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Human- Wildlife Conflict

The case of elephant at Mole National Park

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Natural Resources Management

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Human-wildlife conflict in Ghana: The case of elephants at the Mole National Park

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Dedicated to Dr. Ebenezer Twumasi Afriye

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Abbreviations

HEC	Human Elephant Conflict
HWC	Human Wildlife Conflict
MNP	Mole National Park
NP	National Park

Abstract

Conflicts between wildlife and humans, particularly people who share immediate boundaries with protected areas, are common phenomenon. Declining wildlife resources has been linked to human actions through overexploitation, habitat destruction, and habitat fragmentation among others. Local people also look at wildlife as a liability to them. This view is provoked by a bitter experience they have had due to costs inflicted by wildlife conservation. Such costs include; loss of access to legitimate and traditional rights, damage to crops and other properties, livestock depredation, and risk posed to people's lives through disease transmission and attacks by wild animals. The main objective of the study is to assess human-elephant conflicts at Mole National Park in Ghana. This study was carried out during the months of July and August, 2014 in the Larabanga, Mognori, Murugu and Kananto to look into the HEC Conflicts occurring in these villages. Data collection was through semi-structured questionnaires, desk study. Results from the study revealed that crop raiding were the main cause of human-wildlife conflicts occurring in the four villages. Elephants were identified as the most destructive in farm raiding incidences. More male performed positive attitudes to conservation of elephants than females, there were no significant difference in frequencies of positive or negative attitudes towards elephant conservation found between the different education levels or at different distances from the park.

1. Introduction

Human-Wildlife Conflict (HWC) is fast becoming a serious threat to conservation and the survival of many endangered species in the world. 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). In West Africa, natural resources abound but are gradually diminishing, this is due to numerous conflicts that have surrounded its use, management and the conservation of such resources (Armah, Luginaah, Yengoh, Taabazinga, & Yawson, 2014). Frequently, support to conservation is compromised when people's interests and source of livelihoods are threatened. And this is more intense in developing countries, where human populations tend to suffer higher economic cost (Distefano, 2005; Hoare & Du Toit, 1999; Kideghesho, Røskoft & Kaltenborn, 2007). Human-wildlife conflict can be seen as a major threat to the support of fringed communities for conservation, and aggression of some outspoken minority can undermine regional conservation initiatives (Naughton, Rose, & Treves, 1999).

Human–elephant conflict (HEC) refers to a range of direct and indirect negative interactions between people and elephants which potentially harm both (Zhang & Wang, 2003). Problem elephants normally extend their ranges into human settlements to feed and also sometimes damage food stores, water installations or fences and barriers, and occasionally injure or kill people (Hoare, 1999). In recent years, conflicts between humans and elephants have escalated throughout their range and the most publicized are crop damage by elephants and injury or death to people (O'Connell-Rodwell, Rodwell, Rice, & Hart, 2000; Zhang & Wang, 2003). Early management of wildlife in Africa has involved widespread elephant control and shooting. But despite a general decline in the African elephants (*Loxodonta africana*) population, they have continued to be in conflict with farmers in many parts of Africa (Hoare, 1999; Røskoft, Larsen, Mojaphoko, Sarker, Jackson, 2012). This brings greater attention to West African elephants, since human populations'

expansion is shrinking elephant ranges. This is due to the expansion of human dominated landscapes, most often at places where agriculture is the predominant land use practice highlights the conflict between development and human welfare on the one hand and the preservation of threatened wildlife animals. The damages caused by elephants to the crops, and the realization that elephant populations are going extinct, will always bring about conflict (Barnes, 1999; O'Connell-Rodwell et al., 2000). In the mid 1990's, crop raiding by elephants was a big issue for farmers in the Red Volta Valley. And it was also reported that farmers were intolerant to the risk of losing crops to elephants (Adjewodah, Beier, Sam, & Mason, 2005). For instance in some African countries, peasant farmers perceived many aspects of wildlife conservation negatively due to costs inflicted by crop raiders and dangerous wild animals. More so, farmers who lost crops to elephants were against the conservation of wildlife (Kideghesho, Røskaft, & Kaltenborn, 2007).

1.2 Humans and Elephants

Elephants and people have interacted in Africa for thousands of years. Humans have preyed on elephants since the Stone Age, however, the advent of cultivation probably changed the relationship between the two species from one of a mild predator/prey interaction to one that is fundamentally competitive (Magome, 2007). The distribution of elephants in Africa is inseparably linked to that of humans; not least because they share similar habitat requirements and this would have given rise to localized competition between the two for space, probably resulting in elephants raiding people's crops from time to time. An analysis of rainfall and soil fertility in Kenya and Zimbabwe concluded that elephants like human beings preferred fertile and wet areas hence; competition for resources between the two species is inevitable. Few animals elicit such drastically different human emotions as do elephants (Naughton-Treves & Treves, 2005). Elephants capture the affection of people worldwide, but in some cases bring animosity and fear among those sharing their land with them (Okello, Njumbi, Kiringe, & Isiiche, 2014). Elephants were probably a major obstacle to the evolution of arable farming in pre-colonial Africa in both savannas and forests. Agriculturalists could probably only prosper in large, well-defended villages (Naughton et al., 1999). Field reports from across Africa describe

local antipathy to elephants beyond that expressed for any other wildlife. For instance, people living in central African forests fear and dislike elephants, farmers in Zimbabwe are hostile to elephants, rural Ugandans complain bitterly about elephants, and in Burundi, farmers still dread elephants years after the country's last were killed. This animosity is a threat to future elephant survival, particularly given the trend toward decentralized wildlife management throughout Africa. Under current conditions, most local farmers would eliminate elephants from their environment if given the choice (Naughton et al., 1999). The relationship between people and elephants is complex. It appears that people and elephants can coexist within the same landscape, but only up to a certain threshold of human density. Once this threshold is exceeded, elephants disappear from the landscape. However, it does not appear to be the density of people that affects the elephants so much as the transformation of natural habitat to agricultural land. If land transformation exceeds 40-50%, elephants will be extirpated from the landscape (Naughton-Treves & Treves, 2005; Parker, Osborn, Hoare, & Niskanen, 2007)

1.3 Objectives

The main objective of the study is to assess human-elephant conflicts at Mole National Park in Ghana.

1.3.2 Specific objectives

1. To explore human attitudes towards the conservation of elephants.
2. To determine measures to mitigate human-elephant conflict at the MNP.

1.3.3 Hypotheses

1. Elephants are raiding local people's farms during the night, and during the cropping season.
2. Education level, age and sex, but also distance from the park and level of experienced crop damage, affect attitudes towards the conservation of Elephants.
3. Adequate compensation for farm raiding would bring positive attitudes to local people towards conservation of Elephants.

2 Methodology

2.1 Study area

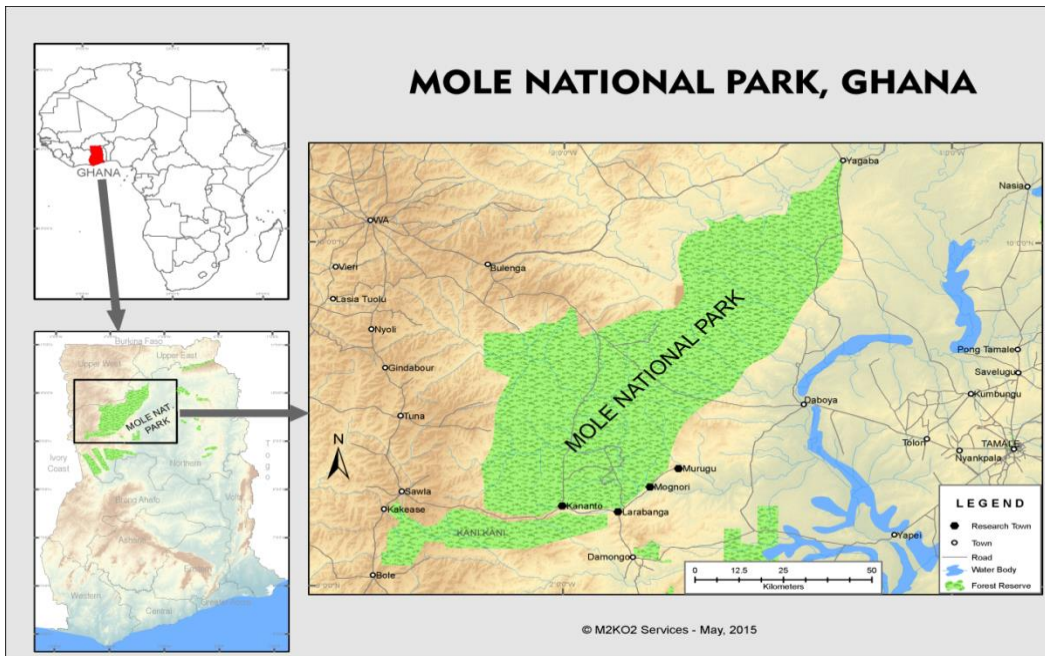


Figure 1 Map showing the study area along with the sampling villages

MNP is Ghana largest park found in the Northern region, lies mainly within the West Gonja District of the Northern Region of Ghana (Figure 1). It is situated between the latitudes $9^{\circ} 12'$ and $10^{\circ} 06'$ north and longitudes $1^{\circ} 25'$ and $2^{\circ} 17'$ west and over 1970 square miles or $5,100 \text{ km}^2$ and it the biggest park in the country (Bowell & Ansah, 1994; Dankwa-Wiredu & Euler, 2002; Riley, 2005).

The Park together with the Yakombo and Kanikani Forest Reserves cover about 30% of the $16,706 \text{ km}^2$ total land area of the West Gonja District. It is located across the western rim of the Volta Basin where the generally undulating topography with flat topped hills is dominated by the Konkori escarpment. The vegetation is Guinea Savanna with a grass-layer that can reach up to 3m in height during the rainy season. Low, open grassland, is found on areas with shallow soils. Narrow bands of riverine forest grow along most of the streams. Other plant populations such as swamps and flood-plains cover only small areas. Numerous rivers and streams run through or originate in the park and drain into the White Volta River. There is a single Rainy season between April and October with a mean annual rainfall of 1104mm. The

mean monthly temperature varies little (i.e. between 26.1 and 30.50 °C) yielding a mean annual temperature of 27.8°C although the average diurnal range is as much as 13.3°C (Dankwa-Wiredu & Euler, 2002).

It is the country's most developed park with rich wildlife and many trails from which they can be witnessed, either on foot or drive safari. Large animals which includes about 800 elephants, 1000 buffalo (*Syncerus caffer*), warthogs (*Phacochoerus africanus*), antelopes such as Defassa waterbucks (*Kobus ellipsiprymnus*), oribi (*Ourebia ourebi*), hartebeest (*Alcelaphus buselaphus*), gray and red flanked duikers (*Cephalophus rufilatus*) among others), hyenas (*Crocuta crocuta*), a few (rarely seen) lions (*Panthera leo*) and leopards (*Panthera pardus*) and five primates, most visibly are the baboons (*Papio anubis*). Two kinds of crocodiles and over 300 birds species including; saddle-billed storks (*Ephippiorhynchus senegalensis*), vultures (*Aegyptius monachus*), herons and egrets (*Ardeidae spp*), Abyssinian rollers, violet plantain-eaters (*Musophaga violacea*), Barbary shrikes, and red throated bee-eaters (*Merops bullocki*) (Riley, 2005).

2.2 Sampling units

As represented in **figure 1**, the sampling unit consisted of four fringed villages that are located around the park. The villages selected were based on the data and information that was obtained from the park management.

2.3 Sampling size

The sampling units were made up of 140 respondents with 32 from Kananto, 30 from Murugu, 53 and 25 from Larabanga and Mognori respectively.

2.4 Sampling design

Stratified random sampling design was used to choose the four communities that were involved in the data collection. Within the selected communities, random sampling was used to select households to be interviewed.

2.5 Data Collection

Both qualitative and quantitative data collection methods were used for the data collection. Questionnaire was administered to local people that live a distance of 5km² from the boundaries of the Mole NP. The questions were both closed and open ended.

2.6 Data analysis

The data obtained from the field was coded, organized, analyzed and interpreted to achieve the purpose of the study. In doing so, Statistical Package for Social Scientists (Version 16) was used to analyze findings interpreted in line with the research objectives and presented using bar charts.

3 Results

3.1 Communities, sex, age, education levels and occupation of respondents

A total of 140 questionnaires were administered. Hundred and eleven (79.3%) and (20.7%) of the respondents were males and females respectively.

Figure 2 shows the age distribution of the respondents. The age group 42-50 had the highest number of respondents.

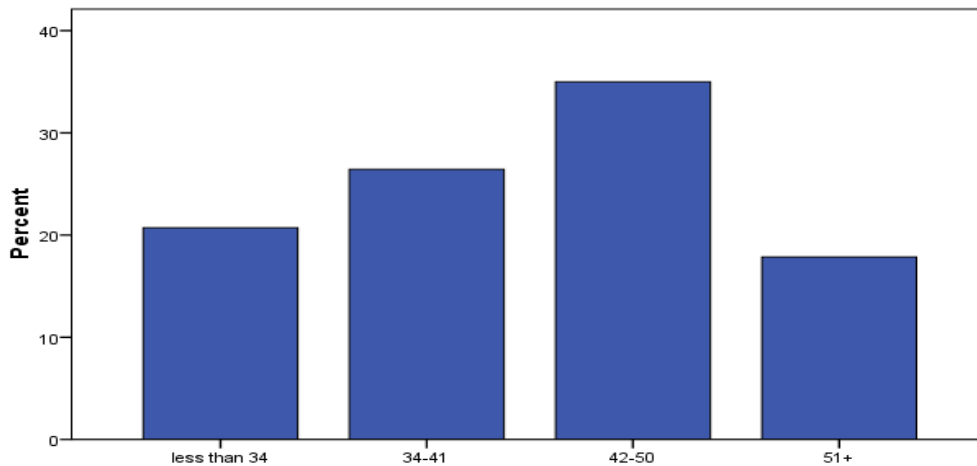


Figure 2 Age distribution of the respondents (n=140) in years.

Most respondents were farmers (n = 107, 76.4%) whilst 33 (23.6%) were defined as other occupations

Ninety four (67.0 %) had no formal education, whereas, 33 (23.6 %) and 13 (9.3 %) have had primary and higher school education respectively.

Most of them (n = 89, 63.6%) had their farms at 4-6 km from the NP while 32 (22.9%) and 19 (13.6%) had their farms located between 1-3 km and 7-10 km respectively.

The majority of the respondents 93 (66.4%) were growing yam and maize, whereas forty seven (33.6 %) were growing cassava, cowpea, millet and other crops.

The average land sizes of the respondents were between 1-5 acres, 6-10 acres and 11-15acres representing 41 (29.3 %), 71 (50.7 %) and 28 (20.0 %) respectively.

Figure 3 shows the contributions of crops grown by respondents in relation to their income levels per season. The income ₵1100+ was the most frequent (42.1 %, n = 59), followed by ₵600-1000.

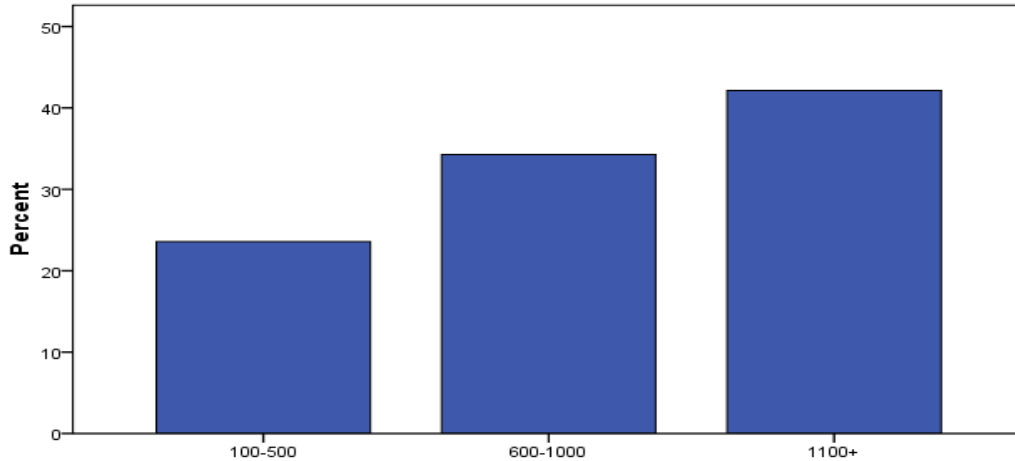


Figure 3 Contribution of crops in relation to different income levels (in Ghana cedis) of respondents

Thirty one (22.1 %) and 109 (77.9 %) lost an average of 0.5-2 acres and 3+ acres of crops per season, respectively. The reasons were animal depredation 86 (61.4 %) and other factors 54 (38.6 %) which was mostly limited to bushfire, inadequate rains and pests and diseases.

Eighty one (57.9 %) complained that elephants were the main cause of farm raiding whilst 59 (42.1 %) complained about other wild animals, such as Patas monkeys, Baboons and warthogs.

Figure 4 shows the perceptions of the pattern of crop raid by elephants from the NP over the last decade. 62 (44.3%) were of the view that the pattern is the same.

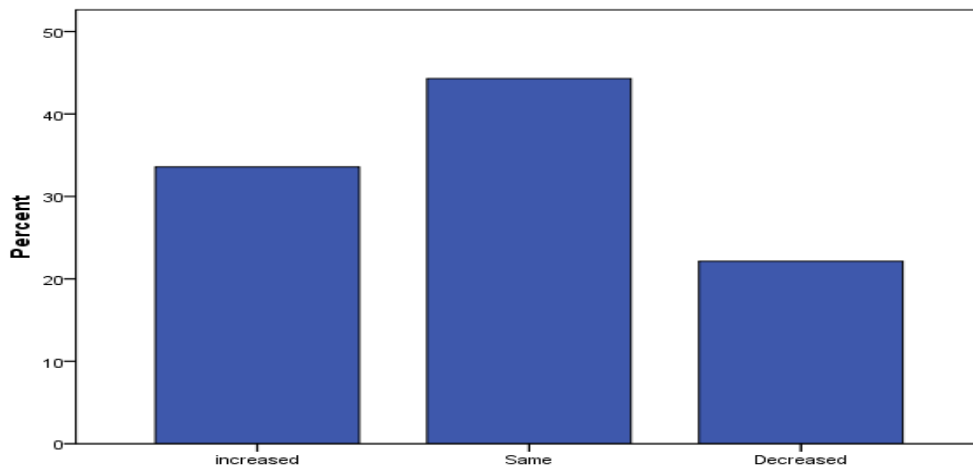


Figure 4 Pattern of crop raiding by elephants over the last decade.

Seventy four (52.9%) answered in affirmative that they report incidences of farm raiding to authorities whilst 7 (5%) refused to report and 59 (42.1%) did never experience raids on their farms.

3.2 Attitudes to conservation of elephants by sex, age, education level and distance from the NP

Overall most respondents indicated positive attitudes toward elephant conservation. However, significantly more males (n = 84, 75.7%) performed positive attitudes to conservation of elephants than did females (31%, n = 9; $\chi^2 = 20.547$, df = 1, P < 0.001).

Twenty three (79.3%) in the age group < 34 years performed positive attitudes. Followed by 31 (63.3%) and 23 (62.2%) within 42-50 years and 34-41 years respectively. However, there was no significant difference between the age groups in this respect ($\chi^2 = 2.75$, df = 3, P = 0.432).

Furthermore, no significant difference in frequencies of positive or negative attitudes were found between different education levels ($\chi^2 = 2.98$, df = 2, P = 0.226).

Thirty one (96.9 %) that had their farms between 1-3 km from the MNP were positive, whilst 47 (52.8 %) and 15 (78.9 %) at a distance of 4-6 km and 7-10 km from the NP performed positive attitudes respectively ($\chi^2 = 22.039$, df = 2, P < 0.001).

3.3 Measures to mitigate human elephant conflict

Thirty seven (26.4%) set fire near their farms to scare the elephants, 35 (25%) went to sleep in their farms during harvesting periods, 30 (21.4%) made scare crows to mimic the presence of human beings, 22 (15.7%) and 16 (11.4%) made clapping noise and hang pepper and grease in their farms respectively to drive away the elephants. However, there was no significant pattern with regards to these mitigation measures to the distance from the park. ($\chi^2 = 10.91$, $df = 8$, $P = 0.207$).

Eighty four (60%) were aware of the use of explosives to drive away elephants, 42 (30%) knew authorities send guards to drive elephants away, whereas, 14 (10%) were aware of periodic training workshops organized by park authorities.

3.4 Measures to reduce human elephant conflict by sex, age and education level

The majority of the respondents mentioned payment of compensation to affected farmers as a way of reducing human-elephant conflict.

Sixty eight (61.3%), 27 (24.3%) and 16 (14.4%) males indicated payment of compensation, restriction of movement of elephants and intensifying guards patrols respectively. Whereas, 6 (20.7%), 16 (55.2%) and 7 (24.1%) females indicated same respectively. ($\chi^2 = 15.607$, $df = 2$, $P < 0.0001$).

Nevertheless, as shown in **figure 5**, 19 (65.5 %), 4 (13.8 %) and 6 (20.7%) within <34 years indicated payment of compensation, restricting the movement of elephants and intensifying guard patrols respectively. There was a statistically significant difference between the age group ($\chi^2 = 23.222$, $df = 6$, $P = P < 0.001$).

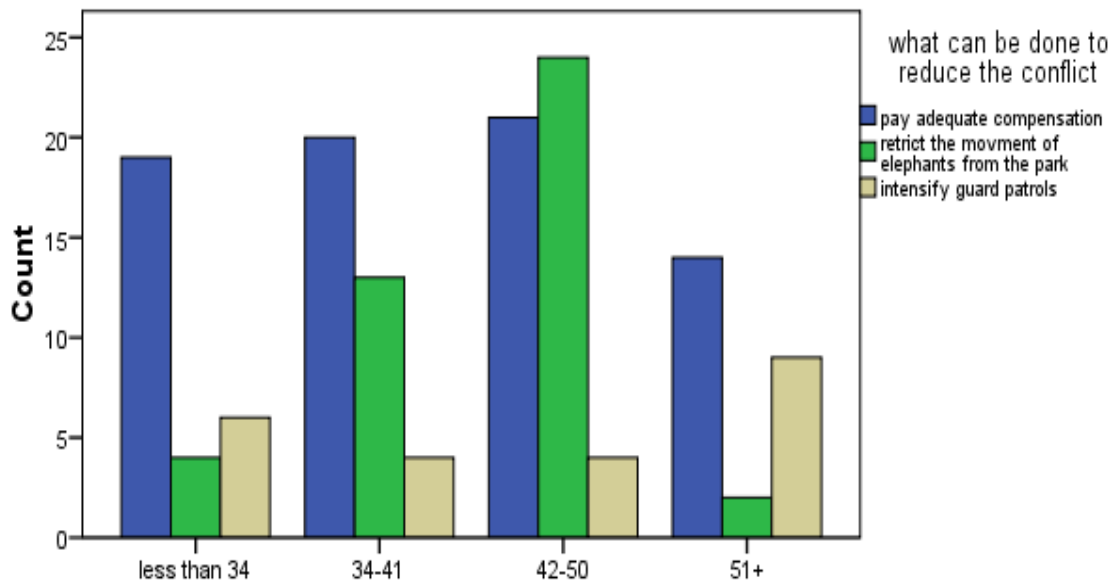


Figure 5 Respondents views on reducing conflict by age of respondents

Moreover, as shown in **Figure 6**, 42 (45.2%), 33 (35.5%), 18 (19.4%) with no formal education proposed payment of adequate compensation, restricting the movement of elephants and intensifying guard patrols respectively. ($\chi^2 = 6.816$, $df = 4$, $P = 0.146$)

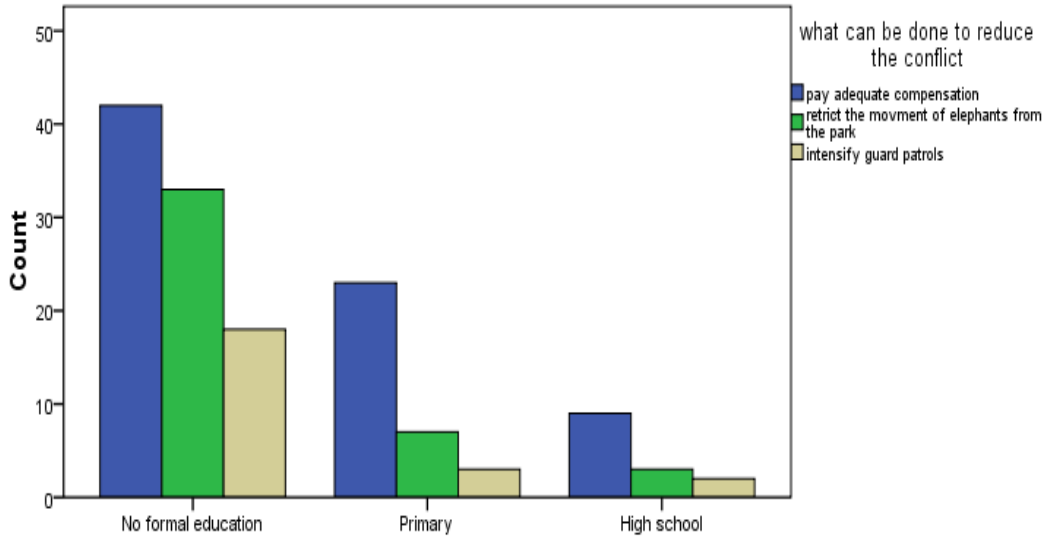


Figure 6 Respondents views on reducing conflict by education level of respondents

3.5 Additional comments by respondents

Sixty six (47.1%) wanted compensation paid to affected farmers. 37 (26.4%) indicated the authorities should provide them with explosive equipment, whereas 20 (14.3%) and 17 (12.1%) indicated elephants should be stopped from leaving the park.

4 Discussion

4.1 Communities, sex, age, education levels and occupation of respondents

The four communities sampled for the study (Kananto, Murugu, Larabanga and Mognori) are located outside the southern part of the park where there is significant human-wildlife conflicts. Owing to the difference in population among the villages, a higher number of respondents were chosen from Larabanga representing 37.9%. The four communities tend to be affected most from the fact that there are more populations of wildlife around the southern part of the park due to the availability of water bodies and preferred vegetation.

Most of the respondents were males, constituting 79.3%. This could be due to the fact that the women are engaged in other livelihood activities such as gari and shea-butter processing among others. Again, the males were the target group since they were more willing to give out information as compared to the females who were more reserved stemming from their cultural up-bringing. Besides, the tradition of the northern part of Ghana is such that males are the head of their households, and that the females would have to seek permission from the men to partake in such activities.

The age distribution of respondents sampled for the study is showing that the age group of 42-50 formed the majority. And the least were within age 51+, this is so because, those within this group do not have the energies required to engage in farming besides, the harsh environmental conditions in the northern part of Ghana. According to the World Bank 2011 report, Life expectancy at birth in Ghana was measured at 60.8 (TheWorldBank, 2011).

The primary source of livelihood in rural communities is mostly farming and this can clearly be seen as, the pattern is generally the same for most of the regions, with the three northern regions (Northern, 73.3%; Upper West, 72.3%; Upper East, 70.1%) having relatively high proportions of the economically active population engaged as skilled agricultural, forestry and fishery workers followed by Brong Ahafo almost sixty one percent (GhanaStatisticalService, 2012). This notwithstanding, 76.4 % of

the respondents were farmers. The farmers were also the group of interest to the study as they are the people that seem to be at conflict with conservation due to the threat on their livelihood (Kideghesho, Røskraft, & Kaltenborn, 2007). In the mid 1990's, crop raiding by elephants was an important problem for farmers in the Red Volta Valley. And it was also reported that farmers were intolerant to the risk of losing crops to elephants (Adjewodah et al., 2005). For instance in Kenya's Laikipia District, peasant farmers perceived many aspects of wildlife conservation negatively due to costs inflicted by crop raiders and dangerous wild animals. More so, in Mozambique, farmers who lost crops to elephants were more negative (Kideghesho, Røskraft, & Kaltenborn, 2007). Other occupations of respondents were students, traders, teachers and others which involved people in gari, shea-butter processing and bee keeping.

With respect to the level of education of respondents, 67.0 % had no formal education, whereas, 23.6 % and 9.3 % have had primary and higher school education respectively. According to the 2010 population and census, the proportions of the population who have never been to school in the northern regions of Ghana range between 44.5 percent in Upper East and 54.9 percent in the Northern region while in the other regions, it ranges between 10.1 percent in Greater Accra to 26.4 percent in Brong Ahafo (GhanaStatisticalService, 2012).

It is revealed that attitudes towards conservation program was related to distance respondents lived from park boundary and accordingly, respondents living further from the park boundary favored the conservation than for those living closer (Røskraft, Larsen, Mojaphoko, Raihan Sarker, & Jackson, 2012). Again, spatial pattern of HEC has shown few universal trends which make it difficult to predict where HEC will take place. In general, HEC is highest in close proximity to protected areas. The distance at which farms were located from parks influenced HEC intensity, with decreasing conflict incidents as the distance from the boundary increases (Pant & Hockings, 2013). However, in this case, farms located 4-6 km from the park experience most of the raids. This could be speculatively due to the fact that guard patrols are mostly conducted near the boundaries of the park. And hence problem elephants are easily detected by the park guards and driven back to

the NP. Besides, elephant irrespective of the distance and time, can remember where to find food and water in case there is drought at the park, even decades after having last visited these sites (Campos-Arceiz & Blake, 2011), this must have accounted for them traveling to that distance so far as they are able to find their preferred food there and forage can forage with no disturbances.. And perhaps, crops grown by farmers at close ranges from the park (1-3km) are unpalatable to the elephants.

Humans and elephants tend to have the same habitat preferences, and this would have given rise to competition between the two for resources and space (Magome, 2007), also the distribution of elephants in Africa is inextricably linked to that of humans; not least because they have similar habitat requirements and this would have given rise to localized competition between the two and probably resulting in elephants raiding people's crops from time to time. An analysis of rainfall and soil fertility in Kenya and Zimbabwe concluded that elephants just as humans preferred fertile and wet areas so therefore; competition for land between the two species is inevitable (Naughton-Treves & Treves, 2005), and this could have probably resulted in elephants raiding people's crops in the four fringed villages at night. Besides, majority of farm raids caused by elephants can also be attributed to the fact that, elephants have a wide range of feeding habits and also travel long distances to get their food. Moreover, human – induced changes in elephants behavior, improved anti- poaching measures has led to some elephants losing their fear for people (Nelson, Bidwell, & Sillero-Zubiri, 2003). Crop raiding by elephants is been identify as a major problem for wildlife managers in Ghana (Boafo et al., 2004), and from the study elephants constituted the main cause of farm raiding. Almost 60 % of the respondents that have had their farms raided associate it with elephants. This could be because of the fact that crop raiding is part of an elephants optimal foraging strategy and raiding peaks during specific times of year when crops becomes more palatable and nutritious as it approaches harvesting (Pant & Hockings, 2013) whereas, 42.1 % are caused by other wild animals, such as Patas monkeys, Baboons and warthogs among others.

As represented in Figure 4, the perceptions of the pattern of crop raid by elephants from the NP over the last decade. 44.3% indicated the same pattern crop raid over

the last decade. With this pattern of crop raids it could be deduced that the elephant population at the Mole NP is stable.

4.2 Attitudes to conservation of elephant

Conflict with conservation arises from a range of direct and indirect negative interactions between humans and wildlife (O'Connell-Rodwell et al., 2000). These can result to potential harm to all involved, and could lead to positive or negative human attitudes to wildlife conservation. Conflict generally arises from economic losses to agriculture (Nelson et al., 2003). Also conservation costs and benefits, socio-demographic factors are important predictors of conservation attitudes (Kideghesho et al., 2007).

It is held that the level of acceptance of conservation increased with the education level of residents. Findings in Kosi Tappu Wildlife Reserve in Nepal, shows respondents with higher household literacy rates had more positive attitudes about the reserve (Fiallo & Jacobson, 1995). It is also reported that the youth and primary school pupils in Tanzania, with low score knowledge thought that National Parks should be converted into agricultural lands, compared to 24% of those with high score of knowledge (Hoare & Du Toit, 1999). In contrast, 62.4% of the respondents with no formal education from the four villages for this study showed positive attitude to conservation of elephants. This could be due to the fact that most of the respondents were people with no formal education. Again, there was no relationship between the attitude of people towards elephant conservation and the damage caused by elephants. It indicates that people can tolerate certain level of damage and people develop negative attitude towards wildlife when damage exceeds the level of tolerance (Pant & Hockings, 2013).

Education-level associated with age tend to influenced people attitude to conservation, as younger residents are assumed to have higher education-levels than older inhabitants because of the formers' greater access to education than in the past (Magome, 2007). But there were no significant difference in frequencies of positive or negative attitudes found between different education levels of respondents.

More males (75.7%) performed positive attitudes to conservation of elephants than females. Out of the 29 female that took part in the study, 69% indicated negative

attitudes to the conservation of elephants. This could be due the fact that females in general exhibits fear for wildlife and for that matter elephants.

4.3 Mitigation measures used by farmers and park authorities in HEC

To deal with HEC, farmers and wildlife managers across Africa rely on some conventional methods, including disturbance shooting, killing problem elephants and fencing as a means of mitigating HEC (Parker et al., 2007). With respect to measures employed by respondents in the study area, 26.4% set fire near their farms to scare the elephants, 25% go to sleep in their farms during harvesting periods, 21.4% of the respondents mount scare crows in their farms to mimic the presence of human beings, 15.7% and 11.4% made clapping noise and hang pepper and grease in their farms respectively to drive away the elephants. However, 60% were aware of the use of explosives to drive away elephants, 30% knew authorities send guards to drive elephants away, whereas, 10% were aware of periodic training workshops organized by park authorities.

4.4 Ways to reduce HEC

Out of the total, 52.9% of the respondents suggested that adequate compensation be paid to affected persons since most of them have their lives dependent on their farms and livestock. 30.7% of the respondents wanted the movement of elephants to be restricted from the park into the communities. The remaining 16.4% of respondents were those that want guard patrols by the park authorities to be intensified.

5 Conclusion and Recommendations

5.1 Conclusion

Human-elephant conflict affects the livelihoods of rural farming communities. This is especially the case for crop damage, which reduces the ability of a farmer to feed their family (Parker et al, 2007). In turn, local residents can with time develop negative attitudes towards reserves and wildlife, exacerbating the conflict and undermining conservation efforts. In order to curtail this, there is a need to protect rural livelihoods, reduce their liability to offset losses with benefits and foster community-based conservation.

People and wildlife suffer tangible consequences and the different stakeholders involved should commit themselves to tackle and resolve such conflicts.

Again, the results from the study indicate that the four communities surveyed by and large suffer chronic crop raiding by elephants. Despite the fact that many farming families suffered extensive losses from elephant raiding, most of them are in favor of the conservation of the mammoth species, and against killing as a solution to the human-elephant conflict.

Moreover, the Mole National Park authorities only visited sites where there have been incidents of wildlife conflicts to assess damages for records keeping but not for the purposes of payment of compensation.

5.2 Recommendations

The Mole National Park should organize educational and training activities at different levels. This would have the objective of disseminating innovative techniques, building local capacity in conflict resolution and increasing public understanding of Human-Wildlife Conflicts.

The Mole National Park should embrace and incorporate differing stakeholder values, attitudes and beliefs to ensure success of wildlife conservation and Human-Wildlife Conflict reduction in the communities.

Better commitment by the Forestry Commission (FC) to address the problem through improved policies. Thus, since tourism tends to generate much revenue, there should

be some provision for compensating people that are affected by wild animal destructions

Wildlife is a generator of income through tourism and in many developing countries it is one of the most significant sources of national revenue generation. It provides market for agricultural products in the locality.

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Appendix

Questionnaire

Dear respondent, I am a student of Norwegian University of Science and Technology, as part of my thesis work I would like to find out the main Human-Elephant Conflicts in Mole National Park and the alternative ways of addressing these conflicts to ensure peaceful co-existence. The following questionnaire has been formulated to achieve this goal. You are kindly requested to answer the questionnaire. Thank you.

Personal information

1. Name of respondent (optional):
.....
2. Name of community.....
3. Age
18-25 26-33 34-41 42-50 51- Above
4. Gender
Male Female
5. Occupation
Farmer Student Trader Teacher Other
(Specify).....
6. Level of education
Primary level Junior High School level Senior High School level Tertiary
level other (specify).....
7. Do you have any of these?
Farm Backyard garden
8. If yes, how far is it from the park?
1-3 km 4-6 km 7-10 km other (specify).....

Cultivated crops

9. What crops/vegetables/fruit do you cultivated in your farm
10. How much land do your household own?
11. Is the same area of land always cultivated or do you move your crops around?
12. Do you follow certain agricultural practices at specific times of the year. If yes specify
13. Does your crops contribute to your income? If yes how much per season
14. What are the reasons for your crop-loss? Rank them.
15. How many acres/hectares of crops have you lost over past 12 months? and for each crop type
16. What is the average crop-loss per year?
17. During which months does most loss occur? Does this vary between crops?
18. Compared to 10 years ago has the crop-loss pattern changed?
Increased Decreased Same Dont know

Wildlife depredation

19. Do you know by which animals the crops are depredated? Name animal
20. How do you know that it is that specific animal?
Signs Direct observation Don't know
21. Does animal depredation vary throughout the year? When is it greater? Do different animals depredate more at different times?
22. During months of increased frequency, how often does raiding take place in a month?

If elephants are mentioned

23. Do the elephants destroy your crops? Yes No
24. Do you/villagers usually see the elephants grazing on crops?

Yes No Sometimes Don't know

25. If this is not witnessed, what signs are attributed to elephant depredation?

Droppings Crops damaged in a certain way Debarkation Elephants were known to be nearby Don't know

26. How often do they destroy your farm or garden?

27. Very often quite often not often

28. Can you tell me the distance from the park to where the raids have been taking place?

1-3 km 3-5 km 5-8 km 8-10 km

29. What time do they come to destroy your farm?

Morning Afternoon Evening Night

30. Do you report such cases to the park authorities? Yes No

31. If yes, how was their response?

.....
.....

32. Has there been any attack on human lives especially that of your children?

Yes No

33. Have there been other damages to property by the Elephants? Yes

No

34. Have you receive any compensation from Park Authorities for loss of crops/ property by Elephant? Yes No

35. If yes was it enough to compensate for the crops/property lost? Yes

No

36. What measures have you put in place now to deal with the destruction by the Elephants?

.....
.....

Human-elephant conflict

37. Is there any benefits of having elephants nearby?

Yes No Somehow Dont know

38. If yes what are some of the benefits

.....

39. Do you think elephants have a right to be here? If not, why not

Strongly agree Agree NeturalDisagree Strongly disagree

40. Please rank which threats are more important to your personal safety:

Road accidents Elephants Agricultural accidents Natural calamities (forest fire or flood)

41. Do you have any idea of the measures put in place by park authorities to deal with the destruction by elephants from the park? Yes No

42. If yes, what exactly do you know?

.....

.....

43. Are you satisfied with how the Park Authorities deal with it? Yes

No

44. What do you think can be done to reduce the human-elephant conflict?

.....

.....

45. Any additional comments?

.....

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