# THE EFFECTS OF CULTURAL PRACTICES AND INDIGINOUS KNOWLEDGE ON ECOSYSTEM MANAGEMENT IN LAKE HAWASSA, ETHIOPIA

**M.A THESIS**

**TADELECH TEMESGEN AMELO**

**HAWASSA UNIVERSITY, HAWASSA, ETHIOPIA**

**MAY, 2020**

# THE EFFECTS OF CULTURAL PRACTICES AND INDIGINOUS KNOWLEDGE ON ECOSYSTEM MANAGEMENT IN LAKE HAWASSA, ETHIOPIA

**TADELECH TEMESGEN AMELO**

**A THESIS SUBMITTED TO THE**

**COLLEGE OF BUSINESS AND ECONOMICS,**

**DEPARTMENT OF COOPERATIVES,**

**SCHOOL OF GRADUATE STUDIES**

**HAWASSA UNIVERSITY, HAWASSA, ETHIOPIA**

**IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR**

**THE MASTER OF ARTS IN COMMENITY DEVELOPMENT**

**MAY, 2020**

# Advisors' Approval Sheet

This is to certify that the thesis conducted "**THE EFFECTS OF CULTURAL PRACTICES AND INDIGENOUS KNOWLEDGE ON ECOSYSTEM MANAGEMENT IN LAKE HAWASSA, ETHIOPIA**." submitted in partial fulfillment of the requirements for the degree of Masters of art in community development in the graduate program of the department of cooperatives and was carried out by **Tadelech Temesgen Amelo** our my supervision. Therefore we recommend that the student has fulfilled the requirements and hence hereby can submit the final thesis to the department.

| **Major advisor;** | **Signature** | **Date** |
|---|---|---|
| **Gari Umeta** | _____ | |
| _____ | | |
| **Co-advisor:** | **Signature** | **Date** |
| **Habib** | _____ | _____ |

## DECLARATION

I hereby declare that this M.A. thesis entitled, **"THE EFFECTS OF CULTURAL PRACTICES AND INDIGENOUS KNOWLEDGE ON ECOSYSTEM MANAGEMENT IN LAKE HAWASSA, ETHIOPIA."** is my original work and has not been presented for a Degree/Diploma in any other university, and all sources of material used for this thesis have been duly acknowledged.

Name: **TADELECH TEMESGEN AMELO**

Signature: _____

This M.A. thesis entitled, **"THE EFFECTS OF CULTURAL PRACTICES AND INDIGENOUS KNOWLEDGE ON ECOSYSTEM MANAGEMENT IN LAKE HAWASSA, ETHIOPIA."** has been submitted for examination with our approval as Thesis advisors.

Name of the Advisor: **GARI UMETA (M.A)**

Signature: _____

Name of the Co- Advisor: **Ato. HABIB BARISO**

Signature: _____

Place and Date of Submission: Hawassa University _____

## Acknowledgements

I am greatly indebted to Almighty God for granting me an opportunity to pursue this Master's program. His abundant care, love and grace have enabled me to soldier forward despite many challenges in my quest for a postgraduate degree. At the outset, I would like to express my heartfelt gratitude and thanks to my major advisor **Mr.Gari Umeta**. Moreover, I am very grateful him for his friendly approach and relentless encouragement to have a confidence to pursue this research.

Also great thanks for my co advisor, **Mr Habib** as my research work would not have been successful without his co-guidance and advice.

My earnest appreciation also goes to my family, and all those who have made any contribution to the success of preparation of this thesis report.

**TADELECH TEMESGEN AMELO**

# Table of contents

**Contents** **page**

# LIST OF TABLES

# ABBREVIATIONS AND ACRONYMS

BMU Beach Management Unit

FAO Food and Agricultural Organizations

HH Household Head

IK Indigenous knowledge

KII Key Informant Interviews

MEA Millennium Ecosystem Assessment

NRU Natural resource utilization

# ABSTRACT

*Lake Hawassa in Ethiopia is one such ecosystem that is currently threatened by degradation needs innovative measures to be conserved. The general objective was to analyze how culture affects resource utilization and conservation by the ethnic groups living in Lake Hawassa ecosystem. The study sample involved 120 households who live in Lake Hawassa ecosystem who were selected using simple random sampling procedure. The study utilized descriptive survey method where data was collected using semi structured questionnaires administered to household heads and face to face interviews with key informants including local community elders. Quantitative data was analyzed through descriptive analysis inform of percentages, frequencies and chi square test. Pearson-chi squared test was used to establish association between culture and environmental management. The study also revealed that the Chi squared test indicated that there exists a strong significant relationship between cultural aspects such as cultural values and norms and environmental management ($_x^2$=24.83, df =6, P<0.001). The study concluded that culture is a fundamental determinant of environmental attitudes which influence environmental attitudes and values and behavior. The study recommends that policy makers utilize a culture-specific approach in designing environmental policies to develop culturally appropriate environmental laws, regulations and policies. This is to ensure that the rights, livelihoods, and culture of communities are considered in designing of environmental laws, policies and regulations and the communities are actively involved in design of policies for sustainable environmental conservation and management*.



**Key words**: Cultural practices, Ecosystem management, Lake Hawassa, Ethiopia

# CHAPTER OE: INTRODUCTION

## 1.1 Background to the Study

Throughout the world, indigenous peoples are among the most valuable with respect to food production, conservation and management of critical ecosystems (Verschuuren, 2008). Indigenous communities at different parts of the world have adapted and attached their livings with the surrounding physical world (Jafari and Kideghesho, 2009). They are interacting with natural ecosystems (such as soil, water, land, forest, trees and wildlife) for various socioeconomic aspects (Millennium Ecosystem Assessment (MA), 2005). Indigenous peoples' relationships to their lands, territories and natural resources carry unique social, cultural, spiritual, economic and political dimensions and responsibilities (Adu-Gyamfi, 2011). Currently, indigenous communities and their civilizations have contributed greatly to the world's agricultural diversity and environmental conservation (FAO, 2007). Their resource management practices and techniques contribute to the maintenance and adaptation of farm productive, sustainable and resilient approaches of ecosystem conservation (Millennium Ecosystem Assessment (MA), 2005).

Indigenous peoples' agricultural, hunting, gathering, fishing, animal husbandry and forestry practices typically incorporate sustainable use of land and natural resources (Tanyanyiwa *et al*. 2011). The recognitions for indigenous people have their own ecological understandings, conservation practices and improving resource management approaches and it has positive impacts on sustaining local environments and its ecosystems for various uses (FAO, 2007). Indigenous knowledge (IK) of local people has now recognized as essential tools in environmental conservation, food production system and sustainable developments (UNESCO, 2011). IK refers to the perception that people have about their surrounding natural environment, which they use to adopt, adapt and develop technologies to their local context and to sustain their livelihoods (Adu-Gyamfi, 2011; Bhattarya and Tripathi, 2004). According to Warren (1991), the term local or IK is used to distinguish the knowledge developed by a given community. Entirely, IK is the local knowledge (LK) that is unique to a given culture or society with unique local practices in agriculture, animal husbandry, healing diseases and biodiversity conservations (Warren, 1991). LK is contrasted with the international knowledge system generated by universities, research institutions and private firms (Appiah-Opoku, 2007). Moreover, it is the

basis for local level decision-making in agriculture, health care, food preparation, education, natural resource management and a host of other activities in rural communities for socioeconomic development (Warren, 1991). This LK is currently conceded as best strategies or candidate in the area of development, and conservation as a coping mechanism (World Bank, 2015).

Nowadays, the recognitions have been given by many stakeholders for local practices in the conservation of natural resources and solving local problems. Because, the current increasing rate of natural resource degradation is a major threat to both human and animal survival. It has been pressing environmental challenges that nations face collectively (Hibbarda *et al*., 2010; Karanam *et al.,* 2013). The loss of each species has been causing the loss of potential economic benefits, as well as the cultural values of ecosystems (Attuquayefio and Fobil, 2005). As such, there has been much increased interest with issues relating to the environment conservation and call for resilient strategies. Indeed, the international knowledge (scientific) has taken the leading steps in ensuring proper conservation of the environmental resources via formal and professional standards. However, before the introduction of modern forms of natural resource management, the indigenous African communities often developed elaborate and viable traditional environmental conservation approaches (Roe *et al*., 2009). For instance, Traditional African societies have environmental ethics that help in regulating their interactions with the natural environment (Shastri *et al*., 2002).

Local people have developed a variety of consistent resource conservation and management strategies in tropical Africa (Appiah-Opoku, 2007). These local practices have been enhancing agricultural productivity, conservation and improving food security. Thus, the increasing attention paid to local ecological knowledge in recent years in various domains of development (Edmundo, *et al*., 2002). Traditional farmers' throughout the tropics exhibit a deep understanding of their environment and how to utilized local environment for livelihoods (Talawar and Rhodes, 1998). Similarly in Ethiopia, farmers have old dating experience and time-tested environmental knowledge of soil and water conservation (SWC), agricultural practices, natural resource management, knowledge of indigenous agro forestry system and biodiversity conservation. Further, the farmers have old experience in local technologies adaptation mechanism in various aspects of agriculture, food production and ecosystem conservation (eg. Konso indigenous

terracing, traditional agro forestry system of Gedeo), coping strategies of Borena and Afar pastoralist, local healing systems and food production in many rural area (Ocho, 2012). In addition to this, Getahun(2013) in his study stated a variety of indigenous soil fertility management and conservation techniques of Ethiopia farmers. Some of these include crop rotation, manuring, mixed cropping, terracing, fallowing and planting legumes and adaptation of agro forestry.

On the other hand, improving soil fertility has becoming a major issue for low productivity in agriculture in SSA. Similarly, land degradation in the form of soil erosion and environmental degradation is a major challenge in the Ethiopian highlands and it has puts impacts on crop productivity, food security and environments (Adimassu e*t al.,* 2017; Laekemariam *et al.*, 2016; Teklu, Williams, and Fanuel, 2018). In addition to this, low levels of input use, moisture stress, soil chemical degradation in the form of soil acidity and salinity/sodicity are some of the major crop production constraints in Ethiopia (Alemayehu *et al*., 2011). Indeed, soil acidity is one of the serious problems constraining crop production in small-scale farmers of the central, western and southern highlands of Ethiopia where precipitation is high enough to leach down soluble salts. Haile *et al*. (2017) estimated that ~43% of the Ethiopian-cultivated land is affected by soil acidity and associated agricultural problems). However, the local people have been adapting and using various practices for improving agricultural as well as environmental problems such as SWC system, soil fertility maintenances measures and practices. These resilient indigenous practices are recognized as coping strategies for small-scale rural farmers in many of tropical Africa (Rim-Rukel *et al.,* 2013).

In similar cases, the indigenous farmers of Sidama communities have been protecting and conserving soil resources via local knowledge. Therefore, the current study is geared to document the effects of cultural practices and indigenous knowledge of communities to manage ecosystem at Hawassa Sidama Zone.

## 1.2 Problem of the Statement

Contemporary ecosystem changes in most of the Ethiopian Rift Valley lakes are not well documented because basic data linking biological production to water quality and hydrological variability had not been acquired or is not well documented (ZinabuGebremariam *et al*., 2002). Hawassa city, located on the shores of Lake Hawassa, is showing radical growth and expansion as compared to other towns in the country. The growth in infrastructure accompanied with rapid population growth is a growing concern of point and non-point source pollutants to the lake. The disappearance of Lake Chleleka. Located in the eastern part of the lake, due to land use change (for the details see SOS-Sahel, 2004 report) and the watershed in the western part of the lake which is severely affected in terms of soil erosion and degradation are major threats for the lake's physical and chemical alteration. During the field survey, the researcher visited the activities the city administration is undertaking to tackle point and nonpoint source pollutants. The researcher appreciated the city administration's attempt to use constructed wetlands, at Amora Gedel and near the Hospital, as waste treatment plants.

However, the size and type of plants used to treat the waste from the city need to be reconsidered to increase the efficiency of wetlands to treat organic wastes. Different mitigation measures to reduce both point and nonpoint source pollutants are well addressed in the report by SOS-Sahel (2004). Different Studies indicate that there is severe degradation of lake Hawassa as characterized by reduced by fish size and fish populations as well as decreased surface area and depth( Elizanbet kebede and AmhaBelay,1994). The degradation of this lake has resulted to loss of livelihood for the fishermen and farmers who depend on this lake for food, water and as a source of income due to the frequent flooding occurrences of the lake and its ecosystem. This study investigates the effects of cultural practices and indigenous knowledge on ecosystem management.

## 1.3. Research Questions

1. What are the natural resource utilization practices of the communities living around Lake Hawassa ecosystem?
2. What are the environmental conservation cultural practices and indigenous knowledge of the communities living around Lake Hawassa ecosystem?
3. How do environmental conservation cultural practices and indigenous knowledge of the communities influence Lake Hawassa ecosystem resource use and management?

## 1.4. Study Objectives

### 1.4.1. The general objective of the study was;

- To assess the effects of cultural practices and indigenous knowledge of communities living around Lake Hawassa, ecosystem management and utilization

### 1.4.2. The specific objectives were:

- To evaluate the natural resource utilization practices of the communities living around Lake Hawassa adjacent ecosystem.
- To examine how culture affects resource utilization and conservation by the communities living around Lake Hawassa.
- To assess the environmental conservation cultural practices and indigenous knowledge of the communities living around lake Hawassa ecosystem.

## 1.5. Significance of the Study

Traditional cultural practices play a role in environmental conservation and management of various ecosystems (Odada *et al*., 2004). Lake Hawassa and surrounding zuria is severely threatened by degradation and waste entering the results of this study will provide baseline data to policy makers on the cultural issues to consider when formulating environmental management regulations to conserve this Lake as well as other natural resources. The study will also offer useful insights on how culture can be utilized as an entry point for community environmental management programmers and the cultural aspects which should be promoted to sustainably use and conserve Lake Hawassa ecosystem.

## 1.6. Scope of the study

This study was conducted around Hawassa lake shore living communities, at four selected sites, finchawa, wondo diqa loke areas and Referral hospital areas and finchawa living communities and the main objective of the study was to assess their cultural effects and indigenous knowledge on ecosystem management and its utilization among communities in the study areas. For the study 120 households were interviewed face to face and six key informants were also included in the study.

## 1.7 Operational definitions

**Culture**

This refers to the ideas, beliefs, values, norms/customs that control the behavior of the members of a specific community or society (Kakudidi, 2004).

**Cultural belief**

This is an opinion that reveals an individual's specific knowledge and evaluation of an issue or subject according to a particular culture or society (Belfiore, 2012).

**Cultural norms**

These are informal understandings that control the behavior of members of a society as the acceptable conduct of individuals (Lapinski and Rimal, 2005). Cultural practices

These refer to the demonstration of a culture of people particularly in regard to traditional and habitual patterns of social interactions, behaviors and activities undertaken by an ethnic group (Kiriro, 2011). They are manifested in forms such as religious and spiritual practices, dietary preferences and traditional ways of natural resource management (Milfont *et al*., 2006).

**Cultural values**

These are guides of behavior that entail the commonly upheld standards of what is acceptable or unacceptable, right or wrong in a society (Belfiore, 2012).

**Ecosystem**

An ecosystem is a system of interconnected elements including living (biotic) and non – living (a biotic) components that interact with one another through nutrient cycle and energy flows (Steiner, 2002).

**Environmental attitude**

This refers to a person's concern for the physical environment and surrounding (Heberlein *et al*., 2012).

**Environmental behavior**

This is behavior that intentionally makes an effort to ensure that an individual's actions reduce negative impact on both the natural and built environment (Heberlein *et al*., 2012).

# CHAPTER TWO: LITERATURE REVIEW

Literature on ecological anthropology hails the immense indigenous knowledge regarding ecology, the faunal and floral diversity. Anthropologists argue that this encyclopedic knowledge emanates from the traditional peoples intimate relations to nature and natural resources. Their close affinity to nature has helped them to develop a repertoire of knowledge on bio - diversity, the subtle ecological processes, the dynamic and behaviors of fauna and flora, the diverse ways in which resources can be put to use, the ways in which appropriate balance need to be made between people and natural resources, culturally mediated means of managing and conserving natural resources, etc. Regarding this, durning (1995) states, Indigenous peoples' unmediated dependence on natural abundance has its parallel in their peerless ecological knowledge. Most forest dwelling tribes display an utter mastery of botany. One typical group, the Shuar people of Equator's Amazonian lowlands, uses 800 species of plants for medicine, food, animal folder, fuel, construction, fishing and hunting supplies.

The Traditional peoples possess myriads of values, myths, taboos, beliefs and practices that relate to nature and its resources. This body of knowledge is recorded and transmitted as a rich cultural heritage from generation to generation through cultural and religious ways. Behind the beauty of traditional peoples' resource management practices are the overriding cultural and religious values. Traditional people exhibit an unfailing degree of "devotion to future generations, ethical regard for nature, and commitment to community among people..."

The modern world has thus divorced itself from the broader community of human and non-human world. The indigenous peoples, to the contrast, have had these holistic views of the cosmos. They have thus much to share form their vast of knowledge of natural resource management. In the words of Nelson (1998) these people have accumulated bodies of knowledge much like (western modern) sciences, and they can give us vital insights about responsible membership in the community of life (Kottack, 2002; Durning, 1993).

## 2.1. Traditional Societies Regarded as Stewards and Custodians of Natural Resources

A modest evaluation of anthropological literature shows that the fundamental world view of traditional people dictates their close and intimate affiliation with natural resources. The encyclopedic indigenous knowledge in ethno- botany and ethno-zoology and their affection to the natural resources enabled the sustenance and well- being of biodiversity. Anthropologists

regard traditional peoples as the stewards or custodians of nature and its resources. As a Columbian University Anthropologist regarding the traditions, kin- based forest resources management practice of the indigenous American - Indians say "The difference between a colonist ---- and an Indian is that the colonist wants to leave money for his children and that the Indians want to leave forests for their children." (Durning,1995). The depletion of natural resources that now threaten contemporary governments is the results, by and large, of the introduction of large scale, intensive economic development activities**.**

## 2.2. " Proven" Practices and Principles Relating to Traditional Natural Resource Management

Indigenous societies may be regarded as those who naturally apply the practices and principles that may be considered as essential in appropriate resource management. These "proven "principles and practices include:

1. The spirit of interactive relations with the natural resources. According to a German theologian Carl Barth cited in Solomon (2004), the biblical standard for man's relationship with other lower creatures and the ecosystem should be interactive. This involves sympathetic, good relations and friendliness with the rest of creation. Viewed in the context of traditional societies, this idea is very relevant. In such societies, as anthropological literature show, people consider the fauna flora and the other inanimate natural resources as if they are "equals" with human beings. They often develop interactive relations with the ecosystem. The human society in the views of traditional people is a community of people, fauna, flora and the ecosystem in general

2. The principle of stewardship and custodianship is another related important aspect of the man-ecosystem relations. This involves handling natural resources as things which are given to be cared for. This excludes the exploitative, dominating handling. Anthropological literature shows that traditional peoples living in the various remote corners of the world are usually the custodian of biodiversity. They treat their ecosystem with care. The destruction of biodiversity in today world is usually associated with the destruction of indigenous peoples and their cultural heritages (Kottack, 2002).

3. Ethical regard for nature: unethical views and practices reacting to the environment and its resources has, among other things, resulted in the deterioration of the resources and threatening of biodiversity. The traditional people have close and intimate ties with nature and the latter occupies central place in the cultural, religious, social beliefs, practices and institutions. The

community of people has no complete picture without the interactive relations with the ecosystem. The ancient values of these people include ethical regard for nature (Durning, 1995).

4. Commitment for community life and the future generation and ancestral ties (Cultural heritages): Individualism promotes the irresponsible use of the natural resources; and selfishness and disregard for the proven, accumulated wisdoms stored in cultural heritages. Commitment for the common good and concern for the future generation contributes for the wise management of natural resources. Because all these values are central to the indigenous peoples' ways of lives, they have lived from time immemorial in harmonious balance with the nature and the ecosystem, and if the intruding actions of the globalizing economy, which is threatening the indigenous cultural heritages stops or reduces, traditional peoples " offer living examples of cultural patterns that can help revive" appropriate, nature- friendly, interactive and ethical beliefs and practices pertaining to the ecosystem (Durning, 1993; Kottack, 2002).

5. The principles of sustainable development: The term "sustainable development" has become a buzz-word in the social science literature and in the GO and NOG development sectors alike. After centuries of economic development activities, the worries of our global society have become how to the use the natural resources to feed the present generation without jeopardizing the needs and rights of our future generation. Is sustainable development one of the core values of the indigenous societies? This question can be answered in the affirmative, given that traditional peoples are not just concerned with the needs of their own generation alone, they also pay much attention to their posterity. Generation-old cultural heritages and their local ecosystems with rich biodiversity have been preserved faithfully until intensified use of natural resources was introduced by economic development efforts.

## 2.3. Natural Resource Utilization in Communities

Resources are the backbone of every nation and community as they play two basic roles including the provision of basic materials for production of goods and services as well as environmental services such as water, air and soil (Rodgers, 2004). Natural resources exist in various forms such as extractive resources which require extraction including oil, gas and minerals and land resources (such as water, soil, and forests) which do not require extraction (United Nations, 2013). Sustainable utilization of resources refers to use of resources for social and economic benefits while maintaining biodiversity protection for use by future generations (Kellert *et al*., 2000).

Natural resources are used in different ways depending on the livelihood of the community living in an ecosystem. For example, the natural resources found in pastoral areas are used for both productive and non-productive uses. Water, which is the most essential natural resource in the ecosystems where pastoralists (arid environments), live is used for both domestic chores and livestock (FAO, 2004). On the other hand, in ecosystems where fishing is the economic activity, water serves the purpose of breeding fish. It is equally a fundamental natural resource for farming populations besides soil which is also used for pottery and brick making.

Community based natural resource management is a participatory strategy that allow as communities to participate in the management of resources surrounding them (Isilda *et al*., 2003). For example if a forest is located within a community's land, the community members are allowed access to resources such as timber for income generation with the principle of payment for ecosystem services. This strategy also recognizes the role of local institutions including community based organizations to protect the rights of the community members. Isilda and others (2003), explain that community based natural resource management is founded on the basis of common property resources and recognition of customary rights and local knowledge of the resources hence fights for the protection of the community against land and resource use rights.

According to Gimenez (2000), community based natural resource management has the capacity to increase sustainable resource management and conservation since it promotes collective action of community members. It ensures equitable resource access and participation of every gender and people of all ages, ethnic tribes, religions and class in management of natural resources. Gemenez (2000) have indicated the potential of the existence of a relationship between community-based management of resources and sustainability of social-ecological systems and hence improved livelihoods. Another closely related principle is that of community based conservation which proposes the involvement of people who affect and are affected by conservation laws, regulations and decisions in the planning and decision making processes of environmental management. It further calls for provision of economic and social benefits to the people involved as they sustain biodiversity (Child and Lyman, 2005).Thus, the inherent role of culture is also recognized by the principle community based natural resource management and community based conservation.

Community based natural resource management is a model that has been used by environmental conservationists to share benefits between the government and concerned communities but in most circumstances has not yielded adequate results (DeGeorges & Reilly, 2009). There are various reasons why it has failed including low resources particularly in the rural areas which are high populated as well as unequal distribution of the benefits that arise from the model and low incomes of rural households. The rural populations therefore do not change their attitude towards conservation as they perceive the model as having few benefits to them and their society. In most cases the governments usually maintain ownership of the resources and acquire revenue from it alienating the rural communities (DeGeorges& Reilly, 2009).Thus for the model to yield long-term benefits, there is need for full devolution of land ownership and natural resources so as to make best use of the benefits.

## 2.4. Environmental Conservation Cultural Practices

Culture is a complex whole that entails the sum total of the way of life which exists in two forms namely material culture (represented by tangible symbols) and nonmaterial/ideological culture (that encompasses practices, knowledge, economic activities, beliefs, taboos, behavior, cultural values, religion and customs ) of a community (Milfont *et al*., 2006). Cultural practices refer to the demonstration of a culture of people particularly in regard to traditional and habitual patterns of social interactions, behaviors and activities undertaken by an ethnic group (Kiriro, 2011).

## 2.5. The Link between Environmental Conservation Cultural Practices and Natural Resource Management

Sustainable management of natural resources calls for community involvement in their management and conservation (Kellert *et al*., 2000). This is often referred to as Community Based Natural Resource Management and it demands for community participation and integration of indigenous values and knowledge in modern ways of natural resource conservation (Kellert *et al*., 2000). Thus, sustainable Community Based Natural Resource Management recognizes the inherent role of culture in environmental conservation.

The importance of incorporating culture in environmental management is also founded on the concept of sustainability, which aims at improving quality of human life without degrading the environment or rather protecting the environment while upholding social values; one of which is culture of people (Mensah and Castro, 2004). Mensah and Castro, (2004), continue to elaborate

that sustainable development aims at achieving economic development while considering culture as an important aspect of people as well as ensuring that the environment is conserved. According to Spies (2003), there is a close interdependence of biologic and social systems which is basically a relationship between the environment and the culture of people. In addition, Becker (2002) argues that in order for sustainability to be achieved there is need to acknowledge environmental and cultural diversities of communities. In this regard, sustainable development entails utilization of natural resources at local, regional, national and even international levels with regard to cultural and environmental preservation.

## 2.6. Threats and Challenges Facing Cultural Relating to Nature and Resource Management

### 2.61. Traditional Resource Management Practices and Clash with Interventions from Development Projects: The Need for Culturally Sustainable Development

Anthropologists argue that traditional people have managed their ecosystems and resources in a sustainable manner. For thousands of years they have been doing a reasonable job of taking care of their natural resources. In the words of anthropologist Kottack (2002), “because of their low energy needs, traditional societies have managed their resources better than the developed societies manage theirs.

### 2.6.2. Industrial Globalization and Its Impact on Indigenous Natural Resource Management Practices

A careful review of literature in social / cultural anthropology shows that the state of the world's ecology, biodiversity and environment was in a good condition until the onset and rapid spread of globalizing industrialization. The indigenous cultures maintained their serene link and balance with the environment and the natural resources. But industrialization brought with it the degradation of the environment. One of the vicious effect of the wide spread effect of "industrialization has been the destruction of indigenous economies, ecologies and population." (Kottack 2002,Calhoun, *et al*, 1994).

The increasing concern for the adverse impacts of economic development on the environment has been also shared by many other social scientists and environmentalist advocators. "Economic growth has caused serious environmental damage and the current state of the environment will constrain further economic development" (Thirlwall 2004, Calhoun, *et al*., 1994).Development Economists argue that that the pressure of economic development on environment and natural

resources is and will be much higher on the developing countries as they heavily depend on the use of primary natural resources for their livelihood and continued existence.

## 2.7. Traditional Communal Structures, Cultural Heritage and Natural Resource Management: the Case of Ethiopia

### 2.7.1. The State of Traditional Natural Resources Management Knowledge and Practices in Ethiopia

Ethiopia is a home for well over 100 distinct ethno- linguistic groups, of which the majority resides in the Southern Nations, Nationalities and Peoples Regional State (SNNPRS). Many of the groups of people that may be termed as "indigenous" are found in the Region. The different ethnic groups have lived for centuries and institutions relating to the ecosystem of which the primary resources bases for livelihood are the major ones.

References to the accumulated repertoire of indigenous knowledge and practices pertaining to the natural resources conservation, agronomical practices, ethno – veterinary medicine, livestock handling, terracing and irrigation, etc in Ethiopia are often made in various sources. The Federal Rural Development Policy and Strategy Document (2002), for example, acknowledge this, stating the need for recording and promoting indigenous agronomic practices. "This indigenous knowledge is not to be lightly regarded, "says the document (p. 39). Regarding the native knowledge in animal resource husbandry among the nomadic paternalists, a rough translation of what is stated in the Amharic Document is as follows: "... the pastoral nomads (of Ethiopia) have invaluable livestock resource management knowledge and skill which they have generated over long periods of time. Without recognizing and being based on this, it would be of no use and destined to fail if we try to development animal resources in these areas. Thus to improve three livestock management practices and technologies in such areas, making detailed evaluation of the local knowledge and practices, and sifting out the beneficial ones form the shortcoming will be a priority task. "(p 123).

Traditional knowledge in soil conservation practices of the various ethnic groups in Ethiopia is also often well recognized. Notable among these is the traditional agronomic irrigation and soil conservation practices of the Konso of south Ethiopia. Regarding this, Professor Fasil G. Kiros, 1993) has this to say: The highly elaborated system of agricultural production of the Konso represents one of the best examples of how subsistence producers can effectively modify the

physical environment and render it more productive. The methods of terracing, irrigation and other technological elements developed by the Konso are probably the most remarkable to be found in the country. In a country where diverse ethnic groups live in varying agro- ecological zones with multiple subsistent production systems, it can be assumed that there are quite many other times – honored traditional knowledge and practices relating to the environment and natural resource use and management. Needless to mention, the bounteous and diverse nature of Ethiopia's natural resources is a well-known and often cited fact. Her diverse climatic conditions, viable topographies, rich fauna and flora, vast cattle, unparalleled water sources, among others, are often mentioned.

## 2.8. Conceptual Framework

Various studies on the relationship between culture and nature have been done and the role of culture in environmental management and conservation recognized (Brink *et al*., 2012; Griskevicius *et al*., 2006; Purzycki *et al*., 2012). A study conducted by Stern (2000) indicates that both environmental attitudes and environmental behavior are closely determined by environmental cultural conservation practices and perspectives. Odada and others (2004) reveal that socio-cultural factors including strict cultural beliefs and stratification of the communities in Lake Hawassa ecosystem play a role in degradation of the Lake's ecosystem. This study sought to understand how cultural factors affect resource use and management and how they can be exploited for sustainable ecosystem management in Lake Hawassa ecosystem since no such study has been done despite cultural factors being identified as playing a key role in degradation. The other research gap that the study sought to fill was to assess how culture can be utilized as an entry point for community environmental management programs and the cultural aspects which should be promoted to sustainably use and conserve Lake Hawassa ecosystem.

A societies' cultural background defines people's perceptions and actions towards nature (Berkes and Folke, 2002). According to Rapport (2006), there exists a symbiotic association between social systems and eco- systems.

This study asserts that ecosystem use and management is shaped by the cultural practices and perspectives of a community which determines environmental attitudes and behavior

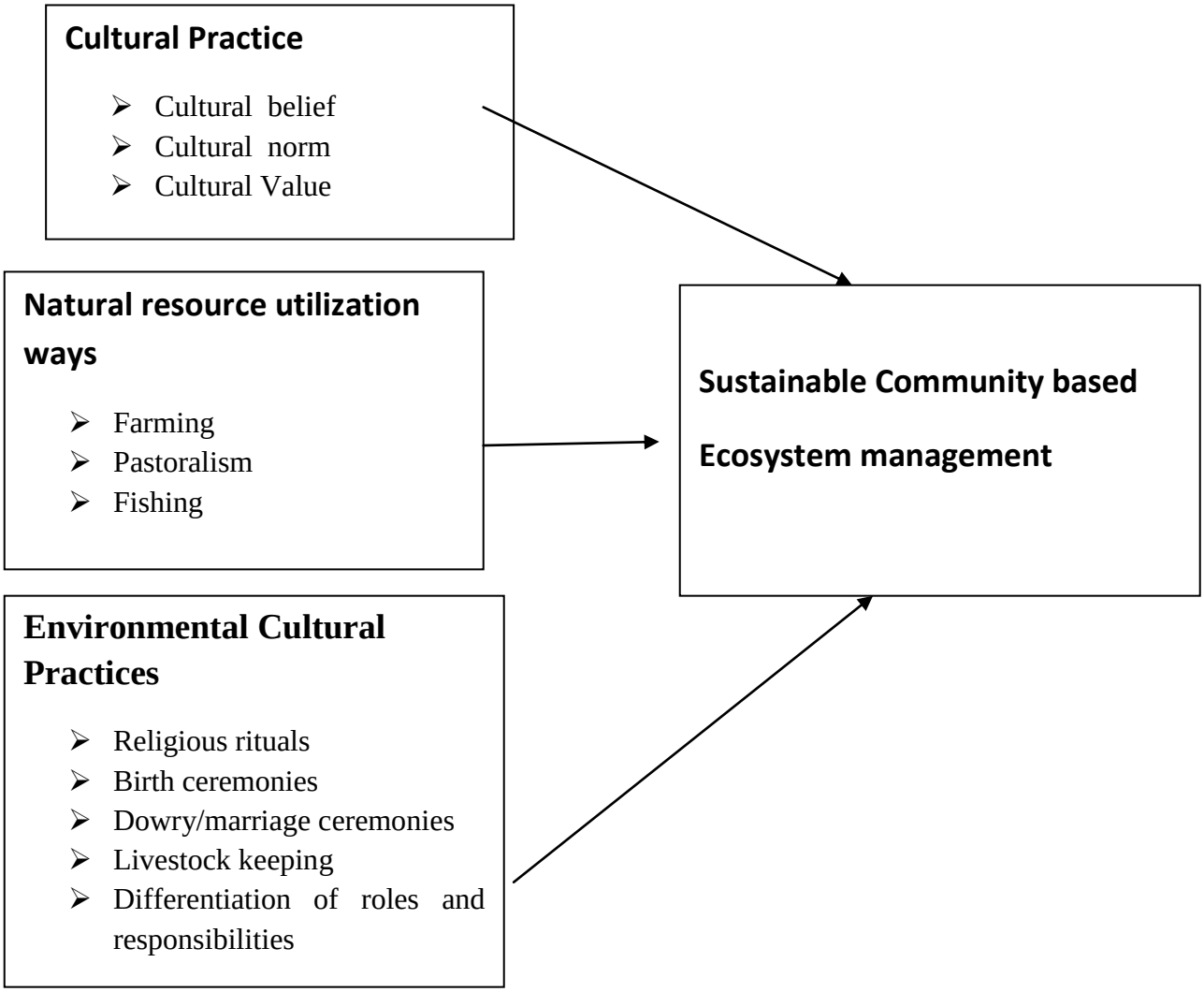



**Figure.1. Conceptual frame work**

**Dependent Variable.** Dependent Variable is Sustainable Community based Ecosystem management

**Independent Variable**. Independent variables are Cultural practices (Cultural belief, Cultural norm and Cultural values), Natural resource utilization ways (economic activities, Farming, Pastoralism, bee keeping and Fishing) and Environmental Cultural Practices (Religious rituals, Birth ceremonies, Dowry/marriage ceremonies, Livestock keeping, Differentiation of roles and responsibilities)

## CHAPTER THREE: METHODS AND RESEARCH DESIGN

### 3.1. Description of the study area and communities

A simple introduction of the areas may suffice here. The Sidama are a Cushitic speaking people of southwest Ethiopia in northeast Africa (Kumo, 2009; Tekile *et al*., 2012; Hameso, 2014), most populous of the Southern Nations nationalities and people's regional states (SNNPRS) 's 56 ethnic groups, with various sources estimating their population size between 3 and 4.5 million (CSA, 2013), making them the sixth most populous in Ethiopia (CSA, 2007). Their land is located some 275 km southwest of Addis Ababa, the national capital.

This study mainly conducted in Lake Hawassa shore living communities in sidama. lake Hawassa found (6033'-7033N latitude and 38022'E longitude, is among the endorheic Ethiopian Rift valley (ERV) lakes, which lies in the middle of a series of the Ethiopia rift valley at an attitude of 1680ma.s.l., some 273 km south of the capital city of Addis ababa. the lakes has a surface area of 90km$^2$ and a maximum and average depth of 22 and 11m, respectively (Elizabet kebede and Amha Belay, 1994). Its main inflow comes from the swampy area, which was once part of Lake Lake shallo and drains through river Tikur weha (Makin *et al*., 1975). The Hawassa area has a dry, sub-humid climate and receives a mean annual rainfall of 1154mm between March and October. The annual potential evaporation for the area is between 1100 and 1250mm (Elizanbet kebede and AmhaBelay, 1994). Lake Hawassa provides a habitat to different fish species, water, birds, plants and aquatic organisms.

The bulk of the schedule interview was conducted about 3 months in four selected(Peasant Associations, PA) of Hawassa District, which in turn is one of 4 such districts in the Sidama Zone, and located 10 to 15 km south west of Hawassa City, the zonal and regional capital. Of the four were specially selected as samples for household survey on purposive grounds (including proximity to a major lake Hawassa near site and the district center of highly lake ecosystem affected areas sites and where our near found localities).

### 3.2 Study Design

The research design was utilized by descriptive survey method. Qualitative research was conducted through face to face schedule interviews that were conducted with key informants including environmental protection bureau and selected community's elders. This method allows

for probing of in-depth information and was used to explore the effects of cultural practices and indigenous knowledge for sustainable community development through linking Ecosystems.

### 3.3. Sampling Procedure

Convenience sampling was used to select four Sub-locations which are in proximity to Lake Hawassa and the residents in these Sub-locations regularly use the lake due to its proximity. Then, simple random sampling was used to get participants from each of the selected Sub locations. In addition, purposive sampling will be used to select key informants of environmental protection bureau.

### 3.4. Sample size

The sample size (n) was determined by using the following formulae given Dongol (2007) as cited in Cole (2009):

$$\text{Sample size} = \frac{NZ^2x0.25}{d^2X\ (N-1) + (Z^2x0.25)}, \text{ Where}$$

n=Sample size required; N= Total target population; d= Precision level (0.05)

Z= Number standard deviation units of sampling corresponding to the desired confidence level; Z=1.96 at 95% confidence level

From this formula, the required sample size for this study was 120 households and it was regarded as representative of the total households. The total number of households and the number of sampled households in each Sub-location was shown in Table1.

**Table 1:Total number of households from study areas**

| Name of Location | Total Number of Households | Sampled households |
|---|---|---|
| 1.Loke area | 64 | 36 |
| 2.Finchawa area | 43 | 34 |
| 3.wondo diqa | 37 | 25 |
| 4.Referal areas | 36 | 23 |
| Total | N=180 | n=120 |

Source from kebele administration

### 3.5. Research Instruments

A questionnaire was developed as guided by the study objectives**.** The questionnaires prepared to capture information on the effects of cultural practices and indigenous knowledge linking ecosystem management around Lake Hawassa area living selected communities.

## 3.6. Data Collection Procedure

Before data collection, the reliability of the research tools was checked through piloting where the research instruments including key informant interview schedules and the questionnaires was administered to few respondents in the research site before the study was conducted. This was done to ensure that the questions were clearly understood by the respondents. Questions that were unclear were rechecked and rephrased to enhance comprehension.

Data was collected using a semi structured questionnaire to generate quantitative data that is attached as Appendix II. The questionnaire had some open-ended questions which were useful in generating qualitative data in order to gain a better understanding that enabled more insightful interpretation of the results from the study. The researcher administered the questionnaires to the respondents who were household heads from four rural selected sites that found near Lake Hawassa ecosystem. Questionnaires were administered to a total of 120 household heads. In addition, qualitative data was collected through key informant interviews where 5community elders and 1 environmental protection and forestry bureaus were interviewed. In addition, an observation sheet and photographs was taken during the data was collect on the natural resource utilization by the communities. The data was collected between the months of January 2019-march 2020.

## 3.7. Data Analysis

The collected data were both qualitative and quantitative as derived from the questionnaire and key informant interviews. The quantitative data that were generated by the structured questionnaires were analyzed using IBM SPSS Statistics for Windows, Version 21. The descriptive and chi-square statistics were used to test significance of relationships between household characteristics and cultural practices with communities' indigenous knowledge to manage ecosystem.

# CHAPTER FOUR: RESULTS AND DISCUSSION

## 4.1 General Information

### 4.1.1 Response Rate

According to Dillman, Smyth and Christian (2009), response rate is the number of participants who completed a questionnaire that is administered divided by the sum of participants who were asked to participate in a study. There were a total of 120 questionnaires administered to household heads face to face and filled by asking to provide their feeling by researcher and, this due to most of the respondents cannot read. Proper and adequate planning was undertaken before the start of the study where the consent of the chiefs of the sub-locations where the study was undertaken was sought before the start of data collection. The chief would then inform potential respondents of the study which increased their willingness to participate in the study. The questions included in the questionnaire were also written in simple language and translated in to Sidamic local languages to enhance understanding.

## 4.2. Demographic Data

### 4.2.1. Age of Respondents

The study revealed that the respondents age, and the results indicated that 30% (36) of them were between the ages of 18-35 years while 24.2% (29) of them were above the age of 60. And the majorities were 45.8% (55) of the respondents were between the ages of 36-60 years. This shows that the majority of the respondents were at the age of actively participating age for environmental protection and have awareness on ecosystem management and utilization due to long live in the areas. According their responses most of them live for more than 30 years in the areas. This is further explained in table 2 Below

**Table 2: Shows frequency of age of respondents**

| Age | | Frequency | Percent |
|---|---|---|---|
| Age | 18-35 | 36 | 30.0 |
| | 36-60 | 55 | 45.8 |
| | above65 | 29 | 24.2 |
| | Total | 120 | 100.0 |

Source: own survey result, 2019

The result indicated that the age of the respondents was significantly different ($x^2$= 24.62, df=6, P< 0.005).It was important to includes all age groups in the study including the energetic young generation (18-35) as they form an important target of environmental education which is a key tool in ensuring there is adequate awareness on environmental policies, laws and conservation measures. The middle aged population (36-60 years) 45.8% was the majority and was equally important in the study as they are the heads of the interviewed households' .The study suggest that they are actively involved in natural resources utilization and can actively participate in natural resources management. And equally important were the elderly respondents who provided an in-depth knowledge of the cultural practices and indigenous knowledge that the study sought to establish.

**Table 3:Shows Pearson Chi-Square test of age**

| Age | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| **Pearson Chi-Square** | 24.629[a] | 6 | .000 |
| Likelihood Ratio | 28.523 | 6 | .000 |
| Linear-by-Linear Association | 6.250 | 1 | .012 |
| N of Valid Cases | 120 | | |

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.08.

### 4.2.2. Education level of respondents

The study also revealed the education level of the respondents. The majority (43.3%) (52) were non formal and Have no attained formal education and 28.3 %( 34) having primary school education, 22.5 %( 27) had secondary education while 5.8% had tertiary and university education. However, 43.3% had no formal education as illustrated in the Table4.below

**Table 4: Education Level of Respondent**

| Education | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Non formal | 52 | 43.3 | 43.3 | 43.3 |
| 1-8 | 34 | 28.3 | 28.3 | 71.7 |
| 9-12 | 27 | 22.5 | 22.5 | 94.2 |
| above 12 | 7 | 5.8 | 5.8 | 100.0 |
| Total | 120 | 100.0 | 100.0 | |

Source: own survey result (2016)

The findings of the study showed that the level of education among the respondents was significant ($X^2$=25.54, DF=3, P< 0.01) with 34(28.3%) of the respondents having a relatively high level of understanding and hence were in a position to understand and respond to the questions asked during the study. This result also suggests that the respondents are capable of making appropriate decisions concerning natural resources utilization and management.

**Table 5: Shows Chi-Square Tests**

| **Education** | N | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|---|
| Pearson Chi-Square | | 25.540[a] | 3 | .000 |
| Likelihood Ratio | | 34.906 | 3 | .000 |
| Linear-by-Linear Association | | 10.410 | 1 | .001 |
| N of Valid Cases | 120 | 120 | | |

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 2.22.

### 4.2.3. Respondents gender

The researcher also aimed at evaluating the respondent's gender whereby among the respondents, the majority were males at 38.3% (82) while 31.7% (38) were female. The inclusion of both genders in ecosystem management is fundamental as they have different roles to play in conservation of natural resources. Women are usually inclosing nexus with their environment as they feed their families. It is fundamental to note that gender roles and responsibilities as well as norms and division of labor determine how human beings relate to the environment. The differences in gender influence the extent and nature of environmental use and even impact

(Milfont, *et al*., 2004). It is important to include women in the study as women and environment are inseparable as they manage the ecosystem's biodiversity and natural resources.

Different gender also have diverse power to control natural resources as women lack power to make decisions while men have power to control management of resources(Aditya, 2016). The study established that both women and men use and manage natural resources differently since women are major water users as their role is particularly focused on household chores such as cooking, washing, cleaning and bathing the family all of which require water. Women are also involved in fetching the water from the lake and as such they often interact with the resource. As such if women are targeted in the sustainable management initiatives of the lake, the efforts would be successful. This finding agrees with that of Aditya (2016) who indicated that women take the roles of cultivating the land; collectors of water and firewood have a close relationship with the local ecosystems.

**Table 6: shows gender response**

| sex | Frequency | Percent |
|---|---|---|
| female | 38 | 31.7 |
| male | 82 | 68.3 |
| Total | 120 | 100.0 |

Source own survey data, 2019

### 4.2.3. Respondents family size

The study also revealed that the respondent's family size and the results indicated that 33.3% (40) of households have 4-6 family size while 23.3% (28) of them were have family size of 7-9. And the majorities have 40 % (48) of the respondents have the family size of 1-3 size. This indicates that large family size is important for inclusiveness and mass involvement on large hectare environmental protection rather than individuals can do.

**Table 7:Shows family size of respondents**

| Family si | Frequency | Percent |
|---|---|---|
| 1-3 | 48 | 40.0 |
| 4-6 | 40 | 33.3 |
| 7-9 | 28 | 23.3 |
| >9 | 4 | 3.3 |
| Total | 120 | 100.0 |

Source: own survey result (2019)

### 4.3 Natural resource utilization ways of the communities living around Lake Hawassa adjacent ecosystem.

From the study objectives, the first one sought to evaluate the natural resource utilization ways of the communities living adjacent to Lake Hawassa. Natural resource utilization ways around lake's and other ecosystem were goods. And also understood fundamental environmental factor and understanding how the communities interact with the resource and how the resource utilization methods can be enhanced to be sustainable. It was established that lake ecosystem have diverse natural resources including water, fertile soil, fish, medicinal plants and animals which the communities utilize for survival.

The respondents interviewed during the study from 4 local sites namely finchawa, loqe site wondo diqa and referral sites

The communities' economic activity was used as means to indicate their natural resources utilization ways. According to the study, 40(33%) of the respondents practice farming 35(29.2%) are livestock and farm while 28(23.3%) of them are practice fishing related business. The communities also utilize the Lake and its ecosystem for tourism activities such as rafting where approximately 38(10%) of the interviewed respondents indicated that they practice it in lake Hawassa adjacent. Bee keeping is also an emerging economic activity that is being practiced by a small group (5%) around Lake Hawassa ecosystem.

**Table 8:Natural utilization ways of the respondents**

| NRU | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Fishing and related business | 28 | 23.3 | 23.3 | 23.3 |
| | Pastoralism | 12 | 10.0 | 10.0 | 33.3 |
| | Farming | 40 | 33.3 | 33.3 | 66.7 |
| | Bee-keeping | 5 | 4.2 | 4.2 | 70.8 |
| | livestock and farming | 35 | 29.2 | 29.2 | 100.0 |
| | Total | 120 | 100.0 | 100.0 | |

Source: Survey result 2019

The results revealed that the natural utilization ways of the respondents were significant ($x^2$= 10.513, df =4, P<0.05) with the majority depending on farming and fishing as the dominant livelihood systems. This result indicates that the respondents' livelihood systems are dependent on the Lake either directly or indirectly. However, the economic activity around the lake cannot affect the lake ecosystem. This is further elaborated in the table-9-

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 10.513[a] | 4 | .033 |
| Likelihood Ratio | 10.862 | 4 | .028 |
| Linear-by-Linear Association | .132 | 1 | .716 |
| N of Valid Cases | 120 | | |

a. 3 cells (30.0%) have expected count less than 5. The minimum expected count is 1.58.

The study further indicated that the households who were interviewed and the responses revealed that the study community practiced mixed economic activities including mixed farming (livestock keeping and crop cultivation) as well as fishing. The lake provides an important habitat for various fresh water fish species namely: Tilapia and cat fish being prevalent in the lake Hawassa. Fishing is particularly an important source of livelihood to the fishery cooperatives and other youths who live in the lake shore as evidenced in the appendix. The study

established that the natural resource utilization ways of the community depends on the lake for one natural resource or another: the fishermen depend on it for fish while the pastoralists use the water for their livestock as well as pasture that grow at the lake shores. Farmers, on the other hand, utilize the lake water for irrigation hence there is extensive exploitation of the lake and its resources by the communities. This results to over-dependence on the lake and its resources by the communities which is the cause of the current degradation (including sediments due to intense soil erosion, water quality degradation, increasing number of fish catch) of the lake and causes fish species loss.

The sample of evidence on appendix shown the Lake's degradation illustrating deforestation of trees in the uplands which are then carried by soil erosion and taken as log sediments other plastic wastes enter into the lake.

## 4.4 Environmental conservation cultural practices and indigenous knowledge of communities

The study also establishes the environmental conservation cultural practices and indigenous knowledge of the communities living around Lake Ecosystem. The study established on local communities believes, practice and norms. When the respondents were asked whether their community have cultural norms and practices as well as cultural beliefs, 40(33.3%)percent of them confirmed that have cultural norms, 50(41.7%)have cultural practices while 30(25%) believe in supernatural beings/ cultural beliefs.

From the literature review and interview, in Sidama community there has been downward spiral in ancestral traditions in the last 110 years in general and the pace of the change accelerated, particularly since the 1950s and 1960s, with the intensification of demographic changes, expansion of modern religions and related socio economic transformations (Hamer, 2007). This is what most local informants generally agree with.

Due to modernization , declining fear and respect for ancestral values and also more importantly, growing needs of livelihood, lack of cultivable land, etc., people are abandoning many of their traditional non-economic based tree conserving beliefs and practices, such as ancestral memorial planting in grave yards decline(from researcher data ,2019.

**Table 9: Shows cultural aspects of community**

| Cultural aspects | | Frequency | Percent |
|---|---|---|---|
| Valid | Cultural Norms | 40 | 33.3 |
| | Cultural Practice | 50 | 41.7 |
| | Cultural beliefs | 30 | 25.0 |
| | Total | 120 | 100.0 |

Source: Survey result, 2019

### 4.4.1. Cultural practices and indigenous knowledge of the communities

During the study, the respondents were asked by researcher whether their community have cultural practices and their responses result showed that majority (81.7%) of the respondents said that their community members uphold cultural practices while 18.3% of them said that they do not as shown in the Table

**Table 10:The number of respondents upholding cultural practices**

| Response | Percentage |
|---|---|
| Yes | 81.7 |
| No | 18.3 |
| Total | 100.00 |

The study further assessed which were the cultural practices of the communities living around Lake Hawassa ecosystem and the findings were as follows: 39.2% (47) of the respondents were involved in Weeding (marriage ceremonies) around lake; 30.8%(37) were involved in Celebration of fichee camballala new year of sidama people; 17.5 %(21) participated Religious showering ceremonies while 12.5% (15) Conflict resolution practiced. This is further shown in the Figure -2-

| Cultural practices | | Frequency | Percent |
|---|---|---|---|
| Valid | Celebration of fichee camballala | 37 | 30.8 |
| | Weeding ceremonies | 47 | 39.2 |
| | Religious showering ceremonies | 21 | 17.5 |
| | Conflict resolution practice | 15 | 12.5 |
| | Total | 120 | 100.0 |

Source: own survey result, 2019

Other cultural practices and indigenous knowledge of the communities that are closely related to the ecosystem management include attachment to livestock, differentiation of roles and responsibilities, plants with cultural value as well belief in religion and God. Among the sidama, in their rationale for agricultural land usage two types of knowledge are detected. The first one is their knowledge of allocating the specific land for cultivation, and the second is that their knowledge of sustainable utilization. Such indigenous knowledge and practices used in conservation of other natural resources like plant species and underground water.

The extent to which each of them is practiced by the community members as indicated by both household heads and key informants is as shown in Table 11.

**Table 11:Cultural practices and indigenous knowledge of community in Lake Hawassa ecosystem**

| Cultural practice | Number of respondents | Percentage |
|---|---|---|
| Attachment to livestock | 35 | 29.1 |
| Differentiation of roles and responsibilities | 42 | 35 |
| Upholds plants of Cultural Value | 34 | 28.3 |
| Belief in religion | 9 | 7.6 |

Source: own Survey result, 2019

#### 4.4.1.1 Environmental cultural practices and indigenous knowledge of the community living in Lake Hawassa ecosystem

##### 4.4.1.1.1. Attachment to Livestock

According to the study, majority of the respondents living around Lake Hawassa ecosystem was depends on farming and livestock keeping either large herds of livestock or practicing it alongside other activities. Out of the120 respondents interviewed, (35%) of them practice livestock keeping .Livestock, in particular cattle, is an important feature of the communities as it is viewed as a major source of wealth. Their food includes blood; milk and meat this makes them to have a special attachment to livestock.

#### 4.4.1.1.2 Differentiation of Roles and Responsibilities

In the study areas, communities have clearly differentiated roles and responsibilities of both men and women. Men are traditionally given the responsibility for farming and looking livestock and actively participating environmental protection to their farm and off farm .In addition, the women in the study area were involved in offer home keeping ,child care, and perform domestic chores including cleaning and washing, food processing. It was established that men in Lake Hawassa ecosystem have the role of protecting their families as well as looking after the livestock and fishing and thus they interact more with resources such as land, forests, and plants.

**Table 12:Gender roles of respondents**

| Role/responsibility | Gender |
|---|---|
| Looking after livestock | Men |
| Offering labor in the farm | Men |
| Child care | Women |
| Domestic chores(cleaning, washing) | Women |

Survey own result, 2019

The study findings imply that women in the study area interact with the lake and rivers draining to it to a greater extent compared to men. In this regard, conservation and management efforts aimed at reducing sedimentation in the lake and river as well as enhancing water quality should to target both women and men because both have a role to play.

Furthermore, women are exceptionally vulnerable to environmental degradation since, it is well established that environmental hazards such as soil erosion and flooding which are now common.

#### 4.4.1.1.3 Belief in Religion, God

The study revealed that most (81%) of members of the community living around the lake's ecosystem are one God (known as in Sidamic Mitticho magano).

The values propagated under indigenous religion are usually very conservative, resisting the influence of modernization including modern religions such as Islam and Christianity (Mary& John, 2009). Thus communities that uphold and practice traditional religion hold rigidly to these values and covenant that join them together and pass them from generation to generation. This contributes to environmental conservation as it ensures that environmental values inherent in traditional religion are insistently upheld and practiced.

The findings agrees with the findings of Shastri and others(2002) who indicated that traditional African communities had a religion that propagated environmental ethics which was fundamental in regulation of human-environment interactions. Their study further elaborated that traditional religion was characterized by environmental beliefs, practices, features and symbolism which ensured that natural resources were conserved. For instance, there were protected areas set aside for gods and goddesses, a practice which run from one generation to the other enhancing conservation. Although the introduction of modern religions such as Christianity and Islam coupled with western education have corroded the rich cultural values and religious beliefs of the African communities, Traditional religion is still upheld in most of these communities and play a significant role in environmental conservation (Smith & Wishnie, 2000).Therefore there is need to integrate traditional religion environmental principles in the modern conservation and management programs so as to achieve sustainable management of natural resources (Eneji *et al*., 2012).

**4.4.1.1.4. Plant species with cultural and spiritual value to the communities**

The study also revealed that the communities living in Lake Hawassa ecosystem have various plant species that are of cultural value to their members. Plants feature in various areas of the communities' culture under this study including medicine, use in ceremonies, religion and social structure. Several plant species play a cultural and symbolic role in the lives of the community members. Some of the plants are used in cultural ceremonies such as weddings including specific species of ketema or coffee ceremony grass. Enset bulla (kocho) provided as cultural food and prepared on ceremonies of fiche chamballala of the sidama new year as well as other cultural activities prepared food and this plant species has high cultural value rather food.

The respondents were asked whether there are plant species that are of cultural value to their community and from the study 88.3 percent indicated that there were tree species and other plants which were medicinal, religious and others used in various ceremonies. As indicated earlier, another key environmental cultural value that the communities have is upholding plants of cultural value as indicated by their responses as shown in Table -13-

**Table 13: Percent of Respondents who use Plants with Cultural Value**

| Response | Frequency | Percentage |
|---|---|---|
| Yes | 106 | 88.3 |
| No | 14 | 11.7 |
| total | 120 | 100.0 |

Source: own Survey result ,2019

The study results indicated 88.3% (106) of the respondents utilize plants with cultural value while 11.7% (14) revealed that they do not utilize them. The observed difference however was not statistically significant; there is no statistical significant difference communities those utilize plants and those who do not ($x^2$= 1.1E2[a], df =4, P< 0.10). This suggests that despite utilization of plant species with cultural value among communities, the use of these plants do not significantly affect Lake Hawassa and near found ecosystem management. Thus, it implies that the cultural values attached to these plants make them be utilized sustainably and sustainable management of the ecosystem.

**Table 14: Chi-Square Tests of plant utilization**

| Plant(tree) | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 1.109E2[a] | 4 | .000 |
| Likelihood Ratio | 79.107 | 4 | .000 |
| Linear-by-Linear Association | 109.910 | 1 | .000 |
| N of Valid Cases | 120 | | |

a. 4 cells (40.0%) have expected count less than 5. The minimum expected count is 1.40.

It is important to note that although the study revealed the existence of some cultural practices such as use of herbal medicine in treatment of diseases pose a danger to the plant species used, particularly if the species are not replanted often. The natural resources used in the cultural practices are slowly becoming endangered according to a key informant and thus there is need to merge cultural ways of conservation with convectional natural resource management methods for sustainable resource conservation. According to a key informant interviewed during the

study, some medicinal plants such as Hamesa, Ejerisa,Masicho and wadicho (sidama ,communities), are currently vulnerable to extinction as they are largely exploited for their medicinal value and specially hamesa high medicinal value among child diarrhea treatment in sidama communities and the number of specie decrease and not found all areas in similar manner . There is need for medicinal plants and plants with cultural and economic importance to be protected to ensure their continual usage among the community. Healthy harvesting of these plants should be encouraged to avoid unnecessary destruction and possible wastage.

In all the communities involved in the study, it was noted that there were both dominant values and tender values which are well illustrated by the roles and responsibilities of either gender. Dominant values are expressed by males/men and they include assertiveness, protection, wealth and material things while tender values are associated with females/women such as care and service for others (Gemenez, 2000). Gemenez (2000) further indicates the communities are influenced more by the dominant environmental values as men have authority over women but the influence of the resulting decisions is short lived. On the other hand, the tender values have a long term effect as women are caretakers of the environment and families.

The study showed that the community has various medicinal plants that they use for treatment of various diseases such as plants used as medicine as shown in the Table 4.6below:

Part(s) of medicinal tree and shrub species used for human treatment in Hawassa zuria District, Sidama, Ethiopia.

The World Food and Agriculture Organization (FAO) promotes the health and well-being benefits of forests and researches in the field of environmental psychology also show the values, perceived or otherwise, people derive from experiencing contact with the natural world, especially trees and forests( Irvine *et al*., 2013).

Respondents generally believed that all plants have medicinal values, despite shimada murro serving as the most important medicinal role. Shimada murro include herbs, climbers, shrubs, grass and other small plants(Interview, 2019).

This is understandable in the context of a country where, some reports estimate, about 80 per cent of the population utilizes traditional medicine that mainly depends on medicinal plants (WHO, 2001; Kassaye et al., 2006; BIE, 2014). Over 95 per cent of decoctions for folk drugs are sourced from medicinal plants (Abebe, 1986, cited in IBCR, 2009). About 887 plant species are used for medicinal purposes, constituting over ten per cent of vascular species of the country

(Zewdu & Demissie, 2001; Bekele, 2007), of which 2.7 per cent are reported to be endemic to the country (IBCR, 2009). In recent years, studies from mainly biological science perspective on ethno medical-botanical beliefs and practices among the various ethnic groups of Ethiopia show continuing relevance of plants in dealing with human and animal health problems ( Wassihun *et al*., 2014).

**Table 15: Medicinal plants among the sidama Community**

| Plant species (sidamic language) | Botanical name |
|---|---|
| Hamesa | Commiphora campestris Engl |
| Ejersa | Olea europaea subsp. cuspidata (Wall. ex G.Don.) Cif. |
| Masincho | Croton macrostachyus Hochst. ex Delile |
| wadicho | Cordia africana Lam |

Source: Survey result 2019

### 4.5 The relationship between environmental conservation cultural practices and indigenous knowledge and resource use and management

The study sought to determine the relationship between the environmental conservation cultural practices and IK and resource use and management around Lake Hawassa ecosystem. Pearson's chi squared test was used to determine whether there is a relationship/ association between the cultural aspects of the communities living in Lake Ecosystem and resource management and the findings indicated that there exists a significant relationship between cultural aspects such as cultural values and norms and environmental attitudes which then influence its management. During the study, the respondents were asked whether their community uphold cultural aspects such as cultural practices, norms and believe. The study showed that majority (95%) of the respondents involved in the study uphold cultural aspects while 5% do not, a difference that is statistically significant ($X^2$= 24.813[a], df=6, P< 0.001). This is an indication that culture is a very fundamental feature in the lives of the members of the community under study and a determinant of various aspects such as natural utilization, housing and food/diet. This implies that a change in the cultural aspects of the community would significantly influence how the community use and manage their natural resources.

The study also revealed that communities uphold various cultural norms, believe in cultural beliefs and perform some cultural practices. Out of the total number of respondents who

participated in the study, 41.7% (50) of them indicated that they uphold cultural practice, 33.3 %( 40) revealed that they perform cultural norms and values while 25 %( 30) pointed out that they have cultural beliefs in which they believe in. This is further illustrated in the Table -16-

**Table 16:Cultural aspects of the community living in Lake Hawassa ecosystem**

| Cultural aspect | Frequency | Percentage |
|---|---|---|
| Cultural norms and Values | 40 | 33.3 |
| Cultural practices | 50 | 41.7 |
| Cultural beliefs | 30 | 25 |

Source: Survey own result, 2019

Pearson's Chi squared test was used to determine whether there is a relationship between the cultural aspects of the communities living in Lake hawassa ecosystem and ecosystem management and the computation gave the following results ($x^2$=24.83, df =6, P <0.001). This finding indicated that there exists a strong statistically significant difference between who uphold cultural aspects of their culture and those who do not. This result also indicates that most of the respondents interviewed upholds and /or practices more than one cultural aspect of their culture and that the cultural aspects are significantly related among the communities. These findings in general indicate that that culture is significantly related to natural resource management and that enhancing the environmental cultural practices and IK would result to better environmental conservation and management.

The study findings agree to the findings of the authors Stern and Dietz (1994) who explain that there are three distinctive motivators for environmental attitudes namely the individual, the community, and all living things. The community and culture are intrinsically interrelated and thus culture drives the different environmental attitudes of a community namely egoistic, ecocentric and bio centric attitudes. According to their study, cultural beliefs and norms drive the individuals in the community to adopt eco-centric environmental attitude due to the belief that environmental destruction has negative effects on them (Dietz, Kalof, & Stern, 2002).The individuals conserve the environment because it has benefits to them and their personal interest is to ensure that they do not suffer from the effects of environmental degradation. Culture further influences the communities to adopt social-altruistic environmental attitudes which are founded on promotion of good for the sake of other human beings (Aoyagi-Usui, Vinken & Kuribayash, 2003).

Some cultural norms, perceptions and practices call the community members to conserve the environment in order to ensure that it is protected for the next generations and even for spiritual beings which they believe in (Adzobu, Okeame & Peter, 2011).According to altruism theory proposed by Auguste Comte, sustainable management and protection of the environment is fundamental because its destruction have long-term consequences for a community. This inspires the community to conserve the environment due to the benefits that they get from it(AoyagiUsui, Vinken & Kuribayash, 2003).

Furthermore, the study findings are in agreement with previous studies (Abo, 1994; Lincoln and Kallenberg, 1990; Taylor et. al., 1996) which have already revealed that cultural beliefs in a community influence values and decisions of people and even managers. It established that indeed culture influence and shape community's environmental attitudes. These attitudes propagate behavior which could be sustainable or unsustainable, pro-environmental or anti environmental behavior which affect people's actions on the environment.

Authors such as Eneji and others (2012), assert that societies that have preserved their traditionalism, commonly referred to as indigenous communities have been able to maintain a balance between humans and their ecosystem much better as compared to communities that have been modernized, referred to as Western societies. In the indigenous societies, culture acts as a central means that maintain a balance between the interests of the individuals, the society and the environment (Eneji et. al., 2012). There is not only traditional ecological knowledge embedded in the cultural practices such as rites and rituals but the community members also invest emotions in their practice, and since every member associates with culture the entire society becomes involved. This promotes participation of every individual in the society in environment protection which is necessary.

Livestock is a key environmental cultural practice as pointed out earlier and a relationship between this practice and ecosystem management was determined using Chi square. A Chi squared test on the number of respondents who kept livestock and those who did not gave these results; ($X^2$= 24.8, df=6, P< 0.10). The findings indicated that there are no statistically significant communities rearing livestock and those who do not rear livestock. This implies that livestock rearing do not significantly affect natural utilization in Lake Hawassa Ecosystem and hence it does not considerably influence natural resource management in this ecosystem. This is an indication that environmental conservation and management intervention measures would be

fruitful if they focus on all natural utilization ways of the people including farming, fishing and pastoralism despite livestock keeping being a moderate and mixed livelihood strategy.

### 4.6. The study also assessed to find out whether stakeholders who are engage in environmental management activities.

Of 53(44.2%) of the interviewed respondents said that they are usually engaged in activities such as environmental conservation days, 25(20.8%) during time of NGOs involved in Environmental protection work and with local communities program and 21(17%) of other respondents said participation occurs at conflict resolution mechanism that are related to the resource. Thus, it was established that the environmental institutions that manage the ecosystem utilize the principle of co-management whereby the decision making power is shared between the local community and the authorities involved including local and national government institutions (Gemenez, 2000).

**Table 17:management of the lake and its resources**

| | | Frequency | Percent |
|---|---|---|---|
| Valid | Government body usually engaged in environmental conservation days | 53 | 44.2 |
| | Agricultural bureau have established institutions such as Beach Management Units | 21 | 17.5 |
| | Fisher and aquaculture institution formulate laws that regulate fishing mechanism | 21 | 17.5 |
| | NGOs involved in Environmental protection work and with local communities. | 25 | 20.8 |
| | Total | 120 | 100.0 |

Source: own survey result, 2019

However, from this finding, it is clear that there is need for increased involvement of the communities in management of the lake and its resources a principle founded on community based natural resource management as well as co-management which call for communities' active involvement in the management of resources within their environment (Pretty & Ward, 2001). This is because this results to ownership of the conservation and management initiatives being implemented and achievement of their goals as the community's participation is fundamental in sustainable environmental management (Walker & Salt, 2006).

This is fundamental as both of these principles are attributed with various benefits including: increased implementation and compliance to rules and regulations, reduced natural resources related conflict, the appliance of both indigenous and modern knowledge in environmental management as well as reinforced relationships between the communities and relevant institutions and above all enhanced environmental management ( Walker & Salt, 2006).

Therefore it is evident from the findings that there is a significant relationship between environmental conservation cultural practices and indigenous knowledge and natural resource use and management in Lake Hawassa ecosystem. This is well illustrated by the associations established during the study between cultural practices such as livestock and farming activities and ecosystem management.

# CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMEDATION

## 5.1 Summary

As per objective 1, the study revealed that lake Hawassa ecosystem has diverse natural resources including water, fertile soil, fish, plants and animals which the communities living in Lake Ecosystem utilize for their livelihoods. Most of them utilize land and livestock since the study revealed that 33.3 % of the respondents practice farming, while 23.3% of the respondents utilize water and fish resources as they practice fishing. Mixed type of way of life is also common 35(29.2%) of respondents practices both farming and livestock. A further 12(10%) only were utilizing land to their livestock. And only few 5(4.2%) were practices Bee-keeping.

The other community groups also utilize the lake and its ecosystem for tourism activities where approximately 10% of the interviewed respondents indicated that few communities practice using lake for ecotourism at areas of fiker hak/amoragedel and further using for fish business. The community members interviewed during the study depend on Lake Hawassa and its ecosystem for their survival implying that the lake is a significant resource to them and this weighty dependence on it has led to its considerable degradation.

In case of objective 2**,** the study revealed that the communities living in Lake Hawassa ecosystem have rich cultural aspects; communities involved in the study uphold cultural aspects. As interviewed respondents, 40(33%) confirmed depends to cultural norms, 50(42%) observe cultural practices while 25(25%) believe in supernatural beings. The communities have a strong cultural attachment to farming as it plays a cultural role in their lives and provision of food. The effect of this cultural practice on the environment is positive because it has made the communities become not that much affects the ecosystem and not put pressure on water resources and land hence resulting in sustainable management of resources.

In the study areas, the communities believes showed that various plants have medicinal and cultural values which are protected by the community members and conserved from one generation to the next though these plants are gradually becoming depleted. Besides, all the communities have a religion which is either traditional religion or Christianity or both. They believe in a supernatural being who is the provider and a judge to those who do not observe and adhere to cultural norms and practices. These religions ensure that environmental values and ethics which are inherent in them are upheld because the followers believe that failure to practice

what is stipulated by religious laws and regulation attracts a punishment from God(in sidamic mitticho Magano).

Communities in the study areas have differentiated roles between men and women whereby men's daily roles include looking after the livestock and fishing while women do cultivation of land besides the domestic chores (food preparation, child care and washing work. This has an implication on how each gender conserves and manages the environment. Men relate more with natural ecosystems including the lake, forests, and pastures while women have a closer relationship with the land systems as they interact with it more often and closely.

In the case of objective 3, the study showed that there exists a relationship between culture and environmental management. The relationship is positive in that environments/ecosystems in which communities uphold cultural aspects and preserve their culture have a rich biodiversity. Their physical environments are characterized by lakes, thick forests, medicinal plants; hills surround farm sites among other natural resources.

The study findings further revealed that culture determines environmental attitudes and values. It was established that the culture of the communities promotes biospheric /ecocentric attitudes which promote protection and concern for the environment as opposed to egoistic altitude and behavior. This is because the respondents interviewed during the study revealed that their communities upheld cultural practices, norms and values which prohibit their members from destroying the environment and encourage them to preserve and protect it. For example it is catastrophic to cut down sacred trees or answer a call of nature in the river or sacred forests. As previous studies (Abo, 1994; Lincoln and Kallenberg, 1990; Taylor et al., 1996) have already shown, the study further revealed that cultural beliefs of a community influence values and decisions of people and even management of natural resources (ecosystem).

## 5.2. Conclusions

Based on the study result of the first objective which was to evaluate the natural resource utilization of the communities living around lake Hawassa ecosystem, the study concluded that the natural resource utilization ways of communities from the study sites Lake Hawassa ecosystem depend on the lake for one natural resource or another; the fishermen depend on the water for fisheries while the pastoralists use the water for their livestock as well as farmers that grow at the lake shores. On the other hand, the farmers utilize the lake water for irrigation to grow crop, vegetables and fruits while the government and private construction sector depend on

the lake water for Hawassa city road and green areas. A large proportion of the youth from all the communities also Practice Lake oriented business and boat racing and act as tourist guides for a fee. The tourist activities thus form a livelihood source for many youths in the area. Hence, there is extensive exploitation of the lake and its resources by the communities which results in over-dependence on the lake and its resources especially on fish species loss.

From the findings of the second objective, "to establish the environmental conservation cultural practices and indigenous knowledge of the communities" the study concluded that the communities living in Lake Hawassa ecosystem have rich cultural diversity as they uphold values, practices and indigenous knowledge which promote environmental conservation and management. They believe in religion which instructs them to protect their environment they live as a commandment from a supernatural God. This commandment attracts either blessings to the members who heed to it or a punishment to those who disregard it resulting to environmental conservation.

The communities continuously pass cultural aspects and indigenous knowledge on environment and how to protect it from elders to young generations through teachings and other methods such as community meeting and songs. In conclusion, the moral and value systems instilled in societies by religion are indispensable in mobilizing people toward preserving the environment for future generations. Further, the communities practice traditional herbal medicine where they use various parts of plants such as roots, bark and leaves for treatment of various diseases. Such plants with medicinal value are keenly conserved from one generation to the other and the elders teach the young people about them and their importance to the community.

Based on the finding of objective 3 which was to determine how the environmental conservation cultural practices and indigenous knowledge affect resource use and management of Lake Hawassa ecosystem. The researcher concluded that there is an identifiable cultural identity of the communities which is environmentally relevant and efficacious in conservation of the environment and as such cannot be ignored. All the communities involved in this study, have a common belief in religion which prescribes and puts forward unquestionable ethics and moral values that guide environmental management by enhancing responsibility of humans towards the environment and guide the relationship between humans and environment.

Based on the findings of the study it can be concluded that culture is a fundamental aspect of determinants of environmental attitudes which influence environmental behavior as it determines

environmental attitudes and values. This is because culture encourages a wide range of ethics and morals including those that directly or indirectly affect environment that people follow.

It was established that the culture of the communities promotes biospheric /ecocentric attitude which promote protection and concern for the environment as opposed to egoistic altitude and behavior. In addition, culture plays a role in propagating environmentally sustainable conservation initiatives by transmitting environmental cultural practices, values, norms and beliefs that conserve and protect the environment from one generation to the other.

## 5.3. Recommendations

### 5.3.1. Recommendations to policy makers

Based on the conclusion one of the study that the natural resource utilization ways of all the communities living around Lake Hawassa ecosystem depend on the lake for their livelihood it is recommended that policy makers should introduce policies that enhance livelihood diversification in order to reduce pressure on the lake and its natural resources. This can be done by both introducing new livelihood strategies that do not put pressure on directly on the lake and promoting their adoption. Such activities would include boat racing and tourism activities as these do not put pressure on the ecosystem services.

Based on conclusion two that the communities living in Lake Ecosystem have immense cultural heritage, there is need to create private and public partnerships on environmental conservation initiatives which takes into account the role of culture in environmental conservation. Such initiatives would include tourism ventures where both private and public conservation institutions enter into legal agreements with community leaders to be able to access natural resources such as the lake, lakeshore places, fish wildlife and other natural resources. The income earned ought to be used to sustainably conserve the ecosystem (lake and its resources).

Despite religion of communities living in the lake ecosystem providing essential environmental values and ethics, religions are generally not well equipped to provide precise guidance in dealing with complex environmental issues facing the communities. Therefore, there is need for collaboration between religious leaders, communities and other stakeholders/actors to be involved in environmental conservation in order to integrate their knowledge so as to sustainably manage the lake and its surrounding ecosystem. This is because researchers as well as religious leaders can be key players in the policy formulation and articulation process. All concerned parties should form alliances by creating common ground for dialogue and creative partnership

for envisioning and implementation of sustainable solutions to reduce environmental degradation.

In addition, based on the significant relationship that exists between culture and environmental management, policy makers would benefit from a culture-specific approach to designing environmental policies. There is need for policy makers to develop culturally appropriate environmental laws, regulations and policies, to ensure that the rights, livelihoods, and culture of communities with strong cultural identity are considered in design of policies. Environmental policy makers ought to officially recognize it and consider utilizing it in sustainable ecosystem management of this lake.

In the case of objective 3, cultural aspects of the communities with rich culture can be used as avenues to promote peace among communities living in Lake Hawassa ecosystem in order to reduce or end the fights that the area has been experiencing which are threats to environment. And the communities have good conflict resolution methods of affini system in sidama elders. There is need for policy makers to consider employing community based natural resources management as a strategy of enhancing the participation of local communities living in Lake Ecosystem since it ensures that all relevant actors are consulted deeply and their inputs considered. This would enhance adherence and enforcement of environmental laws and communities.

### 5.3.2. Recommendations for Further Research

- This study focused on assessment of the environmental cultural practices and indigenous knowledge of the communities living in Lake Hawassa ecosystem and how they affect its resource use and management. There is need to carry out a widespread research in other lakes in County and rift valley as a whole.
- The findings have provided several insights on how culture can be integrated in community based natural resource management of Lake Hawassa and its ecosystem. There is need to conduct comprehensive research to explore the environmental management strategies used by stakeholders involved in environmental management in Lake Hawassa ecosystem this because lake Hawassa live on dangerous situation by city sewage and sedimentation entering into and its surface and depth decreasing.

### 5.3.3 Recommendations for the communities

- Communities should protect the lake from the city and domestic waste entering
- Communities should protect the lake as an our resources rather looking as public
- Community should collaborate with governments and other supporting group's for environmental protecting program and took lake and near found natural resources.

## REFFERENCES


Abebe, D. (1986). Traditional Medicine in Ethiopia: The Attempts being made to promote it for effective and better utilization. SINET Ethiop. J. sci. 9. pp. 61Î69.

Adimassu, Z.,Langan, S.,Johnston, R.,Mekuria, W., & Amede, T. (2017).Impacts of soil and water conservation practices on crop yield, run-off, soil loss and nutrient loss in Ethiopia: Review and synthesis. Environmental Management,59, 87–101.doi: 10.1007/s00267-016-0776-1

Adu- Gyamfi, M. (2011). Indigenous beliefs and practices in ecosystem conservation: Response of the church. Scriptura. **107**:145–155.

Alemayehu, S. T., Dorosh, P.,& Sinafikeh, A. (2011). Crop production in Ethiopia: Regional patterns and trends. Development strategy and governance division, international food policy research institute, Ethiopia strategy support program II, ESSP II Working Paper No. 0016.

Appiah-Opoku, S. (2007). Indigenous beliefs and environmental stewardship: A rural Ghana experience. Journal of Cultural Geography, **22**: 79–88.

Attuquayefio, D. K., & Fobil, J. N. (2005). An overview of wildlife conservation in Ghana: Challenges and prospects. West African Journal of Applied Ecology, 7:1–18.

Becker, D. F. (2002). Sustainable ecosystem management. A Paradigm shift from the Norm. New York: Oxford University Press.

Bekele, Endashaw, (2007). Actual Situation of Medicinal Plants in Ethiopia. [Online]. 2007. Scribd. Available from: http://www.scribd.com/doc/83507057/Actual-Situation-of-Medicinal-Plants-in-Ethiopia. [Accessed: 15 September 2014].

Belfiore E. (2012). "Defensive instrumentalism" and the legacy of New Labour's Cultural policies. Vol. **21** Iss.2

Bhattarya, S.,&Tripathi, N. (2004). Integrating indigenous knowledge and GIS for participatory natural resource management: State of-the-practice. The Electronic Journal of Information Systems in Developing Countries, **17**:1–13.

Calhoun, Craig, et al. (1994). Sociology. Sixth Edition. New York: McGraw-Hill, Inc

CSA (2013). Population Projection of Ethiopia for All Regions at Wereda Level from 2014 - 2017. [Online]. Available from: http:// www.csa.gov. et/images/general/news/pop_ pro_wer_2014-2017_final. [Accessed: 10 October 2014].

Child, B., & Lyman, M. (2005). *Natural resources and community assets, lessons from two continents*. Madison, Washington: Sand County Foundation and The Aspen Institute.

DeGeorges, P.A. & Reilly,K.B. (2009). The Realities of Community Based Natural resource Management and Biodiversity Conservation in Sub-Saharan Africa. Sustainability Journal Vol 1,734-788;doi:10.3390/sul1030734

Durning, Alan T. (1995). "Supporting Indigenous Peoples". In Macionis , John , and N.V Benakraitis ( 1995) Eds. Seeing Ourselves. Classic, Contemporary and Cross - cultural Readings in Sociology , Third Edition . Englewood Cliffs: Prentice Hall.

Elizabeth Kebede and Ameha Belay (1994) Species composition and phytoplankton biomass in a tropical African lake (Lake Awasa, Ethiopia). Hydrobiologia **288**: 13-32.

Eneji, C. V., Ntamu ,G. U. , Unwanade, C. C., Godwin, A. B, Bassey, J. E., Willaims, J. J & Joseph, I. (2012). Traditional African Religion in Natural Resources Conservation and Management in Cross River State, Nigeria. Environment and Natural Resources Research; Vol. 2, No. 4; 2012

Edmundo, B., Delve, R. J., Trejo, M. T., & Thomas, R. J., Integration of local soil knowledge for improved soil management strategies, In: Symposium of 17th World Congress of Soil Science, Bangkok, Thailand, 2002.

Fasil G. Kiros (1993). The Subsistence Crisis in Africa, the Case of Ethiopia… Nairobi: ICIPE Science Press.

FAO (2004). Local Knowledge and Systems of Natural Resource Management. Available at http://www.fao.org/docrep/t6260e/t6260e03.htm.

FAO. (2007). State of the world forest. Rome: Food and agriculture organization of the United Nations.

Getahun, F. (2013). Farmers' indigenous knowledge: The missing link in the development of ethiopian agriculture: A case study of Dejen district, Amhara region. Social Science Research Report Series No.34.

Gimenez E.F., (2000). Community Based Natural Resource Management: State of science

Global Perspectives. Walnut Creek, CA: AltaMira Press.

Griskevicius,V., Goldstein, N. J. & Cialdini R. B.(2006). *A Room with a Viewpoint: Using Social Norms to Motivate Environmental Conservation in Hotels.* Washington DC: Smithsonian Institution Press.

Hamer, J. H. (2007). Decentralization as a Solution to the Problem of Cultured Diversity: An Example from Ethiopia. Africa. [Online]. 77 (02). pp. 207Î225. Available from: http://www.africabib.org/rec.php?RID=305858572&DB=p. [Accessed: 28 October 2014].

Haile, H., Asefa, S., Regassa, A., Demssie, W., Kassie, K., & Gebrie, S. (2017). Extension manual for acid soil management (unpublished report). (A. T. A. (ATA), ed.), Addis Ababa, Ethiopia.

Hameso, S. (2014). The Sidama Nation: An Introduction. [Online]. Available from: https://www.academia.edu/3043889/The_Sidama_Nation_An_Introduction. [Accessed: 11 September 2014].

Hibbarda, K., Janetos, A., van Vuuren, D. P., Pongratz, J., Rose, S. K., Betts, R., Feddema, J. J. (2010).

Isilda, N., Norfolk, S., & Pereira, J. (2003). *Community Based Natural Resources Management in Mozambique: A theoretical or practical Strategy for Local Sustainable Development?* The Case study of Derre Forest Reserve. Sustainable Livelihoods in Southern Africa Research Paper 10, Institute of Development Studies, Brighton.

Irvine, K.N., Warber, S.L., Devine-Wright, P. & Gaston, K.J. (2013). Understanding Urban Green Space as a Health Resource: A Qualitative Comparison of Visit Motivation and Derived Effects among Park Users in Sheffield, UK. International Journal of Environmental Research and Public Health. [Online]. 10 (1). pp. 417Î442. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3564151/. [Accessed: 19 October 2014].

Jafari, R., & Kideghesho,(2009). the potentials of traditional African cultural practices in mitigating overexploitation of wildlife species and habitat loss: Experience of Tanzania. International Journal of Biodiversity Science & Management, **5**(2), 83–94.

Kakudidi, E.K. (2004). Cultural and Social Uses of Plants from and around Kibale National

Park, Western Uganda. *African Journal of Ecology, Afri. J. Ecol., **42** Vol. **1**:114-118.*

Kassaye, K., Amberbir, A., Getachew, B. & Mussema, Y. (2006). A historical overview of traditional medicine practices and policy in Ethiopia. Ethiopian Journal of Health Development.[Online].20(2).pp.127Î134.Availablefrom:http://www.popline.org/node/174509.

Karanam, H., Nadipena, A. R., Velaga, V. R., Gummapu, J., & Edara, A. (2013). Land use/land cover patterns in and around Kolleru lake, Andhra Pradesh, India using remote sensing and GIS techniques. International Journal of Remote Sensing & Geoscience (IJRSG), **2** (2): 1–7.

Kellert, S.R.., Craig, K.L. & E.O. Wilson (eds) 2000. The biophilia hypothesis. Washington, DC: Island Press.

Kottack, Conrad P. (2002). Anthropology . The Exploration of Human Diversity. Boston: McGraw Hill.

Kiriro K. (2011). *The Gikuyu Marriage*. Nairobi: Longhorn Publishers (U) Ltd.

Kumo, W.L. (2009a). The Sidama People of Africa: An Overview of History, Culture and Economy: Part I. [Online]. Available from: http://worancha.blogspot.co.uk/2013/02/the-sidama-people-of-africa-overview-of.html. [Accessed: 13 October 2014].

Laekemariam, F., Kibret, K., Mamo, T., Karltun, E., & Gebrekidan, H. (2016). Physiographic characteristics of agricultural lands and farmers' soil fertility management practices in Wolaita zone, Southern Ethiopia. Environmental Systems Research, 5, 24. doi:10.1186/s40068-016-0076-z.

Lapinski, M.K., & Rimal,R.N.(2005). "An explication of social norms". *Communication Theory, **15**(2), 127-147.)*

Mary, T. & John, G. Haven (2009).*Overview of World Religions and Ecology.* New York: Yale University Press.

Mensah, A.M & Castro, C.L.(2004). Sustainable Resource Use and Sustainable Development. A Contradiction?! Centre for Development Research, Bonn: Deutshe Publishers.

Milfont, T.L., Duckitt, J.& Cameron, L.D. (2006). A Cross-Cultural Study of Environmental Motive Concerns and Their Implications for Pro-environmental Behavior. *Environment and Behavior. November 2006 vol. 38 no. 6 745-767. doi: 10.1177/0013916505285933*

Millennium Ecosystem Assessment (MA). (2005). Ecosystems and human well-being: A framework for assessment. Washington, D.C. USA: Island Press.

Ministry of Information, Audio-Visual Division (2002). Federal Rural Development Strategy and Policy Document, Addis Ababa

Nelson, Richard (1998). " Understanding Eskimo Science. " in Anthropology. Annual Editions. Elvio Angeloni, ed . Slvice Dock : Dushkin / Mc Graw – Hill

Ocho, D. L. (2012). Assessing the levels of food shortage using the traffic light metaphor by analyzing the gathering and consumption of wild food plants, crop parts and crop residues in Konso, Ethiopia. Journal of Ethnobiology and Ethnomedicine, 8(30).

Rapport, D.J. (2006). Sustainability science: An Eco-health perspective. *Sustainability Science*. Washington: United States Government Printing Office.

Purzycki, B. G., Daniel N. F., John S.H., Nathan W.A., Adam B. C. & Richard S. (2012). What Does God Know? Supernatural Agents: Access to Socially Strategic and Nonstrategic Information. *Cognitive Science* **36**(5): 846– 869. http://dx.doi.org/10.1111/j.1551-6709.2012.01242.x

Rim-Rukel, G., & Irerhievwie, A. E. (2013). Traditional beliefs and conservation of natural resources. Evidence from selected communities in delta state. *International Journal of Biodiversity and Conservation, 5(7): 426–432. Nigeria.*

Roe, D., Nelson, F., & Sandbrook, C. (eds). (2009). Community management of natural resources in Africa: Impacts, experiences and future directions, natural resource issues No. 18. London, UK: International Institute for Environment and Development.

Rodgers,C. (2004).Natural Resources Scarcity-Interdisciplinary Perspectives: Lecture presented to ZEF Interdisciplinary Course, October 25-26, 2004. Bonn: University of Bonn.

Shastri, C. M., Bhat, D. M.,Nagaraja, B.C.,Murali, K. S., & Ravindranath, N. H. (2002). Tree species diversity in a village ecosystem in Uttara Kannada district in Western Ghats, Karnataka. Current Science, 82, 1080–1084.

Solomon Tilahun, 2004. The Creation and Human Responsibility: A Christian Survey Focusing on the Ethiopians. Addis Ababa: Birana Printing Enterprise.

Spies, A. (2003).The Sustainability of the Pig and Poultry industries in Santa Catarina Brazil:a

framework for change. Doctorate Thesis. University of Queensland, Brisbane, Australia, p.379

Steiner, F. (2002). Human ecology: Following nature's lead. London: Island Press.

Talawar, S., & Rhodes, R. (1998). Scientific and local classification and management of soils. Agriculture and Human Values, **15**(1), 3.

Tanyanyiwa,VI., & Chikwanha, M. (2011). The role of indigenous knowledge systems in the management of forestresourcesinmugabearea,Zimbabwe.Journalof Sustainable Development of Africa, **13**(3):132–149.

Tekile, M., Tsegay, Z., Dingato, G.G., Garsamo, D. & Bada, B. (2012). The History and Culture of the Sidama Nation [in Amharic]. Addis Ababa, Ethiopia: Sidama Zone Culture, Tourism & Government Communication Affairs Department, Hawassa.

Teklu,E.,Williams,T. O., & Fanuel, L. (2018). Integrated soil, water and agronomic management effects on crop productivity and selected soil properties in Western Ethiopia. International Soil and Water Conservation Research, 6, 305–316. doi:10.1016/j. iswcr.2018.06.001.

Thirlwall, (2004). Development with special Reference to Developing Economics 7th ed. Hound mills: Palgrave, Macmillan

UNESCO. (2011). Promoting and mobilizing local and indigenous knowledge for sustainable development. Jakarta, Indonesia, National workshop 7–8 June.

United Nations (2013).Harnessing natural resources for sustainable development. Report of the SDSN Thematic group 10 on the good governance of Extractive and Land reources.18 September 2013.

Verschuuren, B., Mallarach, J.-M., & Oviedo, G. (2008). Sacred sites and protected areas. In defining protected areas. Edited by Nigel Dudley and Sue Stolton (pp. 164–169). Gland: IUCN.

Warren, D. M. (1991). Using indigenous knowledge for agricultural development. World Bank Discussion Paper 127. Washington, D.C.

Wassihun, B., Asfaw, Z. & Demissew, S. (2014). Ethnobotanical Study of Useful Plants in

Daniio Gade (homeGardens) in Southern Ethiopia. [Online]. Addis Ababa, Ethiopia: Institute of Biodiversity Conservation. Available from:http:// www.ibc.gov .et/ibc/pubn/ files/Ethnobotanical_study_of_Useful_plants_in.htm.

World Bank, A. (2015). Indigenous latin America in the twenty century. Washington, DC: World Bank.

WHO (2001). Legal Status of Traditional Medicine and Complementary/Alternative Medicine: A Worldwide Review. World Health Organization.

Zinabu GebreMariam and Zerehun Desta (2002). The chemical composition of the effluent from Awasa Textile Factory and its effects on aquatic biota. SINET: Ethiop. J. Sci. **25:** 263-274

Zewdu, M. & Demissie, A. (2001). Conservation and Sustainable Use of Medicinal Plants in Ethiopia. Addis Ababa: Institute of Biodiversity Conservation and Research.

# Appendix-I

**HAWASSA UNIVERSITY**

**College of Business and Economics**

**Department of Cooperatives**

**Data collection form**

**I: CONSENT FORM (ENGLISH VERSION)**

Schedule Interview for selected groups

Dear respondents, first of all I am a post graduate student conducting research for acquiring MA Degree in cooperatives development and leadership at hawassa university .As a practical requirement of the program, I am now conducting a research entitled with "**The effects of cultural practices and indigenous knowledge on ecosystem management in lake hawassa, Ethiopia"** kindly response this information during interview. I undersigned have been informed about the study objectives. I have also informed that all the information within the questionnaire is to be kept confidential and that I have the right to decline from or to cooperate in the study. Therefore, with full understanding of the study objective I agree to give the informed consent voluntarily to the researcher .Your cooperation will be highly appreciated in this regard.

Thank you! Yours truly: Tadelech Temesgen

Mobile:+25126528760

**SECTION –I Socio-demographic characteristics of Respondents**

| **Questions** | **Responses** |
|---|---|
| 1. Age of the household head | |
| 1. 18-35 ( ) 2. 36-60 ( ) 3. Above 65 years ( ) | |
| 2. Education level of household head | |
| 1. Non formal ( ) 2.1-8 ( ) 3. 9-12 ( ) 5.>12 ( ) | |
| 3.Gender | |
| 1.Female( ) 2.Male ( ) | |
| 4. Family size of the household | |
| 1.1-3 ( ) 2 .4-6 ( ) 3. 7-9 ( ) 4.>9 ( ) | |
| 5.period of residence in the areas(years) | |
| 1. <10 2. 11 – 20 3. 21 – 30 4. 31-40 5. >50 | |

## Section-II Questions related to Natural resource utilization ways of the communities living in Lake Hawassa ecosystem.

6. Natural resource utilization ways of your communities**?**

1. Fishing and related business ( ) 2. Pastoralism ( ) 3. Farming ( ) 4. Tourism ( )
5. Bee-keeping ( )

**7.** Types of Indigenous knowledge that communities used in soil water management?

1. Traditional ditches ‘feses’ ( )
2. Application of manure ( )
3. Soil (stone) bund ( )
4. Traditional cut off drain ‘makor’ ( )
5. Planting tree ( )
6. Contour ploughing ( )
7. Other ( )

**SECTION-III Questions related to Environmental conservation cultural practices and Indigenous knowledge of communities living in Lake hawassa ecosystem**

8. What cultural aspects does your community have?

1. Cultural Norms ( ) 2cultural Practice ( ) 3. Cultural beliefs

9. What Cultural Practices does your community have?

1. Initiation and FGM 2. Birth ceremonies 3. Dowry Payments

4. New year(fiche cellebration) 5. Religious rituals 6. Cleansing rituals 7. If other…

10. Are the cultural practices similar to what your fore fathers practiced?

1. Yes ( ) 2. No ( )

11. Are these practices known by current generation (youth and children)?

1. Yes ( ) 2. No ( )

12. Do the children and youths practice them?

1. Yes ( ) 2. No ( )

12. 1. If yes, explain which practice more exercised in you areas

1. Celebration of fiche camballala around lake,gudumale ( )

2. Weeding ceremonies in amora gedel,fiker haq and loke serkile ( )

3. Religious showering ceremonies ( ) 4. If others…….

13. How do the elders teach about the community's cultural practices for new generation?

1. Storytelling ( ) 2 .Songs and Dances ( ) 3. Poems ( ) 4. Others (Specify) ( ) ….

14. Do these cultural practices affect the way people use land resources such as: lake, livestock or other resources found around the lake ecosystem? 1. Yes ( ) 2 No ( )

14.1 If yes, what do they affect?

| What resource do they affect | How do cultural practices affect the way people use it. Explain |
|---|---|
| 1 Land | 1. Degrading soil<br>2. Unwisely using |
| 2 Lake | 1.Polluting by releasing domestic wastes<br>2.bulding houses |
| 3.Animals | 1.Over grazing in small places |
| 4.plants | 1.Cutting for construction of infrastructures<br>2. for fire |
| 5.fish | Overfishing…. |
| 6.Others(Specify) | |

15. Do the communities living around Lake Hawassa have some cultural beliefs (things they believe as a community)?

1. Yes 2. No

16. What are the cultural **beliefs** of the communities have living around Lake Hawassa?

1. Lake is gift of God ( ) 2. Live for over ( ) 3. Provides food 4. Holy ( )

17. Does your community have cultural beliefs that determine how people use the environment?

1. Yes ( ) 2.No ( )

17.1. If yes, what are these cultural beliefs of your community?

1. Animal species that live in water take it as a taboo to consume them as food
2. Lake is used for Cleansing of evil spirits in communities
3. Lake Hawassa is considered as **holy** as it is a sin to the gods of water
4. Lake consumes the people if he/she lies

18. Does your community have cultural norms and superstitions? (Things that people are not allowed to do are punishable by the community/elders)

1. Yes ( ) 2 .No ( )

19. What are the cultural norms of your community?

1. Planting trees ( ) 2. Using water for irrigation in wisely manner ( )
3. Fishing in proper manner ( ) 4. Conserve soil erosion

20. Do the cultural norms affect how the communities manage the lake?

1. Yes ( ) 2 .No ( )

21. Do the cultural **norms** have set to govern fishing, grazing and farming activities in your communities? 1. Yes( ) 2.No ( )

21.1. If say, yes which ones?

| Cultural norms | What and how does it affect? |
|---|---|
| 1.<br>2.<br>3. | i) Fishing How? |
| | ii) Grazing How? |
| | iii) Farming How? |

**Section-IV Questions related to communities Indigenous knowledge to manage ecosystem**

22. What Kinds of cultural practice do you used to produce crops and manage ecosystem?

**1**. Plant residue ( ) 2. Animal dung ( )

3. Animal dung and plant residue ( ) 4.other ( )

23. Did your communities practice Crop rotation in their farm?

1. Yes ( ) 2. No ( )

23.1. If say yes, in Q23 what types of Crop rotation practices do have in your communities**?**

1. Intercropping ( ) 2. Change to other crops each year ( )

3. Change to other crops and fallow 4. Practice fallow ( ) 5. Plant same crop each year

**Interview on environmental protection**

**Head office Hawassa**

Dear Interviewee!

These Interviews are prepared to collect information on ecosystem management system and role of your bureau. Please give your suggestion as much as properly and correctly. Therefore, your reliable answers are believed to enrich the study and will help me to recommend possible way-outs in managing our ecosystem from degradation. This information is only to write paper for masters' degree thesis that submitted to Hawassa University. Besides, I appreciate your willingness and cooperativeness during this interview.

Thank you for all.

Researcher Tadelech Temesgen

1. What are does it mean Community based ecosystem management? Please explain

…….

……

2. How to link cultural practices for protection of the ecosystem by the communities owing to the cultural values?

……..

……..

3. Who have the mandate and responsibility to manage and control use of natural resources?

……

……

4. Community based natural resources management ensures community development? Please explain

……

5. Is there watershed management program in your areas? What is its role for ecosystem management?

……..

……..

**……**

## Appendix II- FUURICHO-

## HAWAASSI YUNIVERSITE

## BIISINESSENA IKOONOMIKISETE KOOLEEJJE HUNIIDAANI

## KOOPHARATIVEETE ROSI MINE

## DAGATE LATISHU PROGAMME

## TAAJE TINQIINAANNI QOLLA

**I: TAAJE ( SIDAMIC VERSION )**

xaamammanicho xaamateenni wonshshinanni taajeetti

Ayirradu xaamammanno'ya, ani hawaassi yuniveerisiteera layinki digireera(masteerisete) xinxaallote looso loosate dagate lophpo rosi golini damma (community development). Xinxallo'yanno hariseemahu << dagate buddi ledo amadatinnota kallaqaamu egeeno horonsinee baattonna aanase lelitaanno jiro hattonno hawaassi garibb qooxessi amandooshe la'inohinni xinxallo assateetti> uyiitinnanie dawarrora lowo geeshsha galaaxeema! kinne kaallo lowoohunni hasiisanno'eetenna lede qalaaxe saa'ema.!

Ani: Taadeelech Temesgeenite

Gafa –I xaamaammanichuha heeshosi la'inohunni shiqqinno xa'mo

Xa'mo dawarro

1. Diro……

2. Rosu deera

1. rosinnoikkiha ( ) 2. 1-8 geesha ronsooha ( ) 3. 9-12 ( )

4. seeritifikeete ( ) 5.Dipiilomanna aleenni ( )

3. Hawaassi gaaribi mulle maaricho loosine heedhinanni

1. laallo kasateeni ( ) 2.saada cee'atenni ( ) 3.quullixumunni 4 looso kaalaqire ( )

5.maangisiteete loosinni 6.daadallanchocho ( )

4. maaatee'ne kiiro……..

Gafa- II kunni worronni noo xa'mo dagate buudinna kalaqamu egeenno ledo amadisinse kalaqamu jiro; lawishaho baattonna hawaassi garibba daga hiito raginni horoosidhe dagaanno illamara hisitte saasanno yitanno xa'muwatti

5.Dagannera ummii'yaho yiitannohu budu heeranno yiite heedhato?

1. Ee ( ) 2.denni ( )

6. Dawaarrokki Ee, ikkiturro hawaassi garibbi mule daganne hikoone budeeti lowohunni ayiirisannohu¬?

1. fiichchee canbaallaalate ayaanna,gudumaaleho ayiriisateenni ( )

2. Adhaanna adhaamate jiiritee ayiirisattenni ( )

3. kiirisitannu cu'amanni ( ) 4. Wollutunno heerirro kulie….

7. kuni dagate budi albi annuwi budinni badooshu nooha lawaahee?

1. Ee ( ) 2. Denn ( )

8. Annuwinne budensa oosonsarra woyi xaa illammara saayisanno ?

1. Ee ( ) 2. Denni ( )

9. xaa ooso budunne afiino?

1. Ee ( ) 2. Denni ( )

10. Ee yiitoro, oosonne garunni hikkone bude harunsiitanno?

1. fiichcheete ayaanna gudumaaleho ayiirisaatenni ( )

2. jiilaa woyi saarige serkilletenna amoragedellete jiilateni ( )

3. hawaassi garibbira cuu'amateenni ( ) 4. Wolottuno heeriro kulie…….

11. Denni, iikiturro ooso budensa seekite amadanno gede seejitinnanni?

1. Ee ( ) 2. Denni ( )

12. Ee, hiittonni rosisinanni ?

1. maattottenni ( ) 2 .mazumureteenina sirbunni ( ) 3. hibbotteni ( )

4. wole dogoni.....

13. daganne budi kalaqamu jiro lawishaho;baatto, waa, saadanna woolota seeke amadate kallaano yiite heedato?

1. Ee ( ) 2 .Denni ( )

14. Ee yiitoro ,buddinne hikone kalaqaamu jiro seeke amadanno?

Kunni woroonni noori gido buddi' hiikonne kalaqamu jiro gawajjanno yiite hedatto

Buddi'ne maa'asatenni kalaqammu jiro gawajjishanno

1. loosina'nni baatto aana gawajjo
2 Bushsha shoollolatteni
3. Gariweello horonsirateenni
4.garibbu mule minna minateenni
5.shiima bayichirra hamaatta saada qollatenni

15. Hawaassi garibbi mule heedhanno daga'nne garibba horosiratte gobanni magannitannosi?

1. Ee 2. Denni(dimagantaanno)

16. Dagate amanyooti woyi buddi hawaassi garibba la'inohunni daga heedanno/amaanitannohu hikku raginniti

1. garibbu magannu uyinnonke jiroti yee amanna( )

2. Heegererra heeranno yiiite amanna ( )

3 garibbu saagale manichu beettira aanno yee heda.

4.Garibbu magannu gede keeranchoho yiite amanna ( )

17. Daganne mannu baattote aana noo jiro garrunni horosinanni jiirite wodhitino ?

1. Ee ( ) 2.dino ( )

18. Ee ikkiro, buddine kalaqamu jiro hollanno woyi garigarrannohu hitto laoshinniti?

1. waa gido saada sagalimate horonsirra hoola

2. hawaassi garibbi manna gawajjanno busha ayaanna hunitanno yiite heedatenni

3.hawaassi garibbi magannu uyinonke kaayyootti

4. hawaaassi garibbi daga michaannoha garibbu ittanno yiite heedanno

19. daganne wodhinnoti jiirite kalaqamu jiro gawajishannohu qorrochishaano jiirete noo'ne

1.Ee ( ) 2 .dino ( )

20. daganne rosinno rosichii kalaqamu jiro la'inohunni?

1. haqqa kassa ( ) 2. Gorissa ragunni horonsira ( )

3. quullixime ragunni horonsira ( ) 4. Bushshu hoshoshame agarratenni

21. Dagate rosichi hawaassi garibba horosinannihu ragunniti ?

1. Ee( ) 2 .Denni ( )

22. daganne wodho wodhitino quullixumet horo aana, saada alallinanni bayichonna hattono loosine gallonni baattonna jaajja laa'nohunni?

1. Ee( ) 2.dinno ( )

23 Ee ikkiro kunni woroonni noori giddo hikkonetti?

1. Qullixume maayi raginni fushinanni…….

2. Saadate haso laanohunni hisiteti……

3. Baattote looso woyi jaajju amadoshi…….

gafa-III kunni woroonni shiqinno xa'muwa kalaqaamu jiro horosinanni doogonna amadooshe la'inohunni shiqinno xa'muwara taalo dawarri

24. kinne.daga kalaqamu jiro uminsaate gede asite seekite amade horosidhanno yiite hedato?

1. Ee ( ) 2. denni ( )

25. Ee, ikkiro kalaaqamu jiro agarate dagane maa loosateni beeqanno ikkitanno?

1. busshu shoololame agarratenni ( ) 2. Waa kootenni ( )

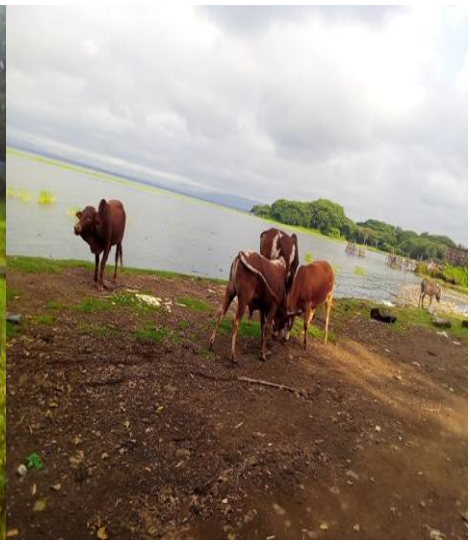
3. haqqa kaassatenni ( ) 4. Boo'e daaratenni ( )

26. Ayee lawannohe kalaqamu jiro agaratte qeechu noosihu?

1. maangisitee calla ( ) 2. Daga ( ) 3. Kabalenna woradu ( ) 4. Wolu heeriro

Appendix-III

Fishing activities for livelihood



A Farm with crops and livestock