

## **Socio-Economic Aspects of Cheleleka Wetland: Current Status and Future Prospects**

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**Abstract:** The main aim of this study is to explore the socio-economic activities that affect Cheleleka wetland resources. The research uses mainly qualitative methods which involve structured observation, in-depth-interview, and group discussion with community members living in and around the wetland to collect, analyse and interpret data. An anthropological theory of political ecology has been used as a theoretical approach to explain factors affecting the wetland resources access and control in the study area. The findings show that complex socio-economic activities which have long been undergoing in and around the size and functions of the wetland. Farm land expansion, deforestation, industrial effluents, mining and irregular settlements are found to be the major socio-economic factors that dwindle the wetland resources. Urgent and concert actions are required among stakeholders to halt the progressive decline of Cheleleka wetland. The findings suggest that treating the watershed of the catchment, introducing appropriate irrigation technologies, delineating boundaries and treating effluents require short term interventions; controlling open grazing, planning resettlement, providing alternative livelihood strategies, introducing environmentally friendly energy sources and engaging stakeholders in meeting their social corporate responsibilities need to be carried out as long term interventions. On top of these, since the identified socio-economic activities affecting the wetland has broad nature, each of which demands detail study to come across sustainable solutions.

**Keywords:** Cheleleka wetland, interventions, political ecology, socio-economic activities

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### **I. INTRODUCTION**

#### **1.1 Background**

Wetlands occupy about 6% (890 million ha) of the land surface of the world, but an estimate of 50% of world's wetlands may have been already altered or lost in the last 50 years [1]. Ethiopia has diverse wetlands of various origins that are distributed in many parts of the country, and a large number of Ethiopians depend on its resources for their survival [2]. As to the estimates of [3] 'wetlands account for 2% of the land mass of Ethiopia'.

Wetlands have considerable socioeconomic and ecological values. They support crop production, fishing and are sources of medical plants. Ecologically, wetlands are instrumental in water storage, filtration and supply, flood control; perform sediment, nutrient and toxins retention functions and habitats for biodiversity of both flora and fauna [4].

Lake Hawassa is one of the many Ethiopian wetland resources. It is located in Hawassa City in the middle of a series of rift valley lakes at an altitude of 1680 m and 275 km south of Addis Ababa. The lake has a surface area of 90 km<sup>2</sup>, and is one of many Ethiopian wetland resources. The community of Hawassa and its environs has utilized the resources of these wetlands as a livelihood source for a long time. The water of the lake is used for bathing, recreation, domestic use, habitat for different wild lives. The fishery of the lake supplies protein and incomes for the local people and beyond. The wetland yields grasses and other vegetation on which cattle graze, boats constructed ('*tankua*'), mattresses, mats and agricultural implements created and houses built. The Lake also supports different species of birds and fish some of which are believed to be endemic and commercially important. Cheleleka wetland, found at the eastern part of the lake, is the major water sources that drain into the lake through *tikur wuha river*.

Nowadays, this wetland and the Lake at large have faced with serious ecological problems due to deleterious anthropogenic activities in the catchment. Clearing of forest, new human settlement and eucalyptus tree expansion, building of factories that emit toxic materials and use of fertilizers, herbicides and pesticides all contribute towards the damage of these indispensable but fragile systems.

This socioeconomic study attempts to assess the past and present status of the wetland and its future prospects, how human interventions affected the wetland, thereby propose a working action plan to safeguard the lake from the hazardous it faced. "Although the effects of pollution on wetlands are not noticeable at the moment, the long term effects are inevitable unless mitigation measures are taken as early as possible" [5].

If the present trend of impacts on human, especially those related to the industrial effluents and domestic sewerage as well as the agricultural activities and deforestation in the catchment continue, the lake will unquestionably go through eutrophication that will eventually lead to irreversible pollution and permanent loss of suitable habitats and the biodiversity (ibid).

## **1.2. Problem Statement**

Wetlands have considerable socio-economic and ecological values which include supporting crop production, fishing and sources of medical plants among others. Ecologically, wetlands are instrumental in water storage, filtration and supply, flood control; perform sediment, nutrient and toxins retention functions and habitats for biodiversity of both flora and fauna. Despite all these functions and services, wetland ecosystems face serious ecological problems due to adverse anthropogenic activities in the catchments. These include, among others, clearing forests, building of industries and use of agro-chemical and fertilizers which contribute towards the damage of these indispensable but fragile wetland systems. 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 [1].

Wetlands and their values remain little understood and their loss is increasingly becoming an environmental calamity. While rates of wetland loss are documented for the developed world, the limited study of these ecosystems in the developing countries like Ethiopia leaves us with little to say [6]. In Ethiopia, there is no or little study has been done as to how socio-economic factors hinder and /or promote wetland resources in general and the resources of Cheleleka wetland in particular.

## **1.3. Objectives of the study**

The overall objective of this study is to assess the opportunities, challenges, and future prospects of Cheleleka wetland and its environs.

The specific objectives of the study are to:

- State the major functions of the wetland;
- Depict the formal and informal institutions existing in the wetland;
- Uncover the livelihood activities among the people in the wet land;
- Reveal the socioeconomic problems encountered in the wetland; and
- Discuss the future prospects of the wetland.

## **1.4. Significances of the study**

This research is expected to play substantial roles in providing insights into the current status and future prospects of Cheleleka wetland and Lake Hawassa. The study provides holistic perspective on the management and use of the noted wetland and the lake. It also directs the need to develop framework to conserve and protect natural resource sharing between two or more regional boundaries. Besides, the study would provide substantial information to local level planners and decision makers so that they consider wetland conservation and management while devising development plans / strategies.

On top of this, this study can initiate other wetland studies in different parts of the country. The results of the study could be one source of literature for similar researches and perhaps serves as a spring board for other scholars who would like to conduct further studies on wetlands and related topics.

## **1.5. Methods and materials**

This study mainly relied on qualitative approaches of data collection methods. Purposive sampling was used to draw informants from the general population. Structured observation, in-depth interview and group discussions were used as instrument of data collection. In-depth interviews and FGDs were conducted with residents in and around the wetland, officials of Chaffee Koti Jebessa *Kebele*, ELFORA Mechanised Farm experts, farmers around Shallo Basic Seed Farm, and Bishan Guracha municipality officials. Books, journals, articles, internet were used as secondary data sources to consolidate the information we got through primary data sources.

The data analysis was carried out using qualitative descriptions. The data collected through different instruments noted above are systematically and thematically organized in line with the research questions, and finally the analysis and interpretation was done accordingly.

## II. RESULTS

Wetlands have been playing crucial roles for human survival. Wetlands have economic, social, cultural, and ecological functions. Although wetlands have been grouped among important natural resources, much of the wetland resources have been declining across time and space.

### 2.1. Functions of the wetland

Cheleleka wetland is found at the eastern part of the lake Hawassa. It is the major water sources that drain into the lake through *Tikur wuha river*. The community of Hawassa and its environs has been utilizing the resources of this wetland as a livelihood source since long. The Wetland serves as a source of food, controls flood and improves water quality. It is an important to biodiversity and wildlife conservation. The wetland yields grasses and other vegetation on which cattle may be grazed, local boats constructed, mattresses, mats and agricultural implements created and houses built, among others some to mention.

Different writers listed out the multifaceted functions of the wetlands of Lake Hawassa. Among these [7] in his study on the *challenges and opportunities of Ethiopian wetlands* illustrated the following major functions of the wetlands as follows:

The water is used by local people for irrigation, sanitation and as drinking water for domestic animals; much of the runoff from Lake Hawassa's catchment area drains first into the swamp and then gradually flows to the lake via the *Tikur Wuha*. Thus, the system plays a vital role in controlling flooding, particularly that originating from the Wondo Genet highland areas; diverse species of water fowl, weed bed fauna, zooplankton, phytoplankton, fungi, bacteria, amphibians, reptiles and macrophytes inhabit the wetland. This makes it an important regional biodiversity domain; the wetland's grasses is used by the local people to graze their cattle on and exploit its vegetation for other domestic needs; there was fish species in the wetland (this is not existing nowadays) and it was serving as a good source of protein for the local people; stabilizing the microclimate and serving as a buffer against harmful additions from natural processes and human activities in the catchment.

### 2.2. Major socio-economic activities around Cheleleka wetland

Divers and complex socio-economic activities have been undertaken in and around the wetland. These activities have been found to be progressively depleting resources of the wetland.

#### 2.2.1. Mechanized and small holding agricultures

Major socio-economic activities in and around the wetland in the northern, north western and north eastern part are mechanized and small holding agricultures and quarry activities. Agricultural development interventions which had been started since 1950 in the area primarily initiated extensive maize crop production. Following the 1974 Ethiopian Revolution, private agricultural activities had been transferred into state farms. After the collapse of the Derge regime, part of the state farms has been remained under the control of the government. Shallo Basic Seed Farm has been a case in point. Shallo Seed Farm covers 1321 hectare land. Maize, Sunflower, Soya Bean and Haricot Bean are the major improved seed types growing in the farm. The farm multiplies and supplies these high quality improved seed varieties to farmers of the region and the nation at large at fair prices. Chemical fertilizers such as DAP and UREA and different types of pesticides and herbicides are applied in the farm while multiplying seeds. An official from Bishan Guracha town municipality indicated that close to Shallo basic seed farm there are individual small holdings estimated to be about 10 hectares of land. These small holdings also use inorganic agricultural inputs. Similarly, ELFORA Private Farm is located in the north and north east part of the wetland. Deputy Manager of the farm states about the farm as follows:

The total area of ELFORA farm is over 3000ha out of which 2600ha is used for growing different types of crops. Maize, Alpha-alpha grass, and vegetables such as green pepper and tomato have been grown by the farm. The farm uses chemical fertilizers (DAP and UREA), herbicides and insecticides to boost production and productivity. Besides, the farm has provided job opportunities for 400-600 seasonal and 55 permanent employees. The farm allows free access to the local farmers to use the crop aftermath for their livestock feed. However, the farm does not have any mechanism to control agricultural inputs/chemicals from its direct flow to the wetland and thereby to the lake. During the rainy seasons, the flood from this farm easily enters the lake ((Interviewed in April 2017). These intensive farming activities have created pressure on resource degradation of the wetland. Years back, these production activities made large grazing land under cultivation. Through creating employment opportunities for the local people, these again initiated irregular settlements in and around the wetland. Most of the settlers in the wetland are those who are working as seasonal labourer in these State and Private Farms.

Though the amount and types of agro-chemicals used in these farms are not easily determined, undoubtedly leached chemicals from these farms reach the wetland and the lake. This has been the trend since long. Such land use and degradation of the catchment produced continuous decline of the size and functions of the wetland.

### **2.2.2. Deforestation and Farmland expansion**

Smallholding agricultural and deforestation are other prominent activities in the catchments of Cheleleka wetland. These activities have been practiced in the eastern, southern and western part of the wetland where Wondo Genet area has taken much of the land share. Hence, the wetland gets much of its water from Wondo Genet catchment. The catchment had been covered with natural forest. The forest used to increase underground and surface water into the wetland for several years.

However, expansion of farm land coupled with the rise in the demand of its products at the nearby urban centres such as Hawassa and Shashemene are responsible for the continuous decline of the forest cover in the area. These activities, in turn, have affected the quantity and quality of water flows towards the wetland. Regarding this, one of the informants in the area states, 'the amount of the river water that come from Wondo Genet area and enter into the wetland have declined.'

### **2.2.3. Irrigation activities**

Another important activity in the catchment is irrigated agriculture. It has been reported that people in Wondo Genet woreda (particularly in such areas like Edo, Basha, Busa, and Elala) engaged in intensive irrigated agriculture for growing *khat*, sugar cane and vegetables which seriously affected the amount of inflow of water into the wetland. Moreover, during our field work, we have observed that the wetland water is intensively used for irrigating vegetables.

Similarly, in the northern part of the wetland where Tulu spring is located, farmers are growing vegetables. They grow potato, onion, tomato and cabbage. These crops are important sources of income for the new settlers of the area. Farm expansions into the wetland are observable phenomenon. The picture below shows how farmers are encroaching into the wetland for the crop production.



**Figure 1.** Tulu spring is used for irrigating vegetables

Unlike the vegetable production in the northern part of the wetland, the south western part has been irrigated with polluted water coming from factories. Indeed, polluted water could damage plants. Farmers experienced the negative effects of waste on their farms. One of our key informants A farmer commented:

I did not have a problem of growing good quality vegetables, *enset*, and coffee before the coming to these factories here. Over the last three to four years, however, the size of my crop production and the taste of vegetables growing here have changed. The leaves of the cabbage turn whitish, dry and ultimately fall off.

The industrial effluents brought about economic setbacks on my family and for other people here. This must be due to the waste of the factories. It is destroying our life and the life of our livestock (Interviewed at Shire Borera kebele, November 2017).



**Figure 2.** Vegetable production in the encroached part of the wetland and industrial effluent used as source of irrigation water

#### **2.2.4. Irregular settlement and land encroachments**

Another important feature that has been affecting the wetland is irregular settlement. This settlement is targeted to get land access for animal grazing and cultivation of crops during the dry and wet seasons. In the north and north west part of Cheleleka wetland, over 500 housing units have been constructed. Our field observation in December 2017 made clear that so many new huts have been still under construction. According to the information from focus group discussants, the settlers are mainly from Shire Borera and Woransa Kebeles of Wendo Genet Wereda, and from west Arsi zone of Oromia Regional State. Currently, the total human population resided in the area are estimated to be 2500. There are two processes of irregular settlements in the area. These are quasi formal land distribution and informal settlement mechanisms. The quasi formal ones are those settlements directed by the government structures often by kebele (local administration) for the local unemployed youths. As per the interview with a young girl in the study area:

I am single and live here in Shire Borera kebele. I am 26. My origin is Shashemene town. I am graduated with BA degree in Accounting from Shashemene US College. I could not get job after graduation and decided to come here. I have built my dwelling in 2016 and now I am growing cabbage and Selata on my farm plot of 1000m<sup>2</sup> which I got some 5 years ago when Shire Borera kebele had been distributed land for the land less and newly married couples in the kebele. Nowadays land is not being distributed by the Kebele, but still some individuals come from different nearby *Weredas* of west Arsi zone, and from Wondo Genet areas, and thereby irregularly construct huts during the nights and start tilling crop land (Interviewed at Shire Borera kebele, November 2017).



**Figure 3.** Irregular settlement and land encroachment in the North West part of the wetland

The second type of land enrichment is related to long history of dry season grazing activities of agro-pastoral system in and around the wetland. Regarding this one of the key informants states:

Every year, particularly during dry seasons (end of December and early February) so many farmers (500-600), with their livestock, come from Gojelle (Aje *Woreda*), Koffole, Kokosa, Arsi Negelle, Bisan Guracha, Daleti and Wondo Genet and settle temporarily in tents, and return to their origin when the heavy dry season leaves its turn to wet / rainy season. The average number of livestock coming to this area with these newcomers is estimated to be over 2000. These people come to the area primarily in search of water and pasture for their livestock. They feed their cattle the aftermath of maize crop of ELFORA farm and water their cattle on the Cheleleka wetland. However, every year considerable number of people remain permanently in Shire Borera and Woransa *Kebeles* after having clandestine purchase of land (Interview at Shire Borera kebele, January, 2018).

Agro-forestry has been an important socio-economic activity serving as a means and end for irregular settlement surrounding the wetland. Eucalyptus tree has been strategic plant used in encroaching the wetland. People use this tree for drying the wetland and preparing it for crop cultivation. It is because of high water absorbing potential, large tract of land has been incorporated into the farming activities. Similarly, it has served as setting boundary to ensure encroached tract of land as legitimate claim. Besides, eucalyptus tree has been used to generate substantial amount of income for the people through supplying it for construction and domestic energy sources in the nearby rural and urban areas. However, eucalyptus tree negatively affects the wetland ecology by absorbing large amount of water.



**Figure 4.** Encroaching and planting eucalyptus trees

Expansion of Hawassa city also seriously impacted on the wetland size. Most people have strong belief that the wetland is a natural resource open access for housing and farming activities, though the *Kebele* administrations have some control over the land. Regarding the issue an official of Chaffee Koti Jebessa *Kebele* Administration explains:

The kebele in collaboration with Tula Sub-city and police force made a survey around the wetland. We found large number of individuals involved in the irregular settlement and land encroachments. Hence, we have recently accused about 400 persons who have involved in irregular house construction and farming activities in and around the wetland. Besides, the Kebele detained individuals who were caught red-handed while they were carrying out or transporting eucalyptus wood into the middle of wetland for house construction (Interview with Chaffee koti Jabessa kebele chairperson, January, 2018). It was also evident during our field visits that the wetland has been under encroachment from the periphery as well as in the middle for housing construction and farming activities.

### 2.2.5. Emergence of social institutions

Institutions governing human relations can be categorized as formal and informal ones. The formal ones are those institutions which govern people interactions on the bases of written rules and regulations. On the other hand informal institutions run relations through implicit ways. In and around the Cheleleka wetland, both the formal and informal institutions are working concurrently, though the formal relations are dominating the informal ones.

Road construction has been crucial social and economic institution for connecting peoples in different localities. At the upstream northwest and northeast of the wetland a new road is paved. The road joins the new settlements with Hawassa-Shashemene asphalted highway. Cars, donkey carts and motor cycles are transporting goods and facilitating service provisions into and from the local settlers. Road accesses have strong power in transforming temporary settlements into permanent ones. Tutu spring is one of water sources coming out of the foot of a big mountain in the northern part of the wetland. The spring has been built and developed to provide drinking water for human and domestic animals, and washing cloth for the community living in the area. Some people also come to fetch the spring water from such distant areas as Toga village. At close proximity to Tulu spring, we find newly established elementary school, mosque and protestant church. In addition, the lowest government structures (*Kebeles*) of the Oromia and SSNPR States are in place. They administer the people and the land in and around the wetland.

### 2.2.6. Industrial Effluent

The south western part of the wetland has been a direct contact with discharges from factories operating in the area. These industries have been releasing effluent since their establishment in 1980s.

During our field observations we have come to see the industrial effluent flowing into the wetland. Although several industries such as beverage, soap, textile, plastic, meat processing and many others are operating in the area, it was evident that the brewery factory, has prominently discharged its waste. The nature and amount of waste discharged are not adequately studied. Its impacts could be many. One of our informants at of Chaffee Koti Jebessa *Kebele* who lives close to the waste drainage structure states:

The industrial effluents coming from Brewery and Hawassa Textile Factory have caused several health and economic problems on humans and animals. We have a direct contact with the waste. We have been suffering from skin irritation and respiratory diseases due to direct contact and pungent smell. Children are affected by the waste, which smells alcohol, while they often use it for swimming during the rainy season. Animals have been contaminated and drink when they cross the industrial effluent to grazing field. The waste causes fetal abortion, reduces milk production, discolors milk and emaciates animals. Occasionally, it leads to the death of animals (Interview, Dec., 2017).

During field visits we have confirmed that the industrial waste has been used for different purposes. Domestic animals have been drinking it when they cross the waste drainage. Moreover, people use the waste for domestic and vegetable productions. Children who fetch the waste water (for the construction of mud houses) are direct victims. The following figures show how the industrial wastes predispose human and animals for possible health effects.



**Figure 5.** Children after swimming, fetching the waste water for domestic use, and industrial effluent drunk by livestock

### 2.3. Socio-economic activities in the wetland

Cheleleka wetland has long been an important dry season grazing area for agro-pastoral systems of the Oromo and Sidama peoples. One of our key informants at Biru Edo village describes the processes of settlement in and around the wetland as follows:

Several peoples came with their animals from Shebedino, Boricha, Melete, Gorche, Wegigra, Wondo-Genet, Tula, Korke, Melga, Dato, Dore-Bafana, Shamana Kedida, Jara damoa, Yanase, Rukesa, Guguma and other rural areas during the dry season of the year. These Woredas are drought prone areas. They used to settle in and around the wetland during the Imperial and Derge regimes temporarily. Biru Edo and Honse villages had been temporary small settlements during the Imperial period. At Biru Edo village the number of housing units during the imperial regime were estimated to be about 40; this number raised to 100-140 during the Derg regime. Nowadays, in this settlement, the number of residential units would be about 1,000-1,500 huts. It has been also estimated that human and animal populations count to be about 5,000-7,500 and 8,000-10,000 respectively. Likewise, the number of dwelling units (huts) in Honse village has risen to 3,000. The total human population in this village is estimated to be about 12-15,000.

Most men used to return to their original places during rainy seasons to engage in crop farming while leaving elders, women, children and some important animals in temporary established huts. However, these short-term settlements had been gradually changed into permanent ones (Interview, Dec., 2017)

Biru Edo and Honse villages are part of Chaffee Kote Jebessa Kebele administration, Tula sub-city. Biru Edo village is also located at about 1 km south of Elffora farm. Honse village is also found about 2-2.5km South of Biru Edo village. The amount of the wetland has not been only reduced from the periphery, but it has also been declined at the middle. The figures below indicate the nature of increasing permanent settlements.



**Figure 6.** Biru Edo and Honse villages' partial view

Animal husbandry, sells of livestock products and grass are among the major economic activities among the villages of the wetland. People living in the wetland make their living primarily from animal husbandry. People rear different types of animals such as cattle, sheep, goats, donkey, horse and mules. By selling animals, milk and milk products in Hawassa and Shashemene markets, people buy crops and other basic necessities. There has been a local institution which has been governing access and control of wetland resources. A key informant at Biru Edo village mentions the roles of local institution as *Tedda* (elders *Shengo*). Local intuition named as *Tedda* (elders *Shengo*). This institution serves to settle dispute arising among settlers in the wetland, oversees/ prohibits any crop cultivation activities in the wetland, and governs mutual aid principles during house construction and death of animals. However, this local institution has been declining from time to time to control social relations in and around the wetland.

In addition, settlers supplement their livelihood by working as daily labourer at Elfora farm and Hawassa industrial park. Apart from other socio-economic pressures around the wetland, overgrazing is also another important problem that need serious concern.

Since, animal husbandry is the dominant source of their subsistence; local institutions manage and use resources in the wetland. Moreover, protestant and Hawariat churches are there to provide religious services for Biru Edo and Honse villagers. However, villagers are getting health and education services outside of the wetland at the Chaffee Kotie Jebessa Kebele. Besides, there are some mutual arrangements among the peoples living in the wetland and outside of it. Some individuals from Wendo Genet and Hawassa towns purchase livestock and give to villagers to keep them for fattening and reproduction in the wetland thereby to share the benefit.



Figure 7. Overgrazed wetland by different animal species

### III. DISCUSSION

Wetlands have been grouped among many natural resources. They have been playing important socio-economic and socio-political functions. However, much of the wetland resources have been declining across time and space. The degradation of such resources has been substantially explained by political ecology than other theoretical perspectives. Political ecology is a theory that links the environmental degradation with political, economic and social factors. It has been indicated the relevance of political ecology approach in studying natural resources related issues as, "... a political ecology focus on land degradation, resource use or resource conflict are proof of the fact that political ecology thinking provides the necessary tools for thorough, differentiated and comprehensive research." [8]. In light of this theoretical perspective, Cheleleka wetland has been the most contested natural resource by different actors. The political, economic and social factors are predominantly influencing the wetland resource changes and the fate of Hawassa lake.

Cheleleka wetland had primarily been the dry season grazing (shock absorbing) area for the agro-pastoral peoples of Oromia and SNNP regional States. They wisely used and managed natural resources depending on seasonal variations for several decades. Through time the peoples in these areas gradually shifted from agro-pastoral ways of life to crop producers. Since 1950s when agricultural development interventions introduced in the area, large tract of grassland had been incorporated into crop production [9]. Political, economic and social changes in the country affected the wetland natural resource use and management. Regime changes in the country caused natural resource degradations in the Hawassa lake watershed where Cheleleka wetland is a part [10].

The findings of this study also indicate that the wetland degradation has been aggravated after the collapse of Derge regime. A change in a regime weakens politic-legal mechanisms to enforce laws to protecting natural resources. Later, during the EPRDF period, where government administrative structure is led by ethnic federalism, conserving and protecting natural recourses in these two regional states have become difficult. It is evident that land encroachments into the wetland using different quasi-legal and illegal mechanisms to expand farm land and irregular settlements have persistently been increased in the area under discussion.

The stable local institutions which have been focussing on the use and management of natural resources of the wetland have been undermined by continually changing government structures that lack accountability and responsibility over natural resource administration in the area. This creates resource competition and open access for the people living in and around the wetland.

Moreover, the findings of this study show that demographic pressures through population growth, urbanisation and industrialization coupled with lack of policy on the administration of natural resources located between or among regional boundaries set conducive conditions to unlimited exploitation of the wetland. The local people consider the wetland as a 'free land' that could have been distributed to anyone when need arises.

On top of these, industrial effluents are found to be serious human and animal health problems in the study area. This finding is related to study by [5] which points the problems of pollutants on people and animals. The findings suggest that till now no interventions has been in place to mitigate the problems of industrial wastes. The economic losses associated with the decline in the dry season grazing area, and the factory contaminants have become the tragedies of the peoples living in and around the wetland.

#### **IV. CONCLUSION**

Cheleleka wetland has been significantly undergoing changes. The wetland has been losing its size and functions in the past three decades. Studying socio-economic activities in and around the wetland becomes central to suggest sustainable wetland conservation measures and bring about lasting positive impacts on the functions of Lake Hawassa. Findings point out restoring mechanisms for policy makers and planners to attain ecologically sustainable development in the area.

The breadth and depth of the problems of the wetland require further study to enact comprehensive policy interventions to conserve and restore the indispensable functions of wetlands and the lake ecosystems

#### **V. RECOMMENDATIONS**

Cheleleka wetland is an important natural resource sharing a boundary between Oromia and SNNP regional States. The efforts for conserving and restoring the wetland require the commitment and dedication of the leadership of two regions. To curb the problems, interventions would like to target:

- delineations of boundaries around the wetland, and create buffer-zone to prevent land encroachments resulting the decline of the size and function of the wetland and thereby the Hawassa lake;
- producing synergy by creating working environment between local institutions and local government administrations to mitigate land encroachments; initiate social corporate responsibilities among industrialists and other stakeholders to treat industrial solid and liquid wastes;
- devise alternative peoples' livelihood and introduce renewable energy sources to overcome deforestation on the Hawassa lake watershed;
- enact a policy over the use and management of natural resources shared by two or more regional states; and
- Although this study uses qualitative data collection methods to explore the socio-economic dynamics that have been causing Cheleleka wetland resource degradation, there is a need to quantify important socio-economic factors to understand the intensity and magnitude of resource degradation in and around Cheleleka wetland.

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