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Tadlo Awoke Mengesha*

Department of Animal Production and Extension, College of Veterinary Medicine and Animal Sciences, University of Gondar, Gondar, Ethiopia

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***Corresponding author:** Tadlo Awoke Mengesha, Department of Animal Production and Extension, College of Veterinary Medicine and Animal Sciences, University of Gondar, Gondar, Ethiopia, E-mail: mebratuaw@gmail.com

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Review Article

Review on the natural conditions and anthropogenic threats of Wetlands in Ethiopian

Abstract

Wetlands are one of the most multifunctional ecosystems of the world that provide a range of economical, biological, ecological, social, and cultural functions and services to human beings. In Ethiopia all types of wetlands except coastal and marine-related wetlands and extensive swamp-forest complexes are found and they are estimated to cover more than 2% of its total surface area coverage. Wetlands deliver a wide range of ecosystem services that contribute to human well-being such as food and feed, construction materials, water supply, water purification, climate regulation, flood regulation and eco-tourism. Wetlands have played a significant role in the growth of human civilizations and cultural development. However, the degradation and loss of wetlands is a worldwide phenomenon and seems to progress faster than in other ecosystems. Despite all those and other indispensable values, these wetlands are under severe pressure and degradation. Due to improper extraction of uses and misconceptions forwarded to wetlands, the health of the wetlands is continuously decreasing from time to time that in doubt their existence in the near future. 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.

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 [1]. Wetlands have played a significant role in the growth of human civilizations and cultural development. This is true globally, where major pre-historic civilizations, including those on the Nile, Euphrates and Tigris, have emerged and developed [2]. Mesopotamia, the Nile delta in Egypt, Alexander's Macedonia in the Axios marshes, Rome by the Pontine Marshes, the Netherlands, London, and the German Hanseatic towns situated in the flood plains of vast deltas are a few examples. In distant continents like the Mekong delta, the marshes in Central Mexico, and the inner Niger delta in Mali should also be mentioned [3]. Wetlands deliver a wide range of ecosystem services that contribute to human well-being such as food and feed, construction materials, water supply, water purification, climate regulation, flood regulation and eco-tourism [4]. Ethiopia is uniquely rich in water resources. In addition to ecosystem services wetlands provide important natural resources, up on which the rural economy in Eastern Africa depends including Ethiopia. They provide many substantial benefits not only to local society, but also to the people who live far away from them. They are recognized globally for their vital role in sustaining a wide array of biodiversity and providing goods and services and also as important sources of natural resources, upon which the rural economies depends. It has numerous water bodies including ponds, lakes, rivers, reservoirs and wetlands. Estimates in Forum for Environment (2009) showed that Ethiopia has a wetland area of 22,600km^2. Wetlands are highly dependent on water levels, and so changes in climatic conditions that affect water availability will highly influence its structure and function. Ethiopia possesses a great diversity of wetlands, which are widely distributed in all climatic regions of the country. Wetlands of Ethiopia are grouped ten depending on habitat type and biological and physical characteristics. Wetlands are found in different parts of the world including in Ethiopia. Even though an exhaustive inventory of wetlands is not done yet, wetlands are estimated to cover about 2% of the country's land coverage [4]. The most common threats of wetlands are the result of a combination of social, economic and climatic factors, which have increased pressure on the natural resources in Ethiopian wetlands. Another constraint to the judicious

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use of African wetlands is lack of knowledge by planners and natural resource managers of the benefits that they provide and techniques by which they can be utilized in a sustainable manner [5]. Despite their small area coverage, wetlands in Ethiopia are among the most productive ecosystems, and have immense economic, social, and environmental benefits. The importance of our wetlands goes beyond their status as habitat of many endangered plant and animal species but they are a vital element of national and global ecosystems and economies. Like in most developing countries, wetlands in Ethiopia are facing increasing pressure of transformation to alternative uses for grazing and agricultural production [6,7]. In Ethiopia, wetlands are distributed in almost all ecological and altitudinal ranges covering approximately 1.5 per cent of total surface area of the country [4]. To ensure conservation and sustainable use of its wetland resources, Ethiopia has environmental, water resources and agricultural policies dealing with the wetland issues, if not have self-standing wetland policy [8]. The public nature of wetlands and lack of consistency among government policies in different sectors such as economics development, environment protection, physical planning are some of the challenges for implementation for wetland management [9]. Particularly, in Ethiopia, wetlands are converted to farmland and sometimes used in uncoordinated way, due to lack of information on its environmental benefits [10].

Objectives

The major objective of this review was:

* To collect information on the distribution of wetlands in Ethiopia
* To gather information on major function and values of wetlands in Ethiopia
* To ass the major anthropogenic threats of Ethiopian wetland

Wetland distribution in ethiopia

Ethiopia possesses a great diversity of wetlands, which are widely distributed in all climatic regions of the country. Ethiopia has all type of wetlands with the exception of coastal and marine related wetlands and extensive swamp forest complexes [11]. The Ethiopian wetlands are distributed in different parts of the country, in almost all ecological and altitudinal ranges covering approximately 2% of its total surface area [4], (Figure 1). The Dallol depression which is located at about 110m below sea level flourishes with wetlands such as Lake Afdera (salty lake). Swamps, lakes and riverine ecosystems are also distributed in central highlands, rift valley areas and mainly in the southwest borders of the country (Figure 1). Even if the country lacks wetland database as comprehensive wetland study has not been carried out yet. The existing estimations of its extent are based on some general environmental assessments. One of the latest wetland assessments is the inventory which was undertaken by the Federal Environmental Protection Authority. This assessment has documented 43 wetlands from the southern (partly following the rift valley line), western (partly from Jima

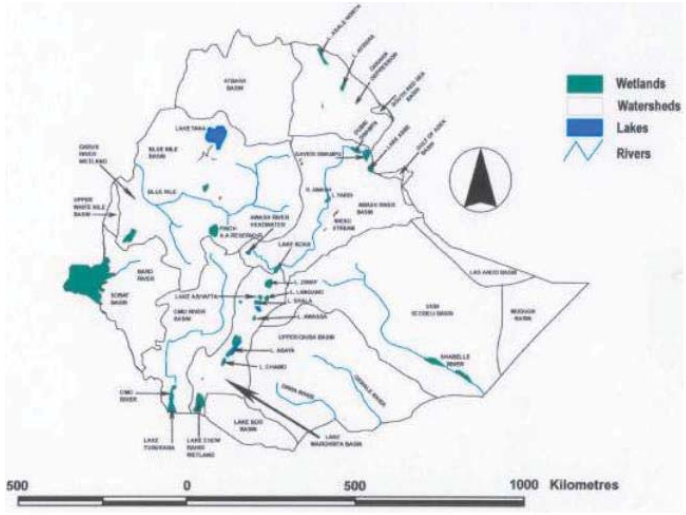

Figure 1: Distribution of wetlands in Ethiopia [2].

Table 1: Functions and Services of Wetland ecosystem.

Wetlands services	Benefits to human well-being
Provisioning(socioeconomic benefits)	
Food	Production of fish, wild game, fruits and grains
Fresh water	Storage and retention of water for domestic, industrial and agricultural use
Fiber and fuel	Production of logs, fuel wood, peat, fodder
Biochemical	Extraction of medicines and other materials from biota
Health	Better health through water purification / Medicinal plants
Genetic materials	Genes for resistance to plant pathogens; ornamental species, etc.
Regulating	
Climate regulation	Source of and sink for greenhouse gases; influence local and regional temperature, precipitation, and other climatic processes
Water regulation (Hydrological flows)	Groundwater recharge/discharge
Water purification and waste treatment	Retention, recovery, and removal of excess nutrients and other pollutants
Erosion regulation	Retention of soils and sediments
Natural hazard regulation	Flood control, storm protection
Pollination Habitat for pollinators	Pollination Habitat for pollinators
Cultural	
Spiritual and inspirational	Source of inspiration; many religions attach spiritual and religious values to aspects of wetland ecosystems
Recreational	Opportunities for recreational activities
Aesthetic	Many people find beauty or aesthetic value in aspects of wetland ecosystems
Educational	Opportunities for formal and informal education and training
Supporting	
Soil formation	Sediment retention and accumulation of organic matter
Nutrient cycling Storage	Storage, recycling, processing, and acquisition of nutrients

Source: Finlayson [40].

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and Gambella line), central and northern parts of the country. However, wetlands in the north-eastern, eastern, south (in the Bale, Arsi line), south (in Kafa, Maji line), west (in Ben Shangule line) and in border areas were not assessed [12].

Functions and services of wetland ecosystems

Wetlands play a paramount role in the life of human beings by providing ecological functions such as the maintenance of ecosystem stability, habitat for various fauna and flora and climatic stabilization; a socio-esthetical service such as the role of ecosystems in development of cultural heritage; intrinsic value, which is the value that resides in the environmental asset itself and an economic functions by providing resources like food, water, raw materials for building , clothing and recreational services, which are monetary measures for benefits or costs of environmental change [13]. The general functions and services of wetland ecosystems are summarized in the following table.

Environmental Values of wetlands

Wetlands are of value because they play an important role in maintaining environmental quality, sustaining livelihoods and supporting biodiversity. Wetlands also play a critical role in maintaining the quality of the environment by absorbing and processing waste products. Wetlands biologically cycle carbon dioxide, methane and hydrogen sulfide. They sequester (trap) and release carbon, regulating climate change. Globally, wetland peat deposits take up just 3% of the land area but store 14- 16% of the soil carbon pool [10]. Many wetland functions effectively "work" for the benefit of people. However, social and economic factors often result in pressure to make wetlands work harder, for example, through their utilization for agriculture. They serve to slow down storm flood, trap sediments and carbon sink, protect property damage in downstream, waste water treatment and the siltation of dams. Studies also reveal that wetlands have a role in ameliorating unfavorable climatic variations. As scientific understanding of wetlands has increased, more slight goods and services have become apparent. Wetlands have been described both as "the kidneys of the landscape", because of the functions they can perform in the hydrological and chemical cycles, and as "biological supermarkets" because of the extensive food webs and rich biodiversity they support [14]. Since wetlands is a source of substantial biodiversity in supporting numerous species from all of the major groups of organisms from microbes to mammals. Generally, wetlands serve as gene bank in ecosystem. Ecologically, wetlands are instrumental in water storage, filtration and supply, flood control; water purification (sediment and toxin removal), nutrient cycling functions and habitats for biodiversity of both flora and found [2]. Additionally wetlands play a role of ground water discharge and recharge. Their flood controlling and sediment trapping abilities protect associated water bodies from pathogenic substances and benefit the biota living in the water bodies, and the rest of the wetlands by purifying the water [15]. According to [16] stated that wetlands and floodplains that enclose Lake Tana are the largest wetland area in Ethiopia and are an integral part of the complex Tana ecosystem. These wetlands serve as breeding and nursery habitats for catfish and Nile Tilapia. Similarly the value of the wetlands for fish and wildlife protection has been known for more than a century now, but some other benefits have been identified more recently (Mitsch and Gosselink, 2007).

According to Ayalew (2010) Lake Tana wetland farming systems provide multiple services, satisfying the needs of the local community (food security, livelihoods) while providing fundamental ecological services for the larger catchment population. Traditional management of these multiuse systems was aimed at optimizing food production (fish and crops) as well as income generation (wetland vegetation and products) (Ayalew, 2010). Wetlands encompass a large and heterogeneous spectrum of aquatic habitats. Similarly the Rift valley wetland is one of these ecological systems and provide ecological functions which maintain and protect nature and human systems through services such as the maintenance of water quality, flow and storage, flood control, sand storm protection, nutrient retention and micro climatic stabilization, along with the production and consumption activities that they support [17]. The whole Rift valley ecosystem, including its wetland drainage system and up lands, is regarded as a rich strategic site for a wide variety of resident and migratory avifauna population [18,19].

Most of the major wetlands are in vicinities of towns, municipal and industrial waste discharges always negatively affect wetlands (Zerihun, 2003). Ethiopian wetlands are increasingly being lost or altered by unregulated over utilization, including water diversion for agricultural intensification, urbanization, dam construction, pollution and other anthropogenic interventions [2]. This has been ever growing problems of in major lakes in Ethiopia like Chamo, Abaya, Awassa, Ziway, Abiyata-Shalla, Tana- Fogera, Haik and wetlands in the Awash River basin [20].

Economic values of wetlands

Wetlands provide multiple economic, social, cultural, and ecological functions and services which are crucial for the local, national and global society. The value of some of these functions and services could be determined by the market forces of demand and supply. However, many of them have non-market values.

Economically, most of the wetland resources are used for fish harvesting, forest resource extraction, roof tacking and dry season grazing. Some of them are used for industrial and irrigation water sources and for domestic water supply. Crocodile farming is also yielding economic benefits in two wetlands – Abaya and Chamo Lakes [21]. Wetlands and the associated wildlife have also the economic value attracting tourists. The fact that some of the wetlands are resting and nesting areas for inter-Africa and Europe migratory birds add to their significance in the tourism industry [17]. Socio-economic functions of wetlands are very high, which make them significant at national and international levels. Even if the resource bases of Ethiopian wetlands are not well accessed, it is known that there is high biodiversity in Ethiopian

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wetlands. According to Ayalew (2010) stated that the loss of rural livelihoods is closely linked to food insecurity. Fishery, livestock husbandry, small scale agriculture and wetland biomass harvesting are the main livelihood activities for communities in the African lake and river basins.

Wetlands provide with various benefits to local communities. These include, of food crops through agriculture by draining and recession, important sites for dry season grazing, resource extraction, raw materials, papyrus supply, fish harvesting, source of medicinal plants and sites for tourist attraction and various traditional ceremonies. According to [22], stated Lake Abijiata and its wetlands provide the necessary services for eco-tourism development and economic base for the local communities. The result indicates that more than 83% of people depend on the wetlands for different types of subsistence including fodder, fuel wood, mining and mineral salt extraction. A similar reports states as wetland crop and fish farming have become increasingly important for people living in river and lake regions in Ethiopia. Economically, most of the wetland resources are used for fish harvesting, forest resource extraction, roof tacking and dry season grazing. Some of them are used for industrial and irrigation water sources and for domestic water supply. Crocodile farming is also yielding economic benefits in two wetlands – Abaya and Chamo Lakes [21]. Wetlands also provide tradable goods and livelihoods. Papyrus and cattail are the main wetland products used for fuel, thatching (dwelling house, pest watching tukul, granary, livestock shelter), as raw material for crafting (raincoat, mat, broom, basket, boat, carpet, etc.), ceremonial (floor covering during festivals), for mulching in nursery, compost making and fodder [23]. Poor rural households, particularly women, rely on wetlands for additional income to their families. Hence, wetlands contribute significantly to efforts aimed at poverty reduction and food self-sufficiency. Growing number of people in Ethiopia, in both rural and urban areas, depend on wetland resources for their survival. Many peasant farmers in the western parts of the country make their living from wetlands. Communities who live around the wetlands in the Rift Valley lakes, and Lake Tana benefit a lot from fishing and irrigation farming [24]. Wetlands are exceptional habitats for endemic birds and are endowed with many natural attractions offering immense potential for tourism development in Ethiopia.

Recreational value of wetland

Wetlands are multifaceted habitats, which support highly adapted characteristic fauna and flora. Wetlands are often inviting places for popular recreational activities including hiking, fishing, bird watching, photography and hunting. Hunting and fishing remain sports that are dependent on wetlands. Lake Abaya and Chamo wetlands and the associated wildlife have also the economic value attracting tourists. The fact that some of the wetlands are resting and nesting areas for inter-Africa and Europe migratory birds add to their significance in the tourism industry [17]. Some wetlands in the Oromia and SNNPRS have also cultural as traditional holiday sites. Some Ethino-medicines are also extracted from the wetland biotas. Game and controlled wildlife hunting are also carried out in wetland areas like Chew Behir. Sport and recreation like swimming and boating are also increasingly exercised in most of the wetlands' water bodies [4]. Lake Abijiata and its wetlands provide the necessary services for eco-tourism development and economic base for the local communities. Similarly Lake Tana area is rich in terms of fauna and flora. When we take the issue of avi- tourism it can be categorized as one of best birding site in Ethiopia [25].

Human induced threats to the wetland

Ethiopia has diverse wetlands of various origins that distributed in many parts of the country because of its large diversity of landforms and climatic conditions, creating a wide-ranging wetland system throughout the country. Wetlands are one of the most multifunctional ecosystems of the world that provide a range of economical, biological, ecological, social, and cultural functions and services to human beings [23]. Despite their contributions wetlands are being degraded at an alarming rate in most parts of Ethiopia. Draining and converting of wetlands in to crop or vegetable fields is common in several parts of Ethiopia especially in areas where there is shortage of cultivable land and rapid population growth [12], Ethiopian wetlands are increasingly being lost or altered by unregulated over utilization, including water diversion for agricultural intensification, urbanization, dam construction, pollution and other anthropogenic interventions [2]. According to [24], stated that major threats to wetlands in Ethiopia, include conversion to agriculture by draining, overharvesting of the resources, appearance of invasive species, introduction of perennial vegetation and overgrazing. Most of the Ethiopian lakes, rivers, and reservoirs are presently facing serious ecological problems [2]. Habitat degradation is a common problem around some Ethiopian lakes. In the catchment areas of rift valley lakes, for instance, water diversion around Lake Awash Abegaz *et al.*, 2010 [26,27], for agriculture and floriculture are significantly affecting the resources. Climate change also seriously affect freshwater wetlands due, principally, to temperature rise, increased evaporation, reduced precipitation (for some areas), and increased intensity of storm events. On top of that, lack of clear awareness in general public, decision and policy makers coupled with the absence of clear policy and direction on wetlands issue are contributing to the problems mentioned before. Claims that 65% of wetland disturbances in Ethiopia came's from human origin [28],, while the remainders have natural origins.

Wetlands are dynamic ecosystems which continually change naturally due to subsidence, drought, erosion and siltation. Wetlands are under severe pressure from water and land-based human activities, jeopardizing the natural services that they provide. Habitat loss as humans develop land and water for agriculture, grazing livestock, and unsustainable use such as draining wetlands and deforestation for agriculture land and polluting the air, soil and water through unwise use of chemical compounds such as herbicides, insecticides, etc.. greatly affect biodiversity (IBCRb, 2001). Natural change is normal and expected but the direct and indirect anthropogenic measures are the one considerably affecting the vital functions,

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values and attributes of wetlands [22]. Wetland degradation could lose their ability to perform their valuables and functions.

Low economy level

Poverty plays a great role in threaten wetlands. In an attempt to use wetland resources to make their livelihood, people over exploit these resources [22]. Vegetation resources in almost all wetlands have been alarmingly denuded that siltation of water bodies is becoming major problem and birds and other wild animals are leaving wetland areas because of nesting and resting shelters distraction. This is due to the fact that trees have been cut down and grasses have been overgrazed [4]. Water abstraction for agricultural crop irrigation and industrial use is also severely threatening some lakes including Lake Tana, Ziway, Abijiata, Shalla, Abaya and Chamo [2]. Therefore, the economic factors are aggravated by poverty and population pressure. As population pressure increases, the newly formed farm house holds i.e. the youth has limited access to farmland. These farmers encroach in to wetlands and forest areas for conversion. Moreover, poor households sell firewood and charcoal to cope with food insecurity [29]. According to [22], report in recent years, Lake Abijata and its associated wetlands are degrading progressively due to natural and human factors such as farmland expansion, sand mining, mineral salt extraction, over use of water for irrigation and other development intervention like soda Ash factory are among the major threats of wetland management.

Improper agricultural practices and expansions

Draining of wetlands for agricultural purpose is a century old practice in some parts of the country mainly in Southwest Ethiopia. Long term draining interferes with the ecological recovery of the wetland system and will fasten its drying up (Mc Kee, 2010). Draining of wetlands for agricultural purpose is a century old practice in some parts of the country mainly in Southwest Ethiopia. Long term draining interferes with the ecological recovery of the wetland system and will fasten its drying up (Mc Kee, 2010). Shortage of agricultural land derived from increased human and livestock populations, the low awareness of communities regarding the ecological benefits of wetlands and the lack of technical and financial support for wetland conservation are underlying factors exerting pressure on the wetlands [4]. The natural resource base in Ethiopia such as land, wildlife and water are vital sources of domestic and national income. Such provide the basis for farming, fishing, energy production and tourism. However, these resources have been degraded due to high demand for agricultural land and home energy use resulting from high population pressure. Hence, environmental degradation has been and will remain a major cause of low agriculture production. Particularly, in Ethiopia, wetlands are converted to farmland and sometimes used in uncoordinated way, due to lack of information on its environmental benefits [10]. Wetland biodiversity are severely affected and in great danger of being lost. Taffa (2008) [30], describes in southwestern parts of Ethiopia, Illu-Abba-Bora Zone, the percentage of the available wetlands under agriculture was increased from 27.7 per cent in 2003 to 65.6 per cent in 2006. Generally, the major causes of biodiversity destruction are poor methods of farming systems which result in soil erosion, loss of mainland and soil fertility. This in return leads to low agricultural yields hence farmers become both agents and victims of environmental degradation [31]. According to Ayelaw, (2010) report wetlands in Lake Tana catchment are now threatened from sedimentation (silt load) as a result of upstream intensive agricultural activities and deforestation. The effects of non-point sources such as agricultural runoff are found to be greater than those of point sources of pollution. In the last 2 decades with an increase of population pressure and limitation of resources (land, water) farming shifted to wetlands including river banks, channel banks and shoreline of lakes (Abunie, 2003). Similarly the use of fertilizers and pesticides to maximize the rice production in Fogera plane has a significant impact especially on the floodplain wetlands (Wollala and Shesher) and at large extent on the lake. Shesher and Wallala floodplains (surface area estimated as 2000 ha) are fragile wetlands highly threatened by drainage aiming in conversion them into teff (Eragrostis abyssinica) and rice fields (Atnafu, 2009). According to Brook (2003) stated Ethiopia has painful experience regarding total loss of Lake Alemaya; the current trend around Lake Abijata shows the lake's likely disappearance in the near future and other less popular ponds/ lakes, streams and wetlands. The "death" of Lake Alemaya was as a result of unbalanced and misuse of the fresh water that was overused mainly for drinking and irrigation, but also used for fishing, recreation and washing. All these services have collapsed primarily due to human use and the local community has suffered from shortage of fresh water subsequent to the collapse of the lake (Brook, 2003).

Urbanization and industrialization

Wetland ecosystem such as rivers, lakes, marshes and rice fields provide benefiters that contribute to human wellbeing. This includes fish and fiber, water supply, water purification, climate regulation, flood regulation, recreational opportunities and increasing tourism. Ancient time, human settlement follows river banks and lake shore areas. Wetlands (mainly rivers and their associated flood plains) have been the heart of human civilization [32]. Thus, wetland systems have played key role throughout the development and survival of humanities. Growing urbanization industrialization and unplanned tourism development activities around the lake and river banks in lack of adequate infrastructural amenities have negatively affected wetland recreational values. According to Dugan (1993) report the importance of water for urban construction and dwellers is vital. Human activities such as settlement, grass and reed collection, grazing, brick production, agriculture taking place in around the wetlands have imposed undesirable impacts on wetlands. Wetlands degradation in Ethiopia is closely linked to the development of urban centers countrywide. Ethiopian wetlands which are found near to urban are suffering negative consequences from the expanding sectors sources (e.g. hotels, health centers, households and factories). For instance, the amount of solid and liquid wastes generated by different sources is increasing in size and composition. In addition to urbanization, industries within the wetlands such as in Addis Ababa, Bahir Dar, Awassa and Arba-Minch industrial

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areas greatly affects their normal functioning impairing its capability to clean wastewater and reduce siltation of streams (Gebremariam, 1994).

Livestock grazing

Grazing has also identified as threat to wetlands in addition to the above factors. When grazing follow continuous cultivation; wetlands easily become degraded, and lose their natural characteristics. Predominantly cattle; lead to some consequences which include soil compaction. And vegetation loss [33]. Livestock trample the soil and compact it and destroys natural vegetation. They erode drainage channels leading to gullies and increase water outflow [24]. These effects often result in the complete degradation of wetlands by reducing the water table and by changing the original vegetation. As such, wetlands produce an ecological equilibrium in the environmentally maintaining the integrity of life support systems for sustainable socio-economic development. Yet, many wetland ecosystems particularly flood plains and swamps are regarded as wastelands and continue to be depleted at an alarming rate throughout Ethiopia [2].

Week institutional capacity

Wetland management in Ethiopia also suffers from capacity limitations such as lack of skilled manpower, finance and technology. Wetland focused training programmes are very scarce in higher learning institutions of the country. Institutions have responsible for land administration, and other natural resources management. However, there is little or no awareness of current status, threats or values of wetlands, lack of capacity to implement the government policies [4], or even the need for their conservation and sustainable utilization. Although there are various organizations/institutions with some sort of wetland expertise and awareness, no coordination exists between these institutions for the conservation, management and wise use of wetlands in Ethiopia [2]. Efforts in wetlands management in Ethiopia are being challenged due to poor legal supports resulting from insufficient political will that failed to incorporate sufficiently the sustainable management of wetlands in the land use policy (Mengistu, 2003). According to [24], report major threats to wetlands in Ethiopia, include conversion to agriculture by draining, overharvesting of the resources, appearance of invasive species, introduction of perennial vegetation and overgrazing. On top of that, lack of clear awareness in general public, decision and policy makers coupled with the absence of clear policy and direction on wetlands issue are contributing to the problems mentioned before. Currently, wetland resources are used beyond their rejuvenating capacity [4]. In terms of land tenure arrangement, it seems that there is no clarity that actually has command on such valuable resources. The reality on the ground forces us to pose critical questions such are our wetlands degrading because of policy gaps or due to our negligence and ignorance? Or lack of legal frameworks on wetland tenure?

Deforestation and degradation of catchments

The major threats of wetland in Ethiopia are land degradation caused by deforestation, overgrazing, unsustainable agricultural practices and wetland degradation. According to [17], report wetlands are under continual threat from deforestation due to population growth and the associated expansion of farming. Increasing demand for fuel and construction of wood. The lakes buffering capacity to deal with stress is reduced from sediment loads and conversion, destruction and encroachment of important natural buffers like wetlands. Despite this high diversity of fauna and flora, several of the existing species are endangered due to loss and fragmentation of habitat. In particular the degradation of forests and wetlands has caused severe habitat destruction for both flora and fauna. As a result, many wetlands are temporary features that disappear, reappear and re-create themselves over time [23]. It is evident that Ethiopia has suffered a lot from natural resources degradation and the severity of the problem has urged the government to make environmental protection a top agenda of the country and assure sustainable development. Wetland ecosystem is under pressure emanating from conversion into agricultural lands; especially for rice production, over exploitation of wetland resources, deforestation, soil erosion and land degradation, siltation, settlement, climate change and pollution. Dugan (1990) [28], claims that 65% of wetland disturbances are of human origin, while the remainder have natural origins. Out of these human origin disturbances 73% are thought to result from direct human actions, while the remaining 27% are believed to come from indirect sources. Ayalew (2010) Stated that wetlands in Lake Tana catchment are now threatened from sedimentation (silt load) as a result of upstream intensive agricultural activities and deforestation. Invasive species such as water hyacinth are becoming threats to aquatic ecosystem of the country. Deforestation and recession agriculture coupled with high erosion from the high lands of Lake Tana catchment resulted in high sediment deposition (average annual sediment yield of 30-65 tons/hectare; (Gebriye *et al.*, 2009). Human encroachment on the wetlands increases every year, with the subsequent depletion of emergent Macrophytes through harvesting and burning, while there is an expansion of submerged Macrophytes stands in other areas. According to Dereje (2015) Preliminary survey Lake Tana, is highest water hyacinth infestation of the weed was observed at North and to some extent North-east direction, with estimated area coverage of 80-100 hectare in observed at Megech River mouth. Similarly [34], reported current estimate of water hyacinth coverage is nearly 40000 ha shore area of the Lake Tana. The infestation rate of water hyacinth increased alarmingly, more than 50 000 ha of the shore of Lake Tana are and about 128 km shore length was infested by this deadly weed [35].

Pollution

Pollution occurs through inappropriate human actions. Poor management of chemicals and poor waste disposal mechanism is the major pollution threats to sustainable wetland resources [36]. Likewise. Pollution is also one of the crucial challenges to the wetland. It affects the overall ecological functioning of the environment. Adugna and Bogale (2015) [37], stated that the wetland is highly affected by the pollutants generated from coffee washing plant. This coffee washing plant is found between Dale woreda and Aleta wondo woreda. The waste

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product of coffee that is generated from this plant directly enters the Dale woreda. Particularly the spring of the wetland. The pollution of this coffee washing plant has also triggered the expansion of many animal diseases.

Overexploitation of wetland resources

There are the poorest households that mostly rely on the wetland since there is no other source to sustain their livelihoods. Over harvesting of the wetland resources by the communities is also a major threat to this ecosystem. Since the majority part of the wetland is under communal hand. Wassie *et al.* (2012) [38], noted that selective fishing in Lake Tana caused a 75% decline in *Labeobarbus* species during 1990s. Excessive water abstraction from wetlands and erosion and sedimentation are other serious threats. Ghermandi *et al.*, (2008) found out excessive abstraction of water from Lake Alemaya, South-eastern Ethiopia caused complete drying up of the lake by the year 2004. Recently, there are increasing treats to the valley bottom wetlands of South-west Ethiopia which mainly arisen from expansion of drainage and cultivation [39-53]. That means it is open for all communities; no one care for it. In addition to all the above human induced threats to the wetland. According to Hailu (2003) report stated that, roughly 20% of the Illubabor Zone wetlands were cultivated between 1986 and 1998, increasing drastically in 1999 to 35% or 7,100 hectares of the wetland area.

Conclusion and Recommandation

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. 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. The degradation and loss of wetlands is a worldwide phenomenon and seems to progress faster than in other ecosystems. Wetlands carry out a wide range of ecosystem services, economic values and recreational values that contribute to human well-being such as food and feed, construction materials, water supply, water purification, climate regulation, flood regulation and recreational values. These include fish and fiber, water supply, water purification, climate regulation, flood regulation, recreational opportunities and, increasingly, tourism. Consequently, wetlands are ranked amongst the most highly threatened ecosystems in Ethiopia and unfortunately the degradation and loss of wetlands are continuing.

There is a need for management efforts that harmonizes the relationship among the stakeholders and sets better management options of wetlands. Appropriate wastewater management system should be developed, instead of direct dumping to the receiving water bodies. Though natural factors, environmental factors and week institutional capacity are important wetland influencing factors, the most sever and coming severing threats are those related anthropogenic factors. Lack of clear awareness in general public, decision and policy makers coupled with the absence of clear policy and direction on wetlands issue are contributing to the problems mentioned before. Most of these anthropogenic factors are raised due to engaging the stakeholders on the immediate benefits and values of 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, work with local agencies to implement watershed actions that will better protect wetlands, their water supply and water quality. Maintain and preserve water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain in the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities. Local government, communities and all others who have stake in wetlands should adopt wetlands and climate change protection and adaptation goals and regulations as part of comprehensive land management and watershed management.

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