COLLEGE OF AGRICULTURE AND NATURAL RESOURCE

DEPARTMENT OF WILDLIFE AND ECOTOURISM MANAGEMENT

FACTORS AFFECTING THE LARGE MAMMALS IN BALE MOUNTAINS NATIONAL PARK SOUTHEASTERN ETHIOPIA

RESEARCH PROPOSAL SUBMITTED TO DEPARTMENT OF ECOTOURISM AND WILDLIFE MANAGEMENT. COLLEGE OF AGRICULTURE AND NATURAL RESOURCE, WOLKITE UNIVERSITY FOR THE PARTIAL FULFILLMENT OF THE COMLETION BSC DEGREE IN WILDLIFE AND ECOTOURISM MANAGEMENT

By

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Contents

ACRONYM

BMNP…………………………………… Bale Mountains National Park.

BIDNTF ……………………………..Biodiversity Indicators Development National Task Force.

CSA………………………………………Central Statistical Agency

EWNHS…………………..……………… Ethiopian Wildlife and Natural History Society.

GMBA……………………………………Global Mountain Biodiversity Assessment .

GC…………………………………………Gregorian calendar.

HHs………………………………………..House Holds.

EBI………………………………………...Ethiopan Biodiversity Institute

ETB………………………………………..Ethiopian Birr

IUCN……………………………………....International Union Conservation of Nature.

OFWE…………………………………… .Oromia Forest and Wildlife Enterprise.

PPS…………………………………………Proportional probablity to size.

REDD………………………Reduction of Emission from Deforestation and Forest Degradation.

SDC………………………………………..Swiss Agency for Development and Cooperation .

ABSTRACT

Large mammals, both wild and domestic, were censused in in four study areas in Bale Mountains National park (BMNP), southern Ethiopia, from April until August 1997, using established road counts and systematic transects, a new approach to censusing large mammals in BMNP. Data collected since 1983 were also examined to indicate trends in mammalian abundance. Civil unrest following the government change over in 1991 disrupted management of BMNP, leading to an increase in human settlement and livestock densities. The effect of these factors on BMNPs wildlife is assessed and discussed. Most large mammalian wildlife has declined since 1983 but signs of recovery for some species in recent years are positive. The fates of two charismatic endemics are emphasized. BMNPs current population of mountain Nyala (Tragelaphus buxtoni, an endangered antelope) was estimated to be between 1100 and 1300. This is lower than estimates for the late 1980s, but shows an increase from very low levels recorded following social turmoil during the government changeover in 1991. Data on the Ethiopian wolf (Canis simensis, a critically endangered canid) also indicate positive trends in abundance, following severe declines between 1989 and 1992 due to rabies epizootics. Action to reduce human utilization of parts of BMNP is urgently required to prevent further degradation of the environment and to safeguard the future of both the mountain Nyala and Ethiopian wolf.

Key Words: Bale Mountains, Mountain Nyala (*Tragelaphus Buxtoni*), Ethiopian wolf *(Canis simensis*) conservation, human settlement, park, wildlife

1. INTRODUCTION

1.1. Background and justification

Ethiopia is one of the highland countries in Africa that dominated by mountains which are supported by river valley and gorges that topped plateaus undulating hill and low lands (BIDNTF, 2010). Due to this species diversity is high in the afro alpine vegetation zone and in the dry mountain forest and grass land complex of plenteous. The high lands which are defined by an area above 1500m with the associated valleys constitutes above 40%of the country. There are large varieties of indigenous plant and animal species with high level of endemism throughout Ethiopian country (Yalden, 1983). At 2002 277 mammals 262 birds over 6600 plants 210 reptile 63 amphibians and 150 fish species were known to occur in Ethiopia (Hillman, 1993). The Ethiopian high lands which are densely populated by humans supported several species of threatened and endangered mammals (Newmark, 1996, Kideghesho *et al.,* 2006). The Bale Mountains National Park (BMNP) is one of the protected areas in southeastern Ethiopia with the largest areas of continuous Afro alpine and Afro montane forest habitats in Africa (Alers et al., 2007; Maselli *et al*., 2010).

Bale Mountains National Park (BMNP) is one of the most threatened National Parks (Mamo and Bekele, 2011; Vial*et al.,* 2011). The threat passed by human pressures on endangered species through habitat loss was widely documented. However, understanding about specific threat to species like Mountain Nyala (*Tragelophus buxtons*), Ethiopian Wolf (*Canis Simensis*) and Menelik's Bushbuck (*Tragelaphus scriptus meneliki*) is locally the past of the historical range of Mountain Nyala in have been occupied by human settlement and cultivation (Brown 1969). Relatively high number of individuals of this species occurs in Dinsho and Adelay area land use system and wildlife habitats despite the best efforts to conserve them in several localities. Human population of extensive areas land for settlement agriculture resources and the infrastructure to support these activities which interns are responsible for wildlife habitat loss and fragmentation was happen due to human encroachment probably the most common cases for extinction of spices as a result of human activities more than hundred times faster than the natural rates of extinction and more for more rapidly than new species can livestock grazing can have strong impact on native wildlife their habitat and over ecosystem .

1.2. Statement of the problem

There are many factors that affect large mammals in bale Mountains National Park Ethiopia. Among these human settlement around the park and livestock grazing are the main problems that disturb the survival of large mammalian populations. But the extent of the affect is less explored. There are still gap factors affecting large mammals. Therefore, the current study contributes to fill the gap.

1.3 Objectives

1.3.1 General objective

- The general objective of this study was to know factors affecting large mammals in Bale Mountains National Park.

1.3.2 Specific objective

- To understand which factors are highly affect the survival of large mammals in BMNP.
- To identify measure human induced problems on large mammals in the study area.

2.4. Research questions

- What are the factors affecting large mammals in the study area?
- What are the possible solutions for existing problems of large mammal?

1.5. Significance of the study

Since for every management activities and decision making process data information is the base for a particular study in order to identify every impacts of human on wildlife particularly on large mammalian populations and on their habitat. Therefore this study was conducted to identify impacts of human activities for that threat the survival and ecology of large mammals in the study site to add empherical results for the decision makers and for better management options.

There result of this study will also provide base line information for other researchers to conduct similar studies elsewhere.

2. LITERATURE REVIEW

2.1. Factors Affecting large Mammals in Ethiopia

The major threats of large Mammals in Ethiopia are agricultural expansion, poaching (illegal hunting), illegal settlement and encroachment, livestock grazing, fire wood and charcoal production, military activities (shooting), and drought Kumsa, 2006). Some of the major threats are the following,

2.3.1. Habitat loss

Habitat loss was the greatest, most serious of all threats to mammals. Habitat loss due to the expansion of human activities, including urbanization and the increase in cultivated land surfaces, was identified as a main threat to all mammal species described in the IUCN Red List (IUCN, 1995).

2.3.3. Invasive species

Invasive species can affect landscapes and the provision of ecosystem service. While many are decrease have identified the diverse of biodiversity loss, they have not considered or modeled the interactions between drivers (Ngwrenocc, Mwasims and Kairu, 2009). Invasive species, overgrazing and land degradation were common problems in Ethiopia. The introduction of non-native species and genetic stock was a major threat to mammal diversity. There were thousands of new and foreign genes introduced with trees, shrubs, herbs, microbes, and higher and lower animals each year. Many of these new species survive and adapt, after many years of adaptation, become invasive. In the park a number of animal and plant species were reported as endangered, threatened or critically endangered. It has failed to protect the species.

2.3.2. Agricultural Expansion

Agriculture and other development activities had led to an overall decline of mammals. Agricultural practices also influence terrestrial and aquatic mammal diversity within and around agricultural fields (Naughton-Treves, 1997). Fertilizers, pest control chemicals, tillage and even crop rotation had an impact on the biodiversity of agricultural ecosystems. Due to increasing human and livestock population was a common experience in protected areas of most Ethiopia.

Such a conversion of natural vegetation covers to other use types such as farmlands, grazing lands, human settlements and urban center has shown for the cause of loss of mammals, deforestation and land degradation (Bishaw, 2001).

2.3.4. Unsustainable Utilization

Unsustainable utilization (over grazing/browsing, harvesting and hunting) of mammal was one of the major threats to large mammals and ecosystem services. Farmers found within the lake watershed were pumping water unsustainably to irrigate. This eventually resulted in the disappearance of the lake affecting the livelihood of the people that have been dependent on the lake Brook, 2011).

2.3.5. Human-Wildlife Conflicts of Large mammals

Naturally, organisms live together in an ecosystem for a long period of time. Then, through time, it shows high degree of intrinsic stability and resilience to climate and other environmental factors in the given ecosystem (Treves *et al*, 2003). However, when humans entered these systems, the natural phenomena become disturbed. One of the effects of human activities was introduction of exotic species. Most of the introduced species cannot develop an adaptive coexistence with the native species. In addition, in many cases, the introduced species are not capable of resisting predators, disease and other factors that occur in the environment Messmer, 2000).

Habitats were forced to decrease their number and invade the marginal habitats but those species that were able to adapt a changing ecology and survive in agricultural system become involved in a direct competition with humans (Deresse, 2003).

2.2. Impacts of human activities on wildlife

The problem is particularly acute in to human impacts more mammals species have been lost in the past 200 years than in other continents combined the impacts of human induced climate change are altering the habitats of corals. Leading to large scale coral bleaching over time destruction of such habitats leads to reduced biodiversity wreaking earth ecosystems and ultimately posing a major threat to human life (Asmamaw D.vorma A 2013).

The local communities and the impact of crop raiding on food economic security the outcome of conflict between people and wildlife may extend beyond population to affect entire ecosystems. Many conflict species example elephant large carnivores are also key stone species whose removal affects the structure of entire ecosystems. Extirpation of grey wolves and grizzly bears from parts of the northern rocky Mountain has been shown to influence through its impact on ungulate density and behavior habitat sustainability for geotropically migrant birds (Berger, *et al.,* 2001).And restoration of grey wolves has affected many facets of this mountain ecosystem (Smith, *et al.,* 2003) wildlife perceived as problem animals are killed both legally and illegally by private individuals in formally organized communities

Bounty hunters and local national government in developed country the most common method are shooting trapping and poisoning but traditional methods are also used (Mamo y, 1968). Animals even beautiful charismatic and highly endangered wild animals can and to kill people destroy this crops and kill their livestock (Refera. B.A.2004)

2.3. Causes of human wildlife conflict

The cause of conflict will the increasing number of human population in the park changed their life style to destruct habitats through encroachment for agricultural and human settlement and the modification of natural habitat in to crop cultivation like fruit products and vegetables and also lack of food for large mammal like Mountain Nyala, Menelik's Bushbuck, Ethiopian wolves and others are major causes of conflict. Consequently the competition for food water and habitat causes conflict between large mammalian and people which result from the increasing survival which is similar to (Dickmon 2008). Study on the determination of conflict between and wildlife in Ruaha national Park and (Lamarque 2009).

On human wildlife conflict in the causes and consequences of major outcomes are crop damage livestock depredation damage to human property destruction of habitat fuel wood collection urbanization road construction grazing farm land are the causes of human wildlife. (L.E, Atickem and loe, 2013)

2.4. Factors affecting large mammals in Bale Mountains National Park

2.4.1 Livestock and settlement

The most striking case was Gojera, where intensive cultivation and other usage by humans and livestock, and minimal presence of wildlife, render the area largely worthless as a wildlife corridor. Increasing settlement and livestock are major concerns for three reasons. First, the erosive effects of livestock are already clearly visible in many areas. The detrimental effects of this on the natural flora and fauna of BMNP have been discussed elsewhere (Hillman, 1988; Woldegebriel, 1996). Second, numbers of livestock have a negative impact on tourists, particularly in the Upper Web Valley. This area is one of the greatest attractions for tourists to BMNP yet their experience is greatly impaired by the presence of thousands of livestock. Similarly, the Gaysay grasslands situated on the main Dinsho-Adaba road are a show case for BMNP. The presence of domestic stock in the area has a very visual impact. Third, increased settlement and numbers of livestock are linked to a variety of threats to the wildlife of BMNP, notably to the mountain Nyala and Ethiopian wolf. From a wildlife viewpoint, pastoralism is a form of interference competition (Happold, 1995). Nyala and other antelope compete directly with livestock for food and no Nyala are seen in areas where livestock pressure is high (Brown, 1969). Domestic dogs, kept to protect livestock from hyenas, are also a direct threat to Nyala and other antelope. Most households keep one or two dogs that are inadequately provisioned and only loosely controlled. Many are free- ranging and are known to kill Nyala calves and juveniles each year; they have also been observed chasing adult Nyala.

The results of human induced disturbance of Ethiopian wolf population are more complex. There is evidence to suggest that cattle compete with rodents (Delaney, 1972) and would thus reduce they prey- base of wolves. Conversely, it has been suggested both that wolves use cattle as a “mobile hide” whilst foraging and thereby increase their hunting success, and that in keeping pasture short, cattle actually encourage rodent communities in the area, promoting wolf prey biomass (Sillero-Zubiri and Gottelli, 1995). The clearest threats to Ethiopian wolves are those posed by domestic dogs. Dogs compete with wolves for prey (Sillero-Zubiri, 1994), spread disease (Sillero-Zubiri *et al*., 1996b) and hybridize with wolves (Gottelli *et al*., 1994). It evident that disease is one of the major agents of decline of wolves. Dogs acts as reservoirs for a number of canid-related diseases including rabies, canine distemper and parvovirus.

Higher numbers of free ranging dogs living sympatrically with the wolves will increase the probability of extra pack copulations between wolves and dogs. An average of 10 dogs free ranging in the Upper Web Valley area each day was estimated (by FPS). As with other FPS estimates, this may well be an underestimate.

2.4.2. Agricultural Expansion

Agriculture and other development activities had led to an overall decline of mammals. Agricultural practices also influence terrestrial and aquatic mammal diversity within and around agricultural fields (Naughton-Treves, 1997). Fertilizers, pest control chemicals, tillage and even crop rotation had an impact on the biodiversity of agricultural ecosystems. Due to increasing human and livestock population was a common experience in protected areas of most Ethiopia.

Such a conversion of natural vegetation covers to other use types such as farmlands, grazing lands, human settlements and urban center has shown for the cause of loss of mammals, deforestation and land degradation (Bishaw, 2001).

2.5 Mitigate solution of impact of large mammals

2.5.1 Awareness creation

Awareness creation should be the first action for large mammalian conservation. The local communities should be aware of the environmental, social and economic importance of wildlife (Anteneh *et al*., 2014). For example, the establishment of the BMNP is important for soil erosion control, getting reliable rainfall and others (Demeke and Verma, 2013). In addition, it is also important for the local community as economic, social and cultural source for humans. In this way, awareness creations help to reduce cutting trees. This also results in the increase in numbers of wild animals especially Mountain Nyala, which in turn increases economic returns through the development of tourism in the area (Demeke and Verma, 2013). Therefore, awareness creation should be applied before the establishment of any protected area.

2.5.2 Promote community involvement

The community at BMNP is participating in fire protection, wildlife, forest protection, vaccination of domestic dogs, repairing fences and providing information about illegal activities found in the park.

However, they are not involved with the park planning and management decisions (Demeke and Verma, 2013). It is obvious that the local communities are directly affected by the establishment of the park more than any other group (Anteneh *et al*., 2014). Therefore, it is believed that resource managements are effective when local people are involved in all phases of the management process from planning to implementation stage (Aramde *et al*., 2012).

3. MATERIALS AND METHODS

3.1. Description of the Study area

The park was established in 1970 containing an area of 240,000 hectares in the Bale massif. It was established by the Ethiopian Wildlife Conservation Organization (EWCO) with the primary objective of conserving the wildlife (endemic species like the Mountain Nyala (*Tragelaphus buxtoni*) and the Ethiopian wolf (*Canis simensis*) and other valuable natural resources in the area (Anteneh and Temesgen, 2009). It protects a broad range of habitats from 1,500 m asl in moist montane forest and ericaceous shrub land to 4370 m asl in Afroalpine habitat on the Sanetti plateau (Alers *et al*., 2007). It is one of the 34 conservation international biodiversity hotspots and qualified for world heritage site and biosphere reserve listing (Anteneh and Temesgen, 2009). The BMNP supports high levels of species richness and endemism (OFWE *et al*., 2014). To date, 78 mammal species have been recorded in BMNP, of which 22 of these mammals are endemic to Ethiopia (Alers *et al*., 2007).From the total endemic mammals recorded in the Ethiopian highlands, 67% are endemic to the Bale Mountains. The mountains are one of the centers of faunal diversity and endemicity, which generate numerous natural processes vital to human existence and support an important reservoir of genetic resource (EWNHS, 1996). BMNP is the home of diversity and endemism of fauna (EWNHS, 1996). The park is home to the largest populations of both the endemic and endangered Ethiopian wolf *(Canis simensis*) and Mountain Nyala (*Tragelaphus buxtoni),* as well as the endemic Bale monkey (*Chlorocebus djamdjamensis*) and the giant molerat (*Tachyoryctes macrocephalus*). Over 170 bird species have been recorded in BMNP to date, about 20% of the species recorded for Ethiopia. Among the endemic birds of Ethiopia, 57% are found in Bale Mountains (IBC, 2007). BMNP possesses one of the highest incidences of animal and plant endemicity among terrestrial habitats in Africa. In BMNP, there are at least 1321 species of flowering plants, of which 163 are endemic (23 to Bale alone) to Ethiopia.

The study was conducted in Bale Mountain National Park in the Oromia administrative regional state. BMNP lies within five Woreda of Bale zone; Dinsho in the North, Adaba to west, Goba to the North-East, Harena bulluq to the south and Barbare to the East (GMP, 2007: Mamo, 2007). For this study dinsho woreda is selected purposively. The Woreda has the total population of 39,124(CSA, 2007).

BMNP is primarily established in 1970 GC with the aim of conserving the Endemic wildlife species such as Mountain Nyala and Ethiopian wolf, as well as other valuable resources in this area. It is governed by Ethiopian wild life authority and nominated to the world heritage tentative list. It is the habitat of a variety and large number of wildlife. Some of the endemic scenery and beauty of the mountains is one of the principal attractions of this park (EWCA, 2012)

3.1.1. Geographical location

Bale Mountain National Park is one of the national parks of Ethiopia located in south eastern part of Oromia region. It is 404 km away from Addis Ababa through Shashemene and 397 km through Asela, to the South Eastern part of the Ethiopia. This park is divided into three section on the basis of landforms and attitudes as Northern Gaysay (Dinsho site), central peaks and senates plateau area and southern Harenna forest area for the case of description. It is encompassed by the coordinate of 6°29'N - 7°10'N latitude and 39°28'E - 39°57'E longitude. The specifically location of the study area is lies on Dinsho Woreda which located in the northern section of the park and astronomically, dinsho Woreda is located between 7◦20'-3920'N and 4030'E -40 at 400 km from Finfinne/Addis Ababa(Bale zone culture and Tourism office, 2011).

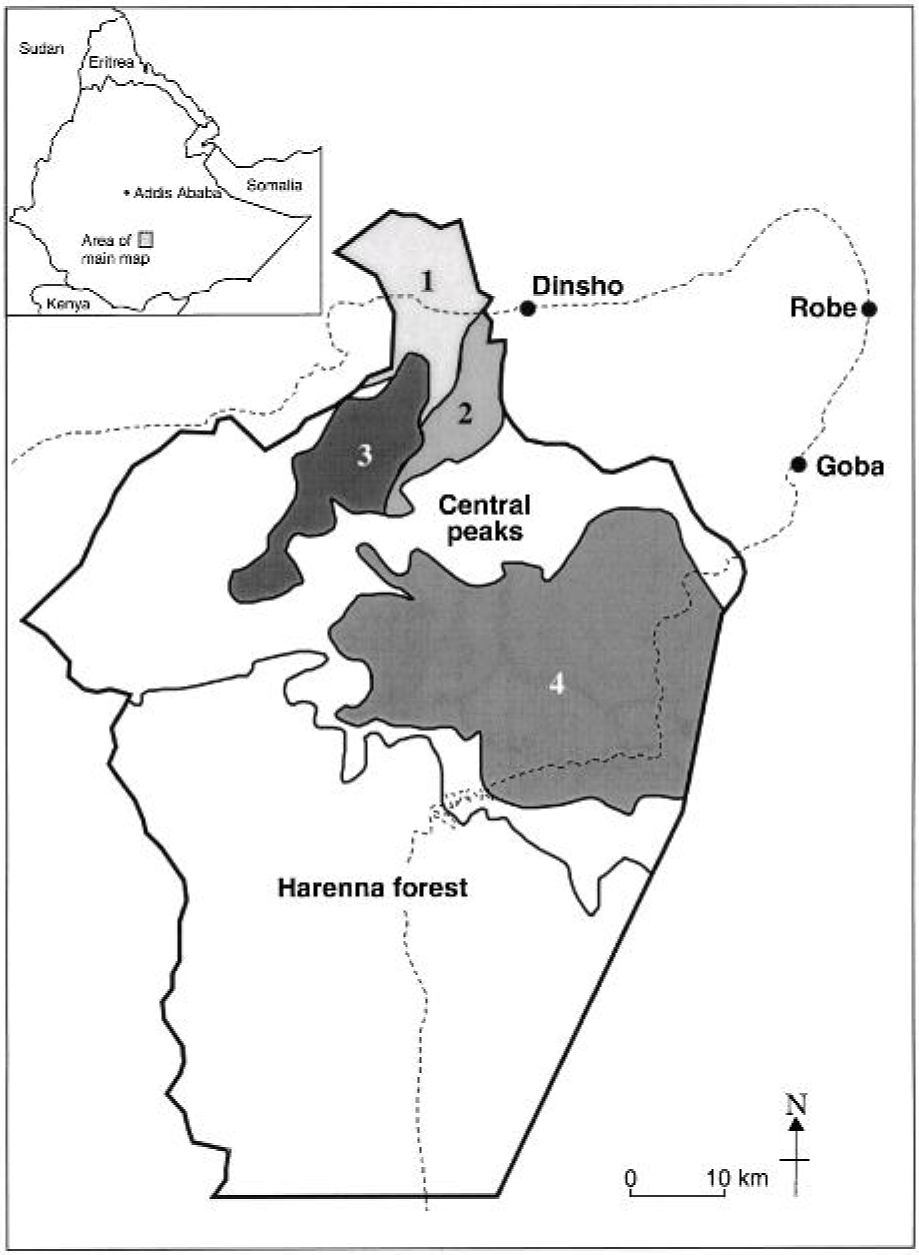

Figure 1.Map of study sites in the Bale Mountains National Park. (1) Gysay, (2) Gojera, (3) Upper valley, (4) Sanetti Plateau. Main towns (filled circle) and road (dashed line) are also shown.

3.1.2. Climate

According to Abdella (2012), in Bale Mountain National park has great variation in altitude and the presence of vary bulk of Mountain massifs which attract orographic rainfall or relief rainfall.

The rainfall of Bale Mountain National park is characterized by one eight month rainy season where the rainfall is well distributed throughout the season. This rainfall season covers months from March to October that followed four dry season months of November to February. The highest temperature recorded is 18.4cin February and the lowest is 1.4c in January. Dinsho and its surrounding experience ‘’dega ‘’ (cool and semi land) type of climate the average temperature not more than 12c. The annual rain fall around 1150 mm between March and October. The altitude of the area range from 2500 to 3300 above sea level. The area was one of the richest in tourism attraction sites.

3.1.3. Topography

Bale Mountain National park is stretched from the North and South with 50km from East to west and divided into three sub-sections on the base of land farm and altitude for easily description.

The three subsections are: Central peak and Senate plateau area, a Southern Harenna and Northern, Gaysay/Dinsho which the study area (*Adisu, 2011*)

3.1.4. Soil type

The soil types in catchment are mainly composed of well drained loam or sandy loam with high permeability (*bigger, 2001)*.

3.1.5. Economic and Socio –Cultural activity

The economics of Dinsho community are highly depends up on agriculture. they product wheat ,barley and beans .in addition to this they are mostly participating on raring livestock’s due to this , they are known by giving milk with porridge ,one of the common cultural food in bale zone.

3.1.6. Flora

Bale mountain national park is home to 1321 species of flowering plants, 163 of which are endemic to Ethiopia (12%) and 23to Bale Zone (14%) of Ethiopians endemic plants. The Forest of Bale Mountains is important for genetic stokes of wild forest coffee (coffee Arabica) and for medicinal plants in Ethiopia. Three medicinal plants have been identified: two are in the Gaysay area and in angensu area spanning the two park bounders. Female flours of *Hagenia* contain *anthelmintic*, which is used to treat tapeworms among the local population.(john sort). A 2006 study estimated the value of the medicinal plants to be approximately 2 billion ETB annually 8%

of Ethiopian federal budget at the time.

3.1.7. Fauna

The Bale Mountains are a land of endemism and a critically important area for several threatened Ethiopian endemics. BMNP is home to 20 Ethiopian endemic mammals as well as five mammals that are only found in Bale Mountains. Mammals of paramount importance in BMNP includes: the Ethiopian Wolf (*Canis simensis*), Mountain Nyala (*Tragelaphus Buxtoni*), giant mole rat (*Tachyoryctes macrocephalus*), bale monkey (*Chlorocebus dgamdgamensis*), menilik bushbuck (*Tragelaphus scriptus meneliki*) bohor reedbuck (Redunca redunca) warthogs (Pacochoerus africanus) spotted hyena (Crocuta crocuta) and others. BMNP is also a significant center of bird and amphibians as well as reptiles. There are around 16 endemic birds in BMNP and important refuge of at least 17 species of amphibians including 48 % endemic to Ethiopia with 5 endemics general to BMNP (Water mine 1975).

Species of amphibians including 48 % endemic to Ethiopia with 5 endemics general to BMNP (Water mine 1975)

3.1.8. Population/human settlement

Based on the 2007 G.C national census conducted by the Central Statistical Agency of Ethiopia (CSA, 2007), Dinsho Woreda has a total population of 39,124**.**

3.2. Research design

The study was carried out by using both qualitative and quantitative form of designs. The quantitative design was used to identify the number of factors affecting large mammals in the study area. The qualitative method was used to gather information using observation the types and status of factors that affect large mammals in BMNP.

3.3. Sampling Design and data Collection

3.3.1. Sample Size Determination

The accurate information about the given population could be obtained only from a census study. However, due to financial, in many cases a complete coverage of a population is not possible.

Thus, taking optimum, manageable and representative sample size is recommended to infer about the population. Sampling is one of the methods, which allows the researcher to study a relatively all number of units representing the whole population (Kaba, 2009). Hence, this study will be applied based on a simplified formula provided by (Yamane, 1967 as cited in Udayakumara *et al.,* 2010) to determine the required sample size.

$\mathrm{n} = \frac{N}{1+N(e)2}$; Where 'N' is total population for the study Kebeles, 'n' is sample size and 'e' is margin of error.

3.3.2. Sampling techniques

The purposive sampling technique was employed to select Districts, by which there is high interaction between human and large mammals and by using simple random sampling households for the study. From the five districts leis within the Park (Dinsho, Adaba, Goba, Harenna bulluq, and Barbare District), Dinsho district was selected purposively for the study because of its proximity to researcher and its potential for the study. Again, from 6 Kebeles (Hora sobba, Gojera, Garamba, Dima, Dinsho 01 and Dinsho 02) of Dinsho Woreda, two Kebeles (Gojera and Dinsho 01) will selected purposively for its potential in factors affecting large mammals in Bale Mountains National Park and impossible to cover all Kebeles due to lack of financial and time to cover all Kebeles. After having the total households population from the selected two Kebeles (365 HHs from Gojera, and 245 HHs from Dinsho 01), random sampling method will employed in order to have a total of 86 sample House hold respondents for the study purpose. Samples was allocate across the two Kebele based on probability proportional to size (PPS) sampling technique. Thus, for the study both purposive and probability sampling will be employed.

3.4. Data collection sources

In order to get reliable, appropriate, and valid data the information was collected from both primary and secondary data sources. The primary includes: Questioners, key informant's interview, direct field observation, participant observation, and focal group discussion. Secondary data was gathered from printed material, published and unpublished documents, and books.

3.5. Data collection method

The relevant data was collected through primary and secondary data collection method.

3.5.1. Primary data collection method

The Primary data was collected through questionnaires interview, field observation, participant observation and focus group discussion surveys.

3.5.2. Secondary data collection method

The Secondary data was collected from printed material, developmental agent, published, unpublished and books source was used for data gathering.

3.6. Data collection instrument

3.6.1. Questionnaire

The questionnaire was prepared by researcher to gather relevant data from concerned stakeholders. Semi-structured interviews were also used to identify the factors affecting large mammals to keep large mammals in sustainable way in BMNP. The questionnaires will be prepared and distributed for different stakeholders to collect enough data to carry out the study.

3.6.2. Direct field observation

Direct observation was carried out to identify and assess factor affecting large mammal that found in the study area. This instrument helps to know the current status and condition of those large mammals and to understand conservation activity of the large mammal's in the area. It supplements data obtain from questioner, focus group discussion and key formant interview.

3.6.4. Focus Group Discussion

This is also another data collection device, which is very important to gather detail information about the factors that affecting large mammals from community, tour guide, some staff from tourism office. It also helps to gather data related to the attitude, activity, and willingness of local community and plan to reduce factors affecting large mammals on the study area. A focus group discussion was conducted with ten respondents (Five men and five female) who lives more than fifteen years near the BMNP.

3.7. Data Analysis

Descriptive statistics was used to analyze responses to the household survey to come up with results and discussions.

4. RESULTS AND DISCCUSSION

4.1. Demography data

Table 1: the demographic data of the hhs

No		Category	Number	Percent%
1	Sex	Female	36	40
		Male	40	60
2	Age	18-28	20	47.5
		29-15	35	24
		>45	21	28.5
3	Education level	Certificate	7	11.6
		Diploma	8	13.3
		Bachelor Degree	25	41.6
		Master	5	8.3
		Illiterate	15	25
		Total	60	100
4	Marital status	Single	30	50
		Married	24	40
		Divorced	4	6.6
		Widowed	2	3.3
		Total	60	100

Source: field survey 2019

As indicated in the above table most of the population respondents were male that means 40 (60%) and the remaining 36 (40%) were females. Majority of the respondents 20 (47.5) were at age of 18-28 years. Majority of the respondents were illiterates i.e. 40 (69%) and the education states of the respondents were 40 (69%) of the total were illiterate and 36 (3%)were literate and 48% of the respondents had family size of 5.32% were fairs of 6 to 10 family size and 20% had greater than ten family size.

Human induced factors affecting the large mammals in BMNP

4.1.1 Human settlement and livestock grazing

The threat posed by human pressures on large mammal's species is highly documented in Bale Mountain National Park. It is evident that the local community use the park area as permanent and temporary settlement are using the area for grazing agricultural purposes and etc. Permanently used house occurs in three village of the park from where the data were collected

These three areas include: -

- Gaysay central park of area
- Adelay village and its surrounding
- Gosera village and its surrounding

Two forms of settlements type involved settled pastorals on the boundary area of park and settled cultivators with associated pastorals in all the other area. This settlement is supported by cultivation and livestock production as well as increasingly by the sale of Acacia wood land to produce mainly charcoal settlement by human in to table below.

Table 2 human settlement in to the park from the three villages

Area site	A	B	C
Gaysay	20	150	680
Adelay	40	170	500
Gosera	60	200	800
Total	120	520	1980

4.1.2. Pastoralism

Number of livestock's was recorded based on respondents and counted during field observation.

Table -3 Numbers of livestock in different peasant assertion.

Different individuals in each protected area	Number of livestock in Gaysay				No of livestock in Adelay				No of livestock in Gosera			
	Caw	Goat	Donkey	ox	Cat	Goat	Donkey	ox	cat	goat	Donkey	Ox
A	300	30	4	30	200	20	2	30	400	15	2	30
B	400	35	2	40	500	30	1	15	250	40	3	20
C	300	50	5	20	300	40	3	20	300	30	2	15
Total livestock in each park	1000	115	11	90	1000	90	6	65	950	85	7	65

The table shows that about 3379 livestock was grazing the habitat of large mammalian populations in BMNP. This high number of livestock has great impacts on large mammals in BMNP. The number of livestock showed by graph below.

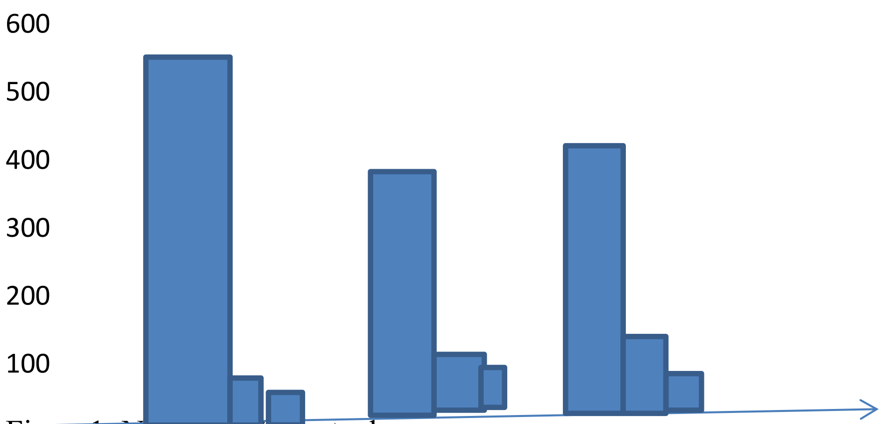

Figure1: Number of livestock

5. DISCCUSSION

5.1. Threats to large mammals

Presently BMNP is home to most of the remaining large mammal population. For example: - Mountain Nyala (Tragelaphus buxtoni), Menelik's Bushbuck (*Tragelaphus scriptus meneliki*), Warthog (Pacochoerus africanus) and others. Mountain Nyala classified by the IUCN as endangered as endemic to the Ethiopian highlands

This species has high economic potential for local communities through tourism and trophy hunting but the numbers of factor affected them. Those include expansion of human settlement that cause habitat degradation and fragmentation, direct disturbance by human, and livestock grazing and hunting. Mountain Nyala are extensively hunted for meat and horns. The latter used for local medicine and to makes nipples for traditional milk bottles.

5.1.1. Competition with livestock

A massive number of livestock present in the park that complete with large mammals like Mountain Nyala and others on this habitat. The cattle population is alone is currently above the carrying capacity now. Number of cattle, donkeys, goats and others are grazed the habitats. These domestic animals are complete with Mountain Nyala especially those who are herbivores. As showed in table (2) a total number of 33740 livestock were compete with Mountain Nyala in the study area. When livestock and Mountain Nyala graze together there is also transmission of disease vice aversely. So permanently occurring of suitable habitat in the park lead to the larger quantity of livestock enters to the park.

5.2. People perception towards large mammals

Majority of local communities in and around the Bale Mountain National parks are Oromo peoples. The people livelihood mainly depend on farming and livestock reusing local population growth by about 2.7%ayear and local livelihood support services are few and even those that exist are poorly resources. Majority of the communities in and around Bale Mountain National Park see no direct and institutionalized benefits from a park. It is even often common to lute that they incur lost from the damage of crops wild animals and restriction on the use of resources. A low number of community members that live in the villages employed as scouts and daily labors or temporary workers.

Consequently within the majority of the local communities there is little awareness of the importance of park and large mammals specially Mountain Nyala to local national or internal needs thus they often prioritize this level hood lids over the wildlife and continues request and reds over the wildlife and continuous to request and often the right to majority of local communities there is only understanding about the park is that imply the government and NGO they see around want to protect the park and therefore tell them it is just good to protect it.

5.3. Human settlement and impacts

5.3.1. Settlement

Where the area first proposed as national park the status of land was complicated. Residents were few and effective control was an exercised before establishing the park (Stephenson 1978 cited in Mohamed alii 2003).The local communities from the three villages are both pastoralists and cultivators. They expand their own boundary and agricultural land. Now days the community turn their face to park and utilize the resource un wisely. The impacts of human settlement are increase number of population urbanization degradation deforestation to reduce the forest places to agricultural purposes etc.

5.3.2. Livestock (Pastoralism)

Livestock predominantly cattle from the basis both substances and capital wealth in the area all most parts of the park. It is major types of forming system practiced in the area. Just like others shoaling region people used to substitutes almost entirely up their hands but with the increasing of the population the possibility of making their livelihood this way has decreased considerable (Mohamed Abdias 2008). This is the most common issues cited as causing impact between human and wildlife in recent study. The number and type of domestic animals killed by wildlife varies according to the species time of the year or season and availability of natural prey particularly this problem is wide spread in the area because of the area dominated by different natural and manmade resources.

5.3.3. Tree cutting

During the study tree catted was observed. New and old cut were observed during the study and estimated. The study showed that a major purpose of tree cutting in and around the park were fore the fire wood charcoal marketing timber and constriction to meet the ever increasing demand in urban areas.

5.4. Solution through community partnership

While there are many factors that have made Large mammals rare like Mountain Nyala, there are also a lot of ways to help it rebound farming a partnership with local people is key in conserving this eye-catching antelope. Ethiopia made several conservation organizations in order to consensus and protect the wildlife flora and fauna species.

6. CONCLUSION AND RECOMMENDATION

6.1. Conclusion

The local communities settled in to the cutting tree. Especially from the three surrounding local communities above 3500 of livestock where complete with large mammals. As a result of this the number of large mammals was decreased annually.
Habitat destruction due to human activities is a potential threat to the survival of wildlife species in BMNP. Wildlife is under threat due to illegal human settlement, expansion agricultural lands, and livestock grazing in and around the protected area. Research findings show that there are major land uses changes which are associated with expansion of cropland cultivation and human settlements into areas that previously serves as wildlife habitats. These changes have negative impacts on the natural habitats of wildlife.

Therefore, calls for involvement of not only conservationists, but also other stakeholders with different interests in the area and professional background, such as agriculturists, conservationists, demographers, policy makers, and land use planners to minimize the challenges. With this current trend of agriculture expansions and illegal human settlement which has already been put under cultivation of the park, the park will no longer act as a conservation area for wildlife as other protected area of the country. Therefore, provision of appropriate conservation education is important for the local communities/children at different levels of schools (primary, secondary, and high schools). Also, continuous monitoring and evaluation process of effects of settlement in the park are needed for future conservation measures. In generally if conservation of large mammals should not take we do not hesitate that the species lost in the short period of time

6.2. Recommendation

Based on the finding of the present study the following points are recommended:-

- Improve the extension services and training in awareness creation and knowledge development of the local community on the importance of mammal conservation, and the participation of local people in design, planning, implementation and evaluation should be encouraged.
- Wildlife management authorities should encourage ensuring that protected areas with mammals receive adequate patrolling
- The federal and regional government should pay attention to the park in the enhancement of local prosperity, to generates supplementary income and expands job opportunities as well as acting as a tool for the conservation of the natural environment.
- The local administration urgently should reallocate farmers that had legal arable land inside the park.
- Wildlife management authorities should encourage ensuring that protected areas with mammals receive adequate patrolling.
- To ensure laws, coordination is required with the police, and perhaps with the military authorities as well as with the local government.
- To calm down the major threats of mammal species (habitat disturbance and) involving a wide range of activities that is impossible for the management authority to carry out all conservation related functions by itself, there should be delegation of some duties and broad participation and cooperation from a spectrum of institutions.

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APPENDIX

College of Agriculture and Natural Resource

Department of Wildlife and Ecotourism Management

Dear participants, I would like to thank you in advance for your participation in this study. The objective of the questionnaire is to assess the anthropogenic impact on large mammalian population and its possible solutions in Bale Mountains National Parks. 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 and patience for responding each and every question by considering importance of your valuable response to study.

Section1: Basic personal information

1. Gender:_____ A, male; B, female

3. What is your educational qualification: _____ A, non-educated; B, primary education; C, secondary education; D, Bachelor degree; E, others (specify)___________________

4. Marital status:_____ A, Single; B, married; C, widowed; D, Divorced;

5. Religion: ______ A, Muslim; B, Orthodox; C, Protestant; D, Wakeffata

Section II: Close ended & open-ended Questionnaires Surveys for respondents

1. What is the impact of humans on large mammals? ____ A, agricultural expansion; B, urbanization; C, fuel wood collection; D human settlement expansion
2. Is there any consequence on large mammal? _____ A yes B no
3. If question no.2is say yes specify..
4. Is there any measurement taken to recover large mammal disturbance? _____
A, yes B. no

5. If say yes for Q 4, specify:

....

....

6. What are your economic activities_____ A. Employee B. Farmer C. Merchant

7. Are you participating on decrease of large mammal process? ______ A. Yes B. No

8. If your 7 question answer is Yes, what is your major reason motivated to participate deduction of large mammal? _____ A. Financial problem B. Misunderstanding C, advantage of forest

9. What is the use of large mammals to the local community? ____ A. Economic B. For environmental beauty C. for tourism value

10. What is the extent of impact of large mammals? ______ A. high B. Medium C. Low

11. What is consequence (effects) of large mammal? _____ A. Loss of large mammal species B. Decrease in economic value C. unbalanced ecological system

12. What is the awareness of people towards the keeping the wildlife today? ____.

A. increasing B. decreasing

13. Is there governmental and non-governmental role to prohibit reduction of large mammals?_____

A yes B, no

14. If your question 14 answer is yes what is the measurement taken to decrease reduction of large mammals? A, educating the people B, increasing forestation C, controlling illegal poaching

15. Do know disadvantage of the decrease of large mammalian population? _____

A. yes B. no