

Wetland and Eco Tourism—A Case Study of Lake Ashenge, Dess'aa National Forest & Hermi Natural Forest, Tigray Region Of Northern Ethiopia

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Abstract: World's surface is covered by valuable ecosystems such as wetlands to the tune of 6%. Wetlands are playing an instrumental role not only for the local flora and fauna and people but also the communities living outside the wetlands. Many wetlands are prime locations to tourism. They provide important services for tourism. They provide resources for tourists such as food and water, and raw material for building tourism infrastructure, and they regulate ecological processes that contribute to a healthy environment such as climate regulations and water purification. One of such wetlands is LAKE ASHENGE, and along with this two Eco-Tourism destinations DESS'AA NATIONAL FOREST & HERMI NATURAL FOREST, have been studied. Lake Ashenge, is one of the most important wetland for the majority of Ferruginous Duck birds, which is located in Ofla Woreda of Southern Zone of Tigray, regional State near the town of Korem. The lake is approximately 125 km from Mekelle, the regional capital. The other two important destinations are viewed from the Eco-Tourism Lens and the possible threats to the above two destinations along with its bio-diversity has been studied and a Desk review has been done with both Primary and Secondary data analysis. This research paper discusses the threats and pollution and human impacts, which have great bearing on the flora and fauna of the Lake Ashenge and other two important destinations namely Dess'aa National Forest & Hermi Natural Forest of Tigray Region, Northern Ethiopia.

Keywords: Wetland, lake Ashenge, Eco-Tourism, Sustainable Tourism, Bio-Diversity in Tigray Region, Northern Ethiopia Eco-Tourism.

1. INTRODUCTION

Tourism is currently the world's largest industry (\$ 3.4 trillion annually) and ecotourism represents the fastest growing segments of this market. With advances in the transportation and information technology, even more remote areas of the earth are coming within reach to travelers. In fact, tourism is now the world's largest industry, with nature tourism is the fastest growing segment (Yadav, 2002) tremendous potentiality for sustainable development of its potential nature based tourist resources (Seace, et al., 1992)

The term "Ecotourism" was coined by "Hector Ceballos Lascurain" in 1983, and was initially used to describe the nature-based travel to relatively undisturbed area with an emphasis on education. The concept of ecotourism is new one, and the state has Wetlands are ecosystems or units of the landscape that are found on the interface between and and water. While water is a major factor of wetland definition (Ramsar Convention Bureau, 1997), soils, vegetation and animal life also contribute to their unique characteristics (Koetze, 1996; Howard, 1995; Roggeri, 1995). As a result, it has proved difficult to define wetlands, and over 50 definitions exist. That used by the Ramsar Convention (1997: 2) is as follows:

"areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters".

This definition provides significant latitude-wetlands, as a result, come in a whole host of forms and types. The Ramsar Convention recognises five major wetland systems (Ramsar Convention Bureau, 1997), while others identify up to seven main groupings (Dugan, 1990). The major Ramsar groupings are:

- marine (coastal wetlands);
- estuarine (deltas, tidal marshes, and mangroves);
- lacustrine (lakes and associated wetlands);
- riverine (rivers, streams and associated wetlands);
- palustrine (marshes, swamps and bogs).

These forms are further divided into more than 30 sub-divisions classifying them according to physical, chemical or biological characteristics. Wetlands are distributed all over the globe and are estimated to cover about 6% of the earth's surface (Maltby, 1986)—some 5.7 million km² (WCMC, 1992). Although Africa is best known for its savannahs and hot deserts, 1% of its surface area (345,000 km²) is covered

by wetlands (Finlayson and Moser, 1991). These ecosystems range from the Senegal River and the Inner Niger Deltas in the West, to the Sudd Floodplains and the Ethiopian Wetlands in the East. Southwards, important wetlands include the Zaire Basin Swamps, the Okavango Inland Delta, the Kafue Flats, the African Great Lakes and the extensive Malagarasi-Moyovosi Wetlands in Tanzania. Wetland characteristics will also vary with altitude, with high ground wetlands, such as those found in the Ethiopian and Kenyan mountain systems, complementing lowland types found in the semi-desert. Wetlands are ecosystems or units of the landscape that are found on the interface between land and water.

2. ETHIOPIA AND ITS WETLANDS

Ethiopia is a country in North-Eastern Africa lying between 8° 00' N and 38° 00' E. Its area covers an estimated 1,127,000 km² of which some 7,444 km² is covered by water. Ethiopia has 5,311 km of frontiers that it shares with Djibouti, Eritrea, Kenya, Somalia and Sudan. Ethiopia's ecological diversity and climatic variation is to a large extent explained by its highly variable topography. Altitudes range from 125 m below sea level in the Dallol Depression, to 4,620 m above sea level at Ras Dashen. These altitudinal extremes mean that Ethiopia is a country of enormous habitat diversity, which is also influenced by the country's climate. The tropical monsoon rainfall pattern is influenced by moisture-laden

3. WETLANDS OF ETHIOPIA: AN INTRODUCTION

Winds from the Atlantic and the Indian Ocean and also by the Inter-tropical Convergence Zone and variations in altitude variation. With the exception of coastal and marine-related wetlands and extensive swamp-forest complexes, all forms of wetlands are represented in Ethiopia. These include alpine formations, riverine, lacustrine, palustrine and floodplain wetlands. Floodplains are found both in Ethiopia's highlands and lowlands, although they are most common in the North-Western and Western Highlands, Rift Valley and Eastern Highlands. Hillman and Abebe (1993) estimate that wetlands cover 1.14% of the total landmass of the country, while forests cover approximately 2%. Rivers from the Ethiopian Highlands annually produce in excess of 110 billion m³ of water, of which 74% flows into rivers draining into Sudan, Egypt, Kenya and Somalia.

In a country like Ethiopia, a wise use wetland programme would need a responsible agency to co-ordinate national action. Because wetlands fall within the ambit of a crosscutting issue like environmental protection, both public and private institutions would need to contribute their expertise and work together. The development of a management plan for Ethiopia's wetlands will need basic studies, including awareness, surveys and inventories, which should be part and parcel of a wetland development programme (Davis, 1993; Ramsar, 1997).

4. IMPACTS CAUSED BY CLIMATE CHANGE ON WETLAND FLORA

Like animals wetland plants are also affected by the change in the global climate change. A period of low water is required by certain species of wetland plant species to undertake reproduction (Markham, 1982), and a change in the seasonality of precipitation could adversely affect the reproduction of such plant species (Bardeckil, 1991). Any increase in average temperature would also allow the dispersal of wetland plant species into new areas by various means especially those considered as weeds, thus altering the structure and composition of many wetland conditions (Bardeckil 1991). According to him, the typical plants mentioned are noxious weeds such as water hyacinth (*Eichhornia crassipes*), water lettuce (*Pistia stratiotes*), purple loosestrife (*Lythrum salicaria*) and African pyle (*Salvinia molesta*) that infest many wetland areas. For example, the water hyacinth (Figure 7), considered as a weed, grows so abundantly due to its rapid growth and lack of natural predators that it sometimes deprives aquatic wildlife of oxygen, causing serious environmental problems (Encarta, 2007). The reason why water hyacinths exist in the Lake Koka of Ethiopia might be due to the increased in nutrient inputs that can result in eutrophication, and as a result of eutrophication the invasion by water hyacinth (*Eichhornia crassipes*), free floating macrophytes, will be formed. Once formed, water hyacinth is known to cause a reduction on productivity of a lake's phytoplankton since the weed mats shade out any photoautotrophs (both phytoplankton and also submersed macrophytes) beneath them (Scheffer et al., 2003). Thus, it is a nuisance to alter the ecology within wetlands by changing species composition and biodiversity.

5. IMPACTS OF CLIMATE CHANGE ON WETLAND FAUNA

As has been stated above, wetlands support high biological diversity, and are important life support ecosystems for migratory birds and other animals. However, endemic and economically important wetland animal species may be affected, and become rare, threatened or endangered as a result of climate change (Maltby, 1986). According to Bardeckil (1991), food fish, shrimp, oysters, waterfowl and fur bearing animals are those of economic importance wetland organisms that are potentially affected by climate change. For example, though it is not limited only to the wetland ecosystems, as a result of a global mean temperature increase of 2.5 - 3.0°C above the year 1990 levels in the Kruger National Park (South Africa) alone, mammals, birds, butterflies and other invertebrates, and reptiles would be committed to extinction (Figure 5), and in total, 66% of animal species would potentially be lost (Bates et al., 2008).

The impacts of climate change on animal populations are likely to include both direct and indirect effects (Magadza,

2011). Direct effects of climate change to be those resulting from changes to a population's abiotic environment. Hence, direct effects of climate change on animal populations might include altered mortality or reproductive rates resulting from changes in ambient temperature, the frequency and severity of extreme weather events, and the availability of surface water. Indirect effects include those resulting from changes in a population's biotic environment, specifically the distribution and abundance of their resources, predators, and competitors. Because patterns of individual energy intake and expenditure represent the point of integration for abiotic and biotic influences, energetic approaches are uniquely suited to prediction of both direct and indirect effects of climate change

Sustainable tourism may be defined as "the tourism that allows visitors to enjoy an attraction, community, or region in such a way that the local natural and artificial environment and social culture can be sustained indefinitely" (Bramwell, 2006). In other words, sustainability in regards to tourism is described as a business with minimum negative impacts on local natural resources, economically with good business practices that continue to contribute to the economic well-being of the local community, and socially with conservation of local culture and social values (Buckley, 1999; SRCW and UNWTO, 2012).

Ecotourism may be defined as a responsible travel to natural areas that conserves the environment and improves the well-being of local people (Drumm and Moore, 2005). It is claimed to help educating the traveler; providing funds for conservation; directly benefiting the economic development and political empowerment of local communities; and fostering respect for different cultures and for human rights (IUCN, 1997; Diamantis and Ladkin, 1999; Honey, 1999; Zambrano et al., 2010).

Moreover, as Drumm and Moore (2005) contend, ecotourism is one of the alternative economic activities and viable strategy to simultaneously make money and conserve resources. The following principles distinguish it from the wider concept of sustainable tourism (Khanal, and Babar, 2007): contributes actively to the conservation of natural and cultural heritage; includes local and indigenous communities in its planning, development and operation contributing to their well-being; interprets the natural and cultural heritage of the destination to the visitor; and lends itself better to independent travelers, as well as organizes tours for small sized groups

The specific objectives of the study were: to Analyze the role Wetland and Eco Tourism by taking a study on Lake Ashenge, and other two destinations from the kalidioscope of Eco Tourism namely Dess'aa National Forest & Hermi Natural Forest. The key findings are to know how that areas have been perceived by the people of that area for the upliftment and betterment of their lifestyles. A brief description about the

areas and their aWetland and Eco tourism, Climatic Change and Bio diversity has been studied for the purpose to know the impact on Wetland, Eco Tourism and Bio Diversity on these areas. Possible threats for these areas have been identifies and if the Federal Democratic Republic of Eyiopia, and Tigray Cultural and Tourism Department in association with various government bodies and NGO's working in these areas much better activities can be carried out in short the objectives can be summerized as the following

6. OBJECTIVES:

- Defining the role of ecotourism in the frame work of sustainable development strategy, preconditions for ecotourism in areas having biological diversity (sustainable mobility, conservation and management of natural and cultural landscapes etc.)
- Identifying the best practices of ecotourism
- Development of strategies for ecotourism development, at the global, national and regional level.
- Reducing the threats posed by uncontrolled tourism development at the fragile sites to conserve.
- Developing a source of long term financial, sustainability for the conservation of protected areas sites.

7. RESEARCH METHODOLOGY

The paper entitled Wetland and Eco Tourism— A Case study of lake Ashenge, Dess'aa National Forest & Hermi Natural Forest, Tigray Region of Northern Ethiopia is a simple descriptive case study:

Data and information were obtained on the spot observation of ecotourism resources by the author supported by secondary information sources like books, papers, reports, maps and information from local people. For this study, data related with ecotourist flow from govt. tourist Dept. of Forest, field survey for primary information and different tourism promotion organization is used.

Lake Ashenge 12^o35' N / 39^o30' E

Description

This highland lake is located in Ofla Woreda of Southern Zone of Tigray Regional State near the town of Korem. The lake is approximately 125 km from Mekelle, the regional capital. The altitude at the lake is 2460 masl. The mountains to the north are over 3000 masl. The lake and surrounding area occupy an old volcanic crater between the Alamata Mountain to the south and the Ambalaghe Mountains to the north. The lake is nearly circular in shape and covers an area of 25 km. Maximum and mean depth is 20 and 14 meters, respectively. The lake does not have any surface outlet but gets its water from flows from the surrounding mountains. The rims of the crater surrounding the lake form steep cliffs. The area around the lake is flat with

a wide shoreline. The shoreline has a slight slope and is free from emergent vegetation. Climate is temperate and has one dry season and one wet season. Annual rainfall exceeds 800mm. The driest months are December and January while the wettest months are July and August. Frost occurs in November, December and January. Natural vegetation is scarce. *Acacia* sp., *Croton macrostachyus*, *Vernonia amygdalina* and *Buddleja polystachya* are the few plants around. Different phytoplanktons including *Chroococcus*, *Anabaenopsis* and *Pediastrum* are dominant species while diatoms represented by *Navicula* and *Cymbella* are found in great abundance. *Tilapia Oreochromis niloticus* is the only thriving fish species in the lake and accounts for 100% of the catch. Another species, *Gara* sp. inhabits riverine systems and is rarely found in the lake.

Unique features

The globally threatened Ferruginous Duck is found in large numbers at this site in the winter. The edges of the lake also are home to 1% or more of the total population of the endemic Wattled Ibis. It may also hold more than 20,000 or more of congregatory species. Several congregatory species including Great Crested Grebe, Northern Shoveler, Southern Pochard, Maccua Duck and Red-knobbed Coot are found in substantial numbers. Highland biome species including Black-headed Siskin, Rougef's Rail, White-billed Starling, White-collared Pigeon and Thick-billed Raven are common residents.

Threats

Lake Asheng's waters are within an enclosed system. Cultivations are increasingly coming close to the shore opening the way to silt loads from the surrounding slopes to flow into the lake. Fertilisers and agro-chemicals are being used to increase productivity around the lake. These chemicals will end up in the waters causing unprecedented problems.

Dess'aa National Forest 13°20' - 14°10' N / 39°32' - 39°55' E

Description

Dess'aa National Forest with a total area of 118, 635 ha, is shared by two Regional States, namely Tigray and Afar. A larger proportion of its area is within Tigray Regional State. In Tigray Region, it is positioned within the woredas of Tsaeda Emba, Atsbi Wonbera and Enderta. The woredas it touches in Afar are Berahle, Dallol and Shikhet. Topography is generally flat to gentle hills to moderately steep slopes. Altitude ranges from 1500 to 2500 masl. The dry evergreen forest zone of the forest is covered by dominant *Juniperus procera*, *Erica arborea*, *Ekebergia* sp and *Olea europea* subsp. *cuspidata*. Frequently burned areas are covered by a secondary growth of *Dodonea viscosa*. The forest is highly degraded in some parts of the range and wildlife resources have diminished. During the reign of Emperor Yohannes (1872-1889), this forest was protected as a state forest following a decision by the state. It

was largely used as a wood exploitation zone during the Italian invasion. It was demarcated and given the status of National Forest by the Regional Government in 1989. It conserves a number of wildlife species including Leopard, Greater Kudu, Warthog, Ratel, Grey Duiker, Serval Cat, Wild Pig and Spotted Hyena. Historical evidence provides information on the presence of Elephants and Lions in this forest.

Unique features

Though the forest has undergone heavy use in the past, it is still believed to provide haven for a large number of wildlife and biodiversity.

Threats

Present levels of threat are not well documented. From what is known, though there are forest guards at the site, there appears to be open access. People are allowed to enter the forest and this will undoubtedly place it in a precarious situation.

Hermi Natural Forest 13°49'– 14°04' N / 38°19'–38°25'E

Description

Hermi is an extensive forest area characterised by dissected hills, undulating terrain, valleys and ridges. It covers an estimated area of 30,900 ha. It is located in north-western Tigray. It is found 320 km north-west of Mekelle, the Regional Capital, and is positioned in three woredas of Asgede-Tsimbila, Tahtay Koraro and Medebay Zana. Its southern boundaries are demarcated by the Tackazee River. Altitude ranges from 900 to 2000 masl. According to traditional agro-climatic zones, it is classified as Woina Dega and Kolla. Ominant vegetation communities include *Acacia-Boswelia*, *Acacia-Commiphora* and *Terminalia* woodlands. Several rivers including Hermi and Keymeret join the Tackazee after traversing through Hermi. It conserves a number of wildlife species including Leopard, Bush Pig, Wild Cat, Jackals and Warthog.

Unique features

The forest is important as it conserves an extensive wooded area that is critical for the production of natural gum and incense. It offers communal grazing land for livestock in the area. Though proper ecological studies are

an imperative in the future, from what is known the woodlands are home to a number of wildlife especially birds, reptiles and invertebrates.

Threats

Not well documented and therefore unknown. More researchers have to take initiative to document their research findings

8. CONCLUSION

Wetlands are distinctive ecosystem in between aquatic and terrestrial ecosystems or are transitional zone ecosystems between dry land and open water body. Accordingly, Ethiopia owns different types of wetlands which have national, regional as well as global ecological and socio economic significances. In spite of all their indispensable functions and values, these wetlands are in the rapid crisis of deterioration due to neglect and unplanned and skewed development needs and priorities. Consequently, wetlands are ranked amongst the most highly threatened ecosystems in Ethiopia and unfortunately the degradation and loss of wetlands are continuing. Though natural factors, ecological factors and lack of potentials are important wetland influencing factors, the most sever and coming severing threats are those related anthropogenic factors. Most of these anthropogenic factors are raised due to engaging the stakeholders on the immediate benefits and values of wet wetlands instead of the long term and sustainable benefits and values.

In order to reverse these emerging problems and conserve these fragile but crucial wetlands, integrated problem solving approach through realizing the collaboration of relevant stakeholders from policy level down to grassroots community is indispensable opportunity to Ethiopian wetlands. Government, Communities, private sector and all others who have stake in wetlands should cooperate and contribute their part. Decision makers at higher levels are required to strengthen sustainable wetland management efforts through effecting policy and legislation, improving institutional arrangements and supporting capacity building initiatives. It is appropriate to reassess the significance of wetlands and their environs for national development, and also the consequences of wetland degradation.

Our study confirmed that ecotourism development in the study area has strengths, weaknesses, opportunities, and threats; ecotourism has perceived positive and negative economic, environmental, and socio-cultural impacts in the study area; and value-chain analysis in ecotourism sub-sector helps to identify the major stakeholders in the value-chain and the major challenges and opportunities for ecotourism development as a local poverty reduction tool.

Appropriate planning and management of ecotourism activities really matter for optimizing the positive economic, environmental, and socio-cultural impacts of ecotourism on the livelihood of rural local communities. The strategy implications identified through our study are believed to contribute much for future improvement in the ecotourism sub-sector in Ethiopia.

Ecotourism is a field of human activity where observation and development can wisely effectively be balanced to achieve a

mutual goal to the benefit of the people in the community. It can be developed effectively only when there is consent and active involvement of the local people, who should become partner in this process.

Ecotourism is possibly is one of the meaningful sources of economic development and job creation. Cross country evidence demonstrates that tourism is labour Intensive and offers a variety of small scale opportunities creating jobs for poor, women, and young people, and jobs for indigenous community. So, community based ecotourism is the best option in such areas which is owned and managed by a community and takes care of their natural resources in order to gain income through operating a tourism enterprise and using that income to better their lives. It involves conservation, business enterprise and community development and there will be direct and indirect participants and direct and indirect beneficiaries . An ecotourist always love to get the first hand experience by staying in the rural areas and closer to the nature, so there is very possibility to get a chance to know .

The local youth can serve as the tour guide with proper knowledge of the village area, the history of the concerned tribe and the available of the local resources. Encouraging local women's craft centers in the village where tourists or visitors can buy their local handicrafts and it will certainly help the economic upliftment of the women. In addition, the community has to maintain local natural area particularly the places, of scenic beauty and the places where rich biodiversity always prevails .This way the natural resources which other wise is destroyed by the people can be conserved. The dept. of tourism and the dept. of forest have enough scope to encourage this in the local area. Local youth from the different communities should be encouraged, trained up to undertake the conducted tour for the tourist with proper publicity. Such groups can take the tourist for a guided walk around villages, watching local crafts centre, boat trip on the river, visit to protected area site, a ride on elephant, a visit to tree garden, cultural events (local music /dance). Adequate safety should be provided to the tourist which is a most important aspect in encouraging such activities. The relationship between conservation of natural area and job opportunities from tourism to the natural area is what community- based ecotourism is all about.

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