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

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Abstract
Human-Herbivore Conflict study was carried out in Sodo Community Managed Conservation Forest, Southern Ethiopia, from December 2014 to June 2015. The rationale was to identify the type of human-herbivore conflicts and the responsible wild animals for the conflict, to find out the extent of damage, and to provide a better understanding on the causes of human-wildlife conflict in the area. Three of the seven adjacent Kebeles were selected purposefully based on the information gathered using the ground survey, the distance from the forest and problems related to crop damage. From the selected Kebeles eight sample areas or villages were chosen to collect data on human-wildlife conflict. Data were collected using questionnaire interview, direct observation and focus group discussion. The most responsible identified wild animals for the conflict are Olive baboon (*Papio anubis*), vervet monkey (*Cercopithecus aethiops*), porcupine (*Hystrix cristata*), bush pig (*Potamochoerus procus*), duikers (*Sylvicapra grimmia),* Giant mole rat (*Tachyoryctes macrocephalus*), bush buck *(Tragelaphus scriptus)*. Crop damage, livestock killing, human disruption and property destruction are the major troubles in the area. The majority (84.2%) of the respondents are suffering from crop damage. 59.71 % of the respondents had negative attitude towards the problem posing animals. Most raided crops were maize, bean, sweet potato and teff. Guarding, chasing, fencing, scarecrow and smoking were used for defending crops. Thus, encouraging local communities to grow unpalatable crops to wild animals, cooperative guard of their crop and changing their means of farming to cash crops like coffee, chat and livestock raring can reduce the challenges associated with the wild animals.
Keywords: Conflict, Community Managed, Conservation Forest, Crop Loss, Herbivore Pests.

INTRODUCTION

Human–herbivore conflicts are generally more intense in developing countries particularly in Africa including Ethiopia, mainly in and around protected areas, where agriculture is important aspects of rural people's livelihoods and income (Else, 1991, Treves *et al*., 2006, Eniang *et al*., 2011). Increasing human population in Ethiopia has resulted in overexploitation of natural resources, which in turn led to a variety of human wildlife conflict. In addition to insects and small mammals, elephants, baboons, monkeys, warthogs, and different antelopes cause major crop damage when these animals venture out of the protected areas looking for food (Petersen, 2003). These animals can also cause significant damage to human lives. These losses can trigger conflict between rural people and wildlife (Begg *et al*., 2007; Bonham *et al*., 2007).

One major source of conflict between wildlife and farmers in Africa and the world at large is crop raiding (Rowe, 1996; Hill *et al*., 2002; Warren, 2003; Distefano, 2010). Crop raiding by wildlife is neither a new phenomenon nor a rare one. Until recently, there has been little attention given to Vertebrate species that damage crops with the exception of elephants and rodents (Damiba and Ables, 1993). In communities with little subsistence economy even small losses can be an economic importance and can generate negative attitudes towards wildlife and conservation in general (Oil *et al*., 1994). According to Ojo *et al*. (2010), crop raiding by wild animals is one of the major causes of human wildlife conflict which involves wild animals moving from their natural habitat on to agricultural land to feed on the produce that humans grow for their own consumption. Moreover, HWC affects subsistence farmers' ability to feed their families. Property damage caused by wildlife, including destruction of agricultural crops, grain stores, water installation, fencing and pipes can impose significant economic costs (Muruthi, 2005, Eniang *et al*., 2011). Crop damaged by wildlife is not only affecting a farmer's ability to feed his family, but it also reduces cash income and has consequence for health, nutrition, education and ultimately development. For example, it has been estimated that the annual cost caused by elephant on crops ranges from US$ 60 in Uganda to US$ 510 in Cameroon per affected farmer (Naughton *et al*., 1999). The occurrence and frequency of crop raiding by crop raiding wild animals is depends on availability, variability and type of food sources in the natural ecosystem for wild life, the level of human activity on a farm and the type and maturation time of crops as compared to natural food sources (Lamarque *et al*., 2009).

Human–wildlife conflicts also can result in negative social impacts, causing children to miss school and

adults to neglect work in order to guard fields. They also cause community members to both lose sleep due to overnight guard duties and suffer from the fear of crop damage; at their most severe, HWC can result in human fatalities (Hoare, 1992, Treves *et al*., 2006, Muruthi, 2005). Such conflicts may also bring about shifts in production when farmers stop producing crops that are frequently injured or destroyed by wild animals.

Ethiopia is a large and ecologically diverse country with unique environmental conditions (Afework Bekele *et al*., 2011). In contrary since many years ago, the natural vegetation of the country has been destroyed by human and natural catastrophic and converted into agricultural and pastoral land. Moreover, its vegetation has been deforested for various purposes (Demeke Datiko and Afework Bekele, 2011). As a result, wild animals resources of the country are now largely restricted to a few protected areas (Tewodros Kummsa and Afework Bekele, 2008). The forest area of south western Ethiopia is under great Threat due to over exploitation (Kitessa, 2007; De Beenhouwer, 2011) which forces wild animals to compete with human being for their resource and resulted in conflict between them. There are some major driving forces that increase pressure on forests in south western Ethiopia. The most important pressure that causes deforestation is rising of population pressure and overexploitation of the remaining forest cover. Agricultural activities are expanding that leads to forests encroachment, habitat destruction and further to human-wildlife conflict which in turn lead the farmers have increasingly Loss crops to Trouble causing animals (Joseline, 2010; Mwamidi *et al*., 2012). Therefore, this study was conducted in view of bridging this gap and come up with recommendations for future dissemination of the solutions. It was initiated to document the magnitudes of human wildlife conflict in the study area to contribute to future intervention plan. Thus, the main objective of the study was to investigate the current status of human herbivore conflict in Sodo Community Managed Forest, Wolaita Sodo Zuriya District, Southern Ethiopia.

MATERIALS AND METHODS

Description of the study area

The Sodo Community Managed Forest is located in Soddo Zuria and Damot Gale Districts within Wolayita Zone, in the Southern Nations, Nationalities and Peoples Regional State (SNNPRS) of Ethiopia, 300km from the capital Addis Ababa. It covers an area of 341.8 hectares. The area is situated at approximately 6°54°N 37°45°E through to 6.5°N 37.5°E (Fig 1). Topographically the zone lies on an elevation ranging from 1200 to 2950 meters above sea level. The population number of Sodo Zuria is 163, 771, out of which 80,525 are male and 83,246 female. The Wolaita Sodo community speaking the local language called Wolaitigna. There are natural spring and rivers and Gorges. For example, along the riverside, bamboo tree, occupying both sides of the river course, support to the hydrological system and it has great contribution to community income. The natural vegetation of Sodo Community Conservation 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 dominated by plant species such as *Albizia gummifera, Erica arborea, Croton macrostachyus, Premnas chimperi, Maesallan ceolata Rhamnus prinoides, Embelia schimperi, Juniperus procera, Hypericum revolutum, Carissa edulis ,Rhamnus staddo, Syzygium guneense, Oleae uropaea, Phoenix reclinata, Podocarpus falcatus, Luxia cankesta, Pittosporumviridflorum, Erythrina abyssinica, Brucea antidysenterica, Arundinaria alpine, Ximenia Americana,* Bamboo*, Vernonia amygdalin, Prunus Africana* (WVE, 2006). The livelihoods of sodo community are based on subsistent agricultural farming system mostly producing Irish potato, potato, sweat potato, wheat, Barley, false banana, cassava and taro. The annual average temperature of the zone is 15.10^0c. The soils type fertile and acidic and highly erosion-prone and as a result the agricultural areas are often highly degraded. 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 is 1365.

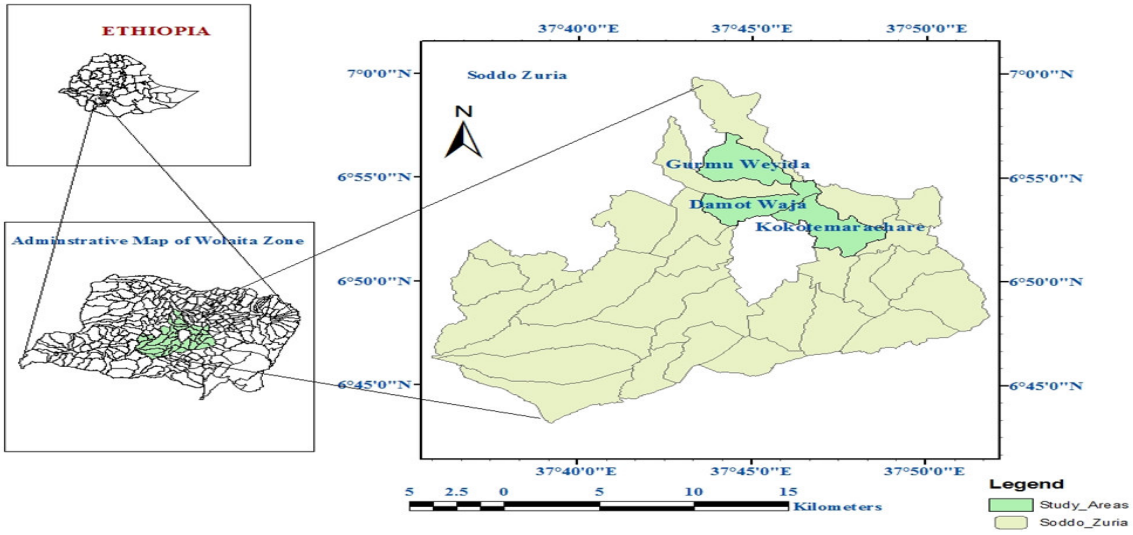

Figure 1 Map of the study area

Sampling Methods

The present study was conducted by means of a questionnaire and focus group discussion modified from Newmark *et al*. (1994) and Maddox (2003). The study was assessed the impacts of human-wildlife conflict in Sodo Community Conservation Forest between December 2014 to June 2015. Before the start of the actual data collection, preliminary survey was conducted during mid-September in 2014. This helped us to identify the boundaries and to decide the study sites and to have a general understanding of the overall situations of the forest. From seven neighborhood Kebeles three Kebeles were selected purposefully based on the information gathered using the ground survey and the distance from the forest and problems related to crop damage. These Kebeles were Kokate, Woide and DamotWaja (Fig.1). 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. Totally, 310 households (about 15% of the total number of households) were included for questionnaire. Of which 217 (70%) and 93 (30%) were males and females, respectively. The questionnaire was designed to understand the situation of human herbivore conflict towards the conservation challenges in the area. The survey assessed the attitudes of people towards wildlife in general, as well as towards five large problematic species, which were chosen due to their tendency to cause intense conflict with the local people. The questionnaire consisted of a series of structured questions focusing on the following points. These include (1) village distance from the forest, (2) identification of problematic wildlife responsible for crop damage, (3) trends in population of problematic animals and their effect in five consecutive years, (4) protection measures adopted and the period of damage, (5) attitudes of people towards wildlife and forest management and (6) level of awareness about the value of wildlife. The data were collected using a semi-structured survey design, following a similar format to that used by Maddox (2003). The questionnaire was administered to farmers within their area of farming and/or residence (Hill, 2000). The structured questionnaire was administered to members of the household in a random manner (Newmark *et al*., 1994), and alternating adult male and female respondents as much as possible. In addition focus group discussions were also held in the villages to discuss the experience in the human- herbivore conflict and to convey information on knowledge about wildlife in the area. These were used as a complement for the questionnaire. In addition, agricultural fields were visited to assess the crop fields damaged by wild animals. Finally,

Data Analysis

The data were analyzed using SPSS version 16 computer software program. Statistical tests were two-tailed, with the significance level set at P = 0.05. The questionnaire was coded and run to SPSS. Data were analyzed using descriptive statistics and responses and compared using chi-square test for different variables.

RESULTS and DISCUSSIONS

A total of seven species (six herbivores species and one omnivore species) were recorded as crop damage (Table 1). These animals were: olive baboon, vervet monkey, porcupine, wild pig, bush duiker, Giant mole rat and bush buck. Among the respondents,55.6 % of them noted That these Animals to cause a major problem, while 36.4 % noted as a minor problem and 8 % noted as no problem, this difference was statically difference ($\chi 2$ =32.36, df =2, P<0.05). According to Lamarque *et al.* (2009) also reported as a wide variety of vertebrate pests conflict with

farming activities in Africa. These include birds, rodents, primates, antelopes, buffalos, hippopotamuses, bush pigs and elephants. Primates are major agricultural pests in the area because of their agility and intelligence (Sprague and Iwasaki, 2006). Dagne Mojo *et al*. (2014) also reported that wild animals threaten the crop production of farmers in Cheha Woreda. They recorded that, in order of importance, Grivet monkeys (*Cercopithecus aethiops*), crested porcupines (*Hystrix cristata*), baboons, antelopes (Gazella spp.), warthogs (*Phacochoerus* sp.), and wild pigs *(Sus scrofa)* were the major wild animals that frequently damage their crops.

Table 1: Problem causing animals in terms of ranking (N=310)

Common name	Species	Percentage of problem		
		Major problem	Minor problem	No problem
*Olive baboon	*Papio anubis*	93	5	2
vervet monkey	*Cercopithecus aethiops*	69	28	3
Porcupine	*Hystrix cristata*	57	37	6
Wild pig	*Potamochoreus procus*	54	39	7
Bush duiker	*Sylvicapra grimmia*	49	38	13
Giant Mole rat	*Tachrocytes macrocephalus*	36	56	8
Bushbuck	*Tragelaphus scriptus*	31	52	17
Average		55.6	36.4	8

*Omnivore

Among these olive baboon, vervet monkey, porcupine, wild pig and duiker were grouped to cause more problems in crop damage. However, bushbuck and mole rat were recorded as less problematic animals. Threats of different animals are given in Table 2. The threats included crop damage, livestock depredation, human safety and cause diseases. Among the problematic animals, both Anubis baboon and porcupine caused threats on crop and human. 84.2 % of the respondents reported threat of crop, while 5.0% reported loss of livestock and also 12.5% reported effect on human life. However, about 4.5% of the respondents reported as they might cause diseases. There is a significant difference among the threats caused by the wild animals ($\chi 2=112.36$, df =4, $P<0.05$). During the study period, Olive baboon, vervet monkey, porcupine and wild pig are the most severe crop raiding wild animals in Woyde, Woide Damota, Kokate Damota and Waja Damota. Baboons come to the Farmers permanently and devastate any crop in the field. Adult male baboons also have the ability to restrain people and create some injuries to people. Leta Gobosho *et al*. (2015) reported that Olive Baboon, Bush Pig, Warthogs, Grivet Monkey and Porcupine were most identified damage causing wild animals on crops in the Gera district, Jimma zone, southwestern Ethiopia. Similarly, Dagne Mojo *et al*. (2014) also noted as most of the farmer responded that porcupine was a big problem in Cheha Woreda of Guraghe Zone. Demeke Datiko and Afework Bekele (2013) also reported that baboons are the most destructive crop raiding animal in Chebera Churchura National Park, Ethiopia.

Table 2: Reasons given by respondents for considering as problematic animals (N=310)

	Percentage of respondents			
Problematic animals	Threat to crop	Threat to livestock	Threat to human	disease
*Olive baboon	95.3	35	25.4	14.6
Vervet monkey	93.5	0.0	0.0	0.0
Porcupine	91.5	0.0	15.6	8.4
Wild pig	81.3	0.0	0.0	0.0
Bush Duiker	79.8	0.0	0.0	0.0
Giant mole rat	76.6	0.0	0.0	0. 0
Bush buck	71.4	0.0	0.0	0.0
Average	84.2	5.0	12.5	4.5

The result showed that not all crops were equally affected by crop raiders. During the present study 61.3 % of the respondents claimed that maize was the most vulnerable crop to crop raiders followed by bean (41.9.5%) and sweet potato (36.7%). Whereas 10.9% the respondent reported that yam was the least vulnerable crop to damage caused by wild animals (Table 3). Baboons are likely to visit fields all year round, and while they eat maize preferentially, they will also feed on bean, sweet potato and potato (Hill, 2002). Thus farmers, whose farms are located close to the forest boundary, are potentially at risk of losing staple crops year round. The present study also confirmed the same situation in the study area, in which maize, sweet potato and bean were highly preferred by most pest animals. Warren (2008) reported that, Maize (ripe and dried) was the most frequently eaten crop by crop raiding in West Africa. During the study period, giant mole rat was the major pests of enset. Muluken Mekuyie (2014) also noted as the Mole rat was the worst pest for both sugar cane and Enset crops followed by Grivet monkey and porcupine in Wosha Soyama village. Respondents also reported that they had stopped producing their main crop, enset, in some areas where it is highly accessible to wild animals.

Farmers stressed that some local varieties are no longer being grown because they are relatively sweet and, therefore, attractive to hungry wildlife. Brandt *et al*. (1997) also supported the findings that porcupines and wild pigs are the major pests of enset. Though this crop tolerates drought, it is threatened by wildlife damage. In the study area, porcupine and duiker were nuisance animals as viewed by the respondents. Hill (2002) also supported the findings that porcupines and duiker are the major pests on sweet potato. In the study area, Bushbucks is not the most problematic animals. They are known to feed on young bean shoots and may virtually clear a newly sprouted bean stand in a night. However, because of the damage occurs early on in the growing season, the farmer is able to replant the field, having first fenced it, and still get a bean crop with relatively little extra work, thus bushbuck damage to beans is not rated as particularly more problematic even though the damage can be extensive (Hill, 1997). Rainfall, season, variety and Characteristics of crops, food availability, distance from forest, nearest farm or village and farm protection methods will have an impact on raiding (Hill, 1998; Naughton-Treves *et al*., 1998). The present studies also showed that the availability, variability and type of food sources in the natural habitats might be the important factors. The raiding frequency and intensity influence the attitude of local people towards Pests. Some food items/crops might be found particularly palatable and attract wildlife. Similarly, the majority of crop raiding incidents involve elephants eating mature food crops which are highly nutritious and palatable to elephants (Hill, 2000). In Guruve district 73% of damage incidents were to food crops, including maize, sorghum and groundnuts (MZEP, 2001). The present study also confirmed the same situation in the study area, in which maize, sweet potato and bean were highly preferred by most pest animals.

Table 3: Rank of crops in the order of destruction by crop raider (N=310)

Crop	Frequency	Percentage	Rank
Maize	190	61.3	1
Bean	130	41.9	2
Sweet potato	114	36.7	3
Teff	111	35.8	4
Wheat	110	35.5	5
Barley	95	30.6	6
Potato	91	29.3	7
Enset	60	19.3	8
Yam	34	10.9	9

The opinion of local people towards population status of vermin animals in the forest is given in Table 4. When asked population trends, 52.06% of the respondents felt that most animal populations have increased over recent years. However, 25.52% of the respondents remarked that the wildlife populations are the same and 14.14 % reflected as decreased. Only few (8.19%) of the respondents were on problematic wildlife population status. The view of the respondents on population status of pest animals shows statistically significant among the feelings of the local people ($\chi 2=51.32$, df=3, $P<0.05$) around the forest. Baboons and vervet monkey are increased time to time due to the presence of the natural forest and agricultural settlement in and around the chebera churchura National Park (Demeke Datiko and Afework Bekele, 2013)

Table 4: Respondents opinions about the status of wildlife during the last 5 years (N= 310)

species	Population status of wildlife			
	Increased (%)	Decreased (%)	The same (%)	Don't know (%)
*Olive baboon	67.74	5.16	25.8	1.29
Vervet monkey	63.87	6.77	24.51	4.83
Porcupine	52.25	12.25	26.77	8.7
Wild pig	51.61	10.96	26.45	10.96
Bush duiker	43.54	21.29	24.51	10.32
Giant Mole rat	43.22	20.64	25.48	10.64
Bush buck	42.25	21.93	25.16	10.64
Average	52.06	14.14	25.52	8.19

The table 5 shows opinion of the local people towards population of pests in the forest. Most (59.71%) of them stated that, the desired population sizes of the animals are decreasing. However, 4.92 % did not respond to this question. The difference in the opinion was statically significant ($\chi 2 =35.68$, df = 3, $P < 0.05$). Local farmers' perceptions of human wildlife conflict do not rely solely on the facts of the damage done by wildlife but on a host of social, political, cultural, economic, and ecological factors (Dickman, 2008). In the present study, it involved crop raiding, human welfare and livestock damage. These also caused farmers to develop a negative attitude against wildlife. This might have been linked to the establishment and conservation activities were carried out for a few years ago in the community managed forest. It diminished illegal hunting as well as habitat distraction by the local people in the forest ecosystem. However, the wildlife conflict has been increasing timely due to the establishment of conservation of the forest ecosystem.

Table 5: Desired population change of surveyed farmers towards pest animals (N= 310)

Species	Desired population change (%)			
	Increased (%)	Decreased (%)	The same (%)	Don't know (%)
*Olive baboon	1.61	91.93	3.87	2.58
Vervet monkey	9.03	57.41	26.45	7.09
Porcupine	8.7	56.77	27.09	7.41
Wild pig	10.64	55.48	28.7	5.16
Bush duiker	10	53.54	31.61	4.83
Giant Mole rat	10.96	51.93	32.9	4.19
Bush buck	12.25	50.96	33.54	3.22
Average	9.02	59.71	26.3	4.92

Distance from the forest and trend in crop damage by pest animals are presented in Table 6. The respondents noted that, in all villages crop damage has been increased during the last 5 years. 83.53 % of the respondents responded as the trend is increasing. The views of the respondents did not differ significantly among the study villages ($\chi 2$ =0.86, df = 7, P > 0.05). Only, 8.01 % of the respondents noted as the trend is decreasing. The level of damage was severe. More of the people from Dagcho, Woide, Kokate Damota, Waja Damota and Woide Damota faced more crop damage than the other three villages. People who live close/ near the forest generally faced many problems than those living far above 2.5 KM of the forest. In Africa, the major problem facing protected areas today are the increase in human settlement of adjacent lands and unauthorized harvesting of resources within the protected areas (Newmark *et al*., 1993).This study also observed that close proximity between farms and the forest ecosystem resulting in high levels of conflict. Those people are live close to the habitat of the wild animals encounter high problems. Eventually, those who live near to the protected forest faced frequent crop damage. This indicated that conflicts between wildlife and people, particularly those who share the immediate boundaries with protected areas into adjacent crop fields, are common phenomenon all over the world (Shemweta and Kidegesho, 2000). This is an increasing phenomenon because the rapid increase of population growth pose pressure on land resources and reduce the area of core habitat for wild animals and eliminate corridors for migration and increase the probability of contact, and possibly create conflict between wild animals' and farmers (Madden, 2008; Mwamidi and Mwasi, 2012;Quirin, 2005).This indicated that the land has been covered by natural forest is shrinking in size due to increasing substance agriculture (Joseline, 2010) in the forest area.

Table 6: Approximate distance from the forest, trend of crop damage by pest animals in the last 5 years

Village	N	Distance from the forest (km)	Trends of crop damage (%)		
			Increased	Decreased	Unknown
Anka	30	2.5-5	80.9	9.4	9.7
Manara	25	2.5-5	79.8	10.1	10.1
Sorto	30	2.5-5	81.4	9.5	9.1
Dagcho	35	1-2	82.9	8.6	8.5
Woyde	40	1-2	83.7	8.9	7.4
Woide Damota	50	0-1	85.4	7.9	6.7
Kokate Damota	50	0-1	87.6	6.1	6.3
Waja Damota	50	0-1	86.5	7.2	6.3
Average	310		83.53	8.46	8.01

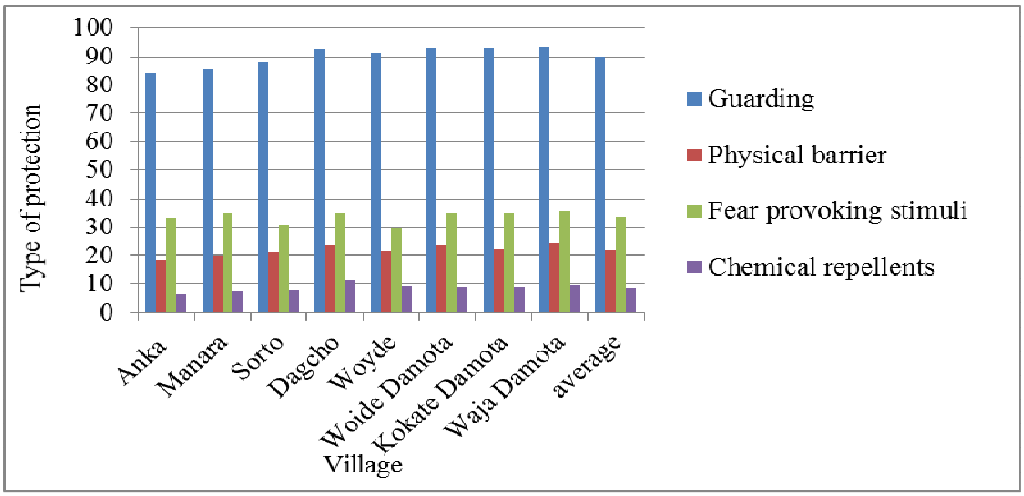

Figure 2: Methods of minimizing crop raid among different villages (N= Number of sampled household)

Farmers utilized various methods to keep their farms against pest animals in the study area in Figure 2. These are physical barriers (fence, walls); guarding (watching eyes, dogs); fear provoking stimuli (visual: scarecrows, lighting fires; auditory: exploders, distress calls) and chemical repellents (chilies) around the forest. Most respondents (93.1% Waja Damota), (92.7% Kokate Damota), (92.7% Woyde Damota), (92.5% Dagcho), (91.2 % Woyde), (87.8 % Sorto), (85.5 %, Manara), (84.1% Anka) reported guarding as a very effective method in all villages followed by fear provoking stimuli (33.58%). However, using chemical repellents was not well known. There was a significant difference ($\chi 2 = 98.17$, df = 3, $P < 0.05$) in use of minimizing crop damage around the forest. Farmers utilized various methods to protect their farm from the damage caused by pests. Hill (2002) stated that deterrents were likely to be more effective against pests. This was also true in the study area, however the deterrent techniques are temporary because animals soon learn and ignore the threat (Bauer, 2003). The same condition was observed in the study area. Consequently, the effective methods to prevent damage by animals not yet clear. The behavior and preference of each pest are not the same. However, for larger animals, guarding was the sole choices to prevent crop damage in the study area. Therefore, a combination of techniques be employed in order to reduce the risk of wildlife becoming used to any single method. In the study area the different techniques like guarding, chasing and scarecrow to minimize agricultural crop damage by wild animals. Similarly different methods also used by local people to minimize crop damage by wildlife in and around Simien Mountain National Park (Mesele Yihune, 2006). Sillero-Zubiri and Switzer (2001) also reported that chasing crop raiders, guarding, scarecrows, plastic flags, use of scents, fences, hunting, trapping and poisoning are some of the methods used in minimizing crop raiding. King and Lee (1987) also reported that the most effective short term prevention methods of crop damage by pest species is guarding together with chasing. Moreover, as noted by Hill (2002) problem animal control methods were developed to be used by farmers to chase crop raiding elephant they included alternative crops such as chilli pepper based chemical deterrents and noise makers. As a result, who were considered to be in high conflict areas have shifted from cultivating food crops to growing cash crops. Finally, applying the various control methods used by local farmers such as whip, whistle, fire, string fence, pepper spray and removing nearby cover/habitat have been recommended (Osborn, 2001).

CONCLUSION

The present study investigated the prevalence of Human-Wildlife Conflict in Wolaita, south eastern Ethiopia and manifested through crop damage. Farmers' perceived crop damage by wild animals as a great hindrance to their agricultural development. The cause of human wild animals' conflict were wild animals' habitat disturbance, increased subsistence agriculture around forest edge, proximity to natural forest, increased plantation forest coverage, and the contribution of all mentioned causes. Crop raiders responsible for the occurrences of human wild animals through crop raiding depredation were Olive Baboon, Bush pig, vervet Monkey Porcupine, duiker and mole rat. Olive Baboons was the most commonly reported crop raiders and domestic animals depredation causing wild animals. Vervet monkey was the second problematic animals on crop depredation followed by Porcupine, duiker and bush pig in the study area.

The impact of the baboon followed by duiker, mole rat and porcupine was strongest in Anka, Sorto and Dagcho villages, while crop loss in Woide, Kokate Damota, Woide Damota and Waja Damota was largely due to Vervet monkeys followed by bush pig and baboons. Crop raiders cause significant loss on farmers' production. Maize was the highest vulnerable crop to be damaged. The trend of crop damage was increasing from time to time. Crop raiders more frequently visit farm near to the forest. The key crop raider protection methods in the study area were guarding and chasing. Farmer's also used fencing, scarecrow and smoking to defend crop raiders

from their crop. Guarding in the field was indicated to be the primary and most effective means of guarding against pests. During guarding the aim was to kill the animal using stone or other harmful instruments. This indicated that there is an immediate need for a sweeping wildlife conservation education program to educate farmers living in Sodo Zuriya district about the purpose and benefits of wildlife conservation, the causes of human-wildlife conflict, and methods for reducing or eliminating various forms of this conflict. The study further revealed that Vervet monkeys and Olive baboons caused human disruption, destruction of property and taking food from kitchens in home of local farmers.

Therefore, human-Wild life Conflict issues must be treated with concern, and placed in the context of local community and individual needs, as well as conservation objectives and those of the government and industry involved. Measures which might seem to be appropriate strategy to researchers might not necessarily be acceptable and practical to community or individual farmers. To establish measures which are sustainable and efficient may not be an overnight event, requiring adoption of a series of strategies. Interventions that can solve one type of conflict might not be applicable to others. Intervention methods are therefore likely to be more successful if they are financially and technologically within the capacity of the people, organizations, institutions or bodies who will implement them. Farmers need to take responsibility for protecting their own crops, which requires assisting them to develop locally-appropriate schemes to successfully reduce loss.

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