

Threats of Bale Mountains National Park and solutions, Ethiopia

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ABSTRACT

Protected areas are the main biodiversity home throughout the world. The Bale Mountains National Park is one of the protected areas of Ethiopia containing the largest Afro-alpine habitat in the continent. The park was established in 1970, supporting high levels of species richness and endemism. In Bale Mountains National Park, 78 mammal species (22 are endemic) and 278 bird species (16 are endemic) have been recorded. Furthermore, the park is an important source for more than 40 rivers and 340 recognized medical plants. In spite of the huge potential of the area, agricultural land is expanding rapidly, grazing areas are heavily degraded, forests are being cut and cleared, and water systems disrupted. There is no effective resource ownership, and users are taking advantage as open access resource management regimes in the area. Consequently, resource losses are increasing alarmingly. Having the problem, remedial solutions taken for conservation of park resources are minimal. Therefore, this paper aims to explore the threats of Bale Mountains National Park and to suggest solutions. Data for this review were collected from journals, books, symposiums and thesis.

Key words: Ethiopia, Bale Mountains National Park, Solutions Threats.

INTRODUCTION

Ethiopia with a land area of 1.12 million square kilometers is a relatively vast country having a wide variety of topography and climate. Altitude ranges from 4620 m asl at the top of Mt Ras Dashen to 116 m below sea level in the Danakil depression. The differences in altitude, coupled with topographic variations, have resulted in wide variations in rainfall, humidity and temperature. Thus, the country comprises of nine ecosystems that range from afroalpine at the highest elevations to desert and semi-desert ecosystems at the lowest elevations (BIDNTF, 2010).

Along the different ecosystems, there are many designated protected areas of land in Ethiopia including national parks, wildlife reserves, priority forests, biosphere reserves and community conservation areas. These areas act as biodiversity 'banks', important spiritual places, centers for traditional ecological knowledge and bringing revenues from tourism and carbon trading (Young, 2012). Protected areas in

Ethiopia cover from 15% (BIDNTF, 2010) to 16.5% (Scherl et al., 2004) of the country's land mass. However, given its rich biodiversity resources, the extent of protected areas in the country is negligible (BIDNTF, 2010).

The Bale Mountains National Park (BMNP) is one of the protected areas in southeastern Ethiopia with the largest areas of continuous Afroalpine and Afromontane forest habitats in Africa (Alers et al., 2007; Maselli et al., 2010). The park was established in 1970 containing an area of 240,000 hectares in the Bale massif. It was established by the Ethiopian Wildlife Conservation Organization (EWCO) with the primary objective of conserving the wildlife (endemic species like the Mountain Nyala (*Tragelaphus buxtoni*) and the Ethiopian wolf (*Canis simensis*) and other valuable natural resources in the area (Anteneh and Temesgen, 2009). It protects a broad range of habitats from 1,500 m asl in moist montane forest and ericaceous shrubland to 4370 m asl in Afro-

alpine habitat on the Sanetti plateau (Alers et al., 2007). It is one of the 34 conservation international biodiversity hotspots and qualified for world heritage site and biosphere reserve listing (Anteneh and Temesgen, 2009). The BMNP supports high levels of species richness and endemism (OFWE et al., 2014). To date, 78 mammal species have been recorded in BMNP, of which 22 of these mammals are endemic to Ethiopia (Alers et al., 2007). From the total endemic mammals recorded in the Ethiopian highlands, 67% are endemic to the Bale Mountains. This is by far the highest proportion of endemics (OFWE et al., 2014). In addition, 278 bird species have been recorded; 16 birds are Ethiopian endemics (Alers et al., 2007). 57% of Ethiopia's endemic birds are found in the Bale Mountains, such as Rouget's rail, spot-breasted plover, blue-winged goose, the black headed siskin and white-backed black tit (Frankfurt Zoological Society, n.d). Thus, the area is not only protecting a significant portion of Ethiopia's and world's biodiversity, but is also an area with immense benefits for species evolutionary processes (OFWE et al., 2014). Besides to being the home of Ethiopian endemic mammal and bird species, BMNP is an area rich in medicinal plants. More than 340 medicinal plants are recognized in BMNP. In addition, the Bale Mountains are also an important water catchment and the source of more than 40 rivers and streams, including four major rivers: Wabe Shebelle, Web, Dumal, and Welmel. Wabe Shebelle is a critical water source for lowland areas in Ethiopia and neighboring Somalia, especially during the dry season (Alers et al., 2007).

In spite of its huge potential and importance, ecological degradation is rapid and poses a severe threat to the survival of most of these species (Farm Africa, 2008; Maselli et al., 2010; OFWE et al., 2014). In BMNP, there is rapid village expansion in and around the park (Jacobs and Schloeder, 2001). Parallel to village expansion, agricultural lands are expanding, forests are being destroyed, overgrazing is overwhelming and forest fire is recurrent (Alers et al., 2007; ETFF, 2007; Anteneh and Temesgen, 2009). If conservation efforts are not successful and people continue to exploit the resources in an unsustainable way, more species of mammals would go extinct than any area of equivalent size on the globe (OFWE et al., 2014). It is only recently the park is legally gazetted. Therefore, the main objective of this review is to explore the threats of BMNP and to suggest solutions.

LITERATURE REVIEW

THREATS OF BALE MOUNTAINS NATIONAL PARK

BMNP (6°29' – 7°10'N and 39°28' – 39°57'E) is located 400 km in southeast of Addis Ababa in Oromia National Regional State. The park belongs to the Bale-Arsi massif,

which forms the western section of the south-eastern Ethiopian highlands covering 240,000 hectares (Alers et al., 2007; Frankfurt Zoological Society, n.d). The park protects a broad altitudinal range of habitats from 1,500 m asl in lowland deciduous woodlands through moist montane forest and ericaceous shrubland to 4,370 m asl in Afro-alpine habitat on the Sanetti plateau with the highest peak, Tullu Dimtuu, at 4,370 m asl (Alers et al., 2007). The park is divided into into five distinct and unique habitats. These are the Northern Grasslands (Gaysay Valley), Northern Woodlands (Park Headquarters), Afro-alpine Meadows (Sanetti Plateau), Erica Moorlands, and the Haremma Forest. It is known for being home to the largest populations of both the endemic and endangered Ethiopian wolf (*Canis simensis*) and mountain nyala (*Tragelaphus buxtoni*), as well as the endemic Bale monkey (*Chlorocebus djamdjamensis*) and giant mole rat (*Tachyoryctes macrocephalus*) (https://en.wikipedia.org/wiki/Bale_Mountains_National_Park).

The BMNP are relatively environmentally intact. It is not shattered by ancient history of cultivation and land degradation. However, the rapidly growing negative pressures on natural resources are threatening the sustainability of the environment (Farm Africa, 2008). Some of the threats are listed and discussed below.

Village Expansion

The BMNP has been under increasing pressure from a rapidly growing human population (Flintan et al., 2008). The population is increasing almost linearly (Figure 1). As a result of this growth, existing settlements are growing, and new settlements are appearing in previously unsettled and environmentally sensitive areas. The emerging of new settlements is mainly associated with the rapid immigration from the surrounding lowlands (Jacobs and Schloeder, 2001; Farm Africa, 2008). As a result of the expansion of villages, Ethiopian Wolves are threatened by close encounters with domestic dogs (Vial, 2010). Moreover, people who have settled inside or on the fringes of the park make heavy use of the park's resources (Alers et al., 2007). The increased settlement and more intensive exploitation of resources by humans in the past have resulted in environmental degradation in terms of soil erosion and loss of vegetations (Vial, 2010).

Agricultural Encroachment

In BMNP, agricultural land has been expanding (Figure 2). Land has been cleared mainly for wheat, barley and garlic production. About 10,000 ha land area inside BMNP is used for agriculture (ETFF, 2007). Recently, agricultural expansion extends at 3,300 m asl on the afroalpine grasslands (Vial, 2010). Sixty percent of all land above 3,200 m has been converted into farmland

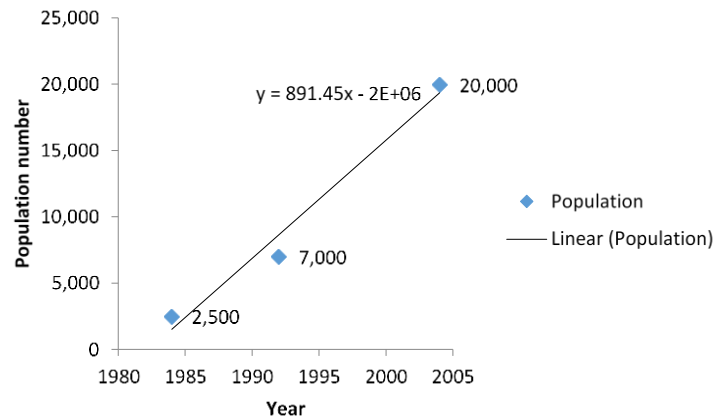


Figure 1. Human population growth in BMNP (Source of data: Flintan et al., 2008).



Figure 2. Agricultural frontiers expansion into moist forest of Harena, Bale eco-region Source: OFWE et al. (2014).

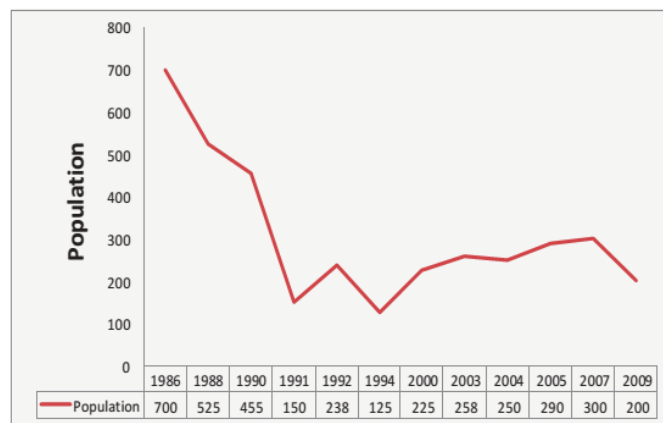


Figure 3. Population trend of Ethiopian wolf in BMNP. Source: IUCN and EWCA in BIDNTF (2010).

(BIDNTF, 2010). Continuous loss of habitat due to high-altitude subsistence agriculture is the major threat to

Ethiopian wolf in BMNP. Reports indicated that the Ethiopian wolves are decreasing overtime (Figure 3)

Table 1. Number and distribution of livestock in BMNP in 2004 (Flintan et al., 2008).

Livestock type	Sanetti plateau	Web valley	North Eastern park	West of Web valley	Harena forest			Total
					Rira	Western edge	Hawo	
Cattle	2,053	7,750	10,684	2,514	2,205	83,340	10,837	119,383
Sheep/Goat	3,393	11,954	7,100	2,727	1,577	9,806	2,847	39,404
Transport animals	176	1,000	2,758	193	964	2,821	1,610	9,522
Total	5,622	20,704	20,542	5,434	4,764	95,967	15,294	168,327

(BIDNTF, 2010). Furthermore, unmanaged expansion of cultivation leads to habitat fragmentation and increased human wildlife conflict, such as crop raiding by Mountain Nyalas, Bush Pigs (*Potamochoerus larvatus*) and Olive baboons (*Papio anubis*) (Vial, 2010). Similarly, there is human- Gelada Baboon conflict in Simien Mountains National Park, Ethiopia. It is estimated that Gelada Baboon is the cause of 117 ± 10 kg annual average crop loss per household (Mesele et al., 2008). In general, human wildlife conflict is not a unique feature of BMNP. It is a common condition in Africa and throughout the world. For example, conflict between humans and crocodiles has been reported in 33 countries spanning the tropics and subtropics, and the problem probably exists in many more (FAO, 2009). On the other hand, clearance of low vegetation for coffee growing in BMNP as part of agroforestry systems is another factor which disturbs the natural forest processes. This process is common in eastern and northern parts of the park (Alers et al., 2007).

Overgrazing

Unquestionably people and livestock numbers have increased dramatically within the BMNP since its establishment (Flintan et al., 2008). Livestock population in BMNP has increased from 10,500 in 1986 to 168,000 in 2004 (Table 1) as a result of population expansion within the park and of the immigration of pastoralist communities from the lowlands. This immigration began after the fall of the socialist-military government (1974 to 1991) during which pastoralists had been prohibited from travelling large distances in search of forage as a result of ethnic conflicts and the government's attempt to restrict the movement of the population within the country (Jacobs and Schloeder, 2001). The increase of livestock number has been creating competition of resources between wild and domestic animals for food. Such competitions negatively affect resources in the park and finally result in overgrazing (Alers et al., 2007). As a result of competition of resources the two endemic species of Ethiopia, Mountain nyala and Ethiopian wolf, are highly affected (Stephens et al., 2001).

Timber and firewood harvesting

In association with settlement and agricultural expansion,

demand for timber and wood in BMNP has increased both locally and commercially (Vial, 2010). The problem was devastating since the 1974 land reform followed by immigration and agricultural expansion, which has caused large scale forest destruction and land clearance. This pattern continues today, especially in the southern lower-level forests (Alers et al., 2007).

Fire

There are recurrent fires in the Bale mountains massif. However, the forest fire that occurs between February and April 2000 is the most severe. This fire destroyed more than 90,000 ha of the country's moist evergreen forest in the Bale Zone alone, which was the worst fire of the past one hundred years. The forest fire occurred in 2008 was recorded as the second severe fire next to the 2000 forest fire. It was occurred in about nine Weredas of the Bale Zone. Five of them among the nine are the major Weredas in which forest fire was out of control. These Weredas are Goba, Dinsho, Dalo Mana, Adaba and Harena Buluq. The BMNP lies within these five Weredas and it is this park which was severely affected. The total forest loss in the five Weredas is 11,947 ha (Table 2) (Anteneh and Temesgen, 2009). The causes of fire in BMNP are anthropogenic in which farmer's set fire for various activities: honey collection, agricultural land preparation, improved forage quality, and reduce suspected livestock predators such as Leopards, *Panthera pardus*, spotted hyenas and *Crocuta crocuta* (Alers et al., 2007; Vial, 2010).

FACTORS THAT UNDERMINE CONSERVATION

Lack of specific legislation and policy concerning BMNP

BMNP falls under the jurisdiction of the Oromia state government, with day-to-day management under the Oromia Rural Land and Natural Resources Administration Authority (Alers et al., 2007). However, forests, grasslands and water are treated as open access resources in spite of the paper policies and theoretically regulated land management systems (Farm Africa,

Table 2. The forest fire occurred in the five Weredas of BMNP with the type of burnt vegetation.

Woreda	Vegetation type	Burnt area in ha	Total in ha
Goba	Ericaceous vegetation	5,974	6,979
	Bamboo	1,000	
	<i>Hageni</i> based forest	5	
Dinsho	Ericaceous vegetation	2,710	2,710
Dalo Mana	Woodland	1,200	1,200
Adaba	Ericaceous vegetation	1,005	1,010
	<i>Juniperus</i> forest	5	
Harena Buluq	Harena forest	48	48
Total		11,947	11,947

Source: Anteneh and Temesgen (2009).

2008).

Pastoralism

The Oromo pastoralists and their livestock have been an integral part of the Bale landscape for many centuries (Vial, 2010). Pastoralists have probably always made some limited use of the park, especially around the small settlements at Konteh. As grazing opportunities outside the park have been reduced, pastoralists are putting greater pressure on the park, causing damage to fragile alpine habitats, competition with native wildlife, and potential for disease transfer (Alers et al., 2007). A similar situation has been observed in Nech Sar National Park of southern Ethiopia. In the park, the competing perspectives between the state and local Gujiagro-pastoralist community have ultimately led to unsustainable resource conservation and, at the same time, threatened the livelihood conditions of the people (Asebe, 2012).

Complex institutional arrangements

There are various stakeholders in BMNP, including local communities, Oromia state government, Ethiopian Wildlife Authority, National Biodiversity Institute, NGOs, etc. However, the various stakeholders from state government to project implementers lack cohesion. They design to achieve different objectives. Such differences are common when conservation activities are linked to donor funding for development (Alers et al., 2007). These differences complicate management of the park.

Inadequate collaboration among development projects

It is possible to operate development projects in BMNP like several projects operating in the vicinity of the country. However, such linkages have not been created (Alers et al., 2007). For example, projects to improve the livelihoods of local community in and around the BMNP

and projects to conserve biodiversity of the park should have a common message of conserving the park resources. If a project concerning to improve the livelihoods of the community is at the expense of the park resources, it is very problematic for the future status of the park. This undermines conservation which further enhancing ecological degradation of BMNP.

SOLUTIONS FOR BALE MOUNTAINS NATIONAL PARK

The Oromia regional government has invested in conservation and development initiatives in the Bale Mountains in response to the adverse and imminent threats. The interventions are mainly focused on improving the management and conservation of BMNP and conserving the unique ecosystems and wildlife of the area. The new intervention program in 2003, however, has been evolving with a focus on expanding conservation and development initiatives, bringing local communities into a central role in sustainable natural resource management, and building sustainable natural resource based livelihoods (Farm Africa, 2008). Nevertheless, they are less effective in conserving the park, and degradation of resources is continuing (Alers et al., 2007; ETFF, 2007; Anteneh and Temesgen, 2009). Therefore, some of the solutions for BMNP are listed and discussed below.

Awareness creation

Awareness creation should be the first action for protected area conservation. The local communities should be aware of the environmental, social and economic importance of protected areas (Anteneh et al., 2014). For example, the establishment of the BMNP is important for soil erosion control, getting reliable rainfall and others (Demeke and Verma, 2013). In addition, it is also important for the local community as a source of medicinal plants (Alers et al., 2007). In this way,

awareness creations help to reduce cutting trees. This also results in the increase in numbers of wild animals especially Mountain Nyala, which in turn increases economic returns through the development of tourism in the area (Demeke and Verma, 2013). Therefore, awareness creation should be applied before the establishment of any protected area.

Promote community involvement

The community at BMNP is participating in fire protection, wildlife, forest protection, vaccination of domestic dogs, repairing fences and providing information about illegal activities found in the park. However, they are not involved with the park planning and management decisions (Demeke and Verma, 2013). It is obvious that the local communities are directly affected by the establishment of the park more than any other group (Anteneh et al., 2014). Therefore, it is believed that resource managements are effective when local people are involved in all phases of the management process from planning to implementation stage (Aramde et al., 2012). In Nech Sar National Park, southern Ethiopia the relationship between the state and the local Guji agro-pastoralist community will continue to be hostile and affect both sides unless the state involve the local Guji agro-pastoralist community in the planning, management and benefit of the park by recognizing their customary rights and knowledge (Asebe, 2012). Thus, involvement of local communities at all levels of management process is important (Anteneh et al., 2014).

Link conservation activity with livelihood improvement through ecotourism

Ecotourism is a holistic conservation approach that integrates conservation of protected areas and improving the livelihoods of communities. The local community in and around BMNP are indulged off-farming activities besides cultivation and rearing of animals. These include, tour guiding, horse rental service and selling handicraft trade. In this case, ecotourism is not only helpful in local environment protection but also plays an important role in transforming local community views towards sustainable use of natural resources as they derive direct monetary benefits out of ecotourism (Demeke and Verma, 2013). Protected areas are biodiversity conservation centers and major tourism assets for a nation, particularly for developing countries like Ethiopia through providing sustainable benefit to the local community while supporting for the maintenance and rehabilitation of the protected areas themselves (Aramde et al., 2012). Therefore, advocating ecotourism in an extensive manner is appropriate to improve the livelihoods of the community and to conserve the park.

Advocacy of private honey production

One of the serious threats of BMNP is fire. Farmers set fire for open access honey collection in the park (Vial, 2010). However, it is possible to produce honey at private level than open access in the park, which reduces the threat of fire coming from honey collection. In this regard, government and NGOs should take initiatives so that the problem will be solved (Anteneh et al., 2014).

CONCLUSION

BMNP has a huge potential in conserving the biodiversity of Ethiopia because of its advantage of containing different ecosystems. Nevertheless, it is one of the highly threatening parks of the country. The major threats are village expansion, agricultural encroachment, overgrazing, timber and firewood harvesting, and fire. Solutions being taken are less effective in conserving the park from degradation. Therefore, controlling immigration from the surrounding lowlands, awareness creation, promoting community involvement, linking conservation activity with livelihood improvement through ecotourism, and private honey production are believed to be important. The solutions are interrelated, and it is therefore important not only to understand them individually but also to address them in a holistic fashion.

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