Natural Resources Characterization

Inventory and Characterization of Potentials and Management of Wetlands in Eastern Amhara

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Abstract

Even though wetlands are biologically diverse and hydrologically important features, they are among mis-managed natural resources in our Region. There is no policy for the sustainable use of them. Even, there is no information and study about the nature as well as the potential of wetlands. Raising awareness on the value of wetlands is therefore, essential for achieving an appropriate recognition of the role that these areas play at present and contribute to the development of the region. This study is aimed at to see the extent, distribution and threats of the major wetlands in Eastern Amhara to investigate sustainable wetland management techniques and institutions based on local and external knowledge systems. A formal survey with a preliminary informal survey was conducted in addition to field observation for the identification of the bio-physical characteristics and socio-economic values of wetlands in Eastern Amhara (North Wollo, South Wollo and Oromia Zones). Thus, wetlands of Chefa, Borkena, Gerado, Alashameda and the margins of Hardibo and Lego lakes have been assessed. The study showed that most part of the wetland is used as temporary grazing for animals during the dry season and there is few practice of early cereal harvesting on the uplands during the belg season. Some needy local people also generate income by selling grass species from the wetland which can be used as house roofing, thatching house floors and for different cultural ceremonies like coffee ceremony. Ealderly people witnessed that the wetland was a house for various types of flora and fauna but currently most of those bio-diversity resources are disappeared. Cheffe *(Cyprus latifolius)* and Tatie *(Wattled Ibis)* are the dominant flora and fauna respectively, which adapt the environment and exist for long years. In general, most of the communities consider the wetlands as a wasteland that has no significant value other than dry season grazing. There is no social attitude to protect and utilize them on a sustainable manner. This indicates that the area is neglected despite its significant role in ensuring environmental stability and food security. Hence, it requires urgent regional policy, management priority and awareness creation.

Key words: Wetlands, fauna, flora, biodiversity

Introduction

wetlands are defined as ``areas of marsh, fen, peat land 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(Davis , 1994). For an area to be a wetland, water does not have to be at the surface, but it has to be close enough to the surface and for long enough to allow anaerobic conditions to develop in the soil (Adrian, 2001). Some wetlands may be permanently flooded, whilst others may have water close to the surface for only a few months in a year.

Ethiopia's wetland resources, which include swamps, uplands bogs, flood plains and the margin of natural and artificial lakes, are widely distributed through out the country. Currently it is estimated that 1-2 % of the landmass of the country is categorized under wetlands. Theses wetlands provide a range of functions and products, which are both environmentally and socio-economically beneficial to local communities. They help to regulate water flows, are essential habitats for many species of flora and fauna and support traditional land use practices.

Even though wetlands are among the most biologically productive ecosystems, their value and significance is often neglected. They are seen in a negative light of wastelands, habitats for pests and threats to the public health. Globally, awareness of the needs for the importance and sustainable utilization and conservation of the wetlands, in 1971, the representatives of 18 countries went to the small town of Ramsar in Iran to put their signature to the convection as it has become known. The Rasmar convection is the only environmental treaty dealing with a particular ecosystem and currently has 134 contracting parties (Davis, 1994). Ethiopia despite the fact that it has got many types of wetlands that are highly threatened is not yet a contracting party to the convection.

Wetlands in Amhara Regional State cover about 3.7% of the area and include areas of seasonally flooded grassland, water bodies and permanently flooded papyrus grass swamp (Abay, 2001). Presently, there is no policy for the sustainable use and conservation of wetlands in country in general and in Amhara region in particular. This study is aimed at to see the extent, distribution and threats of the major wetlands in Eastern Amhara to

investigate sustainable wetland management techniques and institutions based on local and external knowledge systems.

Material and Methods

A formal survey with a preliminary informal survey was conducted in addition to field observation for the identification of the bio-physical characteristics and socio-economic values of wetlands in Eastern Amhara (North Wollo, South Wollo and Oromia Zones). Soil samples were taken from 0 to 40 cm and 40 to 100 cm depths of wetland fields and laboratory analysis of physical and chemical characterization of the soil samples had been carried out.

Results and discussion

Location, Distribution and Soil characteristics

Eastern Amhara is located in the North East escarpment of Ethiopia, which comprises Oromia, South Welo and North Welo administrative zones of Amhara region. Geographically the location is bounded in 10.10^0 to 12.36^0 N latitudes and 38.50^0 to 40.40^0 longitudes. The land area covered by the wetlands is estimated to be 23250ha, which is 0.42% of the total area of the sub region. The wetlands of this area are distributed into five different areas and categorized in Riverine, peat lands, depress ional, and fringe wetlands (Table1). Out of the five-wetland area the chefa wetland is the largest wetland area that share 75.3% of the wetland areas of the sub region and located in two Weredas of Oromia zone. The other four wetlands are located in three different weredas of south welo. There are no significantly registered wetlands in North welo administrative zone except few small ones in spot areas.

Table 1. Location, size and category descriptions of wetlands in Eastern Amhara

Name	Location	Area (ha)	Categorical description
Chefa	Artuma and chefa Dawa werdas of oromia Zone	17500	Dominantly Riverine wetlands but also consist of peat lands and depressional wetlands.
Borkena	Kallu wereda of South welo Zone	2500	Riverine wetlands
Gerado	Dessie Zuria wereda of South welo Zone	1500	Peat lands and riverine wetlands
Borumeda and Alasha	Dessie Zuria and Kutaber werdas of South welo Zone	1000	Purely peat lands
Hardibo	Tehulederie Woreda of South welo Zone	750	Fringe wetlands

Analysis of soil samples taken from 0 to 40 cm and 40 to 100 cm depths indicate that the wetlands have clay soil texture with organic carbon content of 0.9 to 2.3 %. The soil pH is in the range of 6.5 to 8.0.

Table 2. Some physical and chemical characteristics of soils in the wetlands

	pH		% N		% OC		% OM		Texture	
Wet land	0-40	40-100	0-40	40-100	0-40	40-100	0-40	40-100	0-40	40-100
Chefa	7.4	7.7	0.2	0.1	1.4	0.9	2.4	1.5	clay	clay
Borkena	8.0	7.3	0.2	0.2	MR	1.2	MR*	2.1	clay	clay
Gerado	7.5	7.4	0.7	0.3	2.5	1.8	4.4	3.1	clay	clay
Borumeda	6.5	6.6	1.1	0.5	MR	2.6	MR	4.4	clay loam	clay
Hardibo	7.4	7.3	0.3	0.3	2.3	1.8	4.0	3.1	clay	clay

* MR = more than the expected range

Bio-physical features of wetlands

Chefa wetland

Condition of inlets and outlets of the wetland:

The main rivers and streams that cross chefa wetland are Borkena, Betho, Tuluberie,Workie, Dolu, Yigebehal, Habaya, Arfatu, Salons. These rivers discharge water to the wetland particularly during the main rainy season and water in excess of Borkena River, which is the outlet for all these rivers, will cover the wetland surface for about two to three months. Thus, during the rainy season, Chefa wetland would be roofed by water. The wetland has both inlets and an outlet. But during the rainy season, the amount of water discharged in by the inlets is much greater than the amount discharged through the outlet and hence the area would be roofed by water.

Bio-diversity

Chefa wetland is an important habitat for many species of flora and fauna. It is observed that various wetland dependant and wetland associated as well as wetland independent plants and animals use it as their habitat. But detail identification and classification of the flora and fauna was not possible. However, local names of very dominant species were recorded. The major floras available in the wetland are Filla, Senbelet, Delecho, Cheffe (*Cyprus latifolius*), Qetema, Qeqeba, Qewie, and Wonz Admik (*Salix subserrata)*. Balo (mogne fakir) and Benj are also widely distributed wetland independent species which are transported from other areas by water and adapt to the wetland.

According to information by local communities, chefa wetland was forest area several years ago. It was an essential habitat for various tree species mainly Girar *(Acacia spp.)*, Bisana *(Croton macrostachus)*, wanza *(Cordial africana),* Warka *(Ficus species)*, Aregalo Shashatie and Gilo. All these species are now disappeared from the wetland due to dynamic land use changes.The major fauna available in the wetland include Kakisa (birds with long legs and bikes), Tatie *(Wattled Ibis)*, Dakiye, Kebero *(fox)*, Beyeme and fish. Animals like Agazen, Tota *(ape)*, Kerkero, Gureza, Sala were common several years ago but now they disappeared.

Current land use type and economic values

Most part of the wetland is used as temporary grazing for animals during the dry season. It is used as a communal grazing land and any body can use the wetland as a means of feed source for animals during the dry season. Even the nomads from remote areas like Afar region migrate with their animals and settle with in the wetland in temporary huts to use the wetland for grazing during acute feed shortage seasons which is locally called Wuren Mawetat. The grazing land is poorly managed and no local bylaws are applied over its utilization except the ELFORA site. Only about 1648 ha of grazing land is under best management by ELFORA.

The second type of land use is an early cereal harvest on the uplands during the belg season. In some parts of the wetlands and edges, farmers harvest crops like maize and teff using belg rain and supplementary irrigation near Borkena River. But according to farmers' information, inmost cases, there is crop failure due to lack of rain during the belg season and water logging when too much rain comes.

Starting from the mid of June, the wetland will be roofed by water and hence, livestock grazing and crop production activities will stop till the next September. The duration of water logging problem depends on the condition of the rainy season.

The wetland has various economic values other than grazing and cultivation. Local communities use filla (long green grass) for house roofing. Some needy people made dibora or Gadeta from filla and sold it up to 5 birr per unit price. Debora is used as house floor roofing. Some poor families also get income by selling cheffe to towns dewellers, which is used for thatching house floors and for different cultural ceremonies like coffee ceremony. Nomads, who migrate to the wetland, use Filla and other grass species for building temporary huts. Traditional fishery is also a means of income for some people.

Major threats and Farmer's perception to the wetland

Grazing by domestic stock is the major threat to the wetland. The wetland is used by a large number of livestock, which is beyond its carrying capacity, during the dry seasons. Intensive grazing makes wetlands lost their natural features. Drainage problem (water logging) followed by Weed infestation is another threat to the wetland management. During the rainy season, the wetland is roofed by excessive surface water and when water drains, weeds transported with sediments from other areas start to grow. The wetland is now being invaded by transported aggressive weed species like *mogne fikirr*.

Hazard of epidemic disease on animals is a common problem and malaria infestation associated with the wetland is a threat to public health.

Most farmers consider the wetland as a wasteland that has no value other than dry season grazing land. They need it to make fully cultivated land and hence they do not consider other economic values of the wetland. Some farmers, however, are aware of it as a potential natural resource that can be beneficial if its management is improved. Few farmers, around Kemissie, for example, attempt to cultivate rice by their own initiation. They suggest that if it is possible to build dikes to improve the drainage problem, the wetland can be a productive area (both for cultivation and grazing).

The grazing land is a common resource (Community owned) and the wetland used for an early cereal harvest is privately owned. There is no social rule and by-laws to protect the community owned wetland. Every one can utilize the wetland without any limitations.

Borkena (Tekaki and Mar bete) wetland

Condition of inlets and outlets of the wetland

The wetland has both inlets and an outlet. But during the rainy season, the amount of water discharged in is by far greater than the amount discharged through the outlet and hence the area would be roofed by water.The main rivers and streams that cross chefa wetland are Borkena, Tuluba Jibo, Dirma, Felana and Harbu. These water bodies discharge water to the wetland particularly during the main rainy season and water in excess of Borkena River, which is the outlet for all theses rivers, will cover part of the wetland during the rainy season.

Bio-Diversity

Borkena wetland is an essential habitat for filla (wobello), delecho, cheffe and qetema. Shewshewie and shenbeko (Arund donax) are the main plant species which disappeared from the wetland. Dominant fauna currently available are Wutala, white birds, and Dakiye while Agazen and Tota (ape) are extinct animals from the wetland.

Current land use and economic values

Upland of the wetland is under cultivation during the belg season and some part of it is also under meher season cultivation but this part is in risk when the rainy season is heavy. The most central part of the wetland is marshy and no cultivation can be operated but it is used as source of animal feed during the dry season.

Harvest of grass spp. like filla for the roofs of rural houses, fishery (traditional) and selling of grass spp. like filla to the towns are important means of income for some poor families.

Major threats and Farmer's perception

The land is utilized under its capacity due to water logging problem. Malaria infestation that is due to the presence of the wetland causes human health problem.

Some farmers perceive that the wetland is potential for crop cultivation if it is possible to control the water-logging problem. Most farmers consider the temporary grazing wetland as a wasteland that has no value other than dry season grazing.The grazing land is a common resource (Community owned) and the wetland used for an early cereal harvest is privately owned. The

community applies no bylaws to protect the communal wetland and the commons tragedy guides its utilization.

Gerado wetland (Merfeta, Ambo chefe and Bilen meda)

Condition of inlets and outlets of the wetland:

This wetland is located in south Wollo zone of Dessie Zuria woreda. It is extended from Kelina in the southeast to Gerado in the northwest. Altitude of the area ranges from 2210 to 2250 m.a.s.l. It is estimated to be 12 km length by 1km width or about 1200 hectares (this is a rough estimation). The main rivers and streams that cross chefa wetland are Gerado (Qelina), Bilen, Legeworkie, Jegola, yenege woli, and Yito. The wetland has both inlets and an outlet. Gerado river is the outlet but during the rainy season, this river can not drain all the water discharged in and hence the area would be roofed by water.

This wetland is not rich in its bio-diversity. Gerado River are chefa, qetema, gicha and cheffe. Some bird species such as white birds and Ziye (Dakiye) also exist.

***Current land use* and major threats:**

Almost all part of this wetland is under cultivation but it is a problematic farmland. The water level is high and it is impossible to harvest crops during the meher season. Only an early cereal crop harvest can be operated and it will left fallow during the rainy seasons. Main crops that can be cultivated are maize, barley, wheat, and Abish. Land preparation will start in November and planting is in January. Farmers attempt to provide supplementary water to crops by diverting nearby rivers, particularly during the initial growth stages. Part of the wetland along the edges of Gerado river, is used as animal feed source under cut and carry feeding systems.Harvest of grass spp. like Filla for the roofs of rural houses, selling of cheffe and qettema to the towns is important means of income for some poor families. Some marshy sites with in the wetland are sources of theses grass species.

Water logging is the major threat. The land is potential for crop production but it is a problematic area. Starting from June, the area will be under the problem of drainage and during the rainy season, the area will be roofed by water. Farmers are aware of it as a potential farmland despite its water logging problem.

Margins of Hardibo and Lugo Lakes

Condition of inlets and outlets of the wetland*:*

Runoff from hillsides and Water from rivers such as Anqerka, Fecha, Gido, Wulawul, and Gendetre cross the wetland and enter to the lakes, which have no outlet.

Bio-diversity

The lakes are rich in their bio-diversity particularly in their fauna composition. Some of the major bird species recorded in their local names are Yebahir Dero**,** Aliquada (birds with long leg and bikes), hawsew amora, white birds (sabisa), qetie boleche, kakisa, harie gobit and Assa(fish).Some of the dominant grass species in their local name are Hebelo, Qetema, Dilcho, Chefe, Qebero ageda.

Land Use

These lakes and their boundaries are under the category of wetland. The farmland around the lakes, locally called "bahire sheshi meret", is utilized for crop production but it is under stress of water logging. Farmers around lake Hardibo harvest sorghum. According to farmers view, sorghum is relatively better to cope with the problem of water logging but other crops like maize cannot resist it. Farmers around lake Lugo on the other hand, produce perennial crops like orange in addition to cereal crops.

Local Community use Hebelo (long green grass spp.) for house roofing. They also use Delecho to make *Gesso (rain protective material).* Fishery is experienced at theses lakes. There is legally organized union of fishery at Haike Town. Members of the union harvest fish from the lakes. Lake Hardibo is used as a source of irrigation scheme established by SAERAR.

Boru and Alensha Meda

Boru and Alensha Meda *are* communal grazing lands and farmlands to the north and west of these wetlands are under the problem of high water level. Wheat and Barley crops are being cultivated only during the belg season and left fallow during the rainy season.

Conclusion and Recommendations

Wetlands are natural habitats for many types of flora and fauna. On the one hand they keep the biodiversity resources and on the other hand they maintain the balance of the ecosystem. They also have socio-economic

values. However, currently they are mismanaged and are under threat. First of all they are community owned and there is lack of awareness of users on the significance of these resources. There is no rule and by-laws to use the wetlands properly. Every one attempts to get the maximum benefit from these resources with out taking care of their management and hence tragedy of the commons rule is applied on them. If the current land use and management system continues, there will be time that these resources totally distorted leading to environmental imbalance. Hence, there is a need to devise a strategy for better management and sustainable utilization of these resources. Policy needs to be devised to consider and protect theses resources and their ecological functions and socio-economic advantages need to be recognized and valued. This study focuses on preliminary investigation of wetlands as initiation but further investigation and detail study using satellite images to identify the major aspects and mapping the wetlands is strongly recommended for proper monitoring and management.

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