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RESEARCH ARTICLE

The use of Indigenous Knowledge in Minimizing Human-Wildlife Conflict: The Case of Taita Community, Kenya

Daniel M. Mwamidi[1], Shem M. Mwasi[2] and Abdrizak A. Nunow[3]

[1]School of Environmental Studies, Chepkoilel University College, P. O. Box 1124 Eldoret 30100 Kenya
[2]School for Field Studies, Center for Wildlife Management Studies, P. O. Box 27743 Nairobi 00506 Kenya
[3]School of Environmental Studies, Chepkoilel University College, P. O. Box 1124 Eldoret 30100 Kenya

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ABSTRACT

Taita community in Kenya inhabits the Taita-Taveta County of which two thirds of which is occupied by Tsavo National Park. There is increased human-wildlife conflict which has led to losses of properties as well as lives of both human and wildlife. Despite wildlife management efforts by the Government, these conflicts are on the increase thereby their threatening their livelihoods. Their indigenous knowledge on human-wildlife conflict minimization is fast disappearing as it remains in the custody of a few community elders and if not documented may soon disappear. This study documents this knowledge through qualitative interviews with elders living within the parks' neighborhoods. Data analysis showed elders' explanations on the important role of indigenous knowledge in minimizing human-wildlife. However, for successful utilization of indigenous knowledge for this purpose to be realized, this study recommends its use in synergy with scientific knowledge in the use management of wildlife the County.

INTRODUCTION

Human-wildlife conflict is a significant problem in Africa and many parts of the world. The conflict has important consequences for local populations in terms of food security, safety and well-being, for the micro and macro economy, and also for wildlife conservation (FAO, 2009). Considering the current human population growth rate, the increasing demand for natural resources and the growing pressure for access to land, it is clear that the human-wildlife conflict will not be eradicated in the near future. 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). These conflicts often cause human deaths and injuries, although less common than crop damage, which are the most severe manifestations of human-wildlife conflict in Africa (FAO, 2009). Large mammalian carnivores are responsible for numerous fatal attacks on humans, and large herbivores, such as elephants, are also involved in human deaths every year in Africa and especially at the neighboring communities around National Parks and Game reserves. Crop damage is the most prevalent form of human-wildlife conflict across the African continent. According to FAO (2009), the occurrence and frequency of crop-raiding is dependent upon a multitude of conditions such as the availability, variability and type of food sources in the area, the level of human activity on a farm, and the type and maturation time of crops as compared to natural food sources.

Conflict of a wide variety of vertebrates with farming activities in Africa has been recorded. These include birds, rodents, primates, antelopes, buffalos, hippopotamuses, bush pigs and elephants (FAO, 2008). While it is widely recognized that in most cases elephants do not inflict the most damage to subsistence agriculture, they are generally 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 for such damage (FAO, 2008). Some adverse effect of the human-wildlife conflict is the attack and killing of domestic animals by predators. The number and type of domestic animals killed by wildlife varies according to the species, the time of year, and the availability of natural prey. In the savannah and grasslands where livestock keeping remains the main source of livelihood for many people, attacks on livestock are an issue (Hill, 1998). On a national level the losses are hardly significant, but for the individual stock owner, they can be catastrophic. For a small-scale herder, losses to wildlife can mean the difference between economic independence and dire poverty.

As much as we can blame the wild animals for many damages to human, it is worth noting that even the people have induced wildlife mortality which not only affects the population viability of some of the most endangered species, but also has a broader environmental impact on ecosystem balance and biodiversity genetics preservation. According to Kangwana (1993), human-wildlife conflict today ranks among the main threats to conservation in Africa alongside habitat destruction and commercially motivated hunting of wildlife to satisfy the demand for bush meat. This poses a real challenge to local, national and regional governments, wildlife managers, conservation and development agencies and local communities. In Kenya human wildlife conflict is on the rise as the demand to feed the growing population and economic development is on the increase. Communities living around Game reserves and National Parks have been facing co-existence problems with wildlife. For instance, Taita Taveta County whose two thirds of its land is occupied by Tsavo East and West National Parks, have had the conflicts for ages that has

Corresponding author: dmwamidi@hotmail.com, smwasi@fieldstudies.org, anunow@yahoo.com

resulted in the death and destruction of human and domestic animals. In addition to this, poor locals lose crops to wild animals every season, leading to increased poverty in this County. Kenya Wildlife Service (KWS) which is mandated to manage wildlife in Kenya have done little to resolve the human-wildlife conflict in Taita Taveta County (Kigema, 2003). The electric perimeter fences around the parks have had little success and according to the locals, wildlife such as warthogs, hyenas, primates (baboons and monkeys) and rodents cannot be controlled using such fences. Lions circumvent the fences by going through the warthog holes hence crossing over to unprotected areas and killing livestock. Local community also feel that they are not involved in decision making by the KWS in wildlife management the fact that intensifies the conflict as locals view the management policies as "coercive" (Mwamidi *et al*., 2009).

The Taita and Bura district community representatives in Kenya, feel that wild animals on private and communal lands should be considered as the property of the local people so that people can plan how best to manage and use them (KWS, 1996). Similar sentiments on biodiversity management are made by Orsak (2005) who maintains that biodiversity management messages won't be captured or remembered, much less applied, if they are not relevant to people's everyday life and concerns. An understanding of indigenous people's prior knowledge is essential to make human-wildlife conflict minimization more meaningful. It is for the aforementioned human-wildlife conflicts in Taita Taveta County that this paper was compiled to facilitate the minimization of human -wildlife conflict and assist affected communities in applying best management practices. With a focus on indigenous knowledge of the Taita community living in Taita Taveta County in Kenya, the paper describes different traditional methods of conflict management which have been employed by the Taita people living around the Tsavo East and West National Parks and unprotected areas outside the parks for ages.

Study area

The study was conducted in Taita hills found in Taita - Taveta County of what was previously known as Coast Province in Kenya. These hills lie in the South-Western Kenya, south and west of Voi town, and rise abruptly above the semi-arid plains of Tsavo East and West National Parks. Geologically, the hills are the northernmost outpost of the ancient Eastern Arc Mountains that extend southwards to south central Tanzania (Schluter, 1997). This is one of the world's most important regions for biological biodiversity with high endemism in plants, birds, mammals and amphibians (Mittermeier *et al.,* 2004). At the base of the hills, rainfall is only 500mm/year with temperature range of 30°C. This rises to 1,500mm/year on the top, with an average temperature of 14°C (CEPF and EAWS, 2005). Dry bush land runs up the flanks of the hills, giving way rather abruptly near the top to smallholder cultivation and remnant patches of moist forest (Platts, 2010). Despite their small size, the forests are important for water catchments (supplying the Voi River and various local streams), soil conservation (EAWS, 2001) and habitat to wild animals including mammals, birds, amphibians, reptiles and insects (Platts, 2010). The indigenous forests in this area have been fragmented, degraded and some converted from indigenous to exotic plantations (Mwang'ombe, 2007). These forests are crucial for the livelihoods of the local people, existence of wildlife in the rangelands (Tsavo East and West National Parks and local ranches) and the rare and endemic species they hold (EAWS, 2001). There are increased agricultural activities leading to forests encroachment and habitat destruction and further leading to human-wildlife conflict (CEPF and EAWS, 2005). Besides, there is an increased human-wildlife conflict triggered by carnivore turning on domestic livestock since there is a declined number of herbivorous in the wild due to prolonged 2009/2010 droughts and habitat degradation (Marchant, 2010).

METHODS

The study used an ethnographic approach because we wanted to understand the community's co-existence with wildlife in areas around protected and unprotected landscapes. In order to do this, we had to collect data in the natural settings as the people went about their daily chores. Data collection was done in the months of October to December. We considered these months since short rains begin and end during these months. In addition, farmers plant and harvest food crops during that period, hence there are high human-wildlife conflicts especially with rodents, primates, birds and mammals destroying farm produce. Initial community organizing, planning, establishing proper communications and rapport-building visits included discussions with local leaders, village elders and other key informants. Community meetings were also conducted introducing the research activity and the research purposes. We helped to identify key informants including 8 community elders (2 from each division), all of whom were above sixty years of age since the custodians of indigenous knowledge in communities are the elderly (Hughes, 1995). In Taita and Kenyan coastal communities people younger than forty are considered to be youth (Fedders and Salvadori, 1979).

Semi-structured interviews were conducted with key informants (elderly men and women). Observations were used to "collect live data from live situations". Recording of observations was done using transcriptions and observation notes, ongoing notes, descriptions of activities and observation charts. The respondents were briefed on the reasons for the research and the interview was carried out based on their agreement. They also permitted their knowledge to be published. The copy of this publication will be given to them through the office of the District Commissioner (D.C.) at the County headquarters in Taita Taveta. Triangulation of data was achieved when both unstructured interviews, observations, semi structured questionnaires and focus group discussions were used to source data. In administering member checks, we provided a summary of the data gathered for respondents to listen to and comment so as to validate the data collected. The study used descriptive statistics to analyze the data. Since the data were mostly collected in vernacular language, translation had to be done before analysis of the data to make it understood in English. It was thus mostly qualitative in nature. The data was analyzed using nominal scale (categorical variables) by coding it based on: themes, topics ideas, concepts and terms.

RESULTS

This is the presentation of findings that emerged from the data analysis of the interviews, focus group discussions and observations on the indigenous knowledge in human-wildlife conflict minimization among the Taita community in Kenyan coast. Taita people living in the neighborhood of these forests had indigenous knowledge which they used to control or minimize human-wildlife conflicts. Some of this knowledge is still being used in some areas such as Kishushe, Mwakinyambu, Mbulia, Sangenyi, Mwanda, Mghange Nyika, Mghange Dawida and Paranga but other places such as Wundanyi, Werugha, Mbale, Mwatate and Bura appear to have abandoned the use of this knowledge. Some practices are non-destructive while others are destructive. The non-destructive indigenous practices include community collective consensus (irumirio), burning of dung of the wild animals, use of scare crows, painting of primates, use of concoction (Kiture), drum beating, and the use of *Acacia mellifera* (iti). Destructive or harmful practices on the other hand include, kill and expose to scare, noon trapping, trench digging and snaring.

Non-destructive indigenous practices

These indigenous practices on human-wildlife conflict management does not harm the wild animals but act as deterrents and enhances human-wildlife coexistence. These indigenous practices are now presented below. *Community collective consensus* involved all community elders, meeting on a specific cultural site so as to offer sacrifice, mainly a lamb and a goat to their God called *Mlungu* as a binder of the agreement between their community and God. For instance people from Werugha, Mghange, Mwanda, Wumingu, and Rong'e conducted this ritual before and after planting crops in lower

ecological zones such as Kishushe, Kidaya, Mbulia, Mwakinyambu, Sangenyi and Kisima which border Tsavo West National Park. The first procedure of controlling the problem of wild animals encroachment to the farms was to appoint one village elder who was to go to the lower lands of Taita hills and see if the rainy season was near to come. If there were signs of rain then people would meet on a specific day to go and prepare land. They were to camp in the lower land until they finished planting crops so as to wait for the rain. During this period no one was allowed to have sexual intercourse with anyone in the lower zones of Taita hills so as to avoid punishment from ancestors to the whole community by letting wild animals destroy their crops or even kill the people. Women who were experiencing menses were also barred from going to these places because they were considered "unclean" and they could lead to ancestors becoming angry and punishing people in the community. After tilling the land and planting was complete, men drunk the local brew known as *Denge/mbangara* brewed using *K. africana* (*Mwasina*) tree, so as to mark the end of the exercise. During this period all people were supposed to leave the farms and agree that *Mlungu* would protect their farms against destruction by wild animals. All people were to leave at once without looking back where they had come from and no one was to doubt that they had left the farms alone. The second phase which involves weeding was marked probably three weeks after planting. One elder was sent again to go and survey the farms and inform the community on whether the farms are ready for weeding. The same ritual was repeated as the first phase.

The final procedure would involve harvesting the crops. This procedure was done by one elder who would harvest a produce in each field that would fill basket of approximately 10 kilograms of maize grain and offer it to the Taita Shrines called *figi/ fighi*. The *fighi* were believed to be the home of ancestors who died long ago and were buried in these specific locations. People who were buried in these shrines were rain makers, traditional healers and village/clan elders. They provided security to the people against wild animals, intruders (*Wachea-mbai*) and destructive natural calamities. After the first harvest was offered to the shrines, then women were allowed to harvest and carry the produce to their homes which was an approximate distance of between 10-15 kilometers away. There was a condition that if one found maize stalk fallen with a maize cob, this should not be harvested but left behind for wild animals to eat after the harvest was complete. In this manner, wild animals could also enjoy man's sweat. Immediately after the harvest was complete, elders closed the ceremony by taking denge- the local brew and pour it on the ground as a sign of thanksgiving to the ancestors for safeguarding the crops from wild animals. This method was almost 100% effective according to the respondents, and was widely used up to 1970s. Eighty-six percent of the people interviewed said they were for the idea that the practice be reinstated and be used along with the current Kenya Wildlife Service (KWS) strategies on minimizing human-wildlife conflict.

The practice of burning wild animal dung was also an effective means of controlling wild animals. According to the elders, the odor emitted from burning the dung repelled them for over one week. This method was predominantly used in Kishushe, Mghange, Mbololo, Mbulia and Mwakitau. Animals controlled by this method include: elephants, buffaloes, wild pigs, warthogs and porcupines. The scare crow method is still used to date in some areas around Ngangao, Yale, Vuria, Mghange, Mghambonyi, Kishushe and Rong'e. A structure resembling a man was built on the farm where wild animals can see it. The scare crow was used to control birds, baboons, monkeys, porcupines and wild pigs. Eighty nine percent of the respondents observed that scare crows are not an effective means of control, because wild animals easily get accustomed to them. For instance, elders observed that baboons and monkeys would be accustomed to the scare crow within few hours by also scaring it by making noise or making frightening gestures to the scare crow, if they see it does not move they will know it is not a human being so they will get into the farms and destroy the crops. Painting of primates was the most effective means of controlling baboons and monkeys without killing them. A trap is set on their tracks. A trapped animal is then painted with the color different from that of the animal. The paints are made from mixture of red clay soil and charcoal powder which diminishes after some few days and if it rains then it fades off easily. The painted baboon or monkey is then released without it being harmed. In its attempt to join other troop members, they will get scared of the painted colleague and this will make all the baboons/monkeys run away from the painted individual. The more they try to avoid the painted individual, the more the painted individual runs to join them. This will make them run for the whole day until it is dark where they cannot perceive the color. The next day when the sun rises the same chasing begins until all baboons leave their own home range in their attempt to escape the painted individual. This method may force baboons or monkeys to escape from their old home ranges for a long period of time probably until the generation which saw the painted individual die. This helped to minimize the human-wildlife conflict without killing them. The areas within Taita Taveta County where this is widely practiced include Mghange Nyika, Mwanda, Kumbeti, Kishushe and Mwakinyambu. Use of concoction was widely practiced especially before and during the colonial period. In this method, elders used the kiture (mixed leaves of some indigenous plants to form "a medicine" used to repel animals) by pouring on farm boundaries.

This kiture would make wild animals to "think" that there was a wall to prevent them from getting into the farms. The method was used at a small scale, particularly in Mghange, Mwanda and Kishushe. According to elders, Ngulamu son of Kichuchu and his brother *Mwandonge, Malasi* were considered to be the experts of this *kiture*. Mzee Mghenyi who died in 1998 was also famous for this. Drum beating method was used to control elephants and wild pigs from destroying the farm crops. The drums were beaten from dusk to midnight to scare these animals. The method was initially effective but as time goes by, elephants get used to the noise and counter it by trumpeting and eventually raiding crops. The use of *A. mellifera* as a way of repulsing wild animals was also used. *Acacia mellifera* has "claw like" thorns which are used in repulsing lions in their attempt to kill livestock. Any traditional herdsman in the field is supposed to carry a twig of this tree to protect him from lion. It is also used as a gate to livestock's "bomas". A lion often avoids where there is this twig because of its "claw-like thorns" which can injure it. The Use of Taita shrines (Figi/Fighi) was another method of minimizing human-wildlife conflicts. Major role of these shrines was to protect the community not only from wildlife invasion, but also from the neighboring communities. The shrines were located where dead elders' skulls were kept usually in caves. The elders believe that ancestors in these shrines have powers to repel wild animals and "bad people" from crossing over and harming people in Taita, e.g., fighi ya Mnyengelonyi - was used to safeguard the community from the northern parts of Taita (Kishushe, Sangenyi, Vipalo va Wambula and Fombe). They were held in high esteem within the community and nobody was supposed to violate or go against the performance of the rituals on these sites.

Destructive indigenous practices

Noon trapping involved putting snares along porcupines and wild pigs' tracks. It was believed that at noon, these animals normally rest because of the high temperature. When resting, it is believed that these animals would "dream and predict" that traps have been set on targeted locations along their tracks and hence would avoid going to these locations and go to feed elsewhere where there were no traps. According to the elders this protects the farms from invasion by these animals. The method was widely used in Sangenyi, Chambogho, Kishushe, Mwanda and Kumbeti. Locals observed that some traps often harm other untargeted animal species, hence being an ecological hazard. Kill and expose to scare is a method widely used, especially to control guinea fowl, baboons and monkeys. When an

animal is killed for instance a baboon, it is dried and hanged on a tree in areas where baboons frequent especially near farms so as to scare other members of the troop. This indigenous method has an advantage because one animal is killed to scare the whole group. The approach can assist in minimizing human- wildlife conflict and conserving wild animals. Trenches were dug across wild animals' tracks leading to the farms or near bee hives, especially in the control of honey badgers and mongoose that feeds on honey. Wooden spikes were placed on the floor of the trench so as to kill the animal that falls in it. The method was widely used by beekeepers but is no longer in use today because of the reduction in bee keeping farming in the area. Snaring has widely been used especially in controlling dik-diks, gazelles and duikers, porcupines, wild pigs, and warthogs from entering farms. The snares were placed on the periphery of the farms or animal tracks. This method is still being used, although it is opposed by many conservationists as destructive since this method traps indiscriminately, including untargeted animal species, and sometimes even livestock. In general, the commonly used indigenous practices in minimizing human-wildlife conflicts by the Taita neighboring the forests include the use of collective community *consensus* and the use of the shrines practiced in Mghange Nyika and Dawida, Kishushe, Mwakinyambu, Sangenyi and Kisima. Scare crows, concoction and shrines and dung burning are also preferred by the community as methods in minimizing human-wildlife conflicts.

DISCUSSION

Taita people had indigenous practices in human-wildlife minimization which are non-destructive and others that were destructive. Levels of indigenous knowledge on wildlife are "spiritual" and "cultural". Spiritual practices are ecologically friendly because of people's great respect to God. The spiritual level of knowledge in management of wildlife involved community collective consensus that all people would agree that God would protect them from wildlife invasion since they believe he is the one who created it hence he has the powers to control wildlife from harming human beings. According to the elders, spiritual strategies would work 100% in human-wildlife conflict minimization. Cultural level of knowledge category was also ecologically friendly and it was used to "repulse" wild animals away from farms or homesteads without harming them. The destructive practices on the other hand were not ecologically friendly since they involved killing or torturing of wild animals. These practices included digging of trenches along the animals' paths so that they may fall inside, painting of primates, noon trapping, killing of an animal then exposing it to scare other members of the same species. This concurs with Warren (1996), who observed that not all indigenous knowledge practices are ecologically friendly; some practices may endanger the "integrity" of the ecosystem performance.

Taita community has low use of totems because of the increased human-wildlife conflict in the region. Animals such as baboons and monkeys which are considered as totems and sacred in Ghana (Atte and Oluwayomi, 1992). However, these are considered as a menace in Taita hills because they destroy food crops and even kill livestock like goats and sheep. All these indigenous practices are prone to trial and error as previously noted, and that indigenous knowledge has an adaptive and self correcting mechanism, since what used to be effective might cease to be effective as time goes by. For instance, the use of drums as a way of repelling elephants and wild pigs, is seen as being less effective as time advances and most respondents during the study viewed that wild animals have started gaining 'intelligence' and have adaptive counterattack to human manipulations. Beating drums in 1980s was effective as elephants used to flee away from farms, but today instead of fleeing, they would find the source of the drum noise and chase the drum beater or even kill the person. The non-destructive methods described in the results can be effective if Taita community living around reserve areas are involved in their implementation and are also involved in the conservation and sustainable utilization of wildlife resources.

Conclusion

The Taita community demonstrates ecologically friendly human-wildlife conflict minimization mechanisms. Their knowledge on wildlife behavior is rich and they also know the role that wildlife plays in ecosystem functioning and their direct or indirect benefits to the community. This knowledge helps them control wildlife hence living in harmony with it. The Taita community is found to be highly knowledgeable regarding uses of biodiversity with which they interact. But loss of their traditional management practices and uncontrolled utilization of wildlife could lead to subsequent loss of such species, thus threatening the future of the Taita. Documenting traditional knowledge is one way of helping to conserve wildlife. To secure valuable traditional knowledge, the state and agencies mandated to manage wildlife in the country should recognize its value and legitimacy by providing protection against bio-piracy and benefits such as those secured through patent rights to the Taita community. Moreover, integrated wildlife management programs in Taita hills should be developed and implemented to conserve forests of global significance.

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