

**ASSESSMENT OF ECOTOURISM POTENTIALS AND CHALLENGES
IN AND AROUND SHEKA BIOSPHERE RESERVE: IMPLICATION
FOR SUSTAINABLE NATURAL RESOURCE MANAGEMENT, SHEKA
ZONE, SOUTH WEST ETHIOPIA**

MSc THESIS

BY

BINIAM ASSEFA

**SEPTEMBER, 2016
JIMMA, ETHIOPIA**

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**A Thesis Submitted to School of Graduate Studies, Jimma University College
of Agriculture and Veterinary Medicine Department of Natural Resources
Management in Partial Fulfillment for the Requirements for the Degree of
Master Science in NRM (Specialization in Nature and Forest Conservation)**

Major Advisor: - Tariku Mekonnin (PhD Scholar)

Co-Advisor: - Kitessa Hundera (PhD)

September, 2016

Jimma, Ethiopia

DECLARATIONS

This is to certify that this thesis entitled “Assessment of Ecotourism Potentials in and Around Sheka Biosphere Reserve Implication for Sustainable Natural Resource Management, South West Ethiopia” is an authentic work carried out by Biniam Assefa Alemu under my guidance. The matter embodied in this project work has not been submitted earlier for award of any degree or diploma to the best of my knowledge and belief. I recommend that it can be submitted as fulfilling the thesis requirement.

Name of the student

Biniam Assefa Alemu Signature _____ Date _____

Name of the Advisors

Tariku Mekonnin (Assistant Professor) Signature _____ Date _____

Kitessa Hundera (PhD) Signature _____ Date _____

BIOGRAPHICAL SKETCH

Biniam Assefa Alemu was born on August 1991 in Masha district, Sheka zone of Southern Nation's Nationalities and People's Regional state, Ethiopia. He graduated from Masha secondary school in 2009. In 2010 he joined Hawassa University Wando Genet College of forestry and natural resource management and graduated in Bachelors of degree in Wildlife and Ecotourism Management in 2012. He worked in Sheka zone culture and tourism department for two years as a Natural Resource attractions expert. In 2014/2015 he has got a chance to attend Masters degree in Natural Resource Management with specialization in Forest and Nature Conservation in Jimma University College of Agriculture and Veterinary Medicine.

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I praise my God!

LISTS OF ABBREVIATIONS

CABI	Centre for Agriculture and Biosciences International
CERV	Central Ethiopia Rift Valley
EPA	Environmental Protection Authority
EFAP	Ethiopian Forestry Action Program
EFCOT	Ethiopia Forum for Community Based Tourism
EWNHS	Ethiopia Wildlife and Natural History Society
EGA	Environmental Grant Makers Association
FGD	Focus Group Discussion
GPS	Global Positioning System
GDP	Gross Domestic Product
IFMP	Integrated Forest Management Project
IUCN	International Union for Conservation of Nature
LUPO	Land Use Planning of Oromia
MAB	Man and Biosphere Reserve
MELCA	Movement for Ecological Learning and Community Action
MoCT	Minster of Culture and Tourism
SNNPR	South Nation Nationalities and Peoples Regional state
UNWTO	United Nation World Tourism Organization
UNESCO	United Nations Educational, Scientific, and Cultural Organization
WAJIB	Waldaa Jirattoota Bosonaa in Afan Oromo meaning “Forest Dwellers Association
WTO	World Tourism Organization
SBR	Sheka Biosphere Reserve
SPSS	Statistical Package for Social Science

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ABSTRACT

Majority of Ethiopian population are engaged in agricultural activities instead of on off farm activities like ecotourism as a result natural resources are exposed to extreme degradations. Ecotourism could be as a good example of alternative income generation and off-farm activities which benefit local communities while achieving the conservation goals of natural resources. The potentials and challenges of ecotourism implication for sustainable natural resources management were assessed in Sheka Biosphere Reserve (SBR), South West Ethiopia using survey questionnaires, document analysis and field observation. Data information was collected 120 household heads living around the Biosphere reserve using structured questionnaire. Volunteer elders were interviewed while focus group discussions were conducted with key informants. In addition to these field observations were held for Ecourism potentials using camera trape, digital camera and GPS. The data collected by above methods were analyzed by the help of Stastical package for social science (SPSS version 21). The findings of this research revealed that, the Sheka Biosphere reserve is endowed with attractive land scenery, Fauna and flora species, amazing caves and water falls, Mountain Lake covered by bamboo trees and indigenous culture of the local community makes the area as ecotourism destination for feature ecotourism development. About 50 mammals, 254 birds, 39 natural caves and 70 waterfalls and 1 Mountain lake have been recognized. The high reliance of local communities on Biosphere reserves resources, soil fertility reduction, market problems for their products and absence of ecotourism activities are identified as the major socio economic problems of the locals and further threats of natural resources of the area. Introducing additional more options or ecotourism and development of basic infrastructures are important strategic directions for sustainable management of natural resources for Sheka Biosphere Reserve.

Key terms: ecotourism, ecotourism potentials, protected area, Sheka biosphere reserve, natural resource management

1. INTRODUCTION

1.1. Background and Justification

Tourism comprises the activities of persons traveling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes (UNWTO, 2010). It is the largest and fastest growing industry, which has the best possibility for creating many jobs worldwide. It could be business in rural areas since it does not require year's long vocational trainings (Rannersmann, 2003).

In developing countries tourism or ecotourism has become one of the economic sectors that generates substantial income and maintains conservations of protected areas. In Kenya in Amboseli National Park the income obtained from ecotourism is 18-20 times more than the income obtained from agricultural activities (The드로스 Atlabchew, 2002).

Ecotourism is the alternative means of income generations and off-farm activities to minimize degradations pressure on endangered environments in rural areas of Ethiopia (EFCOT, 2003). Ecotourism could be as a good example of alternative income generation and off-farm activities which benefit local communities while achieving the conservation goals of natural resources. Furthermore, assessment of ecotourism or simple nature tourism does not need more facilities and depends on locally obtained facilities or natural capital of the poor that can be managed locally (Scwenk, 2002).

Since majority of Ethiopian's are engaged in agricultural activities instead of on off farm activities like ecotourism, natural resources are exposed to extreme degradations (EFCOT, 2003). For example, the Central Ethiopia Rift Valley (CERV) areas that endowed with a number of lakes and huge potentials of natural resources used for recreation are affected by excessive land degradation, deforestation, and excessive-irrigation (Legesse et al., 2003).

Ecotourism was known since 1990s when environmental issues of tourist destination areas increased (Sindiga, 1999). It was introduced in Ethiopia as component of soil and water conservation under Land Use Planning of Oromia National Regional state (LUPO) which aims to create alternative income generating options to reduce pressure on natural resources (Sisay, 2004). For example, the Integrated Forest Management Project (IFMP) introduced into Adaba-Dodola in the West of Bale Mountains National Parks in the aim of conservation of natural forest (Sisay, 2004). Integrated Forest Management Project organized forest dwellers association by developing ecotourism through creation of non-wood income generating that reduce degradation of forest of project area (Tadesse Weldemariam, 2007).

Ecotourism could be a link between protected areas and local communities by generating income for local communities while conservation goals of protected areas achieved. Ecotourism could be very important where the ecosystem is fragile and other forms of natural resource management might be impossible (Brodnig, 2006). Protected areas are essential for biodiversity conservation. They are the cornerstones of virtually all national and international conservation strategies, set aside to maintain functioning natural ecosystems, to act as refuges for species and to maintain ecological processes that cannot survive in most intensely managed landscapes and seascapes extinct (Dudley, 2008). Protected areas act as benchmarks against which we understand human interactions with the natural world and for stopping many threatened or endemic species from becoming extinct (Dudley, 2008).

Biosphere reserves are areas of terrestrial and coastal/marine ecosystems or a combination there of which are internationally recognized within the framework of UNESCO's Programme on Man and The Biosphere (MAB) Statutory Framework of the World Network of Biosphere reserves (UNESCO, 1996). Biosphere reserves are living laboratories for sustainable development and represent learning centers for environmental and human adaptability (UNESCO, 2010).

Biosphere reserve is intended to fulfill three complementary functions: 1) a conservation function, to preserve genetic resources, species, ecosystems and landscapes; 2) a development function, to foster sustainable economic and human development; and, 3) a logistic support function, to support demonstration projects, environmental education and training, and research

and monitoring related to local, national and global issues of conservation and sustainable development (UNESCO, 2010).

The concept of ecotourism and Biosphere Reserves go together in many ways. In Biosphere Reserves, especially in the core areas, the only responsible tourism in these areas is ecologically conscious and sustainable tourism, thus ecotourism. Ecotourism can help Biosphere Reserves fulfill their responsibilities to demonstrate a balanced relationship between humans and Nature (UNESCO/MAB, 2002).

Ecotourism in protected and environmentally managed areas can be characterized by promoting positive environmental ethics, concentrates on intrinsic values, benefit the wildlife and natural environment, provide a first-hand experience with the natural environment and a high knowledge based and experience based dimension (UNESCO/MAB,2002).

Although tourism contributes to the economic development, in latter periods it resulted in very negative environmental impacts due to the large number of visitors damaging destination areas of tourists. Because of this, since in the 1990s, the tourist's concern for environmental issues increased and ecotourism became known as an economic sector that needs to develop sustainable (Holden, 2003).

Ecotourism in Biosphere Reserves can be an excellent way of educating people about global change or changes in the local Nature and the environment over time. At the same time, extreme care must be taken to ensure that tourism activities do not disrupt the irreplaceable role of Biosphere Reserves as long-term ecological benchmarks and monitors (UNESCO, 2010).

Sheka Biosphere reserve is part of the southwest highlands forests of Ethiopia important for conservation of the Afromontane forest vegetation types, especially the Afromontane Rainforest and alpine bamboo thickets. The area is rich in plant and animal species with deep rooted culture of nature conservation which can concise for ecotourism attractions.

Sheka Biosphere reserve was recognized as man and biosphere reserve by UNESCO in 2012 to conserve bio-cultural diversity, support the development of local communities, promote

environmentally friendly investments in the transition area, enhance knowledge and capacity in the biosphere reserve and to strengthen environmental as well as participatory governance. Accordingly, the major purposes for the study to be undertaken in the south west Ethiopia in and around Sheka biosphere reserve is in order to assess ecotourism potentials as solutions in a way to manage the destructions of natural resources by sustainable use while local communities are being benefited.

1.2 Problem Statement

Ecotourism is increasingly introduced in third world countries in the form of a development package, involving capital, expertise technology and management systems, and is thus becoming something like green revolution (Bhattacharya and Kumari, 2004). However, many issues and challenges confront the practice of ecotourism and these generally differ with in regional and national contexts. Forest and marine habitats are being destroyed and some of the wildlife they contain is being driven to extinction under the pressures of hunting, logging, agriculture and local people encroachment (Mike, 1999).

Despite numerous amounts of natural resources and cultural resources of Ethiopia are endowed with, in terms of tourism revenue Ethiopia is rated among the lowest in sub-Saharan countries. Travel and Tourism competitiveness index rated Ethiopia 126th in the world (Binyam Tesema, 2008). Moreover, ecotourism's contribution to the national income as a source of revenue and as a means of preserving the natural environment is negligible.

Even though natural resources have certain contribution for development of tourism in Ethiopia, lots of attractive natural and cultural resources are exposed to degradations or threats due to negligence (EPA, 1997). Even though the objective of Sheka biosphere reserve is to protect natural resources, its natural resources is being damaging. This Biosphere is notable for its relatively high forest cover as compared to other part of Ethiopia. In general, the area is characterized by dense forest having different natural attractions and wood land containing diverse plant species that provide nectar and pollen to foraging bees. However, this important attribute is threatened by the high rate of deforestation in the area, which has aggravated in recent years due to increased conversion to monoculture plantations such as coffee and tea.

Beside to the natural resource degradations, there is inadequate research done related to ecotourism potentials, its challenges and future prospective for nature based tourism activities that play its own economic contribution for local communities and country as whole. Therefore, this study will help the society, governments, tourists and researchers to be aware of the significance of Ecotourism in terms of the importance it provides for generating revenue by attracting Ecotourists, conserving the natural environment and providing a playground for promoting learning. Moreover, it enables local people to be active participant to conserve their environment and to get benefit for their livelihood and to verify ecotourism potential, challenges and its future perspectives for ecotourism development that enhance the socio-economic livelihoods of the society.

In the past little efforts, have been made to promote ecotourism, to assess the potential that the reserve has for the implementation of ecotourism practices and there is no development to promote alternative tourism. Therefore, this work will evaluate the ecotourism potentials in and around Sheka biosphere reserve and its local community to promote environmental conservation and socioeconomic development that involves local community participation. This study will be expected to answer the following research questions: -

1. What are the natural and cultural potentials for ecotourism development in and around the Sheka Biosphere reserve?
2. What is the current status of tourism development in Sheka zone?
3. What are the implications of socio-economic condition of the society around the biosphere for ecotourism development?
4. What are the constraints for practicing of ecotourism in the area?

1.3 Objectives

1.3.1. General objective

- ❖ The general objective of this study is to assess ecotourism potentials and challenges in and around Sheka biosphere reserve for sustainable management of natural resources.

1.3.2. Specific objectives

- ❖ To assess the potential natural and cultural resources for ecotourism development in the area
- ❖ To assess the current tourism status in Sheka
- ❖ To identify the major difficulties for ecotourism development in the area
- ❖ To assess the major socio-economic conditions of local communities in relation to ecotourism development

1.4 Significance of the Study

The study outcomes will provide valuable information for stakeholders who are interested to involve in the development of sustainable ecotourism in the site by indicating the potential and constraints that block the involvement of local settlers in the sector. This study will also help to fill the gap in the literature of ecotourism potential and constraints to the local people participation perspective. The purpose is to discuss the opportunities of the Biosphere reserve to the local people involvement and how the constraints limit the magnitude of local settlers' participation in ecotourism development in the site. Finally, since there is inadequate studies conducted in the area in relation to the Biosphere reserve resources, that is about the avifauna, wild life, human wildlife conflict and ecotourism potentials as general, this study will provide useful information for ecotourism planners at different levels (national and regional), ecotourism projects decision makers, society, governments, tourists and researchers as well as other natural resource management practices that will involve the local people participation for the sustainability of the resources of the area in particular and the national resources at large.

1.5 Scope of the Study

This study will cover the assessment of ecotourism potentials in and around Sheka biosphere reserve which is found in the Sheka Zone SNNPR. Since the reserve has a short history as a man and biosphere reserve, there is little research in the evaluation of ecotourism potential for the establishment of ecotourism practice in order to benefit the local community while conserving the natural resource there. Therefore, this study will focus on identification of the ecotourism potential that the Biosphere reserve has and the analysis of the main challenge that that impacting the establishment of ecotourism practice

1.6 Limitation of the Study

Financial and time constraints will limit the study only to in and around sheka Biosphere reserve though it shares boundary with Mejeg, Kefa and Illuababora zones. Stakeholders from above zones will not be included due to the aforementioned problems.

2. LITERTURE REVIEW

2.1 World Tourism Development

Tourism was internationally being known since 1950 (WTO, 2002) and nowadays it is the largest and fastest growing business which contributes to lots of new jobs including in rural areas since it does not require long-term trainings (Rannersmann, 2003). In past decades, there were more than 650 million international tourist arrivals in the world which will be more than 1,600 million by the year 2020 (Holden, 2003) (Table 1).

Table 1: Growth of international tourist arrivals by regions annual growth rate (%) in Forecast period, 1995-2020

Receiving Regions	International Tourist Arrivals						
	Av. Annual. Growth (in Million)				Av. Annual Growth Rates		
	1995	2000	2010	2020	1995-2000	2000-2010	2010-2020
Europe	336	385	521	714	2.9	3.2	3.2
East Asia	81	93	194	388	2.7	7.6	7.2
Americas	110	93	190	282	3.3	3.9	4.0
Africa	20	130	48	78	6.2	5.7	5.1
Middle East	14	27	36	69	6.2	7.0	6.7
South Asia	4	6	11	19	5.7	6.7	5.8
World Total	565	659	1000	1550	3.2	4.2	4.5

Source: World Tourism Organization (WTO, 2002)

2.2 Tourism in Africa

Even though Africa is the world's poorest region, especially in rural areas it is recognized by its huge potentials for tourism development (WTO, 2002). There are no adequate facilities and services infrastructures in many places which hamper the full use of exploiting these potentials

of tourism even though there are an existing potential for developing tourism in Africa. The major problems influencing the growth of international tourism globally will also apply in Africa. This will particularly benefit from the increasing international travel interest in nature and cultural tourism and other forms of special interest tourism (WTO, 1999). According to WTO, international tourist arrivals in Africa will reach 77 million by 2020 (Table 2).

Table 2: International Tourist Arrival, 1950-2020 (million)

YEAR	EUROPE	AMERICAS	EAST ASIA	AFRICA	MIDDLE EAST	SOUTH ASIA
1950	16.8	75	0.2	0.5	0.2	0
1960	50.4	16.7	0.7	0.8	0.6	0.2
1970	113	42.3	5.3	2.4	1.9	0.9
1980	186.1	61.4	21.5	7.3	7.5	2.2
1990	282.9	93.6	54.6	15.1	9	3.2
2000	397	131.5	100.1	28.6	19.2	5.7
2010	527.3	190.4	195.2	47	35.2	10.6
2020	717	282.3	397.2	77.3	68.5	18.8

Source: WTO Tourism vision 2020

2.3 Tourism in Ethiopia

2.3.1. Tourism development of Ethiopia

In past periods, merchants played a considerable role for introduction of religions to Ethiopia, which contributes a lot for evolution of tourism in Ethiopia. It was also believed that the Portuguese's missionaries and other Europeans came to Ethiopia as earlier visitors when they made explorations to the source of Blue Nile (Ayalew Sisay, 1992). Considering tourism as one of the economic sector came into being in Ethiopia very recently. It was around 1960, that the potential of tourism drew the attention of the imperial government authorities and he first tourism office was established in 1962 (MoCT, 2006). However, a setback in international tourism demand had been seen during the military regime from 1974 for two decades the

industry was suffering from various adverse effects such as recurrent drought and restrictions on entry and free movement of tourists (MoCT, 2006). Though the sector is still at its infant stage, it has been keep growing since 2001.

2.3.2 The role of tourism in economy of Ethiopia

The numbers of tourist's flow can help us to estimate the economic, social benefits and the effects of tourism in Ethiopia and the amount of money received from international visitors. The effect of tourism also to be measured through the expenditures of tourists that have impact on Gross Domestic product (GDP) or the overall income and earnings from the tourism sectors activities such as job opportunities and services. As far as recorded data indicated that the foreign visitors arrived in Ethiopia in 1963 were 19,836 and revenues obtained from tourists in this year was 11 million Ethiopian Birr (Ayalew Sisay, 1992). However, recently the numbers of tourist arrivals and the revenues obtained from tourists is significantly increasing. For example, in year 2005 about 227,398 tourists reached Ethiopia and about 1,202,368,339 Ethiopian Birr generated from these tourists (MoCT, 2006). Tourist arrival showed irregularities from 2001-2005 (Table 3).

Table 3: Trends of tourist arrivals and the generated revenue in Ethiopia from years 2001-2005

Year (EC)	Tourists Arrivals	Receipts (in millions)		Growth rate (%)
		Birr	USD	
20002	156,327	676.1	77.1	-
2003	179,910	778	89.946355	15.1
2004	184,079	994.408062	114.627850	2.3
2005	227,398	1,202.368339	138.599940	23

Source: Ethiopian Ministry of Culture and Tourism (MoCT, 2006)

As can be observed from Table 3, during the years 2003, 2004 and 2005 arrival has registered high growth rates of 15.1%, 2.3% and 23% respectively in Ethiopia. Foreign exchanges earnings from tourism sector also increased from 77.1 million US\$ in 2002 to 138.6 million US\$ in 2005 increased by growth rate of 16.6% to 20.9% respectively in each year (MoCT, 2006). The contribution of tourism to Ethiopian GDP is low when compared to the other Eastern African countries. For example, in 1996 tourism contribution in Ethiopia was about its 0.5 % GDP whereas its contribution to Kenya was 5.1 % of its GDP in the same year. Tourism Contribution to GDP at current Market price in Million Birr for Ethiopia (Table 4).

Table 4: Tourism Contribution to GDP at current Market price in Million Birr for Ethiopia from 1996-2002

Year	GDP	Receipt	% of Contribution
1996	37,937.6	182.665	0.48
1997	41,465.1	279	0.67
1998	44,840.3	225	0.50
1999	48,687.6	252	0.52
2000	52,074.2	577.8	1.11
2001	53,011.3	642	1.21
2002	51,560.6	676.1	1.31

Source: Ethiopian Ministry of Culture and Tourism (MoCT, 2006)

2.3.3. Potential of tourism resources in Ethiopia

Ethiopia is endowed with unique cultural heritages and attractive natural resources that attract tourists. The oblique, churches, castles, archeological sites, caves, national parks Sactuaries, Biosphere Reserves and Controled hunting areas are some of cultural and natural resources of Ethiopia. There are also high diversity of plants and animals in Ethiopia. In addition to these, there are impressive features such as high mountains, rivers, and lakes in Ethiopia. The favorable diversity of climate is the other factor what makes Ethiopia to attract tourists. Having

Addis Ababa as venue of seat for Africa Organization Unity and United Nation Economic, commission for Africa is also another feature of attractions for Ethiopia (MoCT, 2006).

2.4 Ecotourism

2.4.1 Origin and differentiation of Ecotourism

The specific origins of ecotourism have been variously traced for instances, as early as 1965 (N.D. Hetzer) to late 1970's (Kenton Miller) and early 1980's (Hector Ceballos-Lascuráin), but generally speaking, ecotourism can be understood as evolving from growing concerns about the negative environmental and socioeconomic effects of tourism development. Ecotourism has become everything that tends to feature smaller facilities, attractively designed local materials, engagement with local culture, nature, and communities rather than despoiling the environment, it seeks to protect and enhance it (EGA, 2008).

It is not easy to identify the definite origin of a term that is discussed as heavily as ecotourism. No doubt it is a modern phenomenon which has grown in importance due to the destruction of natural sites and ecosystems as well as the increase in wealth and standard of living. The fact that its relevance has grown tremendously over the last few years does not mean that the roots of the expression are not much older. Referring to some well-known authors, the term ecotourism was first used in the mid-sixties. At that time, four principles of ecotourism were identified, which can be described as minimizing environmental impacts, respecting host cultures, maximizing the benefits to local people and maximizing tourist satisfaction (Weaver, 2001).

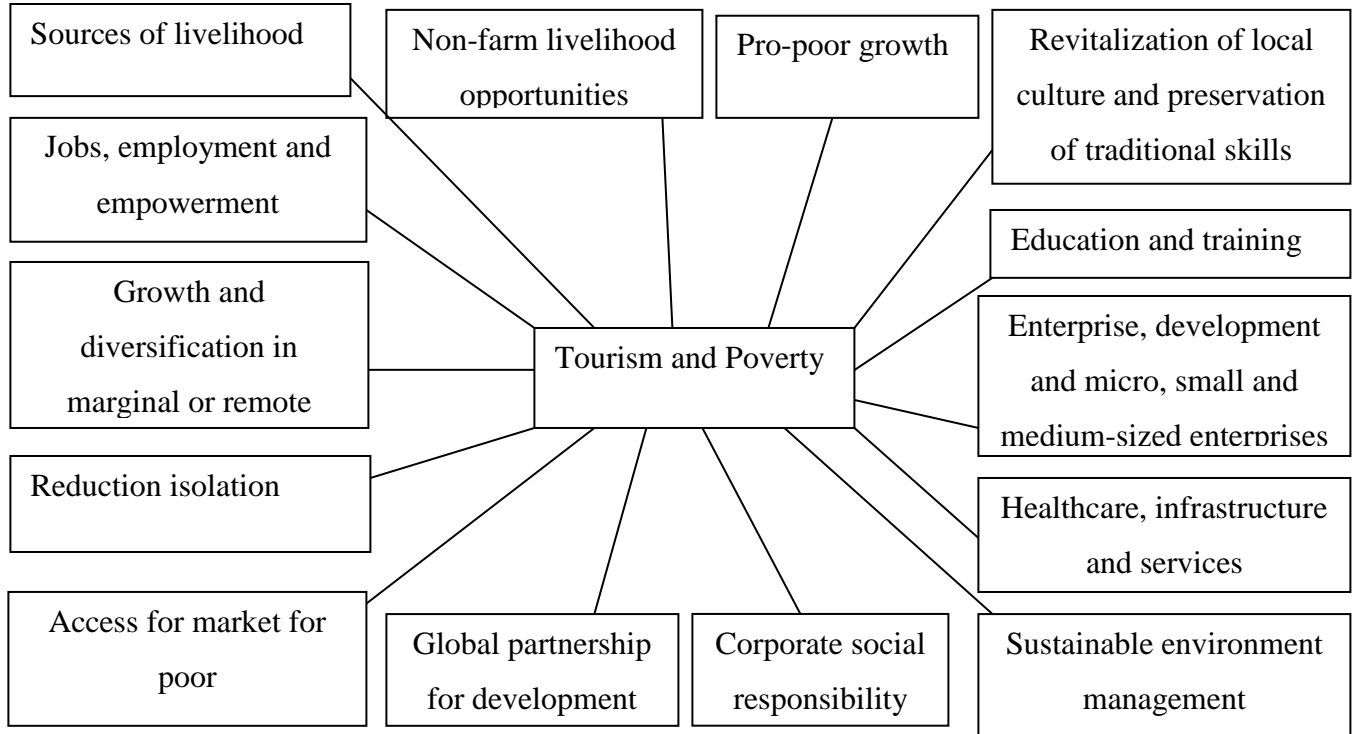
Therefore, those who try to define the term ecotourism can situate it within any one of these contexts, which has led to a diversity of definitions. Hence, a whole range of different conceptual definitions have been proposed in the literature, but no general consensus is established. Some of the most commonly used definitions will be cited and discussed here. Hector Ceballos-Lascuráin (1987) provided one of the first formal definitions of ecotourism, which was later adopted by the International Union for Conservation of Nature as their official definition in 1996, as traveling to relatively undisturbed or uncontaminated natural areas with

the specific objective of studying, admiring, and enjoying the scenery and its wild plants and animals, as well as any existing cultural manifestations (both past and present) found in these areas.

Ecotourism is environmentally responsible travel and travelling to relatively uninterrupted natural areas with specific objective of studying, admiring, enjoying scenery and its indigenous cultures with the spirit of appreciation, participation and sensitivity that the eco tourist practices a non-consumptive way and provide funds for conservation through finance means that aimed to benefit both conservation site and well-being of the local residents (Ziffer, 1989, Diamantis, 1999, Weaver, 2001 and Joshi, 2011). Currently ecotourisms are aimed at eliminating the causes and introducing an array of benefits to natural environments and local peoples in a sense of sustainable, eco and responsible, that it strives to stands out for its promise (CABI, 2008).

2.4.2 Significance of Ecotourism for Economic Development, Envirometal cosevation and Cultural Aspects

Ecotourism, a recent but widely hailed tourism alternative (Schaller, 1998), has high potential to be an instrument for rural economic development and environmental conservation. Figure 1 summarizes the role tourism plays in poverty reduction and natural resource management.



Source: UNESCO (2007)

Figure 1: Linkages between Tourism with poverty reduction and Environment management

2.4.3 The impacts of tourism /ecotourism

Tourism can have both positive and negative impacts on economic, cultural and environmental resources depending on circumstances how it is managed (Strasdas, 2002). In other words, tourism causes three major impacts in host societies: economic, cultural or social and environmental impacts. Assessing these impacts whether positive or negative is impossible in the Third World due to difficulties in measurement and lack of local control over the industry (Lea, 1988).

Ecotourism operates for one or more of the eco-friendly alternatives for the economic use of natural resources compared with other industries (Li, 2006) while negative impacts from ecotourism also occurs when the level of visitors beyond the acceptable limits of change (Veneeva, 2007). Where tourism impacts on the country and society, there may well be conflicts with competing demands for other sectors of economy, or with community interests at large

(Okello, 2003). Ecotourism is thus an important concept in tourism development to solve these problems.

2.4.4 Ecotourism, environment and sustainable development

Ecotourism development is increasingly utilized for its multi-purpose that helps to protect and enhance the natural resources that most of the world's poor look for their livelihoods (Barkin, 1996 and Natsios, 2006). In order to overcome such environmental issues, ecotourism serves as a powerful incentive to protect natural resources because the basic rationale behind ecotourism is to preserve natural resources while profiting from them (Dasenbrock, 2002) through enhancing the special qualities of the site with its flora and fauna, while allowing local inhabitants and future visitors to continue to enjoy these qualities (Barkin, 1996).

Ecotourism promotes sustainable development by establishing a durable productive base that allows inhabitants and service providers to enjoy rising standards of living (Haroon 2002). In short sustainable development, sound environmental management and ecotourism are closely linked. The sustainability of ecotourism depends on its economics, the extent to which it is consistent with conserving its resource base, social acceptability and Political sustainability (Tisdell, 1997).

2.4.5 Ecotourism as a viable strategy for sustainable natural resource management: case studies

Ecotourism plays a great role in natural resource management by generating income for the local communities (Kiss, 2004). Its importance as community based ecotourism that can play a reasonable role in community development and bringing people closer to conservation as a means of reducing local threats to biodiversity (Ngece, 2002; Kiss, 2004). The following practical case studies in Uganda, Ghana and Asian Pacific Region showed how community based ecotourism development can play a great role in sustainable natural resource conservation.

The Budongo Forest Reserve, in Northern western Uganda, was gazetted as a Central Forest reserve in 1932. But the deep forest tended to be shunned by local people for their needs. In 1995, the Budongo Forest ecotourism project was organized with the aim of promoting forest conservation by integrating conservation with community development, and to achieve active involvement of the local communities in the project and management of the forest. The project enables the women to work as guides, facilitators, caretakers and produce handicrafts for sale. The men do similar tasks and additionally work as trail cutters. Farmers' groups in the area are diversifying into vegetable growing and beekeeping, with training provided by the project. The vegetables are being eaten in farmers' homes, and sold to the hotels, lodges and tourism developments connected to the forest, that enables the farmers to have additional source of income. Gradually, the attitude of the local communities to the forest began to change and actively participate in the conservation process (Langoya and Long, 1997).

Before the introduction of the ecotourism project in Tafi Atome village in the Volta region of Ghana in 2004, forest land was cleared for farm use; forest material was extracted, economically viable trees were sold for profit and monkeys were killed. The development of ecotourism project enables local communities to have incentives for the conservation of the forest resources (Edleman, 2006).

Ecotourism development in Asian Pacific Region has played great role for conservation (TIES, 2006). Poaching and unabated habitat loss due to fragmentation, degradation and Conversion of park lands to farming had intensified long-term threats to biodiversity conservation in and around the Royal Chitwan national Park in Nepal. The Chitwan river line forest contains the world's largest concentration of the Bengal tigers (*Panthera tigris*) and one-horned rhinoceros (*Rhinoceros unicornis*). The extensive loss of habitat was associated with high demand of trees for fire wood and fodder. In order to overcome the problem, community based Ecotourism project was developed in 1994. After three years, the forest resources have been improved, Tiger and rhinoceros poaching reduced by three-fold and the revenue earned from the Project has assisted local people to improve their standard of living (Ngece, 2002).

2.4.6 Emergences and development of ecotourism

Although tourism has significant contribution to economic development and conservation of environmental resources, it also became negative impacts on tourist's destination areas. Especially during the past decades because of the interest of business profit of the tour operators to attract more tourists, which resulted in high negative impacts of tourist's destinations, principle of nature based tourism or ecotourism was not considered. Consequently, in the 1990s, the attentions for environmental issues of tourists' destinations areas were increased and ecotourism to be pronounced (Sindiga, 1999).

Ecotourism was given more concerns since the world Ecotourism Summit in 2002, because it is expected as a tool for ensuring sustainable conservation of destination areas, satisfying the enjoyment of tourists, benefiting the destination community and contributes to poverty reduction (Theodros Atlabachew, 2002).

2.4.7 Development of ecotourism in case of Ethiopia

The concept of ecotourism is a new phenomenon and it is difficult to explain its significant achievement since the approach of ecotourism is not widely distributed in Ethiopia. The government of Ethiopia also has recognized development and promotion of ecotourism and provided consultancy services for a number of potential developers of ecotourism sites. Bishangari Eco-Lodge located at Eastern of Langano Lake in Oromia Region and Village Ethiopia located at Afar Region (Bilen) is examples of these private ecotourism developments in Ethiopia (Gobena Adem, 2008). In past few years, Land Use Planning of Oromia aims to create alternative income generating means such as ecotourism to reduce the pressure on the natural resources of land through conducting a pre-feasibility study of proposed areas on the potentials of ecotourism (Scwenk, 2002).

2.4.8 Ecotourism and protected areas

Today protected areas are aimed at conserving biodiversity and large scale of natural ecosystems. However, these protected areas are increasingly facing a number of challenges

(Wearing and Neil, 1999). Protected areas are important destinations for a growing tourism like ecotourism given that it uses diverse nature, landscapes and biodiversity as major attractions. In these protected areas, there might be a potential threat to, and an opportunity for conservation of natural resources. If properly planned and managed ecotourism may minimize the environmental impacts while significantly contributes to the protected areas (Strasdas, 2002).

Ecotourism introduced in protected areas of some countries to reverse these challenges since ecotourism could have a significant role for conservation of natural resources and the overall development in developing countries. For example, in Namibia the current travel and ecotourism potential contributed 16.0% to its GDP and also account for 71,800 jobs, which is 17.9% of total employment opportunities (Louis, 2007).

The relationship between protected areas and local communities is a key factor in the long-term conservation of the natural resources in and around these protected areas (Okello, 2003). However, in many cases, the relationship faces conflicts when locals perceived the protected areas as a burden on their land use and direct opposition on subsistence needs from protected area. Enough attention was not given to the process of involving local people in decision making and conservationist blamed the local people as a major threat to the conservation of the protected area. Therefore, it is necessary to cooperate with local people in order to sustain protected areas through development of ecotourism.

2.4.9 Ecotourism and protected areas in case of Ethiopia

The main objectives of these protected areas are to protect natural resources of the country (Shibru Tedla, 1994) but recently most of protected areas of Ethiopia are exposed to severe degradations due to failure of creating alternative options like ecotourism. Thus, to minimize these problems which expose natural resources to degradations in protected areas, some interventions, which involve ecotourism activities, have been attempted in AdabaDodola forest priority area in Bale zone in Oromia regional state. WAJIB which said to be “WaldaaJirattootaBosonaa” in Afan Oromo meaning “forest Dwellers associations” is an example of an outcome of such effort. Incomes obtained by local community from provision of

accommodation service to tourists, horse provision and tour guiding which contributes to reduce free livestock grazing and deforestation of protected area (Tsegaye Tadesse, 2007).

The forest of Sheka is part of the southwest highlands forests of Ethiopia important for conservation of the Afromontane forest vegetation types, especially the Afromontane Rainforest and alpine bamboo thickets (Tadesse Weldemariam and Masresh Fetene, 2011). There also many endemic species, at least 55 plants, and 10 birds. Altogether, there are over 65 endemic species of plants and birds. There are also over 38 threatened species in the area, which include 5 birds, 3 mammals and 30 plant species (EWNHS, 1996). Skeka biosphere reserve has a great potential as a demonstration site for environmental education and the link between culture and biodiversity or cultural biodiversity.

3. METHODS AND MATERIALS

3.1. Description of the Study Area

3.1.1 Location

The study was conducted in Sheka zone in south west of Ethiopia. The Sheka zone lies between 7°24' -7°52' N Latitude and 35°13' -35°35' E longitude, 676 km south west of Addis Ababa. The altitude ranges between 900 and 2700 m above sea level and it receives a high amount of rain fall with an average of 1800–2200 mm annually. The area receives nearly ayear-round rainfall (MELCA, 2005).

The Sheka Forest Biosphere Reserve is located in the Sheka Zone of the Southern Nations, Nationalities and Peoples (SNNP) Regional State. It covers a total area of 238,750 ha of forest, bamboo thickets, wetlands, agricultural land, rural settlements and towns. It covers a unique biogeographic unit extending from cold and very wet highlands bordering Illuababora zone of Oromia National Regional state and Kefa zone to hot lowland areas bordering Gambela regional state and the Bench-Maji Zone (Figure 2).

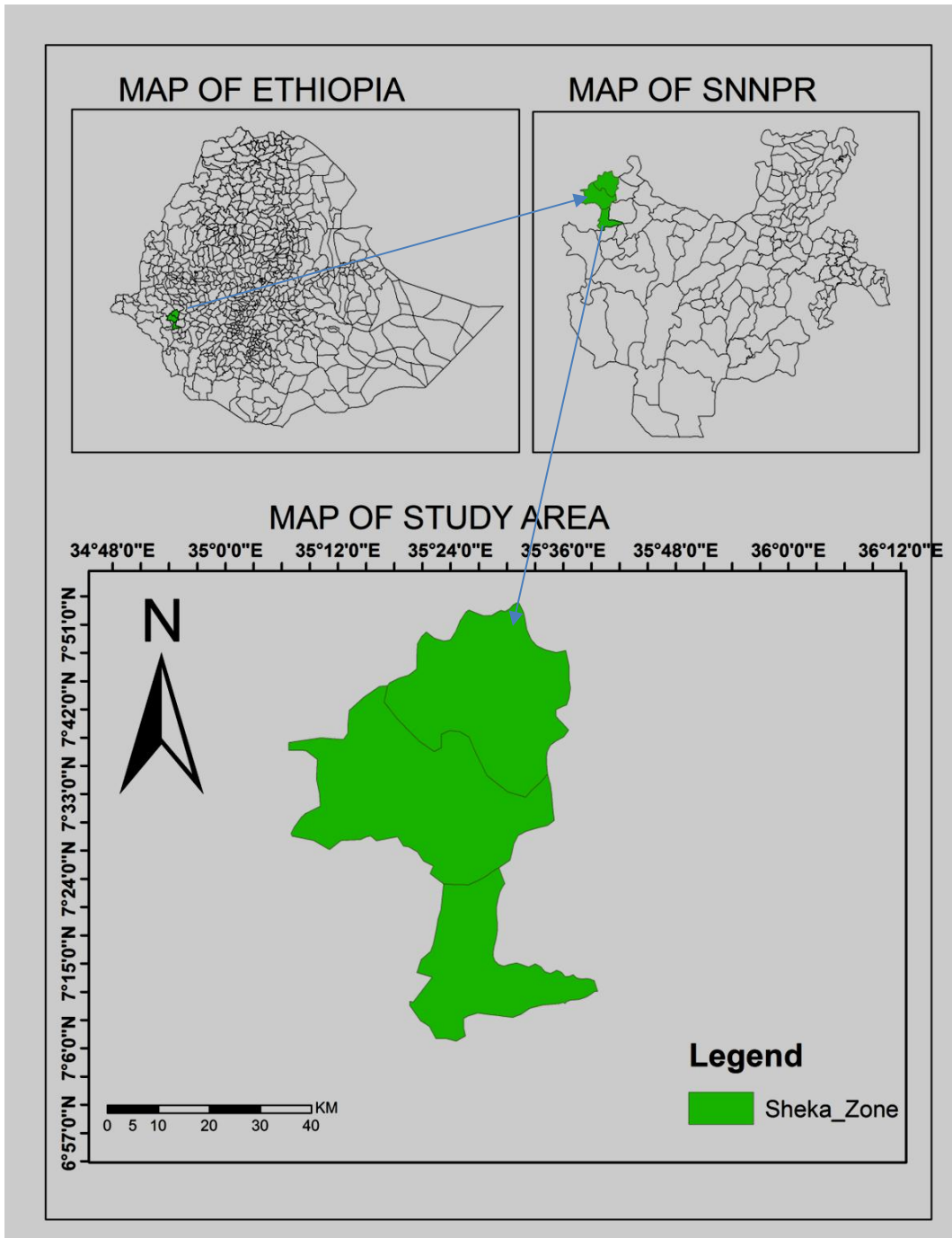


Figure 2: Location of the Sheka forest Biosphere Reserve

3.1.2 Topography

The area is characterized by a rolling topography, and is highly dissected by several small streams, which drain into the Baro, Akobo and Gojeb Rivers. The landform frequently changes from flat surfaces on the top of plateaus to very steep slopes and valley bottoms within short distances. The area is characterized by wetlands, marshes, mountain ranges and narrow valleys. Wetlands on the highlands are dominated by ferns, grasses and bamboo, while the lowland wetlands are dominated by palm trees. Mountain ranges are mostly covered by dense natural forests and bamboo thickets.

3.1.3 Climate

Reliable climatic data of the area is not available due to lack of weather station for many years. Based on the information from the nearby stations at Gore, Tepi and MizanTeferi, the mean annual rainfall is estimated to be over 2200 mm. The mean maximum temperature is estimated to be between 25°C and 34°C, and the mean minimum is estimated to be between 10°C and 15°C. The rainfall distribution is uni-modal, with the highest rainfall between June and September. Rain falls throughout the year, with monthly minimum and maximum of about 70 and 220 mm. It also has a relatively long growing season of well over 250 days per year.

3.1.4 Geology, geomorphology and soils:

The Cenozoic and Proterozoic volcanic sediments underlie most parts of the southwestern Ethiopia (Schluter, 2008). Generally, the soils of the area are red or brownish ferrisols derived from volcanic parent material. The prevalence of high rainfall has masked other soil forming-factors and hence, very similar soils have developed on a variety of parent materials. Other soil groups in the area include nitosols, acrisols, vertisols, and cambisols (Tafesse Asres, 1996).

3.1.4 Fauna and flora

The biosphere reserve has an exceptionally high level of biodiversity. The forest vegetation is rich in plant species. Most tree species in the area are endemic to the Afromontane eco-region. It is among the few remaining pristine habitats of the Afromontane eco-region in Africa, with unique assemblage of flora and fauna. There are many Ethiopian endemics, of which some are range restricted to the southwestern highlands. It also harbors Afrotropical highland biome (HB) bird assemblage. There are 32 species of the total 48 HB bird species occurring in Ethiopia, and is part of the Metu-Gore-Teppi important bird area (EWNHS, 1996).

The Afromontane forest vegetation has long been considered as one of the most threatened eco-region in the world (White, 1983). Ethiopia has the biggest land surface falling within the Afromontane region. The forest in Sheka is part of the southwest highlands forests of Ethiopia important for conservation of the Afromontane forest vegetation types, especially the Afromontane Rainforest and alpine bamboo thickets ((Friis, 1992; Feyera Senbeta, 2006 and Tadesse Weldemariam, 2007).

The area is rich in plant and animal species. There are over 300 higher plants, 50 mammals, 200 birds, and 20 amphibian species, occurring in all habitat types within the biosphere reserve (EWNHS 1996).

The forest is a National Forest Priority Area (EFAP, 1994), designated mainly for conservation of biodiversity and watershed protection. The natural vegetation in the area is predominantly Afromontane Rainforest, along with bamboo thickets and wetland grasslands at higher altitudes. There is also savannah grassland at the western parts of Masha and Anderacha woredas. The area is rich in highland and forest bird species, mammals like colobus monkey and Anubis baboon, and other wild animals (EWNHS, 1996). Apart from the flora and fauna, there are several rivers with the associated riverine habitats, waterfalls, caves, mineral water and several cultural sites.

3.2 Methods

3.2.1 Research type

Since the study focused in assessing the Ecotourism potential (opportunities) of Sheka Biosphere reserve for future sustainable natural resource management, descriptive survey type of research was used. This method or type of research is commonly conducted to collect detail description of existing phenomena with the intent of employing data to justify current conditions (to investigate phenomena in their natural setting) and whenever possible to draw valid general conclusions from the facts discovered (Koul, 2006).

3.2.2 Sample site selection and sampling methods

Target population

Sheka Biosphere reserve was selected for this research because it is one of the remaining forest resources and recently established biosphere reserve in Ethiopia. The subjects or target populations of the study were workers of natural resource protection department, department of culture, tourism and government affairs (including Masha, Andiracha and Yeki woreda), Agricultural and rural development department, MELCA Ethiopia Masha district, local communities living near to the reserve (mainly from Yepo, Karina, Yokichichi, Tugiri, Gebina and Depichinegawa kebeles) and elders living around the reserve

Sampling methods

The samples were selected using both purposive, cluster and volunteer sampling methods. Responsible workers from zonal and woreda were included in the study purposefully because they have better information regarding the issue under investigation. Twelve (12) individuals were participated in focus group discussion.

Information was also collected from six volunteer elders living in the surrounding areas of the Biosphere reserve based on volunteer sampling. The Biosphere reserve is surrounded by fifty-

seven villages located within three woreda of Sheka Zone namely Masha, Andiracha and Yeki. The study was covered six villages bordering the Biosphere reserve, which are Depichinegawa, Yokichichi, Gebina, Tugiri, Yepo and Karina which were selected purposively; however, the household were identified by using simple random sampling technique. The sample size was determined by Yamane (1967) cited by Kasunic (2005) provides a simplified formula. This simplified formula assumes a 95% confidence level and the maximum variance ($p = 0.5$). The formula is:

$$n = \frac{N}{1 + N(e)^2} \dots\dots\dots (Kasunic, 2005).$$

Where

n -is the sample size

N -is the population size

e -specifies the desired level of precision, where $e = 1 - \text{precision}$ (0.05 limit of tolerable error) level of precision= 9% (0.09) and 1 = a theoretical or statistical constant

First, six kebeles with 3353 house hold heads, which are very close to the reserve and have direct impact on its resources were identified from the fifty-seven kebeles (two from Masha woreda side, three from Anderacha and one from Yeki woreda sides) with the help of development agents and data enumerators; Second, all household heads (120) with in the selected villages were included in the study. Lastly code was given to each village starting from 01 up to 06.

In each community of 120 households were selected using systematic sampling methods. Systematic sampling involves drawing a sample by taking every K^{th} case from a list of the population. Ary *et al.* (2002) offers the following steps for conducting a systematic sample:

- 1) Decide how many subjects you want in the sample (n).
- 2) Divide N (the total number of members in the population) by n and determine the sampling interval (K) to apply to the list.
- 3) Select the first member randomly from the first K members of the list, and then select every K^{th} member of the population for the sample. This was done by collecting the lists of the names of

the entire households. The total number of population in each site were divided by sample size (120). The quotients were used as sampling interval (K). Then the lottery method will be used to have random start (the first household). Then every kth household was selected from the list of households, and then the trends were continued until the 100th households were selected.

Mathematically,

$K = N/n$ Where, K= sampling interval, N= total households of the Kebele and n= sample size

3.2.3 Data collection methods

Four complementary data collection methods namely household survey (individual interviews), focus group discussions, key informant interviews (Annex 1-5) and direct observation were used during present study. Secondary data which obtained from written documents, internet, and books were also used to collect detailed information on ecotourism potentials

Household survey

Different types of structured questionnaire were prepared by the researcher and information was collected with closed and open-ended questions from respondents. This helps to bring about information from respondents regarding demographic, socio economic situations and the relation with their natural environment. Three trained person and one researcher have administered the interview.

Focus group discussion (FGD)

For household survey, basic descriptive information was collected. This technique will help to obtain useful and detailed information, which might be difficult to collect through the household survey. Discussions were held with purposively selected 12 respondents from all level of job hierarchy under the guidance of a researcher. Checklists were prepared to guide topics for open-ended discussion with groups of respondents.

Key informant interview

To support the information collected using questionnaire and to get a detailed in picture about ecotourism resources in the areas, in-depth interviews and discussion were held with Biosphere reserve team and local knowledgeable person who have detail information on the reserve dealing about the current status of natural resources, challenges, opportunities and threats. Also, to support the above methods tourists' interview were conducted to respondents or international tourists who were visiting the area at that time.

Direct observation

Direct observation was another method used to collect primary data used to obtain data on ecotourism potentials. During field observation, digital photo camera, Global Positioning System (GPS) for ecotourism attraction sites and bird guide books were used. Also, camera trap was conducted for wild animals which were difficult for direct observations in reserve.

Document Analysis

Documents from Sheka zone culture, tourism and government affairs department, Agriculture and rural development department and natural resource protection department were analyzed.

3.2.4 Methods of data analysis

The information gathered from different sources using questionnaire, interview, and focus group discussion and documentary analysis has been organized in manageable manner based on similarity of the issue in order to make the analysis easy with the help of Statistical Package for Social Science (SPSS version 21). Accordingly, descriptive statistic in a form of percentage and frequency were used to analysis socioeconomic sketch of the respondents and responses were compared using chi-square test and t-test. The field observation data and the secondary sources of data regarding ecotourism potentials analysis has been supported by actual tables and photographs. Finally, conclusions and reasonable recommendations have been drawn based on the major findings of the analysis.

4. RESULT AND DISCUSSION

4.1 Ecotourism Resources in and around Sheka Biosphere reserve

The survey result showed that natural resources are the main ecotourism attraction in the area. These resources include fauna and flora, scenery of landscape, attractive culture, and indigenous knowledge. Therefore, it is possible to say that the study area has potentials for future ecotourism development. Moreover, it is observed that its ecotourism resource in and around Sheka Biosphere Reserve can attract tourists and may contribute to conservation of natural resources if they are developed. From this point of view, the following basic ecotourism resources have been identified in and around Sheka Biosphere Reserve.

4.1.1 Natural ecotourism resources

A) Scenery (landscape, cave, waterfall and lake)

The landscape of Sheka biosphere reserve is characterized by an undulating topography, and is highly dissected by several streams, which drain into the Baro, Akobo and Gojeb Rivers. The landform frequently changes from flat surfaces on the top of plateaus to very steep slopes and valley bottoms within short distances. The area is also characterized by wetlands, marshes, mountain ranges and valleys. Mountain ranges are mostly covered by dense natural forests and bamboo thickets.

The topography of the area and amazing peaks like Getiba, Gay and Gandi nearby Yokichichi Kebele that are covered with dense forest which are attractive sites for tourists. About 39 natural caves, 70 waterfalls and 1 Mountain Lake have been identified. For example, Lake Gnocchi and the surrounding area covered by dense bamboo trees have a good topographic view with attractive landscape. There are several natural caves and waterfalls in and around sheka biosphere reserve which were homes and habitats for many wild animals, especially bats, nightjars and swifts. These caves have historical importance since they were used during the period of war thus needs further archeological investigation in order to know the nature of the caves. The waterfalls contribute to the scenic beauty of the landscape which associated many

life forms especially birds occur in these areas. In general, both waterfalls and caves add to the complexity and diversity of the landscapes and the scenic beauty has high potential for future ecotourism development. The most amazing caves which have potential for ecotourist were; Shekishoko cave, Atile cave, Abelo cave, Dusha cave and Gay Abakakiwasha cave. Shekishoko water fall and cave, situated at 08640'41" N and 07689'45"E at elevation of 2161 meter is the largest one and it has the capacity to serve more than seven to eight thousand peoples. It is the home for the only mammalian bats. Gahamawo stream (tributary of Baro River) originates from the upper side of the reserve which has admiring waterfalls located in Masha woreda and the Gandochi Lake situated at 08203'05" N and 07670'98" E at elevation of 2544 meter that is surrounded by mountains bamboo trees and located in Andiracha woreda has high potential of attracting tourists. Caving, camping, trekking, bird watching, climbing, traveling along the forest, and photographing, etc. can be main tourist activities to be practiced on these resources. So, these ecotourism potentials in area can attract tourists and may contribute to conservation of natural resources if they are developed. (Holden, 2009) also acknowledged that the ecotourism resource in protected areas could generate more revenues, which could benefit the local people and contributed to conservation of protected areas (figure A-H for ecotourism resources).



A) The view of largest cave (Shekishoko water fall and cave)



B) Gay cave in Andiracha Woreda



C) Gahamawo water fall in Masha woreda



D) Yutiy water fall Andiracha woreda



E) Wolo water fall in Masha woreda



F) Gandochi Lake in Anderacha woreda



G) Over view of Baro River



H) Overview of the upper part of the reserve viewed during sunset

Figure 3: Some Fascinating Sceneries of the sheka biosphere reserve (picture by Biniam, 2016)

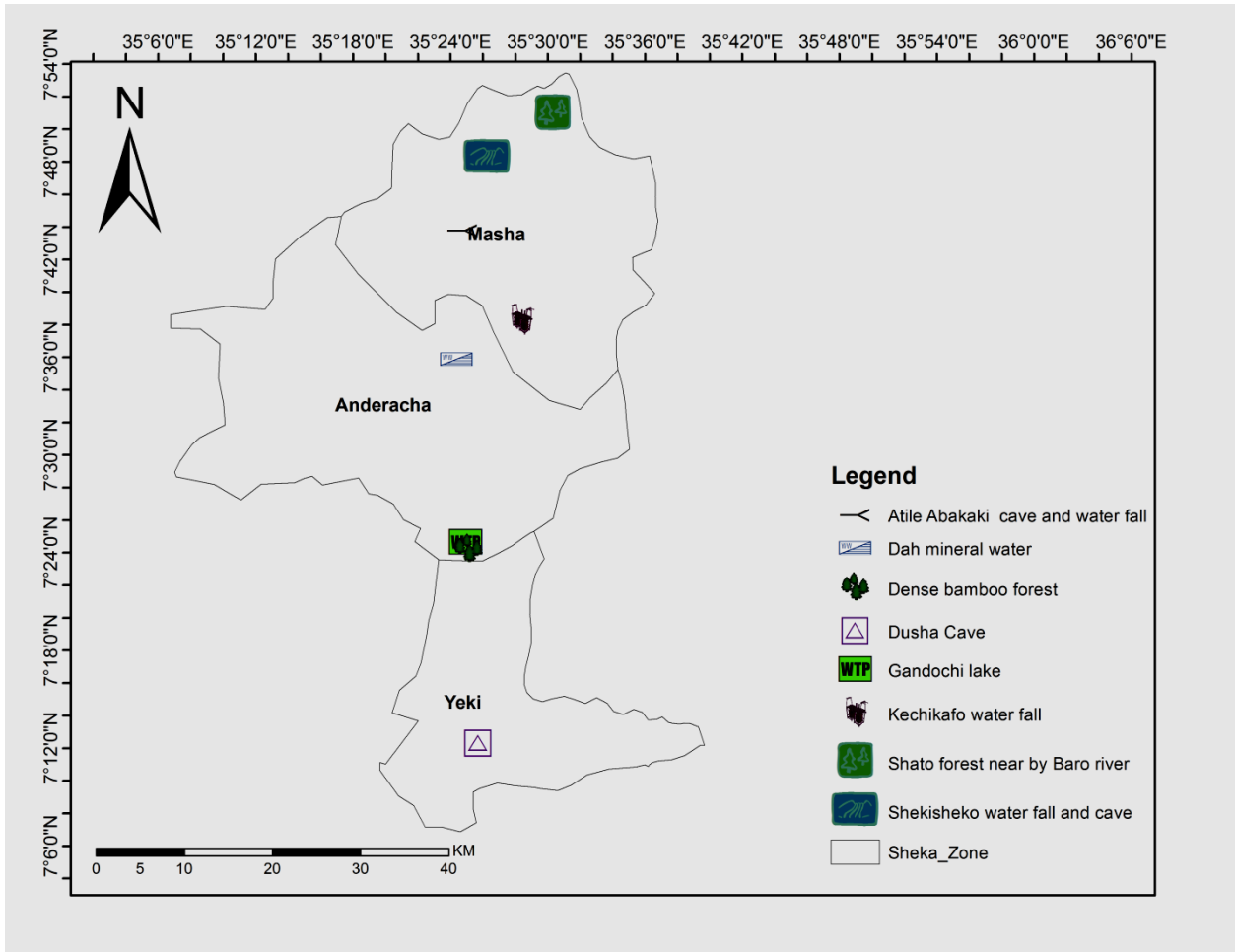


Figure 4: Map of ecotourism attraction sites of Sheka Biosphere Reserve

Source: own source

B) Flora

Ecologically, the forest vegetation of the Sheka biosphere reserve can be categorized into two types: Afromontane rainforest and transitional rainforest (Friis, 1992). The two forest types have many species in common. However, there are some species which are common and characteristics of each type. The characteristic species of the Afromontane rainforest are a mixture of broadleaved tree species and including: *Pouteria adolfi-friederici*, *Syzygium guineense*, *Polyscias fulva*, *Olea welwitschii*, *Diospyros abyssinica*, *Manilkara butugi*, *Cordia africana*, *Trilepisium madagascariense*, *Croton macrostachyus*, and *Schefflera abyssinica*. A discontinuous canopy of smaller trees (less than 10m) include *Allophylus abyssinicus*,

Chionanthus mildbraedii, *Clausena anisata*, *Coffea arabica*, *Deinbollia kilimandischarica*, *Ehretia cymosa*, *Galiniera saxifraga*, *Lepidotrichilia volkensii*, *Nuxia congesta*, *Oxyanthus speciosus*, *Pittosporum viridiflorum*, *Ritchiea albersii*, *Rothmannia urcelliformis*, *Teclea nobilis*, and *Vepris dainellii*. Natural coffee is one of the characteristic species in the understory. The shrub layer includes *Acanthus eminens*, *Dracaena fragrans*, *Lobelia giberroa*, *Senecio gigas*, *Cyathea manniana*, *Maytenus* spp., *Whitfieldia elongata* and others. The lianas and scrambling shrubs are numerous: *Landolphia buchananii*, *Jasminium abyssinicum*, *Hippocratea goetzei*, *Combretum paniculatum*, *Embelia schimperi*, *Dalbergia lactea*, *Paullinia pinnata*, *Oncinotis tenuiloba*, *Tiliacora troupinii*, and *Hippocratea africana*. Epiphytes are very common and include *Canarina abyssinica*, *Scadox nutans*, *Peperomia tetraphylla*, *Asplenium sandersonii*, *Loxogramme lanceolata*, *Aerangis luteoalba*, *Arthropteris monocarpa*, *Asplenium* spp., different orchids, mosses, and others. The ground cover is also very rich and includes: *Dorsteniasorensenii*, *Elatostema orientale*, *Impatiens ethiopica*, *Thalictrum rhynchocarpum*, and many others (Friis, 1992; Tadesse Weldemariam, 2003; Feyera Senbeta, 2006).

The characteristic species unique to the transitional rainforest include *Aningeria altissima*, *Anthocleista schweinfurthii*, *Campylospermum bukobense*, *Celtis philippensis*, *Celtis zenkeri*, *Croton sylvaticus*, *Dracaena fragrans*, *Elaeodendron buchananii*, *Eugenia bukobensis*, *Ficus exasperata*, *Garcinia huillensis*, *Manilkara butugi*, *Morus mesozygia*, *Phoenix reclinata*, *Strychnos mitis*, *Trichilia dregeana*, *Trilepisium madagascariense* and *Vepris dainellii* (Friis, 1992; Tadesse Weldemariam, 2003).

The Biosphere reserve supports many vascular plant species that are nationally considered as threatened species. These species are; *Cordia Africana*, *Pouteria adolfi-friederici*, *Acacia abyssinica*, *Antiaris toxicaria*, *Milicia excels*, *Morus mesozygia*, *Manilkara butugi*, *Pouteria altissima* and *Trilepisium madagascariense* were nationally recognized as threatened species because of overuse or exploitation. These tree species warrant conservation within the biosphere reserve since they are already at risk and becoming rare nationally. More importantly, most Afromontane rainforest species are rare and restricted in their distribution range, and often have a low frequency of occupancy (Tadesse Weldemariam, 2007).

Bamboo thickets in the area represent highland vegetation dominated by alpine bamboo (*Arundinaria alpina*). Such vegetation is found at areas higher than 2300 m in Biosphere reserve. A notable place to observe such vegetation is around Gada in Masha Woreda and Yokochich in Andiracha. The bamboo thickets are largely found in Gada, Kanga, Ateso, Yina, Atile, Gatimo, Tugiri, Chicha and Yokochich kebeles. Bamboo is highly valuable for the local community. It has several local uses: construction (fence and house), beehive (both culm and sheath are used), floor mat, chairs, baskets, Dollo (water container), cups, Gemo (traditional tray), pipe used for smoking tobacco, bed, food, etc. The bamboo thickets also have several other services like habitat for wildlife and watershed protection. Both the Afromontane forest and the transitional rainforest of the reserve have a very attractive view for tourists (Figure A-F and Annex 9 for the major flora type of the reserve).



A) *Pouteria adolfi-friederici* (Baehni)



B) *Polyscias fulva* Harms



C) Dense afromontane forest



D) *Cyathea manniana* Hook (sesino)



E) *Schefflera abyssinica*

F) Dense Bamboo trees near to Gandochi lake

Figure 5: (A-F) Flora of the Sheka Biosphere reserve

C) Fauna

Sheka biosphere reserve is also home for different mammals, amphibians and birds. Studies conducted on diversity and distribution of mammals in the area by EWNHS (1996) confirmed that the presence of more than 50 mammals, 200 birds, and 20 amphibian species, occurring in all habitat types of the biosphere reserve. A list of common forest mammals and birds species in the area which were identified by EWNHS (1996) includes; *Hystrix cristata* (porcupine), *Cercopithecus aethiops* (Chlorocebus), *Cercopithecus mitis* (blue monkey), *Cercopithecus neglectus* (De Brzza's monkey), *Papio anubis danguera* (baboon), *Colobus guereza* (Colobus monkey), *Syncerus caffer* (African buffalo), *Tragelaphus scriptus* (Bush back), *Redunca redunca* (Bohor reedbuck), *Tragelaphus strepsiceros* (Greater kudu), *Sylvicapra grimmia* (Commen duiker), *Phacochoerus aethiopicus* (warthog), *Leptailurus serval* (Serval), *Lycaon pictus* (wild hunting dog), *Panthera leo* (lion), *Panthera pardus* (leopard), *Civettictis civetta* (African civet), *Genetta abyssinica* (Abyssinica genet), *Lepus fagani* (Ethiopian hare), *Orycteropus afer* (aardvark), *Viverridae sanguineus* (Shelemitmat) and many bats (*Chiroptera*).

Among theses the researcher observed and trapped were *Hystrix cristata* (porcupine), *Cercopithecus aethiops* (Chlorocebus), *Cercopithecus mitis* (blue monkey), *Cercopithecus*

neglectus (De Brazza's monkey), *Papio anubis daguera* (baboon), *Colobus guereza* (colobus monkey), *Tragelaphus scriptus* (bushbuck), *Redunca redunca* (Bohorreedbuck), *Leptailurus serval* (serval), *Sylvicapra grimmia* (Commen duiker), *Civettictis civetta* (African civet), *Panthera pardus* (leopard), *Orycteropus afer* (aardvark), *Viverridae sanguineus* (shelmitmat) (see figure 6 and annex 7). The human pressure on natural resource due to agricultural investment expansion and hunting, those big mammals especially Felidae and antelopes were shifted their ecology. Masanja (2014) who reported that the human population in most protected areas over the years has been changing in terms of its size, density and livelihood strategies.

There were also common bird species having conservation importance found in Sheka biosphere reserve were; *Oriolus monacha* (Abyssinian black headed oriole), *Bucorvus abyssinicus* (Abyssinian groundhornbill), *Turdus piaggiae* (Abyssinian ground thrush), *Dendropicos abyssinicus* (Abyssinian woodpecker), *Alcippe abyssinica* (African hill babbler), *Lybiud guifsobalito* (banded barbet), *Agapornis taranta* (black winged lovebird), *Francolinus leucoscepus* (chestnut naped francolin), *Nectarinia olivacea* (olive bellied sunbird), *Rougetius rougetii* (Rouget's rail), *Apus myioptilus* (scarce swift), *Cinnyricinclus sharpie* (sharpe's starling), *Cossypha niveicapilla* (snowy headed robin chat), *Poeoptera stuhlmanni* (stuhmann's starling), *Tauraco ruspolii* (white checked turaco), *Poicephalus flavifrons* (yellow fronted parrot), *Bostrichina carunculata* (wattled ibis), *Cyanochen cyanoptera* (blue winged goose), *Parophasma galinieri* (Abyssinian cat bird), *Parus leuconutus* (white backed backlit), *Onchoganthus albirotris* (white billed starling), and *Carvus crassirostris* (thick billed raven) (Figure 6 and Annex 8).

From these the *Corvus crassirostris* (thick-billed raven), *Oriolus monacha* (Blach headed forest oriole), *Bostrychia carunculata* (Wattled ibis), *Dendropicos abyssinicus* (Abyssinian woodpecker), *Melaenornis chocolatinus* (Abyssinian slaty flycatcher), *Ruogetius rougetii* (Rouget's rail), *Agapornis taranta* (black-winged lovebird), *Macronyx flavicollis* (Abyssinian longclaw), *Parphasma galinieri* (Abyssinian catbird), *Poicephalus flavifrons* (Yellow-fronted parrot) and *Columba albitorques* (White-collared pigeon) were some endemic birds of Ethiopia recorded in the biosphere reserve. The diverse species and abundant forest bird are residing in Sheka biosphere reserve that will contribute to attract Eco tourists or bird watchers.

The biosphere reserve contains one globally red-listed mammal species *Panthera pardus* (leopard). This also displaced in many areas, and is further threatened because of growing habitat fragmentation. Additionally, there are also nationally or locally threatened mammal species, *Hystrix cristata* (porcupine), *Orycteropus afer* (aardvark), *Genetta abyssinica* (Ethiopian genet), and *Civettictis civetta* (African civet) which are under threat due to habitat disturbance. Beside to this there were globally red-listed bird species occur in the biosphere reserve including *Rougetius rougetii* (Rouget's rail). The following figure 6 shows some of the recorded fauna from Biosphere Reserve. So, the establishment of Sheka forest biosphere reserve safeguarded these threatened species and other associated species in the area. According to this study animal diversity is one of the potential for ecotourism development. (Figure 6 (A-E) for some of fauna recorded from Sheka Biosphere reserve).



A) *Cercopithecus neglectus* (De Brazza's monkey) B) *Tragelaphus scriptus* (bushbuck)



C) *Panthera pardus* (leopard)



E) White checked turaco

Rails

Francoline

Figure 6: Some Mammals found in Sheka biosphere reserve

4.4.2 Cultural ecotourism resources

During key informant and elders' interview they indicated that there are potentials of local arts, handicrafts, tools, and cultural dances, lifestyle of the indigenous community, distinctive cultural patterns, cultural festivals, and other economic activities. There are also unique local cultures that are practiced by people living around Sheka biosphere reserve. The cultural activities and cultural products include wedding ceremony, local music and dances, locally produced artifacts, house construction style, Geno system (conflict resolution), community's traditional life style, cultural foods and drinks, pottery, netting and traditional leather craft products etc. can be good tourist attraction resources. WTO (2002) reported also that the local products in tourist destination areas complement the major facilities of tourism.

The cultural or sacred sites areas identified by the community for different rituals, religious and traditional ceremonies that includes; gudo (religious ritual sites), ceco (wetlands), dedo site (Large tree under which prayer or religious ceremony is conducted), dero (lake) sites and rivers were also be cultural ecotourism sites. Byers *et al.*, (2001) reported that strict observance of beliefs can play a positive role through bringing about the orderly behavior of people, which help in the conservation of the forests, land and wildlife. Figure 7 (A-E) depict some of the cultural ecotourism resources available around Sheka biosphere reserve.



A) Old man showing cultural song B) Cultural houses C) the gate of cultural house



D) Cultural bee keeping E) cultural dress of Shaka (left) and Sheko (right) peoples

Figure 7: Some of the cultural attractions

4.2 Socio-Economic Situation of the Local Community

The type of economic activity experienced in a certain area has impacts on its natural resources. The following discussions focus on the major socio-economic activity of the peoples near to Sheka Biosphere Reserve.

As shown in Table 5, 84.2% of the house hold is headed by male; among the total households, 85% were males and 15% were females, 77.5% were married followed by single, divorced and widowed 6.7%, 8.3% and 7.5% respectively. As to the level of education, most of the sampled household heads (40 %) had basic level of education. Household heads with primary education made about 29.2 % of the sampled households. The rest of the sampled household heads were illiterate (22.5 %) and only 7.5% attained secondary level of education. The majority of the sampled household speaks Shekinonoo and the survey result revealed that 80.8 per cent of the sampled households were resident to the area whereas the rest were non-native.

Table 5: Background information of sampled respondents (N=120)

		N	%
HH head	male	101	84.2
	female	19	15.8
Sex	male	102	85
	female	18	15
marital status	married	93	77.5
	single	8	6.7
	divorced	10	8.3
	widowed	9	7.5
Literacy level	illiterate	27	22.5
	able to read	49	40.8
	primary school	35	29.2
	secondary school	9	7.5
language	shekinonoo	59	49.2
	Amharic	14	11.7
	Shekinonoo and Amharic	31	25.8
	others	16	13.3
Residency	Less than one year	1	0.8
	less than 5 years	7	5.8
	six up to 10 years	15	12.5
	more than 10 years	97	80.8

The primary economic activity of the respondents is mixed farming (64.2%). Concerning with their secondary occupation, Crop production (40%), animal husbandry (35.8%) and bee farming (26.7%) are the first, second and third ones respectively. About 4 (3.3%) respondents have no any secondary occupation while 14 (11.7%) and 38 (31.7%) respondents have no second and third secondary occupation respectively. (See figure 8). The major non-timber activity by local community on the Reserve is bee keeping. According to Aseffa Seyoum (2007) the major economic activity of the local communities living around the reserve is mixed farming.

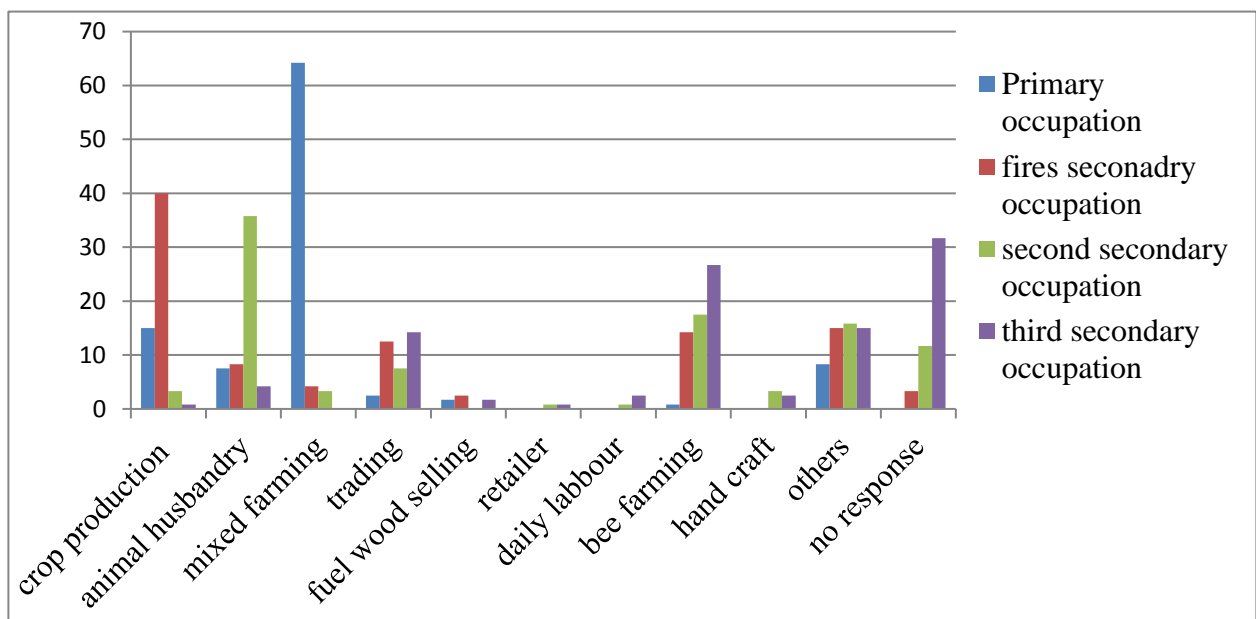


Figure 8: Responses on Primary and Secondary occupation of sampled respondents (N=120)

Rearing of domestic animals mainly cattle and sheep is practiced in the area. The major source of grazing land (figure 9) for the sample respondents was their own private land (84.2%). Their secondary sources were free moving (35%) followed by grazing land rented from other (25.82%). Communal land method was the third alternative method for 4.2% of the respondents. The economic activities of the local communities are highly dependent on natural resources and off-farm activities are not well developed in the area. Diversifying the livelihood of the people in the area helps to minimize the difficulty on the reserve. This is the fact that the more diversified livelihood systems of the locals, the less probably these people will look to

over utilize the natural resources. So, Ecotourism development can be one option to diversify their livelihood.

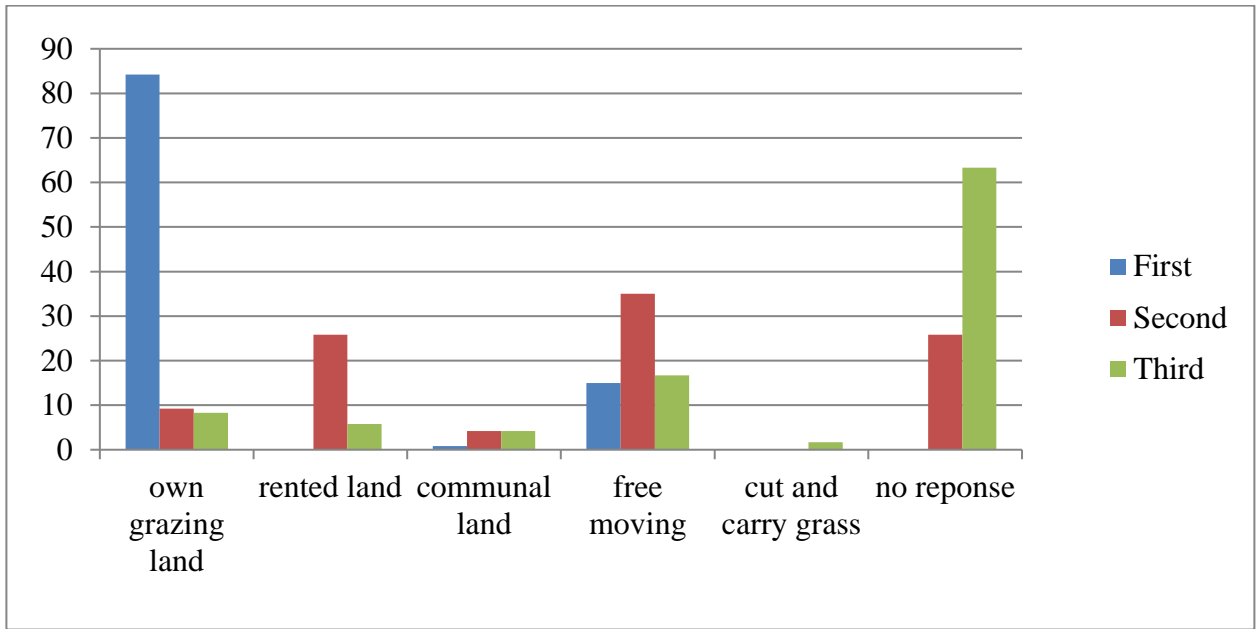


Figure 9: Responses on major source of grazing land for their domestic animals (N=120)

As shown in Table 6, 65% of the households responded that the size of their grazing land has been decreased mainly due to the cumulative effect of change of grazing land in to farm land and reallocation of the grazing land as a result of population pressure (56.7%). Due to this, the locals were facing problems and that may have threats for the resources of the reserve.

Table 6: Respondents response on the size of their grazing land in the last five years (N=120)

size of grazing land	N	%	cause of decrease	N	%
Increased	5	4.2	no response	36	30
Decreased	78	65	change to farm land	2	1.7
No change	37	30.8	increasing of forest	3	2.5
			population growth and change in farm land	68	56.7
			all above	11	9.2
Total	120	100	Total	120	100

Shortage of grazing land (73.3%) and forage (65%) for their livestock were identified as their critical problems associated to rearing of animals (Figure 10). During interview and focus group discussion elders have recognized the change of grazing land in to farm land. When grazing, lands are changed to farm land the locals search for on the resources of reserve for grazing and as a source of forage for their live stocks that will impose threats on the biodiversity of the reserve.

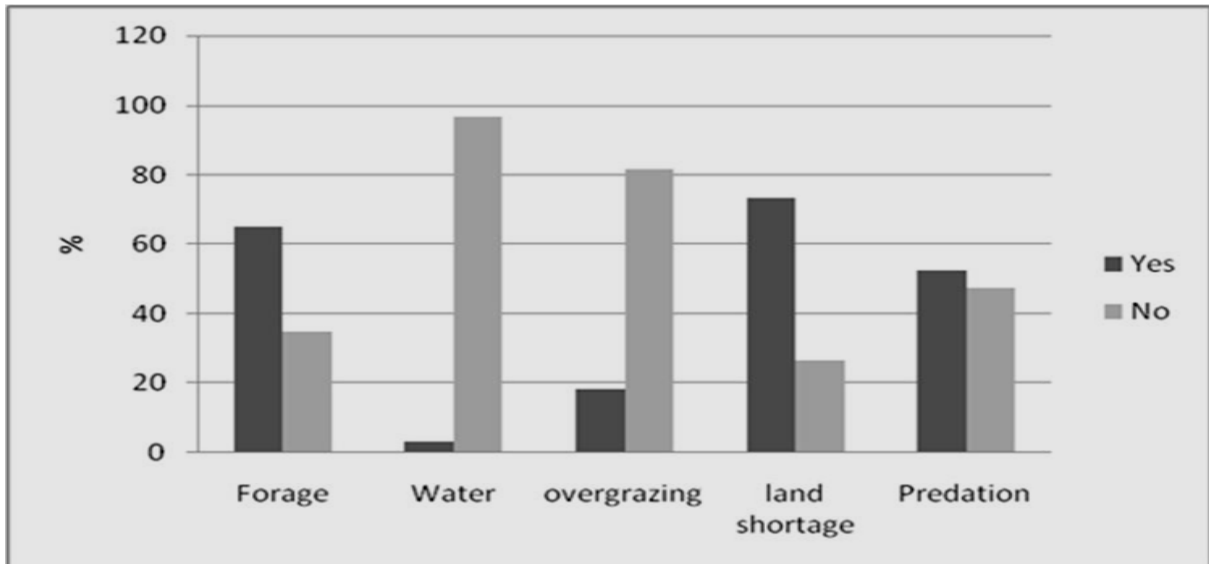


Figure 10: Major Problems of the sampled households related to rearing of Animals

4.3 Ecotourism Resource Conservation problems in Sheka Biosphere Reserve

In this part, the major socioeconomic problems of the local communities that have impact on the resource of Sheka Biosphere Reserve and that would perhaps affect the natural resource conservation have been discussed.

The result revealed that, the major activity of the households is mixed farming (Figure 8). Shortage of farm land (40.8%) and soil fertility reduction (31.7%) were identified as their primary problems followed by shortage of grazing land for their animals (12.5%) and market problems (29.2%) as second and third critical problems (Figure 11). The average agricultural land per household of the sampled respondents was 3.95 hectares. Participants of FGD also confirmed that even if the households have enough land for agriculture; the loss of soil fertility have forced the households either to use their grazing land for farming or search of fertile soil nearby the forest which leading them with conflicting interest on the resource of the reserve with goverments. Due to those associated problems and population pressure further expansion and encroachment of there reserve is expected. Kiss (2004) recommended that ecotourism will be a potential source of economic development and poverty alleviation mainly in marginal areas with limited agricultural potential by diversifying the livelihood of the people.

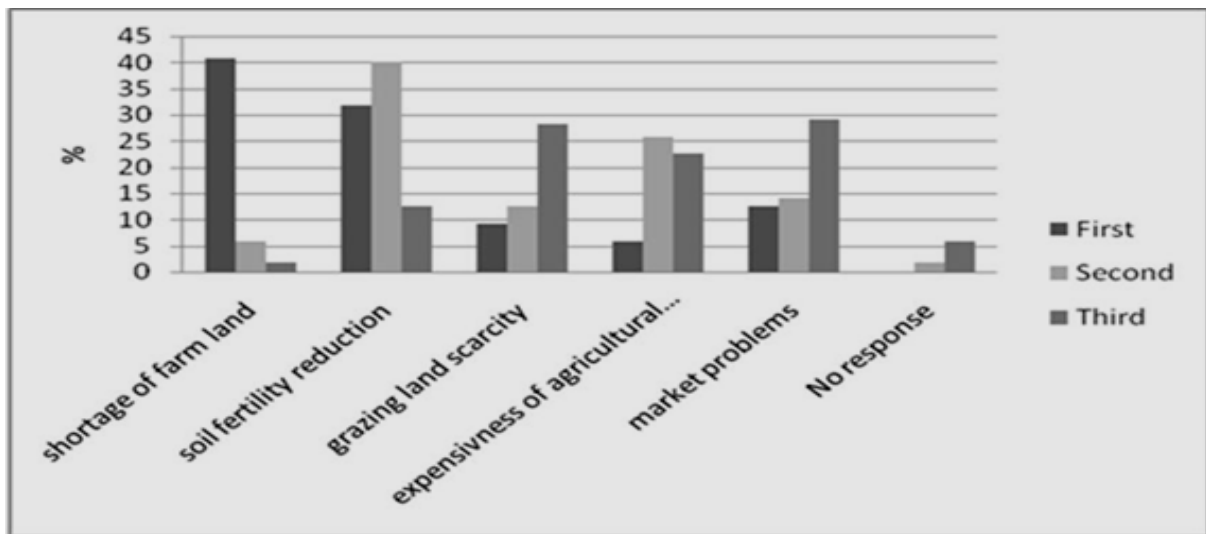


Figure 11: Major Problems of local community on agricultural activity (N=120)

Out of the sampled households 27.5% agreed that the size of the forest has been decreasing in the last five years. From these expansion of agricultural activities toward the forest (100%) and Removing of fuel wood and construction wood from the forest (67%) have been reported as major causes followed by fuel wood for market (48.5%), over grazing 21% and Expansion of settlement in the forest 18%. The impacts of forest fire were not identified as much critical problems (figure 12).

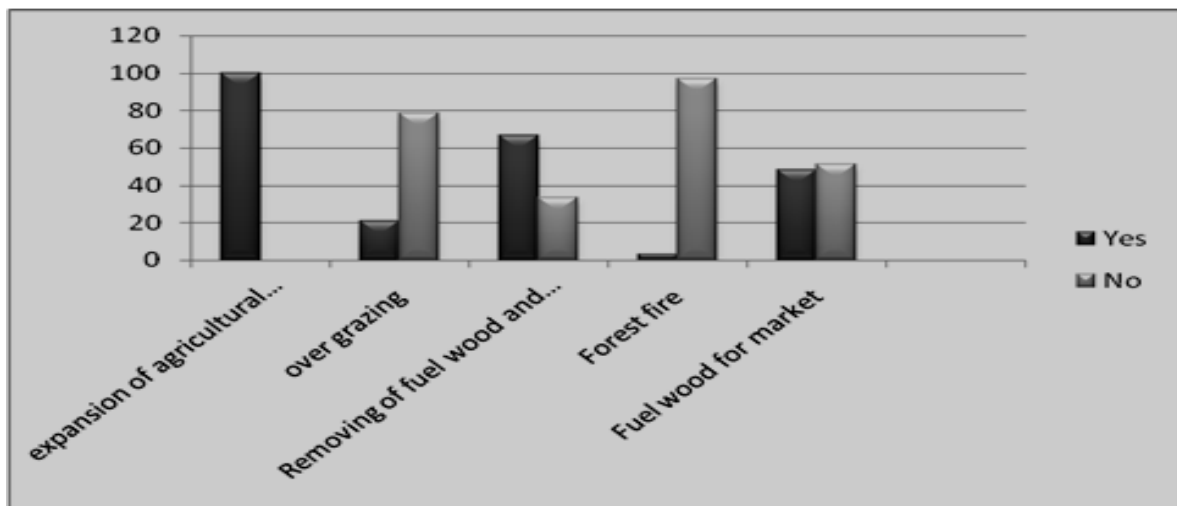


Figure 12: Response on the size of Sheka Forest in the last five years and causes of destruction

The livelihood of the local people is highly linked with natural resources of the reserve. As indicated in figure 13, all of the respondents needed resources from the Biosphere reserve. The most important resources that needed by the locals were fuel and construction wood and need water for livestock (100%), Grass and leaves for animal forage and wild animal need for their meat and skins, utility for farming and households and other needs such as NTFP (99.2%), the forest for bee keeping (97.5%), land for farming (20%) followed by Fuel wood for market and Fuel wood charcoal for market each accounts (14.2%). The need of fuel wood for market and fuel wood charcoal for market and land for farming were minimal., wild animals for their meat and skin, wood for commercial purpose and wood for charcoal were also minimal.

Ecotourism development on Sheka Biosphere reserve therefore, helps to alleviate the major socioeconomic problems of the local community through income generated from tourism related activities. Ecotourism development also contributes for the development of infrastructures which are essential for the development of local communities. When the locals obtain real benefits form ecotourism development on the reserve, they will actively participate in the management of the reserves resources. So, diversifying the livelihood of the people living near to the reserve enables to overcome their pressure on the forest resources.

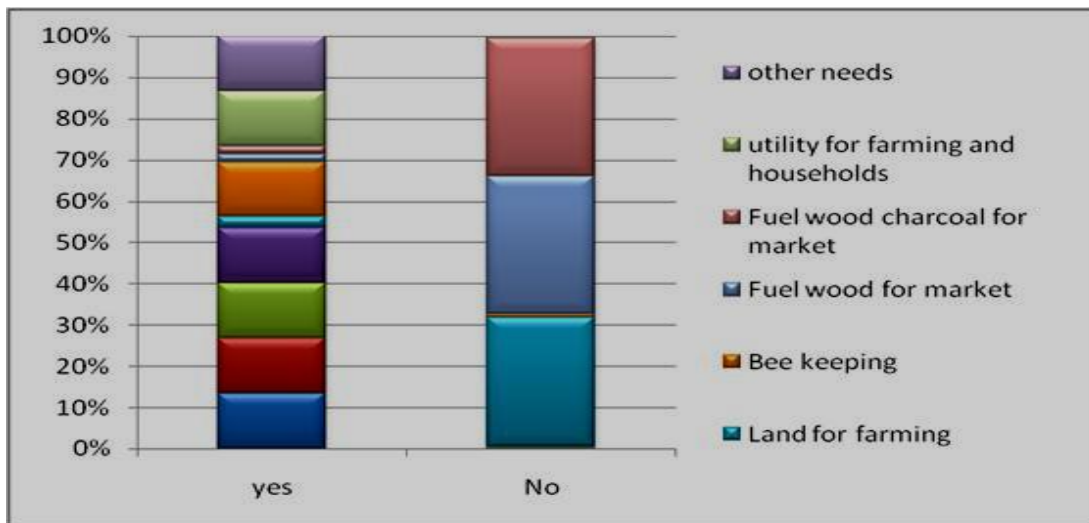


Figure 13 Responses on the need of natural resources by Local communities (N=120)

Regarding natural resource degradation, the level of deforestation and wildlife depletion in and around Sheka Biosphere Reserve were at serious and very serious level respectively (Figure 14). There were significantly difference among sites (kebeles) ($t=11.564$, $p<0.05(0.00)$). Tadesse Weldemariam and Masresha fetene (2007) reported that the rate of deforestation has aggravated in recent years in the study area due to increased rate of conversion to agriculture and monoculture plantations of coffee and tea. Due to the above problems and increasing of human needs from forest because of human population, the biosphere reserve is facing pressure that will be a huge biodiversity threats for feature conservation aspects.

Doria and Rosendo (2003) also reported that if alternative livelihood opportunities are created to local peoples by ecotourism development as economic benefit, they will be no more pressure on natural resources thus promote positive relation among peoples and their environments.

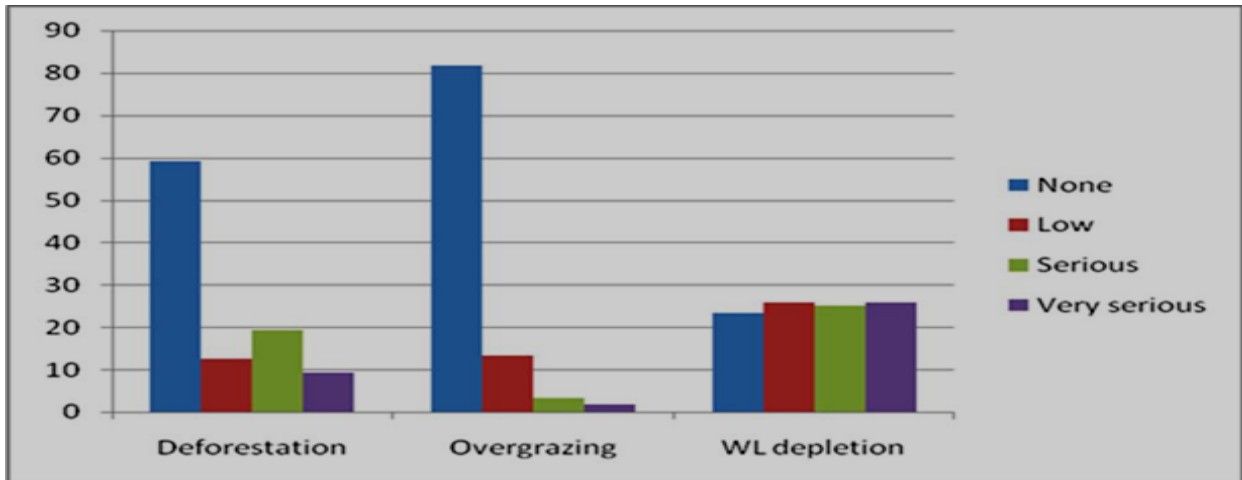


Figure 14: View of respondents on the level of natural resource degradation in and around Sheka Biosphere reserve (N=120)

About 44.2% of the household heads agreed with presence of deforestation and out of these 33.3% of them responded that they are taking some sort of responding mechanisms (Table 7). Those mechanisms implemented by local peoples commonly were; planting of trees (32.5%) and applying modern farm (28.3%). Financial problem (21.7%), lack of knowledge (24.2%) and shortage of farming land (12.5%) were the most important problems that limit locals in their involvement of natural resource management (Table 7). Statstically there is no significant difference among sites regarding availability of envirnmetal problems and its mitigation mechanism ($X^2=10.593$, $P>0.05(.060)$ and $X^2=8.533$, $P>0.05(.129)$ respectively). During field observation, the researcher observed that planting trees near to farm steads mainly exotic trees while, planting native trees species for further purpose were not experienced.

Table 7: Response of local communities on their involvement in Natural Resource Management and Determinant factors (N=120)

Response concerning Natural Resource Management and determinant factors		yes		no	
		N	%	N	%
Deforestation problem		53	44.2	67	55.8
Availability of mechanism		40	33.3	80	66.7
Responding mechanism	Planting trees	39	32.5	81	67.5
	modern source of energy	3	2.5	117	97.5
	controlled grazing	31	25.8	89	74.2
	modern farming	34	28.3	86	71.7
Determinant factor for no responding	Financial constrain	26	21.7	94	78.3
	land shortage	15	12.5	105	87.5
	Lack of knowledge	29	24.2	91	75.8

The result revealed that, 8(30.8%) of the respondents replied the presence of encroachment with the major reasons of fuel wood (30.8%), construction wood (30.8%), charcoal production (24.2%) followed by need grazing land (18.3%) (Table 8). Regarding these timber merchant (12.5%) were identified as primary encroachers followed by landless people (6.7%) and rich people (3.3) as secondary and tertiary respectively. Statstically there is no significant difference among sites (kebeles) ($X^2=5.583$, $DF=5$, $P>0.05(.349)$). According to Sheka Zone agriculture and rural development expert, MELCA Ethiopia and local people were responded that there were some potential activities allowed for local communities from biosphere reserve. For example, bee keeping, spice collection and collecting household construction.

Table 8: Respondents' response on illegal encroachment to the Forest by local communities

Presence of encroachment		Reason of encroachment		yes		no	
				N	%	N	%
	N	%	Fuel wood	37	30.8	83	69.2
Yes	37	30.8	Construction wood	37	30.8	83	69.2
No	83	69.2	Charcoal production	29	24.2	91	75.8
Total	120	100	pit saw	16	13.3	104	86.7
			Grazing land	22	18.3	98	81.7
			Cut and carry grass	2	1.7	118	98.3
			Farmland	12	10	108	90
			first	second	third		
Reason for encroaching	N	%	N	%	N	%	
land less people	12	10	8	6.7	8	6.7	
Timber merchants	15	12.5	18	15	3	2.5	
Poor people	2	1.7	5	4.2	18	15	
rich people	0	0	2	1.7	4	3.3	
Woman	3	2.5	1	0.8	2	1.7	
Community as whole	5	4.2	3	2.5	2	1.7	
No body	83	69.2	83	69.2	83	69.2	
total	120	100	120	100	120	100	

About 69.2% of the respondents have no information about tourism or ecotourism and its contribution for conservation and economic development (Figure 15). There is no significant difference among sites (kebeles) ($X^2=17.140$, $P>0.05(.071)$). For those who have information their sources of information were Media (73.0%) followed by NGOs and other sources from primary and secondary institution (64.9%). This is a difficult ground for the development of ecotourism in and around the Biosphere Reserve.

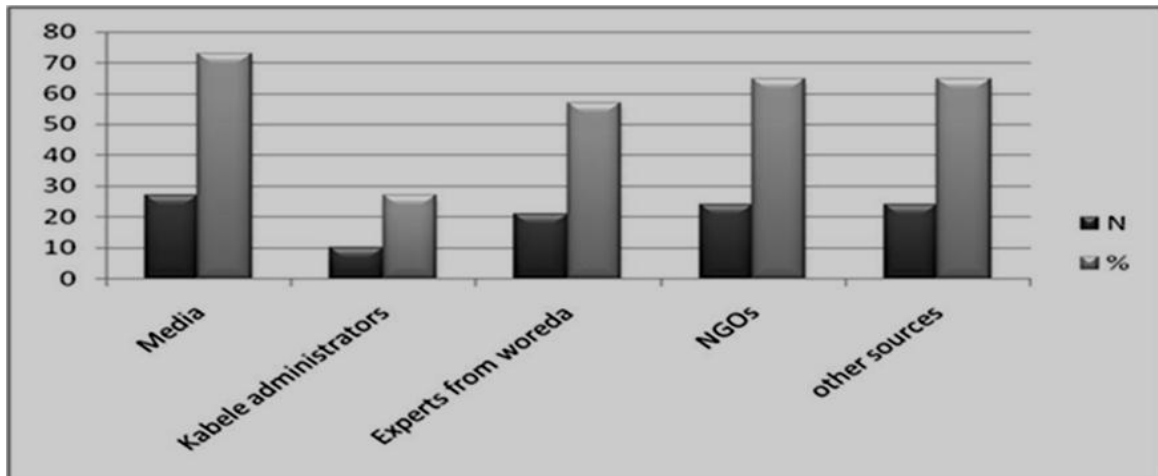


Figure 15: Respondents Information about ecotourism and its advantage (N=120)

About 88.3% out of the sampled respondents have faced human wildlife conflict. According to their response the most frequent cause of conflict with wild animals were; *Papio Anubis* (baboon), *Cercopithecus aethiops* (Chlorocebus), *Leptailurus serval* (serval), *Panthera pardus* (leopard) and *Viverridae sanguineus* (shelmitmat) (Figure 16). The response of respondents from each site were significantly different on human willife conflict in the study area ($t = 18.533, P < 0.05 (0.04)$). Magige (2012) reported that Conflicts over natural resources between the communities living adjacent to protected area have increased in recent years because of changes in land use. Regarding to the establishment of Biosphere reserve, 73.3% of sampled households was respond that the establishment of the Biosphere reserve did not create any human biosphere conflict but the remaining 26.7% of the respondents respond that the establishment of the Biosphere reserve will increase conflicts (Figure 16).

The respondents who have a great fear of human Biosphere conflict increment relates the conflict with human population growth, in such a way that, as human population increases the need for agricultural expansion will also increases and then the landless people will try to encroach into Biosphere reserve resources, in this case the conflict will happens. On other hand the more cultivable land were taken by investors and no more land left for young generations will have also its own side effects. Jackson (2004) indicated that investments oriented towards economic development with little or no regard to aspirations of indigenous people lead to environmental degradation. Castro and Nielsen (2003) also reported that the increased

competition for natural resources among multiple stakeholders with diverse interests that occurring worldwide within the current trends of globalization will also increases the probability of resource conflict.

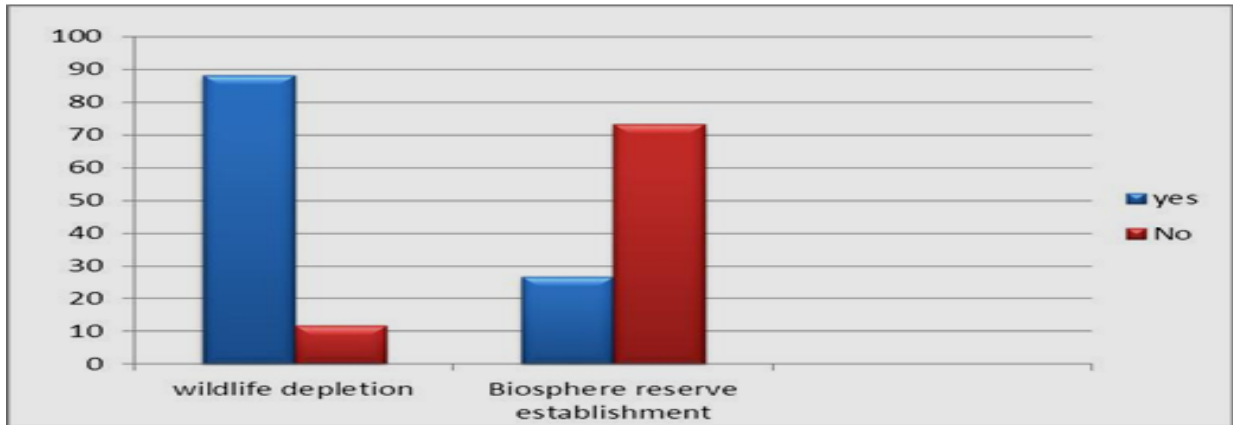


Figure 16: Respondents responses about human natural resource conflict (N=120)

4.4 Visitors Responses Regarding Sheka Biosphere reserve and their Background Informations

Tourists Visiting Sheka Biosphere reserve were coming from different countries (Table 9), led by the Belgium's, Indian, Italy, France, Netherland, Norway and the Philippines. Most of their occupational backgrounds included academia, government service and tourism service industry. Additionally, the primary objectives of tourists were for Volunteer (37.5%) followed by Combination of leisure, research and volunteer which accounts 25%), and finally leisure and research each with 18.8% (Table 9). The purpose of their visit to Sheka Biosphere reserve varied significantly ($\chi^2 = 34.286$; $p < 0.005(.001)$), with most tourists visiting the area for the first time. The ecotourism activities in and around Sheka Biosphere reserve was largely fauna and flora based. From sampled respondents of tourists (37.5%) identified fauna and flora as their primary attraction to the area, with combinations of all (flora, fauna, land escapes, water fall and caves and others) placed next potentials to visit followed by land escape viewing and waterfall and cave that shares 12.5% and 18.8% respectively. During interview, all of them were interested to pay for recreational value of the destination areas with attractive attributes of species diversity, bird spotting or watching, landscape viewing, sunset, lake, waterfalls and caves.

Beside to these the tourist forwarded that more (online) information for possible visitors, informative maps are needed that highlight the forest areas and surrounding features, online information of how to get to tourist sites, trained guides that have sufficient knowledge about species and infrastructure development in the area to inform Eco tourist, many core areas and attractions (water fall, lakes) need more accessibility and keeping community to involve in ecotourism venture.

Table 9: General informations of sampled foreign tourists

Information required	Responses	Frequency (%)	Chi-square (X ²)	Degree of freedom (df)	P-value	Sample size (N)
Nationality	Belgium	4(25%)	112.00	5	<0.000	16
	France	1(6.2%)				
	Indian	2(12.5%)				
	Italy	2(12.5%)				
	Netherland	1(6.2%)				
	Norway	1(6.2%)				
	Philippines	1(6.2%)				
Educational back ground	High school	2(12.5%)	30.048	21	>0.005(.091)	16
	Bachelors	3(18.8%)				
	Masters	7(43.7%)				
	PHD	4(25%)				
Occupation	Academics	13(81.2%)	13.077	14	.520	16
	Business	0				
	tourism service industry	1(6.2%)				
	Government	2(12.5%)				
Purposes of visitation	Leisure	3(18.8%)	34.286	9	<.001	16
	Research	3(18.8%)				
	Volunteer	6(37.5%)				
	Combination	4(25.0%)				
Duration of stay	2 days	5(31.2%)	27.200	21	.164	16
	3 days	4(25.0%)				
	4 days	2(12.5%)				
	More than 4 days	5(31.2) %				
Frequency of visitation	Once	10(62.5%)	26.800	14	.020	16
	Twice	3(18.8%)				
	More than 2 days	3(18.8%)				
Attributes of attractions that tourist were willing to visit	Fauna and flora	6(37.5%)	45.067a	21	<.002	16
	Landscape	2(12.5%)				
	water fall and cave	3(18.8%)				
	Combination	5(31.2%)				

4.5 Ecotourism Development on Sheka Biosphere reserve

4.5.1 Opportunities

The establishment of Sheka biosphere reserve has an opportunity to put appropriate management guidelines in place, in order to attain conservation and sustainable development as well as management of resources will also be based on outputs of scientific research for sustainability.

Sheka biosphere reserve has high potential for ecotourism development. Beside to the ecotourism resources the reserve endowed the legal status of ecotourism resources as internationally recognized diversity plays a great contribution for the flow of tourists in such areas. Woldegabreil Gebrekidan (2003) also showed that the Legal status of any conservation area is essential in order to have received international support both technically and financially.

4.5.2 Challenges

In recent years, forests in the SW Ethiopia are becoming destinations of many tourists interested in nature. A wide variety of tourism opportunities have potential to attract tourists to the area and the surrounding region. Although there is a great potential for tourism in the biosphere reserve area, so far this has little tourism infrastructure and at the moment, there are no more tourist facilities in the area for the development of ecotourism activities. Hayward (2000) also underlined that rapid and efficient transport systems play a great role by giving tourists the chance to travel far and gain a greater knowledge of the world.

The natural ecosystem provides us with a range of ecosystem services but the important challenge is to identify these ecosystem services to conserve them and possibly rehabilitate those that have left. The managed Coffee and conversion of the intact forest into managed and semi-forest coffee production system as well as the expansion of agricultural investment are some of the human impacts on the diversity of natural ecosystems. Bedru Sherefa (2007)

recognized the growing trend of forest areas conversion to subsistence agriculture by small holders and monoculture plantations of tea and coffee over the past decades has been made side effect on natural resources.

Sheka biosphere reserve which was acquired Biosphere reserve status considering its enormous biodiversity importance while the highly dependent of the locals on Biospheres resources and lack of awareness of locals about ecotourism industry may have stress on the Biosphere resources. World Ecotourism Summit report of 2002 state a lack of awareness of tourism among African local communities as a barrier to ecotourism development.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The assessment of ecotourism potentials revealed some of the natural and cultural tourism resources of Sheka biosphere reserve and its surroundings. The absence of alternative options or ecotourism and sustainable management of natural resources are the major problems of Sheka biosphere reserve and its surroundings where as ecotourism potentials are available. The biosphere reserve, with its magnificent scenery, waterfall, caves, Mountain Lake surrounded by bamboo trees, rich biodiversity of flora and fauna and cultural attractions has high potential for ecotourism development.

Mixed farming is major economic activity of the local communities. Shortage of agricultural land, soil fertility reduction, market problems for their product and shortage are critical problems of the local communities.

The practice of modern natural resource conservation activities is not well developed in the area. In addition to this, the current expansion of agricultural investment, other human induced factors and lack of infrastructures are some of threats for the future sustainable natural resource management.

The increasing flow of tourists to southern Ethiopia for the sake of nature, availability of different tourist attractions in and around the Biosphere reserve and high national and international concern for tourism or ecotourism are the major opportunities for the development of ecotourism on Sheka Biosphere reserve.

In general, the study indicated that the presence of ecotourism potentials which will benefit the local communities while contributing sustainable natural resources management of the reserve.

5.2 Recommendation

Based on the major findings of the study and conclusions drawn, the following possible recommendations have been forwarded.

There are some ecotourism potentials and possibilities of alternative options, which are underdeveloped. Ecotourism development is vital to promise the sustainable conservation of the Biosphere reserve. Local people have to see real and tangible benefit from the reserve through generating monetary value and job opportunities. To that end, the state of culture and tourism office in collaboration with the zonal administrators and concerned bodies has to carry out the establishment of ecotourism project.

Since the Biosphere reserve is a newly established one, extensive Promotion has to be done in the area. The developments of basic infrastructures are essential. Therefore, the national government, regional government and zonal administrators in collaboration with concerned bodies have to give attentions regarding the current infrastructure difficulties of the destination.

Providing alternative livelihood options will help to minimize the pressure on the forest resource thus off farm activities are not common. So, diversifying their livelihood helps to minimize the pressure on the natural resource.

In order to avoid disturbance on faunal and flora by human induced factors, a strategy should be designed with the consent of the local community on how to use the Biosphere reserve resources in sustainable manner and the current trend of nearby investments. In addition to this awareness creation for ecotourism has to be made, and the need to provide support for those who will be involved in this venture is crucial.

For possible visitors, informative maps that highlight the forest areas and surrounding features are needed, online information of how to get to tourist sites, trained guides that have sufficient knowledge about species and infrastructure development in the area to inform Eco tourist, many core areas and attractions (water fall, lakes) need more accessibility and keeping community to involve is crucial. Further more, the ecosystem service of the Biosphere Reserve needs further study.

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ANNEXS

Annex 1. Structured questionnaire for household heads

Jimma University College of Agriculture and Veterinary Medicine Science Department of Natural Resource Management

Title: Assessment of ecotourism potentials for sustainable natural resource management in and around Sheka biosphere reserve

The purpose of this questionnaire is to obtain information from concerned stakeholders including household of local community living around the Sheka biosphere reserve about personal background information of households, socio-economic conditions of households, conservation and management problems of natural resources, present and prospect livelihood options of households and ecotourism resources that can attract tourists to the study area.

Dear Respondent: This questionnaire has a research purpose. The outcome of this research will help to identify the major ecotourism resources of the biosphere reserve area, the major problems in relation to sustainable natural resource management and to forward possible solutions. It is believed that it will assist the community, the government and non-government organizations in designing mechanisms to ensure sustainable natural resource management. I confirm you that all data will be treated confidentially and only aggregate and average information will be published. Therefore, I kindly request the cooperation of respondents in filling out the questionnaire accurately considering the importance of the study.

Thank you for your time and cooperation in advance.

Instruction:

Encircle or use tick mark or write the answer as may be necessary to indicate your appropriate response.

A. Interview questionnaires to sample Households

I. Back ground Information

Region: _____ Zone: _____ Wereda: _____ Kebele: _____ Interviewer _____ Date of _____
Name of respondent _____

II. Demographic Characteristics of Household Head

- 1). Type of household: A. Male headed B. Female headed 2) Sex: A. Male B. Female
3. Age in years: _
4. Marital Status: A. Married B. Never married or single C. Divorced D. Widowed
5. Household size Male _____ Female _____
6. Literacy level: A. illiterate B. able to read C. primary school D. secondary school and above
7. Language: A. Shekinonoo B. Amharic C. Specify others
8. Residency in the area? A) Less than 1 yrs. B) 1-5 yrs. C) 6-10 yrs. D) More than 11 years

III. Socioeconomic situation of the house hold

A) Livelihood options of households

1. What is the primary occupation of the household? A. Crop production B. Animal husbandry C. Mixed Farming D. Trading E. Fuel wood selling F. Tailor G. Handicraft F. Daily laborer G. bee keeping
2. What is your secondary occupation? (Rank the first three based on their importance from the above)
3. Do you have your own agricultural land? A. Yes B. No
4. What is/are the major problem/s that the households faces regarding with agricultural activity?
(Identify the first three based on their severity) First _____ Second _____ Third _____
A. Shortage of farmland B. Soil fertility reduction C. Scarcity of grazing land D. Expensiveness of agricultural inputs (fertilizer/ improved seeds) E. Market problem for products F. Other (specify)
5. Do you have any livelihood that is linked with BR? A. Yes B No
6. If yes, your livelihood is linked by A. land for farming B. grazing land C. fuel wood D. materials for constructions E. specify others

B) Livestock resource

1. Do you have your own domestic animals? A. Yes B. No
2. If your answer for question number 1 is yes, what is/are the main source/s of grazing land?
First _____ Second _____ third _____
A. Own grazing land B. communal land C. Land rented D. free moving E. Cut and carry grass or fodder plants from forests F. Other, Specify
3. Which of the following problem/s do you encountered in relation to livestock?
A. shortage of forage B. water problems C. Overgrazing D. shortage of grazing land E. Predation F. all

4. How is the size of the grazing area that the household uses since the last five years?

A. Increased B. Decreased C. There is no change

5. If your answer for question number 5 is “decreased”, what do you think is/are the major reason/s?

A. Grazing land changed in to farm land due to shortage of cultivable land B. Due to high population growth and land reallocation C. Grazing area covered by forests D. AllE. Other (specify)

IV. Questions related with Natural Resource conservation and degradation (forest and wildlife)

1. In your opinion, is there any change in the size of the natural forest for the last five years?

A. Increased B. Decreased C. No change D. I do not know

2. If your answer for question number 1 is “decreased”, what do you think is/are the basic the causes?

3. Are there natural resources you need from the reserve? 1. Yes 2. No

4. If your answer for question number 3 is “yes”, identify the major resources.

Resource	Yes (√)	No (√)	remark
Forest wood for fuel and construction			
Water for livestock			
Wild animals for their meat and skin			
Grass and leaves for animal forage			
Land for farming			
For bee keeping			
fuel wood for market			
Wood for charcoal for market			
Utilities for farming and household			
Others, specify			

5. What is the level of environmental degradation in your locality?

causes	Level of degradation			
	non (√)	low (√)	serious (√)	Very serious (√)
deforestation				
overgrazing				
Wildlife depletion				

6. Do you think that deforestation is an environmental Problem in your area? A. Yes B. No

7. Are you responding to this problem (destruction of forest resources)? A. Yes B. No

8. If your answer for question number 7 is "yes", how are you trying to solve deforestation problem in your locality?

Mitigating mechanism	Yes (√)	No (√)	Reason if your answer is "No"	Reasons (determinant factors)
By planting trees				1. shortage of farm land 2. financial constraint 3. lack of knowledge
By using modern source of energy				
By using control grazing				
By applying modern farming				
Other, Specify				

9. Is there any illegal encroachment to the forest by people from your Kebele? A. Yes B. No

10. If your answer for question number 9 is "yes", local communities encroach into the forest in order to serve mainly for:	Yes (√)	No (√)	Remarks
Fuel wood from the forest			
Construction wood from the forest			
Cut trees for charcoal production			
Cut trees for pit sawing			
Encroach into forest to graze livestock			
Cut and carry grass for livestock from the forest			
land for farming			
Other-specify			

11. If the answer for question number 9 is yes, who do illegal encroach into the forest? (Mention the major two based on their degree of involvement) First _____ Second _____ third _____

A. Landless people B. timber merchants C. Poor People D. The rich E. Women F. community G. Other

12. Do you have information about what does tourism mean and its economic as well as environmental contribution for sustainable natural resource management? A. yes B. no

13. If your answer for question number 12 is "yes", what was your source of information?

A. Media (radio, newspaper etc.) B. Kebele development agents and/or administrators C. Experts from Wereda D. Local and/or international Non-Governmental Organizations E. Others (specify)

14. Is there any human wildlife conflict in your area?

A) If yes, which wild animal is the serious causing of conflict? List the name of wild animal with the resources they damage.

B) Do you think the establishment of the biosphere increases the conflict?

Annex 2: Interviews or questionnaire to senior experts of natural resources, tourism department and other concerned stakeholders about natural resources management of Sheka BR.

The purpose of this questionnaire is to obtain information from experts, agricultural and rural development at different levels and SBR about management problems natural resources and ecotourism potentials including the alternative livelihoods options that contributed to sustainable utilization of natural resources around SBR.

Personal Background Information

I. Personal Background Information about informants/interviewers.

Name: _____ Age: _____ Educational status: _____

Occupational organization: _____ Years of experience: _____

II. Part B: Assessment of the problems with Natural Resource Management and mitigation measures

1. What are socio- economic influences of this area? A. Human habitations B. grazing by cattle C. Fuel wood removals D. Hunting E. Specify others
2. What are external threats of the reserve?
3. What is the extent of local participation in this area? A. Has a local advisory committee B. Does not involve local people at all C. specify others
4. What are the benefits to local people in this area and its surroundings?
5. Indicate the ecotourism resources of the BR?
6. What are the major problems with the natural resources of the BR?
7. What measures can be envisaged to overcome these problems?
8. What are the different livelihoods options can be suggested for the local people?
9. What are the major sites of the BR, which attracts tourists?
10. What are opportunities and Threats related to biosphere reserve?
11. What are the social problems of the people living in in and around the BR?

Thank you!

Annex 3: Interview Questions/Questionnaires to Visitors

The purpose of this questionnaire is to obtain information from visitors on attraction of ecotourism resources and evaluation of these resources of in and surrounding Sheka Biosphere reserve in and around south west Ethiopia.

Name of interviewer_____Address/country-_____Phone_____

1. In which country do you permanently reside? _____
2. Please check one: A. male B. female
3. What is your age group?
A. less than 25 years B. Between 26 and 35-year C. between 36 and 45 years D. Between 46 and 55 years E. between 56 and 65 years F. over 65 years
4. What was your primary reason for visiting this area?
A. Research B. Leisure C. Nature D. Business E. Volunteer F. specify others
5. How long you have stayed in the site?
6. What type of accommodation you frequently used?
7. How many times have you visited this place?
8. What is the highest level of education that you completed? A. Primary school B. High College C. secondary school D. Post-Graduate E. other (specify
9. What attributes of this site of BR is attractive? A. species diversity B. bird spotting or watch C. landscape viewing D. Sunset E. water fall and cave F. others
10. What do you comment/suggest about this BR?

Thank you for participating in our visitor survey!

Annex 4: Semi structured questionnaire for elders

1. Do you think that deforestation is an environmental Problem in your area? 1. Yes 2. No
2. If your answer for question number 1 is “yes”, what are the major causes?
3. What is your observation in your life time regarding: -
 - a. The forest resource of SBR (does its size increased/decreased/ no change). What do you think are the cause for such change in size?

b. Agricultural land size per person (does its size increased/decreased/ no change). What do you think are the cause for such change in size?

c. Grazing land size (does its size increased/decreased/ no change). What do you think are the cause for such change in size?

Annex 5: Semi-structured focus group discussion questionnaires for key informants

I. Personal Background Information about informants

Name of ___Name of organization_____ Years of working experience: _____

1. Age: A. male B. female Sex: A. Male B. Female

2. Educational status: A. below 12 grade B. Certificate C. Diploma D. First degree E. Above second degree

II. Assessment of the problems with Natural Resource Management and mitigation measures

1. What is the extent of local participation in natural resource conservation in the study area?

2. To what extent does the following socio- economic aspects influences the resources of biosphere reserve?

Human habitations (expansion of settlements over grazing by cattle

Fuel wood and construction wood removals hunting

Forest fire High demand of commercial wood

Expansion of agricultural activity towards the forest others

3. Is the area (SBR) has any potential for the development of community based ecotourism? 1. Yes 2. No

4. If yes, List natural ecotourism resources (Flora, fauna, caves, waterfalls, scenery etc.)

5. What major opportunities and challenges are there for the development of community based ecotourism in SBR?

6. Do you think that enough promotion work has been done to publicize Biosphere reserve? What were the major means of promotion?

7. What are the different livelihood options that can be suggested for the local people? What efforts have been undertaken to diversify the livelihood of the local community living around the forest areas?

8. Do you think that ecotourism development can be a viable strategy for sustainable natural resource management? If so, how the local community can be beneficiaries from the development of ecotourism?

Annex 7: Fauna recorded in Sheka Biosphere reserve

No	<i>Scientific or Botanic Name</i>	Common Name	Remark
1	<i>Hystrix cristata</i>	Porcupine	
2	<i>Cercopithecus aethiops</i>	Chlorocebus	
3	<i>Cercopithecus mitis</i>	Blue monkey	
4	<i>Cercopithecus neglectus</i>	De Brazza's monkey	
5	<i>Papio anubis daguera</i>	Baboon	
6	<i>Colobus guereza</i>	Colobus monkey	
7	<i>Syncerus caffer</i>	African buffalo	
8	<i>Tragelaphus scriptus</i>	Bushbuck)	
9	<i>Redunca redunca</i>	Bohor reedbuck	
10	<i>Tragelaphus strepsiceros</i>	Greater kudu	
11	<i>Sylvicapra grimmia</i>	Common duiker	
12	<i>Phacochoerus aethiopicus</i>	Warthog	
13	<i>Leptailurus serval</i>	Serval	
14	<i>Lycaon pictus</i>	wild hunting dog	
15	<i>Panthera leo</i>	lion	
16	<i>Panthera pardus</i>	Leopard	
17	<i>Civettictis civetta</i>	African civet	
18	<i>Genetta abyssinica</i>	Abyssinian genet	
19	<i>Lepus fagani</i>	Ethiopian hare	
20	<i>Orycteropus afer</i>	Aardvark	
21	<i>Viverridae sanguineus</i>	Shelmitmat	
22	<i>Tachyoryctes splendens</i>	Common mole rate	
23	<i>Potamochoerus larvatus</i>	Bush pig	

Source: EWNHS (1996)

Annex 8: Birds (Avifauna) of Sheka Biosphere reserve

No	FAMILY	LATIN NAME	Common Name
1	<i>Podicipedidae</i>	<i>Tachybaptus ruficollis</i>	Little Grebe
2	<i>Phalacrocoracidae</i>	<i>Phalacrocorax africanus</i>	Long tailed Cormorant
3	<i>Anhingidae</i>	<i>Anhinga rufa</i>	Darter
4	<i>Anhingidae</i>	<i>Ardea cinerea</i>	Grey Heron
5	<i>Anhingidae</i>	<i>Ardea melanocephala</i>	Black headed Heron
6	<i>Anhingidae</i>	<i>Bubulcus ibis</i>	Cattle Egret
7	<i>Anhingidae</i>	<i>Butorides striata</i>	Green backed (Straited) Heron
8	<i>Anhingidae</i>	<i>Egretta alba</i>	Great White Egret
9	<i>Anhingidae</i>	<i>Egretta garzetta</i>	Little Egret
10	<i>Scopidae</i>	<i>Scopus umbretta</i>	Hamerkop
11	<i>Ciconiidae</i>	<i>Anastomus lamelligerus</i>	Open billed Stork
12	<i>Ciconiidae</i>	<i>Ciconia abdimii</i>	Abdim's Stork
13	<i>Ciconiidae</i>	<i>Ciconia ciconia</i>	White Stork
14	<i>Ciconiidae</i>	<i>Ciconia episcopus</i>	Wooly necked stork
15	<i>Threskiornithidae</i>	<i>Bostrychia carunculata</i>	Wattled Ibis
16	<i>Threskiornithidae</i>	<i>Bostrychia hagedash</i>	Hadada Ibis
17	<i>Anatidae</i>	<i>Alopochen aegyptiacus</i>	Egyptian Goose
18	<i>Anatidae</i>	<i>Anas sparsa</i>	African Black Duck
19	<i>Anatidae</i>	<i>Anas undulata</i>	Yellow billed Duck
20	<i>Accipitridae</i>	<i>Accipiter melanoleucus</i>	Black Goshawk
21	<i>Accipitridae</i>	<i>Accipiter minullus</i>	Little Sparrow hawk
22	<i>Accipitridae</i>	<i>Accipiter rufiventris</i>	Red breasted Sparrow Hawk
23	<i>Accipitridae</i>	<i>Accipiter tachiro</i>	African Goshawk
24	<i>Accipitridae</i>	<i>Aegypicus occipitalis</i>	White headed Vulture
25	<i>Accipitridae</i>	<i>Aegypicus trachelious</i>	Lappet faced Vulture
26	<i>Accipitridae</i>	<i>Aquila clanga</i>	Greater Spotted Eagle
27	<i>Accipitridae</i>	<i>Aquila rapax</i>	Tawny Eagle
28	<i>Accipitridae</i>	<i>Buteo augur</i>	Augur Buzzard
29	<i>Accipitridae</i>	<i>Buteo buteo</i>	Common Buzzard
30	<i>Accipitridae</i>	<i>Circaetus cinerascens</i>	Western Banded Snake Eagle
31	<i>Accipitridae</i>	<i>Gyps africanus</i>	White backed Vulture
32	<i>Accipitridae</i>	<i>Gyps ruppellii</i>	Ruppell's Vulture
33	<i>Accipitridae</i>	<i>Haliaeetus vocifer</i>	African Fish Eagle
34	<i>Accipitridae</i>	<i>Lophoaetus occipitalis</i>	Long crested Eagle
35	<i>Accipitridae</i>	<i>Machaerhamphus alcinus</i>	Bat Hawk
36	<i>Accipitridae</i>	<i>Milvus aegypticus</i>	Yellow billed Kite
37	<i>Accipitridae</i>	<i>Necrosyrtes monachus</i>	Hooded Vulture
38	<i>Accipitridae</i>	<i>Pernis apivorus</i>	European Honey Buzzard
39	<i>Accipitridae</i>	<i>Polyboroides typus</i>	African Harrier Hawk
40	<i>Accipitridae</i>	<i>Stephanoaetus coronatus</i>	Crowned Eagle
41	<i>Accipitridae</i>	<i>Terathopius ecaudatus</i>	Bateleur
42	<i>Falconidae</i>	<i>Falco ardosiaceus</i>	Grey Kestrel
43	<i>Falconidae</i>	<i>Falco biarmicus</i>	Lanner Falcon
44	<i>Falconidae</i>	<i>Falco concolor</i>	Sooty Falcon
45	<i>Falconidae</i>	<i>Falco tinnunculus</i>	Common Kestrel
46	<i>Phasianidae</i>	<i>Francolinus castaneicollis</i>	Chestnut napped Francolin
47	<i>Phasianidae</i>	<i>Francolinus squamatus</i>	Scaly Francolin
48	<i>Gruidae</i>	<i>Balearica pavonina</i>	Black Crowned Crane
49	<i>Rallidae</i>	<i>Ruogetius rougetii</i>	Rouget's Rail

50	<i>Heliornithidae</i>	<i>Podica senegalensis</i>	African Finfoot
51	<i>Scolopacidae</i>	<i>Tringa hypolucos</i>	Common Sandpiper
52	<i>Scolopacidae</i>	<i>Tringa ochropus</i>	Green Sandpiper
53	<i>Columbidae</i>	<i>Columba albitorques</i>	White collared Pigeon
54	<i>Columbidae</i>	<i>Streptopelia decipiens</i>	African Mourning Dove
55	<i>Columbidae</i>	<i>Streptopelia vinacea</i>	Vinaceous Dove
56	<i>Columbidae</i>	<i>Turtur abyssinicus</i>	Black billed Wood Dove
57	<i>Columbidae</i>	<i>Aplopelia larvata</i>	Lemon Dove
58	<i>Columbidae</i>	<i>Columba arquatrix</i>	African Olive Pigeon
59	<i>Columbidae</i>	<i>Columba guinea</i>	Speckled Pigeon
60	<i>Columbidae</i>	<i>Streptopelia lugens</i>	Dusky (Pink breasted) Turtle Dove
61	<i>Columbidae</i>	<i>Streptopelia semitorquata</i>	Red eyed Dove
62	<i>Columbidae</i>	<i>Treron waalia</i>	Bruce's Green Pigeon
63	<i>Columbidae</i>	<i>Treron calvus</i>	African Green Pigeon
64	<i>Columbidae</i>	<i>Turtur afer</i>	Blue spotted Wood Dove
65	<i>Columbidae</i>	<i>Turtur chalcospilos</i>	Emerald spotted Wood Dove
66	<i>Columbidae</i>	<i>Turtur tympanistria</i>	Tambourine Dove
67	<i>Psittacidae</i>	<i>Agapornis taranta</i>	Black winged Love Bird
68	<i>Psittacidae</i>	<i>Poicephalus flavifrons</i>	Yellow fronted Parrot
69	<i>Musophagidae</i>	<i>Tauraco leucotis</i>	White cheeked Turaco
70	<i>Cuculidae</i>	<i>Centropus monachus</i>	Blue headed Coucal
71	<i>Cuculidae</i>	<i>Centropus senegalensis</i>	Senegal Coucal
72	<i>Cuculidae</i>	<i>Ceuthmochares aereus</i>	Yellowbill/ Green Coucal
73	<i>Cuculidae</i>	<i>Chrysococcyx caprius</i>	Diederik Cuckoo
74	<i>Cuculidae</i>	<i>Chrysococcyx cupreus</i>	African Emerald Cuckoo
75	<i>Cuculidae</i>	<i>Chrysococcyx klaas</i>	Klaas's Cuckoo
76	<i>Cuculidae</i>	<i>Clamator jacobinus</i>	Black and White Cuckoo
77	<i>Cuculidae</i>	<i>Clamator levaillantii</i>	Levaillant's Cuckoo
78	<i>Cuculidae</i>	<i>Cuculus clamosus</i>	Black Cuckoo
79	<i>Cuculidae</i>	<i>Cuculus solitarius</i>	Red chested Cuckoo
80	<i>Strigidae</i>	<i>Bubo lacteus</i>	Verreaux's Eagle Owl
81	<i>Strigidae</i>	<i>Strix woodfordi</i>	African Wood Owl
82	<i>Apodidae</i>	<i>Apus caffer</i>	African White rumped Swift
83	<i>Coliidae</i>	<i>Colius striatus</i>	Speckled Mousebird
84	<i>Alcedinidae</i>	<i>Megaceryle maxima</i>	Giant Kingfisher
85	<i>Alcedinidae</i>	<i>Alcedo cristata</i>	Malachite Kingfisher
86	<i>Alcedinidae</i>	<i>Alcedo semitorquata</i>	Half collard Kingfisher
87	<i>Alcedinidae</i>	<i>Ceryle rudis</i>	Pied Kingfisher
88	<i>Alcedinidae</i>	<i>Ceyx pictus</i>	Pygmy Kingfisher
89	<i>Alcedinidae</i>	<i>Halcyon chelicuti</i>	Striped Kingfisher
90	<i>Alcedinidae</i>	<i>Halcyon senegalensis</i>	Woodland Kingfisher
91	<i>Trogonidae</i>	<i>Apaloderma narina</i>	Narina Trogon
92	<i>Meropidae</i>	<i>Merops oreobates</i>	Cinnamon breasted Bee eater
93	<i>Meropidae</i>	<i>Merops albicollis</i>	White throated Bee eater
94	<i>Meropidae</i>	<i>Merops apaister</i>	European Bee eater
95	<i>Meropidae</i>	<i>Merops pusillus</i>	Little Bee eater
96	<i>Meropidae</i>	<i>Merops variegatus</i>	Blue breasted Bee eater
97	<i>Coraciidae</i>	<i>Eurystomus glaucurus</i>	Broad billed Roller
98	<i>Bucerotidae</i>	<i>Bucorvus abyssinicus</i>	Abyssinian Ground Hornbill
99	<i>Bucerotidae</i>	<i>Bycanistes brevis</i>	Silvery cheeked Hornbill
100	<i>Bucerotidae</i>	<i>Tockus alboterminatus</i>	Crowned Hornbill
101	<i>Bucerotidae</i>	<i>Tockus deckeni</i>	Von der Decken's Hornbill
102	<i>Capitonidae</i>	<i>Lybius bidentatus</i>	Double toothed Barbet

103	<i>Capitonidae</i>	<i>Lybius guifsobalito</i>	Black billed Barbet
104	<i>Capitonidae</i>	<i>Lybius undatus</i>	Banded Barbet
105	<i>Capitonidae</i>	<i>Pogoniulus chrysoconus</i>	Yellow fronted Tinker bird
406	<i>Capitonidae</i>	<i>Tricholaema diademata</i>	Red –fronted Barbet
107	<i>Indicatoridae</i>	<i>Indicator indicator</i>	Greater Honey guide
108	<i>Indicatoridae</i>	<i>Indicator variegatus</i>	Scaly throated Honey guide
109	<i>Indicatoridae</i>	<i>Prodotiscus insignis</i>	Cassin’s Honey guide
110	<i>Picidae</i>	<i>Campethera nubica</i>	Nubian Woodpecker
111	<i>Picidae</i>	<i>Dendropicos abyssinicus</i>	Abyssinian Woodpecker
112	<i>Picidae</i>	<i>Dendropicos fuscescens</i>	Cardinal Woodpecker
113	<i>Picidae</i>	<i>Dendropicos goertae</i>	Grey Woodpecker
114	<i>Picidae</i>	<i>Dendropicos spodocephalus</i>	Grey headed Woodpecker
115	<i>Picidae</i>	<i>Jynx ruficollis</i>	Red throated Wryneck
116	<i>Picidae</i>	<i>Thripias namaquus</i>	Bearded Woodpecker
117	<i>Hirundinidae</i>	<i>Delichon urbicus</i>	House Martin
118	<i>Hirundinidae</i>	<i>Hirundo abyssinica</i>	Lesser Striped Swallow
119	<i>Hirundinidae</i>	<i>Hirundo daurica</i>	Red rumped Swallow
120	<i>Hirundinidae</i>	<i>Hirundo fuligula</i>	African Rock Martin
121	<i>Hirundinidae</i>	<i>Hirundo rustica</i>	Barn Swallow
122	<i>Hirundinidae</i>	<i>Hirundo senegalensis</i>	Mosque Swallow
123	<i>Hirundinidae</i>	<i>Hirundo smithii</i>	Wire tailed Swallow
124	<i>Hirundinidae</i>	<i>Psalidoprocne prestoptera</i>	Black Saw wing
125	<i>Hirundinidae</i>	<i>Pseudhirundo griseopyga</i>	Grey rumped Swallow
126	<i>Hirundinidae</i>	<i>Riparia paludicola</i>	African Sand Martin
127	<i>Motacillidae</i>	<i>Anthus cinnamomeus</i>	African Grassland/ Richard’s Pipit
128	<i>Motacillidae</i>	<i>Anthus novaeseelandiae</i>	Richard's Pipit
129	<i>Motacillidae</i>	<i>Macronyx flavicollis</i>	Abyssinian Longclaw
130	<i>Motacillidae</i>	<i>Motacilla aguimp</i>	African Pied Wagtail
131	<i>Motacillidae</i>	<i>Motacilla alba</i>	White Wagtail
132	<i>Motacillidae</i>	<i>Motacilla cinerea</i>	Grey Wagtail
133	<i>Motacillidae</i>	<i>Motacilla clara</i>	Mountain Wagtail
134	<i>Motacillidae</i>	<i>Motacilla flava</i>	Yellow Wagtail
135	<i>Campephagidae</i>	<i>Campephaga flava</i>	Black Cuckoo shrike
136	<i>Campephagidae</i>	<i>Campephaga phoenicea</i>	Red shouldered Cuckoo shrike
137	<i>Campephagidae</i>	<i>Coracina caesia</i>	Grey Cuckoo shrike
138	<i>Campephagidae</i>	<i>Coracina pectoralis</i>	White breasted Cuckoo shrike
139	<i>Pycnonotidae</i>	<i>Nicator vireo</i>	Yellow throated Leaflove
140	<i>Pycnonotidae</i>	<i>Phyllastrephus strepitans</i>	Northern Brownbul
141	<i>Pycnonotidae</i>	<i>Pycnonotus barbatus</i>	Common Bulbul
142	<i>Turdidae</i>	<i>Cercomela sordida</i>	Hill Chat
143	<i>Turdidae</i>	<i>Cossypha heuglini</i>	White browed Robin Chat
144	<i>Turdidae</i>	<i>Cossypha niveicapilla</i>	Snowy crowned Robin Chat
145	<i>Turdidae</i>	<i>Cossypha semirufa</i>	Ruppell’s Robin Chat
146	<i>Turdidae</i>	<i>Monticola rufocinerea</i>	Little Rock Thrush
147	<i>Turdidae</i>	<i>Oenanthe isabellina</i>	Isabelline Wheatear
148	<i>Turdidae</i>	<i>Oenanthe oenanthe</i>	Northern Wheatear
149	<i>Turdidae</i>	<i>Oenanthe pleschanka</i>	Pied Wheatear
150	<i>Turdidae</i>	<i>Phoenicurus phoenicurus</i>	Common Redstart
151	<i>Turdidae</i>	<i>Psophocichla litsipsirupa</i>	Ground scraper Thrush
152	<i>Turdidae</i>	<i>Saxicola rubetra</i>	Whinchat
153	<i>Turdidae</i>	<i>Saxicola torquata</i>	Stonechat (Ethiopian Race)
154	<i>Turdidae</i>	<i>Turdus olivaceus</i>	Olive Thrush
155	<i>Turdidae</i>	<i>Turdus pelios</i>	African Thrush

156	<i>Turdidae</i>	<i>Zoothera piaggiae</i>	Abyssinian Ground Thrush
157	<i>Sylviidae</i>	<i>Acrocephalus schoenobaenus</i>	Sedge Warbler
158	<i>Sylviidae</i>	<i>Bradipterus cinnamomeus</i>	Cinnamon bracken Warbler
159	<i>Sylviidae</i>	<i>Cameroptera brachyura</i>	Grey backed Cameroptera
160	<i>Sylviidae</i>	<i>Chloropeta natalensis</i>	Dark capped Yellow Warbler
161	<i>Sylviidae</i>	<i>Cisticola cantans</i>	Singing Cisticola
162	<i>Sylviidae</i>	<i>Cisticola erythropis</i>	Red faced Cisticola
163	<i>Sylviidae</i>	<i>Cisticola galactotes</i>	Winding Cisticola
164	<i>Sylviidae</i>	<i>Cisticola natalensis</i>	Croaking Cisticola
165	<i>Sylviidae</i>	<i>Cisticola robustus</i>	Stout Cisticola
166	<i>Sylviidae</i>	<i>Cisticola troglodytes</i>	Foxy Cisticola
167	<i>Sylviidae</i>	<i>Ermomela icteropygialis</i>	Yellow billed Ermomela
168	<i>Sylviidae</i>	<i>Hippolais languida</i>	Upcher's Warbler
169	<i>Sylviidae</i>	<i>Phyllolais pulchella</i>	Buff bellied Warbler
170	<i>Sylviidae</i>	<i>Phylloscopus collybita</i>	Chiffchaff
171	<i>Sylviidae</i>	<i>Phylloscopus sibilatrix</i>	Wood Warbler
172	<i>Sylviidae</i>	<i>Phylloscopus trochilus</i>	Willow Warbler
173	<i>Sylviidae</i>	<i>Phylloscopus umbrovirens</i>	Brown Woodland Warbler
174	<i>Sylviidae</i>	<i>Prinia subflava</i>	Tawny flanked Prinia
175	<i>Sylviidae</i>	<i>Sylvia atricapilla</i>	Blackcap
176	<i>Muscicapidae</i>	<i>Muscicapa infuscata</i>	Sooty Flycatcher
177	<i>Muscicapidae</i>	<i>Myioparus plumbeus</i>	Lead coloured Flycatcher
178	<i>Muscicapidae</i>	<i>Bradornis microrhynchus</i>	Grey Flycatcher
179	<i>Muscicapidae</i>	<i>Melaenornis chocolatinus</i>	Abyssinian Slaty Flycatcher
180	<i>Muscicapidae</i>	<i>Melaenornis edolioides</i>	Northern Black Flycatcher
181	<i>Muscicapidae</i>	<i>Muscicapa adusta</i>	Dusky Flycatcher
182	<i>Platysteiridae</i>	<i>Platysteira cyanea</i>	Banded Wattle eye
183	<i>Platysteiridae</i>	<i>Batis minor</i>	Black headed Batis
184	<i>Platysteiridae</i>	<i>Batis orientalis</i>	Grey headed Batis
185	<i>Monarchidae</i>	<i>Terpsiphone viridis</i>	Paradise Flycatcher
186	<i>Timaliidae</i>	<i>Parphasma galinieri</i>	Abyssinian Catbird
187	<i>Timaliidae</i>	<i>Pseudoalcippe abyssinica</i>	African Hill Babbler
188	<i>Timaliidae</i>	<i>Turdoides leucopygius</i>	White rumped Babbler
189	<i>Paridae</i>	<i>Parus leucomelas</i>	White winged Black Tit
190	<i>Certhiidae</i>	<i>Salpornis pilonotus</i>	Spotted Creeper
191	<i>Nectariniidae</i>	<i>Hedydipna collaris</i>	Collared Sunbird
192	<i>Nectariniidae</i>	<i>Nectarinia cuprea</i>	Coppery Sunbird
193	<i>Nectariniidae</i>	<i>Nectarinia erythrocerca</i>	Red chested Sunbird
194	<i>Nectariniidae</i>	<i>Nectarinia habessinica</i>	Shining Sunbird
195	<i>Nectariniidae</i>	<i>Nectarinia olivacea</i>	Olive Sunbird
196	<i>Nectariniidae</i>	<i>Nectarinia pulchella</i>	Beautiful Sunbird
197	<i>Nectariniidae</i>	<i>Nectarinia senegalensis</i>	Scarlet chested Sunbird
198	<i>Nectariniidae</i>	<i>Nectarinia tacazze</i>	Tacazze Sunbird
199	<i>Nectariniidae</i>	<i>Nectarinia venusta</i>	Variable Sunbird
200	<i>Zosteropidae</i>	<i>Zosterops senegalensis</i>	Yellow White eye
201	<i>Zosteropidae</i>	<i>Zosterops abyssinicus</i>	Abyssinian White eye
202	<i>Zosteropidae</i>	<i>Zosterops poligastrus</i>	Montane White eye
203	<i>Oriolidae</i>	<i>Oriolus monacha</i>	Abyssinian Black headed Oriole
204	<i>Laniidae</i>	<i>Dryoscopus gambensis</i>	Northern Puffback
205	<i>Laniidae</i>	<i>Laniarius aethiopicus</i>	Tropical Boubou
206	<i>Laniidae</i>	<i>Lanius collaris</i>	Fiscal Shrike
207	<i>Laniidae</i>	<i>Tchagra minuta</i>	Marsh Tchagra
208	<i>Laniidae</i>	<i>Tchagra senegala</i>	Black crowned Tchagra

209	Corvidae	<i>Corvus rhipidurus</i>	Fan tailed Raven
210	Corvidae	<i>Corvus capensis</i>	Black Crow
211	Corvidae	<i>Corvus crassirostris</i>	Thick billed Raven
212	Dicruridae	<i>Dicrurus adsimilis</i>	Fork tailed Drongo
213	Sturnidae	<i>Buphagus erythrohynchus</i>	Red billed Oxpecker
214	Sturnidae	<i>Cinnuricinclus leucogaster</i>	Violet backed Starling
215	Sturnidae	<i>Cinnuricinclus sharpii</i>	Sharp's Starling
216	Sturnidae	<i>Lamprotornis chaylbaeus</i>	Greater Blue eared Starling
217	Sturnidae	<i>Lamprotornis splendidus</i>	Splendid Glossy Starling
218	Sturnidae	<i>Onychognathus morio</i>	Red winged Starling
219	Sturnidae	<i>Onychognathus tenuirostris</i>	Slender billed Starling
220	Sturnidae	<i>Poeoptera stuhlmanni</i>	Stuhlmann's Starling
221	Passeridae	<i>Passer swainsonii</i>	Swainson's Sparrow
222	Ploceidae	<i>Amblyospiza albifrons</i>	Thick billed Weaver
223	Ploceidae	<i>Anaplectes rubriceps</i>	Red headed Weaver
224	Ploceidae	<i>Euplectes afer</i>	Yellow Bishop
225	Ploceidae	<i>Euplectes ardens</i>	Red collared Whydah
226	Ploceidae	<i>Euplectes axillaris</i>	Fantailed Widowbird
227	Ploceidae	<i>Euplectes franciscanus</i>	Northern Red Bishop
228	Ploceidae	<i>Euplectes progne</i>	Red shouldered Whydah
229	Ploceidae	<i>Ploceus baglafecht</i>	Baglafecht Weaver
230	Ploceidae	<i>Ploceus cucullatus</i>	Village Weaver
231	Ploceidae	<i>Ploceus intermedius</i>	Lesser Masked Weaver
232	Ploceidae	<i>Ploceus nigricollis</i>	Black necked Weaver
233	Ploceidae	<i>Ploceus ocularis</i>	Spectacled Weaver
234	Ploceidae	<i>Ploceus spekei</i>	Speke's Weaver
235	Ploceidae	<i>Ploceus taeniopterus</i>	Northern Masked Weaver
236	Ploceidae	<i>Quelea erythrops</i>	Red headed Quelea
237	Ploceidae	<i>Quelea quelea</i>	Red billed Quelea
238	Estrildidae	<i>Coccyzygia quartinia</i>	Yellow bellied Waxbill
239	Estrildidae	<i>Cryptospiza salvadorii</i>	Abyssinian Crimsoning
240	Estrildidae	<i>Estrilda astrild</i>	Common Waxbill
241	Estrildidae	<i>Estrilda paludicola</i>	Fawn breasted Waxbill
242	Estrildidae	<i>Lagonosticta senegala</i>	Red billed Fire finch
243	Estrildidae	<i>Lagonosticta rubricata</i>	African Fire finch
244	Estrildidae	<i>Lonchura bicolor</i>	Black and White Manikin
245	Estrildidae	<i>Lonchura cucullata</i>	Bronze Manikin
246	Estrildidae	<i>Mandingoa nitidula</i>	Green Twin spot
247	Estrildidae	<i>Uraeginthus bengalus</i>	Red cheeked cordon bleu
248	Viduidae	<i>Vidua hypocherina</i>	Steel Blue Whydah
249	Viduidae	<i>Vidua chalybeata</i>	Village Indigo bird
250	Viduidae	<i>Vidua macroura</i>	Pin tailed Widow
251	Fringillidae	<i>Serinus citrinelloides</i>	African Citril
252	Fringillidae	<i>Serinus richardi</i>	Stripe breasted Seed eater
253	Fringillidae	<i>Serinus striolatus</i>	Streaky Seed eater
254	Fringillidae	<i>Serinus tristriatus</i>	Brown rumped Seed eater

Source: EWNHS (1996)

Annex 9: Identified flora of Sheka Biosphere reserve

NO	Scientific name	Family name	Life form	Status
1	<i>Abutilon cecilii</i> N.E.Br.	Malvaceae	Shrub	
2	<i>Acacia abyssinica</i> Hochst. ex Benth	Fabaceae	Tree	
3	<i>Acalypha acrogyna</i> Pax	Euphorbiaceae	Shrub	
4	<i>Acalypha marissima</i> M. Gilbert	Euphorbiaceae	Shrub	E
5	<i>Acalypha psilostachya</i> Hochst.	Euphorbiaceae	Shrub	
6	<i>Acalypha racemosa</i> Baill.	Euphorbiaceae	Shrub	
7	<i>Acanthus eminens</i> C.B. Cl	Acanthaceae	Shrub	
8	<i>Acanthus sennii</i> Chiov.	Acanthaceae	Shrub	
9	<i>Achyranthes aspera</i> L.	Amaranthaceae	Shrub	
10	<i>Achyrospermum schimperi</i>	Labiatae	Shrub	
11	<i>Aframomum corrorima</i> (Braun) Jansen	Zingiberaceae	Herb	E
12	<i>Ageratum conyzoides</i> L.	Asteraceae	Herb	
13	<i>Albizia grandibracteata</i> Taub.	Fabaceae	Tree	
14	<i>Albizia gummifera</i> (J. F. Gmel.) C.A.Sm.	Fabaceae	Tree	
15	<i>Alchornea laxiflora</i> (Benth.) Pax & Hoffm.	Euphorbiaceae	Shrub	
16	<i>Allophylus rubifolius</i> (Hochst. Ex A. Rich) Engl	Sapindaceae	Tree	
17	<i>Amorphophallus abyssinicus</i> (A. Rich.) N.E. Br.	Araceae	Herb	
18	<i>Amorphophallus gallaensis</i> (Engl.) N.E. Br	Araceae	Herb	E
19	<i>Aneilema aequinoctiale</i> (P. Beauv.) G. Don	Commelinaceae	Herb	
20	<i>Aneilema beniniense</i> (P. Beauv.) Kunth	Commelinaceae	Herb	
21	<i>Aneilema leiocaula</i> K. Schum.	Commelinaceae	Herb	
22	<i>Aneilema recurvatum</i> Faden	Commelinaceae	Herb	
23	<i>Antiaris toxicaria</i> Lesch	Moraceae	Tree	
24	<i>Apodytes dimidiata</i> E. Mey. ex Arn.	Icacinaceae	Tree	
25	<i>Arisaema flavum</i> (Forssk.) Schott	Araceae	Herb	
26	<i>Arisaema schimperannum</i> Schott	Araceae	Herb	
27	<i>Arundinaria alpina</i> L.	Gramineae	Shrub	
28	<i>Asparagus africanus</i> Lam.	Asparagaceae	Climber	
29	<i>Asparagus officinalis</i> L.	Asparagaceae	Epiphyte	
30	<i>Asplenium aethiopicum</i> (Burm. F.) Becherer	Aspleniaceae	Epiphyte	
31	<i>Asplenium sandersonii</i> Hook	Aspleniaceae	Epiphyte	
32	<i>Berkheya chiesiana</i> Chiov.	Asteraceae		E
33	<i>Bersama abyssinica</i> Fresen	Melianthaceae	Tree	
34	<i>Blighia unijugata</i> Bak.	Sapindaceae	Tree	
35	<i>Bothriocline fusca</i> Oliv. & Hiern	Asteraceae	Shrub	
36	<i>Bothriocline schimperi</i> Oliv. & Hiern ex Benth	Asteraceae	Shrub	E
37	<i>Bridelia micrantha</i> (Hochst.) Baill.	Euphorbiaceae	Tree	
38	<i>Brillantaisia grotanellii</i> Pichi-Sermoli	Acanthaceae	Herb	E
39	<i>Brillantaisia madagascariensis</i> Lindau.	Acanthaceae	Herb	
40	<i>Bothriocline schimperi</i> Oliv. & Hiern. ex Benth.	Asteraceae	Shrub	E
41	<i>Brucea antidysenterica</i> J.F. Mill.	Simaroubaceae	Tree	
42	<i>Buddleia polystachya</i> Fresen.	Loganiaceae	Shrub	
43	<i>Bulbophyllum intertextum</i> Lindl.	Orchidaceae	Epiphyte	
44	<i>Bulbophyllum sandersonii</i> (Hook.f.) Rchb.f.	Orchidaceae	Epiphyte	
45	<i>Bulbostylis abortiva</i> (Steud.) C.B. Clarke	Cyperaceae	Herb	
46	<i>Bulbostylis densa</i> (Wall.) Hand-Mazz.	Cyperaceae	Herb	
47	<i>Caesalpinia decapetala</i> (Roth)Alston	Fabaceae	Climber	
48	<i>Canna indica</i> L.	Cannaceae	Herb	
49	<i>Canthium oligocarpum</i> Hiern	Rubiaceae	Tree	

50	<i>Capparis micrantha</i> A. Rich.	Capparidaceae	Shrub	
51	<i>Capparis tomentosa</i> Lam.	Capparidaceae	Climber	
52	<i>Capsicum frutescens</i> L.	Solanaceae	Herb	
53	<i>Cardamine africana</i> L.	Brassicaceae	Herb	
54	<i>Cassipourea malosana</i> (Baker) Alston	Rhizophoraceae	Tree	
55	<i>Cassytha filiformis</i> L.	Lauraceae	Herb	
56	<i>Celosia trigyna</i> L.	Amaranthaceae	Herb	
57	<i>Celtis africana</i> Burm.f.	Ulmaceae	Tree	
58	<i>Ceropegia recurvata</i> M.G. Gilbert	Asclepidaceae	Climber	E
59	<i>Ceropegia sobolifera</i> N.E. Br	Asclepidaceae	Climber	E
60	<i>Chenopodium procerum</i> Moq.	Chenopodiaceae	Herb	
61	<i>Chionanthus mildbraedii</i> (Gilg & Schellenb.) Stearn	Oleaceae	Shrub	
62	<i>Chlorophytum macrophyllum</i> (A. Rich.) Aschers	Anthericaceae	Herb	
63	<i>Chlorophytum tuberosum</i> (Roxb.) Baker	Anthericaceae	Herb	
64	<i>Cissus ellenbeckii</i> Gilg & Brandt	Vitaceae	Shrub	
65	<i>Cissus quadrangularis</i> L.	Vitaceae	Climber	
66	<i>Clausena anisata</i> (Willd.) Benth.	Rutaceae	Tree	
67	<i>Clematis longicauda</i> Steud. ex A. Rich.	Ranunculaceae	Climber	
68	<i>Clerodendrum alatum</i> L.	Verbenaceae	Shrub	
69	<i>Clerodendrum myricoides</i> (Hochst.) Vatke	Verbenaceae	Shrub	
70	<i>Coccinia schliebenii</i> Harms.	Cucurbitaceae	Climber	
71	<i>Coffea arabica</i> L.	Rubiaceae	Tree	
72	<i>Coleochloa abyssinica</i> (Hochst. ex A. Rich.) Gilly	Cyperaceae	Epiphyte	
73	<i>Combretum paniculatum</i> Vent.	Combretaceae	Climber	
74	<i>Commelina eckloniana</i> Kunth	Commelinaceae	Herb	
75	<i>Commelina foliacea</i> Chiov.	Commelinaceae	Herb	
76	<i>Commelina latifolia</i> Hochst.	Commelinaceae	Herb	
77	<i>Cordia africana</i> Lam.	Boraginaceae	Tree	
78	<i>Corymborkis corymbis</i> Thouars	Orchidaceae	Herb	
79	<i>Costus afer</i> Ker-Gawl	Costaceae	Herb	
80	<i>Crassocephalum montuosum</i> (S. Moore)	Asteraceae	Herb	
81	<i>Crinum ornatum</i> (Ait.) Bury	Amaryllidaceae	Herb	
82	<i>Crossopteryx febrifuga</i> (Hochst.) Bridson	Rubiaceae	Shrub	
83	<i>Crotalaria agatiflora</i> , Schweinf.	Fabaceae	Shrub	E
84	<i>Crotalaria exaltata</i> Polhill	Leguminosae	Tree	E
85	<i>Crotalaria gillettii</i> , Polhill	Fabaceae	Herb	E
86	<i>Crotalaria intonsa</i> Polhill	Leguminosae	Shrub	E
87	<i>Crotalaria rosenii</i> (Pax) Milne-Redh. ex Polhill	Leguminosae	Shrub	E
88	<i>Croton macrostachyus</i> Del.	Euphorbiaceae	Tree	
89	<i>Culcasia falcifolia</i> Engl.	Araceae	Climber	
90	<i>Cussonia ostinii</i> Chiov.	Araliaceae	Tree	E
91	<i>Cyathea manniana</i> Hook.	Cyatheaceae	Shrub	
92	<i>Cynanchum abyssinicum</i> Decne	Asclepidaceae	Climber	
93	<i>Cyperus bifolius</i> Lye	Cyperaceae	Sedges	E
94	<i>Cyperus cyperoides</i> (L.) Kuntze	Cyperaceae	Sedges	
95	<i>Cyperus dichroostachyus</i> A. Rich.	Cyperaceae	Sedges	
96	<i>Cyperus digitatus</i> Roxb.	Cyperaceae	Sedges	
97	<i>Cyperus erectus</i> (Schum.) Mattf. & Kuk.	Cyperaceae	Sedges	
98	<i>Cyperus esculentus</i> L.	Cyperaceae	Sedges	
99	<i>Cyperus macrostachyos</i> Lam.	Cyperaceae	Sedges	
100	<i>Cyperus papyrus</i> L.	Cyperaceae	Sedges	
101	<i>Cyperus pauper</i> Hochest. Ex A. Rich	Cyperaceae	Sedges	
102	<i>Cyperus pectinatus</i> Vahl.	Cyperaceae	Sedges	

103	<i>Cyperus submacropus</i> Kuk	Cyperaceae	Sedges	
104	<i>Cyphostemma adenocaula</i>	Vitaceae	Climber	
105	<i>Cyphostemma dembianense</i> (Chiov.) Vollesen	Vitaceae	Climber	
106	<i>Cyphostemma pannosum</i> Vollesen	Vitaceae	Climber	E
107	<i>Dalbergia lactea</i> Vatke	Fabaceae	Climber	
108	<i>Daucus hochstetteri</i> Braun ex Drude	Apiaceae	Herb	
109	<i>Desmodium hirtum</i> Guill. & Perr	Fabaceae	Herb	
110	<i>Desmodium repandum</i> (Vahl) DC	Fabaceae	Herb	
111	<i>Dioscorea alata</i> L.	Dioscoreaceae	Climber	
112	<i>Dioscorea bulbifera</i> L.	Dioscoreaceae	Climber	
113	<i>Dioscorea praehensilis</i> Benth.	Dioscoreaceae	Climber	
114	<i>Dioscorea schimperiana</i> Kunth	Dioscoreaceae	Climber	
115	<i>Diospyros abyssinica</i> (Hiern) F. White	Ebenaceae	Tree	
116	<i>Dissotis decumbens</i> (P. Beauv.) Triana	Melastomataceae	Herb	
117	<i>Dombeya aethiopica</i> Gilli	Sterculiaceae	Tree	E
118	<i>Dombeya kefaensis</i> Friis & Bidgood	Sterculiaceae	Shrub	E
119	<i>Dombeya torrida</i> (J.F. Gmel.) P. Bamps	Sterculiaceae	Tree	
120	<i>Dorstenia barnimiana</i> Schweinf.	Moraceae	Herb	
121	<i>Dorstenia soerenseii</i> Friis	Moraceae	Herb	E
122	<i>Doryopteris concolor</i> (Langsd. & Fisch.) Kuhn	Adiantaceae	Herb	
123	<i>Dracaena afromontana</i> Mildbr.	Dracaenaceae	R-Tree	
124	<i>Dracaena fragrans</i> (L.) Ker-Gawl	Dracaenaceae	R-Tree	
125	<i>Dracaena steudneri</i> Engler	Dracaenaceae	R-Tree	
126	<i>Dregea abyssinica</i> (Hochst.) K. Schum	Asclepidaceae	Climber	
127	<i>Droguetia iners</i> (Forssk.) Schweinf.	Urticaceae	Herb	
128	<i>Drymaria cordata</i>	Caryophyllaceae	Climber	
129	<i>Drynaria volkensii</i> J. Sm	Polypodiaceae	Epiphyte	
130	<i>Echinops longisetus</i> A. Rich	Asteraceae	Shrub	E
131	<i>Ehretia cymosa</i> Thonn.	Boraginaceae	Tree	
132	<i>Ekebergia capensis</i> Sparrm.	Meliaceae	Tree	
133	<i>Elaeodendron buchananii</i> (Loes) Loes.	Celastraceae	Tree	
134	<i>Elaphglossum deckenii</i> (Kuhn) C. Chr.	Lomariopsidaceae	Epiphyte	
135	<i>Elatostema monticolum</i> Hook.f.	Urticaceae	Herb	
136	<i>Embelia schimperi</i> Vatke	Myrsinaceae	Climber	
137	<i>Ensete ventricosum</i> (Welw.) Cheesman	Musaceae	R-Tree	
138	<i>Entada abyssinica</i> Steud. ex A. Rich.	Fabaceae	Tree	
139	<i>Eriosema scioanum</i> Avetta	Fabaceae	Herb	E
140	<i>Erythrina brucei</i> Schweinf.	Fabaceae	Tree	
141	<i>Erythrina abyssinica</i> Lam. ex DC	Fabaceae	Tree	
142	<i>Eugenia bukobensis</i> Engl.	Myrtaceae	Tree	
143	<i>Eulopia albobrumea</i> Kraenzl	Orchidaceae	Herb	E
144	<i>Eulophia cucullata</i> (Sw.) Steud.	Orchidaceae	Herb	
145	<i>Euphorbia ampliphylla</i> Pax	Euphorbiaceae	R-Tree	
146	<i>Euphorbia schimperiana</i> Sheele	Euphorbiaceae	R-Tree	
147	<i>Fagaropsis angolensis</i> (Engl.) Milne	Rutaceae	Tree	
148	<i>Fagaropsis angolensis</i> (Engl.) Milne	Rutaceae	Tree	
149	<i>Ficus exasperata</i> Vahl.	Moraceae	Tree	
150	<i>Ficus sur</i> Forssk.	Moraceae	Tree	
150	<i>Ficus sycomorus</i> L.	Moraceae	Tree	
152	<i>Ficus thonningii</i> Blume	Moraceae	Tree	
153	<i>Ficus vallis-choudae</i> Del.	Moraceae	Tree	
154	<i>Ficus vasta</i> Forssk.	Moraceae	Tree	
155	<i>Flacourtia indica</i> (Burm.f.) Merr.	Flacourtiaceae	Tree	

156	<i>Galiniera saxifraga</i> (Hochst.) Bridson	Rubiaceae	Tree	
157	<i>Galinsoga parviflora</i> Cav.	Asteraceae	Herb	
158	<i>Galium simense</i> Fresen.	Rubiaceae	Herb	
159	<i>Galium spurium</i> L.	Rubiaceae	Herb	
160	<i>Gardenia ternifolia</i> Schumach. & Thonn.	Rubiaceae	Tree	
161	<i>Geophila repens</i> (L.) J. M. Johnston	Rubiaceae	Herb	
162	<i>Geranium aculeolatum</i> Oliv.	Geraniaceae	Herb	
163	<i>Girardinia diversifolia</i> (Link) Friis	Urticaceae	Herb	
164	<i>Gloriosa superba</i> L.	Colchicaceae	Herb	
165	<i>Gompherena celosioides</i> Mart.	Amaranthaceae	Herb	
166	<i>Gomphocarpus fruticosus</i> (L.) Ait.f.	Asclepidaceae	Herb	
167	<i>Gomphocarpus semilunatus</i> A. Rich.	Asclepidaceae	Herb	
168	<i>Gouania longispicata</i> Engl.	Rhamnaceae	Climber	
169	<i>Grewia ferruginea</i> Hochst. Ex A. Rich.	Tiliaceae	Tree	
170	<i>Habenaria cirrhata</i> (Lindl.) Rchb.f.	Orchidaceae	Herb	
171	<i>Habenaria cornuta</i> Lindl.	Orchidaceae	Herb	
172	<i>Habenaria holubii</i> Rolfe	Orchidaceae	Herb	
173	<i>Habenaria malacophylla</i> A. Rich.	Orchidaceae	Epiphyte	
174	<i>Habenaria schimperiana</i> A. Rich.	Orchidaceae	Epiphyte	
175	<i>Hallea rubrostipulata</i> (K. Schum.) J. F. Leroy	Rubiaceae	Tree	
176	<i>Hibiscus calyphyllus</i> Cavan.	Malvaceae	Shrub	
177	<i>Hibiscus diversifolius</i> A. Rich.	Malvaceae	Shrub	
178	<i>Hibiscus ludwigii</i> Eckl. & Zeyh	Malvaceae	Shrub	
179	<i>Hibiscus micranthus</i> L. F.	Malvaceae	Shrub	
180	<i>Hillieria latifolia</i> (Lam.) H. Walter	Phytolaccaceae	Herb	
181	<i>Hippocratea africana</i> (Willd.) Loes.	Celastraceae	Climber	
182	<i>Hippocratea goetzei</i> Loes	Celastraceae	Climber	
183	<i>Hippocratea pallens</i> Planchon. ex Oliver	Celastraceae	Climber	
184	<i>Hydrocotyle mannii</i> Hook.f	Apiaceae	Herb	
185	<i>Hydrocotyle ranunculoides</i> L.f.	Apiaceae	Herb	
186	<i>Hymenodictyon floribundum</i>	Rubiaceae	Shrub	
187	<i>Hypoestes forskaoi</i> (Vahl) Röm. & Schultes	Acanthaceae	Herb	
188	<i>Hypoestes triflora</i> (Forssk.) Röm & Schult	Acanthaceae	Herb	
189	<i>Ilex mitis</i> (L.) Radlk.	Aquifoliaceae	Tree	
190	<i>Impatiens ethiopica</i> Grey-Wilson	Balsaminaceae	Herb	
191	<i>Impatiens hochstetteri</i> Warb.	Balsaminaceae	Herb	
192	<i>Impatiens rothii</i> Hook.f.	Balsaminaceae	Herb	
193	<i>Ipomoea cairica</i> (L.) Sweet	Convolvulaceae	Climber	
194	<i>Ipomoea hochstetteri</i> House	Convolvulaceae	Climber	
195	<i>Ipomoea tenuirostris</i> Steud. ex Choisy	Convolvulaceae	Climber	
196	<i>Jasminum abyssinicum</i> Hochst. ex Dc	Oleaceae	Climber	
197	<i>Justicia betonica</i> L.	Acanthaceae	Shrub	
198	<i>Justicia bizuneshiae</i> Ensermu	Acanthaceae	Herb	E
199	<i>Justicia diclipterooides</i> Lindau subsp. <i>Aethiopica</i> Hedren	Acanthaceae	Herb	E
200	<i>Justicia schimperiana</i> (Hochst. ex A. Rich.) T. Anders	Acanthaceae	Shrub	
201	<i>Kalanchoe densiflora</i> Rolfe	Crassulaceae	Herb	
202	<i>Keetia gueinzii</i> (Sond.) Bridson	Rubiaceae	Climber	
203	<i>Keetia zanzibarica</i> (Klozsch) Bridson	Rubiaceae	Climber	
204	<i>Kniphofia pumila</i> (Ait.) Kunth	Asphodelaceae	Herb	
205	<i>Lagenaria abyssinica</i> (Hook. f.) Jeffrey	Cucurbitaceae	Climber	
206	<i>Laggera crispata</i> (D. Don) Oliv	Asteraceae	Herb	
207	<i>Laggera tomentosa</i> (Oliv. & Hiern)	Asteraceae	Herb	E
208	<i>Landolphia buchananii</i> (Hall.f.) Stapf	Apocynaceae	Climber	

209	<i>Lannea welwitschii</i> (Hiern) Engl.	Anacardiaceae	Tree	
210	<i>Lecaniodiscus fraxinifolius</i> Bak.	Sapindaceae	Tree	
211	<i>Lepidotrichilia volkensis</i> (Gurke) Leroy	Meliaceae	Shrub	
212	<i>Leptaspis zeylanica</i> Nees ex Steud.	Gramineae	Sedges	
213	<i>Leucas urticifolia</i> (Vahl) Sm.	Labiatae	Shrub	
214	<i>Liparis abyssinica</i> A. Rich.	Orchidaceae	Herb	
215	<i>Liparis deistelii</i> Schltr.	Orchidaceae	Herb	
216	<i>Lipocarpha nana</i> (A. Rich.) Cherm.	Cyperaceae	Sedges	
217	<i>Lippia adoensis</i> Hochst. ex Walp.	Verbenaceae	Shrub	E
218	<i>Lobelia exilis</i>	Lobeliaceae	Herb	E
219	<i>Lobelia giberroa</i> Hemsl.	Lobeliaceae	R-Tree	
220	<i>Lonchocarpus laxiflors</i> Guill. & Perr.	Fabaceae	Tree	
221	<i>Lotus discolor</i> E. Mey	Fabaceae	Shrub	
222	<i>Loxogramme lanceolata</i> (Sw.) Presl.	Loxogrammaceae	Epiphyte	
223	<i>Lycopodium clavatum</i> L.	Lycopodiaceae	Epiphyte	
224	<i>Macaranga capensis</i> (Baill.) Sim	Euphorbiaceae	Tree	
225	<i>Maesa lanceolata</i> Forssk.	Myrsinaceae	Tree	
226	<i>Malaxis weberbaueriana</i> (Kraenzl.) Summerh	Orchidaceae	Herb	
227	<i>Manilkara butugi</i> Chiov.	Sapotaceae	Tree	
228	<i>Marantochloa leucantha</i> (K. schum.) Milne-Redh.	Gramineae	Herb	
229	<i>Maytenus arbutifolia</i> (A. Rich.) Wilczek	Celastraceae	Shrub	
230	<i>Maytenus gracilipes</i> (Welw. Ex Oliv.) Exell	Celastraceae	Shrub	
231	<i>Maytenus obscura</i> (A. Rich.) Cuf.	Celastraceae	Shrub	
232	<i>Metarungia pubinervia</i> (T. Anders) Baden	Acanthaceae	Shrub	
233	<i>Microcoelia globulosa</i> (Hochst.) L. Johsson.	Orchidaceae	Epiphyte	
234	<i>Microglossa pyrifolia</i> (Lam.) Kuntze	Asteraceae	Climber	
235	<i>Milicia excelsa</i> (Welw.) C. C. Berg	Moraceae	Tree	
236	<i>Millettia ferruginea</i> (Hochst.) Bak.	Fabaceae	Tree	
237	<i>Mimosa pigra</i> L.	Fabaceae	Herb	
238	<i>Mimusops Kummel</i> A. DC.	Sapotaceae	Tree	
239	<i>Momordica foetida</i> Schumach	Cucurbitaceae	Climber	
240	<i>Morus mesozygia</i> Stapf	Moraceae	Tree	
241	<i>Myrsine africana</i> L.	Myrsinaceae	Shrub	
242	<i>Nervilia bicarinata</i> (Bl.) Schltr.	Orchidaceae	Herb	
243	<i>Ocimum lamiifolium</i> Hochst. ex Benth.	Labiatae	Shrub	
244	<i>Ocimum urticifolium</i> Roth	Labiatae	Shrub	
245	<i>Oldenlandia capensis</i> l.f.	Rubiaceae	Herb	
246	<i>Oldenlandia corymbosa</i> L.	Rubiaceae	Herb	
247	<i>Oldenlandia goreensis</i> (DC.) Summerh	Rubiaceae	Herb	
248	<i>Olea capensis</i> L. ssp. macrocarpa (C. H. Wright)	Oleaceae	Tree	
249	<i>Olea welwitschii</i> (Knobl.) Gilg & Schellenb.	Oleaceae	Tree	
250	<i>Oleandra distenta</i> Kunze	Oleandraceae	Epiphyte	
251	<i>Olinia rochetiana</i> A. Juss.	Oliniaceae	Tree	
252	<i>Olyra latifolia</i> L.	Gramineae	Sedges	
253	<i>Oncinotis tenuiloba</i> Stapf	Apocynaceae	Climber	
254	<i>Oplismenus hirtellus</i> (L.) P. Beauv.	Gramineae	Sedges	
355	<i>Oplismenus undulatifolius</i> (Ard.) Roem. & Schult.	Gramineae	Sedges	
356	<i>Oxalis corniculata</i> L.	Oxalidaceae	Herb	
357	<i>Oxalis procumbens</i> Steud. ex A. Rich.	Oxalidaceae	Herb	
258	<i>Oxalis radicata</i> A. Rich.	Oxalidaceae	Herb	
259	<i>Oxyanthus speciosus</i> ssp. globosus Bridson.	Rubiaceae	Tree	
260	<i>Pancratium tenuifolium</i> A. Rich.	Amaryllidaceae	Herb	
261	<i>Panicum polystachya</i> (Kunth) Stapf.	Gramineae	Sedges	

262	<i>Panicum hochstetteri</i> Steud.	Gramineae	Sedges	
263	<i>Pappea capensis</i> Eckl. & Zeyh.	Sapindaceae	Tree	
264	<i>Paullinia pinnata</i> L.	Sapindaceae	Climber	
265	<i>Pavetta abyssinica</i> Fresen.	Rubiaceae	Shrub	
266	<i>Pavetta oliveriana</i> Hiern	Rubiaceae	Shrub	
267	<i>Pavonia urens</i> Cav.	Malvaceae	Herb	
268	<i>Pentas caffensis</i> Chiov.	Rubiaceae	Herb	
269	<i>Pentas concinna</i> K. Schum.	Rubiaceae	Herb	E
270	<i>Pentas schimperiana</i> (A. Rich.) vatke	Rubiaceae	Herb	
271	<i>Pentodon pentandrus</i> (Schumach & Thonn.) Vatke	Rubiaceae	Herb	
272	<i>Peperomia abyssinica</i> Miq.	Piperaceae	Epiphyte	
273	<i>Peperomia molleri</i> C. DC.	Piperaceae	Epiphyte	
274	<i>Peperomia retusa</i> (L.f.) A. Dietr.	Piperaceae	Epiphyte	
275	<i>Peperomia rotundifolia</i> (L.) Kunth	Piperaceae	Epiphyte	
276	<i>Peperomia tetraphylla</i> (Forster) Hook & Arn.	Piperaceae	Epiphyte	
277	<i>Peponium vogelii</i> (Hook.f.) Engl.	Cucurbitaceae	Climber	
278	<i>Periploca linearifolia</i> Quart-Dill. & A. Rich.	Asclepidaceae	Climber	
279	<i>Persicaria decipiens</i> (R. Br.) K.L. Wilson	Polygonaceae	Herb	
280	<i>Persicaria nepalensis</i> (Meisn.) Miyabe	Polygonaceae	Herb	
281	<i>Phoenix reclinata</i> Jacq.	Arecaceae	R-Tree	
282	<i>Phyllanthus dewildiorum</i> M. Gilbert	Euphorbiaceae	Shrub	E
283	<i>Phyllanthus lameness</i> Cuf.	Euphorbiaceae	Herb	E
284	<i>Phyllanthus ovalifolius</i> Forssk.	Euphorbiaceae	Climber	
285	<i>Physalis peruviana</i> L.	Solanaceae	Herb	
286	<i>Phytolacca dodecandra</i> L Herit.	Phytolaccaceae	Climber	
287	<i>Pilea bambuseti</i> Engl.	Urticaceae	Herb	E
288	<i>Pimpinella heywoodii</i> Abebe	Apiaceae	Herb	E
289	<i>Piper capense</i> L.f.	Piperaceae	Herb	
290	<i>Piper guineense</i> Schum. & Thonn.	Piperaceae	Climber	
291	<i>Piper umbellatum</i> L.	Piperaceae	Herb	
292	<i>Pittosporum viridiflorum</i> Sims	Pittosporaceae	Tree	
293	<i>Platycerium elephantotis</i> Schweinf.	Polypodiaceae	Epiphyte	
294	<i>Plectranthus laxiflorus</i> Benth.	Labiatae	Epiphyte	
295	<i>Plectranthus punctatus</i>	Labiatae	Herb	
296	<i>Plectranthus sylvestris</i> Gurke	Labiatae	Herb	
297	<i>Plumbago truncata</i>	Plumbaginaceae	Herb	E
298	<i>Pollia condensata</i> C. B. Clarke	Commelinaceae	Herb	
299	<i>Pollia mannii</i> C. B. Clarke	Commelinaceae	Herb	
300	<i>Polyscias farinosa</i> (Del.) Harms	Araliaceae	Tree	E
301	<i>Polyscia fulva</i> (Hiern) Harms	Araliaceae	Tree	
302	<i>Polystachya. caduca</i> Rchb.f	Orchidaceae	Epiphyte	E
303	<i>Polystachya cultriformis</i> (Thouars) Spreng.	Orchidaceae	Epiphyte	
304	<i>Polystachya lindblomii</i> Schltr.	Orchidaceae	Epiphyte	
305	<i>Polystachya paniculata</i> (Sw.) Rolfe	Orchidaceae	Epiphyte	
306	<i>Polystachya riva</i> Schweinf.	Orchidaceae	Epiphyte	E
307	<i>Polystachya steudneri</i> Rchb.f.	Orchidaceae	Epiphyte	
308	<i>Pouteria adolphi-friederici</i> (Engl.) Baehni	Sapotaceae	Tree	
309	<i>Premna schimperi</i> Engl.	Verbenaceae	Shrub	
310	<i>Prunus africana</i> (Hook.f.) Kalkm.	Rosaceae	Tree	
311	<i>Psychotria capensis</i> (Eckl.) vatke	Rubiaceae	Shrub	
312	<i>Psychotria kirkii</i> Hiern	Rubiaceae	Shrub	
313	<i>Psychotria orophila</i> Petit	Rubiaceae	Shrub	
314	<i>Psychotria peduncularis</i> (Salisb.) Steyererm	Rubiaceae	Shrub	

315	<i>Psydrax parviflora</i> (Afz.) Bridson	Rubiaceae	Tree	
316	<i>Pteris catoptera</i> Kunze	Pteridaceae	Herb	
317	<i>Pteris cretica</i> L.	Pteridaceae	Herb	
318	<i>Pteris dentata</i> Forssk.	Pteridaceae	Herb	
319	<i>Pterolobium stellatum</i> (Forssk.) Brenan	Fabaceae	Climber	
320	<i>Pycnostachys abyssinica</i> ,	Labiatae	Herb	
321	<i>Pycnostachys recurvata</i> ,	Labiatae	Herb	
322	<i>Ranunculus multifidus</i> Forssk.	Ranunculaceae	Herb	
323	<i>Raphiostylis beninensis</i> (Planch.) Benth	Icacinaceae	Climber	
324	<i>Rhamnus prinooides</i> L'Herit.	Rhamnaceae	Climber	
325	<i>Rhoicissus revoilii</i> Planch	Vitaceae	Climber	
326	<i>Rhoicissus tridentate</i> (L.f.) Wild & Drummond	Vitaceae	Climber	
327	<i>Rhus quartiniana</i> A. Rich.	Anacardiaceae	Shrub	
328	<i>Rhus ruspolii</i> Engl	Anacardiaceae	Shrub	
329	<i>Ricinus communis</i> L.	Euphorbiaceae	Tree	
330	<i>Rinorea friisii</i> M. Gilbert	Violaceae	Tree	
331	<i>Ritchiea albersii</i> Gilg	Capparidaceae	Tree	
332	<i>Rothmannia urceliformis</i> (Hiern) Robyns	Rubiaceae	Tree	
334	<i>Rubia cordifolia</i> L.	Rubiaceae	Herb	
335	<i>Rubus apetalus</i> Poir.	Rosaceae	Climber	
336	<i>Rubus steudneri</i> Schweinf.	Rosaceae	Climber	
337	<i>Rumex abyssinicus</i> Jacq.	Polygonaceae	Herb	
338	<i>Rungia grandis</i> T. Anders	Acanthaceae	Shrub	
339	<i>Rytigynia neglecta</i> (Hiern) Robyns	Rubiaceae	Tree	
340	<i>Saba comorensis</i> (Boj.) Pichon	Apocynaceae	Climber	
341	<i>Salacia congolensis</i> De Wild & Th. Dur.	Celastraceae	Climber	
342	<i>Sanicula elata</i> Buch. -Ham. ex D. Don	Apiaceae	Herb	
343	<i>Sapium ellipticum</i> (Krauss) Pax	Euphorbiaceae	Tree	
344	<i>Sarcocephalus latifolius</i> (Smith) Bruce	Rubiaceae	Shrub	
345	<i>Satureja paradoxa</i> (Vatke) Engl. ex Seybold	Labiatae	Herb	
346	<i>Scadoxus multiflorus</i> (Martyn) Raf.	Amaryllidaceae	Herb	
347	<i>Scadoxus nutans</i>	Amaryllidaceae	Epiphyte	E
348	<i>Scadoxus puniceus</i> (L.) Friis & Nordal	Amaryllidaceae	Epiphyte	
349	<i>Schefflera abyssinica</i> (Hochst. ex A. Rich.) Harms	Araliaceae	Tree	
350	<i>Schefflera volkensii</i> (Engl.) Harms	Araliaceae	Tree	
351	<i>Scutia myrtina</i> (Burm.f.) Kurz	Rhamnaceae	Climber	
352	<i>Selaginella hraussiana</i> (Kze.) A. Br.	Selaginellaceae	Epiphyte	
323	<i>Senecio myriocephalus</i> Sch. Bip. ex A. Rich.	Asteraceae	Shrub	E
354	<i>Senna occidentalis</i> (L.) Link	Fabaceae	Shrub	
355	<i>Senna petersiana</i> (Bolle)Lock	Fabaceae	Tree	
356	<i>Sericostachys scandens</i> Gilg & Lopr.	Amaranthaceae	Climber	
357	<i>Setaria megaphylla</i> (Steud.) Th. Dur.	Gramineae	Sedges	
358	<i>Sicyos polycanthus</i> Cogn	Cucurbitaceae	Climber	
359	<i>Sida ternata</i> L.	Malvaceae	Shrub	
360	<i>Siphonochilus aethiopicus</i> (Schweinf.) B.L. Burtt	Zingiberaceae	Herb	
361	<i>Solanecio gigas</i> (Vatke) C. Jeffrey	Asteraceae	Shrub	
362	<i>Solanum benderianum</i> L	Solanaceae	Climber	
363	<i>Solanum giganteum</i> L.	Solanaceae	Shrub	
364	<i>Solanum incanum</i> L	Solanaceae	Shrub	
365	<i>Solanum indicum</i> L.	Solanaceae	Shrub	
366	<i>Solanum nigrum</i> L.	Solanaceae	Herb	
367	<i>Spermacoce mauritiana</i> Gideon	Rubiaceae	Herb	
368	<i>Spermacoce princeae</i> (K. Schum.) Verdc	Rubiaceae	Herb	

369	<i>Spermacoce pusilla</i> Wall.	Rubiaceae	Herb	
370	<i>Stereospermum kanthianum</i> Cham.	Bignoniaceae	Tree	
371	<i>Stiotocardia beraviensis</i> (Vatke) Hall. F.	Convolvulaceae	Climber	
372	<i>Strychnos mitis</i> S. Moore	Loganiaceae	Tree	
373	<i>Syzygium guineense</i> ssp. <i>afromontanum</i> F. White	Myrtaceae	Tree	
374	<i>Syzygium guineense</i> ssp. <i>guineense</i> (Willd.) DC	Myrtaceae	Tree	
375	<i>Syzygium guineense</i> ssp. <i>macrocarpum</i> F. White	Myrtaceae	Tree	
376	<i>Tacca leontopetaloides</i> (L.) O. Ktze.	Taccaceae	Herb	
377	<i>Teclea nobilis</i> Del.	Rutaceae	Tree	
378	<i>Tectaria gemmifera</i> (Fee) Alston	Aspidiaceae	Herb	
379	<i>Thalictrum rhynchocarpum</i> Dill. & A. Rich.	Ranunculaceae	Herb	
380	<i>Thonningia sanguinea</i> Vahl	Balanophoraceae	Herb	
381	<i>Tiliacora funifera</i> Oliv.	Menispermaceae	Climber	
382	<i>Tiliacora troupinii</i> Cufod.	Menispermaceae	Climber	E
383	<i>Toddalia asiatica</i> (L.) Lam.	Rutaceae	Climber	
384	<i>Trachycalymma minutiflorum</i> Goyder	Asclepiadaceae	Herb	E
385	<i>Trema orientalis</i> (L.) Bl.	Ulmaceae	Tree	
386	<i>Trichilia dregeana</i> Sond.	Meliaceae	Tree	
387	<i>Trifolium calocephalum</i> Fresen	Fabaceae	Herb	E
388	<i>Trifolium mattirolianum</i> Chiov	Fabaceae	Herb	E
389	<i>Trifumfetta rhomboidea</i> Jacq.	Tiliaceae	Shrub	
390	<i>Trilepisium madagascariense</i> DC.	Moraceae	Tree	
391	<i>Tristemma mauritianum</i> J.F. Gmel.	Melastomataceae	Herb	
392	<i>Uncaria africana</i> G. Don	Rubiaceae	Climber	
393	<i>Urera hypselodendron</i> (A. Rich.) Wedd.	Urticaceae	Climber	
394	<i>Vepris dainellii</i> (Pichi-Serm.) Kokwaro	Rutaceae	Tree	
395	<i>Vernonia amygdalina</i> Del.	Asteraceae	Tree	
396	<i>Vernonia gilbertii</i> Mesfin	Asteraceae	Shrub	
397	<i>Vernonia leopoldi</i> (Sch. Bip. ex Walp.) Vatke	Asteraceae	Shrub	E
398	<i>Vernonia rueppellii</i> Sch. Bip. ex Walp.	Asteraceae	Shrub	E
399	<i>Zanha golungensis</i> Hiern	Sapindaceae	Tree	

The 'E' stands for 'Endemic species'- those species with their ecological distribution restricted within Ethiopian boundaries.

Source: 1. Tadesse; (2003) and (2007) 2. Friis, (1992) 3. Feyera, (2006).