

## **Impact of Wildlife on the Socio-economic Status of People Living Adjacent to Mt. Elgon National Park, Trans Nzoia District, Kenya**

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Mt. Elgon National Park was gazetted at a time when the local population was small and competition for land resources between wildlife and man was hardly foreseen. Impacts of wildlife on socio-economic status of people living adjacent to the Park were studied between January to May of 2003. A list of all members was recorded. A total of 84 respondents were randomly sampled and interviewed. Frequency distribution, chi-square and a logit model were used in the analysis. Results showed that farming practices were skewed towards mixed farming ( $\chi = 150.5$ ;  $df = 2$ ;  $P < 0.001$ ). About 74 % of the respondents reported that maize crop was severely damaged. Another 36 % of the respondents reported that the damage was mostly by buffaloes. Level of education significantly influenced the perception on the type of property damaged ( $\chi = 65.143$ ;  $df = 3$ ,  $P < 0.001$ ). A total of 78 % had primary level of education. About 20 % of respondents reported to have lost between Ksh 20,001- Ksh 30,000. The logit model results indicated that distance from the park boundary significantly influenced the level of damage to property. Peak periods of crop attack was reported to be in July (69.0%). Animals causing damage were spotted frequently at night (69.0%). The prevalent traditional techniques of keeping animals away from farms were use of ambers and banging of metals (46.4%). Respondents did recommend the fencing of the park boundary. Extension and education programmes should be instituted in the adjacent areas.

*Key words:* Respondent, wildlife and maize

### **Introduction**

Like many other parts of the country, Trans Nzoia is in the midst of rapid changes including: changes in the size of the population and their quality of life; traditions; literacy levels; the family structure; and in political systems. National Park and reserves face a multitude of socio-economic and ecological problems. Among the problems confronting its establishment and functioning are the exclusion of the local residents from the benefits accruing from this resource. The situation has been worsened by the restricted access to natural resources in the protected areas. This has in turn resulted in negative attitudes towards conservation areas by residents (Fiallo & Jacobson, 1995). Although the list of protected areas is very impressive, the question, which still looms is whether these areas are viable in the long run within the present institutional framework. Serious conflicts and violation of the integrity of these protected areas continue

unabated. Some of the other common problems include: conflicts between wildlife within protected areas and human activities in the adjacent areas; encroachment into the protected areas; and, blockage of natural corridors and water bodies (Omondi, 1989). However, the present management strategies for Kenya's National Parks do not correspond with the socio-economic, cultural, political and ecological realities of the regions where the parks are situated (Lusigi, 1981).

To garner local people's support for protected areas and the conservation of natural resources that they contain, an understanding of the relationship between protected area managers and the people living within or adjacent to them is necessary. A growing consensus shows that natural resource conservation requires greatly increased involvement of the residents living near conservation/protected areas.

Disequilibria has been noted to have developed between National Parks and their environs, which are experiencing rapid human population growth, due to people moving from other parts of the country to acquire space for cultivation in regions surrounding National Parks (Myers, 1972; Western, 1984; Yeager & Miller, 1986). Resource/demand ratios have always formed an important driver of demand, through natural population increase, immigration or the absence of non-rural livelihood alternatives (Murphree, 2000). This poses a threat to community based conservation initiatives. These complex socio-economic, political and ecological problems are making experts in wildlife conservation to rethink the National Park model. There is a general consensus that, in order to solve these problems, viable conservation strategies must be in consonance with local conditions.

### *Study area*

The study was carried out in the area adjacent to the park estimated at 19.5 Km stretch in Trans Nzoia district (34°35', 35°22'E; 0°48', 1°18' N). Mt. Elgon National Park (MENP) is part of a dormant volcano straddling the Kenya-Uganda border and covers a total area of 34,129 ha. (Fig. 1). It forms part of the larger Mt Elgon ecosystem that comprises diverse natural resources. The annual rainfall in the MENP averages 1000-1200 mm and occurs in one long season from March to October, with two distinct peaks in April-May and July-August. The dry season occurs between November and February. The average temperature is 18°C during the wet season and 26°C in the dry season, with mean minimum of 11.4°C and mean maximum of 25.2°C. (Jaetzold and Schmidt, 1983).

The people adjacent to the park are predominantly agriculturalists, and most own small to medium sized plots of land that range from one acre to slightly over ten acres. The main crops grown include; maize, beans, potatoes and vegetables among others. Livestock husbandry is also practiced and includes keeping of cattle, sheep, goats and poultry.

### **Methodology**

An exploration of the study area was first carried out on foot, along the park boundary with people, in order to have a quick impression on the wildlife impacts on the socio-economic status of the people. All the farm holdings adjacent to the park were considered for simple random sampling selection. Based on the map of Mt. Elgon, the boundary of the park with people was estimated to be 19.5 Km (Wily, 1993). The total numbers of farm holdings in the three adjacent farms were 877. Each farm holding was taken as a sampling unit. Within these farm holdings

110 farms were randomly selected. The residents of the farm holdings selected were ultimately interviewed.

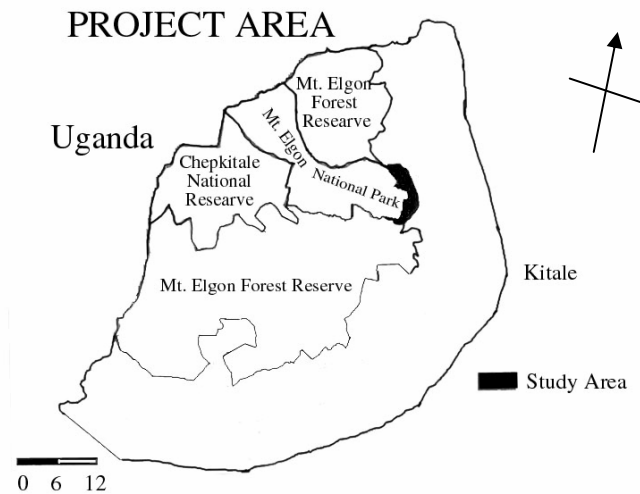


Figure 1: Study area: Mt. Elgon National Park and the adjacent farms

### Data analysis

Upon examining and editing the completed questionnaires to assess completeness and consistency of the responses, 84 out of the 110 questionnaires were considered useful for analysis. Frequency distribution were computed and used to explain the direction of the characteristics being compared and also chi-square analysis carried out to test for independence between the observations. A logit model was used to assess variables that influenced incidences of property damage.

### Results

The majority of the people had primary level of education (60.7%); followed by no formal education (22.6%); secondary level (15.5%); while 1.2% had at least college level education. The level of education significantly influenced the respondent's perception on the type of property damaged in the adjacent areas of the park ( $\chi = 65.143$ ,  $df = 3$ ,  $p < 0.001$ ). Those with at least primary level of education formed 77.4% of the population and those with no formal education were 22.6%. Within those with at least primary level education, 34.5% had the perception that both crops and livestock were the prevalent type of property damaged; 29.8% reported crops as main type of property damaged; 11.9% said other type of property were damaged and 1.2% said livestock were the prevalent type of property damaged. Within those with no formal education, most still saw both crops and livestock (9.5%) as the most prevalent type of property damaged; 8.3% said crops were the type of property damaged; 2.4% reported livestock and 2.4% also reported other type of property damaged; 2.4% reported livestock and 2.4% also reported other type of property damaged.

A total of 50.0% of the 84 respondents interviewed had an average of 1-3 acres; 39.3% owned 3.1- 4 acres; 7.1% had 5.1-10 acres; 2.4% owned less than 1 acre and 1.2% owned more

than 10 acres. This study showed that 91.7% of the sampled households had 5 acres and below, which is a true representative of the population.

The farming practices skewed towards mixed farming ( $\chi = 150.5$ ,  $df = 2$ ,  $p < 0.001$ ). As reported earlier, the majorities (96.4%) of the people interviewed were farmers and 60.5% of them practiced both crop growing and livestock rearing. 38.3% of those who practiced farming grew only crops. The majority the people were farmers (96.4%); followed by other forms of occupation (2.4%); and the business community (1.2%). Occupation significantly influenced the perceptions of the people on the type of property damaged ( $\chi = 150.5$ ,  $df = 2$ ,  $P < 0.001$ ). In the farming community, 44.4% reported both crops and livestock as the type of property damaged and also all in the other form of occupation mentioned crops.

The most prevalent property reported damaged were both crops and livestock (44.0%), followed by crops (38.1%), other property (14.3%), and livestock (3.6%). The crops damaged included: maize, beans, potatoes, vegetables and others such as sugar cane, wheat, cassava and sorghum. Thus the study established that crop damage was dependent on the type of crop ( $\chi = 159.452$ ,  $df = 4$ ,  $P < 0.001$ ). The frequency of crop destruction varied with type of crop; 73.8% of the respondents reported maize as damaged severely, followed by other crops (17.9%); beans (4.8%); potatoes (2.4%) and vegetables (1.2%) (Fig. 2).

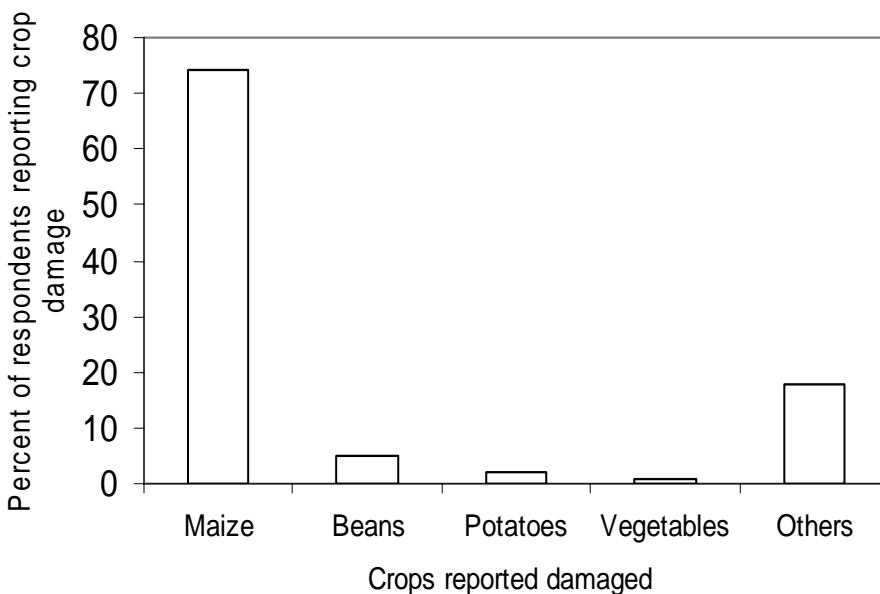


Figure 2: Crops damaged. Others include sugar cane, Wheat, Cassava and Sorghum

Respondents also reported livestock predation. The hyena (*Crocuta crocuta*) was the leading problem animal (36.9%); followed by the Civets (*Viverra civetta*) (9.5%); the eagles (2.4%), the baboons (*Papio anubis*) (2.4%) and the Foxes (1.2%). 47.6% of respondents did not give any response, which was interpreted to mean that they either did not have problems with their livestock or did not own any livestock. Alternatively, they didn't experience any conflict.

When respondents were asked to give their estimated loss due to wildlife; 38.15 % stated that they had experienced a loss of between Ksh 0-10,000; 20.2% said they had lost between Ksh 10,001-20,000 and also the same percentage reported to have lost between Ksh 20,001-30,000; 8.1% lost between Ksh 30,001-40,000; 6.0% lost between Ksh 40,001-50,000 and 7.2% reported

to have lost over Ksh 50,000 (Fig.3). Of those who reported losses in their farms, 50% owned 1-3 acres; 39.3% owned 3.1-5 acres; 7.1% owned 5.1-10 acres; 2.4% owned less than one acre and 1.2% owned more than 10 acres. These results indicate that, the majority of those who reported losses owned between 1-5 acres.

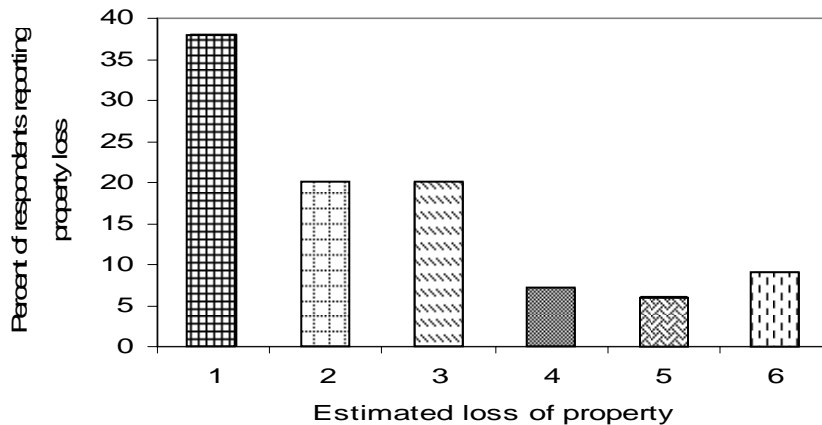


Figure 3: Frequency of respondents who lost property due to wildlife attacks

*Key:*(1= indicate those who lost between ksh. 0-10,000; 2= indicates those who lost between ksh. 10,001-20,000; 3= indicates those who lost between ksh. 20,001-30,000; 4= indicates those who lost between ksh. 30,001-40,000; 5= indicates those who lost between ksh. 40,001-50,000; 6 = indicates those who lost over ksh. 50,000).

When the same respondents were asked to indicate the months of the year when they had animal attacks on their crops: 69.0% mentioned July; 67.9% indicated August; 53.6% said September; 50.0% reported June; 41.7% stated may; 32.1% mentioned November; 32.1% indicated April; 28.6% mentioned December; 9.5% stated march; 7.1% mentioned January and 6.0% reported February (Fig. 4).

The most frequent time of spotting animals was at night (69.0%), followed by evening (7.1%) and early morning (7.1%). 16.7% of the respondents did not make any comments about this issue and this may have implied that they may not have spotted any animals.

A variety of techniques were used by people adjacent to the park to keep the wild animals away from farms. This include fencing off farms (2.4%), scaring animals off by shouting (25%), chasing animals with dogs (6.0%) and using other techniques (46.4%). The most common technique reported was under the category of others. These included methods such as the use of ambers, banging of metals and a combination of all these. The remaining population (20.2%) did not give their views, which might have implied that they did not have any problems.

Respondents were asked to give their opinion on their perception of change in the intensity of conflicts. The majority (70.2%) believed that the conflicts they have been experiencing are increasing and 21.4% thought they were decreasing. 8.3% did not make any comments and this was interpreted to imply there were no conflicts.

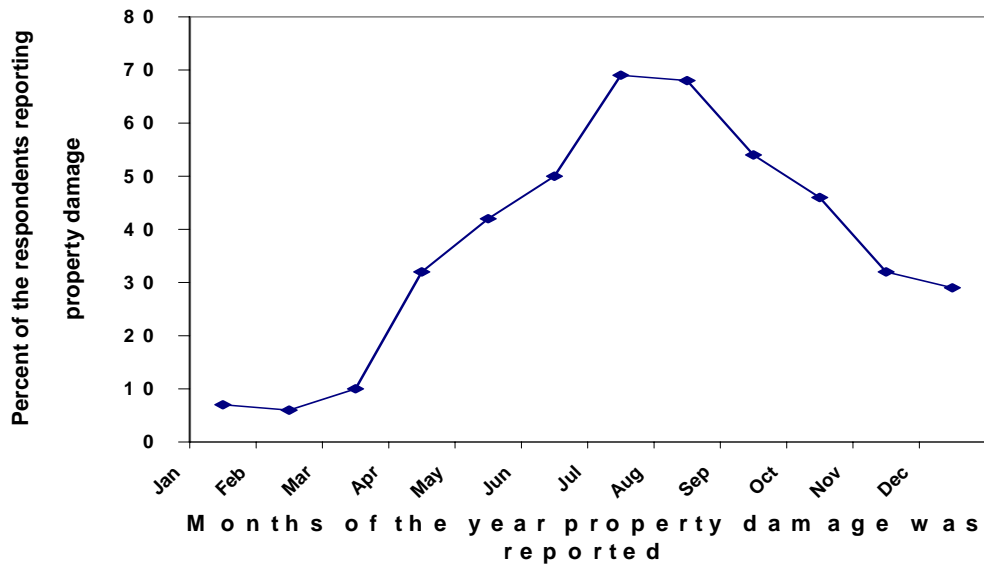


Figure 4: Respondents who reported affirmative on property damage over the months of the year

A logit model was used to assess those variables that influence incidences of conflict. The model was based on data obtained from the respondents who had experienced property damage. Nine variables were included in the model; four of them were significant determinants of conflicts. Result obtained on distance from the park boundary showed that it significantly influenced the level of conflict. This suggests that as one moves away from the park boundary, the chances of experiencing conflict decrease.

**Table 1: Logit model results showing the variables included in the equation that describes the direction of the conflicts and their significance**

	$\beta$	S.E.	Wald	Sign
Ethnicity	-1.123	.638	3.105	.078
Distance from park	-1.039	.492	4.452*	.035
Problem animals to livestock	-1.350	.344	15.357**	.000
Estimated loss due to wild animals	.540	.317	2.899	.089
Where respondent obtains firewood	.540	.635	.724	.395
Where respondent grazes livestock	.883	.304	8.440**	.004
Where respondent obtains water	-.174	.437	.158	.691
Measures taken by KWS	-.528	.473	1.245	.264
Control measures taken by respondent	-1.180	.420	7.892**	
Constant	8.608	2.431	12.542	.000

The results obtained showed also that the presence of problem animals that attack livestock significantly influenced the intensity and perceptions about the conflicts and suggested that as the problem animals to livestock decreased then the chances of experiencing a conflict

decreased. The results indicating where the respondent grazes his/her livestock significantly influenced the conflicts, suggesting that those who did not graze within the park area, encountered less conflict. The results obtained from the control measures taken by the respondents indicated that it did influence the conflicts and thus as the respondent stepped up the control measures, then it was most likely that he/she will reduce the chances of encountering a conflict.

## Discussion

Respondents have adopted different predator control approaches. The majority preferred to use other methods which included the use of ambers, banging of metals and a combination of all these. This shows that farmers spend a considerable time in guarding their crops. To resolve this problem once and for all, farmers thought the use of electric fence would be the best option. However, the effectiveness of an electric fence has been question. Kangwana (1995) reported that electric fences are no longer an effective solution to conflicts and that animals like elephants have been seen going through highly electrified fences. Tchamba (1995) further reports that the use of this measure was very limited because of the prohibitive costs of erecting and maintaining these fences. The responses obtained from this study showed that electric fencing was more popular and this compares well with results of Ngure (1992), Ngene (1995) and Ndungu (1998) who conducted related studies in Mwatate-Bura, Kitengela and Kikuyu escarpment forest reserve respectively with preferred problem animal control. The majority of the respondents suggested fencing probably because of lack of a awareness of its dangers. Traditionally, conflicts between local people and wildlife in Africa have been resolved by creating barriers (Newmark etal, 1993). In certain cases as is with Lake Nakuru National Park the entire park has been fenced. This solution however, may not be effective in resolving conflicts between local people and wildlife because much of the wildlife that frequently causes problems are the small species and are in most cases commensal, like the hyena.

Forced restrictions of wildlife result in disruption of wildlife movements and the annual migrations for other species. The adverse ecological effects of this may include: change in the available quality of forage within the park; the potential loss of access for certain species to critical food resources located immediately adjacent to the park; and competition within the park and the increased likelihood of local extinction for many species (Newmark et al, 1993). This makes fencing an unsuitable solution for minimizing conflict. However to the local population this may not be realistic because of their immediate economic and social constraints. In order to gain support from the population, conservationist should aim at effective control of wildlife property damage, provision of benefits to the local population and efficient compensation in response to losses due to wildlife damage. If such measures are taken, it may make the population to reconsider their stand on fencing permanently as a way of deterring wild animals.

An alternative approach that could reduce conflicts between local people and parks include the introduction of wildlife based enterprises. These enterprises have been known to improve the flexibility of income, increase security and access to transport, improve grazing management, better access to education and improve conservation. Such activities are most likely to change the popular notion that wildlife is a liability to them and make it an economically viable activity. The contribution of wildlife resources to development of local communities may change them in favor of wildlife. For example, the Arabuko sokoke butterfly enterprise has been reported to significantly change the people's attitudes towards the value of wild lands. This change of

attitude towards conservation can also enable the community to come up with community action plans, which could easily attract funding, for example the II Ngwesi lodge community members, who benefited and were able to construct a 12-bed tourist lodge (Sikoyo, et al., 2001). Such projects could be introduced to areas adjacent to Mt. Elgon National Park. Another area to venture into is bee keeping. Wild honey gathering has been a cultural activity practiced by a number of African communities for centuries. However, currently as they gather honey they leave behind fires that end up destroying a lot of biodiversity. Wild fires are common in the Mt. Elgon ecosystem (Ndetei, 2000). In order to reduce these fires, modern bee keeping could be an alternative solution. The adoption of integrated conservation and development project approach would influence the perceptions of the people and land use patterns in the adjacent areas of the park and hence probably lower the prevailing conflicts.

The variation in responses across ethnic and age groups showed that approaches towards mitigating conflicts should not be implemented a long ethnic grouping. Rather, the need to get support for conservation endeavors from the adjacent community should focus on increased formal education and awareness among all residents. In particular, any program aimed at educating the community in areas adjacent to protected areas should devote most of their resources to the youth who are the future conservationists and resource users and managers. This would lower the duplication of effort and resources across age groups.

Community based conservation has the potential to meet multiple objectives and satisfy the aspirations of different constituencies (Murphree, 2000). Conservation requires a perspective that goes beyond park boundaries and must influence national policy and the activities of rural communities. The rural people therefore need be educated to appreciate the role Mt.Elgon National Park plays as a catchment's area rather than as a principal source of tangible benefits. Enhancing benefits in anyway appropriate to stakeholders can result in a balanced and humanistic or people centered approaches to long-term conservation.

## **Conclusion**

There is evidence that residence of areas adjacent do attempt to coexist with the park. This is simply because they have set up temporary fences around their property, scared animals and used other methods that would permit their crops to mature and be harvested in the presence of wildlife. The susceptibility to crop raiding by wildlife is in part a function of location of the field with respect to the park. The intensity of crop damage depended on the type of crop grown, the season and effectiveness of guarding. Crop damage was the most prevalent source of conflict. The respondents have developed traditional control measures such as the use of ambers and banging of metals to reduce crop raiding by wildlife.

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