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Conservation Challenge: Human-Carnivore Conflict in Sodo Community Managed Conservation Forest, Wolaita Sodo Zuriya District, Southern Ethiopia

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Abstract
Close proximity between humans and large predators results in high levels of conflict.
The aim of this study was investigating the extent and factors leading to human carnivore conflict through key informant interview, focus group discussions, questionnaires and field observation in all villages around sodo community managed forest, Southern Ethiopia. Totally, 310 household samples were identified for questionnaire in eight purposefully selected villages. Livestock losses from 2005 to 2007 (n = 745) were reported to be mainly caused by spotted hyena *Crocuta crocuta* (174 animals), leopard (151 animals), baboon *Papio anubis* (79 animals), African wild dog *canis aureus* (42 animals) and caracal *felis caracal* (65 animals). These predators mainly predated sheep (34 %) and goats (20 %) and cattle (25%) and donkey (4 %). Spotted hyena being the main predators of sheep (25.69 %) and goat (14.62 %). Both anubis baboon and African wild dog were majorly depredate sheep (10.67 %). Leopard was the main predators of cattle (38. 2 %). However, Chickens were killed mostly by serval cat depredate 83 animals (65 %). The level of conflict increased during 2005–2007. Livestock depredation was majorly observed during the wet season (62.2 %). Most respondents reported use of guarding using dogs and livestock enclosures with thorn bush kraal as very effective method in the villages. Our findings suggest that improvement of husbandry techniques and education will reduce conflicts and contribute to improve conservation of these predators and reduce the loss of livestock in the area.
Keywords: Conservation, Depredation, Ethiopia, Livestock–predator conflict, Predator, Sodo, Sodo community managed forest.

Introduction

Human wildlife conflict is not recent phenomena; it has been in existence as long as humans and wild animals have shared the same landscapes and resources (FAO, 2009). “Taung skull”, the most famous hominid fossil, which was discovered in South Africa in 1924, belonged to a child who was killed by an eagle two million years ago (Berger and Clarke, 1995; Berger, 2006). However, humans and wild animals had lived together for millions of years without serious conflicts (Woodroffe and Ginsberg, 1999). But, considerable growth of human populations in the last few decades coupled with technological development has had a significant negative impact on human wildlife relation (Hanski, 2005; Holmern et al., 2007). When population increases with technology improvement, demands for agriculture and pastoral lands become increase. Especially in developing countries, agricultural activities, such as shifting cultivation, have resulted in significant habitat destruction and fragmentation through encroachment, land clearing, and human settlement (Yihune, 2009). The report in 21st century indicates every ecosystem on the Earth’s surface has been influenced by human activities (Vitousek et al., 1997). According to Vitousek et al. (1997) around 40-50% of the earth’s surface is estimated to have been transformed by humans, often with marked ecological effects. This human significant negative impact on the planet earth also highlights in human footprint map (Sanderson et al., 2002). Much of these anthropogenic impact is due to the world’s rapidly increasing human population, which currently stands about 7 billion and which the UN predicts to reach 8.9 billion by 2050 (UN, 2004). Increments in the use of natural resources and habitats in many areas associated with increasing human populations forcing a wildlife to live in close proximity to humans (Ikanda, 2009) (9). This causes to overlap human and wildlife population requirements and may exacerbate human wildlife conflicts (IUCN, 2005; Yihune, 2009; Ogada, 2011) and become a major challenge to biodiversity conservation (Woodroffe et al., 2005). Human-carnivore conflict over livestock is one of the most important historical cases of human-wildlife conflict (Ciucci and Boitani, 1998). Due to the habitat degradation of the wildlife, the natural prey of carnivore species is declined resulting into the increased depredation of livestock, which in turn causes the human-carnivore conflicts (Bibi et.al, 2013)

Human-carnivore conflict is one of the main constraints to biodiversity conservation efforts outside many protected areas (Kent, 2011; Lyamuya, Masenga, Fyumagwa, & Røskaft, 2013; Nyahongo, 2007). It becomes a common global phenomenon in rural areas and has become common on the urban fringe in both developing and developed countries (Dickman, 2008) .The most frequent type of conflict between humans and

wild animals in different parts of the world are livestock depredation (Dickman, 2008; Kaswamila, 2009; Nyahongo, 2007). Livestock depredation is probably the most common cause of human-carnivore conflict in Africa. Carnivores also can cause significant loss of human lives (SGDRN, 2007). According to SGDRN (2007) one of the most serious causes of conflict is the fear of being killed or injured by a large carnivore. The death or injury of a person due to a large carnivore causes considerable trauma to the family and community, and may impact severely on the welfare of the surviving family. Due to this human–carnivore conflict can have a substantial and disproportionate financial impact on rural communities, because those who live in closest proximity to carnivores tend to be within the lowest income category (Naughton-Treves, 1998). Conflict can therefore reduce local tolerance towards carnivores and their conservation (Linkie et al., 2007).

Human-carnivore conflict due to predation affects population dynamics of wild carnivores near conservation area boundaries (Kolowski & Holekamp, 2006; Sillero-Zubiri & Laurenson, 2001). However, according to Ogada et al. (2003), conflict with local people, particularly over depredation of livestock, is a major cause of population decline in carnivores, affecting both protected carnivore populations as well as those living outside of protected areas. That is way, carnivore populations have been declining in the worldwide (Nowell and Jackson, 1996). To avoid further population loss and local extinctions, conservation biologists must work toward a better understanding of how carnivores can coexist with people around conservation areas. Population recovery, recolonization, or reintroduction schemes will not succeed unless the original cause of population decline has been eliminated or reduced (Reading and Clark, 1996). That is why this study is conducted at Sodo Community conservation area to identify the causes of human carnivore conflict and to measure the extent of severity of the conflict for the sack of both food security of the local people and sustainable conservation practice in the area.

Methods

Description of the Study Area

The study was conducted in south part of Ethiopia at Sodo Community Managed forest, located in the Soddo Zuria and Damot Gale Woredas (Districts) within the Wolayita Zone (Figure 1). It situated at approximately 6°54°N 37°45°E through to 6.5°N 37.5°E and covers the area of 341.8 hectares. The climate of the area is bimodal with long rainy season from June to October, with a short rainy season in March and April. The average annual rainfall and temperature are 1365mm and 15.10^0c respectively.

According to the local authority, the population number of Sodo zuria is 163, 771 out of which 80,525 are male and 83,246 female. Wolaita trip inhabit the area and speaks the local language called wolaitigna they also speak the national language Amharic. The community keeps livestock, but they do not depend solely upon it, as they are also engaged in crop cultivation and other business activities. However livestock is basic for their livelihoods in many ways as their livelihoods are based on subsistent agricultural farming system and livestock is vital for this way of life. A pre study assessment indicates, the community benefited from the forest in many ways the conflict with the carnivores become sever problem in the area especially for the community who cloth to the boundary who live inside the forest.

Soddo Community Manage forest is a mountain range conservation area and its elevation extends up to 2950 meters above sea level. The forest encompasses natural spring, rivers and Georges. Bamboo trees on both side of the riverside give a natural beauty for the area in addition to support to the hydrological system of the area. The bamboo tree has also great contribution to community income diversification. The natural vegetation of forest is highly diverse and dominated by various plant species. For instance grassy vegetation – with some scattered bush and shrubs, montane moorlands, Broad leaf bushy vegetation and ericaceous vegetation. This habitat is characterized by mixed vegetation type (WVE, 2006).

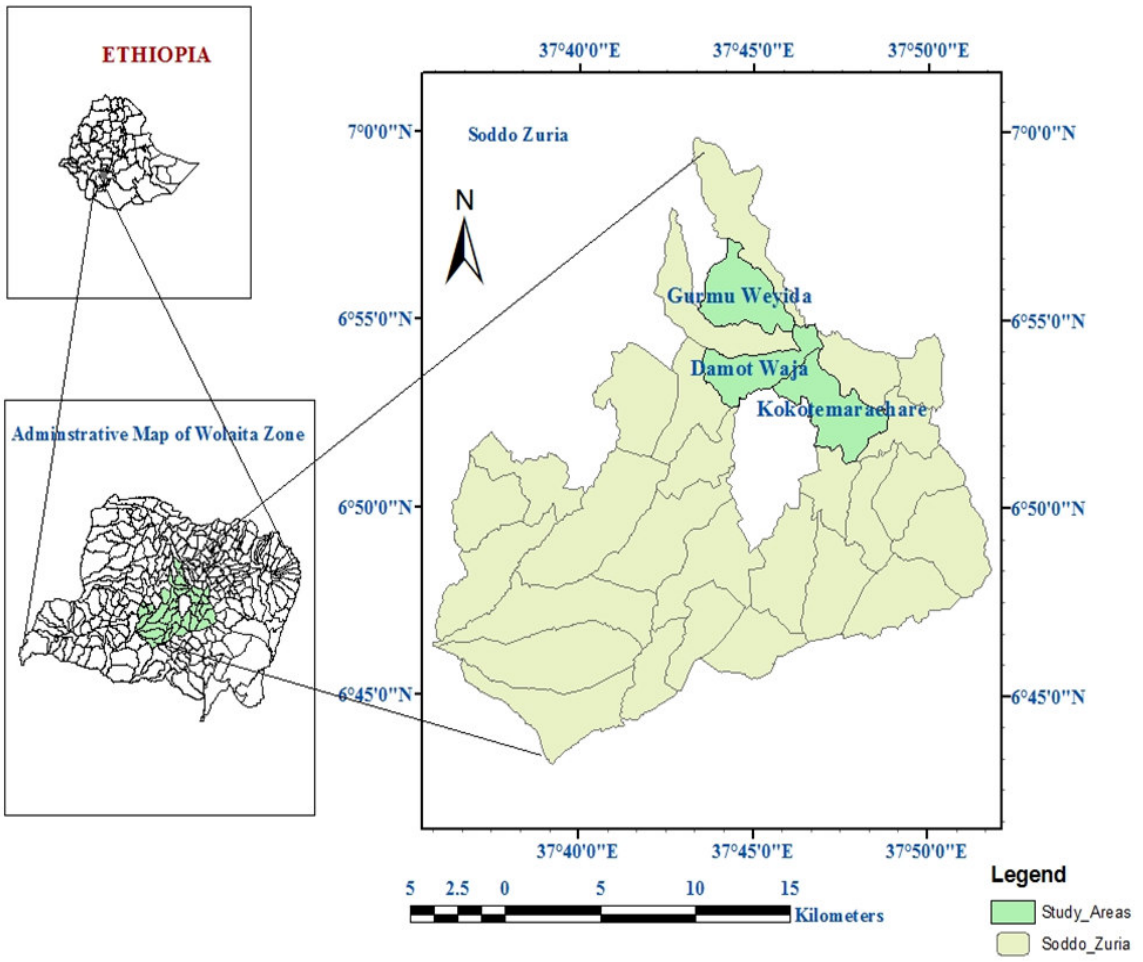

Figure-1. Map of the study area

Data Collection Technique

Data for this study were collected between 2014 and 2015. To get the actual design of the research, to identify the boundaries and to have a general understanding of the overall situations of the forest preliminary survey was conducted in September 2014. The study area has seven neighborhood Kebeles from which three kebeles (Kokate, Woide and Damot Waja) were selected purposefully based on conflict severity and the distance from the forest based on the information from the pre-study survey. Eight villages were selected from the three represented kebeles namely Anka, Manara, Sorto, Dagcho, Woide, Woide Damota, Waja Damota and Kokate Damota ranging from 0 to 5km apart from the boundary of the forest. Based on this, livestock depredation and other related data were collected through different techniques: key informant interview, focus group discussions, and questionnaires. The questionnaire and interviews covered a total of 310 households that were randomly selected from the villages. Interviews were given for illiterates in the same procedure with questionnaire to get similar data.

Semi-structured survey design were used to collected data which is similar format used by Maddox (2003). The questionnaire administered to farmers within their area of farming and/or residence (Hill, 2000) to members of the household in a random manner (Newmark *et al*., 1994), by alternating adult male and female respondent as much as possible. Focus group discussions were also held in the villages with individuals who have experience in human carnivore conflict in the area to complement the data from questionnaire and interview.

Data Analysis

Statistical analyses were conducted using SPSS version 16 (Statistical Package for the Social Sciences). The data were coded and analyzed using descriptive statistics. Chi-square test with the significance level set at $P = 0.05$ were applied to test the differences between independent variables including distance from the forest (village within 1 km, 2 km and 5 km).

RESULT and DISCUSSION

Problem rate of wild animals on domestic animal

A total of seven species of carnivores and one omnivore were recorded as predators of domestic animals (cattle, sheep, goats, donkeys and chicken) surrounding in the forest (Figure 2). These animals were: leopard, Anubis Baboon, Spotted hyena, golden jackal, serval, caracal, Black backed Jackal, African wild dog. 75 % of the respondents reporting that leopard were the major problem animal. Also respondents noted that, anubis baboon, spotted hyena and African wild dog were the major problematic animals. However, serval, black backed jackal, golden jackal and caracal posed limited problem. There was a high level of perceived human-carnivore conflict in the study area, with focal carnivores subject to particular hostility, as has been observed in sodo community conservation forest. According to Dickeman (2008) were reported that human carnivore conflict was a problem around ruaha national park, Tanzania. The number of livestock lost to predators showed a positive relationship with the problem score assigned to focal carnivores. About 80% of the respondents reporting that spotted hyena are the big problem animals in the settlement areas of the rural community living around ruaha national park, Tanzania. In the present studies leopard, spotted hyena, baboon and African wild dogs were posed high problem in livestock, poultry, donkey and human safety. Similarly, Maddox (2002) also reported that Carnivores, particularly spotted hyaenas, leopards, and African wild dogs, were ranked as significantly more problematic than other species.

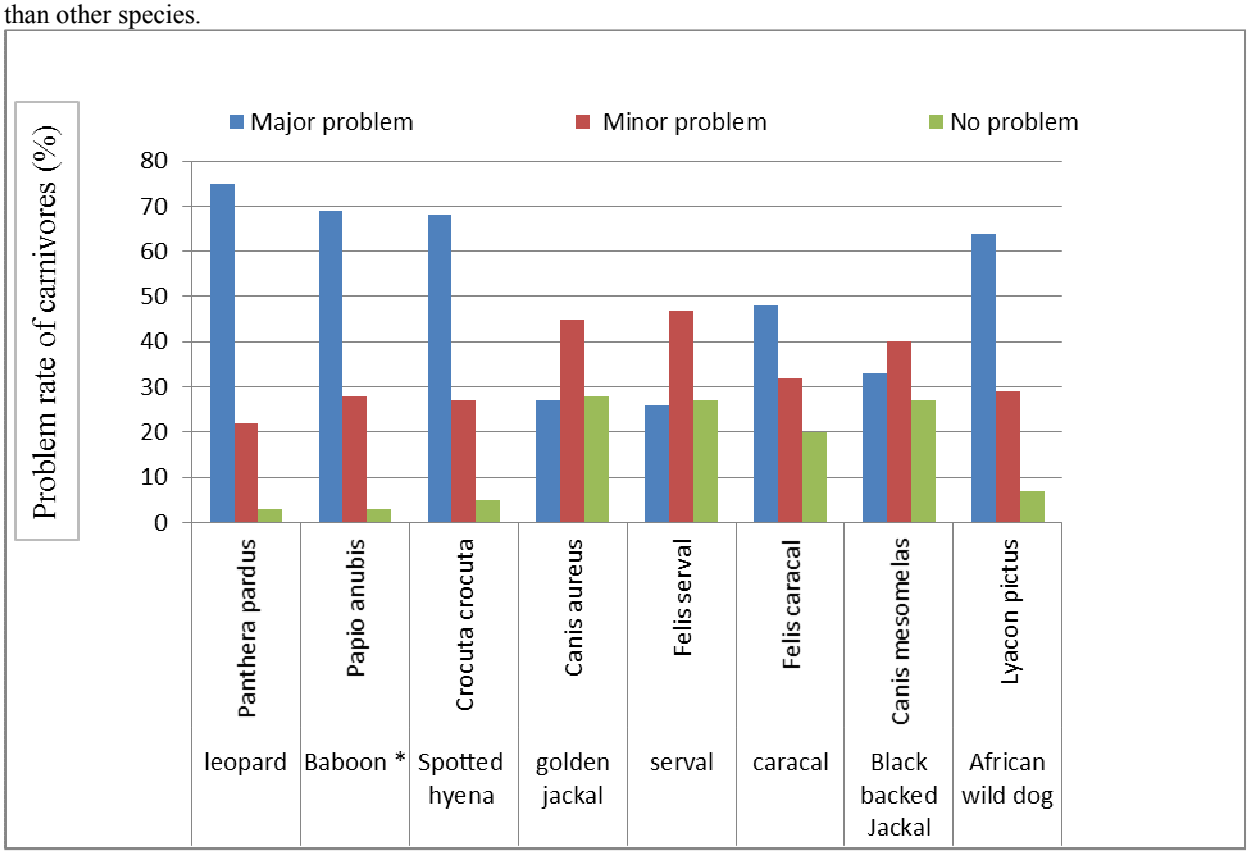

Figure-2. Percentage of problem rate of wild animals on livestock losses around sodo community conservation forest, based on our questionnaire survey (N= 310, * = omnivore).

Wild animals attacks on livestock, human safety and cause diseases

The respondents remarked that the wild carnivores caused threats on domestic animals, chicken and human safeties (Figure 3). These predators were threats to livestock (54.21%), chickens (17.83%), human safety (12.66 %) and disease causing agents (2.51 %). There was a significant difference in the mean percentage of threat scores ($\chi 2$ =45.36, df =4, P<0.05). The loss of livestock was the main reason for disliking focal carnivores. In the present studies, leopard, hyena, baboon and African wild dog significantly depredate livestock (goats, sheep, and calves). The reduction of the natural prey may be one of the major causes of carnivores shifting their diets to livestock (Mishra et al., 2003; Patterson et al., 2004). About 44% of livestock was depredated by leopards as reported by the respondents in Kanha-Achanakmar corridor area, Central India (Rahim Ali *et al*., 2012). About 43% cows were attacked by different carnivores followed by Goat 28%, bull 23% as reported by the respondents. As stated by the respondent, Leopard and spotted hyena were reported to be the most destructive wild animal in all surveyed villages, including baboons, which were especially destructive in all

villages further away from the protected area. Leopard Prefer cow for their prey. Hyenas were reported to be responsible for all types of livestock depredation, from cattle to poultry. Poultry were mainly depredated by small carnivores (jackals and baboons). hyaenas have been found to preferably prey on shoats elsewhere (Kolowski & Holekamp, 2006; Kissui, 2008). However, in present studies, hyena attacks were reported on all livestock type. This might be related to their opportunistic foraging behaviour, as opposed to other large carnivores that may be more selective or have better hunting success on particular livestock types (Kolowski & Holekamp, 2006; Ogara et al., 2010). Hyenas depredated livestock more at night in the study area than during the day when livestock were in the grazing areas. Attacks by leopards exhibited little difference in terms of time (day or night) of their attacks. Wild dogs, as diurnal, typically attack grazing herds by day and hardly ever livestock enclosed at bomas (Ogada et al., 2003; Frank et al., 2005; Woodroffe et al., 2007). However, Leopards, hyaenas and lions, may attack livestock at any time of the day, either in the field or at bomas in the Laikipia-Samburu Ecosystem, London (Patterson et al., 2004; Woodroffe et al., 2007). Differences among predators are most likely due to differences in their size, strength, and behavior. Many other studies in Tanzania (Holmern et al. and Røskaft, 2006; Ikanda & Packer, 2008; Kissui, 2008; Nyahongo, 2007) have reported that the size of predators determines the size of the prey they depredate. Many authors also recognize that when wild preys are abundant, predators prefer them to livestock. Sometimes predation increases during calving period as calves are easier to attack than adult cattle (Michalski et al., 2006). This can also be related to the ease and limited escape abilities of the livestock (Mishra et al., 2003).

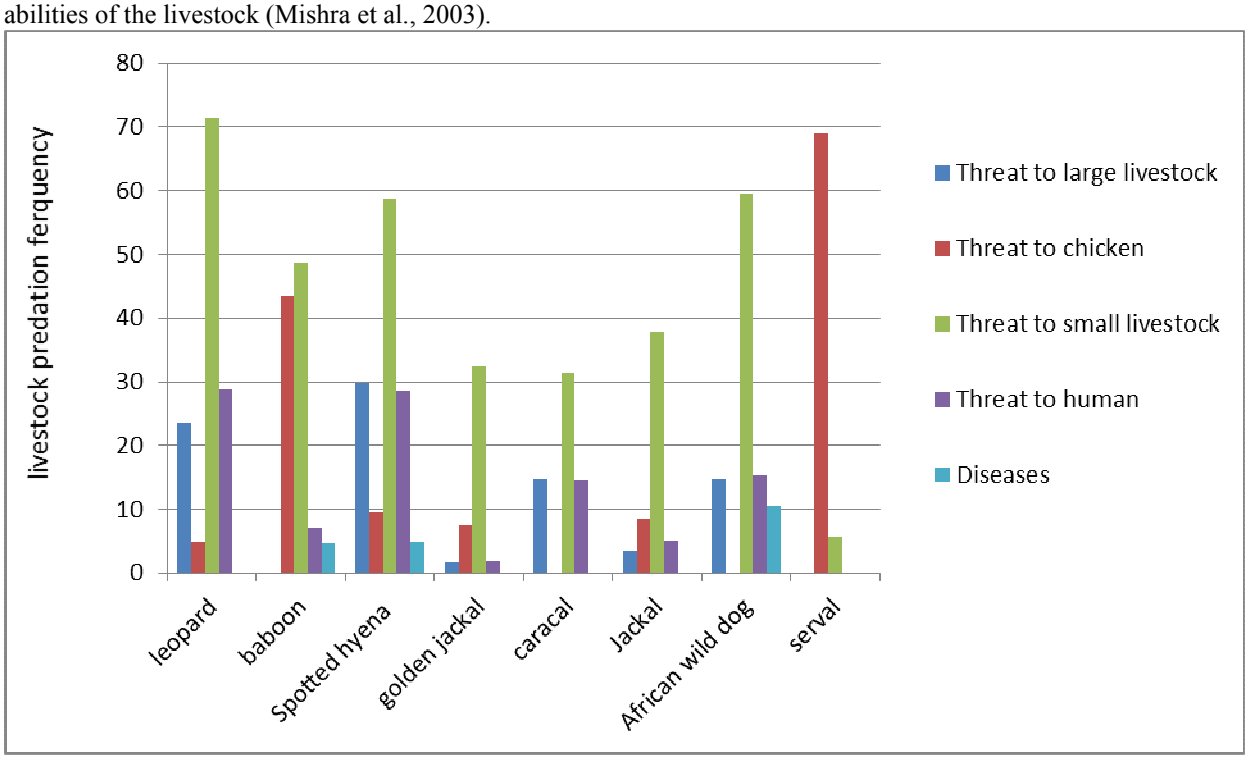

Figure 3. Percentage frequencies of attacks of leopard, baboons, hyenas, golden jackal, caracal, jackal, African wild dog and serval on cattle, shoat, chicken, donkey, human and cause disease around sodo community conservation forest, based on questionnaire survey and Field observation (N= 310).

Respondent opinion towards wild animals

The respondents reported that all population trends of carnivores had increased over the recent years (Figure 4). About 53.11% of the respondents noted that carnivore populations have increased in their respective areas. The mean score of respondents' opinion towards the population status of carnivores was varied ($\chi 2=41.32$, df =3, $P<0.05$).

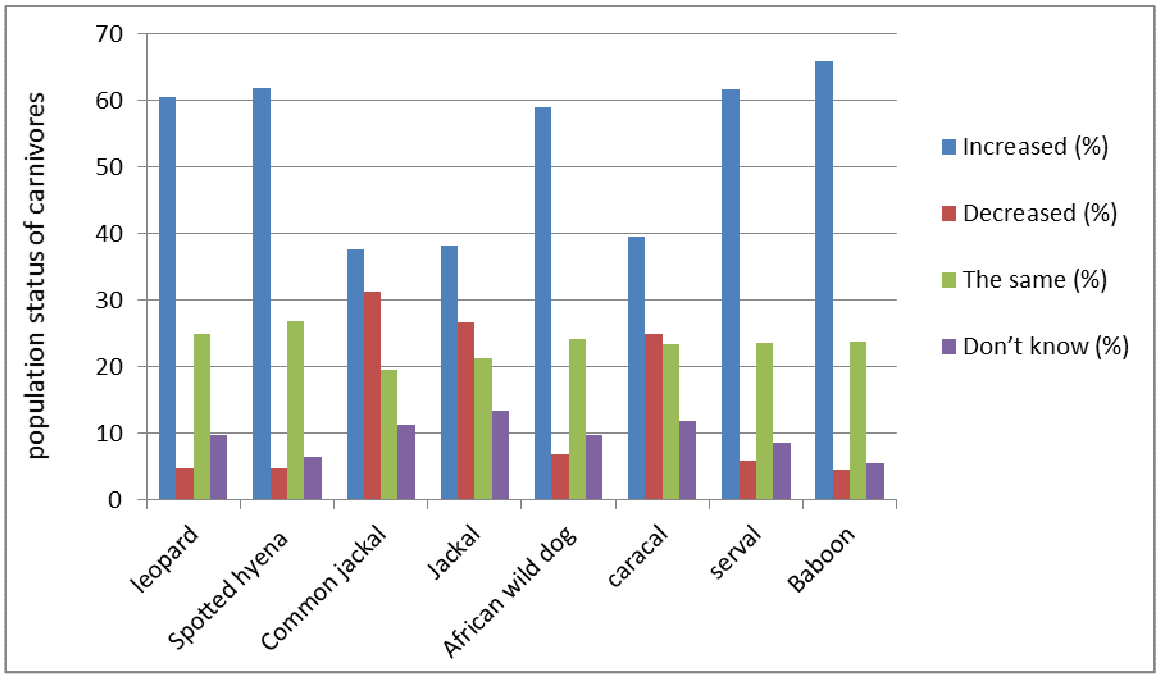

Figure-4: Percentage of respondents opinion about the status of carnivores from 2003 to 2007 years around sodo community conservation forest, based on our questionnaire survey (N= 310).

Attitudes of respondents towards wild animals

The population of carnivores is given in Table 1. About 53%, the respondents suggested a decrease in the number of carnivores. The view of respondents was shows variation on the mean desired population change ($\chi 2=41.46$, df=3, $P<0.05$). The respondents noted that the effect of carnivores has been increasing since the establishment of the protected forest. As the number of wildlife increases around the protected forest, conflict may arise. Studies elsewhere have shown that tolerance of predators depends on the extent of predation on their livestock (Kolowski and Holekamp, 2006). However, the People also tended to want declines for all carnivores rather than judging individual species based on the problems that they caused. This is worrying for those species which actually cause relatively little conflict. For instance, wild dogs caused no reported attacks during the long-term monitoring, but people remained robustly negative attitudes towards them. A desire for total elimination was expressed most commonly with regard to hyenas and baboons. Breitenmoser (1998) and Marker et al. (2003) stated similar findings especially with large carnivores. Moreover, the potential risk to humans was also voiced as a common reason for antipathy towards carnivores, particularly leopard, hyena and baboon. The survey results showed that some people living around the protected forest had strong support towards the conservation of wildlife. This is because of their greater dependency on forest products such as fuel wood, timber and Non Timber Forest Product. One of the respondent told, "Jungle are for the wildlife and they must stay there and the forest is our property, we should take care of our jungle and our natural resources." Some people told that they have no any problem for their loss and they should happy if governments pay them a suitable amount as compensation for their loss.

Table-1: The attitudes of respondents towards population change of carnivores (N=310)

species	Desired population change by respondents			
	Increase (%)	Decrease (%)	Stay the same (%)	Don't know (%)
leopard	8.5	63.7	14.8	13.0
Spotted hyena	10.9	78.3	9.6	1.2
Common jackal	25.3	31.5	28.7	14.5
Jackal	26.9	31.9	28.6	12.6
African wild dog	11.5	46.7	27.6	15.2
caracal	23.6	39.3	25.4	11.7
serval	17.7	42.4	36.1	3.8
Baboon	6.7	87.2	6.1	0.0
Mean	16. 38	52.62	22.11	9.0

Livestock depredation in relation to distances from the protected forest

A total of 745 livestock loss were reported in the last 3 years (Table 2). The number of predation events was

different between the villages and the type of livestock around the forest. There was a significant difference among villages in the total number of domestic animals killed ($\chi 2$ =75.65, df = 7, P < 0.05). Livestock predation intensity increased around the forest relative to the distance. A total of 253 sheep, 147 goats, 186 cattle, 128 chickens, 31 donkeys were killed by predators. These showed a significant difference ($\chi 2$ = 548.57, df = 4, P < 0.05). Distance to the forest and the frequency of domestic animals loss by predators were positively correlated (r = 0.37) in respect to the number of sampled households. The present studies suggest that the distance of the villages from the protected area is an important factor in determining the extent of livestock depredation by wild animals. Our results also confirm our hypothesis that the closest villages to the protected area experience the highest frequencies of livestock depredation, and by the larger predators, such as lions and leopards. This is because higher populations of large carnivore species are found in the villages located close to the protected area (Holmern et al. and Røskaft, 2006). As reported in many other studies (Kangwana, 1995; Kolowski & Holekamp, 2006; Sillero-Zubiri & Laurenson, 2001). However, increasing distance from the protected forest, chicken intake by serval was increased. Similar findings were observed in Serengeti National Park, Tanzania (Holmern et al., 2007) and Tsavo ranches in Kenya (Patterson et al., 2004).

Table-2: The number of livestock depredated from 2005 to 2007 years and estimated distance of the villages in the sodo community conservation forest, based on questionnaire survey and Field observation (N= 310).

Village		Number of livestock depredated				
		Sheep	Goats	cattle	Poultry	donkey
Far away	Mean	17	8	11	5	1.67
Anka, manara & sorto	N	50	24	33	15	5
	SD	1.58	3.46	1.73	2	1.73
Medium	Mean	29.5	15	17.5	10	4
Dagcho, Woyde	N	59	30	35	20	8
	SD	4.96	4	2.82	4	1
Closest	Mean	48	31	39.3	31	6
Woide Damota, Kokate	N	144	93	118	93	18
Damota & waja damota	SD	3	3	3.27	4.58	1
Total	Mean	31.5	18	20.93	15.33	3.89
	N	253	147	186	128	31
	SD	1.69	1.1	0.78	1.35	0.41

Wild animals involved in livestock depredation between seasons

A carnivore impact on domestic animals is given in Table 3. Predation intensity also different by season ($\chi 2$ = 14.57, df = 1, P < 0.05). This peaked during the wet season (464 individuals). Of 310 sampled households, the proportions of domestic animals killed varied; sheep (34 %), goats (20 %), cattle (25 %), chicken (17 %), donkeys (4 %) in the last three years. This showed a difference ($\chi 2$ = 65.63, df = 4, P < 0.05) among the loss of animal types. As can be seen in Table 3, leopard, spotted hyena and Anubis baboon were responsible for most livestock mortalities recorded. The highest number of livestock by spotted hyena (174 animals), leopard (151 animals) and Anubis baboon (79 animals). African wild dog mainly depredated on sheep (42 animals). However, chickens were killed mostly by serval cat 83 (65 %). Livestock predation usually follows seasonal patterns although there are some exceptions (Oli *et al*., 1994; Michalski *et al*., 2006; Holmern *et al*., 2007). During the present study, it was recorded a high in predation/loss of most livestock during the wet season. This was similar to what had been observed in Tsavo National Park, Kenya (Patterson et al., 2004). This might be related to the variation in prey dispersal with season. In addition to a good habitat cover for protection, the prey animals might secure their food nearby and limit their movement. As a result, they minimize exposure to predators during the wet season. According to Patterson *et al*. (2004) also reported that high in predation by hyenas in the late wet season. This is presumably explained by the variation in prey dispersal with season. During the dry season wild herbivores tend to concentrate near water sources within the reserve, where it is probably easier for lions and hyenas to prey on them (Kays & Patterson, 2002). In areas with low mean prey density it may be easier for predators to prey upon livestock at these times (Hunter, 1952; Ayeni, 1975; Eltringham *et al*., 1999). Leopards could be moving with the ungulate migration, owning to concurrent increase in livestock predation in the wet season (Kissui, 2008). During the dry season when there is a shortage of pastures in village areas, livestock keepers may graze their herds near or inside protected areas, which will expose livestock to predators. In regions where attacks high in the dry season this may be because, subsequent to migration of prey after the rains, livestock become an easy alternative for resident carnivores (Rudnai, 1979; Karani, 1994). Towards the end of the dry season food becomes scarce again, resulting in baboons again predating livestock. Increased predation by baboons in periods of wild food shortage has also been reported in Uganda (Naughton-Treves *et al*., 1998) and in Zimbabwe (Butler, 2000).

Table-3: The number of attacks on different livestock (cattle, shoats [cross between goats and sheep], donkeys, and poultry) between seasons and number of incidents per predator from 2005 to 2007 years in the sodo community conservation forest, based on questionnaire survey and Field observation (N= 310).

prey	seasons		Total	predator								
	Dry	Wet	loss	1	2	3	4	5	6	7	8	9
Sheep	98	155	253	46	65	23	25	27	18	-	27	22
Goat	51	96	147	31	37	9	12	15	16	-	19	8
Cattle	68	118	186	71	55	-	-	-	21	-	15	24
Chicken	54	74	128	-	11	-	-	-	-	83	18	16
Donkey	10	21	31	3	6	-	-	-	10	-	-	12
Total	281	464	745	151	174	32	37	42	65	83	79	82

1= leopard, 2=hyena, 3=common jackal, 4= jackal, 5= African wild dog, 6= caracal, 7= serval, 8= baboon, 9= unknown predator

Measures by Local Communities for Prevention of Livestock Depredation

Farmers used various methods to keep their crop and livestock against predators (Figure 5). There are using physical barriers, guarding, and fear provoking stimuli around the farmland. Most respondents reported use of guarding as very effective method in the villages. There was variations in the use of major methods used between villages as physical barriers ($\chi 2 = 2.57$, df = 7, $P > 0.05$), guarding ($\chi 2 = 0.98$, df = 7, $P > 0.05$). There was variations in the use of methods used by villages as fear provoking stimuli ($\chi 2 = 1.89$, df = 7, $P > 0.05$). However, there was a difference between the average type of domestic animals protection ($\chi 2 = 68.45$, df = 3, $P < 0.05$). Conflict is the major problem in wildlife management. Therefore, it is necessary to collect the baseline information on it to reduce the conflict. Before going to mitigate human carnivore conflict and for conservation plan it is necessary to study the current status of conflict patterns and intensity. The present study also suggests that leaving livestock, particularly goats and sheep, unattended during daylight increase the likelihood of livestock predation. Predation may be reduced by kraaling livestock at night, if adjusted for the type of livestock kept and predator involved (Ogada et al., 2003). Most households visited had at least one thorn bush kraal to enclose livestock during the night time. Husbandry techniques may have a great impact on livestock predation (Holmern et al., 2007). Guarding herds using herdsmen are present, predation rate is generally lower (Breitenmoser, 1998). Guarding using dogs were reported to be efficient against serval and baboon attacks but not against lions or caracal. Similar cases were reported from Serengeti National Park, where hyenas kill dogs (Holmern et al., 2007). However, guarding dogs have proved to be successful elsewhere (Gehring et al., 2010). Consequently, community-based wildlife conservation action plan is bottom-up activities that bring local community, individuals and organizations together to work towards achieving desired local community goals for conservation of wildlife. Sustainable livelihood opportunities needed to minimize the pressure on forest and eco-development practices with modified compensation program to give rapid to conflict victims.

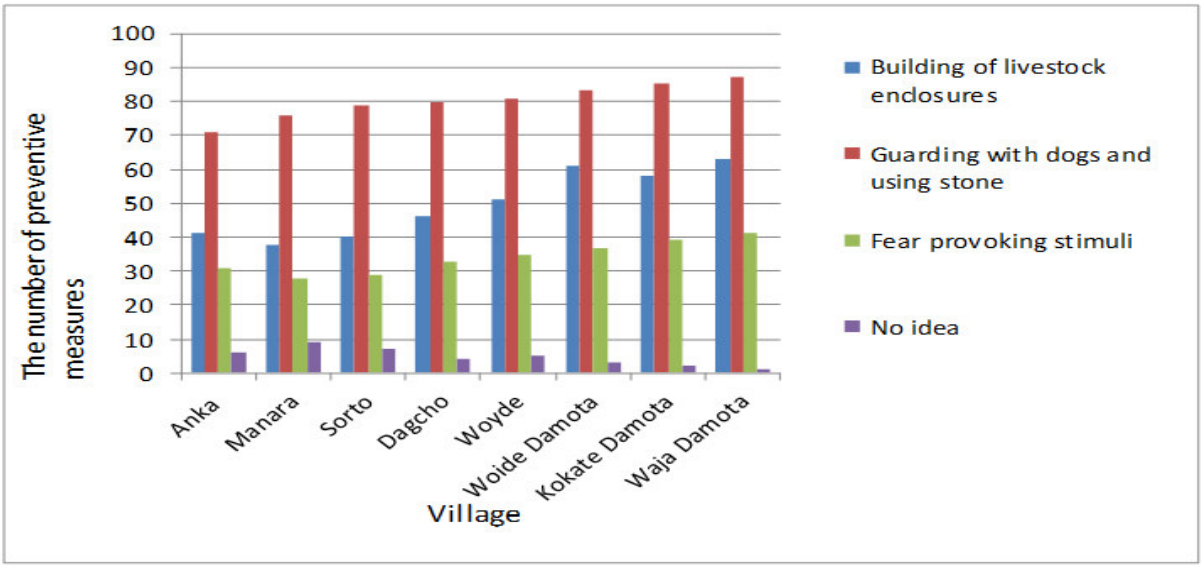

Figure 5: Preventive measures to reduce livestock depredation in relation to distances among different villages around sodo community conservation forest, based on questionnaire survey and Field observation (N= 310).

CONCLUSION

This study revealed that livestock depredation by spotted hyenas and leopards, Wild dogs and baboon were found to be associated with attacks on livestock in the area. Such carnivores were found to cause more losses to the people living around sodo community managed forest. The spotted hyena, leopard, baboon and African wild dog were reported to be the most destructive wild animal in all surveyed villages, which were especially destructive in the medium and farthest villages. Livestock depredation differed significantly among the surveyed villages along the gradient of distance from the park, with the lowest depredation in the farthest village from sodo community managed forest. The most common strategy used to prevent livestock depredation was to build livestock enclosures (thorn bush kraal) to protect livestock at night, followed by constant guarding of livestock with bows and arrows when grazing in the field. Additionally, Improved livestock husbandry practices, including increasing the number of herders to at least four instead of one, the use of more individuals older than children for herding and the use of guard dogs of an appropriate breed are recommended as means that can be used to solve these problems. Herding livestock during the day, keeping the livestock in an enclosure during the night might minimize predation risk. Additionally, diseases that can be transmitted between livestock and wildlife should be controlled in the area. Additionally, more attention should be given to the livestock herds during the wet season, when predation risk is highest. Moreover, ecotourism activities, such as wildlife viewing and cultural expeditions, should be established in the area. These activities will attract a greater influx of tourists in the area and, hence, increase income and revenue for both the local people and the government. All of these measures will increase the tolerance of local people for coexistence with the wildlife in their area.

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