Challenges, Attitude and Perception of Local Communities Towards Conservation of Alledeghi Wildlife Reserve, Eastern Ethiopia

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Abstract
Alledeghi Wildlife Reserve (AWR) was established to serve as buffer zone for Awash National Park, and conserve wildlife population. The aim of the study was to identify major conservation challenges, and determine attitude and perception of local communities towards the AWR. The study was conducted from December 2015 - August 2016. Data was collected through questionnaire survey, focus group discussion, direct field observation, and secondary data sources. Total sample size of the study was 107 households. Out of the 9 Kebeles which are found near to AWR, 4 Kebeles were selected purposively. Data was analyzed by using SPSS version 23 software. The main threats were invasive species expansion (83.17%), habitat destruction (67.28%), drought (52.33%), and poaching (23.36%); it showed significant difference ($\chi2=36.77$, df=3, p<0.05). High dependency of local communities on the natural resources affected habitat quality and size of AWR. Seventy one percent of the respondents had a positive attitude towards AWR. The attitude of local communities towards AWR showed statistical difference among the study kebeles ($\chi2=11.31$, df=3, p<0.05), Education level ($\chi2=77.16$, df=3, p<0.05), Source of income ($\chi2=71.09$, df=2, p<0.05), and gender ($\chi2=16.25$ df=1, p<0.05). Provision of alternative sources of technology and alternative income generation strategies would reduce these effects.
Keywords: Attitude, Invasive species, Local community, Perception, Threat

Introduction

Ethiopia is one of the world's rich biodiversity countries (Yalden and Largen, 1992). The variations in climate, topography and vegetation contributed to the presence of large number of endemic species. Currently Ethiopia sets aside approximately 16% of its total land mass for protected areas in which some of these extend and form transnational boundary conservation areas with neighboring countries such as Sudan, South Sudan, Kenya and Djibouti (EWCA, 2012; Vreugdenhil *et al.,* 2012; Bekele and Yalden, 2013). However, due to rapid human population growth and continuous dependency on natural resources and unsustainable utilizations, natural resource has been altered (Conway-Gomez *et al.,* 2010). The anthropogenic pressures are particularly affecting ecosystem processes and causing unusual changes, like changing in composition and configuration of species, and habitat fragmentation and degradation, aggravated wild animals decline (Goudie, 2013).

Attitudinal studies have widely been adopted to evaluate the impact and acceptance of conservation involvements on local communities (Bragagnolo et al., 2016). The conservation of wildlife is to a large extent dependent on community acceptance (Kleiven et al., 2004). The long term success of conservation efforts ensure through sympathetic relationship between communities and nearby wildlife conservation areas. However, several factors have affected the relationship between people and wildlife conservation (Lagendijk and Gusset, 2008). For instance, in most of Ethiopian wildlife conservation areas absences of alternative livelihood, encroachments, lower education level, and people working in a natural resource dependent profession and limited participation of locals at different level is poor. These factors influenced the perceptions about the benefits and costs related to protected areas (Allendorf et al., 2007; Tessema et al., 2010). The cost creates more negative attitudes toward wildlife conservation and encourages people to devastate wild animals and their habitats (Bagchi and Mishra, 2006). Negative attitudes are frequently associated with situations where the perceived costs to individuals and communities outweigh the perceived benefits (Trakolis, 2001; Walpole and Goodwin, 2001). In general, costs associated with conservation, such as crop damage and livestock predation by wild animals, have negative effects on local attitudes, while benefits from conservation may have positive effects. Positive attitudes towards wildlife or species in particular have been considered an important condition of long-term success (Allendorf, 2010; Pullin et al., 2013).

Alledeghi Wildlife Reserve was established in 1965 to serve as a buffer zone for Awash National Park and conserve the unique, endangered and isolated population of mammals and birds (Hillman, 1993*).* Information regarding threats and local community's attitude and perception towards the conservation values of AWR is

limited. Therefore, the study was conducted to fill this gap with the objective to identify the threats, and determine the perception and attitude of local communities towards the conservation values of AWR. The study provided relevant information for local communities, conservation organizations, researchers, policy makers and other stakeholders.

Methods
The Study Area
Geographically, ARW is located between 9° 0' to 9° 30'N and 40° 10' to 40° 40'E (Fig. 1); with altitudinal ranges of between 800 to 2400m asl (Kebede *et al.,* 2012). It is located 280 km northeast of Addis Ababa, Ethiopian. It covers an area of 1,832 km^2 and has semi-arid climate (EWCA, 2012).
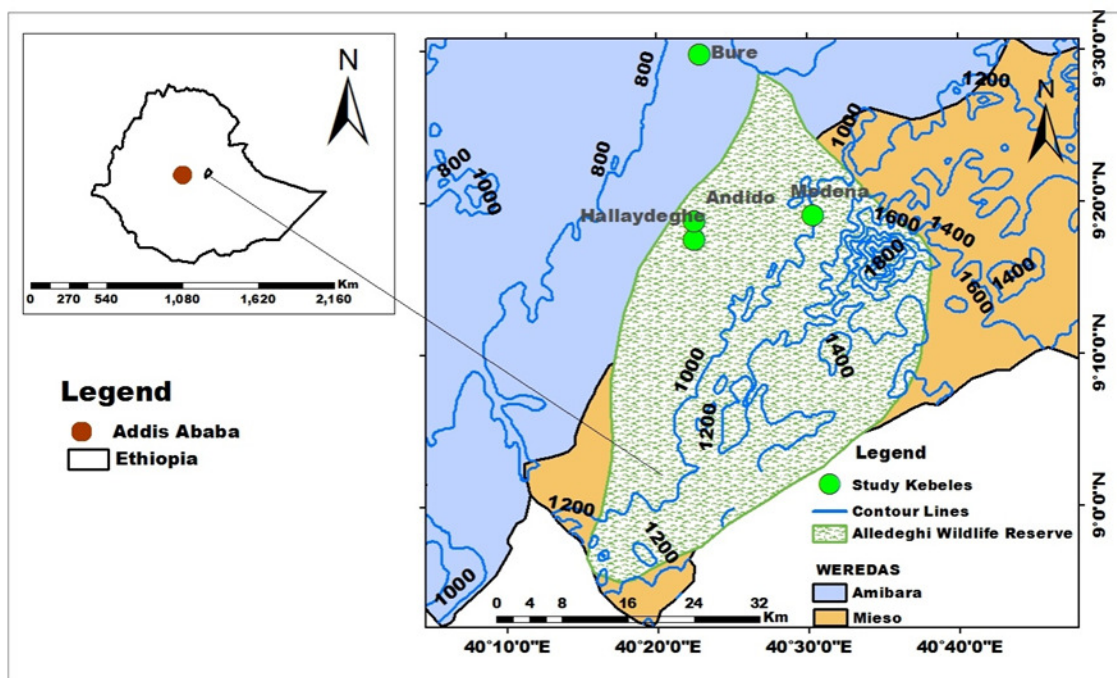

Figure 1: Study area map

The rainfall pattern is bimodal with two distinct rainy seasons. The study area receives an annual average rainfall of 544 mm. The mean monthly temperature ranges from 24.8 to 32.2°C. The major vegetation types in AWR include grasslands, bush-land, shrub-land, wooded grassland, shrub grassland, riverine forest and highland forest.

Data Collection
Data on the main threats, and local people attitude and perception towards conservation of AWR were collected through questionnaire survey, focus group discussion and direct field observation techniques. The combined use of quantitative and qualitative research methods ensured a balance of depth and breadth of research (Bernard, 2002).

Household Survey
Out of the nine Kebeles near to the AWR, four Kebeles namely Haledeghi, Andido, Buri and Medene were selected purposively. The selections of Kebeles were made on the basis of the degree of dependence of the people on the AWR resources, and the comparative proximity of Kebeles to the study area. Respondent households were selected following Gay *et al. (*2009), which advises to sample 10% of the households for a population of more than 1,500 individuals. Accordingly, 107 household respondents were proportionally selected from the total households of each Kebele (Table 1). Respondent households were identified purposively based on their long time interaction with the study area, the ability, awareness and knowledge of the households to achieve the overall research objectives. For the household survey, semi-structured open and close ended questions were designed to the interview. Before the actual data collection, the questionnaire was pretested on small number of interviewees.

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Table 1: Number of population, households and household interviewed in each Kebele

Kebeles	Number of household	Household interviewed
Andido	252	25
Haledeghi	204	20
Buri	445	44
Medene	182	18
Total	1083	107

Focus Group Discussion
Focus group discussion (FGD) is qualitative data gathering method. The group size in each FGR ranged from 6-9, following Mitchell and Branigan, 2000. FGD participants were selected based on their age, knowledge about the area and duration of residency in the study area. The selection was performed with the help of AWR experts, Kebele administrators, and religious leaders. A total of eight focus group discussions were conducted in the selected four Kebeles. Each group was made up of elders of village, female association members, Kebele governmental administrator, religious leaders, and camel riding association members, youth representative in the community.

Field Observation
For the sake of getting adequate and relevant information about perception and attitude of local communities, observation on what people were doing on their daily activities for their livelihoods, overview of their living environment, and interaction of local communities with the park were conducted. Moreover, observations of what people have and don't have, and who does exploration of what local people do, when and for how much, were assessed for identification of major threats.

Data Analysis
Data were managed and analyzed by using Statistical Package for Social Science (SPSS) version 23 software. Descriptive statistics was employed to describe conservation challenges, attitude and perception of local people towards AWR. Inferential statistics refers to the use of percentages, mean, standard deviations and test of significance in the process of comparing community's attitude towards the study areas was used to define relationships between variables considered to draw relevant conclusions. Information collected from the focus group discussions was summarized using text analysis method (Bernard, 2002) and used to validate (cross-check) information obtained through the questionnaire survey.

Result

Demographic and Socio-Economic Characteristics of Respondents
Of the total of 107 respondents interviewed, 92(86%) were male and 15(14%) were females. The majority of the sampled respondents were in the age group of 36-45 (43 %). Only 14% of the respondents aged over 55 years. Regarding to marital status, 83.2% of the respondents were married. 11.2% of the respondents were single, and the remaining was divorced. The majority of the respondents were uneducated (67.29 %), and 23.36%, 7.48% of the respondents attended from grade 1-8 and 9-12 grade respectively. Only 1.87% of respondents had attended college/University. In terms of income, majority of the respondents (85 %) were dependent of livestock production while very small proportion (2.8 %) relied on other sources of income such as traders, temporary and permanent government sector employment (Table 2).

Table 2: Demographic characteristics of respondents

Variables	Categories	Frequency	Percent
	25-35	17	15.9
	36-45	46	43.0
	46-55	29	27.1
Age	>55	15	14.0
Sex	Male	69	86.0
	Female	38	14.0
Marital status	Married	89	83.2
	Single	12	11.2
	Divorced	6	5.6
Educational level	University/College	2	1.87
	Grade 9-12	8	7.48
	Grade 1-8	25	23.36
	Not educated	72	67.29
Income source	Livestock	91	85.0
	Livestock & crop production	13	12.1
	Others (trade & Gov't job)	3	2.8

Conservation Challenges

Eighty three percent of the respondents reported expansion of alien invasive plant species, followed by habitat destruction (67.28%) as the main conservation challenges to AWR. Recurrent drought (52.33%) and poaching (23.36%) were reported as conservation challenges of the reserve (Fig. 2). There was a statistical significance difference among the respondents response to the major conservation challenges of the reserve ($\chi2=36.77$, df=3, p<0.05). The respondent's and focus group discussants perceived that an invasive species expansion is the primary threat that affected the ecosystem and wild animals of the study area.
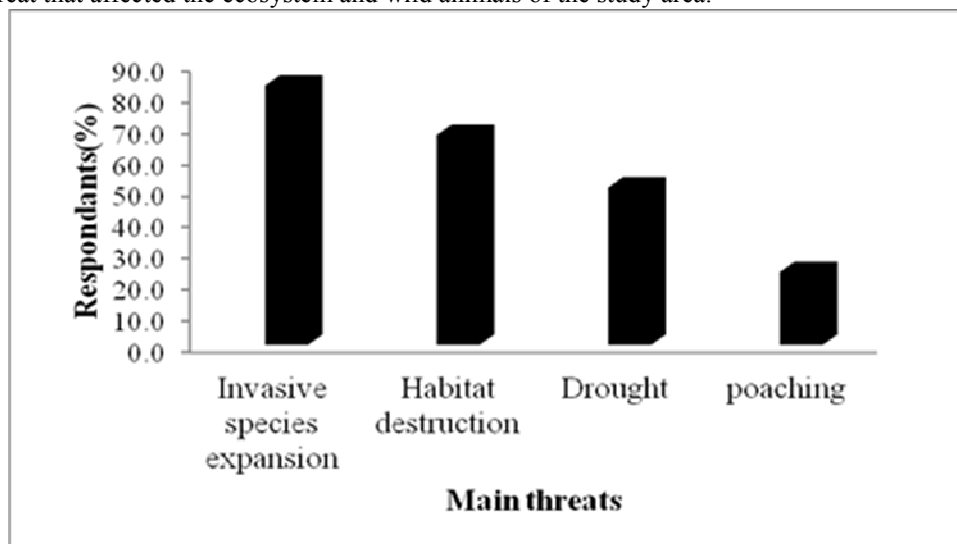

Figure 2: Main conservation challenges in AWR

Attitude of Local Communities towards Conservation of AWR

Eighty five percent of the respondents from Haledeghi, Adido (80%), Buri (54.54%), and Medene kebeles (66.66%) had a positive attitude towards the conservation of AWR. Many of the respondents from Buri kebele (45.46%) had negative attitude, followed by Medene kebele (33.33%). The attitude of local communities towards AWR showed statistical difference among the study kebeles ($\chi2=11.31$, df=3, p<0.05). Almost all proportion of the respondents who attend above grade 9 had positive attitude towards AWR, whereas 26.39% of not educated people had negative attitude. Education level of the respondents showed a statistical significant difference on the attitude of local communities towards AWR. Respondents whose source of income was livestock rearing (67.03%), mixed income (76.92%), and others (100%) had a positive attitude towards AWR. Source of income showed a significant difference on the attitude of respondent towards the values of the reserve ($\chi2=71.09$, df=2, p<0.05). Seventy five percent of males and 57.89% of females had a positive attitude for ARW, and it showed a statistical difference (Table 3).

Table 3: Attitude of the respondents across kebeles, education, income and gender

Variables		N (107)	Attitude towards AWR %		$\chi2$	Df	P-value
			Positive	Negative			
Kebeles	Andido	25	80	20	11.31	3	0.01
	Haledeghi	20	85	15			
	Buri	44	54.54	45.46			
	Medene	18	66.66	33.33			
Education level	University/College	2	100	0	77.16	3	0.00
	Grade 9-12	8	100	0			
	Grade 1-8	25	88	12			
	Not educated	72	73.61	26.39			
Sources of income	Livestock	91	67.03	32.97	71.09	2	0.00
	Mixed (livestock & crop production)	13	76.92	23.08			
	Others (Trade & gov't job)	3	100	00			
Gender	Male	69	75.36	24.64	16.25	1	0.00
	Female	38	57.89	42.11			

Perception of Local Communities' on Benefits and Problems Associated With AWR

All respondents (100%) reported that they received benefits from AWR. These included livestock grazing

(100%), fuel wood collection (78.5%), construction materials (72.98%), training (55.1%), medicinal plants collection (42.1%), social service (28%), job opportunity (20.6%), and benefits through ecotourism association (6.5%). However, 16.8 % of respondents felt that they did not receive any benefit from the reserve (Table 4).

Table 4: Benefits of AWR to the local communities as indicated by the household respondents

Benefit obtained	Response across Kebeles (%)				
	Andido	Halledeghi	Buri	Medene	Overall %
Livestock grazing	100	100	100	100	100
Construction materials	100	100	34.1	100	72.98
Fuel wood collection	100	100	47.7	100	78.5
Medicinal plant collection	32	65	38.64	38.89	42.1
Job opportunity	48	35	6.8	0	20.6
Training	84	75	52.3	0	55.1
Benefits through ecotourism association	28	0	0	0	6.5
Social service	68	40	11.36	0	28

Many of the respondents (87.2 %) had experienced problems with AWR. The most frequently cited problem was livestock depredation (58.9%), followed by property destruction (18.7%) (Fig.3). Ten percent of the respondents reported loss of human life as problems of the area. Only 12.1% of the respondents felt as they did not face any problem due to the existence of wild animals of AWR. There was a statistical significant difference among the reported wildlife damages on the local communities' property and life in the study area ($\chi2=67.16$, df=3, p<0.05).

Figure 3: Perceived problems by local communities

Lion (*Panthera leo*), Jackals (*Canis mesomelas*), and Hayena (*Crocuta crocuta*) were reported as the common wild animals involved in on livestock depredation and loss of human life. Warthogs (*Phacochoerus africanus*) and Porcupine (*Hystrix cristata*) were identified as the main property destructive animals.

Local Community's Perception towards Conservation Value of AWR

Local communities' perception towards conservation values of AWR is shown in (Table 5). On average, 50(46.7 %) of the respondents from all the Kebeles mentioned that the most important reason for conserving the reserve was its value for future generation, followed by creation of job opportunity for the local communities 25(23.4%). Eighteen (16.8%), and 14(13.1%) respondents supported the conservation of AWR for its tourist attraction potential, and traditional belief, respectively. There was a significance difference among the respondents response regarding to the conservation values of AWR ($\chi2=29.26$, df=3, p<0.05). Respondents from Buri (61.4%) and Medene (88.9%) kebeles perceived the value of the park for future generation. There was also a statistical difference among the study Kebeles regarding to the values of AWR for future generation ($\chi2=30.80$, df=3, p<0.05).

Table 5: Reasons given by the local communities for the importance of conserving AWR

Kebeles	Values of AWR							
	Future generation		Job opportunity		Tourist Attraction		Traditional belief	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Andido	3	12	13	52	6	24	3	12
Halledeghi	4	20	8	40	5	25	3	15
Buri	27	61.4	4	9.1	5	11.4	8	18.2
Medene	16	88.9	0	0	2	11.1	0	0
Overall	46.7%		23.4%		16.8%		13.1%	

Discussion

Majority of respondents reported that expansion of invasive species, particularly *Prosopis juliflora*, is the primary factor. *Prosopis juliflora* is a fast growing, often evergreen and drought resistant plant of desert and semi-desert areas (Pasiecznik *et al.,* 2001). Due to its aggressive nature, it impacted most of the grass land, rangelands, access to water points and croplands in the Middle Awash areas (Haile, 2008). *Prosopis juliflora* rapidly spread throughout the AWR, especially near villages and cattle trails, resulting in loss of forage and overall habitat degradation (Kebede et al, 2012)**.** According to focus group discussants the invasive and allelopathic nature of the species has reduced the growth of plant species that are source of food for herbivores in the study area. Areas that are invaded by *Prosopis juliflora* are main sources of forage for both livestock and wild animals. Invasive species can also seriously threaten ecosystem components of an area, and could aggravate the extinction of various mammals, birds, and invertebrates (Atkinson, 2001).

Habitat destruction (67.3 %) was recorded as the major threats in the AWR. In Ethiopia, the wildlife proclamation No. 541/2007 sub-Article-10 allows indigenous local communities to live in wildlife reserves with good practice of wildlife conservation. As a result, unrestricted access to natural resources utilization in the reserve is always observed. Such unrestricted utilization activities results in the destruction of wildlife habitat, due to increasing demand for grazing land and other natural resources utilization in pastoral communities. Expansion of commercial agriculture and a development of borehole in the entire study area may affect the future survival of the species. The discussants stated that former wild animal's habitat areas are now occupied by humans and large number of livestock for grazing, especially in the wet season. The same result was reported by Kebede et al (2012), who confirmed that during the wet season livestock population in the reserve is almost twice the size estimated for the dry season. These encroachments caused habitat destruction and direct competitions of livestock for forage with herbivores in the area. Similar result was reported in Nechisar National Park by Chanie and Tesfaye (2015).

Half of the respondents reported that prolonged drought as one of the threats that caused population decline. Environmental factors such as rainfall and temperature largely influence reproduction and survival of herbivores (Begon *et al.*, 1990). Study conducted by Kebede et al (2012) also reported that drought was considered as the main driving factor for wildlife population decline in the present study area. Similar studies in African savannah ecosystems have demonstrated the harmful effects of drought on populations of several herbivore species. Populations of several ungulate species in the Masai Mara Serengeti ecosystem have declined by 58% in the last 20 years due to drought related effects on vegetation (Ottichilo *et al.*, 2000). The 2009 drought in the Amboseli ecosystem has reduced the Wildebeest (*Connochaetes taurinus*) and Zebra (*Equus quagga*) populations by 70–95% (Kenyan Wildlife Service, 2010). The discussants also stress that the frequently occurring drought for an extended period affected wild animals and their livestock.

Some respondents (23.4%) revealed that poaching was another reason for decline of species diversity and abundance. Mesochina et al. (2003) stated that poaching was the main cause of decline for desert antelopes. Kenney *et al*. (1995) stated that the unintended consequences of poaching might not be immediately obvious due to the fact that extinction of the species may occur several decades after the incidences of poaching. The dramatic declining rate and local disappearance of the species from their most of previous home ranges occurred due to poaching and habitat destruction (Mallon and Jama, 2015).

Education, gender, age and source of income were the demographic features employed in this study. These factors were determinants of respondents' attitude towards the AWR. The study revealed that educated local people had a positive attitude than non-educated respondents. Education level influenced the understanding of respondents on wildlife importance. Sources of income also affected the respondents' attitude towards the protected areas. All the respondents (100%) whose source of income was government work and trade had positive attitude. People with mixed income (79.92%) had a better positive attitude than people whose source of income is livestock production (67.03%). The attitude of local communities showed a significant statistical difference across the selected study kebeles. This might be due to the benefit they gain from the reserve and the challenges they faced with wild animals. Similar finding was recorded by Belete et al (2017).

The result of this study revealed that all of the respondents and focus group discussants reported that they obtained benefits from AWR. They listed the benefits such as, direct consumption, job opportunity, social service and establishment of ecotourism association like camel riding association. Most of the discussants felt that the existence of the reserve has a positive impact on their livelihood. Besides, most of the respondents also acknowledged that the alternative income generation and entrepreneurship training and conservation education provided by the reserve staff. It helped them to get knowledge and skills for the conservation of wildlife and improvement of their livelihood. This implies that local communities obtained benefit from the reserve have positive attitudes compared to those who are not benefited. Similar findings were reported in another place by (Bruner *et al*., 2001; Walpole and Goodwin, 2001; Wang and Macdonald, 2006), communities who obtained benefits are expected to be supportive of ecosystem conservation efforts. On the contrary, according to

Some of respondents reported that occasionally loss of human life has happened particularly in Buri Kebele.

This might be due to destruction and encroachments of wildlife habitat and their movement routes. Kebede et al (2012) explained that expansion of irrigation schemes along the Awash River has increased habitat degradation. In general, majority of respondents complain on conservation of problem causing animals due to the lack of compensation for the damaged properties. People who suffer an economic loss due to problem causing animals have more negative attitudes towards these animal species. A study conducted on Snow leopard predation on livestock in Nepal indicated that when the community subsistence economy was highly dependent on livestock, even a small loss due to predation can cause significant economic damage to the owner can generate negative attitudes towards carnivore conservation (Oli *et al*., 1994).

Conclusion

The study revealed that the high livestock population in the area and encroachment by invasive plant species, and the removal of grasses for house thatching purpose were causing habitat degradation and thus hampering species diversity and abundance in the reserve. The majority of respondents indicated their positive attitude on conservation values of the reserve. Reason given for the importance of conservation values of AWR were job opportunity for local communities, social serves such as using reserve vehicle at emergency time, training and knowledge sharing. In this study, almost all of the respondents believed that AWR should be conserved. The majority of respondents indicated that conserving the reserve is good for values for future generation. It was also confirmed from the focus group discussions that the communities are protecting the reserve, because their ancestors have ordered them to protect. They generally had positive attitude on conservation of the reserve for its potential benefits.

Acknowledgment

Conflict of Interest

Authors did not declare any conflict of interest.

References

Allendorf, T. D. 2010. A framework for the park–people relationship: insights from protected areas in Nepal and Myanmar. International Journal of Sustainable Development & World Ecology 17:417-422.

Allendorf, T. D. Smith, J. L. & Anderson, D. H. 2007. Residents' perceptions of Royal Bardia National Park, Nepal. Landscape and Urban Planning 82:33-40.

Atkinson, I. A. 2001. Introduced mammals and models for restoration. Biological Conservation 99:81-96.

Bagchi S, C Mishra. 2006. Living with large carnivores: predation on livestock by snow leopard (Uncia uncia). Journal of Zoology 268:217-224.

Begon, M. Harper, J. L. & Townsend, C. R. 1990. Life-history variation. Ecology: Individuals, populations, and communities. 2nd edition. Boston, Massachusetts: Blackwell Scientific Publications.

Bekele, A. & Yalden, D.W. 2013. The mammals of Ethiopia and Eritrea. Addis Ababa University Press. Addis Ababa.

Bernard, H. R. 2002 Research methods in anthropology. Qualitative and quantitative approaches. . USA: Altamira Press.

Bragagnolo, C. Malhado, A. C. Jepson, P. & Ladle, R. J. 2016. Modelling Local Attitudes to Protected Areas in Developing Countries. Conservation and Society, 14: 160-166.

Bruner, A. G. Gullison, R. E. Rice, R. E. & Da Fonseca, G. A. 2001. Effectiveness of parks in protecting tropical biodiversity. Science 29:125-128.

Chanie, S. & Tesfaye, D. 2015. Threats of biodiversity conservation and ecotourism activities in Nechsar National Park, Ethiopia. International Journal of Biodiversity and Conservation 7:130-139.

Conway-Gomez, K. Barton, K. Wang, M. Wei, D. Hamilton, M. & Kingsland, M. 2010. Population and Natural Resources conceptual framework: How does population growth affect the availability of resources. AAG Center for Global Geography Education. http://globalgeography. aag. org. 19p. Last accessed: July, 5, p.2014.

EWCA. 2012. List of Protected areas and types archives. Ethiopian Wildlife Conservation Authority Addis Ababa.

Gay,R. L. Mills, E. G. & Airasian, P. 2009. Educational Research: competencies for Analysis and Applications. Florida, USA: Merrill, pearson, Upper Saddle River, New Jersey.

Goudie, A. S. 2013. The human impact on the natural environment: past, present, and future. John Wiley and

Sons.

Haile, Z. M. 2008. Invasion of prosopis juliflora (SW.) DC and Rural Livelihoods the case of Afar Pastoralists at Middle Awash Area of Ethiopia.

Hillman, J. C. 1993. Compendium of wildlife conservation information. Vol1. The Wildlife Conservation Society, New York and the Ethiopian Conservation Department, Addis Ababa.

Infield, M. 1998. Attitudes of a rural community towards conservation and a local conservation area in Natal, South Africa. Biological Conservation 45:21-46.

Kebede, F. Bekele, A. Moehlman, P. D. & Evangelista, P. H. 2012. Endangered Grevy's zebra in the Alledeghi Wildlife Reserve, Ethiopia: Species distribution modeling for the determination of optimum habitat. Endangered Species Research 17:237-244.

Kenney, J. S. Smith, J. L. Starfield, A. M. & McDougal, C. W. 1995. The long‑term effects of tiger poaching on population viability. Conservation Biology 9: 1127-1133.

Kenya Wildlife Service, 2010. The Impact of the 2009 Drought on Wildlife, Livestock and Tourism: Recommendations for Ecosystem Restoration. Proceedings of the Amboseli Ecosystem Conservation Ecosystem workshop.

www.conservationafrica.org/en/resources/downloads.html?task=finish and cid=3and catid=1.

Kleiven, J. Bjerke, T. & Kaltenborn, B. P. 2004. Factors influencing the social acceptability of large carnivore behaviours. Biodiversity & Conservation 13:1647-1658.

Lagendijk, D. G. & Gusset, M. 2008. Human–carnivore coexistence on communal land bordering the Greater Kruger Area, South Africa. Environmental Management 42:971-976.

Mallon, D. P. & Jama, A. 2015. Current Status of Antelopes in Somaliland. IUCN/SSC Antelope Specialist Group and Nature Somaliland.

Mésochina, P. Bedin, E. & Ostrowski, S. 2003. Reintroducing antelopes into arid areas: lessons learnt from the oryx in Saudi Arabia. Comptes rendus biologies 326:158-165.

Mitchell, K. & Branigan, P. 2000. Using focus groups to evaluate health promotion interventions. Health Education 100:261-268.

Oli, M. K. Taylor, I. R. & Rogers, M. E. 1994. Snow leopard Panthera uncia predation of livestock: an assessment of local perceptions in the Annapurna Conservation Area, Nepal. Biological Conservation 68:63-68.

Ottichilo, W. K. De Leeuw, J. Skidmore, A. K. Prins, H. H. & Said, M. Y. 2000. Population trends of large non‑migratory wild herbivores and livestock in the Masai Mara ecosystem, Kenya, between 1977 and 1997. African Journal of Ecology 38:202-216.

Pasiecznik, N. M. Felker, P. Harris, P. J. Harsh, L. Cruz, G. Tewari, J. C. Cadoret, K. & Maldonado, L. J. 2001. The 'Prosopis Juliflora'-'Prosopis Pallida'Complex: A Monograph (Vol. 172). Coventry: HDRA, Coventry, UK.

Pullin, A. S. Bangpan, M. Dalrymple, S. Dickson, K. Haddaway, N. R. Healey, J. R. Hauari, H. Hockley, N. Jones, J. P. Knight, T. & Vigurs, C. 2013. Human well-being impacts of terrestrial protected areas. Environmental Evidence 2:19-23.

Tessema, M. E. Lilieholm, R. J. Ashenafi Z. T. & Leader-Williams, N. 2010. Community attitudes toward wildlife and protected areas in Ethiopia. Society and natural resources 23:489-506.

Tilahun B. Abie K. Feyisa A. A Amare. 2017. Attitude and perceptions of local communities towards the conservation value of Gibe Sheleko national park, Southwestern Ethiopia. Agricultural and Resource Economics: International Scientific E-Journal, 3:65–77.

Trakolis, D. 2001. Local people's perceptions of planning and management issues in Prespes Lakes National Park, Greece. Journal of Environmental Management 61:227-241.

Vreugdenhil, D. Vreugdenhil, A. M. Tilahun, T. Shimelis, A. & Tefera, Z. 2012. Gap analysis of the protected areas system of Ethiopia. EWCA, Addis Ababa, Ethiopia.

Walpole, M .J. & Goodwin, H. J. 2001. Local attitudes towards conservation and tourism around Komodo National Park, Indonesia. Environmental conservation 28:160-166.

Wang, S. W. & Macdonald, D. W. 2006. Livestock predation by carnivores in Jigme Singye Wangchuck National Park, Bhutan. Biological Conservation 129:558-565.

Yalden D. & Largen M. 1992. Endemic mammals of Ethiopia. Mammal 22:115-150.