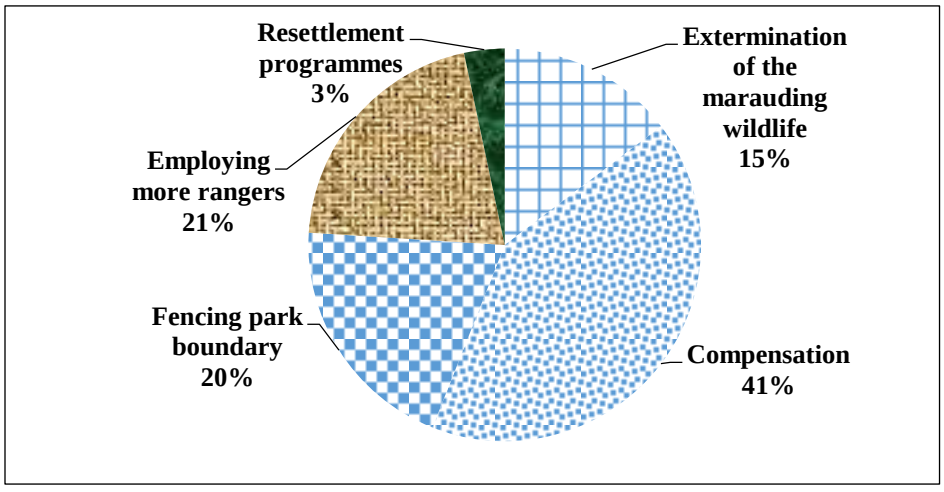

Fig. 5. Measures suggested to prevent farmers-wildlife conflict in the study area (Field Survey, 2023).

Farmer's knowledge of park management intervention to incidents of crop raiding

Table 6 shows farmers' knowledge of park management intervention concerning crop raiding incidents in Kainji Lake National Park. The result with a mean of 2.37±1.51 shows that the majority of the respondents indicated that there is low community awareness and conservation education in the study area. It was further confirmed (with a mean of 1.78±1.10) that the respondents are not aware of any compensation scheme for the affected farmers. There was further disagreement that the park has a voluntary relocation program for affected farmers, neither there is intense human vigilance by the park ranger against crop raiding by wild animals, nor has the park intensified its fencing to bar wild animals from freely moving to human habitat. Most respondents also recounted that most times, the park has not been exterminating the reported marauding wild animals, and the authority does not take up the social responsibility of the affected farmers.

Table 6. Farmer's knowledge of park management intervention to incidents of crop raiding in the study area.

Variables	Strongly agreed		Agreed		Neutral		Disagreed		Strongly disagreed		Means	Std. Dev.
	F	%	F	%	F	%	F	%	F	%		
Community awareness and education.	18	12	24	16	27	18	9	6	72	48	2.37	1.51
The Park has a developed compensation scheme for the affected farmers.	0	0	14	9	34	23	7	5	95	63	1.78	1.10
The Park has a voluntary relocation program for affected farmers.	17	11	34	23	13	9	18	12	68	45	2.42	1.52
There is intense human vigilance by the park ranger against crop raiding by wild animals.	20	13	45	30	20	13	13	9	52	35	2.78	1.51
The Park has intensified its fencing to bar wild animals from freely moving to human habitats.	6	4	55	37	6	4	51	34	32	22	2.67	1.278
Park has been exterminating the reported marauding wild animals.	0	0	0	0	0	0	150	100	0	0	2.00	0.000
The Park has taken up social responsibility for the affected farmers.	0	0	73	49	16	10	23	16	38	25	2.17	1.28

Field Survey, 2023

These inadequacies have earlier been confirmed in the study area by Adelakun *et al* (2021) who suggested that the park needs to do more to address cases of human-wildlife conflicts in Kainji Lake National Park, Nigeria as not to force fringe communities into absorbing the costs of living with wildlife and encourage local support for conservation. Worku (2019) also confirmed that these indices are crucial for achieving wildlife conservation and can influence the relationship between local people and protected areas.

From the study, it is evident that crops raiding usually lead to low yield as farm products are either eaten or damaged by the marauding wildlife and this consequently increases risk of food insecurity as there is less food due to loss of farm produce. It was therefore confirmed from the study that incident of crop raiding is a threat to means of livelihood of affected farmers and thus have adverse effects on the local support for the conservation of wildlife in Kainji Lake National Park. However, farmers think that

a major benefit attributed to compensation programs may increase the tolerance of wildlife and promote more positive attitudes and support for conservation among the local communities.

In addition, Park authority needs to consider reviewing its policy for the minimization of human wildlife conflicts; for instance, enforcement of regulations and legislation on the safe distance on community settlement from the park.

REFERENCES

Adebowale, T. K., O. O. Oduntan, O. A. Ijose and B. B. Onamade. 2021. Wild animal-crop raiding conflict: a case study of Old Oyo National Park, Nigeria. *J. Res. For. Wild. Environ.* **13**(1): 145-156.

Adelakun, K. M., A. J. Adeola, S. K. Halidu, K. Bakare and E. B. Omole. 2015. Socio economic activities of rural community and their perception on conservation in Okomu National Park, Nigeria. *Int. J. Devt. Strat. Hum. Manage. Soc. Sci*. **5**(1): 103-115.

Adelakun, K. M., A. O. Ibrahim, D. A. Joshua, A. S. Adedeji, E. O. Adedeji and A. A. Sa'adu. 2021. Factors influencing human-wildlife conflicts in communities around Kainji Lake National Park, Nigeria. *Nigerian J. Wild. Manag.* **5**(1): 46-53.

Adeola, A. J., O. A. Akande, J. O. Onihunwa, A. Sulyman, O. A. Adeniji and P. O. Olaifa. 2022. Warthog-human conflicts in Borgu Sector of Kainji Lake National Park, Nigeria. *FUDMA J. Sci.* **6**(2): 88-95.

Adeola, A. J., J. A. Ogunjobi, O. S. Odewumi, S. A. Alaye and S. Muideen. 2017. *Causes and impacts of conflicts on biodiversity management in buffer zone area of Kainji Lake National Park (Borgu sector).* In Proceedings of Wildlife Management society of Nigeria (WIMSON), 17th-20th September, 2017 at the Federal University of Agriculture, Abeokuta, Ogun State, Nigeria., pp. 365-372.

Ajayi, S. R. and J. A. Ogunjobi. 2015. Composition of large mammal day-time visitation to salt lick sites inside Kainji Lake National Park, Nigeria. *Ife J. Sci.* **17**(2): 335-340.

Ajayi, S. R., P. O. Osaguona, B. T. Elekhizor, D. O. Oyeleye, P. N. Meduna and A. A. Habib. 2019. Assessment of crop raiding activities of wild animal species in Kainji Lake National Park, Nigeria. *J. Res. Fores. Wild. Environ.* **11**(1): 132-140.

Anthony, B. P. 2007. The dual nature of parks: attitudes of neighboring communities towards Kruger National Park, South Africa. *Environ. Conserv.* **34**(3): 236-245.

Aremu, O. T., S. A. Onadeko, B. A. Ola-Adams and F. I. Inah. 2007. Population Parameters and Biomass of African Buffalo (*Syncerus caffer*) in Kainji Lake National Park, Nigeria. *J. App. Sci.* **7**(13): 1809-1812.

Attia, T. S. N., T. N. Martin, T. P. Forbuzie, T. E. Angwafo and M. D. Chuo. 2018. Human wildlife conflict: causes, consequences and management strategies in Mount Cameroon National Park South West region, Cameroon. *Int. J. For. Ani. Fish. Res.* **2**(2): 34-49.

Ayeni, J. S. O. 2007. *Participatory management plan in Kainji Lake National Park*. ENVIRON-CONSULT: Lagos. 156 pp.

Chaminuka, P. 2010. What do the local communities say about fences? In: K. Ferguson and J. Hanks (eds.). *Fencing Impacts: A Review of the Environmental, Social and Economic Impacts of Game and Veterinary Fencing in Africa with Particular Reference to the Great Limpopo and Kavango-Zambezi Transfrontier Conservation Areas*. Mammal Research Institute, Pretoria, South Africa. 328 pp.

Distefano, E. 2005. *Human-Wildlife Conflict Worldwide: Collection of Case Studies, Analysis of Management Strategies and Good Practices*. SARD. Initiative Report, FAO, Rome, Italy. 34 pp.

Distefano, E. 2010. *Human-Wildlife Conflict worldwide: collection of case studies, analysis of management strategies and good practices*. Retrieved from. *www.fao.org/sard/common/ecg/1357/en/hwc final.pdf.* accessed on 4 May 2022.

Eniang, E. A., H. M. Ijeomah, G. Okeyoyin and A. E. Uwatt. 2011. Assessment of human wildlife conflicts in Filinga Range of Gashaka Gumti National Park, Nigeria. *PAT*. **7**(1): 15-35.

FAO (Food and Agriculture Organisation). 2009. *Human-wildlife conflict in Africa causes, consequences and management strategies*. Forestry paper. Rome, Italy. 157 pp.

Geleta, M., H. Jebessa and A. Bekele. 2019. Human-buffalo conflict around Jorgo-Wato Protected Forest, Western Ethiopia. *Global Veterinaria.* **21**(1): 17-23.

Gillingham, S. and P. C. Lee. 2003. People and protected areas: a study of local perceptions of wildlife crop-damage conflict in an area bordering the Selous Game Reserve, Tanzania. *Oryx.* **37**(3): 316-325.

Hill, C. M. 2004. Farmers' perspectives of conflict at the wildlife-agriculture boundary: some lessons learned from African subsistence farmers. *Human Dimensional Wildlife.* **9**(4): 279-286.

Hill, C. M. 2000. Conflict of interest between people and baboons: crop raiding in Uganda. *Int. J. Primat.* **21**: 299-315.

Hill, C. M. and G. E. Wallace. 2012. Crop protection and conflict mitigation: reducing the cost of living alongside non-human primates. *Biod. Conserv.* **21**: 2569-2587.

Hockings, K. and T. Humle. 2009. Best Practicies Guidelines for the Prevention and Mitigations of Conflict between Humans and Great Apes, *Occasional Paper of the IUCN Species Survival Commissions No 37.*IUCN, Gland, Switzerland. 40 pp.

Karanth, K. K. and S. K. Nepal. 2012. Local residents' perception of benefits and losses from protected areas in India and Nepal. *Environ. Manag.* **49**(2): 372-386.

Kideghesho, J. R., E. Røskaft and B. P. Kaltenborn. 2007. Factors influencing conservation attitudes of local people in Western Serengeti, Tanzania. *Biodivers. Conserv.* **16**(7): 2213-2230.

Linkie, M., Y. Dinata, A. Nofrianto and N. Leader-William. 2007. Patterns and perceptions of wildlife crop raiding in and around Kerinci Seblat National Park, Sumatra. *Ani. Conserv.* **10**: 127-135.

Magama, Y. A., M. Babagana, A. U. Usman, A. A. Gujja, A. Adamu and A. E. Karachi. 2018. Assessment of Wildlife Species Mostly Involved in Human-Wildlife Conflict around Yankari Game Reserve, Bauchi State, Nigeria. *Int. J. Contemp. Res. Rev.* **9**(9): 20262-20277.

Malugu, L. T., R. E. Hoare, D. G. Mpanduji and S. L. S. Maganga. 2011. Status and mitigation measures of elephant crop raiding in areas adjacent to Grumeti-Ikorongo Game Reserves, Northern Tanzania. Proceeding of V. Marchal and C. Hill (2009). Primate Crop-raiding: A Study of Local Perceptions in Four Villages in North Sumatra, Indonesia. *Prim. Conserv.* **24**:107-116.

Marchal, V. and C. Hill. 2009. Primate crop-raiding: a study of local perceptions in four villages in north Sumatra, Indonesia. *Primate Conserv*. **24**: 107-116.

McGregor, J. A. 2005. Crocodile crimes: people versus wildlife and the politics of post conservation on Lake Kariba, Zimbabwe. *Geoforum*. **36**(3): 353-369.

Muhereza, D. 2017. *The influence of animal crop raiding on local peoples' attitudes towards the conservation of Bwindi Impenetrable National Park, Kenya*. B.Sc. Thesis. Department of Environmental Science, Makerere University, Kenya. 57 pp.

Nyangoma, J. 2010. *The Impact of Crop Raiding by Wild Animals from Bugoma Forest Reserve on Farmer's Livelihoods*. M.Sc. Thesis. Makerere University, Uganda.

Nyhus, P. J. and R. T. Sumianto. 2000. Crop raiding elephants and conservation implications at Way Kambas National Park, Sumatra, Indonesia. *Oryx*. **34**(4): 262-274.

Ogunjobi, J. A. and A. J. Adeola. 2016. Wild vertebrates associated with crop raiding around Kainji Lake National Park, Nigeria. *App. Trop. Agr.* **21**(3): 138-142.

Osunsina, I. O. O. 2016. Illegal resources extraction and preponderance distance of villages: a case study of four Nigerian National Parks. *Int. J. Conserv. Sci.* **7**(3): 771-782.

Riley, E. P. 2007. The human-macaque interface: conservation implications of current and future overlap and conflict in Lore Lindu National Park, Sulawesi, Indonesia. *American Anthrop.***109**(3): 473-484.

Shilongo, S. M., M. Sam and A. Simuela. 2018. Using incentives as mitigation measure for human wildlife conflict management in Namibia. *Int. J. Sci. Res. Pub.* **8**(11): 666-682.

Sillero-Zubiri, C. and D. Switzer. 2001. *Crop raiding primates: searching for alternative, Human ways to solve conflict with farmers in Africa*. People and Wildlife Initiative. Wildlife Conservation Research Unit, Oxford University. 20 pp.

Treves, A. and K. U. Karanth. 2003. Human-carnivore conflict and perspectives on carnivore management worldwide. *Conserv. Biol.* **17**(6): 1491-1499.

Twyman, J., J. Muriel and M. A. García. 2015. Identifying women farmers: Informal gender norms as institutional barriers to recognizing women's contributions to agriculture. *J. Gender Agric. Food Sec.* **1**(2): 1-17.

Wagner, K. K., R. H. Schmidt and M. R. Conover. 1997. Compensation programs for wildlife damage in North America. *Wild. Soc. Bull.* **25**: 312-319.

Warren, Y., B. Buba and C. Ross. 2007. Patterns of crop-raiding by wild and domestic animals near Gashaka Gumti National Park, Nigeria. *Int. J. Pest Manag.* **53**(3): 207-216.

Woodroffe, R., S. Thirgood and A. Rabinowitz. 2005. *People and wildlife, conflict or co-existence?* Cambridge University Press. Cambridge, UK.

Worku, D. 2019. Impacts of wildlife on the livelihood of communities living near protected areas in Ethiopia, control measures and its implication for conservation. *J. Res. Dev. Manag.* **55**: 1-6. *doi: 10.7176/JRDM*

(Manuscript received on 01 December, 2023)