

*Full Length Research Paper*

## Threats and conservation challenges of wildlife in Hareenna Forest, Hareenna Buluk District, South East Ethiopia

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This study was conducted in Hareenna Forest, Hareenna Buluk District, South East Ethiopia to assess threats and conservation challenges of wildlife in Hareenna Forests. Data collection was carried out from March to June, 2016 using questionnaire surveys, interviews and focus group discussion. The wildlife threats and conservation challenges of Hareenna Forests were varied among different village's forests. The data revealed that deforestation; habitat loss, degradation and fragmentation; agriculture expansion; settlement; overutilization of forest resources; human-wildlife conflict; fire; district's administration problems and wildlife hunting were the major wildlife threats in the area. Conservation of wildlife resources in Hareenna Forest are challenged mainly due to urbanization, agricultural expansion, habitat fragmentation, and resource extraction. Most of respondents (86.5%) acknowledged that the status of wildlife in the Hareenna Forest is decreasing particularly due to the above mentioned anthropogenic causes. Therefore, awareness creation programmes should be organized in the community and it will help to reduce wildlife threats and to develop wildlife management.

**Key words:** Conservation challenge, Hareenna Forest, threat, wildlife.

### INTRODUCTION

Forests are one of the major biome types on Earth, and of fundamental importance to wildlife. However, the extent of natural forest cover in Ethiopia in the early 1990s was estimated to range from 2.5 to 3.0 million hectares. As a major effort to curb the prevailing

destruction of Ethiopia's forests and associated ecosystems and reverse the consequent social and economic disruptions, countrywide tree planting activities and demarcation of forest reserve areas have been undertaken. With respect to the latest, the demarcation

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and inventorying of 58 natural forest priority areas totaling 4.78 million hectares can be mentioned (Environmental Protection Authority, 2003).

Despite the presence of diversified wildlife and their invaluable benefits, wildlife resources of Ethiopia are under ongoing pressure due to: direct causes including habitat conversion, unsustainable utilization, and invasive species, replacement of local varieties and breeds, climate change, and pollution. Added to these direct causes, demographic changes, poverty, and lack of awareness and coordination, can become indirect causes (Daszak et al., 2000; Ho et al., 2007; IBC, 2014). Wildlife conservation in Ethiopia embodies both utilization of wildlife resources and conservation to make allowance for its continuity in as near natural a state as possible. The need for wildlife conservation evidently became apparent between 1900 and 1945. But the modern system of wildlife conservation in Ethiopia began after 1960s, when international conservation interest was initiated (IBC, 2014).

Wildlife conservation poses a particular challenge to the global community because wildlife has an impact not only on people living in areas where wildlife is found, but also on people located considerable distances away (Bulte et al., 2003). Emerging challenges of wildlife conservation require a multipronged approach in order to have a lasting impact. Conservation of wildlife species, their habitats, and other natural ecosystems such as water catchment areas and wetlands are increasingly coming under intense pressure and threat of extirpation. The pressure is a result of an increase in human population, changing land uses, and the ever-increasing need for goods and services from the ecosystems. These ecosystems therefore need proactive management. One challenge facing conservation is changing the way people perceive wildlife. For as long as they can remember, communities living with wildlife have known a great deal about the animals nearby (Mbugua, 2012).

According to Ministry of Environment and Forest, the forest coverage of Ethiopia has reached 15% (ENA, 2015). However, as in other parts of the developing world, these areas face many challenges of conservation practices of wildlife and forest resources (Hulme and Murphree, 2001; Tessema et al., 2010). An effective management practice of protected areas is one of the best methods to harmonize nature conservation in a given ecosystem. However, the implementation of conservation management plans on protected areas also have many conservation challenges in Ethiopia including Harenna Forest (Amare, 2015a).

However, Harenna Forest ecosystem is vulnerable to many factors such as deforestation of bamboo trees and illegal settlement in and around the forest which affect wildlife resources and their habitats. On the other hand, the irreplaceable wildlife resources in Harenna Forest and BMNP are facing stiff conservation challenges to

alleviate these threats both from human and natural induced factors. These points have led to the formulation of the objective of this study. In order to mitigate such threats, the present investigation has contributed ample data on wildlife in regards to major threats, and conservation challenges required to minimize threats to wildlife.

Despite its ecological values and endemic wildlife resources which have captured the attentions of domestic and international researchers to Harenna Forest, wildlife threats and conservation challenges in the Harenna Forest has not been well studied or monitored. The challenges of wildlife conservation have not been studied and there is no individual or investor who provides a sound plan for identifying wildlife conservation obstacles and forwarding solutions in this area, but wildlife are still struggling to survive in Harenna Forest. Therefore, research on wildlife threats and conservation challenges is crucial in its contribution to address some of the gap areas on wildlife conservation research in Ethiopia in general or in Harenna Forest in particular.

The findings of this study will provide details and comprehensive information about the prevailing challenges of wildlife conservation in Harenna Forest ecosystems so that various stakeholders such as the government bodies at all levels, and other local and international NGOs who are interested to work on wildlife conservation, local communities, national and international research institutions, Higher Education Institutions, International Conservancy Organizations and any other concerned bodies play their role to mitigate the problems. In addition, the findings and recommendations part of the study have significances for policy and decision makers so that they can take measures which will in turn help to ensure sustainable utilization of wildlife resources in the forest. Last but not least, this study will help researchers who are interested in undertaking related or further research in the study area.

## RESEARCH METHODOLOGY

### Description of the study area

Harenna Forest is a moist Afromontane Forest, located in South Eastern part of Oromia regional state. It is a state forest found in Bale Mountain National Park and it situated on the southern slopes of the Bale Mountain, and is about 480 km from Addis Ababa, Ethiopia (Figure 1). Harenna Forest is located between latitude 6° 20' and 6° 50' N and longitudes 39° and 40° E. Along with the adjacent state- and community-managed forest outside the park, it constitutes an area of over 4,000 km<sup>2</sup>. It is also the largest cloud forest in the country. It lies between altitudes of 3300 m to 1150 m asl. (Zerihun et al., 1988 cited in Tesfa, 2006).

### Vegetation and animals

Mountain bamboo grows within the forest, particularly on steep

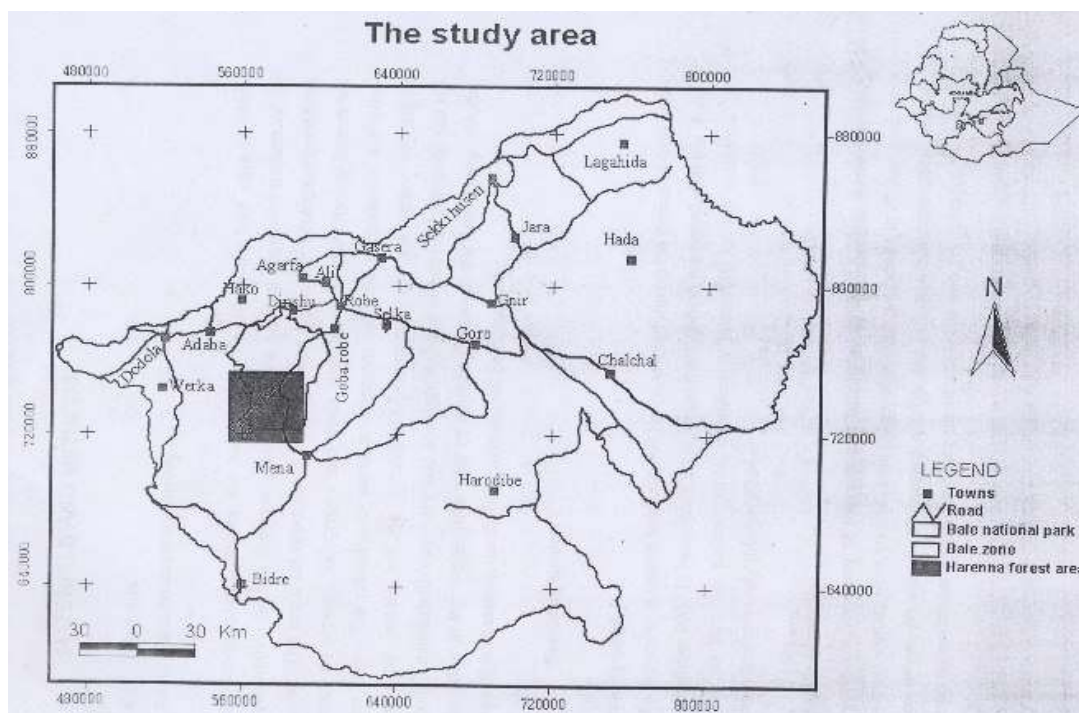


Figure 1. Map of Hareenna Forest (Source: Tesfa, 2006).

slopes. The upper area of the Hareenna Forest is wet cloud forest with an extensive bamboo belt, while the lower parts are drier mountain forest. At about 2,200 m as the slopes become gentler, larger trees of up to 30m tall appear, and the canopy closes (GMP, 2007). In the lower areas of the forest, wild forest coffee (*Arabica* sp.) grows. Because the forest is so dense and clearings are few and far between, the elusive animals of the forest have little trouble staying hidden. Black-and-white colobus monkey, olive baboon, warthog and Menelik's bushbuck are common. With a little luck and perseverance, you might see a giant forest hog, a bush pig or an endemic Bale monkey (Williams, 2002). Clearings are the best places to look for lion, leopard and African wild dog. Genet, civet, porcupine, and hyena are all active at night. Birds of the Hareenna Forest are equally elusive. Look for the *Abyssinian hill babbler*, *Abyssinian crimson-wing*, *Ayre's hawk eagle*, *silvery-cheeked hornbill*, black-winged lovebird, *Abyssinian oriole*, *yellow-fronted parrot*, *white-cheeked turaco* and *Narina trogon*. A wide range of migrant birds can also be spotted, including *Palaearctic warblers* (EWCA, 2013).

#### Methods of data collection

Both primary and secondary sources of data were used. Primary sources of data were gathered via household survey, focus group discussion (FGD), in depth interview and observation to find out information related to factors that influence wildlife resources and conservation practices within the forest. Secondary sources of data includes, journal articles, websites, action plans, minutes, folders, brochures/leaflets and GMP of the parks, reports, bulletin and proceedings, Oromiya Forest Enterprises, Farm Africa, Agriculture and Rural Development Offices, Land and Natural Resource Conservation Offices, Culture and Tourism Offices, Frankfurt

Zoological Society, Ethiopian Wolf Conservation Program and Ethiopian Wildlife Conservation Authority were reviewed to get ideas about the practice and challenges of wildlife conservation.

A household questionnaire survey was conducted. The questionnaire was first prepared in English and translated into Afaan Oromo language. The questionnaire containing both closed and open ended items, while close ended items were used to help a researcher examine respondents' response about the conservation and challenges opportunities for wildlife conservation, open ended questions were particularly essential for identifying the reasons why respondents hold some kind of view on related issues. The survey questions include a category with closed style items requiring the respondents to rank their rate of agreement with a particular item such as 'yes' or 'no'; 'increasing', 'decreasing' and unchanged; and a 3-point Likert scale (where 1=disagree; 2=neutral; and 3=agree) depending on a particular question.

For household surveys, a total of 10 villages were selected purposively, because the forest resources are highly available and adjacent at these villages. According to Hareenna Buluk district Agriculture and Rural Development Office (2015), there are 8883 households in the 10 villages. The sample size was determined using the Israel (1992) sample size determination formula:

$$nT = \frac{N}{1 + N(e^2)}$$
 where n is number of sampled households, 'N' is total target population, n<sub>T</sub> is total number of household, and e is level of precision. Hence, according to the formula, sample size determined at 5% precision and 95% of confidence level will be 382 households. That is

$$n_T = 8883 / (1 + 8883(0.05)^2) = 382$$

In order to determine the sample size of each Village, stratified sampling techniques were employed. According to Kothari (2004),

**Table 1.** Background of the respondents who were involved in questionnaire survey.

Background of the respondents		No. of respondents	%
Sex	Male	216	63.5
	Female	124	36.5
Age	Adult (18-35)	138	40.6
	Middle (36-45)	158	46.5
	Elder (>46)	44	12.9
Educational Status	Uneducated	178	52.4
	Elementary	95	27.9
	Secondary school	22	6.5
	College	23	6.8
	University	22	6.5
Household economy	Agriculture	20	5.88
	Trade	17	5.00
	Governmental work	38	11.18
	Mixed	265	77.94

in stratified sampling technique, the sample size of different stratum is determined proportional to the size of population. Hence, the researchers calculated the sample size for each village (nk) as:

$$n_v = \frac{\text{Number of households}}{8883} * 382$$

In-depth interviews were carried out using structured and semi-structured questions. In doing so the participants for the in-depth interview were selected purposively based on the responsibilities they have, experience, and relevance to issues under study. Accordingly, From Harenna Bulluk District Agriculture and Rural Development Office (1 animal science expert, 1 plant science expert), from Harenna Bulluk District Land and Natural Resource Conservation Office (2 NaRM experts), from Farm Africa (1 Manager, 1 Wildlife and Community Expert), from Oromiya forest enterprise (1 Conservation Expert), from Harenna Bulluk and Angetu District Court (2 judges), from Harenna Bulluk District Police Office (2) were interviewed in detail about wildlife resources of Harenna Forest.

Two focus group discussions were conducted. The participants were selected purposively based on the responsibilities they had experienced, and the relevance to the issues under study. The first FGD was held *with experts* (2 agriculturalists, 1 tourism expert, 1 natural resources expert, 2 plant scientists, 2 animal scientists, 2 wildlife experts, and 2 Experts from Oromiya Forest Enterprise). The second FGD was held with local communities, (2 from religious leaders, 5 members from forest dwellers association, and 4 village administrators). The issues to be discussed include the current challenges for wildlife conservation, the opportunities for conservation and possible solutions for challenges of conservation.

Purposeful, systematic and selective observation and recording of information regarding the challenges and opportunities for wildlife conservation were undertaken by using observation checklists. Digital camera was used to take the pictures of wildlife and habitat degradation as well as conservation practices in and around the forest.

### Data analysis

Statistical package software SPSS version 16.0 was used to analyze the data. Quantitative data which were obtained by using questionnaires was presented using descriptive statistics such as percentages, frequencies and means. The finding from quantitative data was presented or reported through tables, bars, and pie charts. In addition, the findings of questionnaires were integrated and compared with that of in-depth interviews, field observation, focus group discussion and document analysis.

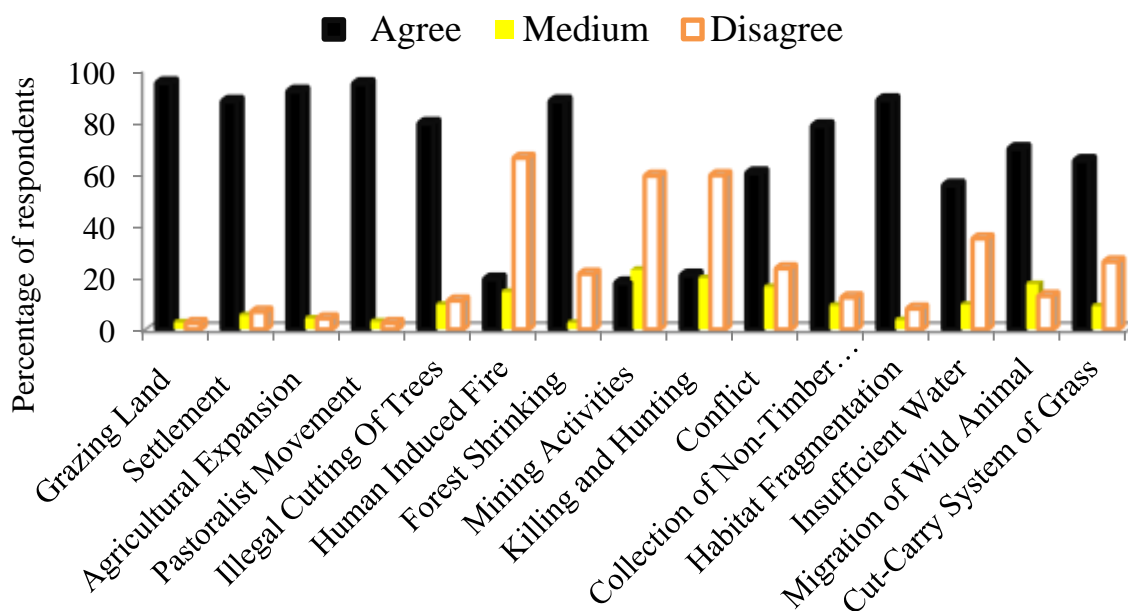
## RESULTS

### Demographic characteristics of respondents

Out of 382 household questionnaires administered, a total of 340 responses were received and suitable for analyses. The results of demographic characteristics showed that 63.5% were males and 36.5% were females (Table 1).

### Wildlife conservation challenges

According to community elders, farmers and indigenous peoples who have lived in and around the forest, the major threats and conservation challenges of wildlife are urbanization, agricultural expansion, habitat fragmentation, accessibility and resource extraction (Figure 2). The majority of respondents agreed that overgrazing the forest (95%), human settlement (87.9%), agricultural expansion (91.8%), pastoralist movement



Conservation Challenges and threats of wildlife

Figure 2. Responses of respondents regarding challenges for wildlife conservation in Harena Forest.

Table 2. Responses of interview on challenges to conserve wildlife.

S/N	Challenges encountered to wildlife conservation	Scale				
		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1	Plant and animal diseases in the forest.	1	3	5	2	
2	Invasive/non-native species	1	2	3	5	
3	Shortage of water	5	2	1	2	
4	Expansion of agricultural practices.			1	4	6
5	Climate change/ global warming			1	5	5
6	High habitat loss, degradation and fragmentation				8	3
7	Unwise utilization and cutting trees	1	1		4	5
8	Gathering of plants or plant products (for non-timber consumption).			1	5	5
9	Human-wildlife conflict		2	2	6	1
10	Hunting of wildlife	2	3	2	3	1
Total frequency		10	13	16	44	26

(94.7%), illegal cutting of trees (79.4%), forest shrinkage (88%), human-wildlife conflict (60.3%), collection of non-timber products (78.5%), habitat fragmentation (88.5%), insufficient water (55.6%), migration of wild animal (69.7%), and cut-carry system of grass (65.1%) were major conservation issues. While, out of the total respondents, 66.1%, 59.2% and 59.4% respondents were stated strongly disagreed to the presence of human induced fire, mining activities and killing and hunting of wildlife, respectively.

According to interview, there were also a total of 10 challenges to wildlife conservation in Harena Forest (Table 2). On the other hand the main challenges mentioned by the Harena Bulluk district offices were:

- i) High turnover of expertise due to lack of incentives in motivating the conservation experts and inadequate salary payment.
- ii) Less attention given by NGOs (non-governmental organizations) for wildlife conservation and community

**Table 3.** Threats of wildlife in Hareenna Forest.

Threats	Frequency	%
Habitat loss, degradation and fragmentation	10	14.29
Deforestation	11	15.71
Expansion of Agriculture	10	14.29
Over utilization of forest resources	8	11.43
Settlement	9	12.86
Administration problem	4	5.71
Pollution	2	2.86
Fire	6	8.57
Human-wildlife conflict	8	11.43
Hunting	2	2.86
Total	70	100%

participation to work in collaboration with local community and natural conservation offices in each Kebeke.

- iii) Difficulties in creating awareness for the community on the issues of wildlife and forest management.
- iv) Illegal practices of cutting of forests and land ownership for renting after getting a license.

According to field observations and respondent information of this study, the major conservation challenges of the wildlife around the study area were habitat disturbances by expansion of agriculture and settlement, competition with livestock and resource and human and wildlife conflict due to its crop raider and livestock attack problems.

The result from the Focus Group Discussion summarized the views and interest of discussants with experts of different sectors and local communities (Figure 4). Most discussants considered the local people affect wildlife in and around the Hareenna Forest through overgrazing, firewood collection, settlement, agriculture expansions, fire and giving less attention to conservation of forest and wild animals from the side of local people. Most experts of different sectors and local community discussants described the shortage of private grazing land and decreased farmland holding. This could have increased the pressure on the Hareenna Forest resources for livestock grazing and agricultural expansion local communities encroached in to the area for subsistence agricultural land. These events are the main conservation challenges of wildlife in Hareenna Forest. Based on this issue, local community discussants said that “if the government and other stakeholders support us we are willing and interested to conserve Hareenna Forest resources and wild animals”. Very few local community discussants had negative attitude towards the Hareenna Forest conservation system, because these discussants use the resources like firewood and grazing land without any restriction.

### Threats to wildlife

The study revealed that all of the selected interviewed Hareenna Bulluk District offices respondents have feeling of threat towards wildlife due to the increase in deforestation (15.71%), habitat loss, degradation and fragmentation and expansion of agriculture (14.29% equally each), displacement from the residence owing to housing development program and illegality of their land ownership (settlement) (12.86%), overutilization of forest resources and human-wildlife conflict (each of 11.43%), fire (8.57%), district administration problems and pollution and hunting (each of 2.86%) (Table 3).

According to direct field observations, there were many anthropogenic threats and conservation challenges of wildlife directly or indirectly (Figure 3). Settlement, Logging, agriculture expansion, direct human disturbance through behave setting, fence making and pollution collecting of fuelwood, overgrazing by livestock, and habitat fragmentation were the most crucial challenges directly to the Hareenna Forest that in turn will affect on wildlife conservation in the area.

According to field observation various development activities, such as roads and canals passing through forest, agriculture and settlements have also created an edge. Habitat fragmentation has restricted the migration and mobility of many species and has increased the incidence of wildlife damage to human life and property. Such people-wildlife conflicts have frequently given negative impression of wildlife conservation. The damage incidents are reported from the migratory route which has been converted into agricultural fields and new human settlements.

### Status of wildlife

Out of the 340 respondents, most respondents [294



**Figure 3.** Major threats of Hareenna Forest (Photo: Sefi and Alefu, 2016).

(86.5%]), acknowledged that status of wildlife in the Hareenna Forest is decreasing, while 11 (3.2%), 16 (4.7%), and 19 (5.6%) of respondents stated increasing, remaining the same and not known, respectively (Table 4). However, there was a significant difference on status of wildlife in the forest among kebele residents ( $\chi^2 = 70.955$ ,  $DF=27$ ,  $P=0.000$ ). There was no significant difference in the view of status of wildlife between different age classes ( $\chi^2 = 4.892$ ,  $DF=6$ ,  $P=0.558$ ). Sex was not important in determining the view of status of wildlife in the area ( $\chi^2 = 0.652$ ,  $DF=3$ ,  $P=0.885$ ). Relatively better-educated groups (elementary, secondary, college and university) ( $\chi^2 = 17.213$ ,  $DF=12$ ,

$P=0.0014$ ) had more view of the status of wildlife than non-educated groups (illiterate and read and write only group).

## DISCUSSION

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

**Table 4.** Status of wildlife in the Hareenna Forest.

Kebele	Status of wildlife in the forest			
	Increasing	Decreasing	Remained the same	Not known
Angettu	13.8	65.5	13.8	6.9
Kumbi	0	100	0	0
Hawwoo	2.4	90.4	2.4	4.8
Bulluk	6.8	75.0	13.6	4.6
Heeroo	0	100	0	0
Soorbiraa	0	85.7	14.3	0
Suduweelmel	3.6	75.0	3.6	17.8
Shawwee	0	78.0	6.0	16.0
Sodu Lalaftoo	0	100	0	0
Garba Gaaloo	6.9	93.1	0	0
Total	11 (3.2%)	294 (86.5%)	16 (4.7%)	19 (5.6%)

a result of conservation program (Hill, 2000). In the same case Hareenna Buluk district, demographic and social changes place more people in direct contact with wildlife; as human populations grow, settlements expand into and around protected areas, as well as in urban and suburban areas. As the human population keeps expanding, there is an increasing demand for land for agriculture, and natural resources for industry, leading to increased contact opportunities for wildlife and people, resulting in conflict (Naughton-Treves, 1998).

Many wildlife areas in Ethiopia are threatened due to ever increasing population, habitat loss and degradation (Amare, 2015a). Due to increasing human population, encroachment in to the wildlife area increases and more lands adjacent to the wildlife area used for farmland, this creates pressure on wildlife population. Land use changes through agriculture, rural and urban development activities have led to the decline and alteration of wild areas, resulting in the extinction to wildlife species and natural areas which serve as their habitat. The results of this study also were addressing some of the causes of losses of forest resources which directly impose wildlife conservation. 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. In Ethiopia including Hareenna Forest, as well as many areas with abundant wildlife, conflict is intensified by land use fragmentation and the development of small-scale farming (Hill, 2000).

Conflicts over natural resources between the communities living adjacent to forest have increased because of changes in land use and accompanying new ideas about wildlife resource management and utilization. These events also in line with other studies which have been done on other parts of Ethiopia on challenge of wildlife conservation (Magige, 2012; Amare, 2015b).

Increased insatiable/voracious demand for resources results to land use changes hence loss to genetic diversity, species reduction and increased ecosystem changes such as random population changes, disease outcrops, habitat fragmentation among others resulting in biodiversity losses (Thecla, 2009).

Human-wildlife conflict is a major concern of most people living next to protected areas in developing countries due to their subsistent live (Amare, 2015b). It arises when growing human populations needs overlap with wildlife areas and results scrambling for resource. As Ethiopia's population increases, there is an increasing demand for space and resource utilization and effects on wild animal's habitat (Yihune et al., 2008). In the same scenario, the Hareenna Forest's wildlife resources were decreased and challenged for conserving. According to interview, there were also a total of 10 challenges to wildlife conservation in Hareenna Forest (Table 2).

According to field observations and respondent information of this study, the major conservation challenges of the wildlife around the study area were habitat disturbances by expansion of agriculture and settlement, competition with livestock and resource and human and wildlife conflict due to its crop raider and livestock attack problems. These findings of the present study are also in agreement with Redfern et al. (2003). Human activities influence ecosystem structure and function, in particular the spatial and temporal distribution of wild animals (Ogutu et al., 2010). This is especially true for the Hareenna Forest, in which forest resources becomes progressively limited, and become points of contacts, conflicts and competition between wildlife and livestock. These threats of the wildlife arisen from settlement and expansion of agriculture.

Overgrazing and deforestation also happened in the study area. These and other activities resulted in disturbance, decrease in abundance and diversity of



wildlife due to destruction of habitat and competition on foraging in the area. Similarly, as reported by Zelealem (2001), livestock from nearby villages stay for longer time, and local community used firewood more frequently in Hareenna Forest. According to Newmark, et al. (1994) the major problem facing wildlife areas today is the increase in human settlement of adjacent lands and the unauthorized harvesting of resources within the areas in Africa. In case of Hareenna Forest also there is the development of settlements which might be a threat to forest and wildlife resources.

Deforestation resulting land degradation is the global threats for many wild animals with its natural habitat and affects the wild animal's life style in their preferred habitats. The extensive deforestation has also led to the extinction of various biota as resulting in significant biodiversity loss. Much of Hareenna Forest land is now widely used for cultivation, grazing, fuel wood and construction. The human population around most protected areas over the years has been changing in terms of its size, density and livelihood strategies (Masanja, 2014). Uncontrolled logging, illegal charcoal production and fuel wood collection were some of the major causes of deforestation that might be directly influenced wildlife's habitat. Habitat degradation and depletion, overexploitation and wildlife diseases are impact on population viability (Daszak et al., 2000) which agreed with the present study. Moreover, human activities impose to decline the scenic beauty of the wildlife area which also affects wildlife resources.

## CONCLUSION AND RECOMMENDATION

Conclusively, the major challenges to the conservation of wildlife resources identified in Harena Forest were overgrazing, human settlement, agricultural expansion, pastoralist movement, illegal cutting of trees, forest shrinkage, human-wildlife conflict, habitat fragmentation, insufficient water, migration of wild animal, and cut-carry system of grass, with little occurrence of human induced fire, mining activities and killing and hunting of wildlife. The following recommendations and suggestions were made based on the findings for the sustainable utilization of wildlife, minimizing threats and the coexistence of wildlife and local people: increasing awareness to different sectors and local communities should continue and be strengthened, community-based conservation approaches must be strengthened, and the implementation of local and national conservation regulations should be maintained. Furthermore, higher institutions with governmental and nongovernmental conservation officials should establish a conservation education center that helps to raise awareness to the community and to reduce wildlife conservation challenges in the Harena Forest.

## CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

## REFERENCES

- Amare A (2015a). Conservation Challenges of Gibe Sheleko National Park, Southwestern Ethiopia. *Nat. Resour.* 6:286-289.
- Amare A (2015b). Wildlife Resources of Ethiopia: Opportunities, Challenges and Future Directions: From Ecotourism Perspective: A Review Paper. *Nat. Resour.* 6:405-422.
- Bulte EH, van Kooten GC, Swanson T(2003). Economic Incentives and Wildlife Conservation.
- Daszak P, Cunningham AA, Hyatt AD. (2000). Emerging infectious diseases of wildlife Threats to biodiversity and human health. *Science* 287:443-449.
- Environmental protection Authority (2003). State of Environmental Report of Ethiopia. Addis Ababa, Ethiopia.
- EWCA (2013). A travellers guide to Bale Mountains National Park. Published at Addis Ababa.
- GMP General Management plan, (2007). Bale Mountains National Park General Management Plan compiled and Edited by Frankfurt Zoological Society and Institute of Biodiversity Conservation.
- Hill CM (2000). Conflict of Interest between People and Baboons. *Crop Raiding in Uganda.* *Int. J. Primatolo.* 21:299-315.
- Ho SS, Brossard D, Scheufele DA (2007). Public reactions to global health threats and infectious diseases. *Publ. Opin. Quart.* 71:671-692.
- Hulme D, Murphree M (2001). African Wildlife and Livelihoods: The Promise and Performance of Community Conservation. Oxford, U.K.: James Currey Ltd.
- Institute of Biodiversity Conservation IBC (2014). Ethiopia's Fifth National Report to the Convention on Biological Diversity. Ethiopian Biodiversity Institute, Addis Ababa.
- Israel GD (1992). Determining Sample Size; Fact Sheet PEOD-6: University of Florida.
- Kothari C (2004). Research Methodology: methods and techniques, second revised edition, New Age International (P) Ltd., publishers, New Delhi, India.
- Magige FJ (2012) Human-Wildlife Interaction in Serengeti and Ngorongoro Districts of Tanzania: A Case Study on Small Mammals. *Tanzan. J. Sci.* 38:95-105.
- Masanja GF (2014). Human Population Growth and Wildlife in Ugalla Ecosystem, Western Tanzania. *J. Sustain. Dev. Stud.* 2:192-217.
- Mbugua P (2012). Wildlife Conservation Education. *The George Wright Forum.* 29(1):59-66.
- Naughton-Treves L (1998). Predicting Patterns of Crop Damage by Wildlife around Kibale National Park, Uganda. *Conserv. Biol.* 12:156-168.
- Newmark DW, Manyanze ND, Gamassa M, Sariko IH (1994). The conflict between wildlife and local people living adjacent to protected area, in Tanzania: Human density as a predictor. *Conserv. Biol.* 8:249-255.
- Ogutu JO, Piepho HP, Reid RS, Rainy ME, Kruska RL, Worden JS, Nyaberge M, Hobbs NT (2010). Large herbivore responses to water and settlements in savannas. *Ecol. Monogr.* 80:241-266.
- Redfern JV, Grant CC, Biggs HC, Getz WM (2003). Surface water constraints on herbivores foraging in the Kruger National Park. *S. Afr. J. Ecol.* 84:2092-2107.
- Tesfa A (2006). Diversity and Ecology of *Vascular Epiphytes* in Hareenna afro-montane forest, bale, Ethiopia, Unpublished Thesis.
- Tessema M, Lillieholm R, Ashenafi Z, Leader-Williams N (2010). Community Attitudes toward Wildlife and Protected Areas in Ethiopia. *Soc. Nat. Resour. Int. J.* 23:489-506.
- Williams S (2002). Bale Mountains a Guide Book. United Press, Addis Ababa, Ethiopia.
- Yihune M, Bekele B, Tefera Z (2008). Human-Gelada Baboon Conflict in and around the Simien Mountains National Park, Ethiopia. *Afr. J.*

Ecol. 19:1-7.  
Zezealem T (2001). Common Property Resource Management of an Afro-Alpine Habitat: Supporting a Population of a Critically Endangered Ethiopian Wolf (*Canis simensis*), Ph.D. Dissertation, Durrel Institute of Conservation and Ecology, University of Kent, Canterbury.