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Local Community Attitudes towards Conservation of Afroalpine Habitat in Chilalo-Galama Mountains Range, Arsi Mountains National Park, Ethiopia

Mohammed Kasso[1]*, Afework Bekele[2] and Leonid A. Lavrenchenko[3]

[1]Department of Biology, Dire Dawa University, E-mail: muhesofi@yahoo.com ,
☎ +251 (0) 911015198; ✉ 1362, Dire Dawa, Ethiopia
[2]Department of Zoological Sciences, Addis Ababa University, afeworksimegn@gmail.com,
☎ +251 (0) 911404260; ✉ 1176, Addis Ababa, Ethiopia
[3]A.N. Severtsov Institute of Ecology and Evolution e-mail: llavrenchenko@gmail.com,
✉ RAS, Leninskii pr. 33, Moscow 119071, Russia
**Corresponding Author*

Abstract

Three fourth of the populations of developing countries live in rural areas where they directly depend on biodiversity and ecosystem services for their livelihoods. Hence, any conservation practices to be successful highly requires the positive attitude and involvement of local community. The main objective of study is to gather information on local communities' attitudes towards the protection of the climate change vulnerable Afroalpine Habitat of Chilalo-Galama Mountains Range which one of the four blocks of Arsi Mountains National Park from March 2014 to December 2015. Stratified random sampling technique was used to sample 370 households based on their settlement distance from the protected area. Both qualitative and quantitative data were gathered through observation, questionnaire and focus group discussion and analysed by simple descriptive statistics. More than 81% of the local communities were happy for the protection of Chilalo-Galama Mountains Range since it provides pasture land, water and possess endemic animals like Ethiopian wolf, Mountain Nyla and Hare which can be used for tourism attraction. About 54% of respondents used different resources inside the protected area and had different attitude on the priority of conservation for different groups of animals and plants. They also perceive differently the conservation and protection based on the distance of their settlement from the it. Providing management responsibility to the local community was supported by 98.11% of the respondents as effective conservation strategy. The local communities were also well perceived as climate change affecting the Afroalpine habitat. The local community positive perception on the conservation of area had tremendous contribution for the conservation of the highly Afroalpine habitat which is vulnerable to climate change and high-altitude encroachment pressure.

Key words/Phrases: Arsi Mountains National Park; Afroalpine; Chilalo-Galama; Climate change; Conservation; local community attitude

**Corresponding author: Mohammed Kasso; email: muhesofi@yahoo.com; Cell phone: +251911015198*

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1. Introduction

Biodiversity conservation is the protection, maintenance and/or restoration of living natural resources to ensure their survival over the long term based on the different values, objectives and worldviews (Roe *et al.*, 2011). According to the World Bank (2018), approximately 75% of the populations in developing countries reside in rural areas. These rural communities heavily rely on biodiversity and ecosystem services for their livelihoods and immediate survival. The dependence on biodiversity is because of their physical location and the nature of their livelihood activities like small-scale farming, hunting, collecting and trading of forest products. Biodiversity is often freely available for them and serves as an emergency lifeline during starvation and as a social safety net by providing food, medicines and clean water, climate change mitigation; and as stepping stone out of poverty serving as a source of income generation and jobs through trade, tourism and food production (Roe *et al.*, 2011). Hence, the conservation of biodiversity ensures continuity of services for livelihoods, but, if it is not carefully designed, the conservation intervention may make poor people worse off (Jalilova and Vacik, 2012). For instance, strict enforcement of protected areas and prohibition of resource use increase poverty due to loss of access of resources (Roe *et al.*, 2011). Communities that conserve wildlife should be allowed to use sustainably the surpluses and to receive the revenue earned as an economic incentive for its conservation (Tisdell *et al.*, 2007).

Mammals are among the best recognizable groups of animals and they are more readily studied (Istvan and Derbowka, 2011). Small mammals are the most numerous wild vertebrates in a number of natural biotopes (Kanchev *et al.*, 2012). However, studies of small mammals are among the least favoured subject amongst zoologists or wildlife ecologists in the world (Louis *et al.*, 1988). Furthermore, the local people's knowledge on small mammals is also limited. Many mammal species are not studied in detail because of their rarity and small geographic ranges (Happold, 2013).

Small mammals and their habitats face multiple challenges, including natural and anthropogenic threats. Natural threats include predators, prey, parasites, diseases, inbreeding, genetic deterioration, food availability, shelter, and climate change (Olifiers *et al.*, 2005). Anthropogenic activities like forest fragmentation and alteration of natural communities are also significant threats (Olifiers *et al.*, 2005; Jalilova and Vacik, 2012). Habitat loss and modification are global concerns affecting all species (Istvan and Derbowka, 2011). Cattle grazing impacts grassland plant communities, which in turn affect animal communities relying on vegetation for food, cover, and burrow construction (Torre *et al.*, 2007). Small mammals, playing a crucial role in regulating plant and arthropod communities, are particularly vulnerable in grassland habitats due to their influence on predation pressures (Torre *et al.*, 2007).

Biodiversity, both wild and domesticated, provides a range of livelihood support to local communities. However, it is facing serious threats from different human activities. Some of the major threats are mining in biodiversity rich areas, large development projects, poaching; human-wildlife conflicts, habitat loss and habitat fragmentation due to a variety of human actions, diversion of grazing lands and other common pool resources to other uses, growing demand for fuel and fodder resources and loss of crop and livestock diversity with the promotion of commercial agriculture and animal husbandry.

Conserving biodiversity in human-dominated landscapes requires an understanding of the complex relationships between human activities and species assemblages. Human encroachment and habitat fragmentation pose significant threats to mammalian fauna in Ethiopia, including the Chilalo-Galama Mountains Range, which possesses high diversity. To effectively conserve small mammals and their habitat, it is important to integrate local knowledge and experiences about social and economic constraints. Previous research indicates that understanding the attitudes and beliefs of local communities towards wildlife and their habitat is crucial for designing effective conservation strategies that have public support (Fischer and Lindenmayer, 2007; Singleton *et al.*, 2003). Thus, the aim of this study is to identify potential threats to small mammals and the prevailing conservation challenges in the Chilalo-Galama Mountains range and to assess the attitudes of the local community towards small mammal conservation, with the goal of developing management options that are effective and have political support. Specifically, we examine the contribution of local perceptions to the conservation and management of the Arsi Mountains National Park and highlight the need for further surveys given the increasing impact of human activities and climate change on Ethiopian habitats (Afework Bekele *et al.*, 1993; Mohammed Kasso *et al.*, 2010).

2. Materials and Methods

2.1. Description of the study area

The study was carried out on Chilalo-Galama Mountains Range, as one block of Arsi Mountains National Park (AMNP) occurring between 7°30′ to 8°05′ N latitude and 39°10′ to 39°35′E longitude in the central part of the Arsi Administrative Zone, Oromia Regional State (Mohammed Kasso *et al.*, 2010) (Figure 1). It is bordered by nine Administrative Districts namely Tiyo, Hetosa, Lode-Hetosa, Diksis, Robe, Tana, Shirka, Lemmu-Bilbilo and Digalu-Tijo. Currently the block comprises 45 Peasant Associations (PAs) or Administrative counts. It occurs at about 60 km east of the Ethiopian Rift Valley lakes (Lake Ziway and Lake Langano) and about 200 km southeast of Addis Ababa (Mohammed Kasso *et al.*, 2010).

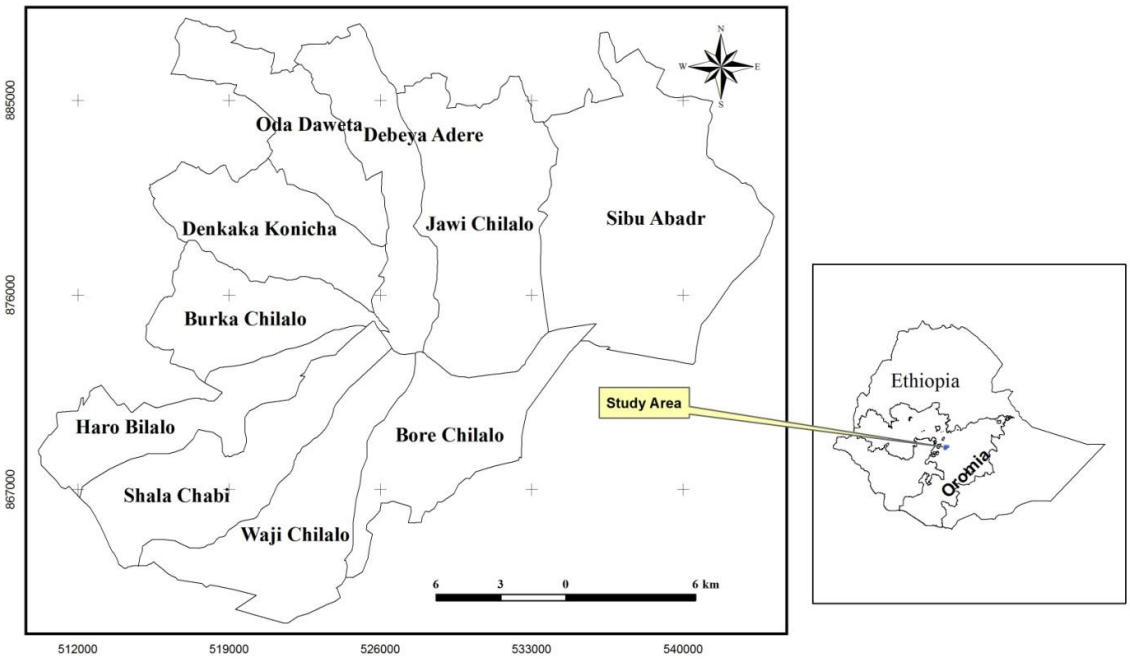

Figure 1. Map of the nine Peasant Associations surrounding Mount Chilalo

2.2. Methodology

The study area was classified into nine clusters (Tiyo, Hetosa, Lode-Hetosa, Diksis, Robe, Tana, Shirka, Lemmu-Bilbilo and Digalu-Tijo) following the boundary line of each District that encloses Chilalo-Galama Mountains Range. Then based on the results of preliminary survey, the study area was decided to include at least seven geographical clusters. The selected study area covered all sides of Mount Chilalo and south-western and central part of Galama Mountains Ridge.

Data on local community perception on the conservation and damage by the small mammals were collected by questionnaire and focus group discussion. Survey of the knowledge, attitudes and practices (KAP) of farmers was conducted on the identification of the major groups of pest small mammals, extent of damage and means of control during March 2014 to December 2015. Data were also collected from the nine peasant associations in Tiyo and Hetosa District that borders with Mount Chilalo (Figure 3). During data collection similar KAP surveys methods undertaken in Philippines by Stuart *et al.*, (2011), in Ethiopia by Meheretu Yonas *et al.* (2010) and Mohammed Kasso (2013), in Myanmar by Brown *et al.* (2008) and in Botswana by Obopile *et al.* (2008) was followed.

A total of 370 households from both sexes (252 males and 118 females) from 9 peasant associations or counties namely Bore Chilalo, Burka Chilalo, Dabaya Adarie, Denkaka Kunicha, Jawi Chilalo, Oda Dhawata, Shala Chebeti and Sibu Abadir were randomly selected based on the following formula.

$$n = \frac{[(z^2 * p * q) + ME^2]}{\left[ME^2 + \frac{z^2 * p * q}{N}\right]}$$

Where:

Z = 1.96, *ME* (Standard error) = 0.05, *N* (total number of households) = 9821, *p* (confidence interval) = 0.5 and *q* = 1-*p*

$$\frac{[(1.96^2 * 0.5 * 0.5) + 0.05^2]}{\left[0.05^2 + \frac{1.96^2 * 0.5 * 0.5}{9821}\right]} = 370$$

Then the total number of respondents selected from each peasant association was calculated based on the proportion of number of households in each PA (Table 1).

Table 1. Members of households in each PA of which households selected

Peasant Association	Male		Female		Grand total	
	Total	Selected	Total	Selected	Total	selected
Bore Chilalo	736	28	352	13	1088	41
Burka Chilalo	606	23	246	9	852	32
Dabaya Adarie	561	21	279	10	840	31
Dankaka Kunicha	709	27	311	12	1020	39
Haro Bilalo	780	29	360	14	1140	43
Jawi Chilalo	719	27	357	13	1076	40
Oda Dewata	793	30	407	15	1200	45
Shala Chebeti	628	24	242	9	870	33
Sibu Abadir	1160	44	575	22	1735	66
Total	6692	252	3129	118	9821	370

Source: Arsi Zone Land use and Natural Resource Department

The number of male and female respondents selected is also based on the proportion of the number of male and female households in each PA (Table 1).

The questionnaire was prepared in English and translated into the Afan Oromo language, as most of the respondents were Oromo. In addition, Amharic language was also used whenever there was a need to clarify the questions and terms. All of the interviews were conducted by an experienced researcher who is native to the area and his mother tongue is Afan Oromo. Before each interview, the respondent was assured as his or her participation was completely voluntary and his options or suggestion is confidential and only used for the use of this study.

The total number of selected respondents from each peasant association was given in Table 1. Stratified random sampling was used to sample households based on the household settlement distance from the protected area such as residents inside the protected area, residents at the border or near the protected area and residents far away from the protected area were considered. Based on their interest and time availability

from 370 respondents interviewed for pest animal damage assessment, 270 were also interviewed for their perception on the conservation of small mammals and their habitat whereas the rest 100 were exclusively interviewed for conservation survey.

2.3. Data analysis

The collected qualitative and quantitative data were analysed with IBM®SPSS® Statistics Version 24 computer program and PAST (Paleontological Statistics Software package for Education and Data Analysis) Version 3.14 Statistical computer programs (Hammer *et al.*, 2001). Appropriate statistical methods such as mean, standard deviation and standard error of the mean, percentage and Chi-square test were used.

3. Results

More than (59.7%) of the local communities were very happy for the protection Chilalo-Galama Mountains Range (Table 2). Their feeling on the establishment and protection of the AMNP in particular the Chilalo-Galama Mountains Range showed variation based on their place of residence. The majority (43%) and (50%) of respondents who were very happy and happy in respective order, belonged to local communities dwelling far-away from the protected area were very happy and happy (50%). Comparatively, 47.8% of the respondents who were not happy for the park establishment and protection were the inside the Park. About 26% of the respondents who were unhappy on park establishment and protection were the nomadic and far away local communities (Table 2). The reasons for unhappiness of inside residence respondents were fear of exclusion and deprivation of access to the resources inside the Park. In contrary to this, the unhappiness for resident respondents far away from the Park was due to the perception of weak enforcement of law and persistence of encroachment and illegal use of the area.

The respondent's agreement on the Park boundary varied based on location of residences. Over 50% of the respondents who agree on the Park boundary demarcation were respondents who were far away from the park (Table 2).

Table 2. Respondents' residence location in relation to protected area and their feeling on the establishment and protection of the park and agreement on the boundary of the park

Place of residence	Feeling on park establishment and protection						Agreement on park boundary					
	Very Happy		Happy		Unhappy		Agree		Not agree		Total	
	No	%	No	%	No	%	No	%	No	%	No	%
Adjacent	34	15.4	18	22.5	0	0	37	16	15	10.8	52	14.1
Faraway	95	43	40	50	18	26.1	117	50.7	36	9.7	153	41.4
Inside	44	19.9	15	18.8	33	47.8	29	12.6	63	45.3	92	24.9
Nomadic	48	21.7	7	8.8	18	26.1	48	20.8	25	18	73	19.7
Total	221	100	80	100	69	100	231	100	139	100	370	100
Proportion (%)	59.7	-	21.6	-	18.7	-	62.4	-	37.6	-	100	-

Out of the total respondents, 172 (46.49%) do not get specific resource inside the protected area whereas the rest 198(53.51%) use different resources inside the protected area.

The prevailing number of respondents (41.41%) possesses farmland, house and barn, garden and plantation (Table 3).

Table 2. Types of resources owned by local communities in different residence locations

Type of resource	Adjacent	Faraway	Inside	Nomadic	Total	Percent (%)
Farmland, house and barn, garden and plantation	15	0	67	0	82	41.41
House and barn	0	0	0	46	46	23.23
Farm land and house	0	0	25	0	25	12.63
Farmland and plantation	18	0	0	0	18	9.09
House, barn and plantation	0	0	0	18	18	9.09
House, barn and garden	0	0	0	9	9	4.55
Total	33	0	92	73	198	100.00

All the respondents had interest for the conservation of Chilalo-Galama Mountains Range although they had slight variation in the interest on the purpose of its protection and conservation. The most commonly mentioned interest usage of water source (Figure 2). The second reason is for conservation of endemic animals like Ethiopian Wolf, Mountain Nyala and other biodiversity.

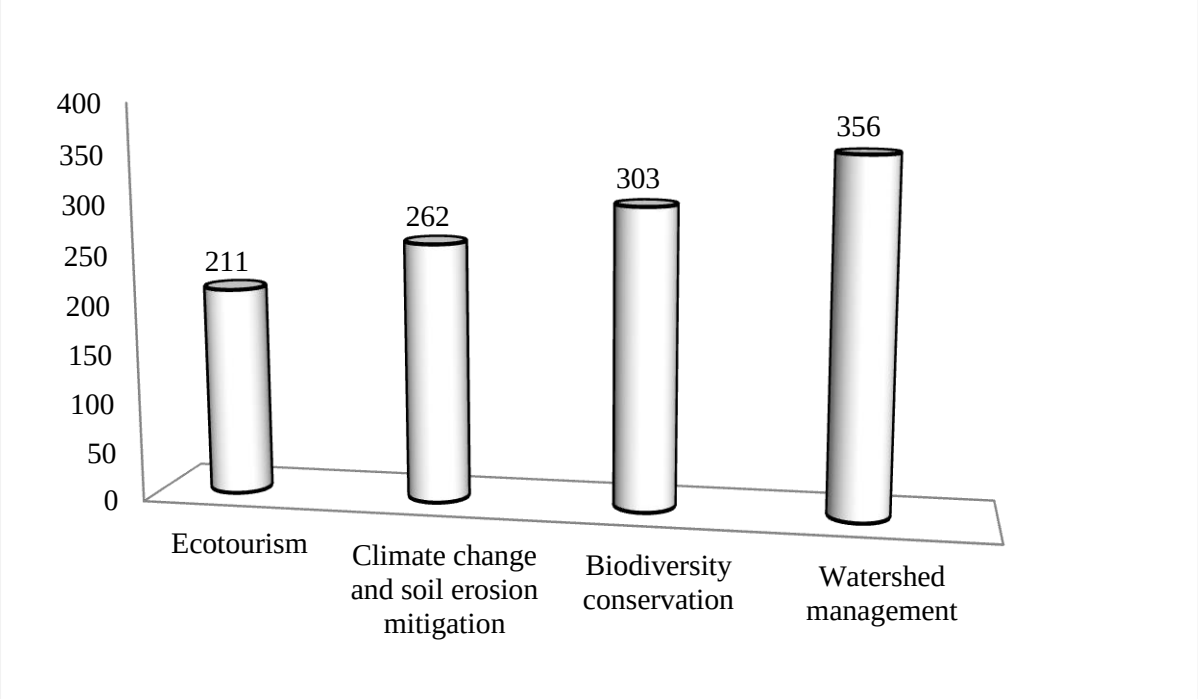

Figure 1. Local communities interest toward the purpose of Chilalo-Galama Mountains range conservation as part of AMNP

Out of all the factors overpopulation was considered as the major threat for conservation was supported by more than 86% of respondents. The second threatening factor was uncontrolled hunting, poaching and deforestation (85.68%) (Table 4). Some of the major threats were also shown on Plate 1.

More than 77% of the respondents did not notice exotic species expansion as threat for conservation of the area (Table 4).

Table 3. Factors that believed as threat for the park conservation

Threats	**Yes**		**No**	
	No	%	No	%
Overpopulation	319	86.22	51	13.78
Uncontrolled hunting, poaching and deforestation	317	85.68	53	14.32
Destruction of habitats by agriculture expansion and settlement	301	81.35	69	18.65
Resource conflict and scrambling to seize park land among the neighboring communities	295	79.73	75	20.27
High demand for charcoal and fuel wood	293	79.19	77	20.81
Poverty, unemployment and lack of food	264	71.35	106	28.65
Presence of predators and pest animals	212	57.30	158	42.70
Climate change	168	45.41	202	54.59
Poor agricultural practice	161	43.51	209	56.49
Price inflation and increment of unemployment rate	152	41.08	218	58.92
Exotic species expansion	82	22.16	288	77.84

Plate 1. Some of the impacts on *Erica* for Charcoal production and fuel wood collection, high encroachment

More than (47%) the respondents confirmed the availability of protection rules and regulations as well as better enforcement (Table 5).

The effort of protection of domestic animal's entrance into the park was judged as poor by 36.49% of respondents and in contrary, it was followed by very good 31.89% (Table 5). However, the conservation practice in Sherka, Lemu Bilbilo, Tana, Robe and Honkolo were very good. In particular, the Honkolo protection from livestock entrance can be used as role model for others and for the practice of community based conservation (Plate 2).

About 46% of the respondents evaluate the suitability of Chilalo-Galama Mountains range conservation by reducing or avoiding the influence of infrastructure as very poor.
Comparatively, most the respondents evaluated the Park as poor based on its suitability for all wildlife (Table 5).

Plate 2. Community based conservation practice and suitable utilization of the resources in Honkolo and northern part of Chilalo-Galama Mountains Range

Table 4. Local community's evaluation on the suitability of Chilalo-Galama Mountains range for the conservation of wildlife and their habitats

Items	**level**			
	Very Good	Good	Poor	Unknown
Availability of protection rules and regulation and their enforcement	177 (47.84%)	83 (22.43%)	84(22.70%)	26(7.03%)
Availability of corridors that allow animals to move freely	122 (32.97%)	117(31.62%)	40(10.81%)	91(24.59%)
Efforts of protection of domestic animals from park entrance	118 (31.89%)	83(22.43%)	135(36.49%)	34(9.19%)
Influence of infrastructures	107(28.92%)	61(16.49%)	170(45.95%)	32(8.65%)
Habitat suitability for all wildlife	102(27.57%)	62(16.76%)	119(32.16%)	87(23.51%)
Extent of protection from illegal encroaching, hunters	102(27.57%)	113(30.54%)	125(33.78)	30(8.11%)
Influence from artificial plantation and exotic species expansion	70(18.92%)	80(21.62%)	143(38.65%)	77(20.81%)

The local communities had different attitude on the priority of conservation for different group of animals and plants. For the conservation of forest and grassland, nearly everyone had positive attitude (Figure 3). Local communities had positive attitude for the conservation of large mammals and birds. However, for small mammals and invertebrate's local communities had nearly stumpy priority (Figure 3).

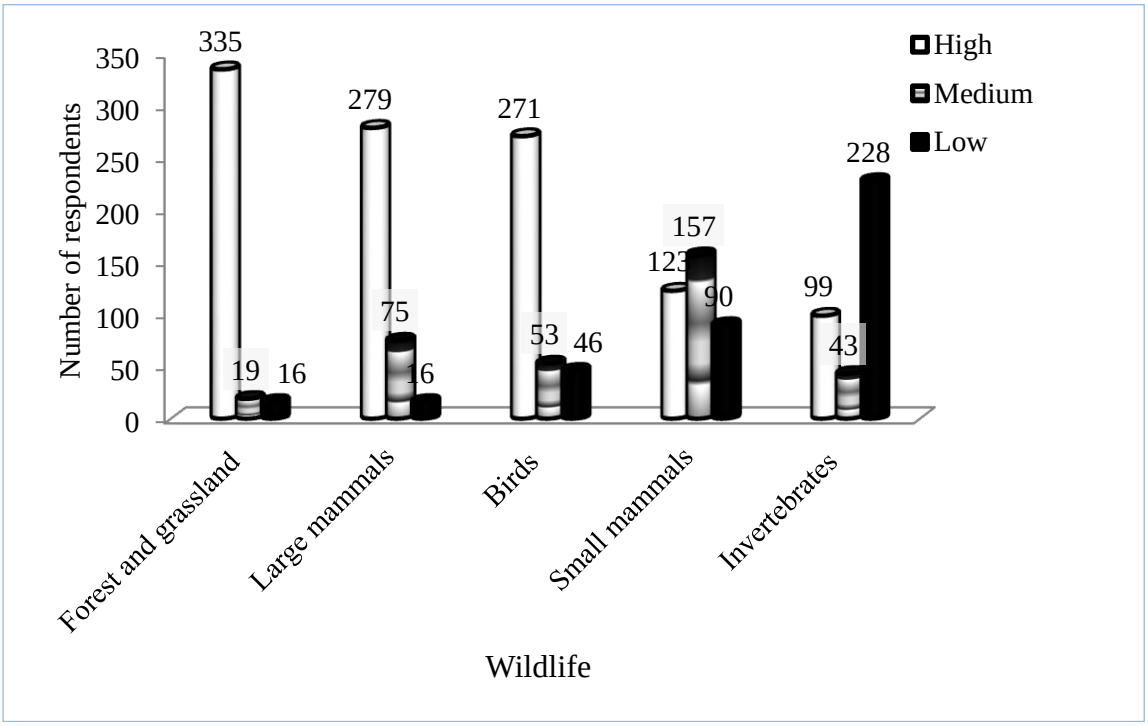

Figure 2. Attitudes toward the conservation of different wildlife

Providing management responsibility to the local community was supported (98.11%) of respondents.

More than half percent of the respondents supported recognition of the local community's rights to use natural resources and culture within the protected area (Table 6).

Table 5. Conservation of management plan to be implemented for the Park

Actions	Agree		Disagree	
	No	%	No	%
Giving management responsibility to local community to manage and use the park	363	98.11	7	1.89
Encouraging participation of local community in co-management activities of the park	363	98.11	7	1.89
Allowing the local community to use the park resource in a sustainable way	264	71.35	106	28.65
Strictly protecting local community from access of any resource and protecting the area for wildlife only	242	65.41	128	34.59
Sharing responsibility and income with local community	195	52.70	175	47.30
Recognizing the local communities rights to use to natural resources and culture within the protected area	188	50.81	182	49.19

4. Discussions

The AMNP is recently established as key biological resource conservation area based on the diversity of large mammal fauna and flora and its unique ecosystem of the area. It has a unique highland ecosystem and center of Oromia Regional State of Ethiopia harboring many unique, rare, endemic or endangered fauna and flora that has a special ecological, biological, social and cultural and conservation interest (Mohammed Kasso *et al.*, 2010). Almost all local communities have positive feeling for the conservation of Chilalo-Galama Mountains Range as protected area. However, the feeling on the establishment and protection of Chilalo-Galama Mountains Range as AMNP showed variation based on their place of residence. Comparatively local communities that reside far-away from the protected area showed very happy tendency to its protection. In particular, the local communities residing inside the Park comparatively were not happy for the Park establishment and protection. Their major reasons for being unhappy on the protection of the area were fear of exclusion and deprivation of access to the resources inside the Park. Frequently, communities are forbidden from extracting natural resources that are important for their livelihoods and removed from their lands with little consultation or adequate compensation (Andrade and Rhodes, 2012). In the same way, there was also similar trend of complaint on the existing boundary of the Chilalo-Galama Mountains Range based on their location of residence. Land is a critical resource for livelihood earning of the people of Ethiopia due to their largely dependence on agriculture. Yet, this valuable asset is being affected by climate change impacts irreversibly.

They are engaged in mixed farming even though most farmers living near ericaceous zone are more inclined to animal rearing than crop production. Currently, there is good tendency and practice by the local community for the conservation of the area. Many

districts like (Shirka, Tana, Dikisi, Robe and Lemmu-Bilbilo) are taking measures in controlling illegal human settlement and agricultural expansions with removal of illegal settlement and farmland that occur in demarcated protected area. In area where such measures have been practiced it is promising for the conservation of the area which benefits the local community and world with its ecosystem functioning like source of water, biodiversity and climate change mitigation (Mohammed Kasso *et al.*, 2010).

The majority of respondents have specific resource inside the protected area. Inhabitants far away from the protected area have no access to the resource and hence do not have any resource inside the protected area with the exception of nomadic pastoralists. The park's establishments were related to expulsion and exclusion of local community that affects local people's perceptions about protected areas (Hartter, 2009). Removing local communities from lands that they have been exploiting for generations without consultation or adequate compensation can result in retaliation and hostile attitudes toward protected area objectives (Hartter, 2009; Andrade and Rhodes, 2012). In addition, restricting local access to natural resources might favor biodiversity conservation in the short term. However, in the long term, such strategies fail to preserve biodiversity (Andrade and Rhodes, 2012). Generally, land degradation which is manifested by deforestation, soil erosion and overgrazing, coupled with climatic variability and environmental instability could escalate the severity of climate change-induced hazards, hence destabilizing the livelihood of local farmers in the region by deteriorating their existence and natural resource basis essential for their survival. All the respondents had interest for the conservation of Chilalo-Galama Mountains Range. Climate change will exacerbate the other sources of environmental degradation and may generate new threats with devastating consequences for both biodiversity and human welfare, especially for the poorest and most vulnerable communities and nations (Lopoukhine *et al.*, 2012). Areas like highlands of Arsi, west Arsi, Bale, East and West Hararge, and central Shewa zones that were formerly considered to receive sufficient rainfall now began to get inadequate rainfall. This also resulted in progressive decrease in water resources both in quantity and in spatial distribution (BoFED, 2008).

Increase of human population density is a threat biodiversity (Luck, 2007). The rapid increase in human population growth and activities that pose greatest threats to bats in Africa include destruction of natural habitat, interference with day-roosts, hunting, and use of pesticides (Happold and Happold, 2013). Local communities also identified as overpopulation was considered the major threat for its conservation. In addition to the indirect negative effect of human activities through habitat disturbance, humans in many poor areas of the world rely to an ever increasing extent on hunting and poaching of mammals for food or trade (Istvan and Derbowka, 2011). 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.

The prominent alien species that cause damage across the country include *Parthenium hysterophorus*, *Prosopis juliflora*, *Eichornia crassipes* and *Lantana camara*. However, in the present study, the majority of local communities did not notice exotic species expansion as a threat for conservation of the area. Nevertheless, they realized exotic species like *Eucalyptus*, *Cupressus* and *Pinus* were affecting on the indigenous plants.

Other factors like climate change, poor agricultural practice and price inflation and high unemployment rate were also considered as threat for the conservation of the area by less than half percent of the respondents.

The rapid increase in population growth has led to rapid deforestation, land clearing, and wetland draining for cropland areas. These actions reduce the area of core habitat for wild animals and eliminate corridors for migration. The current study area is considered relatively better on the availability of corridor that allows animals to move freely. However, the high rate of encroachment and agriculture and settlement in Cheleleka area severely fragments the existing corridor between Mount Chilalo and Galama Mountains Range.

Cattle grazing produce strong effects on the structure and dynamics of grassland plant communities (Torre *et al.,* 2007). Effects of grazing on plants and soil could also affect the animal communities inhabiting grasslands, as they depend on vegetation for food and rely on cover and soil for foraging safely and/or for building temporary or permanent burrow systems (Torre *et al.,* 2007). Areas which were earlier used to serve as pasture lands for livestock grazing and browsing of animals in farming communities have currently shrunk and converted into farmlands because of great pressure imposed from lands for crop cultivations. Abundance and diversity of small mammals are usually affected strongly by grazing due to either decreased food availability or quality, decreased suitability of soil for building burrow systems and increased predation risk in the structurally simpler grazed areas (Torre *et al.*, 2007).

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 has many conservation challenges in Ethiopia. Many studies argue that the knowledge and attitudes of people with regard to mammals constitute a critical issue for the improvement of conservation efforts and people's livelihoods (Jalilova and Vacik, 2012). The results of this study indicate that the local people's knowledge of mammals varied between communities. Even for those who have awareness and knowledge was mostly related to the relatively high-density species that the local people had more opportunities to observe. Income generating activities had a positive influence on local people's perceptions of the benefits of wildlife and the awareness of the project's activities. Local residents generally held positive attitudes towards wildlife because it attracts tourists, creates hunting opportunities during drought, provides a source of income and generates pride in the traditional tribal culture. Negative attitudes are mostly related to human–wildlife conflicts (Jalilova and Vacik, 2012). The local communities had different attitude on the priority of conservation for different group of animals and plants. For the conservation of forest and grassland nearly everyone had high attitude. The second and the third group for which local communities had positive attitude for its high priority of conservation were large mammals and birds in respective order. However, for small mammals and invertebrates, local communities had nearly stumpy priority. Studies by Mohammed Kasso (2013) in Dire Dawa demonstrated that people's negative attitudes were primarily linked with problems associated with damage caused by small mammals. Small mammals were rarely mentioned, which indicated that people did not pay attention to smaller species. The awareness level of mammals varies (Jalilova and Vacik, 2012).

If conservation is to take account of the needs of the poor, then there must be appropriate safeguards to ensure that poor people are not made worse off, or their rights infringed (Roe *et al.*, 2011). Giving management responsibility to local community to manage and utilize its possible resources and encouraging the participation of local communities in co-management activities of the Park was accepted by most respondents. The conservation of biodiversity can be achieved through active participation of local people, which would allow the gaps between policy and its implementation to be overcome (Jalilova and Vacik, 2012).

Even where conservation actions are designed to benefit the poor, there may still be winners and losers among the poor (Roe *et al.*, 2011). The second option of the management plan need to be implemented was the allowing the local community to use the Park resources in sustainable way agreed by most respondents. The importance of incorporating a more participatory approach into protected area decision-making processes in order to foster the implementation of conservation strategies has been widely recognized (Andrade and Rhodes, 2012). When local communities are excluded from protected area management and their needs and aspirations are ignored, it becomes extremely difficult to enforce conservation policies. The majority of respondent agree on the recognition of the local communities' rights to use natural resources and culture within the protected area. The inclusion of local communities in protect area decision-making processes may promote a sense of ownership, where locals cooperatively protect reserves from outsiders and also regulate their own use of natural resources (Andrade and Rhodes, 2012). Decision-making about natural resources management cannot be detached from public involvement. For wildlife management science alone may not be sufficient hence, stakeholder involvement is vital for biodiversity conservation objective to be achieved (Tisdell *et al.*, 2007).

5. Conclusion and Recommendations

5.1. Conclusion

In conclusion, the establishment of the Chilalo-Galama Mountains Range as an Afromontane Natural Park (AMNP) in Ethiopia has generated mixed reactions among the local communities. While communities residing far from the protected area are generally supportive and happy about its conservation, those living within the park express unhappiness due to fears of exclusion and loss of access to resources. This discrepancy in attitudes is a result of limited consultation and inadequate compensation provided to local communities during the process of establishing the protected area. The conservation of the Chilalo-Galama Mountains Range is crucial due to its unique highland ecosystem and the presence of diverse and endangered fauna and flora. Local communities residing near the area have shown positive efforts in controlling illegal settlements and agricultural expansions within the protected area. They recognize the benefits of the park, such as serving as a source of water, preserving biodiversity, and mitigating climate change. However, conflicts arise when local communities are forcibly removed from their lands without proper consultation or compensation. Such actions can lead to hostile attitudes and retaliation towards protected area objectives. It is important to find a balance between biodiversity conservation and the livelihoods of local communities. Restricting access to natural resources may have short-term benefits for conservation but can fail to preserve biodiversity in the long term. Population growth and human activities, such as habitat

destruction, hunting, and the use of pesticides, pose significant threats to the conservation of wildlife in the area. Additionally, land degradation, climate change, poor agricultural practices, and high unemployment rates further contribute to the challenges faced in preserving the Chilalo-Galama Mountains Range. The study also highlights the importance of effective management practices for protected areas. Enhancing the knowledge and attitudes of local communities towards wildlife and involving them in conservation efforts is crucial. Local residents generally hold positive attitudes towards wildlife due to its economic and cultural significance. However, negative attitudes may arise due to human-wildlife conflicts. Conservation initiatives should consider the needs of the poor and ensure that they are not adversely affected or their rights violated. Incorporating a participatory approach in decision-making processes, recognizing the rights of local communities to use natural resources, and involving stakeholders are necessary steps to achieve successful biodiversity conservation. Overall, the research underscores the importance of balancing conservation goals with the well-being and rights of local communities, as well as addressing the various threats and challenges faced in the conservation of the Chilalo-Galama Mountains Range.

5.2.Recommendations

- AMNP has attractive climatic conditions and beautiful natural landscape scenery, as well as cultural and traditional heritages. It also possesses several endemic fauna and flora. It is also in closest to the centre of the country. However, the current underutilization and lack of infrastructure and promotion activity should be improved.
- Threatening factors such as overpopulation, deforestation, illegal high encroachment for agricultural land expansion and settlement, *Erica* fire, over-grazing; over-exploitation for fuel wood and construction materials, habitat degradation and fragmentation should be controlled. Protection and rehabilitation activities are needed to maintain the biodiversity.
- The initiation of local community around Honkolo and districts like Shirka, Tana, Dikisi, Robe and Lemmu-Bilbilo in the control and management of illegal human settlement and agricultural expansion should be encouraged. Such good experience should be used as role model and shared to the others districts surrounding Chilalo-Galama Mountains Range for its effective conservation action.
- The local communities had different attitude on the priority of conservation for different group of animals and plants. Awareness creation and community education on the importance of small mammals and on their conservation need to be carried out.
- The importance of incorporating locals to more participatory approach into protected area decision-making processes should be encouraged in order to foster the implementation of conservation strategies.

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7. Conflict of Interest

There is no any conflict of interest.

8. References

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