



**MADDAWALABU UNIVERSITY, COLLEGE OF NATURAL  
AND COMPUTATIONAL SCIENCE, DEPARTMENT OF  
ENVIRONMENTAL SCIENCE**

**IMPACT OF LAND USE CHANGE AND COMMUNITY  
PERCEPTION ON WETLANDS IN KORE DISTRICT,  
ETHIOPIA**

***MSC THESIS***

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**ROBE, ETHIOPIA**

**IMPACT OF LAND USE CHANGE AND COMMUNITY  
PERCEPTION ON WETLANDS IN KORE DISTRICT,  
ETHIOPIA**

***By: MOHAMMED BONIE***

***A Thesis Submitted to Madda Walabu University College of Natural and  
computational science, Department of Environmental science. In Partial  
Fulfillment of the Requirements for Master Degree in Environmental science***

**ADVISOR: DEJENE WORKU (ASSISTANT PROF)**

**February, 2026**

**Robe, Ethiopia**

## DECLARATION

I hereby declare that the work which is being presented in this thesis entitled “Effect of land use change and community perception on wetlands in kore district” is my Original Work has not been submitted elsewhere for publication or funding in other Universities and all the resource of materials used for the thesis have been duly acknowledged.

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This is to certify that the thesis entitled “Effect of land use change and community perception on wetlands in kore district” submitted in partial fulfillment of the requirements for the degree of **Masters of Science** in Environmental Science with specialization in Environmental Resource Management to the Graduate Program of the Department of Environmental Science, and has been carried out by **Mohammed Bonie**, ID. No. \_\_\_\_\_ Under My supervision. Therefore, I recommend that the student has fulfilled the requirements and hence hereby can submit the thesis to the department.

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## **List of Abbreviation**

*CSA*: Central Statistical Authority

*CS*: Coefficient of sensitivity

*DEM*: Digital elevation model

*ESV*: Ecosystem service values

*EWNHS*: Ethiopian Wildlife and Natural History Society

*LULC*: Land-use/land-cover

*MEA*: Millennium ecosystem assessment

*TEEB*: The economics of ecosystems and biodiversity

*PES*: Payment for ecosystem services

*IES*: Incentives for ecosystem services

## ABSTRACT

*Wetlands are crucial ecosystems, which offer indispensable ecological, economic, and social benefits even if they are increasingly affected by alterations in land use and insufficient community involvement. This research investigates the effects of land use change and community perceptions on wetlands within the Kore district of Ethiopia. A mixed approach was used by combining quantitative data from 384 household surveys with qualitative insights from focus group discussions and field observations in two purposively selected kebeles. The result shows as, 77.6% of respondents expressed their concerns regarding the conditions of wetlands, and 62.8% perceived insufficient community's action in their preservation. Active involvement in wetland conservation efforts was reported by only 20.3% of the households. Furthermore, half of the respondents (49%) indicated a reduction in their landholdings over the preceding decade and a half, thereby intensifying the pressure on wetlands for agricultural and grazing purposes. A significant majority (82%) agreed that expanding cultivation was necessary for family needs, and 73% indicated lack of resources as a barrier to sustainable management. External factors such as weak enforcement of regulations (78%), climate change (73%) and rising demand for agricultural products (62%) were also identified as major drivers of wetland degradations. Community perceptions highlight the importance of wetlands for household resources (88%) and recognize the negative impacts of wetland loss on livelihoods (75%). The study recommends increasing education and awareness campaigns, integrating traditional knowledge into management, and enhancing community participation in decision making.*

**Keywords:** Wetlands, Land Use Change, Community Perception, Conservation, Kore District, Ethiopia

# **1. INTRODUCTION**

## **1.1. Background of the Study**

Wetlands are often seen as having minimal or no value in comparison to other land uses that can generate immediate economic advantages. However, wetlands, which make up merely 1.5% of the Earth's surface, provide nearly two-fifths (40%) of the global ecosystem services (Zedler&Kercher, 2005).

Wetlands are active ecosystems that can vanish, resurface, and regenerate, as they exist in a constant state of temporal and spatial changes (Tekalegn, 2003; Businge, 2012). This dynamic characteristic complicated the definition of wetlands, resulting in diverse interpretations among scientists regarding what defines wetlands (Yilma, 2003; IWMI, 2014).

Worldwide, there is significant ambiguity regarding the quantity and scope of wetlands. Nonetheless, estimates indicate that wetlands cover approximately 6% of the planet's surface (NBI, 2013). Wetlands represent the most productive ecosystems globally, and their contribution to ecosystem services significantly surpasses that of terrestrial ecosystems (Ramsar Convention on Wetlands, 2018). They are acknowledged for their contribution to socio-economic progress by assisting in crop farming, fish collection, forest resource utilization, dry season livestock grazing, and tourism or leisure activities. In the Nile Basin, wetlands serve as a source of income and food for a significant portion of the population, reaching up to 70-80% (NBI, 2013). Wetlands provide (fresh) water for domestic, irrigation, and industrial purposes; fuel wood, household furniture production; medicinal plants, and materials for construction (Tekalegn, 2009; Khan, 2011; IWMI, 2014).

In spite of their numerous services and benefits, wetlands have been regarded as 'wastelands,' lacking value in the eyes of many groups. This perspective has adversely affected the effective management of wetlands, resulting in overuse and transformation that causes degradation and loss (Ajibola, 2012a; Amsalu&Addisu, 2014).

Scientific assessments indicate that during the 20th and early 21st centuries, there has been a significantly accelerated rate of loss with a 64 to 71% reduction in the global coverage of natural

wetlands since 1900, contributing to an estimated annual loss of US\$ 20 trillion in ecosystem services (Davidson, 2014; Gardner et al., 2015).

The Kore district in Ethiopia is experiencing an increasing issue with the degradation of wetlands. Although the diminishing condition, rivalry over wetland resources is escalating among various sectors—primarily agriculture and domestic water consumption (Hengsdijk et al., 2010; NBI, 2013; Elias et al., 2019). If the current trend of wetland degradation is not halted, it may significantly impact the sustainability of these ecosystems. Consequently, a comprehensive response to wetland degradation is crucial to comprehend the current wetland management system, as this is vital for sustainability. Considering this, the current study aimed to evaluate the impacts of land use change and community perceptions on wetlands in the Kore district of Ethiopia. This will offer empirically backed data that can guide possible and practical actions to address the ongoing degradation of wetlands to preserve their ecosystem services

## **1.2. Statements of the Problem**

Since the Ramsar convention of 1971, the topic of wetlands has been central to discussions. However, numerous individuals overlooked the fact that wetlands globally have been supplying various goods and services to diverse users and are at risk (Schuyt, 2005). Many individuals believe that wetlands are a shared resource to utilize and plentiful, allowing anyone to access them. However, many individuals have not noticed that wetlands are either being drained or disappearing and require effective management. Research indicates that half of the planet's wetlands have vanished in the last hundred years, a result of inadequate human understanding of wetland ecosystem degradation (Smith et al., 2013).

Wetlands are valuable ecosystems providing a wide range of ecological, economic, and social benefits (Costanza et al., 1997; MEA, 2005; Davidson, 2014). Wetlands in Ethiopia, covering an estimated 13,700 km<sup>2</sup>, are undergoing degradation that threaten the country's ecological stability (EPA, 2003; Eisenhauser et al., 2011). Despite their value, approximately 250 billion USD is lost globally each year due to wetland degradation and in Ethiopia specific sites like Rift valley, lake Tana have seen surface area reductions over 20-30% in recent decades due to human encroachment (Wondie, 2018; Junk et al., 2013). The Regions with high population density experience 50% decline in local water holding capacity and loss of endemic biodiversity,

creating a critical environmental crisis that undermines the life of millions who depend on wetland ecosystem for water and food (Tessema et al, 2013, Dixon, 2021). Most of the research conducted on national level land use changes and the valuation of ecosystems focusing on addressing the challenges (Kindu et al., 2016; Gashaw et al., 2018). Studies in Blue Nile basin and the Ethiopian Rift Valley have successfully mapped long term vegetation loss and identified rapid urbanization as primary driver of wetland shrinkage (Teferi et al., 2020; Tolosa et al., 2017).

However, a significant gap remains in the geographic and thematic focus of current literature.

Even though, some of the basins like Lake Tana and Awash are well documented critical areas like Kore wetlands remain overlooked. This wetland face unique, localized pressures due to highly intensified agriculture, infrastructure development which lacks macro level studies (Assefa et al., 2020). Meanwhile, most of the research groups wetlands with the forests or with total landscapes ( Admasu et al., 2022; Haregeweyn et al., 2022).

That is why this study wants to minimize these gaps by doing localized assessments on land use impacts and community perceptions at local level. This research will provide deep insights on local practices and perceptions existing in and around Kore district wetland so as to generate site specific evidence.

### **1.3. Objectives of the Study**

#### **1.3.1. General Objective**

The Main objective of this research is to assess the effects of land use change and perception of community on wetlands in Kore district.

#### **1.3.2. Specific objective**

The specific objectives of the study are

- To assess the Impact of land use change on wetland in Kore District.
- To identify external and internal factors of land use change on wetlands.
- To assess the level of community's perception on wetland conservation.

#### **1.4. Research questions**

- What is the impact of land use change on wetlands in Kore District?
- What are the external and internal factors of land use change on wetlands?
- What are the local community's perceptions of the ecological importance of wetlands in their area?

#### **1.5. Significance of the Study**

This study will have the following contributions; it may assist the government and non-governmental institution to know their weaknesses and strengths on practical conservation and management of wetland and examine ecological and social dimensions of wetland change so as to improve wetland management.

It may help the Environmental protection office to know who, how, why, when and where to tackle wetland degradation. It also, helps community on the ways of handling and using wetland in proper manner. This study may help as a springboard for other researchers who want to conduct further research in the area of wetland so as to sustain safe community needs.

#### **1.6. Scope of the Study**

In scientific terms, the study was focused on determining the effects of land use change and community perception on wetland in Kore district. In spatial terms, the study focused on Kore district of Ethiopia. This area is purposively chosen because of its fragility and sensitivity of wetland and it is one of the sub counties which was so much affected by wetland degradation and is also easily accessible. In temporal terms, the study was assessed current effects of wetland and perceptions of community on wetland.

#### **1.7. Organization of the study**

The paper contains the following sections: chapter one introduction that contains background of the study, statement of the problem, objectives of the study, significance of the study and the scope of the study. Chapter two presents literature review on the effects of land use change and community perception on wetlands. Chapter three deal with the materials and methodology,

chapter four analysis Result and discussion data and chapter five has conclusion and recommendation in accordance with investigation.

## **2. REVIEW OF RELATED LITERATURE**

### **2.1. Overview of wetlands**

Wetlands consist of marshes, fens, peatlands, and shallow aquatic environments (International Water Management).Institute (IWMI) 2014), recognized for its significant role in managing both the volume andcondition of water resources (Dugan 1990). Humans rely on the provisioning, regulating,assisting, along with cultural ecosystem advantages offered by wetlands (Finlayson, D'Cruz, andDavidson (2005), particularly minor wetlands within farming areas (Blackwell and Pilgrims).

2011). This is why wetlands are considered systems with multiple benefits for humans.(Mitsch and Gosslink 2000).However, in recent decades, wetlands have suffered degradation, resulting in the loss of ecosystem services.It has declined due to the transformation of wetlands for urban and agricultural purposes, along withpolluted by industrial, urban, and agricultural contaminants (Ricaurte et al. 2013). Especially, innumerous tropical nations, the transition to agricultural intensification focused on wetlands due to their elevatedcrop yield and irrigation for adjacent upslope agricultural land (Bagalwa 2005).

As a result, the area covered by wetlands has decreased by as much as 50% since the 1950s intropical areas (Junk 2002) and subtropical nations (Zedler and Kercher 2005). The swift declineand the deterioration of wetlands jeopardizes human health by causing a reduction in biodiversity, as well as thedecline in goods and services offered by these ecosystems (MEA 2005). Numerous efforts have beencreated to rehabilitate damaged wetlands by depending on knowledge of ecosystem functions (Cottet,Piégay, et Gudrun 2013).

. It is now well recog- nized that social criteria should also be defined for ecosystem preservation and restoration, where understanding the perceptions of local people and their opinions about ecological value is a critical part of the development of sustainable management plans and biodiversity conservation (Higgs 1997; Vining, Tyler, and Kweon 2000; Miller and Hobbs 2007).

## **2.2. Importance of Wetlands**

The advantages offered by wetlands today assist millions of individuals in various ways. Particularly in nations such as Ethiopia, where agriculture is crucial to the economy, wetlands appear to be primary sources of livelihood (FAO, 2008). Clearly, the social, cultural, and economic advantages, combined with substantial ecological benefits, can benefit both the community and the environment if existing mismanagement practices are corrected sustainably. Although wetlands provide invaluable benefits, their destruction worldwide is frequently prevalent and primarily results from land reclamation and drainage driven by high human population density (Junk et al., 2013). Wetland ecosystems in Ethiopia are also facing significant threats (Yilma and Kim, 2003; EWNRA, 2005; Tessema et al., 2013).

Wetlands offer various benefits for local communities living nearby, but they are increasingly being harmed by human-related activities. The actions taken for conservation determine the sustainability of the benefits produced by wetlands. Moreover, the community's attitude toward wetland resources impacts the efforts made by the community in conserving wetlands. Insufficient awareness of the significance of wetlands and their preservation may affect the perspectives of local communities regarding wetland conservation. Nonetheless, the advantages provided by wetlands and the perspectives of local communities regarding wetland preservation in southwestern Ethiopia have not been thoroughly examined. This research sought to determine the advantages of wetlands and evaluate the perspectives of local communities regarding the conservation of wetlands in southwestern Ethiopia

## **2.3. Land-use and land-cover changes**

Per the International Geosphere-Biosphere Program and the International Human Dimensions Program (IGBP-IHDP, 1999), land cover signifies the physical and biophysical material that blankets the earth's surface, encompassing the distribution of vegetation, water, bare soil, and human-made structures. Land use pertains to the planned utilization or management of land cover types by humans, including activities like agriculture, forestry, and construction. Land use and land cover change (LUCC) is typically classified into two main categories: conversion and modification (Meyer and Turner, 1994).

Conversion denotes a shift from one type of cover or usage category to another (e.g. from forest to grassland). Modification, conversely, signifies a transformation within a single land use or land cover category (e.g. from rainfed cultivated zone to irrigated cultivated zone) as a result of alterations in its physical or functional characteristics. The alterations in land use and land cover systems significantly affect the environment due to their effects on water and soil, biodiversity, and microclimate (Lambin et al., 2003). Changes in land cover have been affected by the rise and fall of a specific population (Lambin et al., 2003). In many developing nations such as Ethiopia, population increase has been a primary factor driving changes in land use and land cover compared to other influences (Sage, 1994). A notable statistical relationship exists between population increase and land cover change in many countries across Africa, Asia, and Latin America (Meyer and Turner, 1994). The rising needs for food production are causing agricultural areas to grow, leading to the loss of natural vegetation and grasslands (Lambin et al., 2003).

Land use and land cover attributes have numerous links to the hydrological cycle. Land use and land cover types can influence the amount of infiltration and runoff resulting from precipitation events (Houghton, 1995). The types of land cover significantly influence both surface runoff and groundwater flow (Abebe, 2005). Surface runoff and groundwater movement are the two elements of streamflow. Surface runoff primarily results from rainfall, while groundwater flow comes from water that has infiltrated the soil. Nevertheless, during the rainy months, the primary source of stream flow is mainly surface runoff, while in the dry months, the flow comes from groundwater. Expansion of agricultural land and reduction of forests leads to higher stream flow due to the moisture needs of crop soils.

Crops require less soil moisture than forests; thus, rainfall addresses the soil moisture deficit in agricultural areas quicker than in forests, leading to increased runoff when agricultural land is extensive. Thus, this results in an elevated stream flow. Moreover, deforestation affects hydrological processes, resulting in reduced rainfall and quicker runoff following precipitation (Legesse et al, 2003). Consequently, alterations in land use and land cover could influence stream flow in both wet and dry periods, as well as affect stream flow components (surface runoff and groundwater flow), and evaluating these effects is central to this research. In general, understanding how changes in land use and land cover affect natural resources such as water resources relies on knowledge of historical land use practices, existing land use and land cover

patterns, and forecasts of future land use and land cover influenced by factors like population size and distribution, economic growth, technology, and others.

Evaluating changes in land use and land cover is a crucial phase in developing sustainable land management strategies that can aid in reducing agro-biodiversity declines, especially in developing countries like Ethiopia (Hadgu, 2008).

## 2.2. Land Use and Land Cover Change Studies in Ethiopia

In Ethiopia, the land is used to grow crops, trees, animals for food, as building sites for houses and roads, or for recreational purposes. Most of the land in the country is being used by smallholders who farm for subsistence. With the rapid population growth and in the absence of agricultural intensification, smallholders require more land to grow crops and earn a living; it results in deforestation and land use conversions from other types of land cover to cropland.

The researches that have been conducted in different parts of Ethiopia have shown that there were considerable land use and land cover changes in the country. Most of these studies indicated that croplands have expanded at the expense of natural vegetation including forests and shrublands; for example Belay, (2002); Bewket, (2003); Kidanu, (2004); Abebe, (2005) in northern part of Ethiopia, Zeleke and Hurni, (2001) in north western part of Ethiopia, Kassa, (2003) in north eastern part of Ethiopia; and Denboba, (2005) in south western part of Ethiopia. Kassa (2003) in his study, in southern Wello, reported the decline of natural forests and grazing lands due to conversions to croplands.

Bewket (2003) have reported an increase in wood lots (eucalyptus tree plantations) and cultivated land at the expense of grazing land in both Chemoga watershed in north-western Ethiopia, and Sebat-bet Gurage land in south-central Ethiopian. The changes of land use and land cover that occurred from 1971/72 to 2000 in Yerer Mountain and its surrounding results an expansion of cultivated land at the expense of the grasslands (Gebrehiwet, 2004).

Hadgu (2008) identified that decrease of natural vegetation and expansion of agricultural land over a period of 41 years in Tigray, northern part of Ethiopia. He concluded that population pressure was an important driver for expansion and intensification of agricultural land in recent periods. Garedew, (2010) in the semiarid areas of the central Rift Valley of Ethiopia, during the

period 1973-2000 cropland coverage has increased and woodland cover lost. Similarly, Feoli, et al., (2002) also reported the expansion of evergreen vegetation with increase of population.

According to many literatures, population growth has a paramount impact on the environment. For instance, population pressure has been found to have negative effect on Riverine vegetation, scrublands and forests in Kalu district (Tekle and Hedlund, 2000), Riverine trees in Chemoga watershed (Bewket, 2003), and natural forest cover in Dembecha Woreda north-western Ethiopia (Zelege and Hurni, 2001). Similarly, Pender et al., (2001) report that the population growth has significant effect on land degradation, poverty and food insecurity in the northern Ethiopian highlands. However, most of the empirical evidences indicated that land use and land cover changes and socioeconomic dynamics have a strong relationship; as population increases the need for cultivated land, grazing land, fuel wood; settlement areas also increases to meet the growing demand for food and energy, and livestock population. Thus, population pressure, lack of awareness and weak of management are considered as the major causes for the deforestation and degradation of natural resources in Ethiopia.

## **2.4. Factors Influencing Land-Use and Land-Cover Change:**

Changes in land use and cover are affected by multiple factors that function across various spatial and temporal scales, operating not in isolation but within complex networks of relationships specific to particular places and times. Numerous theories from the Natural and Social Sciences, along with recent interdisciplinary research, have been proposed to depict and elucidate changes in land-use and land-cover. Land-use change begins at the level of individual parcels when land managers determine that a shift to a different land-use or land-utilization type is necessary. Collectively, personal land-use choices lead to alterations in land-use/cover at broader spatial scales.

Land managers primarily react to internal and external factors affecting the land-management unit, and their choices are shaped by their individual characteristics and local environmental contexts, along with the immediate and wider environmental, socio-economic, institutional, and political frameworks surrounding the land unit. A primary differentiation, therefore, arises between factors relevant to the individual land parcel level (the micro-level) and those applicable to broader spatial or organizational levels (the macro-level). At both micro and macro levels, the elements affecting land-use and land-cover change are generally categorized into biophysical and societal, based on their source.

## **2.5. Impacts of LULC Changes on the individual Ecosystem Service Value**

Alterations in LULC have led to a persistent decrease in nearly all specific ecosystem services throughout the research periods. This decrease is primarily attributed to the decrease in wetland areas, which consequently causes the loss of essential ecosystem services related to water management, waste processing, and habitats necessary for biodiversity conservation. Numerous studies have validated the negative impact of land use and land cover changes on various ecosystem services. For example, a reduction in vegetation cover (forests, woodlands/shrubs/bushlands) has resulted in the decrease of numerous individual ecosystem service values in various areas of Ethiopia (Kindu et al. 2016; Tolessa et al. 2017; Gashaw et al. 2018; WoldeYohannes et al. 2020).

The successful implementation of PES would occur if the intervention areas are determined using ecosystem-based spatial planning and strategic environmental assessment (Dhyani et al.

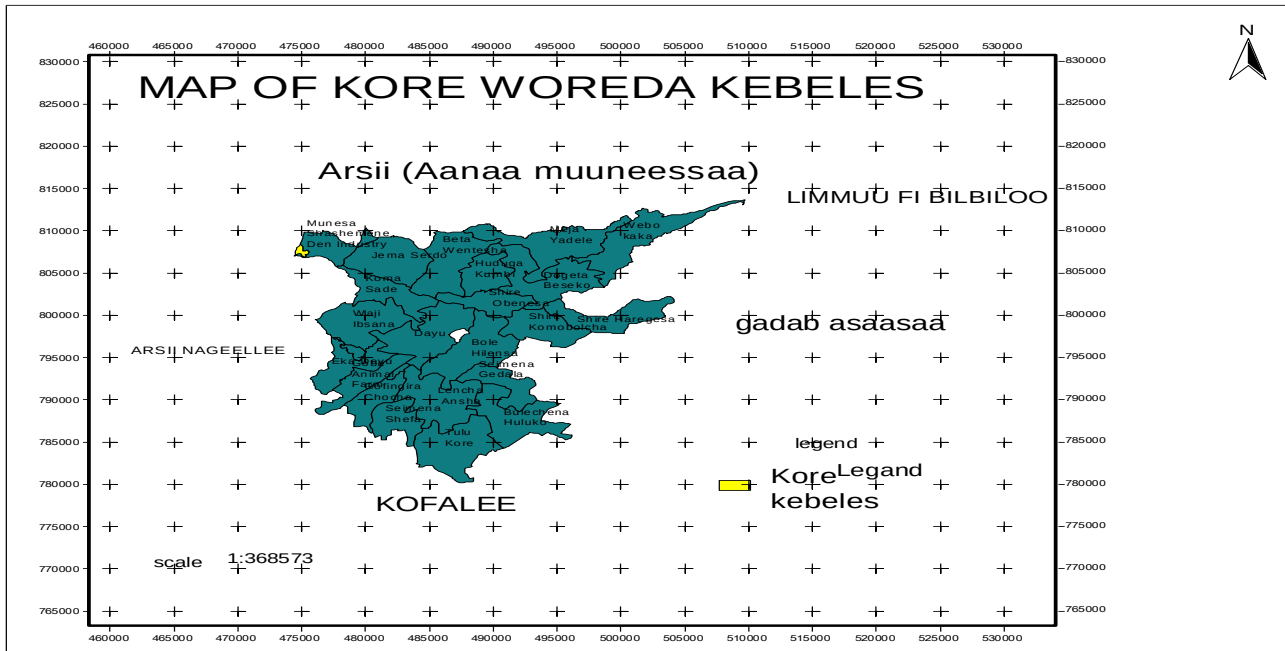
2018; Ferreira et al. 2019). Moreover, establishing green infrastructure in urban and peri-urban zones, rehabilitating degraded wetlands with indigenous plants, and fostering environmental education could support the sustainability of ecosystem service flows (Ethiopian Wildlife and Natural History Society (EWNHS) 2018; Douglas 2018; du Toit et al. 2018)

### **3. METHODOLOGY**

#### **3.1 Description of the study area**

Kore town, was one of the town under the administration of west Arsi zone . it was founded as a district independently with its own administration since 1998 E.C but, prior to the year 1998 the town was union with and named as Kofele district under the same administration. Kore District now a days has 20 rural Kebeles and two manucipality towns with its own structure and administration. Those Rural kebeles are Webos- kaka, DogataBasaku, mejayadale, shire Haragessa, Shire Kombolcha, Shire Obensa, Beta Wontesha, HudugaKumbi, Bole Hilenssa, JemaSerd, WajiIbsana,DodaDeyu, EkaDeyu, GofingiraChocha,LenchaAnsha, Sa'imenaGedala, Tulu Kore, BulchanaHulluko, seimanaShifa and komasadhe. The District is under the administration of West Arsi Zone, with its Capital City Shashemene located at a distance of 47 Km and 300 KM from the Regional Capital Addis Ababa.

Geographically, kore Town was bounded by ArsiNegelle District from the North, GedebHasassa District from the South, MunessaDistictfrom the East and Kofele District from the West. Astronomically, kore District is found in the location  $7^{\circ}12'33''$ - $7^{\circ}07'37''$  Northing and  $38^{\circ}55'14''$ - $38^{\circ}58'05''$  Easting. The total Area of the Woreda is 50,185.084 in hectar or 501.85 in  $\text{km}^2$ . The total population of the District was estimated about 136,736(2009) from this ,Male 67,683 females 69,053 in the year of 2012 total Population are 142,935 out of this of them were male whereas 71,386 of them were female 71,549. Among these Urban population Constitute for about 6011(2009), out of this Male 2,975, female 3036 (2010) total populationof the urban 6,519 out of this Male 3221, female 3,298.The district has its own boundaries and map that shows different natural Resources and socio economic issues and other infrastructure utilized in the area.



### 3.2. Research Design

This study employed a descriptive survey research design to assess the impacts of land use change and community perception on wetlands in Kore District. The descriptive survey method was chosen because it enables the researcher to systematically gather detailed information about the current status, trends, and challenges related to wetlands, as well as the perceptions and participation of the local community.

The study was employed mixed research approach both quantitative and qualitative data collection and analysis. The qualitative data were collected using structured household questionnaires to measure variables like land use change, awareness levels and participation in wetland conservation practices. Quantitative approach was used to generate statistical results for the identification of patterns and relationships among the variables.

To support quantitative data, qualitative data were gathered through focus group discussions and field observations. FGDs were conducted with selected local community leaders, and stakeholders to explore attitudes, traditional practices, challenges and wetland management. On the other side, field observations were done for physical condition of wetlands, visible land use changes and ongoing conservation practices.

### 3.3. Sampling techniques

Kore District is chosen purposely based on the district's recognized challenges related to the effects of land use changes and community perceptions on wetlands. The research was carried out within Kore district, two kebeles (GofingiraChocha and Dayyu) which are also selected purposively due to their significant wetland resources and observable land use change dynamics in addition to their proximity to the wetland and the use of wetland area for various socio economic activities.

The sample size for the study was determined using Yamane's (1967) formula. According to the formula for a 95% confidence level and  $P=0.5$ ,

The size of the sample would be

$$n = N / (1 + N(e^2))$$

Where, N is population size and e is the level of precision.

Let this formula be used for our population, in which  $N= 10,300$ , 5% precision assuming 95% confidence level and  $P=0.5$ , we get the sample size as

$$n = 10,300 / (1 + 10,300(0.05^2)) = 384$$

The sample sizes of household heads of the two purposely selected kebeles were 384. After the sample size determined, the household heads were selected purposively by choosing knowledgeable individuals about wetland issues and directly affected by land use changes. This allows the researcher to focus on well experienced individuals and households so as to increase the quality and relevance of data collected using both structured and unstructured questionnaires.

### 3.5. Sources of Data

The study used both primary and secondary data sources. Most of the primary data was collected from sample respondents selected from each kebele through questionnaires survey to assess effects of land use change and community perceptions on wetland in Kore district. Field observations also used for direct assessment of wetland conditions, land use practices and community activities related to wetland management. Secondary data were collected from

different documentary sources those include official documents and annual reports from district Agricultural and Environmental protection offices and published materials.

### **3.6. Methods of Data Collection**

Methods for collecting both quantitative and qualitative data were utilized. For primary data gathering, utilize structured and unstructured questionnaires, conduct focus group discussions, carry out interviews, and make field observations. The questionnaires consist of closed and open-ended questions to assess land use changes, community perceptions, involvement in wetland conservation, and understanding of wetland values. Unstructured surveys were employed to gather comprehensive qualitative insights from key informants (community leaders, elders, officials).

FGDs were employed to gather opinions, customary practices, difficulties, and recommendations concerning wetland management.

Thus, all data collection instruments were in accordance with fundamental research inquiries and aims of the study. These multi-method approaches were employed to gather comprehensive and trustworthy data that facilitates a thorough analysis of the impacts of land use changes and community perceptions on wetlands in the Kore district.

### **3.7. Data Analysis method**

To analyze the data all the responses were tallied, coded, edited, and prepared for the analysis. Then descriptive statistical tools (frequency, percentages, means were used based on the nature and type of the obtained data. Hence, descriptive data analyses were conducted using excel, Origin software-and Statistical Package for Social Sciences (SPSS) version 20. The qualitative data obtained from key informant interviews are stated in narrative form.

#### 4. RESULT AND DISCUSSION

**Table 1: Socio-Demographic Characteristics of Respondents**

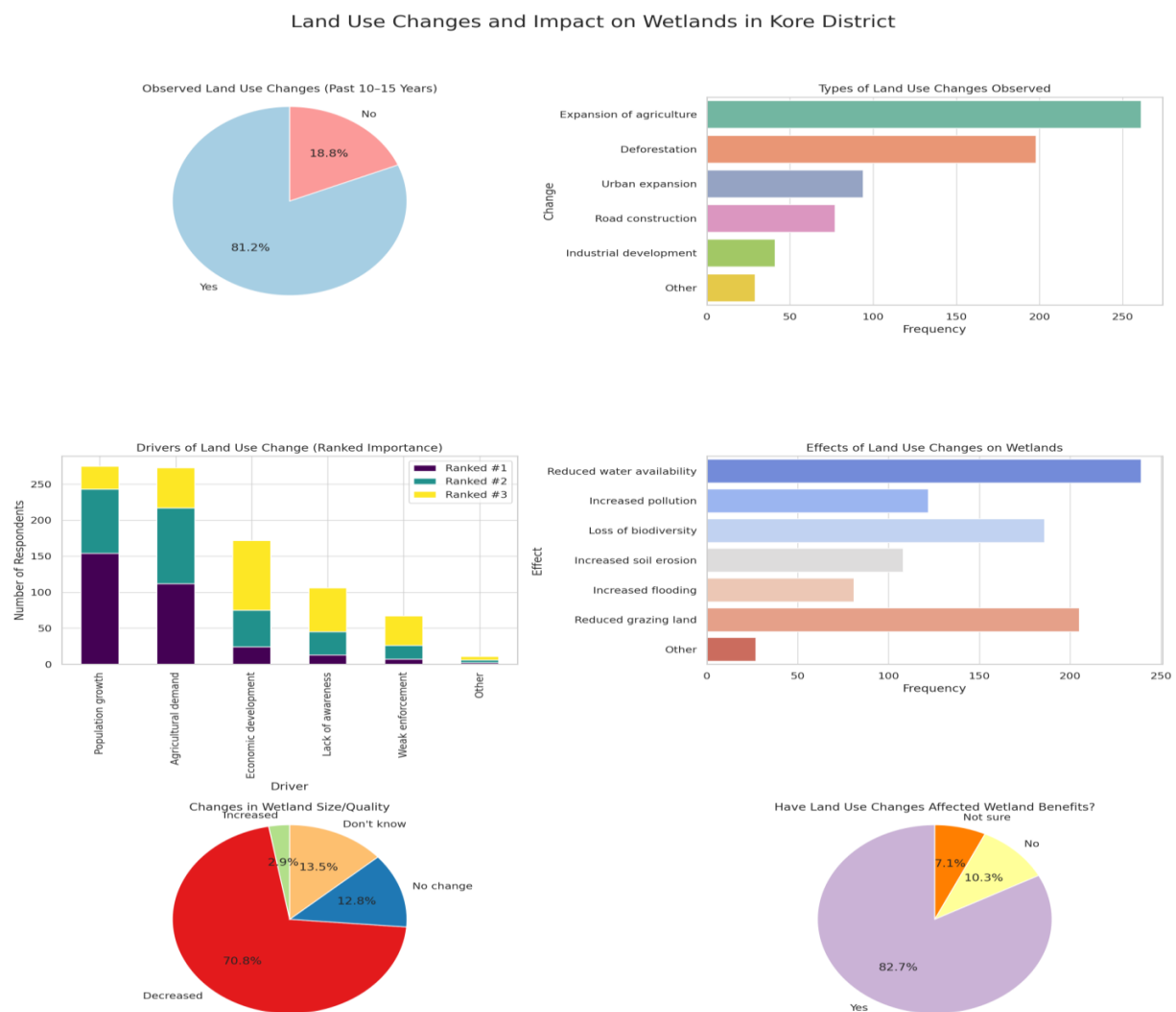
| Variable        | Category             | Household heads (N=384) |    |
|-----------------|----------------------|-------------------------|----|
|                 |                      | Frequency               | %  |
| Sex             | Male                 | 238                     | 62 |
|                 | Female               | 146                     | 38 |
| Age             | 18-29                | 77                      | 20 |
|                 | 30-39                | 96                      | 25 |
|                 | 40-49                | 116                     | 30 |
|                 | 50-59                | 58                      | 15 |
|                 | 60 and above         | 37                      | 10 |
| Education level | Higher Education     | 27                      | 7  |
|                 | Secondary Education  | 69                      | 18 |
|                 | Primary Education    | 134                     | 35 |
|                 | Illiterate           | 154                     | 40 |
| Occupation      | Farmers              | 211                     | 55 |
|                 | Livestock Keepers    | 77                      | 20 |
|                 | Business Owners      | 38                      | 10 |
|                 | Government Employees | 31                      | 8  |
|                 | Daily Laborers       | 27                      | 7  |
| Household Size  | 1-3                  | 108                     | 28 |
|                 | 4-7                  | 230                     | 60 |
|                 | 8-11                 | 38                      | 10 |
|                 | Above 11             | 8                       | 2  |

In this subsection the general profile of the respondent households is presented. This includes age, sex; educational status, Occupation, and family size were summarized (Table 1). As shown in Table 1 the majority of respondents are in their productive years up to 40-49 (30%) age while only 10% are aged 60 and above. The middle aged majority of adults suggests that the primary users of wetland resources with greatest influence on household agricultural decisions. Most of

the samples Households (62%) are male headed holding dominant role in land use compared to only few of the Households (38%) whom are female headed.

As shown in Table 1, from the total number of respondents 40% are illiterate whereas only 7% have attained higher education. This illiteracy level most of the time correlates with limited awareness of modern conservation techniques and ecological consequences of wetland conservation. Concerning the occupation of the respondents 55% were farmers and only 7% were engaged in non-agricultural labor, which indicates direct dependence on wetland soil and water for survival.

## 4.2 Land Use Change and its Impacts on Wetlands



**Figure 2: Land Use Change and its Impacts on Wetlands**

The result revealed that with 81.3% of respondents observing significant land-use shifts over the last 15 years. This finding is similar with that of national trends done by Teferi et al., (2010) and Gashaw et al., (2018).

As clearly indicated in (Figure 2) 70.8% of respondents indicate a decline of wetland quality, referring the reduced water availability (76.6%) and declined grazing land (65.7%) as the most critical implications. This finding are in line with the workdone by Kindu et al., (2016) and Van et al., (2013), which indicates the loss of water creates the vulnerability of rural community increasing poverty and resource based conflicts.

#### 4.2.1. Livelihood Dependence and Conservation Implications

As presented in (Table 2), 54.8% of kore's residents were dependent on wetland and 79% of those residents were vulnerable to the degradation. This result is similar with the findings of Mekonnen (2020) and Hagos et al., (2014), who stress that wetland loss in Ethiopia with livelihood loss. Ribot (2004) and Adhikari and Gurung (201) argued that land inequalities and ensuring tenure security are prerequisites for moving from unsustainable exploitation to participatory community led restoration.

Above all, 31.5 % of respondents whom are young or adults and 40% being a woman are underutilized wetland. Hence, sustainable management of this wetland requires shift from top-down to inclusive frameworks as critical infrastructure for food security, water safety and climatic reliance.

**Table 2: Perceptions of Climate Change and Wetland Degradation on Livelihoods**

| <b>Demographic Characteristic</b> | <b>% of Respondents</b> | <b>Potential Influence on Perceptions of Climate Change &amp; Wetland Degradation</b> | <b>Potential Influence on Livelihood Impacts</b>                             |
|-----------------------------------|-------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Age Group                         |                         |                                                                                       |                                                                              |
| Younger (18-35)                   | 31.5%                   | Increased threat perception due to limited historical context                         | Immediate and severe impacts on current income and basic needs (food, water) |

|                                                 |       |                                                                               |                                                                                |
|-------------------------------------------------|-------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Older (56+)                                     | 7.2%  | Historical knowledge of wetland changes, cultural and spiritual connections   | Long-term livelihood changes (e.g., shifts in practices, reduced productivity) |
| Gender                                          |       |                                                                               |                                                                                |
| Women                                           | 38.7% | Prioritize water security and resource availability                           | Disproportionate impacts on livelihoods (increased workload, income loss)      |
| Men                                             | 61.3% | Focus on agricultural productivity and income generation                      | Changes in income, resource access, agricultural practices                     |
| Livelihood Dependence on Wetlands               |       |                                                                               |                                                                                |
| Heavily Dependent (e.g., fishing, farming)      | 54.8% | Direct threat to survival due to reliance on wetlands                         | Immediate and severe impacts on income, food security, and basic needs         |
| Moderately Dependent (e.g., water, reeds)       | 25.8% | Different level of urgency, potentially relying on alternative income sources | Indirect impacts on livelihoods (e.g., increased prices, competition)          |
| Less Dependent (e.g., recreation, cultural use) | 19.4% | Lower level of concern, but still affected by indirect impacts                | Less immediate impacts, but vulnerable to downstream consequences              |
| Distance from Wetland                           |       |                                                                               |                                                                                |
| Directly Adjacent (<1 km)                       | 42.0% | Firsthand experience with changes, visible effects of degradation             | Direct impacts on daily routines and resource access                           |
| 1-3 km from wetland                             | 30.8% | Rely on second-hand information, less immediate                               | Indirect impacts on water quality, resource availability,                      |

|                                               |       |                                                                                       |                                                                                                              |
|-----------------------------------------------|-------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|                                               |       | impacts                                                                               | and downstream agriculture                                                                                   |
| More than 3 km from wetland                   | 27.2% | Limited direct knowledge, potentially unaware of broader impacts                      | Indirect impacts on water security and resource availability                                                 |
| Land Ownership                                |       |                                                                                       |                                                                                                              |
| Own land near wetlands                        | 45.2% | Vested interest in wetland health due to impact on productivity and land value        | Direct impacts on income and food security due to reduced productivity and potential land value loss         |
| Tenant farmer near wetlands                   | 22.6% | Greater vulnerability due to limited control over resources and increased competition | Increased vulnerability to landlessness, resource scarcity, and livelihood diversification challenges        |
| Landless resident near wetlands               | 24.2% | Limited access to resources and higher vulnerability to changes                       | Similar to tenant farmers, with potential additional challenges related to lack of land ownership            |
| Water Access                                  |       |                                                                                       |                                                                                                              |
| Primarily rely on wetland water               | 57.6% | Critical role of wetlands in water security                                           | Water shortages and contamination as significant livelihood threat                                           |
| Rely on mix of sources (wetland, wells, etc.) | 30.8% | Options and flexibility in dealing with water shortages                               | Still affected by increased water scarcity and competition for resources                                     |
| Primarily rely on non-wetland sources         | 11.3% | Lower dependence on wetlands for water                                                | Less immediate impacts, but potential future concerns as wetland degradation affects overall water resources |
| Experience with Wetland                       |       |                                                                                       |                                                                                                              |

|                                           |       |                                                    |                                                                  |
|-------------------------------------------|-------|----------------------------------------------------|------------------------------------------------------------------|
| Degradation                               |       |                                                    |                                                                  |
| Witnessed significant wetland degradation | 79.0% | Strong negative perceptions and urgency for action | Increased vulnerability to all aforementioned livelihood impacts |

As easily illustrated in Table 2, respondents experience mixed residency lengths with 25 lived there for more than 20 years having long term knowledge. 50% of the respondents indicate as they have lived in the area for less than 11 years which in turn implies dynamic community with different perspectives and adaptive capacity to change. The medium age ranges indicate potential link between residency duration and age offer more understanding of community perspectives.

**Table 3:Residency Duration of Respondents in Kore District (2024 Survey)**

| Residency Duration | Frequency (%) | Age Range (Median) | Potential Implications                                                                                                                             |
|--------------------|---------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Less than 5 years  | 20%           | 18-34 (25)         | Younger residents, new to the area, may have different perspectives on wetland changes and resource use.                                           |
| 5-10 years         | 30%           | 25-44 (32)         | Relatively recent arrivals may offer a nuanced perspective on recent changes and potentially higher adaptability.                                  |
| 11-20 years        | 25%           | 35-54 (42)         | Witnessed significant changes over time, likely have established resource use patterns, and may hold key local knowledge.                          |
| More than 20 years | 25%           | 45-65+ (52)        | Deep historical knowledge and understanding of wetland dynamics, potentially holding cultural perspectives and long-term resource use experiences. |

#### 4.2.2. Residency Duration and Traditional Ecological Knowledge

The residents those staid in the study area for more than 20 years serve as a bench mark of ecological knowledge which similar with that of Nyaunga et al., 2022. But, new residents less than 11 years offer fresh eyes perspective displaying higher sensitivity to recent rapid

environmental shifts (Adger et al., 2007). The lack of experience among younger and new residents leads to divergent risk assessments (Ribot, 2004).

#### 4.2.3. Dynamics of Wetland Resource Utilization

Under this subsection 40% of the respondents indicated as they maintained stable use of resource pattern, 25% increase their reliance and 35% decrease their use. Hence, those with stable use may be resistant to changes but remain exposed to environmental impacts. Those in decreasing trend may face a loss of traditional income streams. Research done by Ribot (2004), indicated these patterns are attached with land ownership and resources access inequalities.

**Table 4: Changes in Wetland Use in Kore District over the Past 10 Years (2024 Survey)**

| Change in Wetland Use   | Percentage of Respondents | Potential Implications                                                                                                                                                                                                                                                                                                     |
|-------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Increased significantly | 15%                       | <ul style="list-style-type: none"> <li>✓ Growing resource needs due to population growth or livelihood diversification.</li> <li>✓ Potential for unsustainable use exceeding wetland capacity.</li> <li>✓ Requires investigation into drivers and implementation of sustainable resource management strategies.</li> </ul> |
| Increased slightly      | 10%                       | <ul style="list-style-type: none"> <li>✓ Moderate shift in use patterns, potentially adapting to changing needs or resources.</li> <li>✓ Explore drivers and monitor trends to ensure sustainable utilization.</li> </ul>                                                                                                  |
| Remained the same       | 40%                       | <ul style="list-style-type: none"> <li>✓ Stable resource extraction, potentially reflecting established practices or limited alternatives.</li> <li>✓ May be vulnerable to future changes in wetland health or competing demands.</li> <li>✓ Consider measures to enhance adaptation and resource security.</li> </ul>     |
| Decreased slightly      | 20%                       | <ul style="list-style-type: none"> <li>✓ Reduced reliance, possibly due to environmental</li> </ul>                                                                                                                                                                                                                        |

|                         |     |                                                                                                                                                                                                      |
|-------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         |     | degradation, alternative resource availability, or livelihood shifts.<br>✓ Investigate reasons and address concerns about community vulnerability and income diversification.                        |
| Decreased significantly | 15% | ✓ Marked decline in use, potentially indicating severe environmental concerns or livelihood challenges.<br>✓ Requires urgent attention to address vulnerability and support sustainable livelihoods. |

As presented in (Table 4), 15% of respondents increased their use trends which are similar with that of Adhikari and Gurung (2011). However, as Borrini F. et.,al,(2010) indicated increased patterns leave them vulnerable to future environmental changes or competing demands.

Besides 35% of the respondents indicated potential shifts from alternative sources which is similar with the findings of Ribot (2004).

#### **4.2.4. Observed Changes in Kore District's Wetlands**

According to the sample survey response, 40% of respondents have observed changes in the wetland, while 35% perceived slight changes and 25% observed no changes. These diverse perspective of the respondents are based on respondent location and proximity to wetlands.

**Table 5: Perceived Wetland Changes in Kore District**

| Perceived Change           | Percentage of Respondents | Potential Drivers (Hypotheses)                                                                       | Scientific Considerations                                                                      |
|----------------------------|---------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| <b>Significant Changes</b> | 40%                       | ✓ Climate change (e.g., altered precipitation patterns)                                              | - Analyze alongside long-term climate data (rainfall, temperature)                             |
|                            |                           | ✓ Human activity (e.g., land use change, water extraction)                                           | - Overlay with land use maps and water resource data                                           |
|                            |                           | ✓ Infrastructure development (e.g., dams, drainage systems)                                          | - Analyze spatial correlation with infrastructure projects                                     |
|                            |                           | - Assess impacts on water quality (e.g., conductivity, pH)                                           | - Conduct water quality testing across various wetland sites                                   |
|                            |                           | - Evaluate changes in biodiversity (e.g., species composition, abundance)                            | - Conduct ecological surveys to document flora and fauna                                       |
|                            |                           | - Analyze consequences for ecosystem services (e.g., water purification, flood control)              | - Assess changes in ecosystem service provision through modeling or field studies              |
| <b>Slight Changes</b>      | 35%                       | - Gradual fluctuations in rainfall patterns or groundwater levels                                    | - Monitor water levels at key locations over time                                              |
|                            |                           | - Localized impacts from specific land use practices or infrastructure projects                      | - Conduct targeted investigations in areas reporting slight changes                            |
|                            |                           | - Consider potential variations in perception based on respondent location and proximity to wetlands | - Analyze spatial distribution of reported changes                                             |
| <b>No Changes</b>          | 25%                       | - Localized variations in wetland dynamics or individual differences in perceived changes            | - Conduct field surveys and interviews to understand local perspectives and spatial variations |
|                            |                           | - Investigate potential biases or limitations in survey methodology                                  | - Consider refining survey questions for future data collection                                |

**Table 6:Public Perception and Wetland**

| Question                           | Interpretation Focus     | Response Categories                    | Count | Proportion | Key Trend/Finding                               | Statistical Test (Optional)                          |
|------------------------------------|--------------------------|----------------------------------------|-------|------------|-------------------------------------------------|------------------------------------------------------|
| <b>Frequency of Wetland Visits</b> | Trend in visit frequency | Never                                  | 10    | 0.074      | Increasing frequency                            | Chi-Square 10.24 $\approx$                           |
|                                    |                          | Rarely                                 | 20    | 0.147      |                                                 |                                                      |
|                                    |                          | Monthly                                | 35    | 0.257      |                                                 |                                                      |
|                                    |                          | Weekly                                 | 25    | 0.184      |                                                 |                                                      |
|                                    |                          | Daily                                  | 10    | 0.074      |                                                 |                                                      |
|                                    | Trend in wetland size    | Increased Significantly                | 15    | 0.11       | Potential for both positive & negative changes  | Chi-Square 14.56 $\approx$                           |
|                                    |                          | Increased Slightly                     | 25    | 0.184      |                                                 |                                                      |
|                                    |                          | Remained the Same                      | 30    | 0.221      |                                                 |                                                      |
|                                    |                          | Decreased Slightly                     | 5     | 0.037      |                                                 |                                                      |
|                                    |                          | Decreased Significantly                | 5     | 0.037      |                                                 |                                                      |
| <b>Water Quality Change</b>        | Dominant trend           | Significantly Worse & Slightly Worse   | 25    | 0.184      | Assess dominant trend (improvement/degradation) | Chi-Square 12.29 (p-value $\approx$ 0.002) $\approx$ |
|                                    |                          | No Change                              | 40    | 0.294      |                                                 |                                                      |
|                                    |                          | Slightly Better & Significantly Better | 35    | 0.257      |                                                 |                                                      |
| <b>Plant Life Change</b>           | Dominant trend           | Significant Decrease & Slight Decrease | 20    | 0.147      | Monitor for potential biodiversity loss/gain    |                                                      |
|                                    |                          | No Change                              | 50    | 0.368      |                                                 |                                                      |
|                                    |                          | Slight Increase & Significant Increase | 30    | 0.221      |                                                 |                                                      |

Outcomes of the community interaction with wetland indicates shift from frequent engagement. Currently, 50.7% of respondents visit the wetland at least weekly or monthly while 10% only has no interaction with wetland.

According to the survey, water quality decline was observed with 18.4% of respondents while 36.8% indicates stable plant life and 22% indicates an increase.

As clearly presented below, community perception on wetland changes in Kore district reveals a landscape with 75% of residents observing changes. Hence, these changes are due to the relationship between climatic drivers and anthropogenic pressures like water extraction.

**Table 7: Climate Change Impact on Kore District Wetlands: Community Perspectives**

| <b>Community Belief</b>                     | <b>Evidence for Climate Change Impact</b>                                                            | <b>Additional Information</b>                                                                                          |
|---------------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Yes, definitely (70% of respondents)</b> |                                                                                                      | 70% reported decreasing water levels, 65% noticed changes in plant & animal life (bird species loss, invasive plants). |
| <b>Probably yes (20% of respondents)</b>    | Over 90% of studies link climate change to significant wetland impact.                               | 1°C temperature increase, 10% decrease in annual rainfall in past 20 years (align with global trends).                 |
| <b>Unsure (10% of respondents)</b>          | Comprehensive studies needed to fully understand the extent and mechanisms of climate change impact. | Land-use changes (agriculture, construction), overgrazing by livestock could also contribute to wetland degradation.   |

As shown in above table 70% of respondents attributed wetland degradation to climate change which is similar with the finding done in the upper Awash Basin where 85% of respondents perceived similar issues (Ayanew et al., (2020).

According to EEFR, (2019), Local temperature increase of 1°C and a 10% decrease in rainfall strengthen the direct link to climate changes which is described by some reports. Hence, climate change and localized human impacts threatened wetland resilience.

#### **4.2.5 Water Availability Changes in Kore Wetlands: Community Perspectives and Evidence**

In this sub section, the researcher tries to present findings related to water availability.

Accordingly, 65-75 of the respondents indicate decrease in water levels. Small percentages of

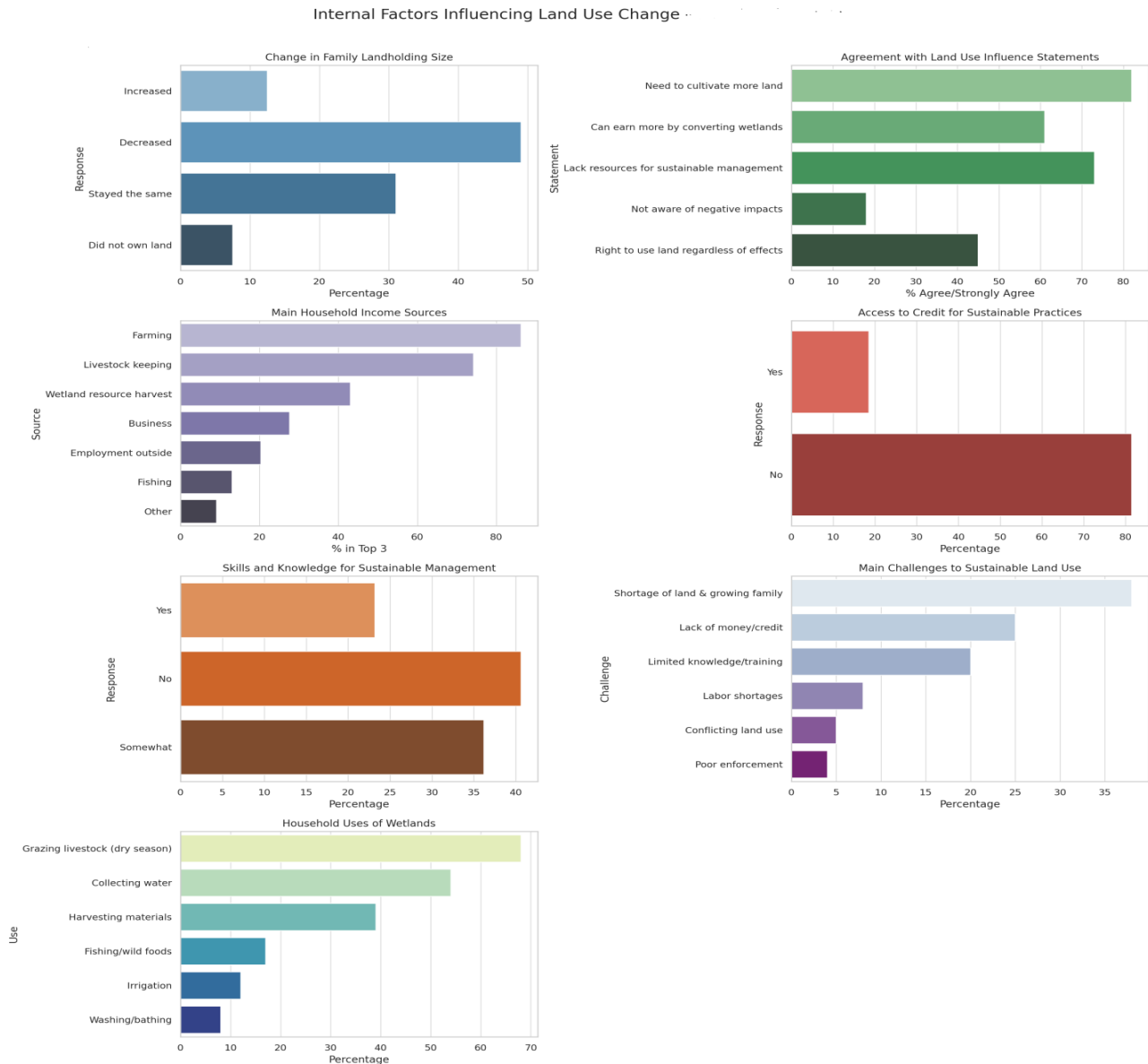
respondents (2-8%) reported localized increase in water availability due to water management efforts.

**Table 8: Water Availability Changes in Kore Wetlands**

| <b>Option</b>                        | <b>Evidence (From Respondents)</b>                                                                           | <b>% of respondent</b> |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------|------------------------|
| <b>Significantly decreased (70%)</b> | The water used to come up to my knees, now it barely reaches my ankles.                                      | 70                     |
| <b>Slightly decreased (20%)</b>      | The reeds near the water's edge are drying up and disappearing.                                              | 20                     |
| <b>Remained the same (5%)</b>        | The water level always goes down during the dry season, but it usually comes back up in the rains.           |                        |
| <b>Slightly increased (3%)</b>       | Building the small dam upstream, the water levels in the lower parts of the wetland have become more stable. | 3                      |
| <b>Significantly increased (2%)</b>  | I haven't seen the water levels rise in my lifetime, only fall.                                              | 2                      |

### 4.3. External and internal factors of land use change on wetlands

#### 4.3.1. Internal Factors Influencing Land use changes



**Figure 3:** Internal Factors Influencing Land use

#### 1. Change in Family Landholding Size

In this sub section, the researcher tries to present land pressure in the study area and 49% of the respondents report that a decrease over the last 15 years compared with only 12.5% who

indicating an increase. This is similar with broader patterns across sub-Saharan Africa where arid lands intensify land uses of households (Jayne et al., 2014). Therefore this wetland face encroachment as families struggle for subsistence cultivation which in turn offset the loss of land.

## **2. Economic Status**

In this study one of the pushing factors for wetland degradation is economic survival questions as reported by 82% of respondents whom feel to expand their cultivation land for household demands. In line with this finding, Bewket (2003) and Mulat et.al, (2006) indicated economic aspects most of the time overrides environmental knowledge.

## **3. Main Sources of Household Income**

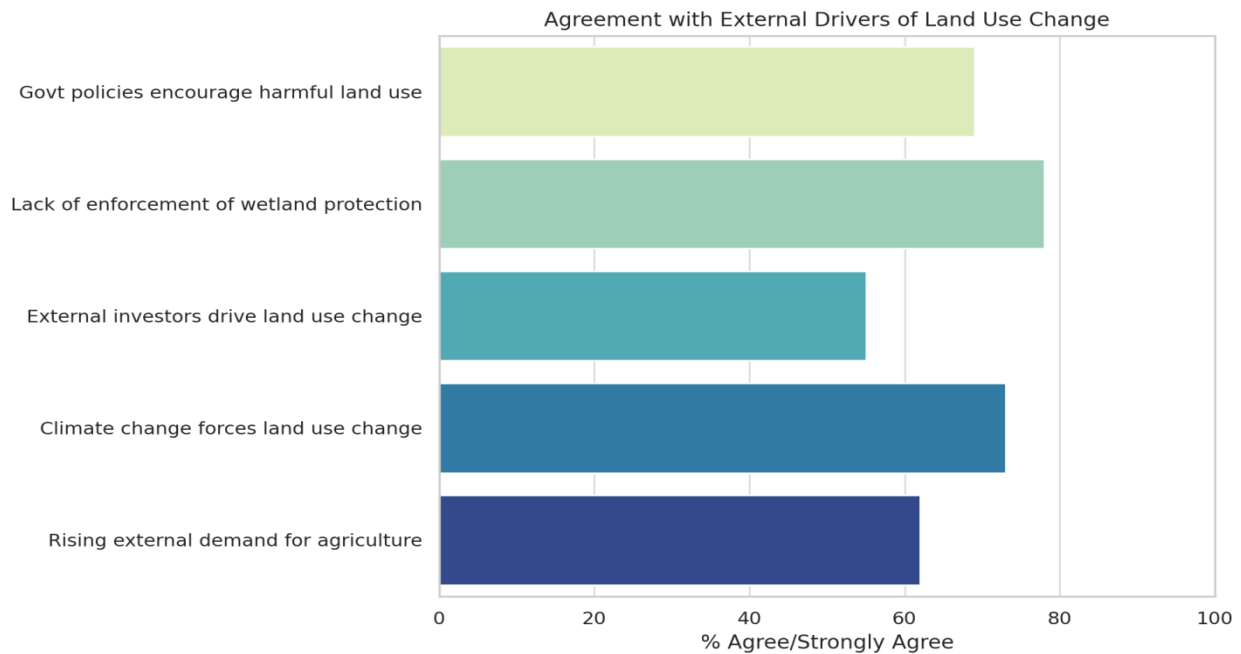
Based on the sample survey results with 86.2% of respondents rely on farming 43% of the respondents indicate as if they harvest resources from the wetland like medicinal plants, fodders and reeds. This ultimate dependence on the wetland for livelihoods is similar with the research done by Getie et al., 2020 in Uganda.

## **5. Skills and Knowledge**

As a survey results indicates almost 40.6% of respondents indicated as they lack skills for sustainable land management while 23.2% said they do have the skills. This is in line with the issue in rural parts of the country indicated by Taffa (2009) and Amsalu and Graff (2007), absence of training and agricultural extension prevents environmental awareness.

### **4.3.2 External Factors Influencing Land Use Change**

Based on the sample survey results 78% of the respondents agreed as there is lack of regulation enforcement pertaining to wetland conservation. At the same time, 69% of them agreed as the government policies themselves encourage or permit harmful changes. Over 55% of respondents indicated external investors used as a catalyst for land conversion, while 62% indicated it is due to increasing demand of agricultural products.

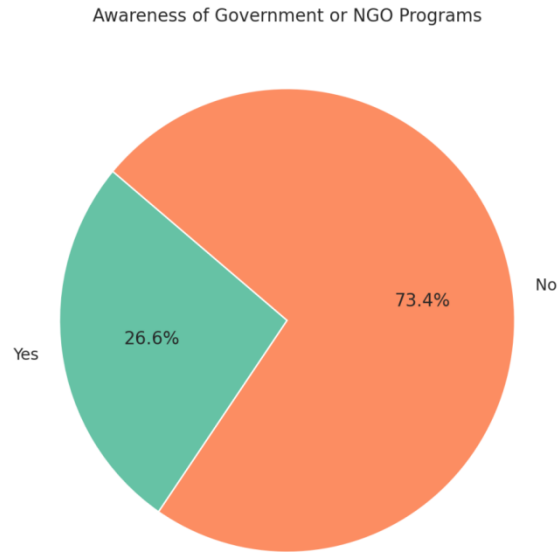


**Figure 4:** External Factors Influencing Land Use Change

This report is similar with studies done by Gebreyes and Kirubel (2018) indicating that regulatory enforcement contributes to wetland degradation.

## **2. Awareness of Government or NGO Programs**

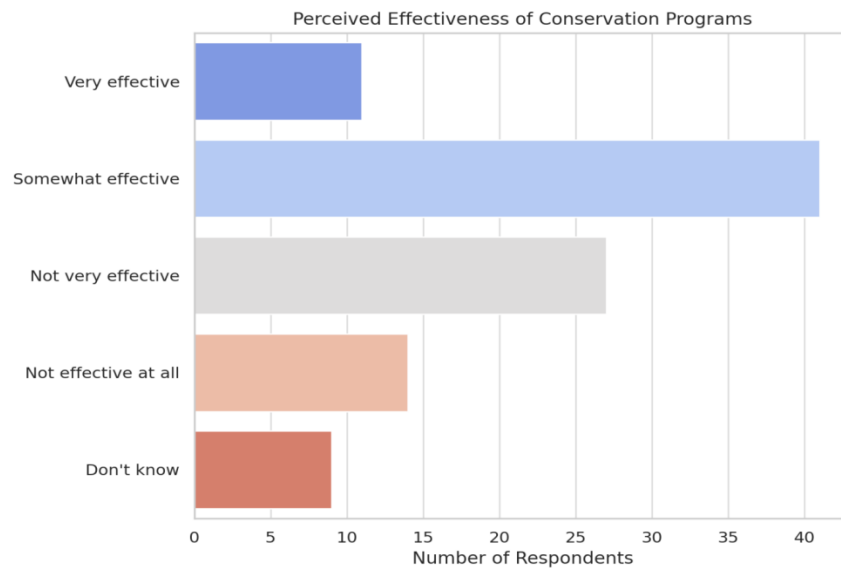
Based on the sample survey results about 26.6% of respondents indicated as government and NGOs led conservation. This implies that either there is low awareness of the wetland status or there are minimal and insufficient engagement strategies. This in turn is similar with the findings from Mekonnen et al, (2020), whom observed land tenure policies and un coordinated development plan hindered and cause wetland degradation.



**Figure 5:** Awareness of Government or NGO Programs

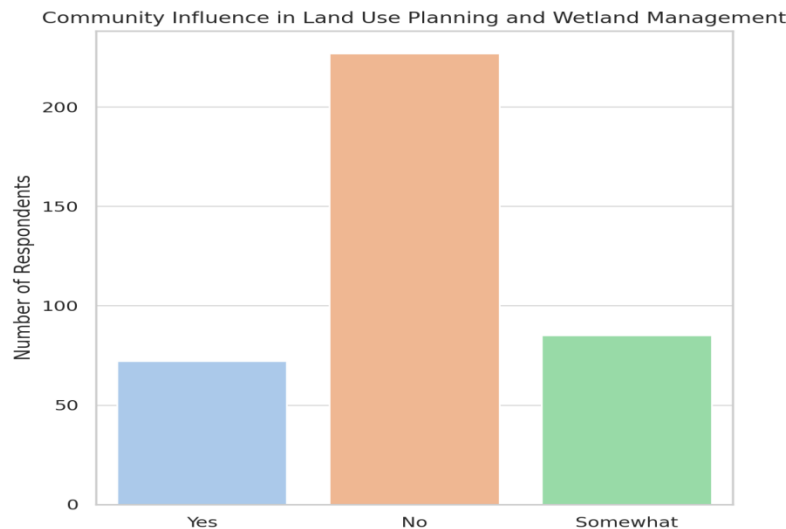
### 3. Perceived Effectiveness of Existing Programs

Based on the sample survey results only 10% of the respondents agreed as if the existing programs for wetland conservation are effective. This indicates that



**Figure 6:** Perceived Effectiveness of Existing Programs

This aligns with the work of Kassahun (2017), who emphasized that community-based natural resource management in Ethiopia often fails due to weak institutional presence at the grassroots level and inadequate dissemination of information.

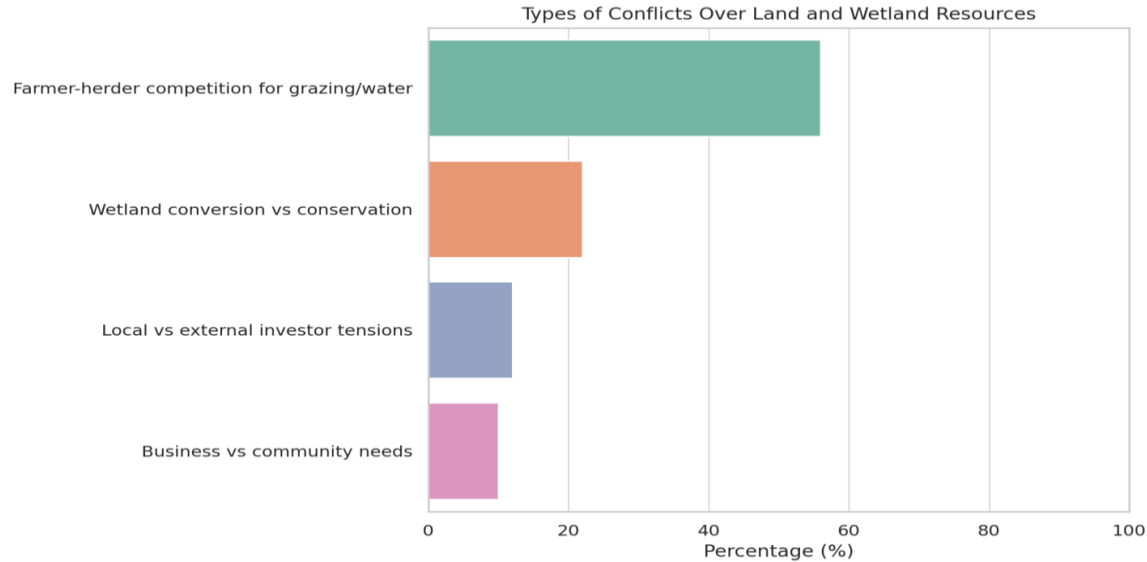


**Figure 7: Community Influence in Land Use and Wetland Management**

Based on the sample survey results from Koredistrict only 10.8% of respondents perceived effectiveness of existing programs. This effectiveness on the other hand is compounded by almost 59% of respondents as there is no influence over the land use and wetland management. As indicated by Tasema et al., (2019) environmental management most of the time fails when it lacks local participation and cultural contextualization as sustainable resource management.

## 5. Conflicts Over Land

As shown in Figure 8, 60.7% of respondents indicated as there are conflicts due to land and water resources in the study area. Accordingly most of the time the conflict as reported by 56% of respondents is due to intensified competition between farmers and herders to convert wetland in to permanent crop land and grazing land. The other 12% of respondents indicated as if it is due to external investors 10% is due to commercial interests.

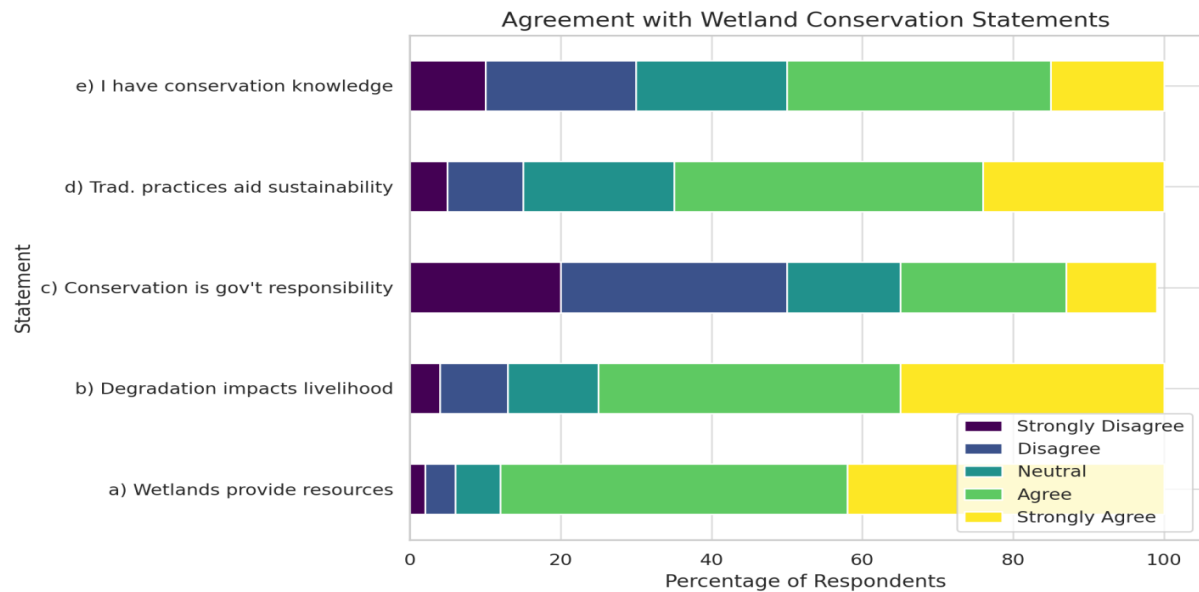


**Figure 8: Conflicts Over Land and Wetland Resources**

#### **4.4. Community Perception on Wetland Conservation**

In this sub section, the researcher tries to present community perception on wetland conservation and 88% of the respondents perceived as the wetland is very important for the survival of the community and its ecological degradation can cause impacts on the livelihood of the community. This finding indicate that majority of the respondents are motivated by the benefit from wetland , and lack of formal education and agency planning noted as a barrier for this positive perception to be effective for the conservation activities.

This finding is similar with that of Gedafaw et al., (208) that states rural Ethiopian livelihoods are highly tied with wetland ecosystems. Among the respondents 75% of them perceived as the wetland degradation is directly linked with wetland which is similar with Alemayehu et al., (2020) that come up with strong valuation of the wetland for the life of the community.

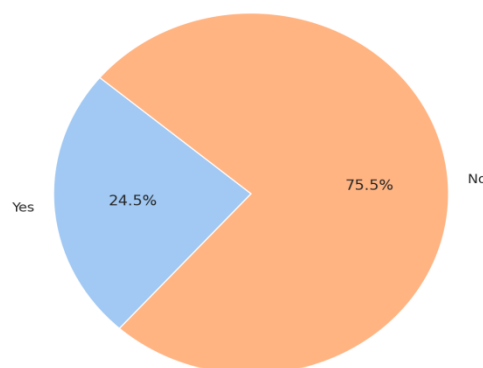


**Figure 9: Community Perception on Wetland Conservation**

## 2. Community Involvement in Wetland Conservation Activities

As shown in Figure 10, only 24.5% of the respondents are actively involved in the wetland conservation while 75% (n=29) are not involved. This in turn indicated as there is a gap between environmental awareness and actual behavioral engagement. As Alemayehuet. al, 2020 indicated this is due to lack of formal structure, limited access to conservation projects, economic dependency on wetlands as well as in effectiveness of conservation measures.

Active Involvement in Wetland Conservation Activities

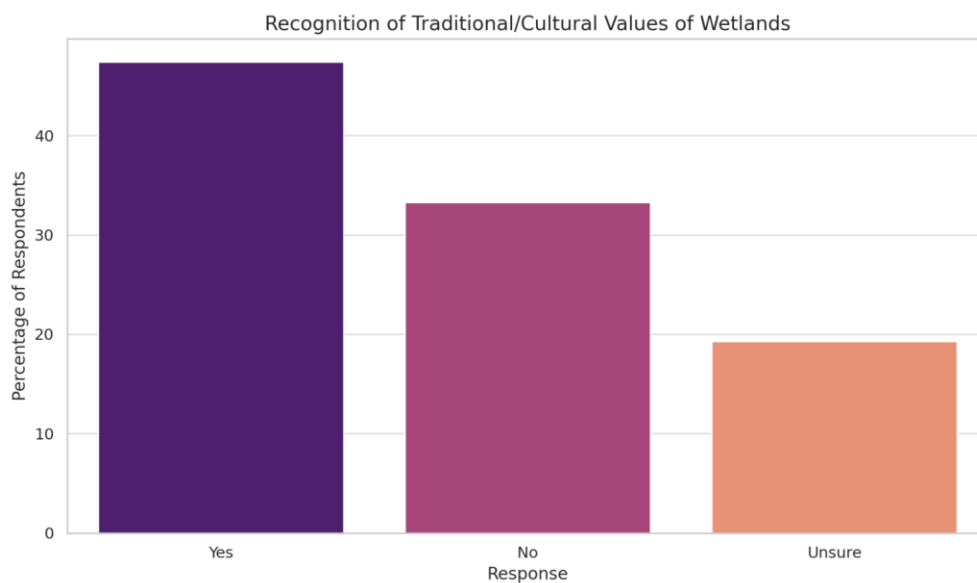


**Figure 10: Community Involvement in Wetland Conservation Activities**

Previous studies, such as that by Dixon and Wood (2003), have noted that lack of community participation often stems from limited capacity, unclear incentives, or exclusion from decision-making processes.

## 5. Recognition of Traditional or Cultural Wetland Values

As shown in Figure below around 47 % of the respondents perceived cultural and traditional values as they affirm strong connection with wetland management. But, 33% of the respondents denied the cultural integration with the wetland management and 19% of respondents are an aware of of it. This variation is due to generation changes, urbanization or due to shifting of livelihoods.



**Figure 11: Recognition of Traditional or Cultural Wetland Values**

## 8. Awareness of Land Use Planning Decisions

As shown in Figure 11, only 17 % respondents agreed as if they are aware of land use planning decisions can affect wetland in the district and 55% were unaware of it. This implies that compartmentalization of land for agriculture, investment or infrastructure have most of the time impacts on wetland ecosystems.



Figure 12: Awareness of Land Use Planning Decisions Affecting Wetlands

As shown in (Figure 12), 55% of respondents were not involved in land use planning decisions. This exclusion for governance decisions is barrier for sustainable development as indicated by Reid et al., (2010), community inclusion in land use planning have legitimacy and effectiveness of environmental planning.

## **5. CONCLUSION AND RECCOMENDATION**

### **5.1. Conclusion**

Land uses in Kore district have ecological degradation characterized by a visible contraction of wetland extent, and changing the landscape as half of the respondents agreed. These on the other side triggered vulnerability of wetland where loss of the hydrological services and biodiversity undermines food and water security of 54.8 % of the population who rely on these ecosystems for survival. Meanwhile, the impact of these land use change is not simply an environmental issues rather causes socioeconomic crisis.

The degradation of this wetland is driven by complex internal socioeconomic pressures and external environmental stressors. Factors like population growth, lack of agricultural options and wetland dependence for immediate survival are the major internal factors. Meanwhile, weak policy implementations, top down governance, climate change are the major external factors.

Moreover, most of the communities members (88%) perceived wetland positively and they have recognized traditional ecological knowledge even if their active participation in conservation of wetland remains low due to lack of empowerment and resources.

### **5.2. Recommendations**

Based on the findings, discussion and conclusions above, the following are the recommendation that can be made;

For Woreda and Zonal Authorities

1. Local authorities should enhance legal demarcation and enforcement of the regulation that restrict human activities close to the wetland
2. They have to facilitate community based participatory governance of wetlands

**For Universities and Research Institutions**

1. Conduct in depth research to assess the effectiveness of wetland in the woreda and improve documentation of traditional knowledge.
2. Provide education campaign so as to raise positive perception on economic implications of wetland degradation in the area by providing technical capacity building

3. Conduct longitudinal and multifaceted methodological impact full studies

**For Non-Governmental Organizations**

1. Support the livelihood diversification programs where farmers can share experiences, test new ideas and adopt conservation friendly benefits.
2. Provide resources and technical assistances for establishing micro watershed sites that incorporate practices such as gully rehabilitation, water harvesting and soil stabilization.
3. Support conservation awareness campaigns on the causes and implications of wetland degradation.

**For Local Community**

1. Participate in the creation of peer led groups where farmers can learn and practice by establishing wetland user groups.
2. Coordinate in regular communal restoration initiatives

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## 7. APPENDIX- QUESTIONER

### Section 1: Demographic Information

| Question           | Options/Response Type                                                                                                                                                                           |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Name (Optional) |                                                                                                                                                                                                 |
| 2. Village/Kebele  |                                                                                                                                                                                                 |
| 3. Age             |                                                                                                                                                                                                 |
| 4. Gender          | <input type="radio"/> Male<br><input type="radio"/> Female                                                                                                                                      |
| 5. Education Level | <input type="radio"/> No formal education<br><input type="radio"/> Primary<br><input type="radio"/> Secondary<br><input type="radio"/> Higher education                                         |
| 6. Occupation      | <input type="radio"/> Farmer<br><input type="radio"/> Livestock keeper<br><input type="radio"/> Business owner<br><input type="radio"/> Govt. employee<br><input type="radio"/> Other (Specify) |

### Section 2: Knowledge and Awareness about Wetlands

| Question                                                                             | Options/Response Type                                                            |
|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| 1. Are you familiar with the term "wetland"?                                         | <input type="radio"/> Yes<br><input type="radio"/> No (If no, skip to Section 3) |
| 2. If yes, how would you describe a wetland? (Open-ended)                            |                                                                                  |
| 3. What types of wetlands are found in your area? (Open-ended)                       |                                                                                  |
| 4. Do you think wetlands are important for the community?                            | Yes / No / Not sure                                                              |
| 5. If yes, what benefits do wetlands provide to the community? (Tick all that apply) | <input type="radio"/> Water source,<br><input type="radio"/> Grazing land,       |

|                                                                         |                                                                                                                                                                                                           |
|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                         | <ul style="list-style-type: none"> <li>○ Fishing,</li> <li>○ Agriculture,</li> <li>○ Erosion control,</li> <li>○ Flood control,</li> <li>○ Biodiversity conservation,</li> <li>Other (Specify)</li> </ul> |
| 6. Are you aware of any changes happening to wetlands in this district? | <ul style="list-style-type: none"> <li>○ Yes</li> <li>○ No (If no, skip to Section 4)</li> </ul>                                                                                                          |

### Section 3: Land Use Change and its Impacts on Wetlands

| Question                                                                                                                                               | Options/Response Type                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Have you observed any changes in land use around the wetlands in Kore District in the last 10-15 years?                                             | <ul style="list-style-type: none"> <li>○ Yes</li> <li>○ No (If no, skip to Section 4)</li> </ul>                                                                                                                                         |
| 2. If yes, what types of land use changes have you observed? (Tick all that apply)                                                                     | <ul style="list-style-type: none"> <li>○ Expansion of agriculture,</li> <li>○ Deforestation,</li> <li>○ Urban expansion,</li> <li>○ Road construction,</li> <li>Industrial development,</li> <li>Other (Specify)</li> </ul>              |
| 3. In your opinion, what are the main drivers of land use change in this area? (Rank the following in order of importance, 1 being the most important) | <ul style="list-style-type: none"> <li>○ Population growth,</li> <li>○ Demand for agricultural land,</li> <li>○ Economic development,</li> <li>○ Lack of awareness, Weak enforcement of regulations,</li> <li>Other (Specify)</li> </ul> |
| 4. How do you think these land use changes have affected the wetlands? (Tick all that apply)                                                           | <ul style="list-style-type: none"> <li>○ Reduced water availability,</li> <li>○ Increased pollution,</li> </ul>                                                                                                                          |

|                                                                                                            |                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                            | <input type="radio"/> Loss of biodiversity,<br><input type="radio"/> Increased soil erosion,<br><input type="radio"/> Increased flooding,<br><input type="radio"/> Reduced grazing land,<br><input type="radio"/> Other (Specify) |
| 5. Have you noticed any changes in the size or quality of wetlands in your area?                           | <input type="radio"/> Increased<br><input type="radio"/> Decreased<br><input type="radio"/> No change<br><input type="radio"/> Don't know                                                                                         |
| 6. If decreased, what do you think are the causes? (Open-ended)                                            |                                                                                                                                                                                                                                   |
| 7. Do you believe that land use changes have impacted the benefits that wetlands provide to the community? | <input type="radio"/> Yes<br><input type="radio"/> No<br><input type="radio"/> Not sure                                                                                                                                           |
| 8. If yes, how have these benefits been affected? (Open-ended)                                             |                                                                                                                                                                                                                                   |

#### **Section 4: Community Perception and Participation**

| Question                                                                                            | Options/Response Type                                                                   |  |
|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|--|
| 1. Are you concerned about the current state of wetlands in Kore District?                          | <input type="radio"/> Yes<br><input type="radio"/> No<br><input type="radio"/> Not sure |  |
| 2. Do you think the community is doing enough to protect wetlands?                                  | <input type="radio"/> Yes<br><input type="radio"/> No<br><input type="radio"/> Not sure |  |
| 3. Are you aware of any local initiatives or regulations aimed at protecting wetlands in this area? | <input type="radio"/> Yes<br><input type="radio"/> No                                   |  |
| 4. Have you participated in any wetland conservation activities?                                    | <input type="radio"/> Yes<br><input type="radio"/> No                                   |  |
| 5. If yes, what kind of activities? (Open-ended)                                                    |                                                                                         |  |

|                                                                                                                    |                                                                                      |
|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 6. What do you think are the main challenges to wetland conservation in this area? (Open-ended)                    |                                                                                      |
| 7. What measures do you think should be taken to better protect and manage wetlands in Kore District? (Open-ended) |                                                                                      |
| 8. Are you willing to participate in future wetland conservation efforts?                                          | <input type="radio"/> Yes<br><input type="radio"/> No<br><input type="radio"/> Maybe |
| 9. Any additional comments or suggestions regarding wetland conservation in Kore District? (Open-ended)            |                                                                                      |

### Section 5: Internal Factors Influencing Land Use Change

| Question                                                                                                                                                                                  | Options/Response Type                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. How has the size of your family's landholding changed in the last 10-15 years?                                                                                                         | <input type="radio"/> Increased<br><input type="radio"/> Decreased<br><input type="radio"/> Stayed the same<br><input type="radio"/> Did not own land |
| 2. To what extent do you agree with the following statements regarding factors influencing your land use decisions? (Use a scale of 1-5, where 1 = Strongly Disagree, 5 = Strongly Agree) |                                                                                                                                                       |
| Statements for Q2 (Likert Scale):                                                                                                                                                         |                                                                                                                                                       |
| * a) I need to cultivate more land to feed my family.                                                                                                                                     |                                                                                                                                                       |
| * b) I can earn more money by converting wetland areas into farmland or other uses.                                                                                                       |                                                                                                                                                       |
| * c) I lack the resources (e.g., money, labor, knowledge) to manage my existing land sustainably.                                                                                         |                                                                                                                                                       |
| * d) I am not aware of the negative impacts of land use change on wetlands.                                                                                                               |                                                                                                                                                       |
| * e) I have the right to use my land as I see fit, even if it affects wetlands.                                                                                                           |                                                                                                                                                       |
| 3. What are the main sources of income for your household? (Rank the top 3 in order of importance, 1 being the most important)                                                            | Ranking (Drag and Drop or                                                                                                                             |

|                                                                                                                                                                             |                                |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--|
| Options for Q3: Farming, Livestock keeping, Fishing, Wetland resource harvesting (e.g., reeds, medicinal plants), Business, Employment outside the village, Other (Specify) | Number Input)                  |  |
|                                                                                                                                                                             |                                |  |
| 4. Do you have access to credit or loans to invest in sustainable land management practices?                                                                                | <input type="radio"/> Yes      |  |
|                                                                                                                                                                             | <input type="radio"/> No       |  |
| 5. Do you have the necessary skills and knowledge to implement sustainable land management practices on your land?                                                          | <input type="radio"/> Yes      |  |
|                                                                                                                                                                             | <input type="radio"/> No       |  |
|                                                                                                                                                                             | <input type="radio"/> Somewhat |  |
| 6. What are the main challenges you face in trying to use land in a more sustainable way that protects wetlands? (Open-ended)                                               |                                |  |
| 7. How does your household use the wetlands directly (e.g. for grazing, water, materials)? (Open-ended)                                                                     |                                |  |

### Section 6: External Factors Influencing Land Use Change

| Question                                                                                                                                                                                   | Options/Response Type                 |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--|
| 1. To what extent do you agree with the following statements regarding external factors influencing land use change? (Use a scale of 1-5, where 1 = Strongly Disagree, 5 = Strongly Agree) | Likert Scale (1-5) for each statement |  |
| Statements for Q1 (Likert Scale):                                                                                                                                                          |                                       |  |
| * a) Government policies encourage or allow land use changes that harm wetlands.                                                                                                           |                                       |  |
| * b) There is a lack of enforcement of regulations protecting wetlands.                                                                                                                    |                                       |  |
| * c) External investors or companies are driving land use changes in this area.                                                                                                            |                                       |  |
| * d) Climate change (e.g., droughts, floods) is forcing people to change how they use land.                                                                                                |                                       |  |
| * e) There is increasing demand for agricultural products from outside the community.                                                                                                      |                                       |  |
| 2. Are you aware of any government or NGO programs that promote wetland conservation or sustainable land management in this area?                                                          | <input type="radio"/> Yes             |  |
|                                                                                                                                                                                            | <input type="radio"/> No              |  |
| 3. (If Yes) How effective do you think these programs are in protecting wetlands?                                                                                                          | <input type="radio"/> Very effective  |  |
|                                                                                                                                                                                            | <input type="radio"/> Somewh          |  |

|                                                                                                                                                                 |                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                 | <p>at effective</p> <p><input type="radio"/> Not very effective</p> <p><input type="radio"/> Not effective at all</p> <p><input type="radio"/> Don't know</p> |
| 4. Do you think local communities have enough say in decisions about land use planning and wetland management?                                                  | <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Somewh at</p>                                                       |
| 5. Are there conflicts between different groups (e.g., farmers, herders, businesses) over the use of land and wetland resources in this area?                   | <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>                                                                                              |
| 6. (If yes) Briefly describe these conflicts.( Open-ended)                                                                                                      |                                                                                                                                                               |
| 7. What kind of support or assistance would be most helpful to your community in protecting wetlands from the negative impacts of land use change?( Open-ended) |                                                                                                                                                               |

### **Section7: Community Perception on Wetland Conservation**

| Question                                                                                                      | Options/Response Type                                                             |
|---------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| 1. To what extent do you agree with the following statements regarding wetland conservation in Kore District? | Likert Scale (1-5) for each statement                                             |
| Statements for Q1 (Likert Scale):                                                                             | (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree) |
| * a) Wetlands provide important resources for my household (e.g., water, grazing, materials).                 |                                                                                   |
| * b) Wetland degradation negatively impacts my community's livelihood.                                        |                                                                                   |
| * c) Wetland conservation is primarily the responsibility of the government, not local                        |                                                                                   |

|                                                                                                                                                    |                                                                                                     |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--|
| communities.                                                                                                                                       |                                                                                                     |  |
| * d) Local traditional practices contribute to the sustainable use of wetlands.                                                                    |                                                                                                     |  |
| * e) I have adequate knowledge about the importance of wetland conservation.                                                                       |                                                                                                     |  |
| 2. Are you actively involved in any activities related to wetland conservation in Kore District?                                                   | <input type="radio"/> Yes<br><input type="radio"/> No                                               |  |
| 3. (If Yes) Please briefly describe the activities you are involved in.                                                                            | Open-ended Text Field                                                                               |  |
| 4. To what extent do you agree with the statement: "Existing local regulations (if any) are effective in protecting wetlands"?                     | Likert Scale (1-5)(1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree) |  |
| 5. Are there any specific traditional or cultural values associated with wetlands in your community?                                               | <input type="radio"/> Yes<br><input type="radio"/> No<br><input type="radio"/> Unsure               |  |
| 6. (If Yes) Please describe these values briefly.( Open-ended)                                                                                     |                                                                                                     |  |
| 7. What support or resources would encourage you and your community to become more actively involved in wetland conservation efforts?( Open-ended) |                                                                                                     |  |
| 8. Do you think that land use planning decisions in Kore District adequately consider the importance of wetland conservation?                      | <input type="radio"/> Yes<br><input type="radio"/> No<br><input type="radio"/> Unsure               |  |

## **KII and FGD checklists:**

### **A. Key Informant Interview (KII) Checklist**

#### **I. General Information:**

- Name of Key Informant:
- Position/Role:
- Village/Kebele:
- Date of Interview:

#### **II. Interview Questions (Aligned with Objectives):**

##### **A. Land Use Change and Wetlands:**

1. What types of land use changes have you observed in Kore District, particularly around wetland areas, in the last 10-15 years?
2. What do you believe are the primary causes (drivers) of these land use changes?
3. How have these land use changes affected the wetlands in terms of:
  - Size and extent?
  - Water quality and quantity?
  - Biodiversity (plant and animal life)?
  - Overall ecological health?
4. Can you provide specific examples of wetlands that have been significantly impacted by land use change?
5. Are there any areas where land use practices have helped to protect or restore wetlands?

##### **B. Internal and External Factors:**

1. What internal factors (within the community) contribute to land use changes that affect wetlands? (Probe for population growth, agricultural practices, economic needs, cultural beliefs, etc.)
2. What external factors (outside the community) play a role in these land use changes? (Probe for government policies, market demands, investment, climate change, etc.)
3. How do government policies and regulations influence land use practices around wetlands? Are they effective?
4. Are there conflicts between different groups (e.g., farmers, herders, developers) regarding wetland use? How are these conflicts managed?
5. What are the main economic activities of the people in this area? How are the economic activities affecting the wetlands?
6. What are the common practices that are affecting the wetlands?

### **C. Community Perception and Conservation:**

1. What is the general level of awareness and understanding in the community about the importance of wetlands?
2. What benefits do community members derive from wetlands? (Probe for water, grazing, fishing, agriculture, materials, etc.)
3. Do you think community members are concerned about the degradation of wetlands? Why or why not?
4. What traditional knowledge or practices exist in the community related to wetland conservation? Are they still practiced?
5. How do community members participate in wetland management and conservation efforts? What are the barriers to participation?
6. What local initiatives or organizations are involved in wetland conservation? How effective are they?

7. What are your suggestions for improving community engagement in wetland conservation?
8. What are the challenges affecting the implementation and effectiveness of wetland conservation?
9. What do you think can be done to address the challenges affecting wetland conservation?

### **III. Additional Probes:**

- Are there any specific success stories or failures in wetland management in this area?
- What resources or support are needed to improve wetland conservation efforts?
- Can you recommend other individuals or groups who could provide valuable information on this topic?

### **B. Focus Group Discussion (FGD) Checklist**

#### **I. General Information:**

- Date of FGD:
- Village/Kebele:
- Number of Participants:
- Facilitator:
- Note-taker:

#### **II. Discussion Questions (Aligned with Objectives):**

##### **A. Land Use Change and Wetlands:**

1. In your opinion, how has the landscape around the wetlands in this area changed over the past 10-15 years?
2. What types of new activities or developments have you seen near the wetlands?

3. How do you think these changes have affected the wetlands themselves? (Encourage participants to describe specific impacts they have observed).
4. Have you noticed any changes in the availability or quality of water from the wetlands? How has this impacted your lives?

**B. Internal and External Factors:**

1. Why do you think people are changing the way they use land around the wetlands? (Probe for various reasons and motivations).
2. Are there pressures or influences from outside the community that affect how land is used here? (e.g., government policies, market forces).
3. Do you think everyone in the community agrees about how wetlands should be used and managed? Are there any disagreements or conflicts?
4. What benefits do you get from the wetlands?

**C. Community Perception and Conservation:**

1. How important are wetlands to the community's well-being and livelihoods? (Encourage participants to share specific examples.)
2. Are you concerned about the future of wetlands in this area? Why or why not?
3. What are some of the things that community members are already doing to protect wetlands (if anything)?
4. What challenges do you face when trying to protect wetlands?
5. What could be done to encourage more people in the community to care about and protect wetlands?
6. What role should the community, government, and other organizations play in wetland conservation?

7. What kind of training or education do you think would be useful in promoting wetland conservation?
8. Do you have any local by-laws related to wetland conservation?
9. If yes, are these laws respected and fully implemented?
10. Do you have any suggestions for improving wetland management and conservation in this area?