

Livestock-Wildlife Interactions as a Threat for Community Based Ecotourism Development at Simien Mountains National Park, Ethiopia

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Abstract: The majority of rural residents in the nearby rural areas of Semien Mountains National Park (Smnp) depend on resources for different purposes, of which livestock grazing forms the major use. Therefore, the objective of the research was to see the effect of livestock - wildlife interactions as a threat for community based ecotourism development. For the study, secondary literatures, focus group discussion, structured and semi-structured questionnaires, comprehensive field survey and physical observation were used. The results revealed that from the total number of households live adjacent to the park in Debark, Adiarkay and Janamora districts, about 6.03 %, 0.5%, 0% reside inside the park, respectively. Meanwhile, from the total population live adjacent to the park, 7.3%, 0.41% and 0.18 live in Debark, Adiarkay and Janamora districts, respectively. In Debark district Adisgie-Miligebsa and Debir Peasant Administration (PA) were the areas with medium grazing pressure and conflicts. The PAs with severe grazing pressure and highest conflicts were Argin-Jona and Abergina. The numbers of tourists visiting the park every year are generating income for the government as well as for the community. From 2000 to 2013, on average, the government and the community earned millions of Ethiopian Birr every year from thousands of tourists. The communities are participating as guide, scouts, cooks, mule/horse renters and follower, renting of other materials like cooking materials.

Key words: Ecotourism • Interactions • Livestock • Smnp

INTRODUCTION

Human-wildlife conflict has been becoming a critical threat to the survival of many globally endangered species, in particular to large and rare mammals. The numerous cases from countries all over the world demonstrate the severity of human-wildlife conflict and suggest that an in depth analysis is essential to understand the problem and support the conservation prospects of threatened and potentially endangered species [1]. Rural communities can develop a negative attitude towards reserves and wildlife, exacerbating the conflict and undermining conservation efforts. This could be due to the fact that farmers often feel that the large wild animals are the property of the government and therefore, local communities were not allowed to deal with the problem themselves [2].

Ethiopia with a land area of 1.12 million square kilometers is a relatively huge country having a wide topography and climate variation. Altitude ranges from 4620 m a s l at the top of Mt Ras Dashen (where Semien Mountain is found) to 116 m below sea level in the Danakil depression [3]. The differences in agro-ecological variations and ecosystems have resulted in wide variations in weather distribution. Along these differences, there are many designated protected areas of land in Ethiopia including national parks, wildlife reserves, priority forests, biosphere reserves and community conservation areas. The ecosystems range from afro-alpine at the highest elevations to desert and semi-desert at the lowest elevations [4]. Protected areas in Ethiopia cover from 15% [4] to 16.5% [5] of the country's land mass. However, given its rich biodiversity resources, the extents of protected areas in the country is negligible and are exposed to many disturbances [4].

The Simen Mountains National Park (SMNP), because of its being inhabited for at least 2,000 years the population pressure and the competition for natural resources have been increasing for several decades and threaten both the livelihoods of local smallholders and the diverse fauna and flora of the park [6]. The issue of people living inside the park thus dates back to the time of its creation, as several villages and land used for agriculture and livestock grazing were included in the protected area. The majority of rural residents in the nearby rural areas depend on park resources for different purposes, of which livestock grazing forms the major use. With regard to this, several reports [6, 7] indicate that one of the pressure points to the ecological sustainability of the Simen Mountains relates to livestock.

In and around the SMNP, overgrazing and deforestation have resulted in serious degradation of natural resources, leaving the area susceptible to soil erosion by water and wind. Reports also confirmed that such degradation and its ecological impacts have forced both the *Walia ibex* and Ethiopian wolf to vacate some of their original ranges and to move further up into the less disturbed highlands. Cultivation inside the park has also been a serious concern where such form of land use is known to be incompatible with conservation objectives. Because of this, soil degradation has been identified as a major problem on cultivation land inside and around the park.

Although, livestock are critically essential within the existing mixed farming systems of local smallholders, they still exert huge pressures on the vital resources of the park at an alarming level. The pressure being exerted on the already shrinking grasslands of the park is a great concern. On the other hand, growing interest in ecotourism and increasing human presence in protected

areas are creating the platform for conflicts between humans and wildlife. The local capacities to manage and regulate public access and large-scale use of protected areas are weak as is the awareness of the tourists regarding the dangerousness of wild animals. The general objective of the study was therefore, to see the effect of livestock and wildlife Interactions as a threat for community based ecotourism development.

MATERIALS AND METHODS

Study Area Descriptions: The Simen Mountains National Park (SMNP) is found in the north-western part of Ethiopia, North Gondar Administrative zone. It has an altitude and average temperatures ranging from 1,900 to 4,543 m.a.s.l. and -5°C to $+18^{\circ}\text{C}$, respectively. The SMNP is surrounded by three districts of North Gondar Administrative Zone including Debarq, Janamora and Adarkay (Figure 1). Three of the 32 large mammal species are locally endemic (*Walia ibex*) and endemic to Ethiopia (Ethiopian wolf and Gelada baboon), which are a national symbol and the flagship species of the park. The *Walia ibex* (*Capra walie*) and the Ethiopian wolf (*Canis simensis*) are considered critically endangered and endangered species respectively. The Simen Mountains are also home to many small mammal and bird species endemic to Ethiopia. The mountains are, furthermore, part of the afro-alpine centre of plant diversity characterized by a high level of plant endemism.

Sample Site Selection: Selection of the sampling Peasant Administrations (PAs) employed through an intensive discussion with the park development and protection authorities ecologist. The selection was made in such away that those representative villages for little, medium

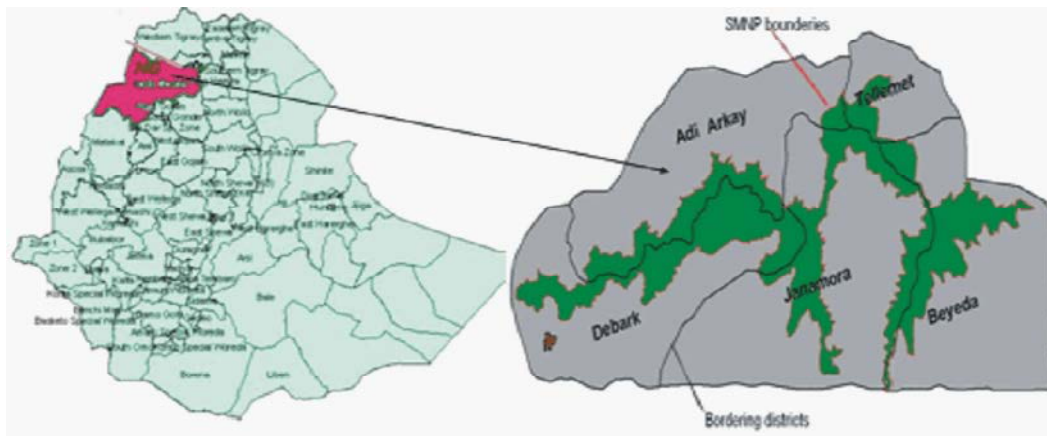


Fig. 1: Map of Ethiopia, North Gondar Administrative Zone and SMNP with bordering district

and heavily grazed areas and respective conflicts as well as areas with highest tourists flow were considered. Furthermore, PAs representing the grazing pressure problem areas within and outside the park areas were taken in to account. The target population was defined as all households within and around the park. In addition, key informants from different Government and non-Government organizations, concerned bodies, which are directly or indirectly involve in SMNP management, were also used as sources of information during data collection. The districts and respective peasant administrations selected based on the number of households (HH) live in around the park.

Methods of Data Collections: Reviewing a number of secondary literatures (existing documents and plans, outbreak reports and recommendations, study results and scientific articles) were done. Set of checklist for core activities and focus group discussion were used as guideline to accomplish prioritized activities and discussed with various stakeholders, who were involved/experienced in the various activities of the park to address problem in the previous periods. Collecting primary data was done through a comprehensive field survey and/or physical observation of the area, covering various angles. The data were used to obtain first hand information on the general condition of the park, interactions between human associated factors and wildlife, resources available, observable problems, wildlife and livestock interactions,

extent and intensity of grazing and degradation, trends and park population's characteristics were closely assessed. Additional data were also gathered through semi-structured questionnaires including questionnaire administration to livestock owner's /household heads/. Interviewing park experts, guides and wildlife scouts were interviewed on the historical backgrounds and current status of the park, human-wildlife-livestock interactions and/or conflicts in and around the park as well as ecotourism development. For data analyses both for the qualitative and quantitative data analyse, descriptive statistics [8].

RESULTS AND DISCUSSION

Results

Livestock and Wildlife Conflicts: In and around the SMNP, overgrazing and deforestation have resulted in serious degradation of natural resources. This leaves the area susceptible to soil erosion by water and wind. Both within and outside SMNP are almost devoid of native woody vegetation due to the intensive natural resources utilization by the people residing in and around the park. From the total number of households live adjacent to the park in Debark, Adiarkay and Janamora districts, respectively, about 6.03 %, 0.5%, 0% lives inside the park. Meanwhile, from the total population live adjacent to the park 7.3%, 0.41% and 0.18 live in Debark, Adiarkay and Janamora districts, respectively (Table 1 and Figure 2).

Table 1: List of the PAs and their Population adjacent to the SMNP

Districts	PA	Number Of Households			Total Population		
		Inside	Outside	Total	Inside	Outside	Total
Debark	Debir	27	1,117	1,144	137	5,585	5,722
	Adisge	41	1,493	1,534	153	8,958	9,111
	Adebabay	76	1,607	1,683	514	6,728	7,242
	Abergina	225	800	1,025	1,672	4,250	5,922
	Argin Jona	82	966	1,048	413	6,279	6,692
	Zebena	0	630	630	0	3,000	3,000
	Dib Bahir	0	420	420	0	2,100	2,100
	Sub-Total	451(6.03 %)	7,033	7,484	2,889(7.3%)	36,900	39,789
Adiarkay	Agdamiya	13	560	573	64	2,800	3,360
	Angwa	0	1,100	1,100	0	5,500	6,600
	Seragudela	0	931	931	0	4,655	5,586
	Sub-Total	13(0.5%)	2,591	2,604	64 (0.41%)	12,955	15,546
Janamora	Lori	0	1,085	1,085	0	5,425	5,425
	Bahiranba	0	826	826	0	4,130	4,130
	Atigiba	0	693	693	0	4,180	4,180
	Barna	0	1,050	1,050	0	3,050	3,050
	Sekeba	0	1,050	1,050	0	5,250	5,250
	Zakelta	0	770	770	0	3,581	3,581
	Debel	0	1,866	1,866	0	9,330	9,330
	Sub-Total	0 (0%)	7,340	7,340	64 (0.18)	34,946	34,946
Grand Total		464(6.08%)			3017(7.9%)		

Source: SMNP Park Office and Debark Agricultural Office

Table 2: Households with their agricultural population and total livestock unit

	Addi Arkay	Debark	Janamora
Total Area (km ²)	2,110	1,573	1,209
No. Of Rural Households	24,563	22,943	31,112
Agricultural Population	123,205	111,980	148,754
Total Livestock (TLU)*	86,412	73421	79,211
Human Density (per km ²)	60	71	123
Livestock Density (TLU/km ²)	41	47	67
Number of TLUs per household	3.5	3.3	2.6

TLU = Tropical Livestock Unit (an animal weighing 250 kgs; therefore cattle = 0.75TLU, sheep and goats = 0.1 TLU and equines = 0.75 TLU).

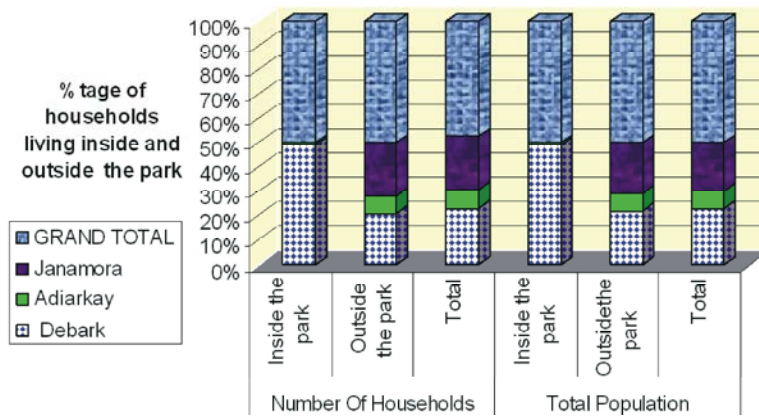


Fig. 2: Total number of households live and population live inside and outside the park

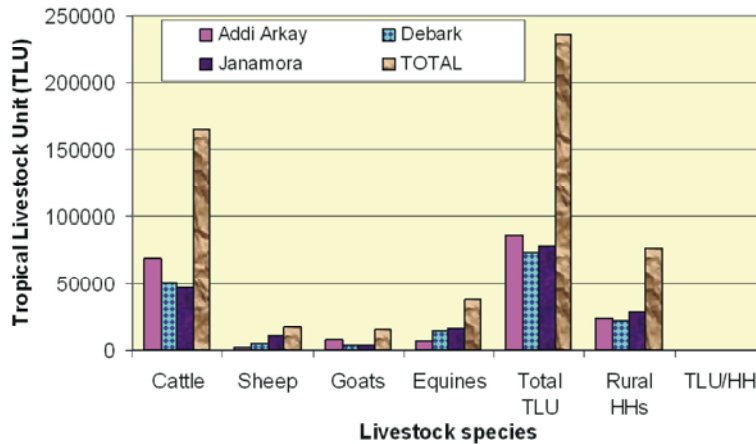


Fig. 3: Livestock species and their tropical livestock unit

Pasture of livestock destroys the mosaic of long and short grass, which is an essential requirement for wild animals. Heavy overgrazing and trampling led to eroded paths and soil erosion damages until the complete denudation to the rock basement. This is due to the fact that the human populations reside in and in adjacent to the park having important livestock population which in one way another depends on the park (Table 2 and Figure 3).

In the districts, areas with no grazing pressure and no conflicts, with medium grazing pressure and medium

conflicts as well as severe grazing pressure and highest conflicts were identified. Accordingly, in Debark district for example, PAs such as Adisgie-Miligebsa and Debir were the areas with medium grazing pressure and medium conflicts. The PAs with severe grazing pressure and highest conflicts were Argin-Jona and Abergina (Table 3).

The conflicts of wild animals with the population live inside and outside the park were identified. The conflicts commonly rose with Walia ibex, Gelada Baboon and leopard. Walia ibex conflicts with farmers due to crop grazing going by outside the park. Gelada baboon

Table 3: list of PAs where grazing pressure is studied

Districts	PAs	Level of conflicts of wildlife with livestock, crop grazing	Remarked Village
Janamora	Lori	Medium grazing pressure and medium conflicts	Duhara
	Bahiranba	Medium grazing pressure and medium conflicts	Jona
	Atigiba	No grazing pressure and no conflicts	
	Barna	Severe grazing pressure and highest conflicts	Timirk
	Sakeba	No grazing pressure and no conflicts	
	Zakelta	No grazing pressure and no conflicts	
	Debel	Medium grazing pressure and medium conflicts	Awria Feres
Debark	Adebabay-Tsion	No grazing pressure and no conflicts	
	Zebena	No grazing pressure and no conflicts	Lialimo Abo
	Debir	Medium grazing pressure and medium conflicts	
	Argin-Jona	Severe grazing pressure and highest conflicts	Argin
	Abergina	Severe grazing pressure highest conflicts	Gichi
	Adisgie-Miligebsa	Medium grazing pressure and medium conflicts	Buitras, Kebero

Table 4: The number of tourists visited and revenue earned at the community and government level

Parameters considered	No of years	Statistical values			
		Minimum	Maximum	Mean	Std. Error
No. of tourists	14	1289	17566	9427.5	1542.467
Government revenue	14	205678	4881836	2543757	4.662E5
Community Revenue	14	230000	4498875	2364438	4.197E5
Total revenue earned	14	446303	8812376	9427.5	8.744E5

Source: SMNP Park Office



Fig. 4: Sheep grazing inside the SMNP

conflicts with the human population eating crop and household foods both in the low and highland areas. In the low land areas, leopard mostly conflicts with humans, goats and sheep. Whereas livestock conflicts with wildlife due to severe grazing pressures exert on grasses used by wildlife (Figure 4). For example, since the feeds of common mole rats are grazed by livestock, the survivals of these mole rates are becoming the survival of Ethiopian wolf (*Canis simensis*).

Ecotourism Development and its Threats: In SMNP, there are about 35 endemic mammals (22 large and 13 small mammals like rodents) that includes the endemic species

such as *Walia ibex*, Ethiopian wolf, gelada baboon, grass rat, 182 bird species including the endemic birds like Abyssinian woodpecker, ankober siren and more than 300 plant species with the endemic floristic composition like giant lobillia. Therefore, Numbers of tourists are visiting every year the park and generating income for the government as well as for the community. From 2000 to 2013, on average, the government and the community earned 2,543,757 and 2,364,438 Ethiopian Birr every year from 9,427 tourists (Table 4 and Figure 4).

The communities are participating as guide, scouts, cooks, mule/horse rent and follower, renting of other materials like cooking materials. Tourism in the SMNP has



Fig. 5: Handcraft developments and market opportunity at SMNP

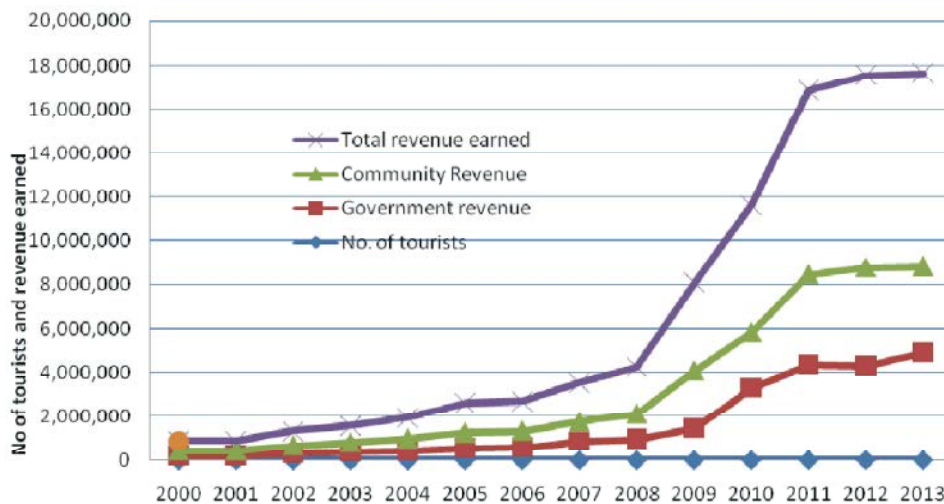


Fig. 6: Trends of tourists visited, revenue earned from 2000- 2013 at SMNP

also created positive and negative environmental, social and economical impacts. From the environmental view, the positive impacts created were enhanced conservation practices, make wise of fragile lands and improve of environmentally friendly infrastructures. Of course, from negative side tourism has created Soil erosion and compaction, noise and disturbance of wildlife, poor waste disposal particularly plastic and Ecological distraction.

On the other hand, from socio cultural aspect has created promotion of cultural exchange, improved understanding of external world and improved access to service and facility. Off course, loss of some beautiful cultures and Loss of local identity are critical. Income generation for government and local peoples, providing job opportunities for the communities, market opportunity

for handcrafts and local products are appreciated with its negative impacts such as increasing price of goods and service (inflation), creating dependency of livelihood on tourism (Figure 5).

DISCUSSIONS

Demographic and social changes place more people in direct contact with wildlife: as human populations grow, settlements expand into and around protected areas [9] as well as in urban and sub-urban areas. In Africa, human population growth has lead to encroachment into wildlife habitats, constriction of species into marginal habitat patches and direct competition with local communities [10].

Meanwhile, Species habitat loss, degradation and fragmentation are also interconnected with population growth and land use change. Again, this is a further aspect of the issues discussed above. In Sumatra, the alteration of forest areas into agriculture and grazing land has restricted the Sumatran tiger's (*Panthera tigris sumatrae*) [11]. Growing densities in livestock populations can create also an overlap of diets and forage competition with wild herbivores, resulting in overgrazing and decline or local extinction in wild herbivore populations [12]. In India, domestic animals often outnumber wild ungulates within the protected areas, reaching density of up to 1500/Km² and it has been ascertaining that that livestock graze in 73% of wildlife sanctuaries and 39% of protected areas [13].

The Park has preserved a representative part of the Ethiopian Tropical Seasonal Highland biome and contains vegetation characteristic of each. The plant species that are recorded to be endemic to the Simen Mountains include *Festuca gilbertiana*, *Rosutaria simensis* and *Dianthus longiglum*. The faunal diversity is also high, which is mainly related to variations in the topography and vegetation cover of the area.

According to Nievergelt *et al.* [14], a total of 32 mammals including 10 endemic species, 129 bird species of which 14 are endemic, 27 aquatic invertebrates and six species of rats and shrews have been recorded in the Simen Mountains. Apart from the Walia ibex (*Capra ibex walie*), the other major wildlife resources found in the SMNP are the (*Canis simensis*) and the Gelada baboon (*Theropithecus gelada*), Klipspringer and menilik bushbuck which are endemic to the country [15]. Other large mammal species include the Anubis baboon, Hamadryas baboon, klipspringer, leopard and golden jackal.

However, these wildlife are constantly competes with human use of wildlife habitats (e.g. crop cultivation, livestock grazing, wood cutting, grass harvesting, etc). Studies indicated that such areas near to settlement are heavily used for grazing fuel wood and construction purposes [16]. This finding confirms also that 7.9 % of the population live inside the park. Due to this, areas of different vegetation stratum used as source of food and habitat for wild animals areas similarly used by domestic stock and highly affected by human and over grazing pressure. The quality of the grazing lands that were overgrazed resulted in deterioration of quality with an increase of unpalatable grasses. This in turn has been having negative consequences on the vegetation cover and composition and soil preservation.

Wildlife is a generator of income through tourism and in many developing countries it is one of the most significant sources of national revenue generation. The tourism industry can increase employment within local communities by creating additional job opportunities. This approach would compensate the cost of maintaining wildlife and contribute to changing local people's negative perceptions of conservation. The managers of Kibale National Park in Uganda, for instance, intend to foster positive attitudes towards the park and supportive conservation behaviour by the local populations, though sharing revenues from tourism with the local populations [17]. Tourism is a human activity that affects the way of living of the local community both negatively and positively since tourism is described as a multi-faced industry, as it requires inputs of economic, socio-cultural and environmental nature which mean that it affects all aspects of communities [17]. Significance efforts should undertake to enhance the efficiency of tourism industry so that to change the livelihood of the local communities, despite this, the full utilization of the potential is lower in Ethiopia at large. Tourism itself has become an increasing complex phenomenon with political, economical, socio-cultural, educational, biophysical and aesthetic dimensions. Therefore, the achievement of the beneficiary and aspiration of visitors and local communities present many challenges and opportunities.

CONCLUSION

From the study, it was possible to see that more numbers of households with significant numbers of populations are residing in and adjacent of the park. Consequently, intensive natural resources utilization leads the park to overgrazing and deforestation. Severe livestock grazing destroys the mosaic of long and short grass, which is an essential requirement for wild animals. Heavy overgrazing and trampling led to eroded paths and soil erosion damages until the complete denudation to the rock basement. Even, some *PAs* were under severe grazing pressure and highest conflicts with wildlife. On the other hand, the local community and the government are being benefited from tourists visiting and increasing yearly. Besides interaction of livestock with wildlife and generating income from tourists visiting the park, the local community were curious that the tourists are creating negative environmental, social and economical impacts.

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