

## Wild Vertebrates Associated with Crop Raiding Around Kainji Lake National Park, Nigeria

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### ABSTRACT

Crop raiding activities of wild vertebrates around Kainji Lake National Park (KLNP), Nigeria was investigated in 2013. Based on closeness to the park boundaries, ten out of thirty communities were purposively selected for this study. Questionnaire and on-site field assessments were used to gather research information while catalogue with pictures of different wild vertebrates endemic to KLNP was used to authenticate farmers' claim on wild animal species. Data generated were subjected to descriptive and chi-square analyses. The common wild vertebrates raiding farmlands identified by the farmers comprised of nine species belonging to three orders (primates, rodentia and aves). Large percentage of the raids (43.53%) was perpetrated by primates with the highest single raid carried out by *Papio anubis*. Statistically, species of wild vertebrates involves in crop raiding were significantly different ( $\chi^2 = 344.09$ ,  $df = 8$ ,  $p < 0.01$ ) in relation to farm locations. There are seven commonly raided crops and *Zea mays* was the most frequently (30.73%) raided while *Manihot esculenta* (1.67%) was the least. Raiding pattern by wild vertebrates was similar to farmers' cultivating pattern (*Zea mays* > *Sorghum bicolor* > *Vigna unguiculata* > *Oryza sativa* > *Arachis hypogaea* > *Discorea spp* > *Manihot esculenta*). The raided crop however varies significantly ( $\chi^2 = 324.68$ ,  $df = 6$ ,  $p < 0.02$ ) across the selected communities.

**Key words:** Wild vertebrate, wildlife management, crop raiding, livelihoods

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### INTRODUCTION

Increase in human population especially around protected areas encourages direct competition for natural resources by both human and wildlife. Competition for land resources between human and wildlife had resulted to human-wildlife conflict between wildlife manager and people living around protected areas (Hill, 1999). Understanding and addressing conflict between humans and wildlife due to crop-raiding is a crucial conservation issue (Graham and Ochieng, 2008). Around Kainji Lake National Park (KLNP), land hunger due to increase in human desires for space to meet their livelihood needs is of great concern. In a place with similar experience with what biodiversity of KLNP is facing, increase in human population and expansion of agricultural land will forced wild animals into modified habitats (Forthan Quick and Demment, 1988) which will continue to cause crop raiding and damages (Osborn and Hill, 2005).

In western Uganda for example, crop raiding has been identified as a key form of human-wildlife conflict and the

most important perceived disadvantages of farming close to protected areas (Archabald and Naughton-Treves, 2001). Crops near forest are sources of food for wildlife and damages through raiding by wild animals can cause reduced farmers livelihood (Strum, 2010). However, the orders of wild animals most often cited are primates and rodents (Newmark *et al.*, 1994; Kaswamila, 2007) while Cassava (*Manihot spp*), Sweet potatoes (*Ipomea batatas*), Groundnut (*Arachis hypogaea*), Sorghum (*Sorghum vulgare*) and Maize (*Zea mays*) are the most affected crops in Tanzania (Malugu and Hoare, 2007; Kikoti *et al.*, 2010). According to Graham and Ochieng (2008) and Hockings and Humle (2009), understanding and addressing possible conflict that can arise due to crop raiding is a crucial conservation issue. This study evaluated the common wild vertebrates involved in crop raiding around KLNP, Nigeria. The focus of this research was to identify common wild vertebrates that participate in crop raiding activities and the affected crops.

## MATERIALS AND METHODS

### The Study Area

Kainji Lake National Park (KLNP) is the premier national park in Nigeria covering a total area of 5340.82 km<sup>2</sup> and composed of two non-contiguous sectors (Borgu and Zugurma sectors). The Borgu sector of the park with an area of 3970.02 km<sup>2</sup> is situated in Borgu (Niger State) and Kaiama and Baruten (Kwara State) Local Government areas while the Zugurma sector occupies an area of 1370.80 km<sup>2</sup> and situated in Mashegu Local Government area of Niger State. The two sectors of the park are separated by the Kainji Lake, a lake impounded on the Niger River for hydroelectric power generation (Figure 1). The entire park lies between latitudes 9° 40' N and 10° 23' and longitudes 3° 30' and 5° 50' E (Ogunjobi *et al.*, 2012). Majority of the communities around KLNP can be described as rural area with subsistence farming the most important economic activity of the people apart from the presence of state and federal government ministry and agencies.

**Table 1:** Distribution of farmers interviewed in the selected communities (N=271)

| Names of communities | Number of farmers interviewed | Percent (%) |
|----------------------|-------------------------------|-------------|
| Ibbi                 | 55                            | 20.3        |
| Felegi               | 20                            | 7.38        |
| Mulea                | 18                            | 6.64        |
| Shafini              | 24                            | 8.86        |
| Kiizhi               | 16                            | 5.9         |
| Wawa                 | 40                            | 14.76       |
| Gada-Oli             | 32                            | 11.81       |
| Kuble                | 16                            | 5.9         |
| Luma                 | 30                            | 11.07       |
| Worumakoto           | 20                            | 7.38        |

### Sampling Techniques and Sample Size

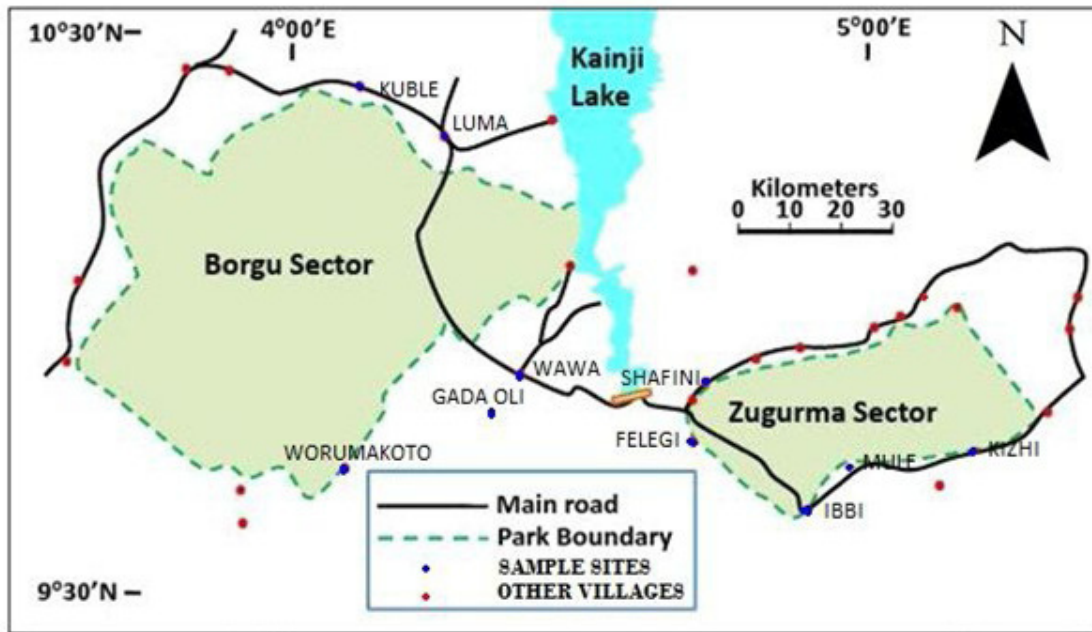
Multistage sampling was adopted in this study. Firstly, reconnaissance survey of the communities around KLNP done in conjunction with the volunteered youth around the park to determine the location of the communities. In the process, thirty communities were accessed. In the second stage of this study, questionnaires were administered to two hundred and seventy-one (271) farmers purposively selected based on their readiness to attempt the questions (Table 1). The questionnaire was written to elucidate types of crops raided and the species of wild vertebrates that

were responsible for the raid. The questionnaire covered farmers' experienced of crop raiding incidence in recent time, wild vertebrates responsible for the raids, types of crops affected, and parts of crops affected. On-site assessment on feeding behaviour, animals droppings and footprints where available was assessed in the third stage. Data generated were subjected to descriptive and chi-square analyses.

## RESULTS AND DISCUSSION

Interviewed farmers in the selected communities claimed that wild vertebrate raids were considered to be a major problem. Wild animals from three orders namely primates, rodentia and aves were mentioned raiding farm crops around KLNP. These three orders of wild vertebrate mentioned different in their body size and feeding ecology. Primates alone accounted for about 43.53% of the total percentage of the raids while rodentia and aves raids were 35.86% and 20.61%, respectively (Figure 2). Majority of single raids (30.47%) was done by *Papio anubis* while the least raids (5.38%) was performed by *Cricetomys gambianus*. *Erythrocebus patas*, *Thryonomys swinderianus* and *Francolinus bicalcaratus* were also mentioned by these farmers (Table 2). Naughton-Treves (1997) explained that large mammals will often forage on agricultural land, and human-animal conflict will be a common problem in many places where farmland borders protected areas. Baboons and rodents living near agricultural land were reported to often raid farms (Cuong *et al.*, 2002; Kaswamila, 2007). Our finding agreed with Govan (2010) report where it was stated that baboons are common near cultivated land. Species of wild vertebrates involved in crop raiding in this study shows significantly different ( $\chi^2 = 344.09$ ,  $df = 8$ ,  $p < 0.01$ ) from one location to the other.

Seven crops planted are mostly raided by wild vertebrates and the parts of crops eaten or destroyed during the raids depend of the species of wild vertebrates involves in the raid and the type of crops under attack (Table 3). Leaves, seeds, fruits and stems of *Zea mays* were mostly affected (30.73%) followed by the seed, seedling, fruits and leaves of *Vigna unguiculata* (13.83%) while the stems and roots of *Manihot esculenta* (1.67%) was the least. Raiding pattern of the animal similar to farmers' cultivating pattern (*Zea mays* > *Sorghum bicolor* > *Vigna unguiculata* > *Oryza sativa* > *Arachis hypogea* > *Discorea spp* > *Manihot esculenta*). Field assessment conducted within *Oryza sativa* farms within Ibbi community for example shows that *Thryonomys swinderianus* cut rice tillers at their base. Damage to rice tillers by rodents in this study was similar to the report of Buckle and Smith (1994). The parts of crops raided were significantly different ( $\chi^2 = 324.68$ ,  $df = 6$ ,  $p < 0.02$ ) from one crop to the other.



**Figure 1:** Map of Kainji Lake National Park showing the selected communities.

**Table 2:** Farmers' opinion on species of wild vertebrates raiding farms

| Species            | Scientific name                 | Order    | Frequency | %     |
|--------------------|---------------------------------|----------|-----------|-------|
| Olive baboon       | <i>Papio anubis</i>             | Primates | 238       | 30.47 |
| Patas monkey       | <i>Erythrocebus patas</i>       | Primates | 102       | 13.06 |
| Striped squirrel   | <i>Xerus erythropus</i>         | Rodentia | 74        | 9.48  |
| Unstriped squirrel | <i>Xerus rutilus</i>            | Rodentia | 58        | 7.43  |
| Guinea fowl        | <i>Numida meleagris</i>         | Aves     | 49        | 6.27  |
| Weaverbird         | <i>Ploceus velatus</i>          | Aves     | 62        | 7.94  |
| Cane-rat           | <i>Thryonomys swinderianus</i>  | Rodentia | 106       | 13.57 |
| Giant rat          | <i>Cricetomys gambianus</i>     | Rodentia | 42        | 5.38  |
| Francolin          | <i>Francolinus bicalcaratus</i> | Aves     | 50        | 6.4   |

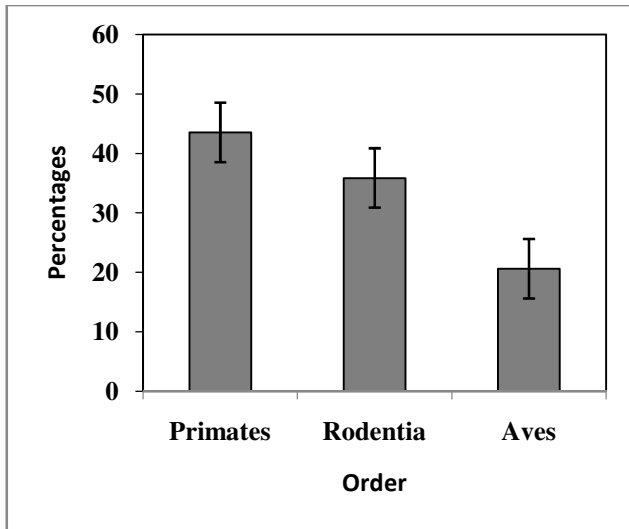


Figure 2: Crops raiding based on wild vertebrate order

## CONCLUSION

From this study, it is obvious that crop raiding by wild vertebrates is present around Kainji Lake National Park. Different parts of seven cultivated crops were affected during wild vertebrates' raids. Out of the seven cultivated crops raided, *Zea mays* and *Sorghum bicolor* were found to be predominantly affected. *Papio anubis* was reported to be responsible for the majority of the single raids. The planting pattern of the farmers needs to be adjusted to reduce the menace of crop damage by the wild vertebrates around Kainji Lake National Park. We encourage further studies to identify various methods adopted by the farmers in combating crop raids on their farmland. In order to incorporate sustainable livelihood of the farmers and encourage farmers' tolerance to wild vertebrates, research on how to develop realistic measures to reduce raiding activities of these wild vertebrates and support the livelihoods of the farmers around the park is inevitable.

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