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EFFECTS OF HUMAN-WILDLIFE CONFLICT ON FOOD SECURITY: A CASE OF KWALE COUNTY, KENYA

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ABSTRACT

The study assessed the effects of Human-wildlife conflict on food security, based on externalizing and internalizing coexistence. The key question being, are the communities aware of their reactions towards the animals and the way they provoke them? The study gathers evidence on the various factors that cause the different perceptions and relate them to the various effects as portrayed by human-wildlife conflict. The methodology of the study is quantitative and qualitative approach with cross-sectional survey methods. The target population is the household heads of the identified villages. This study clearly illustrates that human-wildlife conflicts occur in kwale, but the governments are not able to consider a proactive approach to managing these conflicts. Until some threshold is met, the communities may not be willing to devote the time or resources necessary to enact proactive approaches and before then, development and utilization of information and educational resources materials can enhance capacities for the Community, Government and other Stakeholders to develop and implement a comprehensive human - wildlife conflict management plan for kwale communities in the future. The human population growth rate, increasing competition for resources clearly scores that human wildlife conflicts will not be eradicated soon and therefore better understanding of conflict management strategies is essential. The most sustainable strategies should ensure improvement of local livelihoods and reduction of community vulnerability through revenues generated from the natural resources.

KEYWORDS

Human-Wildlife conflict, food security, Kenya.

INTRODUCTION

Human-Wildlife Conflict (HWC) or negative interaction between people and wildlife has recently become one of the fundamental aspects of wildlife management as it represents the most widespread and complex challenge currently being faced by the conservationist around the World. HWC arises mainly because of the loss, degradation and fragmentation of habitats through human activities such as, logging, animal husbandry, agricultural expansion, and development projects (Fernando et al. 2005).

The damage to humans as a result of contact with such animals can include loss of life or injury, threats to economic security, reduced food security and livelihood opportunities. The rural communities with limited livelihood opportunities are often hardest hit by conflicts with wildlife. Without mitigating HWC the results is further impoverishment of the poor, reduced local support for conservation, and increased retaliatory killings of wildlife causing increased vulnerability of wildlife populations. The conflict problem is hence a cause for concern that urges managers to shift their conventional policy from that of managing wildlife populations to enhancing their societal values. As such understanding the ecological and socio-economical context of the HWC is a prerequisite to bring about an efficient and long-term management of Wildlife and its habitats.

Kwale, one of the districts in coastal province of Kenya, with an area of 8,960km² and a population of 692,991 persons (2009 census) faces this negative human – wildlife interaction. The district borders Taita Taveta to the West, Kilifi district to the North- West, Mombasa and Indian Ocean to the East and Republic of Tanzania to the South.

Shimba hills ecosystem which houses the protected wildlife habitat lies along Kenya's 600 Km coastlines, 30 Km to the South West of Mombasa Town. Shimba Hills Ecosystem is completely surrounded by communities whose main economic activity is mixed farming. Many of the wild animals, including elephants stray outside the protected areas (Shimba national reserve and Mwaluganje elephant sanctuary). The livestock keeping communities (Duruma) , the mixed farmers (Digo) and their families who live around these wildlife protected habitat, all have to cope with the consequences of damage to and destruction of crops, livestock predation, competition for grazing and water, increased risk of some livestock diseases, and other inconveniences including loss of sleep due to protecting crops at night and even direct threats to human life as a result of this interaction ,

EFFECTS OF HUMAN –WILDLIFE INTERACTION**➤ REPORTED CASES OF HUMAN –WILDLIFE CONFLICT IN KWALE**

Over the years, there has been an upward trend of human-elephant conflict incidences, with the highest number of cases being reported in 2009. There was a notable decline of reported cases between 2004 and 2006 as shown below. The situation however started changing as from 2007 in which the number of reported cases started to increase. This trend is seen to have continued for a period of three years until the end of 2009 when the human elephant conflict cases started to drop again (Kenya wildlife service –report occurrence book). This situation could be attributed to the good prevention strategies adopted during this period i.e. rehabilitation of Shimba national reserve and Mwaluganje Elephant Sanctuary electric fence. The status of this fence had deteriorated completely before the rehabilitation exercise. This might have contributed considerably to the declining human elephant conflict cases noted as from year 2010.

FIGURE 1: GRAPH ON HUMAN – ELEPHANT CONFLICT CASES IN SHIMBAHILLS (KWS REPORT)

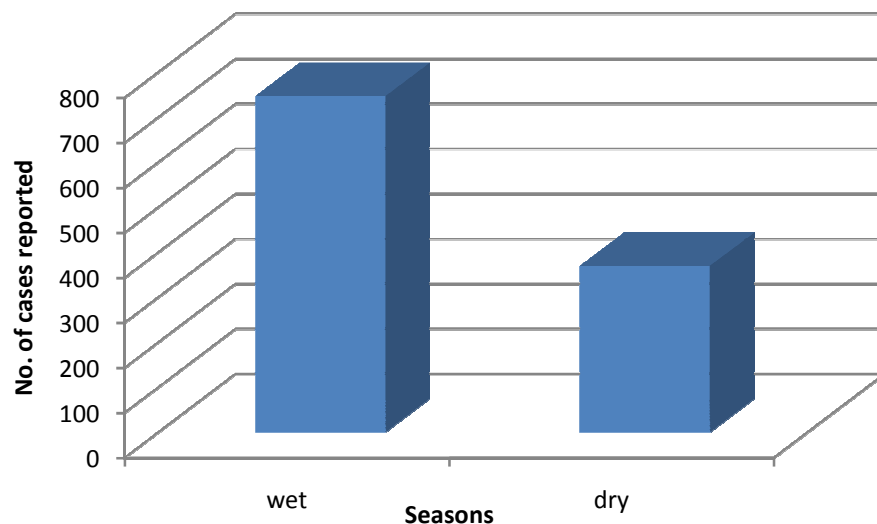
Human-Elephant Conflict Cases within Shimba Hills Ecosystem (2000-2011)



Shimba hills experiences two rainy seasons in a year. One in between August to March commonly known as the long rains season (wet) and the other in between February and September commonly referred to as the short rains (dry) since most of the months within this period are always dry with very little rainfall. From the bar graph below, conflicts distribution is quite irregular across the two seasons with most conflict cases falling within the wet season of the year. This therefore means that human elephant conflict incidences around the ecosystem are not necessarily triggered by the absence of water resources, but majorly by the availability of forage materials in the surrounding farms especially food crops. This is clearly illustrated by the high conflict cases reported during the wet seasons as compared to the dry seasons in the period under review.

FIGURE 2: GRAPH-COMPARISON OF THE HUMAN ELEPHANT CONFLICT CASES IN THE TWO SEASONS IN SHIMBAHILLS

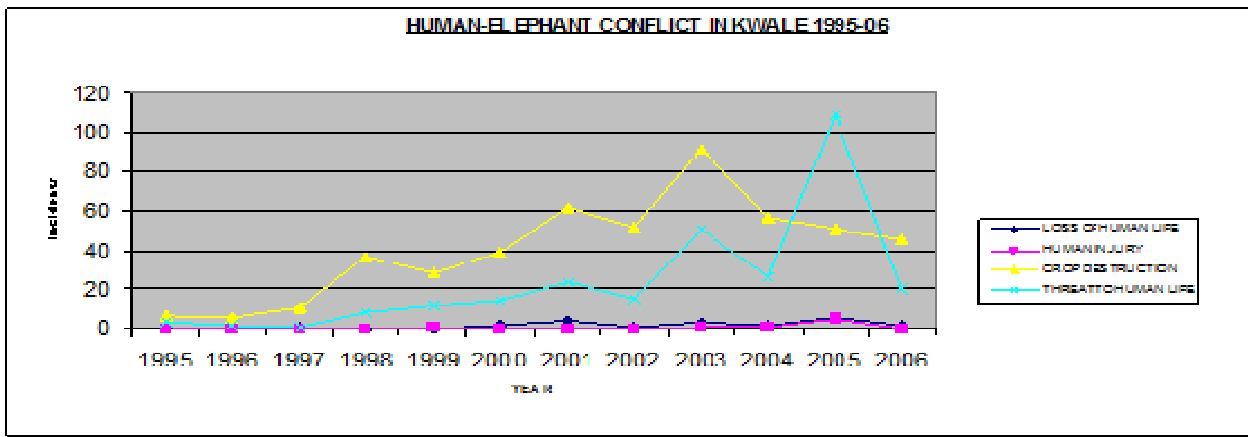
Human elephant conflict cases within the two seasons in Shimba Hills



There were 1,213 cases reported between 1995 and 2006 in total. Within the same period, there were 29 (2.3%) cases of human death and injury caused by elephants, 448 (36.9%) reported cases of crop destruction and 285 (23.4%) cases of threat to human life by the same. The rapidly expanding agricultural activities and an increasing and mobile population of elephants are the perfect conditions for human-elephant conflict to occur. This has greatly resulted in regular farms raids and injuries and / or deaths to people. The elephant is responsible for most of the reported cases of HWC in the general area. Reports of crop destruction by elephants, children barred from attending school, destruction of /or damage on infrastructure by elephants are common occurrences. Mtsangatamu village, which borders the reserve to the north-west has suffered most with Golini (north), Magwasheni (south west) , Lunguma (north east), Mkongani (west), in that order. In an effort to address this, the Kenya Wildlife Service (KWS) has embarked on management approaches which could help mitigate the conflicts. Relocation of elephants from SHNR to the Tsavos and erection of artificial barriers (electric fence) have been the major management tools that have been employed with varied success.

Between the years 2005 and 2006, 228 elephants were moved to the northern section of the Tsavo East National Park. Before then, the conflicts were on the rise and after relocation exercise (2005) where 228 elephants were relocated, the general trend of conflict began to drop. In 2005, six people lost their lives compared to two in 2006. This translates to roughly a 66.6% drop in deaths caused by elephants. During the same period human injuries dropped from five to naught. Crop raiding, however, remained almost the same. In 2005, there were 51 cases reported compared to 46 in 2006. Meanwhile threats to humans dropped by 68%. The results however should be treated with a little caution since other management options could as well have contributed to the downward trend in HEC, for instance a good working electric fence among others. (Kimuttai, 2007)

FIGURE 2.3: CATEGORY OF HUMAN –ELEPHANT CONFLICT FOR 1995-2006 (KWS REPORT)



METHODS AND MATERIALS

The study involved household heads in the two divisions in Kwale County, Coast Province, Kenya. The two divisions were chosen because they border the wild life habitat. 2 divisions in Kwale County were selected. 2 locations from each of the selected divisions was then selected, 2 villages from each location was then selected and 5 households from each selected village were selected using multistage sampling technique making a total of 40 household heads. Multi stage sampling was chosen because, it was easier to administer than most single stage designs mainly because of the fact that sampling frame under multi-stage sampling is developed in partial units; a large number of units can be sampled for a given cost under multistage sampling because of sequential clustering, whereas this is not possible in most of the simple design (Kothari, 2003). Each household head was chosen using census method. This was so because each household is headed by a head hence making a total of 40 household heads.

The questionnaire was the best instrument to be constructed. Wiersma (1985:142) defines a questionnaire as a list of questions or statements to which the individual is asked to respond to.

This Survey research comprises a cross-sectional design in relation to which data was collected predominantly by questionnaire on quantitative data in connection with two or more variables, which were then examined to detect patterns of association. Needless to say, such a design was advantageous in that the researcher was able to collect data quickly and generate research results in a timely manner

RESULTS

FIGURE 3.1

Households Heads' Gender

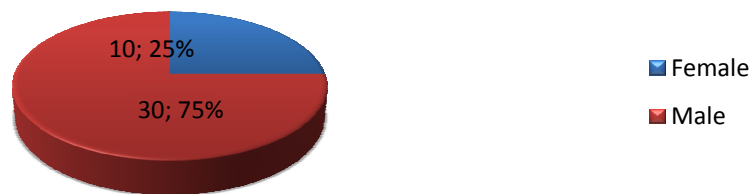


FIGURE 3.2: COMMUNITY RESPONSES ON THE CAUSES OF HUMAN –WILDLIFE CONFLICT

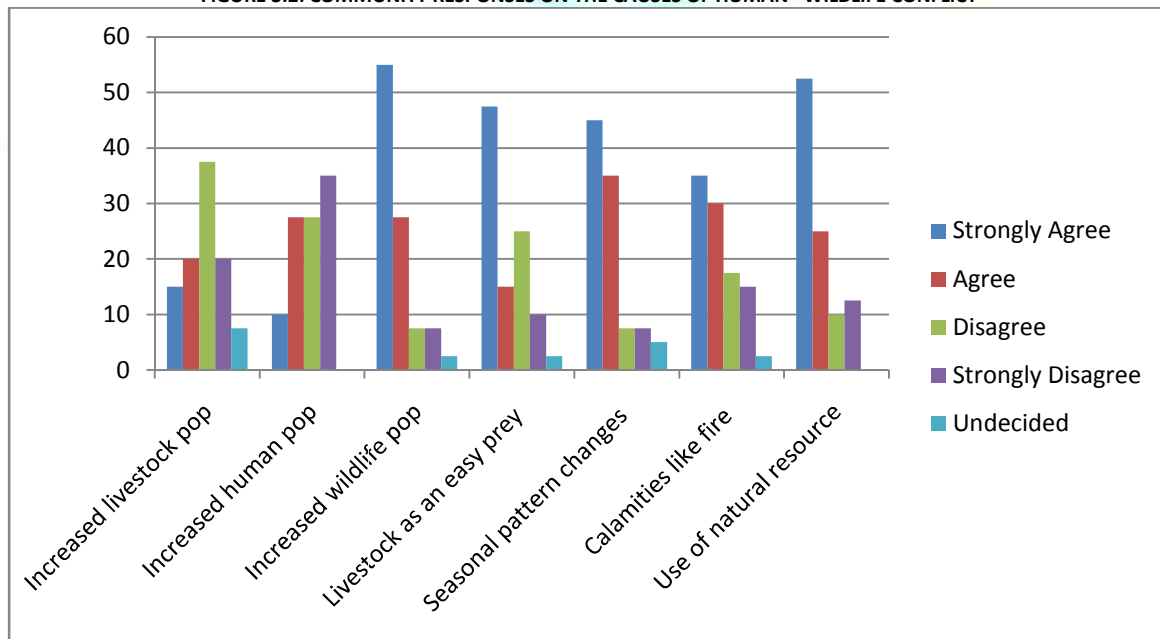


FIGURE 3.3 COMMUNITY RESPONSES ON LAND PRACTICES AROUND THE WILDLIFE HABITAT

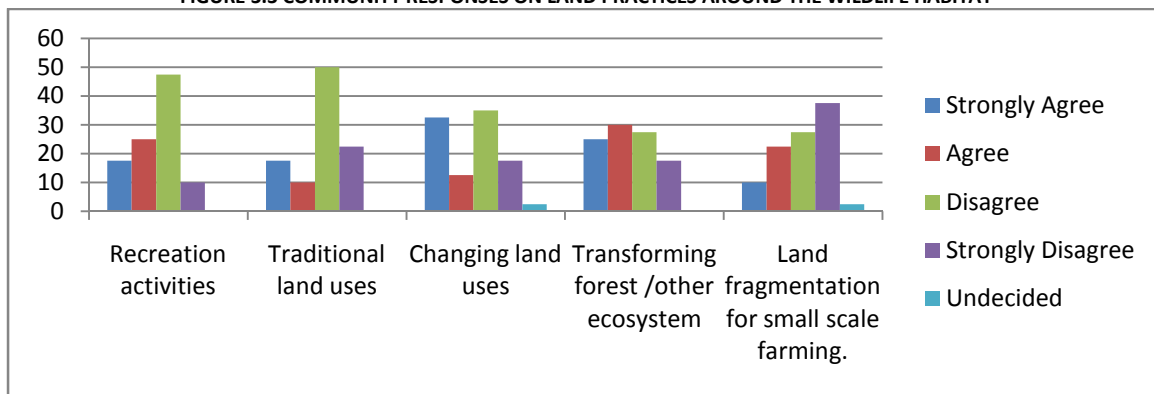


FIGURE 3.4: COMMUNITY RESPONSES ON EFFECTS ON FOOD SECURITY

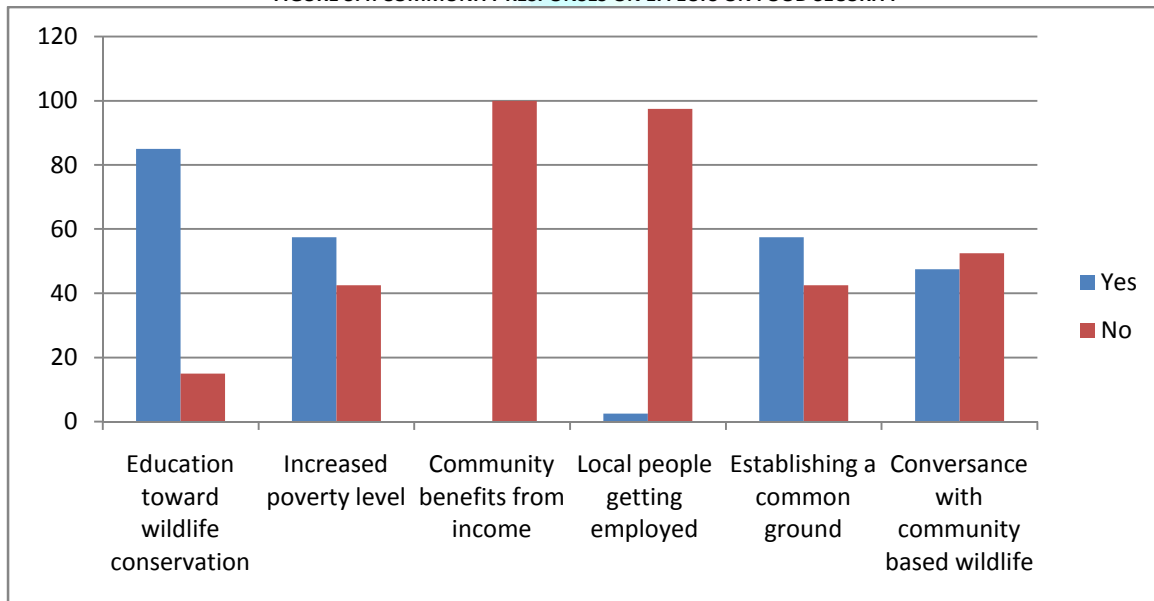
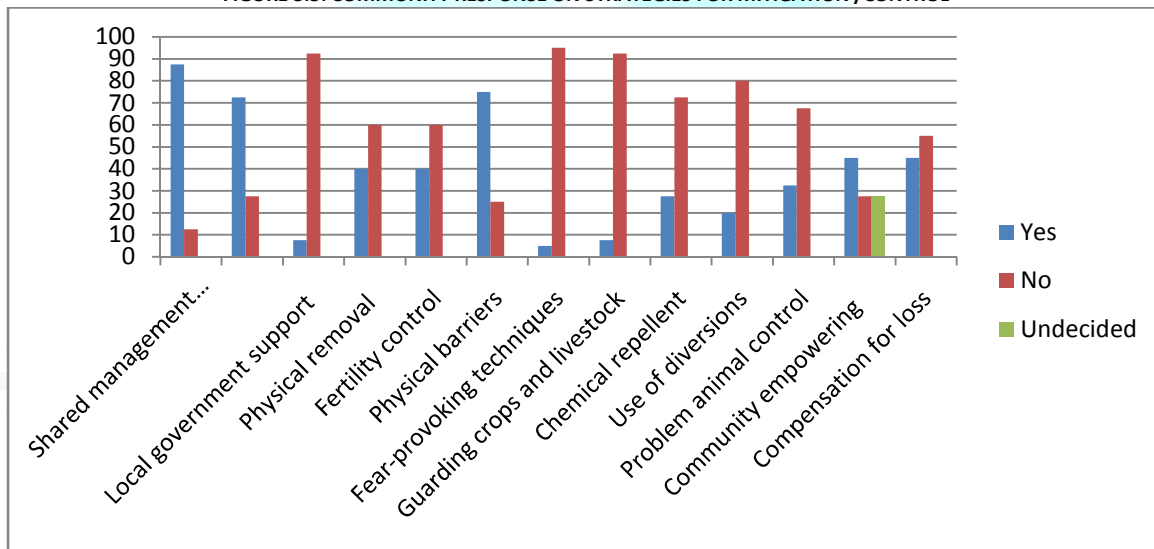


FIGURE 3.5: COMMUNITY RESPONSE ON STRATEGIES FOR MITIGATION /CONTROL



DISCUSSION

Figure 3.2 above shows that 52.5% strongly agreed that use of scarce natural resources mainly water and pasture is major causes of conflict. 37.5% disagreed on the increased livestock population resulting to overgrazing causing problems.. 55% strongly agreed that increased wildlife population causes conflict. 35% strongly disagreed that increased human population leads to encroachment into wildlife habitats. 47.5% strongly agreed that Easy prey of livestock encourages carnivores to shift their diet to livestock. 45% strongly agreed that Seasonal showing changes encourages wildlife to invade the villages. 35%strongly agreed that Calamities like fire make wildlife seek refuge in the villages. Early preparations should be done to encounter any calamities.

Figure 3.3 above shows 50% disagreed that Land use policies undermine traditional land use practices. It is only a matter of education that will guide the locals well. 35% disagree that Changing land use areas surrounding protected areas affect wildlife. 30%agreed that transformation of forests, savannah and other ecosystem into agrarian areas affects wildlife. 37.5% strongly disagree that land use fragmentation and development of small scale farming interferes with

wildlife. 27.5% agree that selling of state and truck ranches as small holdings and cultivated with commercial horticultural crops disturbs wildlife and human beings.

Human-wildlife conflict can be reduced, or mitigated by changes to land use of communities neighboring this habitat. This can be achieved through changes to the surrounding landscape so that the problem-causing animal is more vulnerable, easier to spot by people and dogs, and generally less at ease in the area (Muruthi, 2005). Little research exists on wildlife preferences for particular crops, but some crops are less palatable to wildlife. There are some crops that elephants appear not to eat. For this reason alternative crops such as ginger and chilli have been encouraged in some areas. Small islands of crops scattered across a landscape inhabited by wildlife are more vulnerable to destruction than those that are clustered together. A landscape approach to reducing human-wildlife conflict might therefore involve growing crops in large communal fields with straight edges, fences or thorny or spiny hedges, and also removing nearby cover and habitat for wildlife (Muruthi, 2005). Livestock raids can be minimized through good husbandry practices, such as herding during the day, keeping livestock in a predator-proof enclosure at night. Livestock herders avoid taking livestock to water points which are known to be inhabited by Predator.

The figure 3.4 above shows that 19 (47.5%) were conversant with community based wildlife conservation policy while 21 (52.5%) were not conversant with community based wildlife conservation policy. 85% said community education is important toward wildlife conservation. 57.5% said this conflict contributes to high poverty levels. 100% said they did not benefit from income from this wildlife. 2.5% said the local are employed in wildlife industry. 57.5% said it is necessary to establish common ground for human wildlife interaction

Food security is precarious in many communities, relying on a single cropping season or on a sale of livestock. Although on a national scale, the loss of two or three hectares of maize to elephants in a single night means nothing, to a family, it means destruction of their livelihood for the year. This consequence is particularly acute where governments do not have the capacity to pay compensation for losses. The capacity of smallholder subsistence farmers to cope with these losses varies in many cases.

In some semi-arid rural farming areas of Zimbabwe and Kenya, elephant damage to food crops accounts for 75 to 90 percent of all damage caused by large mammals. It has been estimated that the annual cost of elephant raids to crops ranges from US\$60 (Uganda) to US\$510 (Cameroon) per affected farmer (Naughton, Rose and Treves, 1999). Elephants can also damage food stores during the drier months following the main harvest. The loss of this stored food is considered far more disruptive to farmers than the raiding of crops while they are still growing in the fields, because so much damage can be done to a concentrated food source and can only be replaced in the following growing season.

Likewise, the loss of a family's small herd of cattle to lions can effectively destroy that family's wealth and way of life. For rural populations, domestic animals are not only their main resource through production of manure, milk, meat, and livestock sales, but are also their only source of wealth (means of saving, source of income, social role). Predators such as lions often kill numerous domestic animals such as cattle in one raid, and can devastate a household's food security

Figure 3.5 above shows 87.5% said shared management responsibilities is the strategies to manage human-wildlife conflict. 92.5% said the local government do not assist in managing this conflict. 60% said physical removal of human or wildlife will not solve this. 5% and 7.5% said yes to use of fear provoking techniques and guarding of crops/livestock respectively. 45% said yes while 27.5% remained undecided to community empowering as a strategy to mitigate this conflict. 55% said no to compensation of loss as a strategy while 45% said yes if all losses incurred are paid for. The crop destroyed is basically the livelihood for family then and therefore immediate intervention kitty should be created instead of compensation schemes which take long. The failure of most compensation schemes is attributed to lack of funds, bureaucratic inadequacies, corruption, cheating, fraudulent claims, time and costs involved, moral hazard that less literate farmers must overcome to generate a compensation claim.

Compensation rates were set at such low rates that they could not address social opportunity costs borne by people who were affected by wildlife. For example, compensation for loss of human life has been pegged at Ksh 200,000, which is not enough to even meet funeral expenses

Crop damage is the most prevalent form of human-wildlife conflict. The occurrence of crop-raiding is dependent upon the availability, and type of planted food crop compared to natural food sources. A wide variety of vertebrates conflict with farming activities are birds, rodents, primates, antelopes, buffalos, hippopotamuses, bush pigs and elephants. Elephants are identified as the greatest threat to African farmers (Parker *et al.*, 2007). Elephants can destroy a field in a single night raid. Most peasant farmers are unable to deal with the problem of elephant damage themselves and governments rarely offer any compensation

A series of measures are available to prevent or mitigate human-wildlife conflict. Well-designed human-wildlife conflict management plans which integrate different techniques and are adapted to the nature of the problem can be successful. Potential solutions can be selected based on their effectiveness, cost, human and social acceptability. The most sensible approach in addressing human-wildlife conflict is to implement a combination of short-term mitigation tools alongside long-term preventive strategies.

CONCLUSION/SUMMARY

Negative Human-Wildlife interaction is becoming a threat to many endangered wildlife species in the world. Many studies demonstrate the severity of the conflict and suggest that more in-depth studies on the conflict need to be done in order to address the conservation of these biodiversity.

This research project provides an insight into the HWC issue and its effects on food security in Kwale county, the study is a comprehensive review on the available literature on this conflict. It highlights common problems and mitigations across regions in order to provide a better understanding of the HWC. It also shows that HWC have similar causes and impacts, and that accurate and detailed information, scientific research and stakeholder commitment are key to the development of sustainable strategies to solve the problem.

HWC conflict is not restricted to certain regions but occur in all areas where wildlife and human populations coexist and share limited resources, however the level of vulnerability differs, for instance a Small subsistence farmers can lose an entire season's crop production in one single raid by a wild animals compared to large scale farmer who can employ wildlife preventing strategies. There is no single solution to the conflict and all preventatives and mitigative strategy should be tested for its cost effectiveness and impact on the habitat. Most sustainable approach should ensure improvement of local livelihood from revenues collection from natural reserves.

Protected wildlife habitat and presence of large wild life populations inflict costs on local population, thus can erode local support and tolerance. The people neighboring this habitat can develop a negative perception towards reserves and wildlife, exacerbating the conflict and undermining conservation efforts. In order to curb this menace, there is a need to protect rural livelihoods, reduce their vulnerability, and balance losses with benefits while promoting community-based conservation. Both people and wildlife suffer tangible consequences and different stakeholders involved should commit themselves to tackle and resolve the conflict very soon. In order to enhance protected area effectiveness, conservation should be based on sound scientific knowledge, practical local indigenous knowledge and participation.

Considering the human population growth rate, increasing demand for resources and access to land, it is clear that human wildlife conflicts will not be eradicated very soon and On the contrary, it will continue to grow as African economies continue to be driven by the production of resources for supply to more industrialized nations (Friedman, 2007). This is particularly true in African countries where subsistence agriculture will continue to play a dominant role in supporting the continent's burgeoning populations. But it is also true for countries that have developed a modern agricultural sector, such as Zimbabwe and South Africa, and where recent government policies have favored a switch from modern commercial agricultural practices to a return to subsistence agriculture. In this way immediate problems are addressed while the rapid development of innovative approaches is fostered to address future issues and eradicate the problem in the long term.

The study reveals mitigating HWC is multifaceted in that some approaches are ineffective; others are expensive and complex for communities to embrace. However, this can be minimized through good practices and education A number of mitigation strategies, such as electric fencing, compensation systems, community managed natural resource management programmes and insurance programs should be put in place. When low environmental impact strategies and traditional low-cost deterrents are not successful, some invasive approaches, such as regulated harvesting, wildlife translocation or human relocation may

need to be implemented. Of the various strategies available, settlement of rights, benefit sharing, Community Based Natural Resource Management, insurance programmes and land-use planning seem to be the most sustainable

Though mitigation to negative human-wildlife conflict has no panaceas, and both wildlife and people are in conflict. The goal is thus to enable coexistence and sharing of resources at some level. This is best achieved by addressing both sides of the equation and finding a balance between conservation priorities and the needs of people who live alongside wildlife. Increasing tolerance levels of local communities for wildlife and adapting the human landscape are essential goals, but will always be the most difficult. A well developed human-wildlife conflict strategy which encompasses different techniques based on the nature of the problem can boost co-existence. It may be necessary to develop a long-term policy to manage the main problem animals.

Solutions considered to address this conflict should be based on its effectiveness, cost and acceptability by the stakeholders. Reducing conflicts between wildlife and human will likely erode the negative attitudes that many communities have towards the protected habitat and wild animal species. Furthermore, reducing wildlife destruction on crops and livestock will improve food security and also curb the community's destructive action like hunting.

It is of paramount importance that an international forum be set up to promote information sharing on human-wildlife conflict issues and that a Web-based portal be developed to provide conflict databases, remediation technologies, good management practices, and innovative solutions and their outcomes. Furthermore, community members want a role in managing human-wildlife conflicts. Respondents recognized the need to forge partnerships to achieve long-term management of human-wildlife conflicts. This suggests that, the local community are more than willing to utilize whatever resources they have so as to benefit from wildlife resource

Finally, in order to reverse the negative attitudes towards the protected habitat and wildlife, there is great need to protect community livelihoods, reduce their vulnerability, balance losses with benefits and encourage community-managed conservation programs.

RECOMMENDATIONS

1. Damages caused by wildlife and the attempts to prevent it affect many interest stakeholders such as crop farmers, livestock keepers, and wildlife conservation institutions. Ideally, a precise study should be undertaken. This would serve to identify the actual measure of wildlife damage, evaluate the effects of preventive measures and assess the costs incurred through this vice for the purpose of compensating the affected group. This should be done by Kenya wildlife service in collaboration with wildlife conservation entities.
2. Strategies for addressing the HWC issue are often constrained by local, national or international regulation (falls and Jackson 2002). In some countries existing wildlife policies are outdated. Policies on land tenure, controlled utilization of wildlife and trade of wildlife products, game farming, tourism development and compensation schemes should be strengthened and made to conform to the present community /other stakeholder needs
3. Wildlife in many countries is one of the most significant sources of national revenue through tourism. The tourism industry can offer employment within local communities by creating job opportunities. This approach would compensate the damage caused by wildlife and contribute changing local people's negative attitudes of wildlife conservation.
4. Education and training for communities either through adult classes or farmer field schools will build local capacity in conflict mitigation and increase their understanding of HWC. This would result in behavioural change amongst local populations, thus reduced risks, vulnerability and improve their livelihoods.
5. The success of wildlife conservation and HWC reduction largely depends on the ability of managers to recognize, embrace and incorporate differing stakeholder values, attitudes and beliefs (Messmer, 2000). The commitment and coordination of these stakeholders will enhance the participation, contribution and support. Encouraging stakeholders' collaboration will make any strategy more successful, hence easy to resolve the HWC.
6. Participatory wildlife management through involving local communities is considered crucial in successful wildlife conservation. In Kenya, participation of local communities in wildlife conservation and management has been promoted through: (i) Tourist viewing; (ii) Safari hunting; (iii) Game cropping; and (iv) Capture of live animals. Recent initiatives to facilitate involvement of local communities include: (i) Conservation of biodiversity resource areas (COBRA) through which classrooms, water dams, cattle dips, health centres, and boreholes have been constructed, and (ii) Conservation of resources through enterprises (CORE) that supports setting up business enterprises in rural localities.

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