WOLKITE UNIVERSITY

COLLEGE OF AGRICULTURE AND NATURAL RESOURCE

DEPARTMENT OF WILDLIFE AND ECOTOURISM MANAGEMENT

Human-Hippopotamus Conflict in case of Gibe Sheleko National park, Gurage Zone, Southern Ethiopia

BY: -

Linigerew Yismaw

Adviser: - Ahmed Mohammed (MSc)

Senior Research Project Submitted to Wolkite University, College of Agriculture and Natural Resources, Department of Wildlife and Ecotourism Management in Partial Fulfillment of the requirements for the Degree of Bachelor of Science in Agriculture (Wildlife and Ecotourism Management).

June, 2019

WOLKITE, ETHIOPIA

Declaration

This research project report is my original work and has not been presented for an award in any other university or college or learning institution for examination or academic purposes.

_____ _____

Linigerew Yismaw Date

This research project report has been submitted for examination with my approval as university supervisor:

_____ _____

Mr. Ahmed Mohammed (MSc) Date

Lecturer, Department of wildlife and Ecotourism Management Studies Wolkite University

Acknowledgement

First of all, I would like beholden or to express my thanks to almighty GOD for his unlimited help and plus.

Secondly I would like to express thanks for my advisors Ahmed Mohammed (MSc), for his supporting by giving advice and necessary documents for me to do my senior research projects and other supporting from the root of my heart.

Thirdly I would like to thank my families for their supports from the beginning up to the end of my academic educations and studies. Finally, but not least, I would like to express a special thanks or compliment to all my friends' them who helps me by provide of personal computer and another material which are already helps to me to do and accomplish the research on the given time.

Abbreviation and Acronyms

GSNP -----– Gibe Sheleko National Park

HWC – ----- Human Wildlife Conflict

IUCN------- International Union for Conservation of Nature

PAs – --------- Protected Areas

SARPO– - --- Southern African Regional Programme Office

WWF– ------- World Wide Fund

Table of Contents

Lists of table

Lists of figures

ABSTRACT

Many of the hippopotamus in Africa are found in the Eastern part. In Ethiopia, hippopotamus mainly occurs in the western part of the country. this study was conducted to assess human hippopotamus conflicts in Gibe Sheleko national park, Gurage, zone, Ethiopia. In order to study the conflicts between Human Hippopotamus in the national park, random sampling technique used to interview the local community and purposive sampling used to interview tourism managers, experts and scouts. Field observation was employed specifically by foot, and both primary and secondary data sources were used. Human settlement 15 (33.3%) and agricultural activities (i.e. irrigation) 12 (26.7 %) are the most serious driving forces or causes of human-hippos conflicts in the studying area. Hippopotamus affect the crop of local community and human life which totally accounts 56.6 % (25) from the total respondent. Guarding in the field was indicated to be the primary and most effective means of controlling crop damaging often against hippos which comprised / accounts about 51.1% from the rests of mitigation or conflicts control methods. To control human hippos conflict, performing awareness creation program and local community participation in the conservation implementing and prohibit the expansion of human settlements, agricultural activities, as well as provide incentives and compensation or restitution to gate out the peoples / settlers from the national park was recommended.

***Keywords**; Human -Hippopotamus Conflict, Gibe Sheleko National Park, Gurage Zone.*

1. INTRODUCTION

1.1 Background

Human-wildlife conflicts were started since the beginning of the emergence of human beings. During the time people lived in caves there is a conflict between wild animals and human being. Slowly, with technological advancement it is man who invented traditional sharp materials such as hand axes during Stone Age and Iron Ages to protect themselves from wild animals. Later on, human beings began to hunt wild animals for food and protection (Eltringham, 1979). The numerous cases reported from countries all over the world demonstrate the severity of human wildlife conflict and suggest an in depth analysis to understand the problem and support the conservation prospects of threatened and potentially endangered species (Hill, 2000).

Man and animal have to common their homes with each other (Hamson *et al*., 2009). This is a common reason for negative attitudes and conflict between human inhabitants and wildlife. These fights are often due to predation of cattle by large meat-eaters (Hamson *et al.,* 2009), but even wild herbivores or omnivores can posture big problems to farmers' crops and livestock. Human-wildlife conflict is more intensive in developing countries where livestock holdings and agriculture are important parts of rural people livelihoods and income (Boer and Baquete, 1998). In these areas, competition between local communities and wild animals for the use of natural resources is particularly intense and direct. As a result, resident human populations or wildlife is vulnerable (Messmer, 2000). Species most exposed to conflict are also shown to be more prone to extinction (Ogada, *et al* 2003), because of injury and death caused by humans; these can be either accidental, such as road traffic, capture in snares set for other species or intentional, caused by retaliatory shooting, poisoning's or capture (Distefano, 2010). Larger herbivores such as the common hippopotamus (*Hippopotamus Amphibuies*) and the African elephant (*Loxodonta Africana*) are among the most problematic species because of their ability to cause crop damage and because of the physical threat they pose to humans. For example, farmers in Malawi have negative attitudes towards common hippos because of crop raiding (Mkanda and Kumchedwa, 1997), and respondents in Tanzania believed that elephants were dangerous an offered no benefits to local people (Hill, 1998).

Hippopotamus-human conflicts are reported from several countries in Africa including Ethiopia. Most records referred to as crop damage or losses, attacks on fishermen by destroying fishermen's nets or attacking their canoes, and loss of human life (Eltringham,1999; Admassu, 2007). The damage caused by hippopotamus is often far greatest than the other common agricultural pests. This is because their raids are unpredictable, more damage per raid, trampling and destroying certain areas of the field (Admassu, 2007). Crop damage in Africa by potentially life threatening species such as hippopotamus, warthogs, vervet monkeys and Anubis baboons results in unique dilemma (Naughton-Treves, 1998).

1.2. Statement of the problem

The people living in developing countries of Africa and Asia are suffering from the negative impact of human-wildlife conflict. Crop raiding by baboons, elephants, hippopotamus and other herbivores seriously affect poor farmers. Across the globe, primates are the most frequently identified crop raiding animals. This is because of the renowned crop raiding behavior of the species (Sillero, 2001). The extent of damage caused by large mammals is insignificant when it is considered at the global level compared to the damage caused by invertebrates and rodents. Relating to this, in Gibe sheleko national Park local peoples are live in and adjacent to the protected area, and also hippopotamus (*Hippopotamus Amphibuies*) in the Gibe river, which is flow towards the park is home to hippopotamus. Generally, due to the presence of human activities (such as, farming, irrigation and livestock production) in and around the park as well as due to poor land use planning, human hippopotamus conflict affects the socioeconomic activities and the welfare of wildlife and their natural habitat.

However, before now, there is no well provided scientific information towards human hippopotamus conflict in the park. Therefore, due these and related gaps the research will be conducted to investigate human hippopotamus conflict in Gibe sheleko national park along with its cause, impact, and possible solution to mitigate it.

1.3 Significance of the Study

Identifying the cause of human wild life conflict will help to find possible solutions for the peoples who are living in the protected areas. In Gibe Sheleko national park, identifying human hippopotamus conflict will help to tolerate and find out possible solution for the local peoples, and it is also important for the well-being hippopotamus population and its habitat. In addition to this, the research is important in providing additional information for researchers who are interested and motivated to conduct a research which are related to human wildlife interaction and their environment. The research could also be base line for the park manager, scout and stakeholders as well as before localities about human wildlife conflict and its resolution methods.

1.4. OBJECTIVES

1.4.1. General Objective

The general objective of the study was investigating human-hippopotamus conflict in case of Gibe Sheleko National Park, Southern Ethiopia.

1.4.2. Specific Objectives

1. To identify the major causes of human-hippopotamus conflict in the studying area.
2. To investigate the impacts of hippopotamus against local peoples in the studying area.
3. To find the mechanism to mitigate the impacts of hippopotamus in the studing area.

1.5. Research Question

1. What are the major causes of human hippopotamus conflicts in the studying area?
2. What are the impacts of hippopotamus against local peoples in the studying area?
3. What are the possible systems to mitigate human hippopotamus conflict in the studying area?

1.6. Scope of the study

The research was conducted in a limited scope along with geographical, budget, time and conceptual demarcation. The study was covered the area of local peoples who are living in and near to the protected area and hippopotamus which is abundant to the park.

1.7. Limitation of the study

This research was already completed with many obstacles or along with different challenges facing in its processes to do it. The most commons obstacles are involuntariness of respondents to response, limited time duration and language barriers. Due to different reasons the research may have not include necessary information. There was no scientifically proven published related information on the study area; thereby the present research is limited to get enough information to come up with concrete conclusions.

2. LITERATURE REVIEW

2.1. Definition of human wildlife conflicts

Different scholars define Human-wildlife conflict (HWC) in different ways. The world wide fund of nature (WWF, 2005) defined HWC as "any interaction between human and wildlife that results in negative impact on human social, economic, on conservation of wildlife population or on the environment". The International Union for Conservation of Nature (IUCN, 2005) defines HWC as a conflict occurring "When human population requirements overlap with those of Wildlife resulting in costs to both residents and wild animals." HWC is the term commonly used to conservationists to describe friction between wild animals and people. The conflict emergence when wildlife and human requirement overlap with consequential costs to humans and wild animals, destruction of property by wildlife and killing of wildlife by people (Osei-Owusu, 2008). Human wildlife conflict normally rises when wildlife needs intermingle with those of humans (Datiko and Bekele, 2013). This type of conflict develops with the people and the wildlife near the areas declared as protected (Gandiwa *et al* , 2013). Result is in the form of damage to crops, loss of domesticated animals and killing of people by the wildlife (Treves *et al*, 2011). In some case this conflict occurs when local community wants to kill the wild organisms (Ashenafi, 2005).

The one common reason in this conflict is the increasing tendency over utilization of the natural resources between people and wildlife (DeFries , Karanth and Pareeth ,2010 ; Mearns , 1997). A wide variety of vertebrate conflict with farming activities in Africa. These include birds, rodents, primates, antelopes, buffalos, hippopotamuses, bush pigs and elephants. However, the larger herbivores (elephants, buffalo and hippopotamus), large mammalian carnivores (lions, leopards, cheetahs, spotted hyenas and wild dogs), and crocodiles are traditionally seen as the animals representing the greatest threat to humans and responsible for the majority of human-wildlife conflicts. This may be due to the fact that local communities often regard the large wild animals as government property, as was the case under previous colonial legislation, and therefore feel prohibited from dealing with the problem themselves (WWF SARPO, 2005).

2.2. Human herbivore conflicts

In Africa, conflict between agriculturalists and primate herbivores have always existed (Tylor, 1982). At the periphery of protected area large wild animals wander in closer proximity to human settlements. This poses serious problem in terms of crop damage. In such areas the integration of Conservation with other land uses has become difficult. However, the intensity of crop raiding around protected areas is different depending on factors such as human population density, distance of the farm land from protected area boundary and season of the year and the animals' behavior (Lee, 1987). Various animals are featured in varying degrees of crop raiding. Not all crop raiding animals come from protected areas only. Some are residents outside protected areas. They live in suitable habitats in different gardens within the community. Crop damage by wild animals may vary from season to season as the type farming during wet seasons and dry seasons (Whitesell, Lilieholm and Sharik, 2002). The behavior of the animal is also another factor which has an influence on the extent of crop raiding. Information from wildlife managers field observations in Zimbabwe have suggested that crop raiding may be learned by young elephants from older bulls (Kagoro-Rugun, 2004).

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).

2.3. Driving forces of human wildlife conflicts

As a population expands in to wild animals, habitats, natural wildlife areas are displaced. Mitigation in availability of natural food source lead to wild animals seeking alternate source. New resources created on human draw wildlife resulting to human wildlife conflict (Muruthi, 2005). Existence of human offers opportunity for wildlife in the form of food and habitat interference and destructive threat for both human and wildlife. Competitions for food source also occur when human and endeavor to reap natural resources such as forest, grassland pasture and wild animals (Mulholland and Eagles, 2002).

A set of global trends has contributed to the escalation of HWC worldwide. These can be grouped into human population growth, land use transformation, species habitat loss, degradation and fragmentation, growing interest in ecotourism and increasing access to nature reserves, increasing livestock populations and competitive exclusion of wild herbivores, abundance and distribution of wild prey, increasing wildlife population as a result of conservation programs, climatic factors and stochastic events.

2.3.1. Human population growth

Demographic and social changes place more people in direct contact with wildlife: as human populations grow, settlements expand into and around protected areas (IUCN – World Conservation Union , 2003) as well as in urban and sub-urban areas. In Africa, human population growth has led to encroachment into wildlife habitats, constriction of species into marginal habitat patches and direct competition with local communities (Siex and Struhsaker, 1999).

2.3.2. Land use transformation

This driving force is very much associated with the previous one, as the transformation of forests, savannah and other ecosystems into agrarian areas or urban agglomerates is a consequence of the increasing demand for land, food production, energy and raw materials. For instance, In Kenya, in many areas with abundant wildlife, such as Samburu, Trans-Mara, Taita and Kwale, conflict is intensified by land use fragmentation and the development of small-scale farming. In fact, state and trust ranches have been subdivided and sold as smallholdings and cultivated with commercial horticultural crop (Kenya Wildlife Service, 1996).

2.3.3 Increasing livestock populations and competitive exclusion of wild herbivores

Growing densities in livestock populations can create an overlap of diets and forage competition with wild herbivores, resulting in overgrazing and decline or local extinction in wild herbivore populations (Mishra*.,et al* 2003).

2.3.4. Increasing wildlife population as a result of conservation programs

Beyond the ongoing problems of HWC, new questions have emerged. In recent years, the successful recovery of declining or near extinct species population (Fall and Jackson, 2002) through wildlife management and protection from over exploitation (Messmer., 2002) has also led to conflict.

2.4. Impacts of human wildlife conflicts

Human-wild animals' conflict is a growing problem in today's crowded world, and can have significant impacts on human population. As human population and the extent of landscape transformation increase the probability of competition for resource between human being and wild animals also increase (Dickman, 2008). As the need and behavior of wildlife and human being become close to each other, it impacts negatively the goals of human and finally create conflict between them. Wild animals can have very significant impacts up on human directly and indirectly these impacts range from clear cut economic hard ship to less tangible effects such as increased opportunity costs and decreased quality of life. Living along side of wild animals can incur variety of additional costs aside from the direct impact of depredation (Distefano, 2010).

Human-wildlife conflicts are a global problem, and are occurring in many countries where human and wildlife requirements overlapping (O'Riain, 2010).

Conflicts between people and wildlife are encountered by a diverse group of communities, particularly those residing close to protected areas containing large to very large herbivores (buffalo, hippopotamus, rhino, and elephant) and large carnivores (Newmark., et al 1994; Hamsun *et al*., 2009).

2.5. Human and hippopotamus conflict

As hippopotamuses will often engage in raiding nearby crops if the opportunity arises, humans may also come in conflict with them on these occasions, with potential for fatalities on both sides (Kendall, 2011). The pattern of human-hippopotamus conflict was related to agriculture such as crop damage and over grassing of grassland (Mkanda, 1997 and Kanga *et al.*, 2011). The hippopotamus crop raids are unpredictable and can cause more damage per raid (Hoare, 1992). Crop damage by hippopotamus was by feeding, by trampling and destroying certain areas of the field (Kanga *et al.,* 2011).

2.6. Traditional methods used by the local people to prevent crop damage

People can prevent crop damage by using different methods such as guarding, chasing, strange scents, fencing, scarecrows and trapping to control their crop damage. Guarding was the most familiar method. Most farmers guarded their crops especially during the harvest season. Chasing and fencing were also the second and the third important methods, respectively. Yelling and throwing stones were the other methods used to chase wild animals away from the farmland (Musa, 2009). They are also forced by wild animals to change their cropping patterns to escape crop damage. Moreover, they spend additional labor, time and expenditure to protect their crop against wild herbivores (Sekhar,1998).

2.7. Overview of common hippopotamus

The IUCN stated the common hippopotamus to be “a critical element to the overall preservation of Africa’s wetlands (Lewison and Oliver, 2008). They directly and indirectly impact their ecosystem in many important ways. Due to the roles of the contributions in morphological or physically and chemically condition of an ecosystem common hippos are commonly referred to as “ecosystem engineers” (Wright and Jones, 2006). Common hippopotamus change biomass (grass) into usable forms of fertilizer in water body or system (Mosepele, 2009).

They create and maintain a “mosaic of habitat” for other organisms, which promotes biodiversity in the area (Lewison and Carter, 2004).

Likewise, hippos create and maintain channels between water sources (McCarthy, TBloem, 1998), important for movement of fish, amphibians, and nutrients. Predators are able to use areas of tall grass cover to discretely hunt for prey, and the reduction of tall grasses opens the visibility for smaller grazers. They move river substrates that provide places for birds and small crocodiles to rest where they are safe from predators and create areas for predators to feed on fish production enhanced by hippo dung (Eltringham, 1999). Lastly, hippos contribute nutrients to river systems, which fuel primary production and the food web that Support fish populations (Mosepele.,*et al* 2009).

3. MATERIAL AND METHODOLOGY

3.1. Description of the study area

Gibe sheleko national park (GSNP) is located in Gurage Zone, southern Ethiopia. It is 170 and 18km far from southwestern of Addis Ababa and Wolkite, respectively. It is geographically located from $05^{0}25`N$ to $06^{0}15`N$ and $35^{0}24`E$. Altitude of the area ranges from 1050 to 1835 m above sea level. The Park is bounded by three districts namely Cheha, Abeshigea and Enamor ena Ener (Alemneh, 2015). The park was designed as a regional park since 2009/2010 due to its high endemism and biodiversity conservation importance and home for numerous migratory and endemic bird species. The park covers 360 km^2, and characterized by heterogeneous landscape, flora, fauna and habitat types and it is dissected by deep gorges of the Gilgel Gibe and Wabe rivers. The annual rainfall is high and reliable, averagely 1100mm/year with low inter-annual variation and the temperature ranges from 7.5-25^{o}C. The rainfall in the area is bimodal (i.e. having two rainy seasons). The dry season includes December, January, February and March and rainy season includes June, July and August (Alemneh., 2015).

Figure1. Feature of Gibe Sheleko National Park

3.1.1. Wildlife species in the GSNP

The area has rich and intact vegetation cover. The area covers grasslands with scattered trees, woodlands, mountain and riverine forest. The park is also inhabited by an extraordinary composition of fauna. Recent records show that about 16 species of larger mammals inhabit the park. The mammals include: Lesser kudu, Warthog, Common bushbuck, Lion, Leopard, and Black and White Colobus and others. The Gibe River that flows across the park hosts various species of fishes, Water Fowls, Hippopotamus and Crocodile.

3.2. Methods

3.2.1 Research design

For this specific study, the target group was Abeshge district, which is among the three districts sounding the park. Purposive sampling technique was employed to select the sample Kebeles from the selected districts based on the recommendation of the park officials by considering the level of interaction, knowledge and experience, distance, and dependency on the national park. The Kebebles of the selected districts were Gibe, Borer, and Serite from Abeshge woreda. Simple random sampling technique was used to select the respondent households.

Interview and questionnaire survey was conducted in the studying area by both closed and opened question. To observe the perceived magnitude of human-wildlife conflict, a preliminary survey was conducted in January 2019 for the appropriateness of the research. Information was also gathered on causes, impacts of human wildlife conflicts and possible solutions to mitigate that once since locals are an aware of the problem. For the significance of the research, taking representative about 45 households and interviewing them was provided.

Household survey was a formal surveying method where a semi structured interview scheduled will be employed with closed and open-ended questions. It helps to eliciting information from respondents regarding demographic data (such as, age, sex, marital status, and family size and educational level), cause of conflict, impact of conflicts on human resources and the perceived or local attitudes towards using possible solution. The interview was conducted within the respondent's territory and in interviewing by translating questionnaires' in to their language.

Key information interview was made to strengthen the information collected using questionnaire and to have a detailed in site about HWC in the areas, in depth interviews and discussion about

cause, impact and possible solution to such conflict in the study area.

Direct observation was also conducted for the surveying of the all over the information towards the targeted area. Therefore, from the total households (1260) kebeles of on this, 45 sample households were selected from the total lists of households in three kebeles which are shows below in the table 1.

Table 1: Sample households from selected Kebeles

Sample kebeles	Total household	Sample household
Gibe	457	20
Borer	423	18
Serite	380	17

3.2.2. Sampling methods

In order to study human hippopotamus conflict in the national park, sampling method was employed specifically by foot in the study area. On the other hand, random and purposive sampling techniques were used for the purpose of sampling respondents for the purpose of this research. Random sampling technique was used to sample respondents from the local communities who are living in different kebeles within the boundary of the national park. While, purposive sampling techniques was used to sample respondents from the park, for example from kebele administration, tourism office, scouts and managers those who have immediate concern about the park.

3.2.3. Data sources and type

For the purpose of this research, both quantitative and qualitative data was chosen more data includes the cause of human hippopotamus conflicts, the impacts of hippos against the local communities as in different degrees and the possible solutions to reduce such negative impacts.
Both primary and secondary data sources were used. The primary data was collected through observation, interviewing the park officials and local communities, disseminating questionnaire to the community; whereas the secondary data was collected from reports prepared by the park's

manager, and other relevant literatures. Both open ended and close ended questions were prepared for the purpose of this research and the questions were presented to the local communities by translating them in to their local language of the community.

While, during an interview with the local community and the park officials, information's in relation to the cause of human hippopotamus conflicts, the impacts of hippopotamus against on the livelihood of local communities and any attempts made by the local communities mitigate as well as to avoid or abandon and disturb the hippos' population along with its habitat was gathered for later.

3.3. Data Analysis

Data which was collected from primary and secondary sources were analyzed, summarized and presented. Then the data was presented in table, graphs and pie charts and statement or narration to make possible conclusion based on outcome.

4. RESULT AND DISCUSSION

4.1. Background of the respondents

The respondents are both males and females and their percentage was accounts at 62.2% and 37.8% respectively. The age distribution of the majority of respondents lies at the age of 31-45 which have accounts to 44.4% (20) of the total respondents. This was followed by those respondents with the age class of 18-30 accounts 26.7 %(12) of the total respondents, and then the respondents with the age class of 46-50 contribute 22.2%(10) of the total respondents. While the least accounts was made by the age class of above 51 covering 6.7% (3) of the total respondents. They are also the best workers in community by conserving the resource, and giving awareness to other age levels.

Table2, also describes the educational status of the respondents as majorities of them are illiterate which accounts 55.6% (25) while 33.3 %(15) are completed their primary education and the remaining 11.1%(5) are accomplished a higher rank of education other than primary or secondary levels. This data also clearly shows that the majority of the respondents 88.9% (40) in the study area make a living through farming activities, while some of the respondents the respondents 11.1% (5) have been employed in government office.

Table 2. Background of respondents with respect to age, sex education and occupation

Variable		No of respondent	Percentage (%)
Sex	Male	28	62.2
	Female	17	37.8
Age	Age interval	-	-
	18-30	12	26.7
	31-45	20	44.4
	46-50	10	22.2
	Above 51	3	6.7
Education	Farmer	25	55.6
	Primary	15	33.3
	Secondary	0	0
	Above	5	11.1
Occupation	Employed	40	88.9
	Unemployed	5	11.1

4.2. Socio-economic profile of respondents

The main economic activities of the respondents were mixed farming and livestock rearing. From the 45 respondents, 82.3%(37) of them exercise mixed farming and livestock rearing as a major source of income and to administer their livelihood as well as themselves to live. Those respondents are using the livestock to farming activities and for meat and milk production. The other remaining economic activities of the respondents in the studying area is governmental employments which contributes, 11.1 (5) % of the total respondents next to farming and

livestock rearing. Trade and other activities are use as source of income in the study area which contributes 4.4 %(2) and 2.2 %(1) respectively.

The economic activities of the respondents or local communities are farming activities and livestock rearing. The reason why they use mixed economic activities are the forest area and outside forest area have good food for livestock and there are good weather conditions for survive for who live in the community. Mostly in and around the park/studying area, goat and cattle production are practiced. Cattle are purpose for many activities and are reflected a vital portion of every day survives of the people and their beliefs (Dovie *et al*., 2006.

However; farming activities are the most crucial land-use venture in Gibe Sheleko national park especially in and around hippo site area. In the study area of hippo site in the present study, there is lack of compensation which in turn results in poor implementation of management options that aimed at conserving the biodiversity in general and hippo's population in particular.

Table3. Economic or livelihood activity of the respondents

Economic activity	Respondents	Percentage (%)
Farming and livestock rearing	37	82.3
Government employee	5	11.1
Trade	2	4.4
Other activities	1	2.2
Total	45	100

4.3. Causes of human-hippopotamus conflicts in the study area

The respondents in the targeted area during data collection the major or main causes of this conflict are identified and ranked by its level of frequency. Human settlement 15 (33.3%), agricultural activities (i.e. irrigation) 12 (26.7 %), over grazing by domestic livestock 10 (22.2 %), habitat distraction 5 (11.1%), and deforestation for firewood as well as other domestic uses 3 (6.7 %), were the causes of those conflict between human and hippopotamus in the study area. This result has an agreement with finding of Kivai (2010) who states the causes that made wild animals forced to crop raiding and human killing which create conflict between land owners

or farmers and hippos, variables such as deforestation, distance of farm land from residence, grazing livestock and farm land expansion to forest area.

The major threats that affect the diversity of hippopotamus population identified in the present study are in agreement with the finding of Kujirakwinja (2010) reported for Mara River in Kenya, and Virun National Park, Democratic Republic of Congo respectively with potentially adverse consequences. The populations of hippopotamus have declined in response to human disturbances and threats in Africa (Lewison, 2007). Human activities influence ecosystem structure and function, in particular the spatial and temporal distribution of wild herbivores (Ogutu *et al*., 2010). This is especially true for, in which water availability becomes progressively limited and water sources become points of contacts and conflicts and competition between hippopotamus and human. These threats of the area arisen from settlement and expansion of agriculture. The pattern of human-hippopotamus conflict was related to agriculture (crop damage and over grazing of grassland) and is similar to that reported by Mkanda and Kumchedwa (1997). The hippopotamus's crop raids are unpredictable and can cause more damage per raid (Hoare, 1992). Crop damage by hippopotamus was by feeding, by trampling and destroying certain areas of the field (Post, 2000). The local community stated that the major impacts or problems of the hippopotamus are its effect on crop damage, and grazing privates grazing land which comprised 56.6% and 37.7% respectively, and in some extent hippos also killed the people when they want to chase the hippos from crop raiding which comprised 6.7% of the response of farmers.

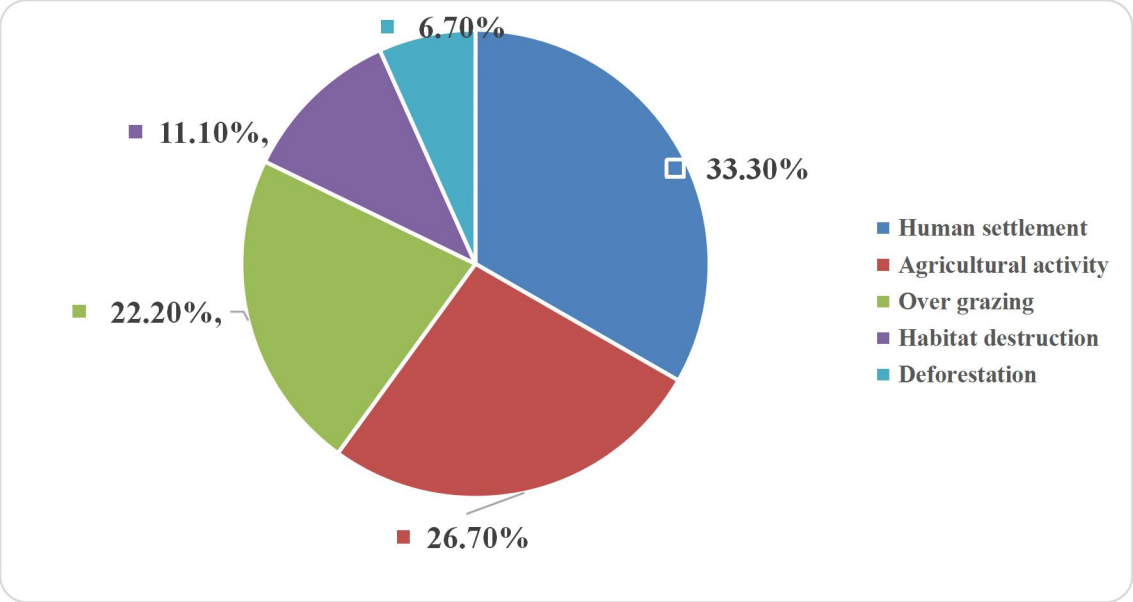

Figure2. Cause of human hippopotamus conflict according to the response of local community in the studying area.

A. Livestock population in GSNP **B**. Farming areas in GSP

Figure 3. Driving forces which causes for human hippos conflict in Gibe sheleko national park.

4.4. Impacts of Hippopotamus against local communities in the study area

The response of local community during an interview, due to the presence of different human related cause in and around the national park, which is already home to hippos and others wildlife, hippos affect the resource of settlers or local communities including directly killing them. The hippos found in the study area have many impacts on local communities often by moving individually. Hippo's moves an individually both at night and day time, especially at the morning and afternoon outside from their habitat to damage crops. Crop damage in Africa by potentially life threatening species such as hippopotamus, warthogs, vervet monkeys and Anubis baboon's results in unique dilemma (Naughton, 1998). Human life was also died or moribund when they want to chase away hippos from their crop and grazing areas. From targeted or the total respondents, 25 (56.6%) of them responded that, Hippopotamus is the most difficult wild animal in study area which affects local communities by moving individually and damaging or riding the respondent's crop, 17(37.7%) of the respondents responded that hippos affects them by destroying their own grazing land and also in some extent hippos were killed directly the human being for take an account from the total respondents' 3(6.7%) testified. Property damage caused by wildlife, including destruction of agricultural crops, grain stores, fence 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 a negative consequence for health, nutrition, education and ultimately development problem.

Table 4. Impacts of hippopotamus against local people according to the response of respondents in the studying area.

Types of impact by hippos against local community	Frequency	Percentage (%)	Rank
Crop damage/riding	25	56.6	1
Grazing of private grass land	17	37.7	2
Human killing	3	6.7	3
Livestock killing	0	0	4
Total	45	100	-

4.5. Mechanisms to control human hippopotamus conflicts

The different methods to control hippos from their crop include guarding, chasing, fencing for example, terracing and burrowing or digging a hole and smoking. From these different traditional methods in which most of the respondents were used guarding their crop which contributes 51.1% (23) from the response of the total respondents and it was the first because of its high degrees of being preferred by the farmers or respondents in the studying area, whereas using fencing (i.e. terracing and burrowing and sometimes wood fencing) were adopted as a second alternative, which contributes 26.7%(12) according to the response of them. Whereas the farmers also use chasing and/or chasing away the hippos to escape their crops from lost and being affected, which contributes 13.3 %(6) from them as a third alternative.

The remaining using smoking/firing to repeal the crop raiders /hippos from their crops in the night time which was the lowest alternative, which contributes 8.9 %(4) of them. Respondents reported that as they guarded their crops throughout crop growing season. Fencing and chasing were also the second and the third important methods respectively. Smoking was also used to as supplementary.

This result was the same with the finding of Eniang, *et al*. (2011) in Nigeria and (Gandiwa*, et al*., 2012), in Zimbabwe who founds that guarding and chasing away of animals was ranked first and second in protecting crop raiders from crops.

Following to the human hippopotamus conflict and its impact, local community follow and take their own mitigation measure to resist or control such impacts. From all these methods, guarding crop permanently was the effective method to protect crops from damage of hippos.

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 the national park about the purpose and benefits of wildlife conservation, the causes of human-wildlife conflict, and methods to reduce or alleviate such conflicts. Guarding was popular method in different parts of Africa (Sillero, 2001).

The finding of the present study indicates successfully guarding required that people be in the fields for long period of the day throughout the seasons when there was vulnerable crop in the most of the year. This study agrees with the study made by Kate (2012) who reported that people

had other tasks to complete including attending school, household chores, trading in the local market and employment for local chores. In these finding men, women and children were the people who guarded the crop to protect from the damage by hippos. Really the nostrils, eyes and ears of hippopotamuses are placed at the top the skull (Jones, 2008), which is important to control them from entering in to cultivated lands simply by putting thorn fences either at the edge of the land, at run way of the hippopotamuses or entering sides of the land, and also fences is still crucial to control hippos from crop raiding, which contributes 26.7% with regards to the response of the peoples in the studying sites. Digging deep and narrow holes towards the bottom furrow at entering sides of the land and covered it with grasses is used as an alternative method to trap hippo's. This is because, the animal will not be able to move forward or backwards and cannot come out once entering into the rut due to their large body, massive and inflexible neck and short legs (Eltringham, 1999). Similarly, farmers live in and around Lake Victoria used fencing materials like cedar poles and barbed wire and digging of trenches to minimize crop damage by hippopotamus (Post, 2000).

In the Gibe sheleko national park, human hippo's conflict was a serious problem often happens due to different causes. The most cause in the study area is overgrazing, agricultural activities, fire wood collection, settlement, and distraction. But human settlement, agricultural activities and overgrazing are the dominant causes which totally accounts 33.3 %(15), 26.7% (12) and 22.2% (10) from the total respondent respectively. As result of these causes hippos affects the crop and loss of human life directly killing them (local communities).

The respondents also protect their crop and livestock by smooth way methods but the conflicts are not stopping those using different killing mechanisms. Ogada *et al*. (2003) also contend that humans can be economically affected through destruction and damage to property and infrastructure such agricultural crops, fencing and pipes livestock depredation transmission of domestic animal diseases such as foot and mouth. The achievement of biodiversity conservation depends a lot on the local peoples' support which is often linked to the direct benefits communities get from the conservation areas (Sekhar, 2003).

Table.5. Traditional methods used by local communities/ farmers to control hippos from crop raiding in the study area.

Methods to control Hippos impact/crop raiding	Frequency	Percent (%)	Rank
Guarding	23	51.1	1
Fencing	12	26.7	2
Chasing	6	13.3	3
Smoking/firing	4	8.9	4
Total	45	100	-

5. CONCLUSION AND RECOMMENDATION

5.1. Conclusion

- The present study tried to investigate the cause, impact and mitigation measures of human-hippos conflict in Gibe sheleko national park, Gurage zone, souther Ethiopia.
- Hippo's habitats/sites are highly affects due to expanded settlement, agricultural activity, overgrazing and the habitat destruction, and due to this fact reduce the number of Hippo.
- The main economic activity of respondent is mixed (crop farming and livestock rearing).
- Those respondents are using the livestock to farming activities and for meat and milk production.
- The habitat of hippos in Gibe sheleko national park was highly affected due to the existence and expansion of human settlement, agricultural activities, high livestock population which acts overgrazing, habitat destruction and fragmentation.
- Hippos affect the resource of settlers or local communities including directly killing them. The hippos found in the study area have many impacts on local communities often by moving individually. Crop damage and loss of human life by hippopotamus as a great hindrance to their agricultural development, as well as their well-beings.
- The different methods to control hippos from their crop include guarding, chasing, fencing due to by applying burrowing or digging a hole and smoking.
- Guarding was the most effective means of controlling of hippos impact against human resource, and still it was often applied and considered as a best alternative method to control hippos from crop damage.

5.2. Recommendation

- ❖ Based on the present study, the following points are recommended to mitigate the human-hippopotamus conflict in the study area.

- ➢ To reduce the dependency of the local people on the national park, it is better to encourage the local people to plant trees for their various types of utilization and is better to minimize deforestation.
- ➢ To reduce risks of conflicts between human and hippos in protected area protecting hippos and their natural area from agricultural activity, overgrazing, and fire wood collection must be implemented.
- ➢ Farmers must get compensation based on the amount what they lose by hippos and give ownership for themselves by empowering them to keep those species along with their habitat.
- ➢ Most of the people in an area were un educated, therefore create an opportunity to educate those un educated peoples and awareness raising campaign for scouts and nearby local communities to strengthen them should be undertaken for better management and conservation of hippos.
- ➢ Giving awareness among the local people to develop the knowledge about the issue of environmental degradation along with the relative issues, its impact on human and wild animal wellbeing and its overall impact, as well as sense of ownership of natural resources.
- ➢ Strengthen the management strategy and regulations of human settlement, agricultural activities and high livestock population in the hippos site should implemented for the wellbeing ness of both human and hippopotamus population.
- ➢ Further study should be carried out to design the site specific appropriate strategy to alleviate human hippopotamus conflicts, to mitigate crop and human killing, and to improve local peoples' livelihoods so that people relationship will be better.

REFERENCE

Admassu, M. (2007). Damage caused by large mammals in Wonji-Shoa Sugarcane Plantation, central Ethiopia. *MSc. thesis Addis Ababa University, Ethiopia.*, Pp. 76.

Alemneh,A.(2015). Conservation challenges of Gibe Sheleko National Park, Southwestern Ethiopia.

Ashenafi ZT, Leader-Williams N. (2005). Indigenous common property resource management in the Central Highlands of Ethiopia. . *Human Ecology* , 33(4), 539–563.

Begg, C., Begg, K. and Muemedi, O.(2007). Preliminary data on human-carnivore conflict in Niassa National Reserve, Mozambique, particularly fatalities due to lion, spotted hyena and crocodile. *Maputo, pp.*, .1–22.

Boer, W.F. and Baquete, S.D. (1998). Natural Resource Use, Crop Damage and Attitudes of Rural People in the vicinity of the Maputo Elephant Reserve, Mosanbique. *Environmental Conservation* , 25:208 - 218.

Bonham, R., Wield, R. and Turner, A. (2007). Human-wildlife conflict. *E. Afr. Soc. Rev.*,23:1–3.

Damiba, T. E. and Ables, E. D. (1993).Promising future for an Elephant population. . *A case study in Burkina Faso, West Africa. Oryx* , 27:97–103. .

Datiko, D, Bekele, B.(2013). Conservation challenge:Human-carnivore conflict in Chebera Churchura National Park, Ethiopia.*Greener Journal of Biological Science*, 3(3), 108-115.

Dovie, D.B.K.Shackleton, C.M, and Witkowski, E.T.F. (2006). Valuation of communal area livestock benefits, rural livelihoods and related policy issues. Land Use Policy, 23, 260–271.

DeFries R, Karanth KK, Pareeth SJ.(2010). Interactions between protected areas and their surroundings in human-dominated tropical landscapes. *Biological Conservation* , 143, 2870– 2880.

Dickman, A. J.(2008).Key determinants of conflict between People and wildlife particularly large carnivores around Ruaha National Park, Tanzania. *PhD Thesis, University College London (UCL) and Institute of Zoology, Zoological Society of London. Distefano*.

Distefano,E.(2010).Humanwildlifeconflictworldwide.collectionofcasestudies,analysisofManagementstrategiesandgoodpractices.SouthAricaf. 1-34.

Else, J. G. (1991). Nonhuman primates as pests In: Primate responses to environmental change. (Box, H. O. ed.), pp. *Chapman and Hall, London.* , 115–165.

Eltringham, S.K.(1999). The Hippos Population and Housing Census. Cambridge, Great Britain: *University Press.* Final Results: Freetown, Sierra Leone.

Eltringham,S.(1979).TheEcologyandConservationofLargeAfricanMammal.*TheMacmillanPress, London*, .103-109Pp.

Eniang EA, Ijeomah HM, Okeyoyin G, Uwatt AE. (2011). Assessment of Human - Wildlife Conflicts in Filinga Range of Gashaka Gumti National Park, Nigeria. . PAT 7(1), 15-35.

Fall M.W and Jackson W.B. (2002). The tools and techniques of wildlife damage management-changing needs: an introduction. *International Biodeterioration & Biodegradation,*, 49(2-3):87-91.

Gandiwa EI, Heitkönig MA, Lokhorst AM, Herbert H, Prins HT, Leeuwi C. (2012). CAMPFIRE and Human-Wildlife Conflicts in Local Communities Bordering Northern Gonarezhou National Park, Zimbabwe. . . *Ecology and Society*, 18(4), 7-22.

Hemson G., Maclennan, S., Mills, G., Johnson, P. and Macdonald, D., (2009). Community, lions, livestock and money: A spatial and social analysis of attitudes to wildlife and the conservation value of tourism in a human-carnivore conflict in Botswana. *Biological Conservation*; 142:2718-2725.

Hill,C.(1998).ConflictingattitudestowardselephantsaroundtheBudongoForestReserve,. *Uganda.Environ.Conserv*, .25:244-250.

Hill,C.(2000).Conflictofinterestsbetweenpeopleandbaboons.*CropraidinginUganda.Intern.J.Primate*, 21;299-315.

Hoare, R. E. (1992).The Present and Future use of Fencing in the Management of Larger African Mammals. Environ. Conserv. 19(2): 160-164.

IUCN – World Conservation Union. (2003). Red List of Threatened species . *[www document]*, Available at: http://www.redlist.org/ .

IUCN.(2005).BenefitbeyondBoundaries.*Proceedingofthe5thIUCNWorldParksCongress.IUCN,Gland,SwitzerlandandCambridge,UK.*, Ix.306Pp.

Jones, R., (2008). Husbandry Guidelines for the Common hippopotamus (*Hippopotamus amphibious*). *Western Sydney Institute of TAFE*, Richmond. Pp. 5-52.

Kate, K. (2012). Possible strategies/practice in reducing wild animal (primate crop raids) in Unprotected areas Hioma district Uganda.21Pp.

Kagoro-Rugunda,G.(2004).CropraidingaroundLakeMburoNationalPark,Uganda,African.

Journalofecology, 42:32-41.

Kanga, E. M., Ogutu, J. O., Piepho, H.-P., & Olff, H. (2011). Hippopotamus and livestock grazing: influences on riparian vegetation and facilitation of other herbivores in the Mara Region of Kenya. . *Landscape and Ecological Engineering*, 9(1), 47-58. doi: 10.1007/s11355-011-0175-y .

Kenya Wildlife Service. (1996). Wildlife-human conflicts, Sources, Solutions and Issues. *[www document] Available at: http://www.safariweb.com/kwild/wildlife.htm* .

Kivai,S. (2010). Are the Endemic and Endangered Tana Rivere primate's culprits of crop raiding? Evaluating Human -Nonhuman primate conflict status around Lake Tana River primate Reserve.

Kujirakwinja, D., (2010). The status and conservation of common hippopotamuses in Virunga National Park, Democratic Republic of Congo. MSc Project, University of Cape Town, Percy Fitzpatrick Institute of African Ornithology, South Africa. Pp. Pp. 60

Lee,P.(1987).Humanattitudestoprimates:perceptionsofpests,conflict and consequences for Primateconservation.In:PatersonJD,WallisJ.CommensalismandConflict*:thehumanprimate interface.AmericanSocietyofPrimatologists,Norman,OK,*, ,p1-23.

Lewison, R. L., & Carter, J. (2004). Exploring behavior of an unusual megaherbivore: a spatially explicit foraging model of the hippopotamus. *Ecological Modelling,*, 171(1-2), 127-138. doi: 10.1016/s0304-3800(03)00305-3 .

Lewison, R., & Oliver, W. (2008). Hippopotamus amphibius. In I. S. H. S. Subgroup (Ed). *The IUCN Red List of Threatened Species* , (Vol. 2014.3).

McCarthy, T. S., Ellery, W. N., & Bloem, A. (1998). Some observations on the geomorphological impact of hippopotamus (Hippopotamus amphibius L.) in the Okavango Delta, Botswana. *African Journal of Ecology*, 36, 44-56.

Mearns R. (199). Livestock and environment: . *potential for complimentarily. World animal review, FAO*, 1, 2-14.

Messmer T.A. (2002). The emergence of human– wildlife conflict management: turning challenges into opportunities. *International Biodeterioration & Biodegradation,*, 45(3-4): 97-102.

Mishra, C., Allen, P., McCarthy, T., Madhusudan,M.,Bayarjargal,A.and Prins,H. (2003). The role of incentive programs in conserving the Snow Leopard. *Conservation Biology.*, 17(6): 1512-1520.

Mkanda, F. X. and Kumchedwa, B. (1997). Relationship between crop damage by hippopotamus (*Hippopotamus Amphibious* L.) and farmers' complaints in the Elephant Marsh. J. Afr. Zool, 111: 27-38.

Mosepele, K., Moyle, P. B., Merron, G. S., Purkey, D. R., & Mosepele, B. (2009). Fish, Floods, and Ecosystem Engineers: Aquatic Conservation in the Okavango Delta, Botswana. BioScience. *BioScience,*, 59(1), 53-64. doi: 10.1525/bio.2009.59.1.9 .

Muruthi, P. (2005). Human wildlife conflicts: lessons learned from AWF's African heartlands. *AWF Working Papers. Nairobi, Kenya, African Wildlife Foundation.*, pp.1-12.

Musa,A. (2009). Population status of Gelada baboon and human wildlife conflict in and around denkoroforest,Ethiopia,. *Msc.Thesis,Addis Ababa University.*

NaughtonTreves,L.(1998).PredictingpatternsofcropdamagebywildlifearoundKibale. *,Uganda.Conserv.Biol*, .12:156-168.

Newmark, W. D., Manyanza, D. N., Gamassa, D. M. and Sariko, H. T.(1994). The Conflict between Wildlife and Local People Living Adjacent to Protected Areas in Tanzania Human Density as a Predator. *Conservation Biology* ., 8:249-255.

O'Riain,M.(2010).Thespatialecologyofchacmababoons(Papioursinus)inahumanmodified.*Int.J.Primatol.*, 32:308-328.

Ogada,M,Woodroffe,R,Oguge,N.andFrank,G.(2003).Limitingdepredation by African carnivores*;theroleoflivestockhusbandry*.

Ogutu, J. O., Piepho, H. P., Reid, R. S., Rainy, M. E., Kruska, R. L., Worden, J. S., Nyabenge, M. And Hobbs, N.T., (2010). Large herbivore responses to water and settlements in savannas. Ecol. Monogr., 80: 241-266.

Oil, M. K., Taylor, I. R. and Rogers, M. E.(1994). Snow Leopard (Panther auncia) Predation of Livestock: an Assessment of Local Perceptions in the Annapurna Conservation Area. Nepal. . *Biological Conservation*, 68: 63-68.

Ojo, O. S., Akinyemi, O. Sodimu, A. I., Ojelade B. S. and Jayeoba, W. A. (2010). Human-wildlife conflict:. *Issues, effects and conservation. http//environmentlankCom/blog/2010/human%E2%80%93-wildlifeconflict-issues-effects-and-conservation/. Osborn*.

Osei-Owusu, A. (2008). Humanwildconflict.FAOEphanTechnicalManual. 45pp.

Petersen, J.(2003).Human - Wildlife conflicts in Ethiopia. Berryman Institute, Utah State University. *NADCA Salt Lake City, Issue 229:*, pp 6.

Post, A., (2000). The hippopotamus: nothing but a nuisance Hippo-human conflicts in Lake Victoria area, Kenya. *MSc*. thesis, University of Amsterdam, the Netherlands.

Rowe, N. (1996). The Pictorial Guide to the Living Primates. *The Pictorial Guide to the Living Primates. Pogonias Press,*, pp 150-151.

Sekhar, N.U. (1998). Crop and livestock depredation caused by wild animals in protected areas: The Case of Sariksa Tiger Reserve, Rajasthan, India. Environmental Conservation 25: 160-171.

Sekhar,N. (2003) Crop and livestock depredation caused by wild animals in protected areas:. *TheCaseofSariskaTigerReserve,Rajasthan,India,Environ.Conserv.*, v.25:160-171.

Siex,K.S. Struhsaker, T.T. (1999). Colobus monkeys and coconuts: a study of perceived human–wildlife conflicts. *Journal of Applied Ecology,*, 36(6):1009-1020.

Sillero, Z. (2001). Cropraiding Primates:Searching forAlternative,Human ways to Solv eConflict withFarmersinAfricanWildlifeinitiative.*Wildlife ConservationResearchUnit,OxfordUniversity,Oxford*, .123-134Pp.

Treves A, Martin KA, Wydeven AP, Weidenhoeft JA. (2011). Forecasting environmental hazards and the application of risk maps to predator attacks on livestock. . *Bio Science* , 61, 451–458.

Treves, A., Wallace, R. B., Naughton-Treves, L. and Morales. A. (2006). Co-managing human–wildlife conflicts: . *a review. Hum. Dimens. Wildl.*, 11: 383–396. .

Tylor,R. (1982). Buffer zones: relving conflict between human and wildlife interest in the Sebbungweregion. *ZimbabweAgricultureJournal.*, .79;179-184.

Warren, Y. (2003). Olive Baboons (Papio anubis): Behaviour, Ecology and Human Conflict in Gashaka Gumti National Park, Nigeria. *Ph.D. Thesis, University of Surrey.* .

Whitesell SRJ, Lilieholm, Sharik TL. (2002). A global survey of tropical biological field stations. *Bio Science*, 52(1), 55–64.

Wright, J. P., & Jones, C. G. (2006). The Concept of Organisms as Ecosystem. *Engineers Ten ears On: Progress, Limitations, and Challenges.*, 56(3), 203-209.

WWF. (2005). Human wild conflict manual southern African Regional Programmeroffice. 30pp.

WWF SARPO. (2005). Human wildlife conflict manual. Harare, Zimbabwe, WWF Souther African Regional Programme Office (SARPO).

WOLKITE UNIVERSITY

COLLEGE OF AGRICULTURE AND NATURAL RESOURCE

DEPARTMENT OF WILDLIFE AND ECOTOURISM MANAGEMENT

APPENDIX

Dear participants

I would like to thank you in advance for your participation in this study. The objective of the questionnaire is to investigate human hippopotamus conflict in Gibe Sheleko national park. I am conducting it as part of my degree program in Department of **Wildlife and Ecotourism Management**, at Wolkite University. I want to assure you that, your response is confidential and used only for academic purpose. Therefore; I kindly request your cooperation & patience for responding each and every question by considering the importance of your valuable response to study.

Thank you once again!!!

QUESTIONNAIRE NO:

Interview date ……..……

Enumerator's name ……..……

Name of village ……..……

Village Head ……..….

Interview Duration ……..…

SECTION A: local community demographics

This first section is about the people who live at this homestead and eat from the same pot as yourself and the general activities they engage in. this includes people who live away from the house during the month or week, but comes back on a regular basis and contribute to the income of the household.

1. Gender:

A. Male

B. Female:

2. Age:

3. Marital status

A. Married B. Unmarried

4. Educational status:

A. Farmer B. Primary C. Secondary D. above

5. Occupation;

A. Employed B. Unemployed

6. What are your sources of income?

A. Farming and livestock rearing

B. Government employee

C. Trade

7**.** How far from the distance of your house from the National park?

A. Inside NP

B. Near to NP (<5km far)

C. Far from NP (5>x<10km

D. Above 10 km from the NP

8. Do you own land inside the National park**?** **A**. Yes B**.** No

If your answer is **YES**, what is its size and Land use type?

A. Farm Land

B. Woodlot

C. Grazing Land

D. Others

9. Do you rear domestic or Livestock? A. Yes B. No

If your answer is **YES**, what types of domestic/livestock do you have?

A. Sheep
B. Caws and Oxen
C. Goats
D. Horses and Mules
E. donkeys

10. Do you have your own grazing area? A. Yes B. No

11. If your answer for question number 10 is **NO**, where else you graze your cattle?

A. From inside the park B. anywhere else:

12. Is there a conflict between local community and Hippopotamus?

B. Yes A. No

13. What is the cause of conflict?

A. Human Settlement
B. Overgrazing by livestock
C. Agricultural activities
D. Destruction
E. Deforestation
F. Other specifics

14. Is there a loss of livestock (any domestic animal) or crop by wildlife?

A. Yes: B. No:

15. If your answer for question number 16 is **YES**, List the livestock you have ever lost and crop; which wild animals are known to cause for this problem?_____

16. How do farmers protect their property from wild animals' problem and how much it is effective? _____

17. What type of activities do you think most affects the habitat of Hippopotamus?

A. Water diversion

B. Agricultural activity

C. Settlement

D. Overgrazing

18. What is the reason of human and hippo conflict?

A. Human killing C. Both

B. Hippo killing D. Others (specify) _____

19. Is hippo affecting the local community with groups or individuals?

A. In Group

B. In Individual

C. In Both

20. Are there conflict resolution activities in Hippo site of Gibe Sheleko national park?

A. Yes B. No

21. If your answer for question 22 is No, why?

A. Poor government involvement

B. Lack of compensation

C. Poor implementation of legal frame works

D. Others (specify) _____

22. If your answer for question 23 is yes, how it is managed?

23. How is your access of the National park?

A. Very easy: B. Easy: C. Medium: D. Hard: E. Very Hard:

24. What benefits you get from the National park? You can select more than one choice.

A. Firewood

B. Wood for house construction

C. Timber

D. Charcoal

E. Non timber products (honey, medicinal plant, gum, resin etc.)

F. Grass for domestic animals

G. Livestock grazing

H. Job opportunity

I. Nothing gets from national park

J. Others

25. Is there any form of deforestation in and around the park? A. Yes B. No

26. Have you been involved in any practices of cutting trees? A. Yes B. No

27. What is/are reason/s for the destructions? (You can select more than one reason).

A. House construction

B. Fuel wood

C. Expanding farming land

D. Joining plots

E. Destroy hiding places of wild animals

F. Destroying bad weeds

G. Reducing the forest coverage

H. Others

28. Which of the two types of impacts are more dominant? A. Positive B. Negative

29. If positive, what are the reasons? _____

30. If negative, what are the causes? _____

31. What are the impacts of hippopotamus against local people?

A. Crop damaging/raiding

B. Grazing private grass lands

C. Human killing

D. Livestock killing

E. All of the above