# Perception of Local Communities on the Environmental and Socio-economic Benefits and Management Systems of the Bale Mountains National Park, Ethiopia

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# Abstract

Assessing the perception of local communities on the benefits and disbenefits of protected areas is crucial to ensure the sustainability of their multiple benefits to people's livelihood. This study was conducted in Bale Mountains National Park (BMNP), Ethiopia to assess the perceptions of local communities on the benefits and benefit-sharing mechanisms as well as on the existing shared management of the park. Household surveys, key informant interviews, and focus group discussions were tools used to collect data. The results indicated that most local communities exhibited a negative attitude toward the management systems in place though local authorities claim that 60% of the benefits from the BMNP goes to the local communities. This could be attributed to the lack of communication among stakeholders and limited access to the tangible economic benefits at household level. In addition, the focus of existing benefit sharing mechanisms to only known community-based organizations and ecotourism associations, and lack of meaningful participation as well as unhealthy relationships between local communities and the management team could contribute to the development of negative attitudes. Further, the additional costs due to crop damage by wild animals and relocation costs due to the implementation of key strategic plans of the park could contribute to the negative attitudes. Improving the participation of local communities in managing natural resources in the park and local communities' access to the economic benefits could help improve the engagement of local communities and consequently help reduce the observed negative attitudes. Compensation might help to reduce the additional costs incurred to local communities due to crop and livestock damages caused by wild animals. The park management should be transparent to the communities about the revenue of protected areas and engage them when establishing community-based organizations and ecotourism associations.


# Introduction

The world is rapidly losing biodiversity through the degradation of ecosystems due mainly to land use change, climate change, pollution, and invasion of alien species (IPBES, 2019) and this has an ultimate negative impact on the healthy performance of ecosystems (Naeem et al., 1994). Protected areas are a key approach to global ecological conservation efforts and are recognized as the most important way to protect species in their natural habitats (Watson et al., 2014). Over the last decades, massive efforts have been made to manage protected areas using diverse strategies (Vimal et al., 2021). This same study further elaborated that 41% of the terrestrial protected land in the globe is managed via a strict control of human activities to conserve wild areas, 13% is dedicated to particular species or habitats often requiring active management and 25% preserves both natural and cultural values and promotes the sustainable use of resources.

The practice of conservation has a long history in Ethiopia which dates to Emperor Zerea Yacob (1434–1468) (Teressa, 2017), and Ethiopia becomes one of the few countries in the world which uses the management of protected areas as one of the strategies to conserve fauna and flora with a high level of endemic species in the country (Tefera, 2011). Though the country is a signatory to Convention on

Biological Diversity and rich in biodiversity, all the protected areas are being threatened by a growing human population, unsustainable natural resource management, poor enforcement of existing legislation, insecure land tenure and very low public awareness of the impact of climate change and the importance of biodiversity and ecosystems (Young, 2012). The Bale Mountains National Park (BMNP) is one of the biodiversity hotspot areas in Ethiopia and is located at the center of the Bale Eco-region (BER) which covers an area of 2,150 $km^2$ (Watson, 2013). The Park exhibits a big altitudinal variation (ranges from 1500 to 4377 m a.s.l) and consists of five vegetation zones: 1) the northern Grasslands (Gaysay valley), 2) the northern woodlands, 3) montane ericaceous forest, 4) the Afro-alpine moorland, and grassland, and 5) the Harenna Forest (Gashaw, 2015).

Like other parks in the country, the BMNP is exposed to severe human-induced threats due to agricultural expansion, livestock grazing, and increased settlement within and around its boundaries (Williams et al., 2004; Gashaw, 2015). The rapid population growth, poverty, and lack of government commitment to sustainably manage land and water resources, poor law enforcement, and poor implementation capacity of a government officials are affecting the potential of land and water resources in the park to provide ecosystem services (Endalew et al., 2017). Also, this has been putting the region's unique flora, fauna, and water supply for more than 20 million people living downstream at high risk (Gashaw, 2015; Ethiopian Wildlife Conservation Authority, 2017).

In response to these problems, successive Ethiopian governments have been adopting different approaches to protect biodiversity of the BMNP. For example, during the Derg regime (1974–1991) strong ‘protectionist and exclusion management systems’ was applied with the assumption of the protected area’s major advantage to the nation and that it must be protected and excluded from people living adjacent to it (Ongougo et al., 2007). However, the local communities were not happy with this approach, and they frequently set fire to the park. This was mainly attributed to poor benefit-sharing arrangements and the local communities were not benefiting from the revenue being generated out of their resources which they have been sustaining for several years (Tadesse et al., 2011). While most communities viewed protected areas and wildlife positively, the lack of tangible economic benefits limits their support to parks and natural resources management (Tessema et al., 2010).

The state ownership of the park has often excluded the involvement of local communities and worsened the lack of clarity over their rights to receive benefits generated from the park (Jambiya et al., 2012). As a result, negative attitudes over the use and management of the BMNP were developed. This, in turn, threatened the survival of the unique and globally significant fauna and flora (BMNP, 2007; Hussein, 2021). It is increasingly recognized that biodiversity is ultimately lost or conserved at the local level, and it is therefore central that the perception of the local people should be understood, and their interests and priorities should be considered if the management of protected areas and natural resources are to be sustainable (Pratt et al., 2004; Yoseph, 2015).

However, studies investigating the perception of local communities on park management and existing incentive and benefit-sharing mechanisms in the context of the study area are lacking. Also, factors

influencing the perception of local communities and their participation in decision-making processes related to the management of protected areas are not investigated well. Information on the perception of local communities living in and around protected areas is important to integrate the diversity of management strategies that best suit the protection of biodiversity alongside the development of local community livelihoods into conservation plan (Vimal et al., 2021). Furthermore, as a signatory to the Convention on Biological Diversity (CBD), Ethiopia is obligated to implement and fulfill all its responsibilities to protect its biodiversity through sustainable use and fair distribution of benefits derived from genetic resources (IBC, 2009) where such a study gives a brief on the works being done. Therefore, this study was conducted in the BMNP to assess the perceptions of local communities on the environmental and socio-economic benefits of BMNP and benefit-sharing mechanisms for improved management of natural resources and parks.

## Material And Methods

# Study area

The study was conducted in BMNP, Ethiopia (Fig. 1). The Park covers an area of 2,150 $km^2$ with an elevation ranging from 1,500 to 4,377 m above sea level and possesses the largest afro-alpine area in Africa (Gashaw, 2015). The BMNP has a global significance due to the rare, endemic, and endangered species which are found across all taxa and habitat types, and the hydrological system which provides water and thus economic benefits to up to 20 million downstream users (Ethiopian Wildlife Conservation Authority, 2017). Also, other features of the BMNP including the Afroalpine plateau, the Harenna forest, and the distinct altitudinal zones of BMNP have considerable significance to the local, national, and global communities.

The BMNP exhibits diverse climatic conditions, with the plateau and its associated mountains characterized by a cool temperature and high rainfall, whereas the lowland part is characterized by a tropical warm, and dry climate. The eastern part of the BMNP possesses a bimodal rainfall and the long rainy season occurs from July to October with the highest peak in August, and the short rainy season occurs from March to June, with peak rainfall in April. The lowland part of the MBNP receive only a short rainy season, which occurs from February to June (BMNP, 2017). This lower altitude area of the study site receives a mean annual rainfall of 600–1000 mm, whereas the higher altitudinal areas receive 1000-1400mm of mean annual rainfall (BMNP, 2007). The daily temperature of the study area displays a huge fluctuation (ranges from − 15 to 24 °C). The mean annual maximum and minimum temperature is 18.4 and 1.4 °C, respectively.

The livelihood of the local communities mainly depends on farming, livestock rearing, and beekeeping (Teshome et al., 2018). In the southern parts of the National Park, coffee production is one of the major land use systems with increasing importance in terms of contributing to household livelihoods. Coffee is produced in the form of small-scale gardens and wild coffee production systems. The park has devised a 10-year (2017–2027) strategic plan to increase the benefits of local communities from the park through

carbon credit from REDD$^{+}$, community ecolodge development and other tourism related benefits and ensure equitable benefit sharing among communities associated with the park (Ethiopian Wildlife Conservation Authority, 2017). However, limited livelihood alternatives combined with the rapidly increasing human and livestock population are putting heavy pressure on the park's natural resources due to overgrazing, clearing of forest for fuelwood and expansion of agricultural land, medicinal plant, and timber. This even becomes more important in the face of expanding settlement within the park (Gashaw, 2015). These coupled with the weak formal and informal institution and lack of strong commitment to implement the general management plan of the park has increased the degradation of the natural resources (Petros eta al., 2016).

# Study design and Sampling

The study employed a multi-stage sampling approach to select sample districts, kebeles, and households. During the first stage, three districts were selected purposefully from five districts bordering the BMNP. The criteria used to select the three sample districts include population density, the closeness of the districts to the park, the level of interference to the park, and accessibility. In the second stage, eight kebeles were selected from the three districts based on their geographical location and direct interaction with the park, and the existence of jointly managed forests and grazing lands. In the third stage, sample households or respondents from each Kebele were selected using Slovin's formula (Eq. 1) (Table 1).

$$n = \frac{N}{1 + N(e)^2} \quad \text{…… Eq. 1}$$

where n = Number of samples, N = Total population and e = Error tolerance (95% confidence interval or a margin error of 0.05).

Table 1
Total household and proportion of sample size in selected kebeles

| District | Kebele | Total household | Proportion | Number of sampled households |
|---|---|---|---|---|
| Dinsho | Garemba | 1,403 | 20% | 75 |
| | Gojar | 684 | 10% | 36 |
| | Kara Ari | 861 | 12% | 46 |
| | Ayyida | 1023 | 14% | 54 |
| | Gofingira | 607 | 9% | 32 |
| | Hora soba | 760 | 11% | 40 |
| Goba | Angasso | 362 | 5% | 19 |
| Delo | Chiri | 1389 | 20% | 74 |
| | | N = 7089 | 100% | N = 379 |

Key informants (n = 9) were selected from the government (e.g., Ethiopian Wildlife Conservation Authority, Agricultural offices, Oromia Forest and Wildlife Enterprise, tourism development offices) and non-governmental (e.g., Frankfurt Zoological Society) organizations involved in the management of the BMNP. Subject area knowledge, experience, and involvement in the management of the park were some of the criteria used to select key informants. In addition, the study employed focus group discussions (FGD) to strengthen information obtained through household surveys and key informant interviews on the perception of local communities on the benefits and disbenefits of park management, co-existence of wildlife and local communities, and existing incentives to participate in park management as well as their perception on benefit-sharing mechanisms. In each selected kebele, three FGD (men, women, and youth) were conducted with participants having in-depth knowledge and understanding of the BMNP and its management. Each focus group consisted of five members. During the entire fieldwork, 24 focus group discussions were carried out.

# Data Collection And Analysis

The study employed semi-structured questionnaire to collect data from household heads, but either the household head's wife or another permanently resident adult was interviewed if the former was unavailable and if he/she was not able to provide accurate information about the household. In addition, unstructured and open ended, checklists were used to collect data from key informants and participants of focus group discussions. Further, secondary data on benefits of the BMNP and existing benefit sharing mechanisms were obtained from the Frankfurt Zoological Society of Ethiopia.

Household survey data on attitudes and perception of local communities on the level of participation in decision-making, awareness of the importance of BMNP for environmental protection and livelihood, and shared management and benefit sharing mechanisms were analyzed with five possible responses or the 5-Point Likert Scale (Preedy, 2010), in which responders specify their level of agreement to a statement typically in five points: (1) Strongly disagree; (2) Disagree; (3) Neither agree nor disagree; (4) Agree; and (5) Strongly agree. The overall perception or attitude of local communities was assessed using calculated weighted average of responses. The internal consistency of the scale was measured by the reliability coefficient, Cronbach's alpha (Cronbach, 1951). The responses obtained on the 5-point Likert scale were used for three inferential statistics, correlation, One-Way ANOVA, and logistic regression analysis. These analyses were performed to assess household characteristics influencing the perception and attitude of local communities towards the benefits and management of the BMNP. The qualitative data gathered using key informant interviews and FGD were analyzed through topic coding and building categories, themes, and patterns of relationships (Braun and Clarke, 2006). Descriptive statistics was used to describe the characteristics of households engaged in the study. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) Version 20.

# Results And Discussion

# Household characteristics of sample respondents

Majority of respondents in the study area were male-headed households, (334, 88.4%) and are in the age group of 29–50 years (82.1%) (Table 2). Agriculture is the main livelihood mechanism for most respondents (366, 96.6%), while a few (13, 3.4%) of the respondents engaged in other economic activities such as trade and government related jobs to support their livelihood. Although majority of respondents (369, 97.4%) own farmland with a mean size of two hectares, most (286, 75.5%) don't produce sufficient food from their farm to support their livelihoods. The results suggest that only 25.5% of the respondents were food secured, while 74.6% of the respondents were food insecure for three and more than three months. This, in turn increased local communities' dependence on the natural resources of the park. This might have been exacerbated due to high population in the area with an average household size of 7.22 (ranging 2–16), which is much higher than the national and regional average of 4.7 and 4.9, respectively (CSA, 2012). The large household size can be attributed to the practice of polygamy by large number of households surveyed (113, 26%) (Table 2).

Considering the education level, most of the respondents (149, 39.3%) had no formal education and 150 (39.6%) had lower level of education (Table 2). This might have affected previous biodiversity conservation in the area and could have the potential to affect the adoption of new technologies related to the management of natural resources, as education helps local communities better understand the changes in their surroundings and enhance their awareness of the benefits of a healthy environment. Education is also of key importance in managing information on natural resources (Erhabor and Don, 2016; Chen and Tsai, 2017; Sadowska and Lulek, 2020). Respondents displayed considerable differences in landholdings and the number of livestock they own (Table 2). A considerable proportion of the respondents had a small land holding (ranging from 0.25 to 2 ha), herding large number of livestock (6,620 in total) with a mean of 17.5 (ranging from 0 to 45 livestock holding per household). As a result, significant number of households (112, 29.6%) graze their livestock inside the park and communal land around it due the fact that almost all (373, 98.4%) don't have enough private grazing land to graze their livestock. This could contribute to the degradation of natural resources in the BMNP through increased free grazing (Girma et al., 2018; Muhammed and Elias, 2021). Studies conducted elsewhere also demonstrated that open livestock grazing affects the structure of the forest and wildlife in the park (Piana and Marsden, 2014; Soofi et al., 2018). Younger population dominates the population structure (41.8%), implying that more pressure is expected on parks under the current level of landholding and natural resources management.

Table 2
Household characteristics of sampled respondents.

| Socio-economic variables | Number | Percent |
|---|---|---|
| Sex | | |
| Male | 335 | 88.4 |
| Female | 44 | 11.6 |
| **Total** | 379 | **100** |
| **Age category (years)** | | |
| 18–28 | 28 | 7.4 |
| 29–39 | 159 | 41.8 |
| 40–50 | 153 | 40.3 |
| > 50 | 39 | 10.3 |
| **Total** | 379 | **100** |
| **Family size (number)** | | |
| 1–5 | 62 | 16 |
| 6–10 | 278 | 73 |
| 11–15 | 25 | 7 |
| > 15 | 14 | 4 |
| **Total** | 379 | **100** |
| **Marital status** | | |
| Single | 9 | 2.4 |
| Married | 363 | 95.8 |
| Divorced | 7 | 1.8 |
| **Total** | 379 | **100** |
| **Educational status** | | |
| No formal education | 149 | 39.3 |
| Primary | 150 | 39.6 |
| Junior | 61 | 16.1 |
| Secondary and above | 16 | 4.1 |
| Preparatory and above | 3 | 0.8 |

| Socio-economic variables | Number | Percent |
|---|---|---|
| **Total** | 379 | **100** |
| **Land holding (ha)** | | |
| No land | 8 | 2.2 |
| 0.25–2 | 229 | 60.4 |
| 2–4 | 114 | 30 |
| 4–6 | 23 | 6.1 |
| > 6 | 5 | 1.3 |
| Livestock (number) | | |
| 1–15 | 233 | 61 |
| 16–25 | 107 | 28 |
| > 25 | 39 | 10 |
| | 379 | **100** |

# Perception of local communities on the benefits of Bale Mountains National Park

The results of key informant interviews suggested that BMNP is important in providing both environmental and socio-economic benefits to the local communities. For example, the BMNP is key in providing environmental benefits such as conservation of biodiversity, medicinal plants, forest honey and fuelwood and supplying clean water and air for large number of communities. According to data obtained from the Frankfurt Zoological Society of Ethiopia, the BMNP is also important in providing economic benefits through eco-tourism activities such as control hunting and engagement of associations in different activities like tourist guides, horse renters, porters, cooks, handicrafts, coffee providers, and honey providers. In line with this, about ETB 8,946,645.55 (equivalent to US$ 173,098 based on the exchange rate on 8 June 2022) has been generated from 2018 to 2021 through 26 community-based organizations engaged in control hunting activities organized in three control hunting areas (supplementary material 1). Similarly, ecotourism association engaged in varies activities (Supplementary material 2) generated ETB 5,917,696 from 2010 to 2021 (equivalent to US$ 114,494 based on exchange rate on 8 June 2022).

Survey results indicated that local communities' perceptions on the benefits obtained from the BMNP varied across benefit types (Table 3). Majority (70%) of the respondents agree on the perceived benefit of the BMNP in providing important natural resources such as water supply, fuelwood and medicinal plants and practicing beekeeping (Table 3). In addition, a significant proportion (59.9%) of respondents agree on the contribution of the BMNP to the conservation of biodiversity (Table 3). However, only 17% of the

respondents agree on the importance of the BMNP in creating jobs. In line with this, participants of focus group discussions elaborated this as:

*"The BMNP has great contributions in protecting the environment and maintaining agricultural productivity. However, the management of the BMNP is constrained in generating tangible economic benefits for wider communities and that benefits are channeled only through kebele administrations and community-based organizations. The BMNP also constrained in allocating some resources from the revenues to address some crucial problems of local communities such as lack of clean water".*

A considerable proportion of the respondents (40%) strongly disagree and (43%) were undecided/neutral regarding the importance of BMNP importance for tourist attraction and the conservation of biodiversity (Table 3). The regression analyses also showed that household characteristics such as age, education level, livestock holding, and family size did not have significant influence on the perception of respondents on the benefits of BMNP. These results suggested that more efforts are needed to improve local communities' awareness on the importance of BMNP for livelihood and environmental protection. Other similar studies conducted in the BMNP (e.g., Asmamaw and Verma, 2013) also indicated that most of the local communities had a low level of awareness of the importance of BMNP for tourist attraction and were not aware of community-based tourism. However, the better agreement of local communities with the importance of BMNP in environmental conservation and associated benefits (e.g., beekeeping, better water supply, and air quality) could help improve local communities' participation in park management. A relatively better understanding of the link between park management and environmental conservation and associated benefits could be attributed to environmental education offered to the local communities by the park management (Ardoin et al., 2020). This, in turn, supports to increase community-based tourism in the study area (Welteji and Zerihun, 2018). One of the key informants elaborated this as:

*"The awareness of local communities on the importance of BMNP for their livelihood is improving. However, it is still crucial to increase the benefits of local communities from the protected area through job creation and livelihood diversification".*

In line with this, Aseres and Sira (2021) indicated that increasing the economic benefits of local communities from the protected areas improves their participation and enhances the protection of protected areas. This, in turn, supports reducing conflicts and improving the sustainable management of parks. Similarly, Chevallier and Milburn (2015) demonstrated that protected areas flourish when embedded in a landscape in which the welfare of all stakeholders is considered. The success of conservation strategies through protected areas may lie in the ability of managers to reconcile biodiversity conservation goals with social and economic issues and to promote greater compliance of local communities with protected areas' conservation strategies (Andrade and Rhodes, 2012).

The results also demonstrated that efforts need to be exerted to increase the tangible benefits from the protected areas. Tangible economic benefits enhance the interest of local communities to engage in the management of the park. This, in turn, enhances the protection of the park and the sustainable

management of resources available within the park. In line with this, one of the key informants described this as:

*"The contribution of the BMNP to generate income and improve the livelihood of the local communities is limited to community-based organizations and ecotourism associations engaged in activities such tourist guides and horse renting".*

Similarly, one of the key informants elaborated this as:

*"The existing park management approaches did not give attention for the needs and priorities of the local communities in developing infrastructures and facilities within the park, which consequently affected local communities' involvement in park management and realizing the existing shared management and benefit sharing mechanisms".*

Local communities' perception was not consistent with the perception of the management team that administer the BMNP. The management team perceived that the local communities have been gaining income and benefit from the park through different ecotourism activities (Supplementary materials 2). The park management team also explained that the local communities are benefiting from controlled hunting activities organized in three different controlled hunting areas (Supplementary material 1). Some of the key informants and participants of focus group discussions also supported the idea of the management team in that they revealed the benefits obtained from the park though they mentioned that it was not enough. Such difference between the local communities and park management team in the perceived benefits of the park could arise from the un proportional distribution of benefits among the studied districts. For example, from districts included in this study, controlled hunting is practiced in one district (i.e., Dinsho district) and only two out of the 26 community-based organizations reside in this district. This could have contribution on the discrepancy between local communities' perception and park management team. This, in turn suggests expanding the establishment of community-based organization and ecotourism association and improve local communities access to generated benefits in the other districts bordering the park.

Perception of local communities on existing shared management, incentive and benefit sharing mechanisms.

The results indicated that there are efforts to implement shared or joint management practices through developing the general management plan using a participatory process involving a review of problems and issues carried out by park staff, a stakeholder workshop and community consultations. The benefit sharing mechanisms in place in the park are mainly implemented through community-based organization and kebele administration (this mainly works for benefits generated through control hunting activities, Supplementary material 1) and through different ecotourism associations (mainly for benefits generated through various ecotourism activities, Supplementary material 2).

The survey results suggested that the respondents were not happy with the existing shared management, incentives, and benefit-sharing mechanisms (Table 3). For example, more than 50% of the respondents disagree with the key statements describing the engagement of local communities in the management of park, incentives, and the level of transparency (Table 3). This could be attributed to the fact that the general management plan, designed for 2017–2027 is not fully implemented and its fruits were not realized. Also, the limited tangible or short-term economic benefits, restrictions to the use of natural resources, loss of crops and livestock due to damage by wild animals, and conflicts with park managers could contribute to the dissatisfaction of local communities. The results also suggest that local people did not have a sense of strong ownership towards BMNP, and they did not look at it as a valuable resource for their livelihood. In summary, the existing management and incentive systems of the park is not attractive to the local communities.

The regression analyses revealed that the perception of local communities on existing shared management system, incentives and benefit sharing mechanisms significantly varies among the three studied districts ($F_{(2, 376)} = 4.937, P < 0.05$). Respondents from the Goba district better accept the existing shared management, incentive and benefit sharing mechanisms than respondents in Dinsho district. This could be attributed to the difference in the level of dependence on park resources between the residents of the two districts. For example, communities in Dinsho district are highly dependent on the resources from the park either for grazing, fuelwood collection and they are the ones affecting the park due to settlement and agricultural expansion. Therefore, the probability of developing significant positive perception on existing shared management might be rare.

Table 3
The perception of local communities on the benefits, participation, shared management, and benefit-sharing mechanism

| Statement | Five-point Liker Scale | | | | | Mean ± SD |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| **Benefits of the Bale Mountains National Park as perceived by respondents.** | | | | | | |
| Communities are aware of the importance of BMNP to attract tourists. | 40 (10.6) | 71 (18.7) | 51 (13.5) | 217 (57.3) | 0.0 | 3.17 ± |
| The BMNP benefits local communities through improving services such as hotels, lodges, camping facilities, and other industries established through Ecotourism | 53 (14.0) | 129 (34.0) | 107 (28.2) | 90 (23.7) | 0.0 | 2.95 ± 1.92 |
| The BMNP supports job creation through Ecotourism activities. | 229 (58.0) | 0 (0) | 95 (25.1) | 64 (16.9) | 0.0 | 2.01 ± 1.23 |
| The BMNP allows the local communities to participate in horse renting activities. | 86 (22.7) | 0 (0) | 138 (36.4) | 155 (40.1) | 0 (0) | 2.96 ± 1.45 |
| The BMNP benefits local communities by providing opportunities to get a medicinal plant, forest honey, and firewood | 229 (58.0) | 0 (0) | 62 (16.4) | 118 (31.1) | 168 (44.3) | 3.59 ± 0.86 |
| Bale Mountains National Park is a hotspot area that brings the supply of clean water and air. | 4 (1.1) | 27 (7.1) | 62 (16.4) | 119 (31.4) | 167 (44.1) | 3.59 ± 0.86 |
| The BMNP supports the conservation of biodiversity | 4 (1.1) | 43 (11.3) | 105 (27.7) | 227 (59.9) | 0.0 | 3.46 ± 0.74 |
| Overall, the communities are satisfied by the amount and type of benefit derived from the BMNP. | 95 (25.1) | 177 (46.7) | 96 (25.3) | 11 (2.9) | 0.0 | 2.06 ± 0.79 |
| **Perception of local communities on existing shared management, incentive and benefit sharing mechanisms.** | | | | | | |
| Local Communities around BMNP are familiar with the existing shared management and benefit-sharing mechanism. | 45 (11.9) | 172 (45.4) | 67 (17.7) | 95 (25.1) | 0.0 | 2.56 ± 0.99 |
| The existing management system encourages members of local communities to Participate in shared management approaches. | 60 (15.8) | 155 (40.9) | 129 (34.0) | 32 (8.4) | 3.0 (0.8) | 2.32 ± 0.90 |
| The existing management system is transparent for local communities on benefit-sharing arrangements. | 60 (15.8) | 165 (43.5) | 120 (31.7) | 34 (9.0) | 0.0 | 2.34 ± 0.85 |
| The existing management system is agreed by local communities. | 60 (15.8) | 190 (50.1) | 77 (20.3) | 52 (13.7) | 0.0 | 2.32 ± 0.90 |

| Statement | Five-point Liker Scale | | | | | Mean ± SD |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| The existing management system is willing to pay incentives to compensate costs of communities incurred due to crop damages. | 68 (17.9) | 164 (43.3) | 78 (20.6) | 69 (18.2) | 0.0 | 2.39 ± 0.98 |
| The members of the local communities show interest to support the management of BMNP. | 25 (6.6) | 139 (36.7) | 129 (34.0) | 60 (15.8) | 26 (6.9) | 2.79 ± 0.01 |
| There is a sense of strong ownership by the members of local communities towards BMNP. | 22 (5.8) | 157 (41.4) | 107 (28.2) | 60 (15.8) | 33 (8.7) | 2.81 ± 106 |
| **Participation of local communities in managing the Bale Mountains National Park.** | | | | | | |
| Local people participate in benefit-sharing related decisions | 40 (10.6) | 139 (36.7) | 88 (23.2) | 106 (28.0) | 6 (1.6) | 2.56 ± 2.56 |
| Local communities have the opportunity to involve in the development of a protected area management system. | 27 (7.1) | 68 (17.9) | 85 (22.4) | 134 (35.4) | 65(17.2) | 3.37 ± 1.17 |
| Local peoples are consulted about establishing ecotourism service provider associations. | 21 (5.5) | 186 (49.1) | 38 (10.0) | 58 (15.3) | 76 (20.1) | 2.95 ± 1.29 |

*(1) Strongly disagree; (2) Disagree; (3) Neither agree nor disagree; (4) Agree; (5) Strongly agree. Values in the bracket are percent values. The mean is weighted mean.*

# Communities' participation in Managing Bale Mountains National Park

The study assessed the level of participation of local communities at different stages (from planning to monitoring and evaluation) of activities related to the management of the BMNP. Majority of the respondents (36.7%) did not agree on the level of local communities' participation in decision making processes in the BMNP (Table 3), which seems that the decision-making system in BMNP still follows top-down approach or not inclusive. This might negatively affect the sustainable conservation of biodiversity of the park as lack of control on the decision-making process may hinder their ability and willingness to support the future conservation of the park (Umuziranenge and Muhirwa, 2017). Also, majority of respondents (49.1%) did not agree on the statement that the local communities participate when the park management team establishes community-based organizations and ecotourism associations (Table 3). However, the degree of agreement on the statement describing local communities' participation in developing the management systems of the park was relatively good or (35.4%) (Table 3). In line with this, one of the key informants elaborated this as:

*“The park management teams usually encourage the local communities to participate in managing the protected areas through engaging them in environmental education, tree plantation, and outreach programs”.*

Improving the participation of local communities is key to sustain the benefits from the park, as the participation of local communities helps to ensure the sustainable management of natural resources within the park (Iori, 2012). It is a fact that taking part actively in protected area management and decision-making processes is a proper way of including the local communities in protected area management and this helps in developing positive attitudes and perceptions towards protected area management. Participation of local communities in protected area management is a good approach that would not only minimize the cost of management and conservation but also helps in changing the attitudes and perceptions of the local people towards protected areas, wildlife, and tourism (He et al., 2020). The general management plan of the BMNP (2017–2027) also recognized the importance of meaningful participation in park management and designed following participatory approach.

# Factors affecting the attitude of local communities on the parks and its management

Most of the respondents 44.9%, 37.7% and 34.6% agree that the lack of communication, lack of short-term economic benefits, and unhealthy relationships with park management team were the potential factors negatively affecting local communities’ perception on the management of the BMNP, respectively (Table 4). The correlation analysis also showed that these variables negatively and significantly associated with the attitudes of local communities on the existing shared management, incentives and benefit sharing mechanisms ($r = -0.222, P < 0.05$). Further, the results of multiple regression analysis (Table 5) demonstrated that livestock holding and the number of months being a household food insecure negatively and significantly ($p < 0.05$) influence local communities’ perception on the park and its management. This could be because, those households having large number of livestock would like to graze in the BMNP, which is not consistent with the existing management system. This, in turn contributes to develop negative attitude towards the park and its management systems. The food insecurity of a household increases its dependence on natural resources and interference to the park, which could result in conflict between local communities and the park management. This, in turn contributes to the development of negative attitude on households who are food insecure. In summary, the results suggest that more efforts are needed to build positive attitude among communities through increasing access to tangible economic benefits, ensuring meaningful participation and building trust.

Interestingly, the BMNP management team did not agree that the lack of short-term economic benefits can be one of the reasons contributing to the development of negative attitudes among local communities. The management team argues that the local communities are obtaining economic benefits through community-based organizations and ecotourism associations (Supplementary materials 1, 2). The management team further elaborated that the benefits might not be enough due to the limited capacity of the park in generating economic benefits and benefits are shared through Kebeles and

association. Studies (e.g., Iori, 2012) indicated that issues related to economic benefits and benefit-sharing are usually sensitive and affect the relationship between stakeholders managing protected areas.

Table 4
Factors affecting the attitude of local communities towards the management of Bale Mountains National Park

| Statements | Five-point Liker Scale | | | | | Mean SD |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| Lack of regular communication between the local communities and the park management team on benefit-sharing mechanism. | 25 (6.6) | 35 (9.2) | 96 (25.3) | 170 (44.9) | 53 (14.0) | 3.27 ± 1.07 |
| Lack of short-term economic benefits from the BMNP. | 16 (4.2) | 67 (17.7) | 60 (15.8) | 143 (37.7) | 93 (24.5) | 3.18 ± 1.21 |
| Unhealthy relationship between communities and park management team. | 25 (6.6) | 49 (12.9) | 69 (18.2) | 131 (34.6) | 105 (27.7) | 3.23 ± 1.63 |
| Lack of meaningful participation in decision-making related to the management of the park. | 8 (2.1) | 26 (6.9) | 112 (29.6) | 104 (27.4) | 129 (34.0) | 3.44 ± 0.89 |

Table 5
Logistic regression showing relationship between household characteristics and attitudes towards BMNP and its management

| Variable | B | SE | t | P |
|---|---|---|---|---|
| Gender | 0.043 | 0.091 | 0.471 | 0.638 |
| Age | -0.001 | 0.004 | -0.173 | 0.863 |
| Household size | 0.008 | 0.012 | 0.676 | 0.500 |
| Education | 0.053 | 0.033 | 1.628 | 0.104 |
| Size of land | 0.027 | 0.023 | 1.138 | 0.256 |
| Livestock holding | -0.019 | 0.006 | -3.041 | 0.003 |
| Food insecurity | -0.065 | 0.021 | -3.069 | 0.002 |

Note: *B refers to logistic regression coefficient, SE refers to standard error, t refers to t statistics (which has a $\chi^2$ distribution), and P = level of significance.*

The results demonstrated that majority of the respondents agree with statements that indicate communities living adjacent to the BMNP suffer losses in crops, livestock, and human lives as well as incur additional costs related to the shortage of fuelwood and relocation costs (Table 6), which could negatively affect the perception of local communities on BMNP.

Table 6
Agreement of respondents to statements describing costs incurred by local communities due to the presence of BMNP

| Statements | 1 | 2 | 3 | 4 | 5 | Mean ± SD |
|---|---|---|---|---|---|---|
| Communities that are living adjacent to the conservation areas, suffer losses in crops, livestock, and human lives. | 0.0 (0.0) | 14.0 (3.7) | 39.0 (10.3) | 231.0 (60.9) | 95.0 (25.1) | 4.07 ± 0.71 |
| Local communities incur a lot of costs to compensate for the damages caused by wild animals. | 0.0 (0.0) | 9.0 (2.4) | 49.0 (12.9) | 253.0 (66.8) | 68.0 (17.9) | 4.00 ± 0.64 |
| Human-wildlife conflicts increased with time and crop and livestock loss displayed an increasing trend. | 0.0 (0.0) | 2.0 (0.5) | 44.0 (11.6) | 168.0 (44.3) | 165.0 (43.5) | 4.27 ± 0.65 |
| The local communities incur an additional cost to get fuelwood due to the protection of the park from human interference. | 0.0 (0.0) | 1.0 (0.3) | 52.0 (13.7) | 187.0 (49.3) | 139.0 (36.7) | 4.22 ± 0.68 |
| The community incurs costs to settle in a new place due to relocation caused by the expansion of the BMNP. | 0.0 (0.0) | 11.0 (2.9) | 83.0 (21.9) | 199.0 (52.5) | 86.0 (22.7) | 3.95 + 0.75 |

The key informants and participants of focus group discussions also supported this and further elaborated that Common warthog (*Phacochoerus africanus*) are the major problematic animal causing significant losses to crop of farmers adjacent to the park. In line with this, one of the participants of the focus group discussions described this as:

*"We are very much disappointed that the administrators of the BMNP did not give attention to damage caused by wildlife. They only focus on the protection of the park and fining the local communities".*

In addition to the commonly known damage caused by wildlife, local communities incur an additional cost to get fuelwood due to restrictions of human interference into the park. This was supported by 86% of respondents and mentioned as one of the most important costs for local communities. This is also supported by the participants of focus group discussions in that they mentioned that local communities restricted access to resources outside the park by worrying punishment they could face if captured when they cut trees and graze in the park. Even though the park management prevented them to access resources, local communities still illegally accessed resources in the park.

Further, local communities incur costs to settle in a new place due to the implementation of the new strategies of the park management (Ethiopian Wildlife Conservation Authority 2017). This was supported by about 78% of the respondents. In line with this, Yosef (2015) indicated that relocation of the local communities has negatively affect the relationship of the park authority and the communities because it had been done by force.

# Conclusions

The study investigated the perception of local communities on the environmental and socio-economic benefits, benefit-sharing mechanisms, and participation in the management of the BMNP. The results suggested that the participation of local communities in managing the BMNP was not optimal and needs improvement. The modalities of participation should be inclusive and should not be focused on associations or groups who are directly benefiting from the park. Most of the local communities exhibited negative attitudes toward the park due to the lack of tangible short-term economic benefits, damages caused by wildlife, and lack of clear benefit-sharing mechanisms. Also, the additional costs incurred by the local communities due to crop and livestock damage caused by wildlife, restricted access to forest for fuelwood, costs due to relocation contributed to the development of negative attitudes among local communities in the BMNP. The results of the study supported that improving the participation of local communities in the planning, implementation and monitoring and evaluation stage of the park management could help improve the engagement of local communities and consider their interest and priorities, and consequently help reduce the observed negative attitudes. Compensation or implementing an insurance system might help reduce the additional costs incurred by local communities due to crop and livestock damages caused by wildlife. Continues meetings and awareness-raising campaigns could help local communities better understand the benefits of BMNP and improve the relationships between park managers and local communities. In summary, the park management and other relevant stakeholders should work to revitalize fair benefit sharing to communities as the sustainability of the BMNP management depends on the provision of tangible economic benefits to local communities. In line with this, concerted efforts are required to properly implement the long-term general management plan of the park, which is designed following participatory approach.

# Statements & Declarations


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### Competing Interests

The authors have no relevant financial or non-financial interests to disclose.

### Author Contributions

*All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by All authors. The first draft of the manuscript was written by [Endaylallu Gulte] and [Wolde Mekuria] all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.*

### Data Availability

*The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.*

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# Figures

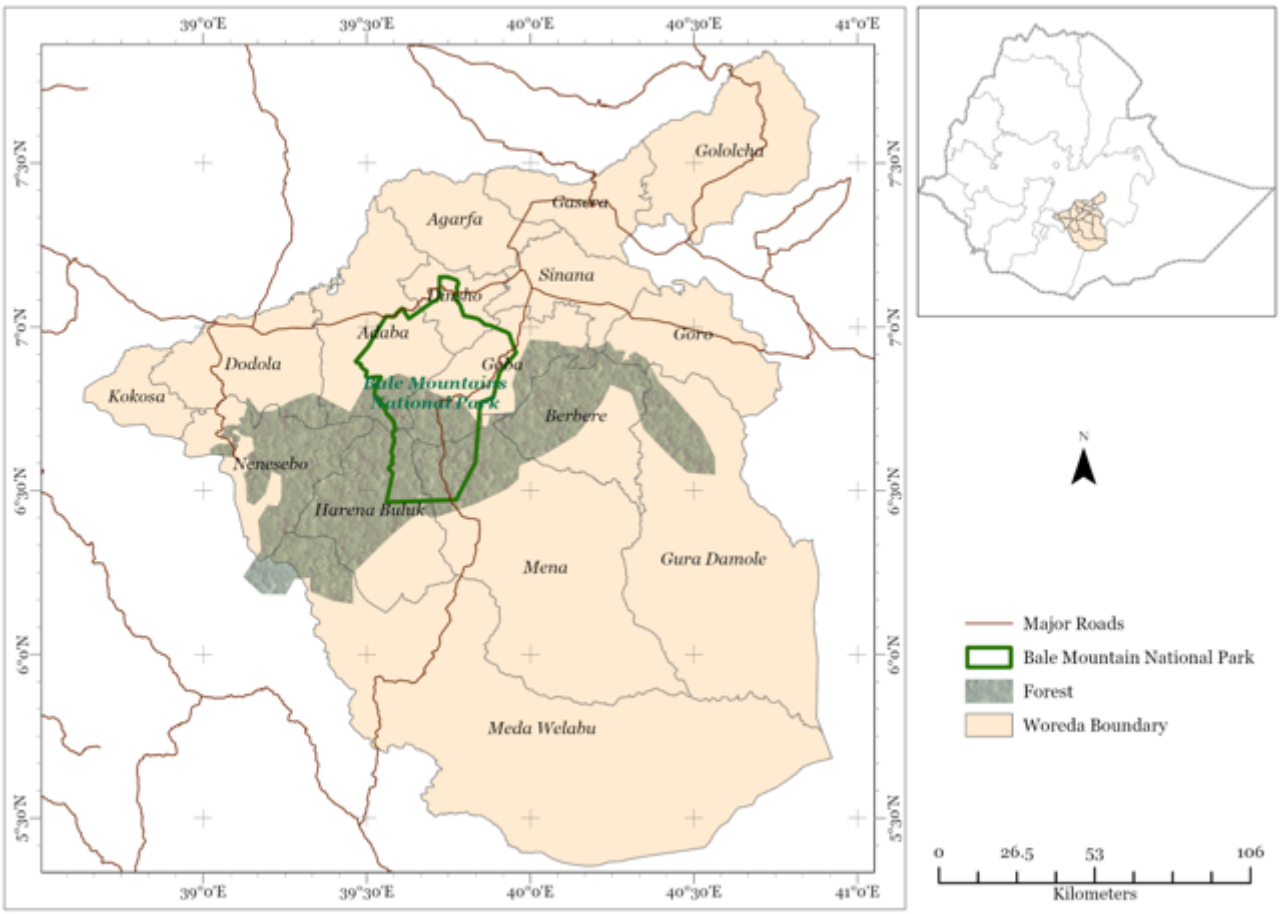


**Figure 1**

Location map of the Bale Mountains National Park, the study area

# Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SupplementaryMaterial1BenefitControlHunting.xlsx
- SupplementaryMaterial2BenefitEcotourismactivities.xls