Addis Ababa University

(Since 1950)

ANTHROPOLOGICAL STUDY ON THE LIVELIHOOD ASPECTS OF FISHERS-LAKE INTERACTION AT LAKE HAWASSA: EXPLORING PRACTICES, OPPORTUNITIES AND CHALLENGES

By

Tesfatseyon Yosef

A Thesis Submitted to the Department of Social Anthropology in Partial Fulfillment of the Requirements for the Degree of Master of Arts in Social Anthropology

November 2017

Addis Ababa, Ethiopia

Addis Ababa University

College of Social Sciences

Department of Social Anthropology

ANTHROPOLOGICAL STUDY ON THE LIVELIHOOD ASPECTS OF FISHERS-LAKE INTERACTION AT LAKE HAWASSA: EXPLORING PRACTICES, OPPORTUNITIES AND CHALLENGES

By: **Tesfatseyon Yosef**

Advisor: **Mamo Hebo (PhD)**

A Thesis Submitted to the Department of Social Anthropology in Partial Fulfillment of the Requirements for the Degree of Master of Arts in Social Anthropology

November 2017

Addis Ababa, Ethiopia

Addis Ababa University

College of Social Sciences

Department of Social Anthropology

ANTHROPOLOGICAL STUDY ON THE LIVELIHOOD ASPECTS OF FISHERS-LAKE INTERACTION AT LAKE HAWASSA: EXPLORING PRACTICES, OPPORTUNITIES AND CHALLENGES

By

Tesfatseyon Yosef

Approved by Board of Examiners:

Advisor	**Signature**	**Date**
Mamo Hebo		05/12/2017
External Examiner	**Signature**	**Date**
Desalegn W.		05/12/2017
Internal Examiner	**Signature**	**Date**
Getachew S.		07/12/17

ACKNOWLEDGEMENTS

First and foremost, I would like to express my deepest gratitude and heartfelt thanks to my advisor, Dr. Mamo Hebo, for his critical scholarly advice with careful guidance, constructive comments, and continual corrections in every step of this thesis. This thesis would not have been accomplished without his unlimited support, invaluable guidance and advice, encouragement and polite treatment.

Next, my grateful thanks and appreciation goes to all of my research participants in the fieldwork as data sources. Especially, W/ro, Ayinadis Seyife, from the animal and fish resource development department (significantly helping me as a key informant in getting the right primary and secondary data sources), Ato Elias Azmeraw, my research assistant, Ato Lukas Canche, the chairman of Lake Hawassa fishery cooperative, Ato Dawit Dida, an individual fisher and local guide as my key informant, Ato Tsegaye Belete from the federal authority for the rift valley lakes basin, Ato Lalisa Gemechu instructor of Hawassa University, Ato Elias Tibo and W/ro Rahel Nadew from the Hawassa City Administration, environmental protection dep't, Ato Iyasu Tareso from the culture, tourism and communication affairs, W/ro Hagernesh Sankura from natural resource development dep't and Ato Alemayehu Danbe from the cooperatives agency. I am deeply indebted to these individuals and respective bureaus for their cooperation in allowing and providing me with all the required data.

I also want to express my sincere thanks to the Department of Social Anthropology at Addis Ababa University for accepting me in the program and providing me with all the academic and financial requirements. I am also grateful to thank ARCCH for giving me the opportunity for learning with great sincerity and different supports as well as my colleagues for covering my work duties.

I would also like to acknowledge all of my families for their multidimensional togetherness in the course of this study, especially my wife Meseret Assefa, for her limitless patience, care and promotion, and my Mom, Mintwab Bekele, with motherly emotional and psychological support. Moreover, I also want to forward my sincere thanks to my host families in Hawassa in the course of my fieldwork for their material and psychological guidance. My gratitude also goes to my classmates and friends in consulting and encouraging me in every steps of the thesis, especially Abera Anjulo, Tariku Tsegaye, Dawit Getu and Admassu Abebe. The last but not the least, I greatly indebted full for all who were on the side of me during the research endeavor.

TABLE OF CONTENTS

Contents **Pages**

LIST OF TABLES AND FIGURES

List of Tables

List of Figures

GLOSSARY OF LOCAL TERMS

Addis Ketema	One of the eight sub-cities at Hawassa city
Ambazza	Large Barbus (a fish type found in Lake Hawassa)
Amora Gedel	The Major Landing Site and fish market area at Lake Hawassa
Asa Gebeya	A fish market area at Lake Hawassa (Tourism and Livelihood)
Bilcha	Cat Fish (a fish type found in Lake Hawassa)
Birr	An Ethiopian Currency
Cheleleka	One of the tributary river of Lake Hawassa
Dagim	Name of a Fishery Cooperative based at Fiker Hayik Landing Site
Datta	Locally prepared hot sauce served with fish and other food stuffs.
Dore Bafano	One of the landing sites for fishing boats at Lake Hawassa
Fiche Chambalala	A New Year festivity annually celebrated among the Sidama society
Fiker Hayik	The major landing site and recreational area at Lake Hawassa
Gebeya Dar	One of the eight sub-cities at Hawassa city
Gudumalle	A socio-cultural and recreational area around Amora Gedel site
Hawassa	a wide water body (Sidama term)
Kebele	The local administrative body of the city
Kudade	Main Fasting Season (Lenten) among the Tewahdo Orthodox followers
Oasis	The circle man-made recreational area found in Fiker Hayik site
Qoroso	Tilapia (a fish type found in Lake Hawassa)
Tikur Wuha	A tributary river of Lake Hawassa and a landing site of the lake
Woreda	An administrative body in the district level authority

ACRONYMS AND ABBREVIATIONS

BNP	Big Numbers Project
BoA	Bureau of Agriculture
CPUE	Catch Per Unit Effort
CU	Copper
DFID	Department For International Development
EC	European Commission
E.C.	Ethiopian Calendar
EFASA	Ethiopian Fishery and Aquaculture Science Association
FAO	Food and Agriculture Organization
FfE	Forum for Environment
FGD	Focus Group Discussion
GDP	Gross Domestic Product
GMT	Greenwich Meridian Time
HCA	Hawassa City Administration
ILEC	International Lake Environment Committee
IUCN	International Union for Conservation of Nature
LFDP	Lake Fisheries Development Project
LOS	Law of Sea
M.a.s.l	Meter Above Sea Level
Mn	Manganese
MoA	Ministry of Agriculture
NGOs	Non-Governmental Organizations
NRC	National Research Center
ORS	Oromiya Regional State
RiPPLE	Research-inspired Policy and Practice Learning in Ethiopia
RVLBA	Rift Valley Lakes Basin Authority
SES	Social-Ecological Systems
SFLP	Sustainable Fisheries Livelihood Program
SLA	Sustainable Livelihood Approach
SNNPR	Southern Nation, Nationalities and People Region
SSFs	Small Scale Fisheries
SSIF	Small Scale Inland Fisheries
UN	United Nations
UNEP	United Nations Environmental Programs
UNESCO	United Nations Education, Science and Culture Organization
USIP	United States Institute of Peace
WCED	World Commission on Environment and Development
Zn	Zink

ABSTRACT

Residents of Hawassa city and the surrounding rural communities have close interaction with Lake Hawassa. The interaction takes different forms and involves diverse interests-livelihood interest being the most important one. This study mainly focused on understanding the local people's livelihood-based interaction with Lake Hawassa through fishing practices. The study further aimed at exploring the socio-economic and legal (policy) factors that have been affecting, positively or negatively, the fishers-lake interaction. Data has been collected through qualitative (observation, in-depth interviews, FGDs and case studies) method and supported with some quantitative (questionnaire survey) method. Data analysis involved description, interpretation and thematically-based explanations. The study result reveals that Lake Hawassa provides diverse services to the population inhabiting its catchments: scenic setting for tourism and associated diverse businesses, and water for irrigation and city beautification, all contributing for people's livelihood in one way or another. In the two major fish landing sites, Amora Gedel and Fiker Hayik, which are the focus of the present study, fishing and related activities constitute either major livelihood strategy or supplementary means of income for 1000-1500 people. Main actors in these activities include: individual fishers, fishers organized into cooperatives and suppliers of fish products for market at Lake Hawassa. In this regard, social network play a key role serving as a means of value/supply chain, employment and cluster-based fishing practices. Fishing activities at Lake Hawassa seem increasing from time to time. For instance, while the maximum carrying capacity of the lake's fishing is said to be 750nets/day, currently there are 1200-1400 nets/day operating on the lake. The number of people involved in fishing at the two major landing sites also increased three times from around 300 in the past five years to around 900 Currently daily income of fishers ranges between 250 and 500 ETB, which correspond to the production of 32 and 50 Kgs of fish respectively. However, it has been found out that in addition to technical and material capacity, volume of fish production, marketing and its contribution to the livelihood or income, differ between fasting and non-fasting periods, weather conditions' favorability or not for fish breeding, whether it is tourism peak season or a lean season. Accordingly, production, marketing and income from fishing increase in the former scenarios while decreasing in the latter ones. Fishers try to maximize their livelihood interest or fish production and income from it by using officially prohibited type of gill nets, reducing the mesh size and fishing more than once per day. These informal ways of trying to increase fishing with the aim of improving the livelihood goal obviously put pressure on the fish resources at the lake. In addition, competing claims between members of different cooperatives over access to fishing grounds by setting imaginary or informal boundaries are causing (or serving as justification) for net thefts and leading to open conflict. Therefore, local communities' increasing socioeconomic interests in fish resources, their struggle to maintain access to the lake to sustain their livelihood on one hand, and inadequate management practices or rules by institutions in charge of natural resources management on the other, are exposing the lake's fishery and other resources to pressure, thereby creating conditions that could serve as threat of sustainability to the lake resource and people's relation as well as livelihood in the long run.

Key Words: ***Lake Hawassa, Livelihood, Fishery.***

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

Nowadays half of the world's livelihood activities are within 20 km of water resources. Fishery is serving 30 million people in small-scale fishery and 95 % of them are in developing countries (Small and Cohen 1999). Although, Fishery-related livelihoods are often complex, dynamic and adaptive, fishing might be engaged in full-time, as part of a mixed farming-fishing-livestock livelihood, or as a seasonal fallback to generate income and get access to basic goods and services such as education, health, food and other assets needs in turn (DFID 2005). Sustainable fisheries, therefore ultimately can reduce economic scarcity and food vulnerability by controlling external influences such as environmental degradation and climate change through the implementation of effective management and decision-making with recognizing the roles of fisheries as livelihood strategy.

Unlike other African countries, Ethiopia, as a landlocked country, uses inland freshwaters for various socioeconomic purposes. Fishery is one of the primary activities conducted on those water bodies as a livelihood strategy. There are more than 180 species of fish in Ethiopia, and 30 of them are endemic to the country (Assefa 2014). However, compared to the potential, the contribution of the fishery industry in the country's GDP is insignificant due to inappropriate use, lack of strong policies, rules and regulation as well as the level of such community's awareness. Ethiopian rift valley lakes take the lion's share of fish production and development in a variety of historical stages with their comparative potential and attention in legal production, market and advancement, but comparatively it covers small number of people (Mars 1998).

The SNNPR capital city, Hawassa nowadays is one of the fastest growing cities with the rapidly growing population size and diverse socioeconomic activities. As the center of the city's edge is surrounded by the lake, a number of socioeconomic activities are practicing on and the catchment areas of the lake. As the city expands in all directions, the lake comes under pressure from residents close to the edge of the lake and nearby different development activities. While the existence of the lake with proper water balance and its aquatic life is very necessary for the city's "*healthy*" continuity. Therefore, the lake is considered as a potential gift and an opportunity for the city's socioeconomic and ecological values either via direct or indirect ways.

Beyond those potential opportunities, different human causing factors, such as soil erosion, flooding and other climatic changes are challenging the water balance, quality and aquatic biodiversities, which in turn may challenges not only the livelihood patterns of the environs communities, but also the city's development and ecological aspects (Yemane 2004).

Lake Hawassa is one of the smallest rift valley lakes in Ethiopian (90 km^2 in area and 11 m mean depths) with crucial socioeconomic, ecological, political roles in the city and surrounding communities. As the lake is fresh water, it provides commercial fishing, irrigation, recreation, balancing ecosystem and a number of other values. As a closed basin system in receiving water from only *Tikur wuha* River and runoff from the catchment, the quality of the lake water is vital for sustainable resource utilization of the lake (Getachew et al., 2015). Lake Hawassa is naturally privileged with six fish species resources, and three of them, namely Tilapia (*Oreonchromis niloticus*), Catfish (*Clarias garienpinus*), the Large Barbus (*Barbus gregorii*) are commercially the most important species in kind, demand and availability with the leading of Tilapia among the three in taking a lion's share of production and market (Amare 2005; Behailu et al., 2010). Therefore, such different fish species can be taken as a great opportunity and their products is serving as a source of high protein food, medicinal values and even tourist attraction as well as livelihood strategies both for the consumers and fishermen households. The lake's fish market with diverse values, such as source of subsistence, income, employment, protein and tourism has great opportunities to efficiently utilize and sustain the potential of such sub-sector via responsibly using those diverse fish species in accordance with its increasing demands, the environs livelihood activities and tourism as an advantage.

The study area's fishers-lake interaction has been undertaking for over four decades where fishery serves as livelihood strategy. But, when it compares with other agricultural sub-sectors, the fishers-lake interaction, employment and economic gains are not competent due to lack of proper awareness and consistent control and follow up system of concerned bodies in managing and accessing it equivalently with other sectors (LFDP 1997). The lake's fishery practice nowadays may be considered relatively as well established with a number of legally registered cooperatives, consisting of members responsible for different activities operating in selected potential landing sites. In the study area, some of such socioeconomic activities are agriculture, fishery, tourism, street vendors, micro and small enterprises and other small and medium industries in which they may positively or negatively affect the lake's ecosystem depending on social responsibility taken.

Therefore, such various activities on and its surrounding has a couple of interaction with the lake. Among such various socioeconomic and ecology related activities, fishers-lake interaction, specifically drives me to conduct my study from the community perspective in anthropological worldviews (culturally relative point of views). Because, as the city and surrounding population is fast growing with the increasing demands and socioeconomic activities, the local communities' continuous livelihood and development interaction with lake's resource comes under different dynamics (changes and continuities) regarding the pressurized resource utilization. Following this, various opportunities and challenges are emerging with the socioeconomic /livelihood and development/, ecological and politico-legal collision of interests among such different communities and institutions. Unlike the others legally unregistered and unorganized individual fishers who are practicing it with traditional material in taking less responsibility, most of legal fishers are practicing it with planked boats and few with motor boats as well as relative awareness.

As the lake's water quality and ecosystem play a primary role in the aquatic biodiversity's continuity, social and legal aspects, such as lakeside house hold and community management, alternative livelihood strategies, community based sustainable fishery, claims of resource ownership, offshore thefts and conflicts as well as clear and consistent political administration issues are also have to takes into consideration. Particularly, the specific study areas *Amora Gedel* and *Fiker Hayik* with their potential fishing activities in diverse fishing culture, social networks and a well known fish market as well as tourism, unemployment, food security, household matters and environmental dynamics, opportunities and challenges makes the area very researchable.

1.2. Statement of the Problem

Small-scale fishery is commonly practice fishing as livelihood diversification strategy while engaging in other income generating activities (Bene & Friend 2011). An estimated 93–97 million people were directly involved in fishing, processing and marketing in small-scale fisheries in the developing world in 2008, 51 million of whom associated with inland fisheries (BNP 2008). Small-scale fishing in developing countries has often been termed as a 'livelihood of last resort' (Panayotou 1982), which implies that fishing is chosen due to a lack of better alternatives This in turn suggests that providing alternative livelihood options would entice fishers out of the fishery thereby preventing overfishing (McManus 1997; Kühlmann 2002; Allan et al. 2005). Because of human beings' dependence on water bodies, many human settlements worldwide are concentrated near freshwater ecosystems (Small and Cohen 1999).

This also seems to be true for Ethiopia, where major settlements along important inland water resources that inhabitants use as sources of livelihood and development. For instance, such lakes as Tana, Ziway, Hawassa and Chamo can be mentioned as important inland water bodies where such major cities as Bahir Dar, Ziway, Hawassa and Arba Minch respectively, have been established and thriving. Inhabitants of these urban settlements and those of the surrounding rural communities rely on diverse livelihood opportunities that these water bodies' offers to them. However, increasing urbanization and associated expanding socioeconomic activities on and around the lakes, could pose challenges to the sustainability of the lake's ecosystem in general and fishery resources in particular. In addition, solid and liquid waste disposal, toxic contamination, siltation, shoreline alteration and wetland destruction are threatened these water bodies and the livelihood of the surrounding communities.

The situation of the interaction between Hawassa city (and surrounding rural communities) and lake Hawassa could not be different. The city's interaction with the lake environment began with the establishment of the city in 1960, while the surrounding rural communities had much longer relationship with the lake. The lakes freshwater is being increasingly used for irrigation. The lake is also used for tourism, commercial fishery, and socio-cultural events, (e, g. wedding, birthday, graduation and *Fiche-Chambalala*[1] festivity). Such interactions, however, are being intensified in recent years with the expansion of socioeconomic activities due to the fast growth of the city and its population, and transformation of livelihood and land use among the surrounding rural communities. These economic activities are visibly putting pressure on the lake and its watershed (Getachew et al., 2015). That is, recently the lake is facing increasing pressure from rapid population growth, urbanization and industrialization, tourism, intensive agricultural and other human activities that pose growing threats to the ecological integrity of the lake.

This particularly important for the lake's fishery resource, which has been serving as a major livelihood strategy for the surrounding communities for long rapid urbanization and unsustainable fishing practices; shoreline modifications and the subsequent loss of fish spawning habitat; pollution; inadequate policy enforcement and legal regimes could be mentioned as major challenges currently facing fish production and marketing. This calls for studies to explore specific challenges that the lake and its catchments are facing and to be able to come up with appropriate management strategies to be implemented on and around the lake.

[1]Fiche Chambalala is New Year festival among Sidama societies.

In this context, this research focuses on livelihood dimension of people-lake interaction with particularly emphasis on fishing activities. Fishing on the lake is being practiced in both traditional and modern ways along such major fishing areas as, *Amora Gedel, Fiker Hayik, Dore Bafano* and *Tikur Wuha*. The fishers-lake interaction nowadays can officially be seen as either 'legal' or 'illegal' depending on whether people who engage in some form of fishing are registered/licensed or not; organized in cooperatives or operate on individual basis; use a given type of fishing materials and methods.

A number of 'hard science' studies conducted on the catchment of Lake Hawassa focused on the physical, biological, and inorganic elements, such as Yeneneh 2014, Simegn 2015, Lamiso 2015, Admassu 2014. Little attention has been paid to the fishers' interaction with the lake in order to secure their livelihood. Hence, this study mainly assessed diverse livelihood opportunities and challenges fishers' are facing in their interaction with the lake. It manly explores the practice of fish production, marketing and consumption; contribution of fishery for people's livelihood; emerging competition and conflict over fishing rights, and socio-cultural and politico-legal context within which rights are claimed or conflicts emerge.

1.3. Objectives of the Study

1.3.1. General Objective

The general objective of this study is to analyze the livelihood dimension of fishers-lake interaction at Lake Hawassa: focusing on the practices, opportunities and challenges.

1.3.2. Specific Objectives

Furthermore, this study specifically intends to: -

- Explore the local community's livelihood-based interaction with Hawassa lake through fishing practices;
- Investigate fish marketing dynamics and value chains in Hawassa Lake ;
- Explore the socio-legal factors currently influencing fishers-lake interaction and opportunities and challenges emerging in this context.

1.4. Research Methods

The study mainly conducted through the qualitative research approach to gather detail in depth opinion and lived experiences. In addition the study utilized quantitative research method to support the qualitative data with some statistical data via utilizing both primary and secondary data sources. Personal observation was one of major qualitative primary data collection tools conducted for a preliminary research activity to grasp study area's activity and for the preparation. Interview was another major tool (structured interview for officeholders and other concerned bodies' participants and semi-structured for the target groups of fishers) to obtain detailed data. Focus Group Discussion (FGD) would also take place to grasp more competing views, power differences and struggles among such forming groups on the basis of raising ideas for more grounded and contextual data explanation.

Lived experiences, the last qualitative method have been undertaken to obtain practical life stories and different experiences of the target groups for general explanation and illustrative data analysis. Survey questionnaire, eventually used to support the qualitative data with some quantitative data for tallying, tabulating and graphing some statistical data regards to their relationship with variables. Therefore, this research has been used such primary data collection methods to make the study more fully-fledged by triangulating one tool with another in utilizing the methodological significances of both approaches and uncover the findings enough.

The bulk of data obtained through such tools are analyzed thematically in accordance with meeting the research objectives. As if the basic theme of this study is assessing the core of livelihood aspects of fishing in line with its opportunities and challenges, presenting and interpreting findings with themes through qualitative explanation and some quantitative descriptions is more convenient to find out the attributes, experiences, discourses and relationships of variables with thematic statement and statistics for proposed issue.

This study also supported by secondary data sources to illustrate and make the overall study more concrete. Such data are gathered from both published and unpublished written materials, records, files and also a broadcasting system which are relevant for the reliability and adequacy of the study. Therefore, these methodologies and data collection methods guide the researcher to come up with new findings in critically using ethnographic ethics and anthropological insights.

1.4.1. Primary Data Collection Instruments

1.4.1.1. Fieldwork Observation

Observation refers to the gathering of information by being in the fieldwork's natural setting and observing the overall living and working environment of the particular study area via using our five senses and basic ethnographic research method and ethics. When the researcher gathers field data, it could be in accordance with his/her observation of the target group's unique as well as general patterns in everyday life within that particular setting either during or after the interview conducted (Creswell 2009).

Therefore, this method enabled the researcher too observe and record the original setting's performances and conversations as it is undertaken in the ways of direct/naturalistic observation to observe the flow of behavior directly in its own setting in grasping the total situation, community's diverse activities so that it can be captured efficiently. Because, unlike indirect observation in controlled environment, direct/naturalistic observation (i.e. unstructured observation) helps to study the spontaneous behavior of participants in natural surroundings with greater advantage of ecological validity in being able to observe the issue in its own setting.

The observations were conducted in two different periods (on the Lenten Ethiopian Tewahdo Orthodox fasting time and immediately after the Easter holyday/non-fasting periods) to grasp the production, market and fishers density with the demand, supply and price differences comparing one to the other period, because such two periods have directly different inputs for the overall fishers-lake interaction and fishing related activities. The researcher then grasped/recorded each relevant events/practices in different compatible ways in their everyday life activities in such two comparative periods by being on those areas since the early morning of their production and market activities.

As this study has been also seeking for the target communities' everyday activities and interaction with Lake Hawassa, it guided the study crucially in digging out the unexpressed findings in filling the study gaps. The data obtained with this method guided the researcher in understanding how fishers and other socioeconomic communities interact with the lake through their activities in enabling to observe the individual-based and cooperative fishers' product/market situation and power differences in line with ways of fishing and processing mechanisms.

The cooperation/division of duties in age/gender and coping culture of fishers with individual-based and cooperative fishers' power differences and rules of access/operation also observed. In addition, it has been also a critical tool to capture their feeling and working behavior through using their fish/ fish products to know how they practically experiences of their everyday life patterns.

Therefore, I believe that the data which is obtained from this method greatly helps the study as a preliminary basic data about their daily life experience of fishing as well as socio-cultural patterns as it occurs in informal and unstructured ways. However, as it critically needs proper interpretive skills and ethical considerations, those data are analyzed in accordance with the community's values and beliefs.

1.4.1.2. Interview

It refers to asking of questions to different target population to get reliable data. Among three types of interviews I used two of them: structured interview for scientific data from the officeholders to get organized and specified data on the basis of the questions and, semi-structured interview to get sufficient explanation on different related issues. It can be referred with interview information similarly raised questions with discussing flexibly of such important ideas (Dawson 2007). Moreover, most of bulk data gathered with this method, as it is one of important sources of data in getting a chance to seek clarification and explanation on the spot were interview is undertaking (Finn et al., 2000). Because, the researcher does not follow a rigid format in collecting such data, rather the dimension of the questions might be modified in the course of discussion to obtain more data. It also allowed the researcher in having a control over the line of each question to get what is needed depending on the objectives of the study (Creswell 2009). Therefore, basic related questions for the informants were raised in accordance with the intended goal of the study and their level of interaction with the issue.

Questions related with the communities' livelihood dependence on the lake's resource utilization, practical livelihood values of lake's fishing, market issues with demand and supply of fish products, lake's/environs status with contemporary influencing factors as well as their coping strategies issue has been discussed in the course of semi-structured interview and obtained more valuable data. The other organized data gathered in structured interview from the organizations' concerned bodies on the issues of the interaction of surrounding communities with the lake, profile of registered cooperative and individual-based fishers, rate of supply and market opportunities in reducing challenges, awareness creation as well as access and regulation of fishing.

The role of key informants were very crucial in collecting such kind of wide range data, in introducing the overall pattern of study area, facilitating and joining the right concerned bodies with the researcher in creating common understanding and further verification with the intended 15 diverse research participants. Later on, the selection of such research participants was conducted based on the contextual consideration of age, sex, experience, socio-cultural and geographical background, willingness and the occupation status of both specific study areas for structured as well as semi-structured interviews to obtain a full-fledged and balance data from that variety of informants' different level of exposure, understanding and experience of the issue.

As responses are relatively frequent and target oriented than other methods, the research flexibly can meet to its intended goal. Furthermore, such method was a desirable qualitative data collection tool in grasping the respondent's real perception and emotion through their words (Guba and Lincoln 1981). The data gathered from such method were wide range, detail and new directional with sufficient evidences. Therefore, such early expected advantageous results in acquiring the desired understanding drives me to use this method. Both types of interviews were conducted in the study areas with more concerned informants through the convenient time schedule and directly related understandable questions. Applying such types of interviews, more organized data was analyzed through obtaining one unreachable data from the other one.

Name	Age	Ethnic Group	Occupation and Landing Site	Experience
Zelalem Abebaw	24	Wolayita	Cooperative fisher at Fiker Hayik	7 years
Biniam Asres	36	Sidama	Cooperative fisher at Amora Gedel	12 years
Yosef Kassahun	23	Sidama	Individual-based fisher at Amora Gedel	5 years
Markos Tariku	28	Wolaita	Individual fish supplier at Fiker Hayik	8 years
Bereket Daniel	39	Sidama	Individual-based fisher at Fiker Hayik	6 years
Mesha Tulu	14	Kembata	Day laborer at Amora Gedel	3 years
Ashenafi Belete	30	Amhara	Tour guide and fish supplier at Fiker Hayik	10 years
Tekalign Markos	27	Hadiya	Expert at Hawassa tourism development bureau	4 years
Lukas Kanche	37	Sidama	Chairman at Amora Gedel cooperative	15 years
Rahel Nadew	32	Amhara	Expert at Hawassa city environment conservation bureau	8 years
Abera Fola	38	Sidama	Chairman at Amora Gedel cooperative	15 years
Ermias Tadesse	34	Sidama	Management committee at Amora Gedel fishery cooperative	20 years
Tariku Beka	25	Sidama	Hired fisher at Amora Gedel	6 years
Worku Tefera	28	Oromo	Individual-based fisher at Fiker Hayik	4 years
Ayalew Matheos	36	Hadiya	Cooperative fisher at Fiker Hayik	9 years
Ayinadis Tesfaye*	30	Amhara	Expert at Hawassa city fish resource development bureau	6 years

Table 1: Background of In-depth Interview Informants (* Key Informant).

1.4.1.3. Focus Group Discussion/FGD/

Focus Group Discussion /FGD/ refers that a number of people are asked to come together in a group to discuss a certain issue in a specific period of time. As this kind of discussion led by moderator or facilitator, the researcher has a chance in clearly introducing the topic, asks specific questions, controls digressions and balance participation with break-away conversations in which recording the process (Dawson 2007). The researcher used this method to obtain some new data and triangulate those diverse competing ideas which have been raised from such different informants via observing their behavior, attitude and expression. Therefore, such kind of group dynamics allow the researcher to obtain even more concrete and illustrative data with firsthand insights as well as on the ground experiences (Miles and Huberman 1994).

FGD were conducted by gathering diverse informants who were directly concerned with the issue via careful selection of those participants considering age, sex, occupation status, lived knowledge and experience, willingness/interest as well as other socio-cultural and ecological background in order to efficiently discover the intended data from such effectively diverse collection of the research participants. As it takes place within the specified group, their interaction and group effect is a useful resource for a good data analysis in line with asking questions and remembering the issue each other in a relative freedom (Dawson 2007). Such incredible significances consequently would drive to use this method as it yields a wide range and competitive data in a relative short period of time on the spot. Therefore, the study employed three Focus Group Discussions (FGD) in two different landing sites (*Amora Gedel* and *Fiker Hayik*), with fishers and concerned officeholders after personal observation and interview conducted with the collection of the environs' fishers and related socioeconomic communities with a balanced selection of six research participants for each FGD.

As each participant come with a different viewpoint, experience and understanding of the issue, such diverse exposures has been great input of the study in triangulating such diverse data and contextualize power differences and struggles through the group's discussing ideas and competing views for the ultimately required data. The issues has been raised and discussed in the realm of the research objectives to answer such people-lake interactions from livelihood aspects of the lake vis-à-vis its practices, opportunities and challenges. Majorly raised discussing points for such diversity were related with the practical dependence of target communities with lake's resources as well as fishery to know the livelihood and developmental dynamics within time and place.

Access differences among individual-based and cooperative fishermen in utilizing fishing opportunities for livelihood and respective challenges as a result of internal and external factors has been discussed efficiently in line with each participant's level of exposure. The issue of how legally registered and organized cooperative and individual fishers differs with others in the power of the landing site, equipment, and market access was discussed to obtain the imaginary lines, struggle, competition and conflicts as well. Their indigenous fishing strategies/management system and level of interaction one another also was the other side of a discussion to contextualize the overall system. The case of legal and social aspects on the lake has been critically discussed regards to increasing pressures, livelihood diversities, social networks, cause and consequences of illegal/overfishing, net thefts and conflicts either in illusive boundary or property ownership. Therefore, overall discussion of both FGDs were mainly goes with those major ideas in critically manage it within the scope and ethical considerations to obtain well defined anthropological data.

Name	Age	Ethnic Group	Operation Section and Site	Experience
Danbe Baro	24	Wolayita	Cooperative fisher at Fiker Hayik	7 years
Zerihun Belete	36	Sidama	Cooperative fisher at Amora Gedel	12 years
Matheos Tesfaye	23	Sidama	Individual-based fisher at Amora Gedel	5 years
Aschalew Abera	28	Wolaita	Individual fish supplier at Fiker Hayik	8 years
Simon Goshu	39	Sidama	Individual-based fisher at Fiker Hayik	6 years
Lalango Zedagim	24	Sidama	Hired fisher at Amora Gedel	4 years
Abreham Tamene	35	Amhara	Cooperative fisher at Amora Gedel	10 years
Fikadu Begize	26	Kembata	Cooperative fisher at Fiker Hayik	8 years
Asmamaw Alemu	32	Sidama	Cooperative fisher at Amora Gedel	7 years
Tigabu Mersha	30	Sidama	Cooperative fisher at Amora Gedel	9 years
Solomon Seyifu	43	Amhara	Cooperative fisher at Amora Gedel	25 years
Dawit Dida	28	Wolaita	Individual-based fisher at Fiker Hayik	8 years
Tesfaye Amare	40	Sidama	Exert at Hawassa city fish resource development bureau	6 years
Elias Tibo	29	Sidama	Expert at Hawassa city environment conservation bureau	7 years
Elsabeth Asmare	27	Sidama	Expert at Hawassa city tourism development bureau	4 years
Tilahun Kora	42	Sidama	Case team leader at Hawassa city fish resource development bureau	14 years
Alemayehu Lema	36	Sidama	Case team leader at Hawassa city cooperatives agency	12 years
Ayinadis Tesfaye	30	Amhara	Expert at Hawassa city fish resource development bureau	6 years

Table 2: Background of Focus Group Discussion (FGD) Participants.

1.4.1.4. Case Study

Furthermore, case study has been used on the lived experiences of fishers around Lake Hawassa to come up with a more general picture of the lake's fishing and livelihood strategy with evidential experiences of five differently exposed fishers from both study areas through illustrating their long lasting interaction with lake's resource. As it is a narrative story of particular target people, it needs careful interpretation of such complex explanations. Case studies involve an in-depth examination of a single person or a few people with the ultimate goal of providing an accurate and complete description of the case (Yin 1989). It has principal value in expand understanding about the variations of the issue via their general/unique experiences with the lake's fishery.

Case studies of individual participants often include in-depth interviews and practical experience sharing (Marczyk et al., 2005). It has been mainly goes in line with explaining the research questions on the basis of its stated problems with the unit analysis of the *Amora Gedel* and *Fiker Hayik* individual-based and cooperative fishers. Determination of how each data are linked to the stated problems and the criteria to interpret the ultimate findings was also among the major considerations during and after the case study is conducted. Therefore, it guides me to depict their whole experiences related with the overall livelihood aspects of lake's fishery with its changes and continuity diachronically with the emerging opportunities and challenges as well as how they integrated and survive with the continued ecological and developmental dynamics.

Name	Age	Ethnic Group	Operation Section and Site	Experience
Daniel Alaro	24	Wolayita	Cooperative fisher at Fiker Hayik	7 years
Simon Amare	39	Sidama	Individual-based fisher at Amora Gedel	6 years
Tarekegn Dana	23	Wolayita	Individual-based fisher at Fiker Hayik	5 years
Abreham Tesfaye	42	Sidama	Cooperative fisher at Amora Gedel	22 years
Teshale Worku	36	Sidama	Cooperative fisher at Amora Gedel	12 years

Table 3: Background of Case Study Participants.

1.4.1.5. Survey

The study also used the quantitative data collection method through a survey questionnaire. As the research findings includes some quantitative data, this method was differently helped me to tallying, tabulating and graphing specific aspects of the communities, such as their relationships with variables in the interactions of different kind of fishers with the lake. It is also discoverable and inclusive of targeted population through sampling (Glasow 2005). The general concept of the study is people-livelihood relationship via lake resources interaction;

The data which obtained from this method shows how people influence the environment and are influenced by their social environment/resources in related with either quantifying or classifying specific variables, such as income and price differences with demand and supply variation as well as production and market differences magnitudes in time, landing, access to the resource.

The study has been used this method to obtain different dependent (such as, livelihood, development, individual-based and cooperative fishery, rules of access and level of operation) and independent (such as, fish, Lake Hawassa and landing sites, local communities status by age or sex) variables' level of interaction and cause-effect relationship among them. It was also helpful for the study in describing different research problems, such as socioeconomic and demographic characteristics, practical/detail roles and challenges of fishery industry with fishers' free views as well as some coping strategies with different variables. Specifically, I used stratified sampling type of survey instrument, because the issue of this study was more of cluster and interaction based in landing sites, associations, shifts/type of operations.

Questions for the surrounding target local communities has been both open and close ended types to efficiently gather both kinds of data from such different respondents in education and experience background in keeping the proper procedures of dependent and independent variables to achieve its ultimate goal of obtaining validly quantitative data. In such a way, the questionnaire conducted in 40 respondents from the two clusters/landing sites /*Amora Gedel* and *Fiker Hayik*/ including cooperatives and individual fishers through stratified random sampling method to obtain those strata's different views and interpretations regard to the lake's fishery in different sites and access and level of operation in such differently clustered fishers. Therefore, it was an accurate method to get the representatives in critically applies such method. The sampling method of this survey critically considered different scope, cost, language, education, experience and other status in the realm of reaching all mandatory areas. During the field stay, samples were selected considering cost, respondents' language and willingness. The researcher gave efficient time and freedom for such respondents gathering a detail and appropriate data.

1.4.2. Secondary Data Collection Instruments

The secondary sources of data obtained from different published and unpublished written documents which are closely related to the issue of study through using books, journals, academic and methodology literatures, policy documents, organizational reports and other related literatures to support and illustrate the study.

1.5. Ethical Considerations

Ethical considerations in the course of study can be seen as the appropriateness of the researcher's attitude and behavior in related with the participants of the research or those who are affected by the research. Ethical issues are a considerable aspects of the research, because social researches inevitably deal with different socio-cultural target groups and things that may affect them, as it is necessary to keep the overall research process healthy and reliable (Bernard 2006).

As a social science research, the study issues intrudes the socio-cultural norms, values and beliefs, then it may affect the target groups in different ways unless proper ethical considerations taken. Thus, in related with the application of different methodologies for this study, I have observed the study setting, discussed in the issue and interviewed different selected informants as well as recorded their voice, picture or overall activities depending on their informed consent to obtain the required data. As all of these processes required the permission of such target group, basically, all local communities and other stakeholders addressed hierarchically through a collaboration letter which obtained from the department. The other one is related to the researcher's ethical issue in the course of the data collection and acknowledgement of using related literatures. Once the issue is granted at will of the informants, the researcher should follow some ethical issues, such as informed consent of the research participants to get involved in the research.

Thus, confidentiality in disclosing of all data at all required time, anonymity of each informant's personality (such as, using pseudonyms or real names depending on the sensitivity of the issue and willingness of the informants), transparency on the actual purpose and impact of the research and the informants' right of withdrawal from the research was clarified. Pictures and related figures taken in the field are also used in this research based on the will of the informants. The related literature contributors on this research are also duly acknowledged. Therefore, the researcher goes through critically keeping and applying such considerations in each step of the research.

1.6. Fieldwork Experiences

As the ethnography research, it is expected to spend more time with the local communities at the field in which the study is conducting to understand the issue in detail and obtain sufficiently reliable and valid data. In such a way, the fieldwork has been carried out in and around Hawassa city, which is about 275 kms due south of Addis Ababa, with a total duration of 51 days from April 3 up to May 24, 2017.

The data collection with all crucial instruments then becomes my daily activities in applying one after the other in accordance with the research ethics and its suitability. In such further exploration the key informant's help, as anxieties of interactions reduced, the issue becomes more attractive and incisive for more investigations. Initially, in the case of filling survey questionnaires, there was a challenge in getting the appropriate informants in two study areas with my research assistant, Elias Azmeraw. Later on, its challenge gradually reduced and normalized with the help of officeholder and local communities' key informants. Responses of such diverse informants were mostly willing and collaborative, but few of them were reluctant, especially in open-ended answers.

However, in all of my field experience, there was a friendly and family relationship even after our formal discussion and due to most of my childhood and educational background was from there, I become as part of them, and then I got even sensitive data, such as legal aspects, reasons behind conflicts and 'informal' practices on the lake in differently applying such major qualitative data collection tools. Therefore, as this research was unusual anthropological study on the livelihood aspects of fishers-lake interaction at Lake Hawassa, newness of the issue was one of my fieldwork experiences in addition to understanding the informants' behavior, nicety of the issue as well as its broad scope with a short duration at the field. Generally, due to the issue is previously unstudied from the community's perspective; it needs further investigation.

1.7. Data Analysis

Data analysis is the method of searching patterns in data and explaining such patterns in accordance with the theme of the study. It is also the process of explaining in trying to make sense of the data received and reducing it to meaningful accounts (Bernard 2006). Therefore, the main method of this study is a thematic analysis through the explanations of different kind of bulk data in accordance with answering each basic research questions to meet its objectives. Additionally, descriptive analysis takes place to present some quantitative findings. Thus, each method's basic elements of data categorized through coding in meaningfully assigned titles. Observational data therefore analyzed as a general overview of the issue regards to behavioral patterns and everyday life activities of the communities within their natural setting. The obtained data, then critically interpreted in accordance with their respective objectives in integrating them with recorded data.

Data gathered from interviews (both semi-structured and structured) presented and interpreted as a detail analysis of the ways of drawing out different patterns and behaviors from such concepts, values and insights in such research participant's social context. In the interpretive philosophy, the recorded and written raw data pass through transcribing, coding and analyzing each data regards to achieving its respective objective.

Focus Group Discussion (FGD) data, as a competing and arguable concept and views, it has been analyzed as a context or cross-sectional arguments in critically triangulating and interpreting such debating and contextually different views of those purposely diversified participant's data. Therefore, in analyzing such data, different socioeconomic and demographic aspects considered for proper analysis when passing through the procedural steps of qualitative data analysis.

The analysis of survey data, as a quantitative method, passed through describing the hypotheses of different variables via measuring the magnitudes to find out numerical description. To do so, each questionnaire answers are thematically organized in line with related qualitative data and the research objectives for valid analysis. Finally, lived experiences which obtained from case studies analyzed as an illustration of the overall continual process of the issue through changing time, place, rules of access and operation as well as technology and environment for more concrete evidences. Yet, as case studies focuses on individual's general explanation of the practical life story, the analysis of such recorded data needs proper care of considering different time, place and condition contexts for a relatively balanced analysis.

As thematic analysis, identifying themes, patterns and relationships/interactions taken place to acquire well organized interpretation, descriptive analysis also utilized for tabulating, graphing or tallying some statistical data. Ultimately, the general organization of the study summarized in critically examining the linking of research findings with its objectives.

1.7.1. Thematic Analysis

In using thematic analysis, each data has been clustered in different categories in accordance with the nature of the research questions and responses of the respondents to efficiently meet the required research objectives. In employing this method, the data goes through different steps of data analysis to put each under basic themes and sub-themes. Initially, the recorded audio, video and different FGD and personal interview data were transcribed with the researcher's personal observation so as to transform such recordings into textual form.

The task of coding such transcribed data was the next step via reading and re-reading of those transcripts and notes for clear understanding and reflection on each theme and sub-themes from each method's of data. As each intended objectives and questions considered as the main categories and themes of data with the stated research problems and sub-themes of the study, each data are organized accordingly. Common views and answers, and debating/disagreed competing ideas are clustered and presented as a one dimension of the proposed concept of fishers-lake interaction. Therefore, the developed data in line with their themes/ sub-themes explained and interpreted with the related concepts, theories and materials presented in the literature review.

1.7.2. Descriptive Analysis

Descriptive analysis, moreover involves understanding of data through graphic displays, tables and summary statistics to have valid and reliable data in hand (Bernard 2006). In this analysis method few and significantly selected numerical data are organized in tally, tables and graphs statistical formats. Therefore, the description of such results described and explained in accordance with the nature of data with its respective objectives.

1.8. Reliability and Validity of Instruments

It is the way of checking and balancing of each data collection, analysis and interpretation methods on and after the data processing. Thus, in this study, various methods have been employed to check the reliability and validity of both qualitative and quantitative results. Thus, such research questions were basically checked by my advisor and also some collogues who are PhD students to ensure its compatibility in answering the research questions and meeting the intended objectives via every questions content, clarity and relevance to fill the study gaps. Following some comments, modifications on some questions made to make it sounder in every aspect. The same questions, basic to this study, were raised for different informants, via each data collection instruments beyond the diverse questions so as to maximize the reliability and validity in using them with critical considerations of socioeconomic and political aspects of informants.

1.9. Scope of the Study

The study has been carried out in two different study areas with the conceptual scope of anthropological study on the opportunities and challenges of fishers-lake interactions from the wider livelihood and developmental aspects of fishing strategies via its change and continuity at Lake Hawassa. The geographical scope of the study has been in SNNPR by selecting two study areas, i.e. *Amora Gedel* and *Fiker Hayik* landing sites respectively.

The selection of those specific study areas is mainly depends on their fishing capacity, socio-cultural and ecological diversity as well as distinctive operations for a contextual understanding of the study. As one of the means to gather important data, the study reviewed previous related works which conducted in the selfsame thematic area, which in turn enabled the researcher to identify the information gap that was expected to be captured by the research.

1.10. Significance of the Study

I believe that this study will have a number of expected outcomes and significances for Anthropology and related disciplines' further study and the country in different ways. The first one is that, other researchers and concerned bodies will have a clear picture about Lake Hawassa and local communities' multilateral co-existence and its various socioeconomic and ecological values. Specifically, the livelihood and developmental aspects of fishery from its opportunities and challenges with different changes and continuities previously was not studied on Lake Hawassa. Therefore, this study can guide other researchers as a footstep to investigate more on the issue.

The result of this study also may clearly aware stakeholders about the influence of surrounding 'local' and commercial communities on the lake. It basically forwards possible ways on the community-based management and conservation of fishery industry on Lake Hawassa of assessing the specific study areas opportunities and challenges this sub-sector from the wider socioeconomic aspects of the lake. Furthermore, as a new dimensional social science research, the result of this study can aware the target groups and all stakeholders by suggest on the relative and consistent fishers-lake interaction from the community's perspective in specific rule and regulations of current context to create a mutually interdependent wider socioeconomic activity on Lake Hawassa. Therefore, the study contributes more in filling the research gap on social science arena and suggests for policy making in creating community based management of the lake.

1.11. Description of the Study Area

1.11.1. Geography

Lake Hawassa is one of the Rift valley lakes located at central location of Ethiopian Rift valley at 275 km south of Addis Ababa. It is the smallest (96 km2) of the eight Major Lakes found in the Rift Valley of Ethiopia. Mulugeta Dadi (2013) has found that the Maximum Depth of Hawassa Lake is 23.4 m with an Average Depth of 11 m. The Lake drains an area of 1250 km2, and can accommodate 1.036 × 109 m3 of water.

Lake Hawassa is a Caldera Lake, which occupies the lowest elevation in the Lake Catchment. The Lake Catchment falls into two regions, Southern Nation, Nationalities and Peoples' Regional State (SNNPRS) and Oromiya National Regional State. It lies between latitude 6°48'45" – 7°14' 49" N, and longitude 38°16'34" – 38°43'26" E. Elevation of the Area generally ranges from 1680 to 2600 m.a.s.l. Lake Hawassa, in comparison to the other Rift Valley Lakes, had a relative high water transparency and low sediment load because the large swampy area to the east on the *Tikur wuha* River called *Cheleleka* acts as efficient settling area for silt coming from the higher hills and mountains of the eastern escarpment (Jacobus et al., 2011). The surface of the lake receives on average about 85 million m^3 of water annually through precipitation. However, the rate of open water evaporation on average is 160 million m3/year (FfE 2007; Pattnaik 2014). The Watershed comprises Seven Woreda form SNNPRS and four Woredas from Oromiya Region, some partly. The area coverage of each Woreda is presented on Table 1 and figure 1 below:

Table 4: **Administrative Structure of Lake Hawassa Watershed.**

Region	Zone	Woreda	Area(km²)	%
SNNPR	Sidama	Hawassa City Adm.	254.8	69.5
		Boricha	94.6	
		Shebedino	39.8	
		Wondo Genet	227.4	
		Melga	150.4	
		Gorje	56.7	
		Hawassa Zuria Woreda	155.5	
Oromia	West Arsi	Shashamane	188.3	30.5
		Shala	74.8	
		Siraro	51.9	
		Kofele	23.6	

Source: (**Daniel et al. 2015**).

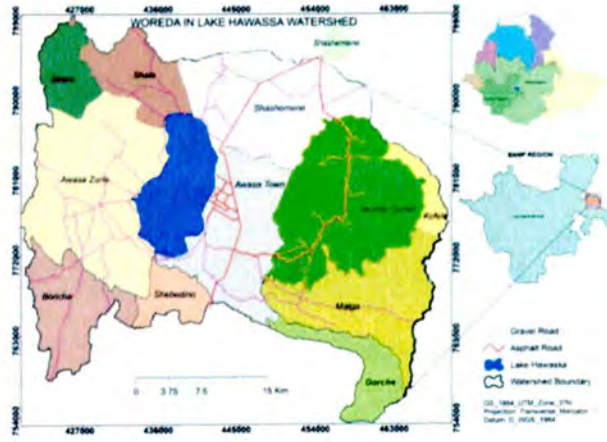


Fig.1: Administrative Map of Lake Hawassa Watershed.

1.11.2. Population

Demographically, the population pattern both in Hawassa city and its rural areas (sub-catchments of Lake Hawassa) shows that young people under the age of 25 takes a lion's share in covering around 65%. Adults shares 29% and people over the age of 50 covers 5.5% of the total population. Based on the projection result of the Housing and Population Census the total population of Hawassa city administration in 2008 is 371,826, out of this 191,352 are males and 180,474 are females.

Out of the total population, the urban people are 242,489 and the remaining 129,337 people live in the rural areas of the administration. Therefore, the annual population growth rate is 4.02, with 4.8 growth rate in urban and 2.8 in the rural areas of the city. For instance, total population in 2002 was 292,533 (150,486 male and 142,047 female), while it reaches to 371,826 in 2008 (191,352 male and 180,474 female). (Hawassa city Finance and Economic Development Dep't 2008).

There are eight sub-cities in Hawassa city administration and among them, *Hayik Dar* cub city (comprising of *Gudumale* and *Gebeya Dar* kebeles, both are the lake's catchments and the major focus areas of this study) consists the second highest population next to *Addis Ketema* with 26,895 and 27,584 people respectively. Ethnically, there are diverse ethnic groups are resided in the city and lake's catchment with increasing number. The Religious proportion of total population of Hawassa city and Lake's catchment mainly classified in to seven categories with the dominant share of Protestant up to the least followers of other beliefs.

Table 5: Population of Sub-catchment by Ethnic Group (2008 E.C)

No.	Ethnic Group	Number of People		
		Male	Female	Total
1.	Sidama	91,656	80,001	171,657
2.	Amhara	26,756	29,622	56,378
3.	Wolayita	26,821	26,434	53,255
4.	Oromo	9,673	9,382	19,055
5.	Guragie	8,199	7,662	15,861
6.	Kembata	5,201	4,793	9,994
7.	Hadiya	2,615	2,433	5,048
8.	Tigrie	2,400	2,355	4,755
9.	Other Groups	18,031	17,792	35,823
	Total	191,352	180,474	371,826

Source: **Hawassa City Administration (2008).**

Table 6: Population of Sub-catchment by Religion (2008 E.C.)

No.	Religion	Number of Followers			
		Male	Female	Total	%
1.	Protestant	113,623	107,458	221,081	59.5
2.	Orthodox	50,349	49,589	99,938	27
3.	Catholic	7,181	6,815	13,996	3.76
4.	Muslim	16,526	13,626	30,152	8.1
5.	Traditional	341	195	536	0.14
6.	Others	3,333	2,790	6,123	1.66
	Total	191,352	180,474	371,826	100

Socioeconomically, the development of the city and lake's catchment mainly depends on the presence and improvement of social sectors (such as education, health and employment) and infrastructure facilities (such as, road, telephone, water supply and electricity) as well as the pillars of the city's economy such as tourism, agriculture, trade and industry plays great role for the city and surrounding people (City's Finance and Economy Development Department 2008). As the lake is very important natural resource of the city with its considerable reason for the establishment and naming of 'Hawassa' (meaning, wide water body), the community of Hawassa and its environs utilize the resources of the lake as a source of livelihood for a very long time. It is an important source of water for the surrounding rural population for various domestic uses and livestock, and can be used to irrigate some crops including vegetables.

Thus, the magnificent Lake Hawassa naturally privileged with different species of microscopic plants including freshwater invertebrates, bacterioplankton and six species of fish of which, three are endemic and commercially important. (Hawassa City Culture and Tourism Bureau 2008).

Tourism in Hawassa, for instance is serving as backbone of the city's socioeconomic activities in hosting 200 thousands local and foreign tourists each year. Major tourist destinations such as, Lake Hawassa, the fish market, *Gudumale* Park (*Amora Gedel*), millennium park (*Tikur wuha* Forest), Mount Tabor and Alamura and other natural and man-made tourist attractions are the icons of the city's tourism. Different species of birds, waterfowl, hippopotamus and reptiles reside in and are supported by the Hawassa Lake. Particularly, the magnificent Lake Hawassa with its fish market and bird specious visited by 300-400 domestic visitors and 30-40 foreign tourists per day, which ranks the first place among the other tourist attractions of the city. The annual local visitors in 2002 was 12, 451, foreigners 58, 856 and total 70,856 with 13,022,708 ETB total income. While, in 2008, it reaches to 180,136 local visitors, 44,678 foreigners and 224,814 totals with 195,192,755 ETB total income.

1.12. Limitation of the Study

Research limitations are the constraints that might challenge the researcher on the successful accomplishment of the study. As the issue is all rounded and somewhat new for the department and social sciences, discussion with informants and getting related documents from concerned offices were difficult. In the course of this study, I have also faced time and financial constraints, willingness of the informants regards to legal aspects, collaboration of stakeholders and newness of the issue in social arena and community's perspective challenged me throughout the study.

1.13. Organization of the Study

This study is generally organized with five major chapters. The first chapter consists the proposal part of the study basically including introduction, research problems, objectives and methodology; the second chapter extends with briefing the conceptual and theoretical frameworks related with this study; in the third chapter major findings or results regarding the local communities livelihood interaction through different fishing practices starts to be presented thematically from the diachronic perspectives in accordance with their respective objectives; chapter four extends to interpret the next findings in the socio-legal issues of fishers-lake interaction in recent years; finally, in chapter five, major findings are summarized as concluding remarks.

CHAPTER TWO

CONCEPTUAL AND THEORETICAL FRAMEWORKS

2.1. Conceptual Frameworks

2.1.1. Conceptualizing Sustainable Livelihoods with Environment and Development

As livelihoods are a key factor to sustainable development, household well-being is explicit in livelihood thinking and constitutes a positive livelihood outcome in terms of basic material for a good life, human security and better social relations in the overall development pattern (MEA 2005). Approaches to sustainable development have focused on 'top-down' quantitative indicators based on scientific expertise and have a tendency to measure progress at global, regional and national scale. Sustainable Livelihood Approaches (SLA) have tended towards 'bottom-up' qualitative analyses of data begins at household levels (Sen 1981; Chambers and Conway 1992). SLA have evolved from shifts in perspectives on poverty, participation and sustainable development and in 1987, the World Commission on Environment and Development used the term 'sustainable livelihoods' for the first time in discussions on resource ownership, basic needs, and rural livelihood security as well as a means of linking socioeconomic and environmental concerns (WCED 1987; Conroy and Litrinoff 1988).

The livelihood diversity of the study area's local community relied on Lake Hawassa renewable resources and their strong social networks in division of responsibilities to realize ecologically friendly livelihood pattern for their overall sustainable livelihood. The livelihood and developmental patterns of local people may shapes ecosystems in the course of utilization and ensuring its sustainability, and ecosystem services may not be assessed without this reality. Furthermore, communities are the primary users and managers of most ecosystems, and are aware of their needs and goals in ecosystem management; including public participation in scientific assessments adds local and indigenous perspectives to scientific knowledge (Functowicz and Ravetz 1990). Capacity to respond to perturbations, such as a shift in lake levels, may encompass reactive capacity and proactive capacity, which is a capacity to search for and create livelihood options and strategies in order to increase competence with which to confront a threat (Ifejika et al. 2014). While, both instances were important for moving international concern regarding environmental problems towards a focus on people and their livelihood activities, and placing these concerns within a policy framework for sustainable development.

In the local level livelihoods context, the question of environmental sustainability is rely on whether livelihood activities maintain and enhance, or deplete and degrade, the natural resource base. At the global level, the question is whether livelihood activities make a net positive or negative contribution to long-term environmental sustainability, and therefore to other livelihoods. As the issue of sustainable livelihood strategy has cause-effect relationship with sustainable development and environment, integrating them in community-based knowledge and practical socioeconomic and environmental experiences may results in relatively win-win outcomes. Fishers-lake interaction at Lake Hawassa is also a cause-effect relationship with livelihood aspect the people and the Lake's ecosystem. Therefore, the issue of 'sustainability' can be a matter of capacity to properly respond to the socio-ecological perpetuations in the continuities of lake's fishing practices by each stakeholder.

2.1.2. Human-Water Bodies Livelihood Interaction Nexus

Wetland ecosystems, such as rivers, lakes, marshes, rice fields, and coastal areas, provide many services that contribute to human well-being and survival strategy. Some groups of people, particularly those living near wetlands, are highly dependent on these services and are directly affected by its healthy existence. Two of the most important wetland ecosystem services affecting human well-being involve fish supply and water availability (Millennium Ecosystem Assessment 2005). The study area nearby communities are also utilizing lake's fish and water resources for their livelihood, as it is relatively accessible for them. Inland fisheries, then, have particular importance in developing countries, and they are sometimes the primary source of animal protein to which rural communities, as Ethiopian rift valley areas have an access in its socioeconomic values. Inland fisheries provides opportunities of employment for millions of people not only for fishing, but also from fishing related activities such as fish processing, transporting and trading, net repair, and boat making which is carried out mostly at small scale level.

As fishing comprises multifarious activities, it becomes source of employment for thousands of individuals at Lake Hawassa with permanent and temporary access. In the case of utilizing water resources and its catchments for recreation and tourism, as one of major livelihood strategy, since the earliest periods, ecotourism has been practicing as a pillar of tourism activities, specifically water bodies have a considerable value in tourism sector as visitors come to these areas to enjoy boating, fishery and water sports, as well as to witness the remarkable range of freshwater and inland biodiversity that they support (IUCN 2004).

It is also increased environmental conservation as people struggle to maintain Africa's lakes in their natural state as a way to sustain local tourism activities. Ten thousands of domestic and foreign visitors are coming to Lake Hawassa to enjoy and use lake's resource, such as fish market, boat transport, and lakeside attractions thereby it may increases the livelihood values of lake's resources in benefiting the participating stakeholders.

Lake's fishery and tourism, African Lakes also house about 500 different aquatic species, creating the potential for sustainable fishing activities. Despite all these opportunities, increasing tourism can also have negative impacts. Without proper management and regulation, growing tourist facilities, other infrastructure can wreak havoc on fragile freshwater environments (UNEP 2006). A rapid increase in visitor numbers, beyond its livelihood and tourism value for the area, may render lakeside developments which are environmentally unsound and negatively impact the very fish and other creatures that brought people there in the first place. Therefore, as it may have both positive and negative impact on the surrounding communities, responsibly sustainable tourism activities results in mutual advantages for the lake ecosystem and the communities. As interaction is dialectical, it is real that the increasing flow of people to Lake Hawassa is causing for the income increment of the economic group on the one hand and putting influences on the lake's ecosystem on the other hand.

Such watershed communities are characterized by various livelihood strategies depending on the wetland resources. The difference of socioeconomic status indicates different livelihood strategies of particular communities. Different livelihood strategies are influenced by many factors, including not only environmental conditions, but also cultural, social and political background (Ashley & Carney 1999; Ellis 1999). Seemingly, the study area's small scale fishers are facing constraints by the socio-cultural changes in the practice and lack of access to alternative livelihood activities thereby it is potentially increasing the level of fishing efforts. Even though alternative occupations did not immediately reduce fishing efforts; hence fish resource extraction within its continuous interactions. Therefore, fishers tend to leave their new livelihood options and continue fishing (Pomeroy et al., 2009). Hence, a number of forces continue to seriously challenging such natural water resources. Many of these are primarily the result of human actions and include ecosystem and landscape change, agriculture, population pressure, industrialization, urbanization, sedimentation, pollution, over-abstraction and climate change.

The removal, destruction or impairment of natural ecosystems is among the greatest causes of critical impacts on the sustainability of the natural water resources and such livelihood patterns. (Freshwater Society 2004). Although, such kind of influences are also critically affecting the study area's biodiversity, still they are struggling via their social system/structure to reduce such challenges being with other stakeholders. They have a weekly program for cleaning of the lakeside areas and protecting solid wastes to entering the lake basing their division of duties to keep going the livelihood values of lake's fishing, but it varies one to another landing sites depending on their knowledge and values.

Moreover, in the course of continuous livelihood interactions, human activities commonly affect the distribution, quantity, and chemical quality of water resources. The range of such interactions that may affect the ground and surface water biodiversity is diverse. The effects of human activities on the quantity and quality of water resources are felt over a wide range of space and time scales (Dessie and Christiansson 2008). Agriculture, for instance, has been the cause of significant modification of landscapes throughout the world via irrigation and application of chemicals or pesticides to cropland.

In the study area, Lake Hawassa and its catchment there have also been changes in geographic properties, socio-political changes, population growth, unstable land tenure principles, agricultural development, and the improvement of transport capacity due to high population growth and the alarmingly increasing watershed's developmental works. These point sources have been documented to be a source of various pollutants in the lake ecosystem, mainly if the appropriate effluent control system is not in place to properly utilize the lake's various resources for long (Drevnick et al., 2012).

Despite that Lake Hawassa is a major feature (symbol) of the city and the livelihood pillar of surrounding communities, it subjected to the receiving end of various pollutants originating from the city Hawassa and its surroundings. In addition, intensification of weather changes has been observed in the watershed due to global warming (Abera 2015). Therefore, different livelihood activities and natural disasters on such case studies show that community-lake' interactions should go through conformity by taking social responsibility as most of natural disasters come from human influences in cope up the changes in the continuous interactions emanating from the dynamic livelihood interests of lake's surrounding communities.

2.1.3. Livelihood and Lake's Fishery in Ethiopia: Opportunities and Challenges

Ethiopia has only inland freshwater capture fisheries. There are potential resources of 180 different species of fish in Ethiopia and 30 of those are native to the country. The total area of the lakes and reservoirs stands at about 7000 to 8000 km2 and the important rivers stretch over 7000 km in the country. Fishing contribution to the country's GDP is very low with the estimated production potential of 51,000 tons/ year (Assefa 2014). Ethiopia is a landlocked country depending only on inland water resources for the supply of fish as a low cost protein source. The inland water body of Ethiopia is estimated to encompass about 7,400 km2 of lake areas and a total river length of about 7,000 km (Dereje, 2014).

As many other countries challenged in the world, population rise urbanization, agricultural development, industrialization and other water resource development activities have resulted in a decrease in the species diversity of freshwater fish species. Among the major identified challenges in developing countries within this sector is a high dependency on the fisheries resources, leading to over exploitation resulted in annual catch reductions. This condition is getting worse because of other external factors such as market price fluctuation, limited access to credit facilities, and lack of improved knowledge and facilities for fish processing and preserving (Chowdhury et al., 2011). Fishers-lake interaction at Lake Hawassa also has been a long lasting experience since the last four decades as one of major livelihood strategies. Through these times, lake's fishery passed facing with the emerging opportunities of increasing market demand, employment, tourism values, socio-cultural cohesion and overall livelihood values on the one hand, and production-market dynamics, seasonal variations, increasing of informal fishing practices as well as irregular management systems challenges as socio-legal-ecological encounters in differently affecting such participants.

Fish is one of the known aquatic animals used for human consumption as food. Aquatic animals in general do contain a high level of protein (17-29%) with an amino acid profile, similar to that of the meat of land animals (Assefa 2014). The flesh of a fish is also readily digestible and immediately utilizable by the human body, which makes it suitable for complementing the high carbohydrate diets. People consume large amount of fish in fasting days, in big cities, around production areas and towns, especially in Zeway, Arbaminch, Hawassa, Bahir Dar and Addis Ababa. However, the domestic market for fish is small due to religious issues, high price and demand-supply incompatibility, especially outside of Great Rift Valley lake areas (LFDP 2007).

As a major goal of fisheries is sustainability; human factors in environmental problems is the management of fisheries, that is, to limit catches so that fish populations are never damaged or depleted. For instance, over-fishing can result in the loss of jobs for those employed in the fisheries and loss of food for a nation's population (Botsford et al. 1997). Nowadays, low supply and management in the catchment areas causing for high price of food in urban areas and lack of trend in using such food for domestic purpose makes it a commercial food and source of income. In the case of Lake Hawassa, it becomes under the socioeconomic interests of currently emerging fishing participants on the one hand and inadequate implementations of rules and regulations on the other hand thereby such socio-legal dynamics are benefiting some the informal ones and challenging others to compete and continue within the practice.

2.1.3.1. Open-Access Nature of Fishery and Social-Legal Aspect Dynamics

The social/livelihood and legal/management aspects of world fishery have been goes through contradicting dichotomies with the free access of such resources and socioeconomic vulnerabilities on the one hand and, the inconsistency of management and legal frameworks on the other hand is making fishery as common pool resources of most environ communities. Such socio-legal dynamics becomes a challenge for the development of sustainable fishery in arising claims of resource ownership, livelihood and political competitions and conflicts one another in related with its limitedness. Therefore, the solution can be seen as two-fold: fisheries should no longer be treated as free goods, but as a resource with a specific value; thus it will be valued by the resource-exploiters (FAO 1992). This will come about as alternative systems of property rights in fisheries, including exclusive use rights are developed. An opposite view argues that it is not the ownership stake of fishers that promotes care of the resource, but better technology and science, and increasing environmental regulation. It is the stick, not the carrot that obliges industry to comply with the increasing demands of government management strategies.

Another argument takes the middle ground in this issue, and suggests that the evolution of property rights in fisheries is no more than "the development of the old system of licenses, with more of the valuable characteristics added". Fisheries rights were not consciously developed to create a property right; they were introduced merely to improve existing license systems in the face of dwindling fish stocks by adding certain desirable characteristics, which thereby turned the regulatory regime into a form of property right.

Thus, co-management can be implemented as a dynamic partnership using the capacity and interest of user-groups complemented by the ability of the fisheries administration to provide enabling legislation (Hollup 2000). This approach also emphasizes that recourse has to be involved in the management process and participation in regulatory decision-making, implementation and enforcement for its sustainability.

On the other hand, unclearly defined access and ownership, particularly over fisheries have led to the tragedy of the commons, which is one of the many other reasons behind the failure of fisheries management (Allison 2001). Because, common-property resources such as fisheries, wildlife, surface and groundwater, range, and forests; and it is important to delineate the characteristics shared by these resources, and to distinguish between the resource and the property-rights regime in which the resource is held (NRC 1986). Therefore, there are two broad challenges to examine the management of such kind of common-property resources: the exclusion of potential users and the regulation of access to ameliorate the problems regarding subtractability (Fenny et al., 1990).

In this case, the continuities of previous social and legal aspects of fishery at Lake Hawassa are also come under question due to the dynamics of community-lake interaction through time, place and conditions. Diverse issues on the lake, such as making imaginary lines, thefts and conflicts between different surrounding communities/ethnic groups at Lake Hawassa for the case of property ownership on lake's resources either for the matter of seniority or economic benefits. Thereby unavoidable tragedy follows from the open access nature of lake resources, lack of constraints on individual behavior, conditions in which demand exceeds supply and resource users who are incapable of altering the rules. In Ethiopian context, even though there is some general fishing proclamation to apply as federal and regional level, but it doesn't consider specific fishing area's clearly specified property right.

2.1.3.2. Livelihood Strategies and Socio-Legal Management of Fishers-Lakes Interaction

All lakes, natural or artificial, undergo various transformations through time due to natural processes of aging caused by climatic, hydrologic and ecosystem changes. However, the greatest degradation impacts to lakes and wetlands are caused by human interventions (Ayers et al., 1996). The growing population and industrialization in a Lake Basin can lead to mounting pressures for development of lake resources, such as water withdrawals and fish landings (Chapman 1996).

Therefore, each development activities can have a great deteriorating impact on Lake's Ecosystem and biodiversity unless social responsibility by themselves and full management on the project progress undertaken (UNEP 1994; NRC 1992; Davis and Hirji 2003). As Lewis (1987), in the absence of protective management, tropical lakes would decline greatly in their utility for water supply, production of commercially useful fish and other species, and recreation, because tropical lakes are more sensitive than temperate lakes to pollution. Therefore, management system combines a set of regulatory scheme within a particular resource to achieve a manageable outcome (Hanna 1995). The effectiveness of regulatory measures depends on the support gained from the user group and the way they define their problem (socio-legal contradictions), their involvement in the decision-making process, in installing and enforcing the regulations (Jentoft1989).

In this case, the SFLP (Sustainable Fisheries Livelihoods Program) used a process approach engaging the SLA (Sustainable Livelihood Approach) within the broader policy setting of the code to improve fisheries livelihoods in local communities and to influence and inform national and regional policies and institutions promoting sustainable livelihoods and responsible resource utilization (Kébé and Muir 2008). People's social and economic activities should be at the center of the analysis with acknowledging that attempt to reduce fishing pressure or allocate clear property rights and access to the poor have to be understood in wider terms than just their fishing capacity (Allison and Badjeck 2004). Because, increasing claims and competitions regarding fair access to the resource and property ownership and inadequate legal implementations may leads to conflicts and it is became usual among the study area's fishing communities with setting imaginary lines in between and stealing the other groups' nets that try to fish in their specific areas. Therefore, compatibility of socio-legal issues key role in the sustainability of lake's fishing.

As fishing communities has extensive local or indigenous technical knowledge, strong vocational skills, local task and resource sharing processes, learning processes, and diverse and flexible livelihood strategies, local ways of reducing vulnerability for sustainable development impact should also constantly encouraged, because sustainability is a core of fisheries management, recognizes the dynamics of such people's lives via the capacity of elements of a livelihood system to withstand shocks and adapt to change (Allison and Horemans 2006b). Together with this, such works should go in line with the focus people's livelihood systems, and the ways they interact with resources and with social, economic and policy forces around them than external management and development views for more positive results.

However, in considering some points, such as licensing a certain number of fishermen and fishing gears according to biological limits, apply closed season (June –July) to prevent fishing during one of the tilapia breeding seasons and Mesh size limitation of minimum 10 cm stretched mesh for gill nets and 8 cm for beach seine may reduce such challenging factors. Moreover, as progressive reduction in number of beach seines by 50% in 2 yrs leading to total eradication, prevention of beach seining in certain areas by placing obstacles in the near shore areas and planting of inshore vegetation and closed areas to prevent fishing in designated areas where fish are known to breed may become a contextually understood solution for management strategies of Ethiopian lake's fishery (Assefa 2014). Therefore, the general water resource policy in the critical context of property right and livelihood patterns of the community should go through recognizing water as scarce and vital socioeconomic resource; manage water resources as a strategic planning basis with long-term visions and sustainable objectives to ensure the surrounding communities fair and responsible utilization of the resources.

It ensures that water resources management is compatible and integrated with other natural resources as well as river basin development plans, with the goals of other sectoral developments in energy and agriculture to see the expected result (Tigist 2009). Moreover, unclearly defined property right systems, as a major challenge for managing institutions, provincial authorities should clarify local institutions on the status of aquatic resources, the property rights thereof (Weimin et al., 2010). The plight of fishermen and the inefficiency of fisheries production stems from the common property nature of the resources of the sea is further corroborated by the fact that similar patterns of exploitation and similar problems in other cases of open access. All of such depletion, poor economic and instability effects result from treating the resource as common property until they are caught (Pearse 1992).

Due to this open-access equilibrium dissipates the wealth (or rent), the result has been that excessive effort is used in fishery, fish stocks may be dramatically reduced and fishermen tend to remain poor with incomes little more than their opportunities incomes. As the study area's fishing is running with different legally registered and unregistered individual fishers and cooperatives with the respective different concerned bodies, claims of property right in landing sites, disputes by imaginary line regards to seniority and resource ownership and market access from such fishers is usual; they should engage fishing communities towards co-development, accepted objectives and adopted measures for resource protection and sustained local fisheries.

2.2. Theoretical Framework

2.2.1. Social-Ecological Systems (SES) Framework

Ostrom proposed a framework to analyze the sustainability of Social-Ecological Systems (SES) that integrated the efforts of many scholars over years to develop an integrative and multidisciplinary approach to understand complex interactions within different systems and scales around natural resources governance (Epstein et al. 2013). The framework is based on eight first-level core sub-systems defining the interactions (I) between four multi-linked subsystems [resource units (RU), resource system (RS), governance system (GS) and users (U)] that deliver outcomes (O) and interacts with the social, economic and political settings (S) and with the related ecosystems (ECO). Based on extensive field research, Ostrom proposed a set of different variables to synthesize the main features of each subsystem, but left open the option to chose other variables or add a deeper level of variables based on the particularities of the analyzed SES (Ostrom 2009).

As the world is currently convoluted by considerable interaction with many natural resources, including fisheries, lakes, and forests, as well as experiencing major reductions in biodiversity and the threat of massive climatic change, all humanly used resources are embedded in such complex, Social-Ecological Systems (SESs). SESs are composed of multiple subsystems and internal variables within these subsystems at multiple levels analogous to organisms composed of organs, organs of tissues, tissues of cells, cells of proteins, the interaction and outcome among them etc. In a complex SES, subsystems such as, a resource system (e.g., inland fishery), resource units (fish catch), actors/users (fishers), and governance systems (rules of access and level of operation that govern fishing on that landing) are relatively separable but interact to produce outcomes at the SES level, which in turn feed back to affect these subsystems and their components, as well as other larger or smaller SESs (Wyborn and Bixler 2013). Therefore, human-natural resource (such as, fishers-lake) interaction requires a deep understanding of the complexity of different systems involved (social, biophysical, economic, political etc.) and of their outcome-based interactions.

The framework is a conceptual model that provides a common language for case comparison, organizing the many variables relevant in SES analysis into a multitier hierarchy that can be unfolded when needed (Binder et al. 2013). Furthermore, it is holistic (analyses social, economics, ecological and policy aspects at external and internal levels, but also their interactions and outcomes), multi-layered (different layers of information can be superposed and researchers or actors can focus their interests) and nested (individual systems and subsystems are an integrated whole and – at the same time – part of larger *systems*) (Janssen and Anderies 2013).

A. Social, Economic, and Political Settings (S)

This subsystem describes how SES is affected and may affect the larger socioeconomic, political, and ecological context in which they are embedded. It informs of the management strategies designed at different levels, from national to local, and describes how aspects managed at larger scales impact on the SES. To clearly differentiate SES and settings is essential, but it can be difficult because the boundaries are not always clear or may depend on the different features at stake. Some information can be similar, while other variables might differ significantly. Ostrom (2007, 2009) more illustrates such interconnected social economic and political settings (S) are: Demographic trends (S1) (such as, *number of inhabitants*, *population density*, *demographic structure*, *population growth rate*, *migration trends* and *settlement patterns)* which provide a more precise overview of the social situation and the threats derived from human pressures. Such issues are described in this study concerned on fishers-lake interaction in which how those variables the social system of fishing practices and being affected each other.

The next setting is economic development (S2) (includes *economic sectors*, *employment per sector*, *income per capita* and *income dispersion).* The third major setting, political stability (S3) is described by *respect for democratic values*, *norm compliance* and its reinforcement capacity, *existence of conflicts* and *drivers for political change.* Those political and economic variables are helped this study to see the political economy and ecological aspects of fishers-lake interaction in which both economic and political issues have direct relationship with the study area either in complementary or mutual interactions. Government resource policies (S4) are also described with the study through *governmental regulatory framework* for the management and use of natural resources, *environmental policies* at different levels and their level of implementation and *compliance with environmental regulatory framework and policies*.

To explore market incentives (S5), the variable subdivided into: *type of products* marketed (commodities and non-commodities), *influence of local/global markets* in the area's dynamic, *access to markets*, *demand for natural resources* and *market incentives for conservation*. Media organization (S6) and its role in society and on environmental issues can be understood considering the *presence of media*, *media deterrence capability* and *media interest in socio-environmental issues,* such as the study area community's social network and value-chain system in fish production and marketing for common socioeconomic/livelihood values.

The area's fishers' socio-structure configuration that comes through time either with individual-based or cooperative fishing livelihood functioning circumstances in line with the overall socio-ecological mutual interactions and local dynamics helps to know fishers-lake interaction. Furthermore, it tends to show that how the area's fishing based livelihood pattern particular system/social structure functions and survive within a variability of a given socio-cultural and ecological setting. Thus, such societies may use different cooperation to survive with different natural and human-made dynamics through specific systems in accordance with the setting, such as Lake Hawassa fishers' cooperatives under the guidance and management of institutions, such as the city's natural resource and environmental protection office to sustain it with proper functioning of each part for the as a livelihood system.

B. Resource System (RS)

This subsystem describes the environmental conditions where the resources are located or produced. System boundaries are a key variable; well-defined boundaries are more effective for successful collective resource management (Ostrom 1990) and for controlling and preventing negative processes. As SES boundaries can be defined naturally or by man we proposed *natural boundaries* and *anthropogenic boundaries* and added *boundaries to extraction access and property*. To analyze the equilibrium properties, describing the *interactions between subsystems*, the *external impacts and system responses* and the *history and evidence of impacts in sub-systems and its effects* needs to be considered. Fishers-lake interaction at Lake Hawassa is seemingly running through cluster based fishing system with specific landing sites using fluid imaginary lines one another. Access to the resource is mainly determined by their social network and legal implementations. Such people-lake and inter-human interaction is resulting in positive or negative effect up on the lake's resource and human relation through overfishing, net thefts and conflict.

As Human ecology analyses the consequences of human activities as a chain of effects through ecosystem and human social system, Fishing is directed toward one part of the marine ecosystem, namely fish, but fishing has unintended effects on other parts of the ecosystem. Those effects set in motion a series of additional effects that go back and forth between ecosystem and social system. Drift nets, for instance, are nylon nets that are invisible in the water. Fish become tangled in drift nets when they try to swim through them (Marten 2003). In this framework the study intended to see both of Lake Hawassa's local ecosystem and resource system interactions and their influences one another with considering the resultant effects throughout its livelihood activities.

C. Resource Units (RU)

This subsystem describes the natural resource units generated by the resource system. They can be countable/manageable (e.g. fish, water, wood) or need approximations to be measured (e.g. biodiversity). The economic value is associated with monetary value, but a complete understanding of the resource value should include other values. Such *resource values* can be seen through *market value* (price associated to the resources), *environmental value*, even if it is not recognized by the market, and *strategic value*, which can be linked to economic, social, geopolitical, cultural or even symbolic considerations of the resource unit. In the case of fishers-lake interaction at Lake Hawassa, the main resource unit is fish catch/lake's resource in which it has different economic, social and ecological value for such actors and other related ecosystems. Thus, it became measured with the diverse livelihood values and sustainability of biodiversities by stakeholders as iconic socioeconomic and ecological resource.

Due to there are diverse socio-ecological and economical interests starting from the local up to regional level of participants, livelihood aspect of the lake's resource unit (fish catch) in the study area bounded is by different concerns, such as economic profit, ecological protection and sustainability or local political interests. Therefore, not only the local ecosystem but also related politics highly concerns the study area's target community's livelihood strategies, because such kind of nature-based resource units highly embedded with economic, ecological and political connotations. Such socio-environmental interactions with the resource unit also go in line with different parties' property right claims and power difference/struggles as survival strategies over their competing views and other external structural issues. While the influencing factors on fishers-lake interaction of Lake Hawassa is running with changes in individuals, institutions and states interests, social structure, choices and decision over the livelihood pattern and function of lake's fishing with the local environmental changes and continuities as a whole, not only particular politico-legal or socioeconomic interest issue.

D. Actors (A)

This subsystem describes the actors affecting or affected by the resource system. The SES framework initially defined it as 'users'. However, McGinnis and Ostrom (2014) replaced it by 'actors' to expand the framework's potential range of application. These authors proposed nine second-level variables to describe it. Actors (A1) were renamed as *relevant actors* and included two groups: *direct users* (fishers) and *other actors* (suppliers), to be described numerically and mentioning its dependence and influence on the SES.

Socio-economic attributes of users (A2) include a broad spectrum of information. We subdivide it into: *demographic attributes* (number of inhabitants, population density, gender ratio, demographic structure, population growth rate, migration trends and settlement patterns); *economic attributes* (sources of income, subsistence activities, non-paid activities for SES management, time allocation to different economic activities and actors' specialization/dependence on SES resources) and *social attributes*) (access to health assistance, formal education and basic services, poverty and vulnerability levels, local consumption patterns, women's rights in relation to natural resources access and cultural identity). For those described in the settings, here, we asked to highlight the differences.

Leadership/entrepreneurship (A3) has a high impact on management decisions. We proposed to include: *leadership patterns* to explain the type of leadership existing and the acceptance of and respect for leaders and *entrepreneurship patterns* to define the entrepreneurial skills of actors and leaders. Norms/social capital (A4) is also critical for understanding the SES functioning, but included unclear concepts for the communities. We subdivided into: *traditional forms of collaboration*, *social capital,* including aspects such as trust and reciprocity, *attitude toward corruption* and *traditions and community values related to natural resource use*. To better understand knowledge of SES/mental models (A5) we suggested: *local knowledge of SES*, *knowledge of the effect of over-harvesting*, *knowledge of social attitudes toward resource management*, *knowledge of the effect of biological shocks* and *mental models related to SES management* (e.g. conservation, exploitation, human-nature relationships).

The SES Framework, with its emphasis on the processes by which how people's knowledge about how to interact with their environment, the study area's fishers also has been using their socio-cultural values within the lake's surrounding socio-ecological-political dynamics, such as fishing strategies and social organizations. It helps to know how change occurs in social systems in response to environmental perturbations in simulating adaptive and autonomous agents to draw information from their localities and apply it to decisions and behavior. The framework is particularly useful for the insight as it gives into why traditional farmers accept or reject agricultural innovations, and in my case it helps me to assess how fishers go on with different fishing strategies to survive than others. Mocrman (1968) has explained why peasant rice farmers in northern Thailand have adopted tractors under certain environmental circumstances while they continue to rely on water buffalo under other circumstances.

As the framework incorporates social/ecological processes, structure, norms, and institutional factors, agents can be created to implement these features, making it possible to put them into place of local social and spatial context (Entwisle 2007). Different group of fishers at Lake Hawassa didn't easily accept new fishing materials, for instance, *'Monofilament'* is new modern gill net with effective fishing capacity, but they do not accept it, because it can't go on with their socially adaptive fishing practices, as it catch immature fishes and other unwanted animals together. Thus, their socio-ecological knowledge is favoring them to survive as agents/actors.

E. Governance system (GS)

This subsystem looks into the processes through which decisions on SES management are made, implemented, reformed and reinforced. The framework proposed eight variables to describe it. Government organizations (GS1) was subdivided into *state organizations* and *communitarian organizations*, to distinguish between the roles played by the government in the SES management and the existing community-based governance structures. Network structure (GS2) was divided to identify the most important networks affecting the SES: *social networks*, *community networks*, *environmental networks* and *market networks*. To better describe the property-right system (GS3), we introduced *property-rights system*, *excludability* options and *subtractability*. Monitoring and sanctioning (GS4) was divided in *monitoring processes* and *sanctioning processes* to underline the importance of both and the fact that they are not necessarily linked. Therefore, fishers-lake interaction at Lake Hawassa is going through the reciprocal interaction of governmental and social organizations in which their diverse interests and capacity of implementation became contradicting and creates competing views/conflict over the property right/access to the resource.

G. Interactions (I)

Several variables informing the Interactions among sub-systems were easily understood, only examples or additional information were added. Harvesting levels (I1) was divided into *harvesting levels of different users and its effects on the SES* and *free-riding* activities. Information sharing (I2) should be more specific, unfolding the processes and their effects on the SES dynamics by describing the *knowledge transmission* of the cumulative ecological body, the *information/knowhow sharing about SES variations* and the presence or absence of *learning processes*. Deliberation processes (I3) was better understood by adding *knowledge about participation mechanisms and rights* among the users and *trust building processes*.

For networking activities, *internal networking activities*, *external networking activities*, *partnership and cooperation activities* and *external communication processes* were proposed. The social network system in the study area's fishery communities and their interaction with different related variables is contributing for their livelihood differently depending on level of awareness, access to the resource and value/supply chain in fish production and marketing.

H. Outcomes (O)

This subsystem describes the results of the interactions among the aforementioned variables. It explains and evaluates the results of the dynamic interaction processes among different sub-systems and the interrelations and influences on the SES. O1 would be better named as *socio-economic performance measures* because it goes through social and economic processes including, *efficiency*, *social-economic sustainability*, *equity* (to explain the distribution of benefits among SES users), *accountability*, *effects of deliberation processes on the SES*, *empowerment* (including a gender analysis) and *adaptation strategies* to environmental or man-made changes. The outcome or actual livelihood significance in the study area can be seen either through household well-being, level of poverty or features of access to resource depending on the appropriate measure taken cope up the related socio-economic dynamics.

O2 should comprise: *environmental sustainability, pressures on resources*, including aspects such as the increasing demand of resources, the presence of new actors and resource uses, the uncontrolled harvesting, etc.; *natural habitat conditions*, including information on biodiversity indexes, species richness, connectivity, and situation of the habitat (conserved/degraded/fragmented); *effect of SES management on natural hazard impacts* to describe whether changes in type, frequency or patterns are happening; *environmental quality* to describe the condition of the resources, including information on its quality and availability; *resilience* and *vulnerability*. The two last variables are not easy to measure, but a qualitative approach can be selected to understand the views of stakeholders on them. Basurto et al (2013) used this approach assigning a low, medium, or high measure to some variables. Finally, O3 have been subdivided into *positive externalities* and *negative externalities*. Therefore, the final outcome of fishers-lake interaction in the study area is resulting with positive and negative impacts on the participants' livelihood and local ecosystem/fish resource sustainability. For instance, the measure taken by cooperatives and individual-based fishers to adapt seasonal as well as socio-economic changes is different thereby the effect in their life and ecosystem is also different.

I. Related Ecosystems (ECO)

The last core subsystem of Ostrom's framework describes the connection between the considered SES and the surrounding using three second-level variables: climate patterns, pollution patterns and flows into and out of the focal SES. No additional variable was proposed because our SES has limited capacity to influence these parameters. Additionally, it was not easy to collect information or data at local level to describe the influence of the SES management on other ecosystems. Such related ecosystems also have bilateral interaction with the aforementioned variables in the study area and its result status is relied on the overall measures taken for the sustainability of the resource. For instance, the level of management works undertaking by all stakeholders to conserve fish resource at Lake Hawassa has its own implication on fishers-lake interaction.

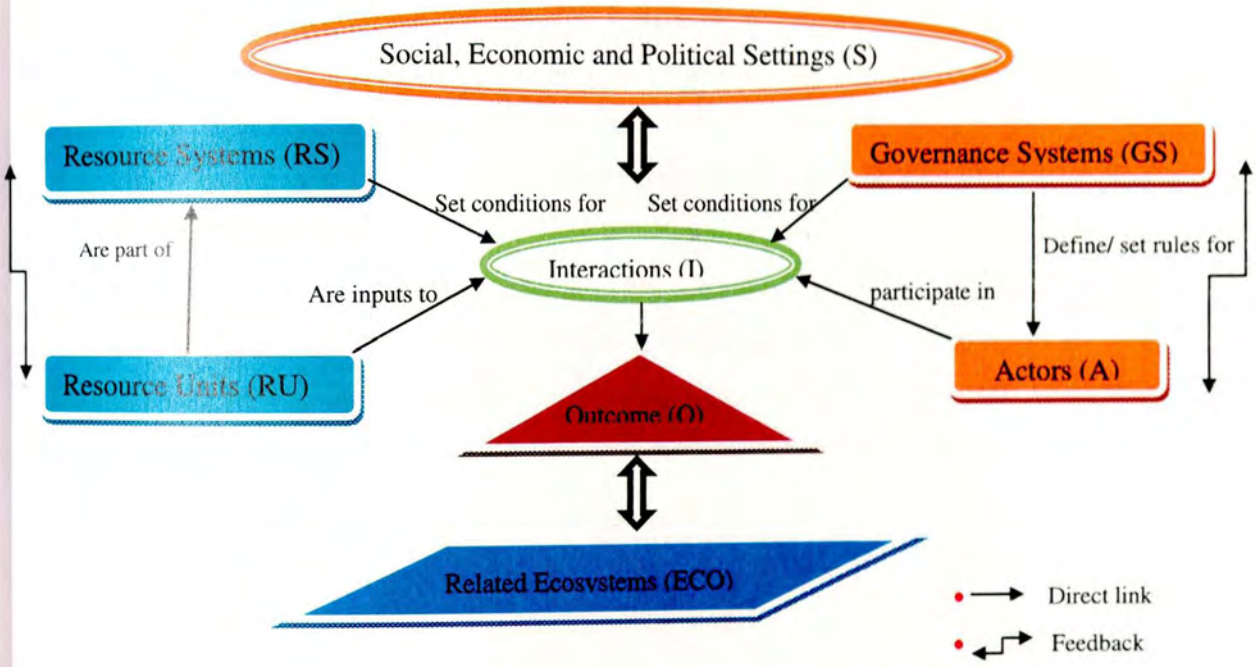


Figure 2: Social-Ecological Systems (SES) Framework (Ostrom 2009).

CHAPTER THREE

LAKE HAWASSA, FISHERY PRACTICES AND LIVELIHOOD NEXUS

As Lake Hawassa is providing diverse values for the surrounding communities, they are interacting with the Lake's onshore and offshore resources for different livelihood purposes, such as fish production and marketing, thereby this kind of community-lake interaction is resulting with varying consequences both on the lake's resource as well as human relation. Thus, this chapter explored how the lake's resource is affecting the communities and being affected by their fishery related practices illustrating the seasonal feature of fishery and participants' changing strategies. The increasing number of dependent communities and varying values of the lake's fishery is further explained as it is mainly depends on their access to the resource and different coping strategies with changing situations, such as social network, value-chain, and methods of fishing. Therefore, the two-way interaction between fishery related communities and lake's resource is being determined by different variables, such as access to fish production and marketing, season (variation), ways of fishers' organization and related demographic/socioeconomic variables. Currently, the increasing number of participants with diverse access/interest to the resource on the one hand and changing values of fishery due to various socio-ecological factors on the other hand is making the interaction under dynamic livelihood values. As increasing participants affect the lake for their livelihood interest, the lake also affect them in turn positively or negatively. Therefore, this chapter mainly assessed those interactions and its varying consequences both from human socioeconomic relations and the lake's resource sustainability in different ways/levels.

The Social-Ecological System Framework greatly support this concept making the issue of 'Interaction (O)' at the center of livelihood activities and different social, economic, ecological and political as a pillar contributing variables for the actual livelihood significance or Outcome (O). Same wise fishers-lake interaction at Lake Hawassa is going through such interacting variables. Demographic behaviors, social network and dynamic feature of involved agents are driving factors for different access to the resource and its livelihood significances, which are the Resource System (RS) including access to fishery and landing sites, as well as Resource Unit including fish catch and marketing. On the other hand, different Actors (A) including individual-based and cooperative fishers are participated in fishery practice, and Governance System (GS) including set rules for access to the resource and level of fishing operation. The final Outcome (O) and Related Ecosystem's (RS) are relied on those variables multilateral interaction. Thus, this study is going through exploring such variables interaction within diverse livelihood activities and its impacts.

3.1. Lake Hawassa and Local Communities' Interaction Through Time

Lake Hawassa plays considerable roles in the livelihood of the surrounding communities and in the environmental, socio-economic, and the overall development of Hawassa city and its environs. The lake has total surface area of 95 km2 and total drainage area of 1,371.6 km^2; it is an important source of fresh water for the city and the surrounding rural population (Daniel et al. 2015). The lake's water is under continuous utilization by the communities for various purposes including pumping the water for gardening, using it for domestic purposes, and pumping it for irrigating subsistence oriented and commercial scale farms. The water of the lake and its shores are also used for bathing and recreation. The lake and its environs are the main rendezvous places for recreation, fishing, fish marketing and catering, bird watching and site seeing. The lake side also provides an attractive scene for social events, such as weeding occasions and other public gatherings.

Lake Hawassa has close relationship with the establishment and overall development of the city starting from its naming (the word Hawassa literally means 'wide water body' in Sidama language) (Hawassa City Administration Annual bulletin 2008). The city's rapid development and popularity is partly attributed to the natural resources and scenery of the lake, which provides scenic beauty and fresh breath for the city and its surroundings. Some of these important services are, however, coming at some costs to the lake with the increasing awareness of, interest in exploiting the diverse values of the lake. In this regard, Alemayehu[2] explains:

> *...For instance, in the past, less than five cooperatives engaged in Hawassa city's green development activities (e.g., the city's squares, road edges and centers). Currently, there are 48 cooperatives engaging in the same activities. The main reason for the rise in the number of cooperatives is that the water for gardening of such areas is simply pumped from the lake without any restrictions, which lowers their cost while increasing their livelihood values.*

That means the city's attractive look for visitors and for its residents is being created and maintained at the expenses of the lake's resources. I observed during my fieldwork that so many larvae fishes, eggs and other aquatic specious were pulled out together with the continually pumped water used for the beatification of the city. Two of my key informants, Rahel and Elias[3], acknowledged the diverse values that the lake provides to the communities and the city, including its livelihood value as related to its fishery resource, but also expressed their concern regarding the sustainability of such resources in view of how the city is interacting with the lake as follows:

---

[2] Case team leader of Hawassa City Cooperatives Agency, 28 April 2017, Hawassa.
[3] Experts, Hawassa City Environmental Conservation office, 7 April 2017.

The city and community's overall development is highly related with Lake Hawassa and its valuable resources. Numerous hotels, resorts, industries, farming and other activities are flourishing along the lakeshores even beyond the 100 meter buffer zone restrictions. Although, such activities are playing pivotal roles in the socioeconomic development, they are not occurring in environmentally responsible manner in protecting and safeguarding the sustainability of the lake's resources. This will have implications for the city's socioeconomic development and ecological sustainability of the lake.

In the past, local communities'-lake interaction was largely bounded with limited subsistence related activities, such as individual-based fishery, small-scale business and farming. Recently, the lake and its catchment are experiencing widespread practices of relatively larger scale irrigated agriculture, cooperative-based commercial fishery, urban development and other socioeconomic activities. Now, inhabitants of the city and the Lake's catchment areas engage in diverse livelihood activities and utilize the lake for diverse purposes as mentioned earlier. They have been altering ecological variables in the catchment to buffer and survive in the context of ecological and socioeconomic fluctuations. The continuity of such diverse activities mainly depends on the existence of the lake's resources, which in turn is influenced by the sustainability of patterns of livelihood and development activities unfolding in the area. According to Tekalign[4]:

Surrounding communities' livelihood interaction with the lake is changing through time from subsistence-oriented to commercial in accordance with the changing environment, demand for fish and rules of access and operation. For instance, the Fish Market, which began as the subsistence and recreational activity, has developed into a well known livelihood and tourism activity at Lake Hawassa for about four decades. Moreover, numerous boats with outboard engines are also used by local and expatriate visitors. Such tourism activity is providing boat owners and tourist guides their income and overall livelihood.

Moreover, hotels, café, small vendors and other recreational centers are recently flourishing along the lakeshore basing lake's resources for their livelihood. There are also some traders in harvesting and selling macrophytes to the visitors with diverse forms of practices.

The lake's fishery, as a major livelihood activity, supplies vital fish protein and income for the people of the area and beyond. The lake also supports women and children, who have no other income sources to support their families. Similarly, along the lake's shores, there are a number of cooperatives engaged in different business activities, almost all of which serve fillet and roasted fish to customers. There are fish suppliers and processing firms selling the products relatively with costly prices than the fishers.

[4]Hawassa City Tourism Development expert, interviewed on 16April 2017, Hawassa.

These businesses are socioeconomically more advantageous than the fishers in obtaining better income by adding values with less effort due to a relative access to such resource and market. They also put their effort for the local ecology and livelihood improvement as valuable. For instance, member of *Fiker Hayik* recreational and boat transport cooperative illustrate that:

> *In the past, this place [stretch of land along the lake shore] was full of waste materials and covered by bush. It was a place where a lot of crimes (e.g., robbery) were committed by addicted and unemployed youth. After we organized ourselves into cooperatives, we cleaned that area, planted some trees and converted it into an attractive environment for business. Since then, it not only is contributing to our livelihood enabling us supporting our family and beyond but also to the disappearance of the crime. We are now also contributing to the socio-ecological sustainability of the surrounding*[5].

Thus, as the lake has a great livelihood and tourism potential, cooperatives are flourishing in lake sides. There are now more than 15 cooperatives along the lake side practicing fishing, or providing recreational, green development and other tourism related activities operating more than 25 mixed use businesses. Over 75 % of these cooperatives are engaged in fish related businesses in value adding ways. In addition, the surrounding large scale businesses are also engaging in fish market starting from 25 birr selling price depending on the standards of the destinations. It shows that fishery and fish market is the primary feature of the lake and lake-side socioeconomic activities. Generally, the lake's, especially at *Fiker Hayik* and *Amora Gedel* sites with *Gudumalle* Park, has different values viz. social (wedding, anniversary, birthday festivities), and recreational and educational values. The increasing economic (livelihood) values can be manifested through fishing, (either in individual-based or in cooperatives), boat transportation serving local people, researchers and other visitors charging customers staring from 10 birr per person with a maximum capacity of 9 persons in one boat.

Tourism Values of Lake Hawassa and Fishing Nexus

In many Countries, lakes are often centers of livelihoods for individual-based local fishers, as well as a base for much larger fishing operations and whether located in developed or developing countries, larger lakes are important tourism attraction and transportation routes for both people and products beyond their being main source of fishery, water and other socioeconomic values (World Lake Vision 2003). Ecotourism has also increased environmental conservation as people struggle to maintain lakes in their natural state as a way to sustain local tourism activities.

[5] Interview with Aschalew, 7 April 2017, Hawassa.

Lake Hawassa provides scenic beauty and fresh breath for the city of Hawassa and its surroundings. It is also ecologically and economically important to the local community in generating income from tourism, hotel industry and the fishery. In particular fishery serves as a means of tourist attraction in addition to income and livelihood strategy for large number of formally organized and informal fishermen and their associates. Hawassa city became major tourist destination mainly due to the existence of the lake with its different fish and bird species. It is also one of the major tourist attractions of the city due to its gentle chain of mountains and a low plateau that surrounded the lake, swampy bays interspersed with volcanic rocks and sandy shores with bare rock hill for different visitors. The lake hosts 2000-3000 domestic visitors and 100-300 foreign visitors per week. (The Hawassa City Administration Culture and Tourism Office 2017).

Fish production and marketing, the major socioeconomic and tourism activity at Lake Hawassa, are operating in different recreational, subsistence-based and commercial ways that attract tourists. However, as such kind of activities are practiced on the lake side and usually on the place locally known as *'Oasis'*[6], (Fig 3), in my observation, mostly the newly hatched larvae and juvenile fish were caught with those individuals and this kind of activities are becoming increasingly common practice in such areas.

Figure 3: fishing as a recreational activity at *Fiker Hayik* (*Oasis*) (photo by the researcher 5/11/2017).

As fishery and tourism are two sides of the same coin, fish market may have incredible role for a healthy tourism development in such area. For instance, the well known fish market (*"Asa gebeya*[7]*"*) on the lake, specifically, on the major study areas, i.e. *Amora Gedel* and *Fiker Hayik* sites is serving as a major tourist attraction and socioeconomic activity.

[6] Oasis is man-made circle place inside the Lake around *Fiker Hayik* site at Lake Hawassa.
[7] Asa Gebeya is an iconic fish market area found in the lakeshore of Lake Hawassa.

The overall practice on the lake often begin in the early morning when every fisher men return from the lake and arrive at the lakeshore with their wooden rowing boats loaded with Tilapia and other fish species. The negotiation process among the fishers and buyers is among the major events attracting the attention of visitors. Ashenafi[8] explains the lake's tourism value as follows:

> *Amora Gedel is one of the earliest parks of the town occupying spectacular view of the lake. As the area is found near to the main fish market along the lake, it is usually visiting with the same tourists after having fish and fish products. As Amora Gedel site comprises diverse tourism and fishery related activities, including the long row boats full of fresh fishes, the nets losing and fish filleting boys, vendors of plastic tents and bread, fish soup cooking women, Marabous, Pelican and other bird types impressive activities are some major features to attract different visitors to the area. In addition to the main actors event, this area is also sparkled with full of wondering apes, goats and sheep in search of leftover fish in the open fish market. This known tourism attraction of the lake is an in late to the city with its multidimensional attraction features, coming to this area, once paying five birr entrance fee, one can also have an access to go to the adjacent Amora Gedel ('Gudumalle'[9]) park in walking inside after visiting the fish market.*

The other major area practicing fish market and tourism around the lake is *Fiker Hayik* site. This area is found at the end of a major avenue that runs through the center of the city. Starting from the main gate, the area is covered with different attractive tourism activities; many cooperatives, and private businesses, street vendors and other parts of the community are practicing multifarious businesses in both left and right sides, such as fishery cooperatives, tour guide, fish market and recreation, boat riding, café's, traditional coffee, souvenirs and other fast foods. The survey and observation results reveal that, roasted and filleted fish market takes a lion's share of the business in the site. The impressing fish roasting and processing events here and there with lively interaction between shop operators' consumers compel every visitor to be part of it. Zerihun[10] explains what makes preferable Fiker Hayik site from the fish market (*Amora Gedel*) as follows:

> *When you prefer to enjoy or be served here, you got various recreational options, infrastructure, and very suitable resting areas on the lake side with attractive views of the lake and enormous individual-based fishers' attractive fishing activity, the ease availability of individual fishers to got fillets, proximity to the city center and other facility and accommodation value adding features. In this case, many visitors usually coming to this area in mass to enjoy and have fish products, and their number becomes highly increased, especially in weekends, holidays and summer season. Therefore, as most of fish market owners in this area are suppliers who buy the row fish from the fishers, the price of roasted fish is relatively expensive than Amora Gedel landing site, but variety of fish products in better quantity and cheaper price is more available there.*

[8] Founding member of tour guide cooperative at Lake Hawassa (Amora Gedel area), 29 April 2017.
[9] Gudumalle is a lake side place around *Amora Gedel* site serving for socio-cultural events and tourism activities.
[10] Tour guide around Fiker Hayik, Zerihun 04 May 2017.

Therefore, fish market said to be an iconic livelihood activity of the local communities and visitors' demand beyond the various tourism attraction features of Lake Hawassa. In my discussions with different consumers, most visitors coming to those fish markets and recreational areas commonly participate in the purchase or consumption of row, fillet or roasted fish.

Table 7: Fish Market (Valued in Birr) and Tourism Interactions.

Fish Food Type	Added Values	Selling Price	Net Income	Visitors' Preference
Row Fish	Time and energy	10-12	6-8	4th Level
Filleted Fish	Time and skill	8-10	6-8	2nd Level
Roasted Fish	Time, skill, energy	20-25	10-15	1st Level
Boiled Fish	Time, skill, energy	5-10	3-5	5th Level
Fish Soup	Time, skill, energy	3-10	2-6	3rd Level

Source: field survey results, April and May (2017).

Visitors who come to the fish markets are expected to have one of the five types of fish products in accordance with their preferences. The fishers, hotels and suppliers also make ready of their products by adding different values and setting prices to have their daily income depending on the timely market access. As of table 7, the livelihood value of such activities is significant for thousands of local communities who are directly or indirectly relying on fish production, processing and market. If they can make such net income from a piece of product, selling many pieces of fish/ fish products on daily basis can secure their livelihood safe depending on their level of awareness and timely marketing strategies with the changing conditions. Moreover, with the increasing demand of fish with residents and visitors, a number of youths start to lead their life by guiding such tourists in the fish market and practicing in intermediary services either as a key informant or cultural facilitator. The livelihood share of fish market becomes very considerable in everyday life of participant communities thereby the increasing domestic demand and tourism.

3.1.1. The Role of Social Network in Access to Fishery Practice

Social networks seem to be essential for adaptive management processes which may come from the local socioeconomic forces and ecosystem changes in enhancing communities' resilience and well-being either through the kinship channel or cooperating the community members one another for a common goal depends on their ability (Folke et al. 2003). Resource System (RS) and Resource Unit (RU) variables of SES framework are integrated with the role of social network in access to one of the fishing practice and its production/marketing through value chains. Because, ability to organize for collective action has direct impact on landscape structure and function and the services it generates.

Therefore, different Actors (A) with their social network and diverse skill/capacity in fishing practice integrates the resource system and resource unit for the development of a community in the role of social system for good socio-ecological circumstances. As the human-environment-livelihood nexus is the integration of local communities' social system with other ecosystem, the internal dynamics within such community striving them to survive and make changes with their own system based knowledge and values.

One of these strategies is social network in the study areas having the values of livelihood in one side and sustainably managed fishery in another side depending on the proper implementation of their social values/knowledge. However, broader processes of change affect local needs and choices, and thereby the community members' activities with respect to ecosystems. Therefore, these experiences of change in social-ecological systems are going with providing the context for flexible and adaptive responses, particularly during periods of crisis and reorganization.

Seemingly, the socio-ecological processes in fishers-lake interaction at Lake Hawassa mainly go in line with variant social networks. As the lake is surrounded with diverse households and ethnic groups in different exposure and correlation one another, they usually start to be engaged with lake's resource in household level for subsistence purpose. In the process of deciding on and securing sustainable livelihood strategy, they becomes looking forward to the lake's potential income generating activity with their ability to do so, and then once the elder household member engaged in such activities either in individual-based or cooperative level, the sector becomes more related with those households and through time becomes acquired in the clan level.

Fishery at Lake Hawassa, as a long stand activity, comes through different socio-ecological changes; the social network on the fishers-lake interaction is therefore one of the major feature of its dynamic perpetuation in having values on fishery with transferring age-old experiences generation to generation through these strong networks. Social network has a vital role in comprising the nearby local communities in fish production as well as market. This is mainly due to the senior stuffs have an access to bring them to the profession initially as a daily laborer, supporter and individual-based vendor. "As I spend most of my leisure time coming to the lake with fishery related activities with brother and friends, I becomes efficiently acquire fishery and join the major production and market initially individual-based and then in cooperative membership." Addis, cooperative member at Fiker Hayik, said.

Most of the surrounding youths are engaged in individual-based fishery as one of the area's cultural practice and livelihood means thereby their strong social network. Most of them are students between grade 4 and 10^{+2}. Daniel, 10^{+2} student and individual-based fisher at Fiker Hayik site said, "I strive to cover my younger brothers' and sisters' educational and other expenses with this income beyond mine, because it is best source of income which I can easily utilize." Moreover, Tilahun[11] explains the local communities' ways of continuing interaction as follows:

> *As the lake is believed to be a common resource of the local community, many of the nearby youths engaged in fishing. The youth initially start fishing for a recreational and livelihood purposes without much legal considerations. Consequently, their localized socio-cultural and economic interactions will remain central to the overall development of their recreational and subsistence fishery to commercial one even beyond our control and follow up.*

The issue of social network in *Amora Gedel* and *Fiker Hayik* cooperatives and individual fishers therefore can be seen as family-based and clan related; meaning, as the lake is surrounded with different ethnic groups/clans with the relative dominance of Sidama, Wolaita and Oromo in this profession on the lake, bringing new member mainly depends on their closeness either in common areal settlement or ethnic group to make the overall activities more ease and mutually beneficial. In this case, the survey result shows that *Amora Gedel* landing site dominantly covered by the surrounding nearby *kebeles* community, especially Sidama (89%). While, the respective *Fiker Hayik* and *Tikur wuha* sites are also with Wolaita (81%) and Oromo (91%) societies respectively. But, other diverse groups are also conducting their livelihood activities in common/privately in such areas. Fikadu[12] elaborates his fishery experience within the role of social network as follows:

> *My resident is beyond the lake, as my father and elder brother were practicing fishery as major livelihood strategy and supplementary means of income respectively, I also began to fish 8 years ago due to my exposure to the practice. In addition, most of my friends were practicing it to cover their own expenses. Therefore, the family and my peers influence bring me to this practice and in my 8 years experiences I have also bring a number of younger friends to this practice, because we have close relationship either in affiliation, common settlement or other socio-ethnic shared aspects.*

As Fikadu, different aspects of social network come up them together in the same practice, mainly due to such commonly integrated society's settlement pattern since the early days were specified in particular areas and which is also more close to those landing sites. Therefore, their age-old closeness in specified areas and continual interaction with the lake creates the present day's strong social network and dominance of one group in one landing site particularly.

---

[11] Case team leader of fish resource development bureau, 13 May 2017.
[12] Cooperative-based fishermen at Fiker Hayik Landing Site, 22 April 2017.

As fishery most of the time is not an individual activity due to it has a value chain process from the net preparation up to fishing and processing for market, it needs different age, sex and skill for such diverse activities. In such a way, the role of socio-cultural bond is crucial in making the family members of the main fishermen and other surrounding communities as part of it and then its livelihood value can be seen as all rounded in comprising such diverse people in the profession.

On the other side, beyond its diverse value for such groups, this kind of accustomed social network is adversely affecting other communities that are out of this "circle" in excluding them to get an access in the profession either due to seniority or compatibility. However, recently, various people are becomes participating in the fishing and marketing of fishery other than the usual groups even by shifting their previous professions due to lack livelihood diversity. Therefore, social network is helping the whole fishery 'communities' including cooperatives and individual-based fishers in performing their fish production and marketing in friendly manner other than escalating the load with informal practices on the lake, especially if it goes without alternative livelihoods, awareness and community-based frameworks.

3.1.1.1. Value Chain and Employment Aspects of Fishery

Globally, 54.8 million people are engaged in capture fisheries and aquaculture, and about three times as many are involved in upstream and downstream activities (e.g. fish processing and selling, net-making and boat building). Women comprise about half of this global fisheries workforce, typically concentrated in the pre-harvest and post-harvest sectors. While employment is stagnating in wild-capture fisheries in most regions, it is increasing in aquaculture, especially in Asia, where employment rose from some 3.7 million people in 1990 to well in excess of 10 million people by the late 2000s. It is thought that the small-scale sector employs 90 percent of the world's fishers, producing almost half of world fish production and supplying most of the fish consumed in the developing world (UN 2012). The sector predominates in developing countries, which also account for most fishing-related employment.

Fishery practice at Lake Hawassa comprises diverse activities from the production up to consumption at different level of access and capacity, including of the equipment maker, supplier, hired fisher, main fisher, processor, trader, daily laborer and management bodies, in which each of them have their own distinctive roles in the production, processing, marketing and consumption activities depending on their physical, mental, psychological, biological and financial capacity to do so.

As it demands a number of variously skilled man power, the lake's current fishery practice is going through different supply chain, value add and employment features in a diverse ways and status. Because, fishing is not a single activity that the production-consumption processes can be performed by the main fisher, rather it is a combination of different chains and efforts to make the practice successful. Tilahun[13] elaborates the employment and value chain aspects of fishery in the study areas, i.e. *Amora Gedel* and *Fiker Hayik* as follows:

> *Fishery in such major landing sites is practicing with 2-3 times additional labor power in such areas beyond their 270 and 36 main members respectively. The main cooperative members often perform their practice having fishing related equipments from the makers and suppliers with their demand-supply chain and harvest fish being with their hired fishers and daily laborers to control, catch, supply and make ready for the next fishing. These on-shore and off-shore practices demands up to 4 individuals per boat, 2 youths to control and come out the fish catch spending the whole night on the lake with the nets and boat; and after accomplishing their duty, the other 2 teenagers task will be preparing the nets and boat for the next fishing regards to its category. Fish processing and marketing is the next practice which is also usually performed by the main fishers and other individuals who are acting as a broker at same time distributor in facilitating and distributing with wholesale for different firms by adding values and then, the final retailers also sold fish and fish products with value added methods and we support them for the formal practice.*

All these value and supply chains also have their own income and employment values for such involved individuals, but it adds much cost up on the consumers in passing through such chains, even it is on the spot. The increasing fish demand paves the way for the rapidly joining individuals in different work status to have their livelihood and then its supply/value chains become more segmented into various sections. Therefore, the study areas current fishery practice is bounded by different equipment suppliers in selling fish related products for the fishing communities.

The main fishers are under creating job opportunities for the environs teenagers and youths as a daily labor or permanent management and finance bodies in addition to the value/supply chain aspect of fishery as a recent activity. Numerous suppliers are participating in the harvested fish processing and marketing in wholesale and retail market. Thomas, fish supplier at Lake Hawassa said, "I buy the products from the main fishers in large number and sell it with 2-5 Birr additional prices either for the processors or firms before it reaches to the hand of final consumers. Such firms finally accessed the products to the final consumers in different forms."

[13] Coordinator of Hawassa City Administration fish resource development bureau, 11 May 2017.

In all of these value and supply chain processes diverse participants are involved as a temporary and permanent means of livelihood in obtaining both daily food stuffs and income for their households, as it has row, fillet, roasted, boiled or soup kinds of products. Teshale[14] explains his experience as follows:

> *I have been working as hired fisher under Amora Gedel cooperative, through time I become part of the cooperative. Later on, I come out of the cooperative by replacing my friend in my cooperative's share and began to work privately with buying fishes in large number from such fishers and selling it to different firms and hotels with 2-4 birr additional price in each fish depending on the season, their buying capacity and the quantity they received. Such 2-4 birr difference is the cost for labor force (as I'm working with other facilitators/brokers), processing, and transportation and delivery services of value and supply chains. Therefore, now I benefit even others on the daily basis, beyond myself, through such demand supply chains and adding values.*

The value adding and employment aspects of lake's fishery in this case is in the continual timely changes, as it is upgrading from the cooperative to private and from single to diverse market systems. In the case of individual-based fishers, the rate of value adding and employment aspects of fishery becomes decreased due to they usually sold their products directly to the consumers on the spot without a third party intermediary. As they fish with hooks and reed boat, their selling price is in the cost of their time and energy. Such fishers' value adding market strategy is in the ways of selling the products with filleting and being ready for consumption, because as it is relatively fresh, it is believed that their product is better for fillet than the cooperatives one. The rate of employment among such fishers is relatively stagnant than the cooperatives due to most production and market activities are undertaken by themselves, unless they sometimes leaves the processing works to other teenagers. Their direct production and market system in specified areas and methods exclude other individuals' temporary and permanent involvement into the practice.

However, the increasing dependence of many individuals in both kinds of fishery practices, makes the employment and the value adding aspects of lake's fishery more expanding than the previous periods. Fish surplus and peak market seasons are the period of high employment and value adding rate, due to the main fishers at these periods becomes busy with high demand and then they gave some responsibilities for other hired fishers and daily laborers. Individual-based fishers also began to sell their products using the customer network either for individuals or the surrounding small firms. Lake's fishery practices therefore habituated within such value add and employment dynamics depends on the season and occupational status differences, and thereby fish marketing strategies and livelihood aspects are also differs one another.

[14] Senior cooperative member in Amora gedel site, Teshale 13 April 2017.

3.2. Fisheries as a Major Livelihood Activity at Lake Hawassa

Fishery serves as a means of daily income and overall livelihood for large number of formal and informal fishermen and their associates. Locally, it is one of the main sources of animal protein for the low income community. Members of the surrounding local communities are practicing diverse socioeconomic activities on daily basis since early morning. These activities are mainly related to fish market in major fish production and marketing sites. Such activities include: preparing and selling fish soup, bread, local drinks and mineral water, lemon, soft drinks, *'datta'*[15], tea/coffee and other business activities.

Figure 4: diverse fishery-based livelihood activities in major landing sites (photo: researcher's gallery April 2017).

These activities are performed by different categories of people based on age, sex and socioeconomic status. Approximately 300-500 city residents and members of the surrounding rural communities engage in such activities on regular basis (Fig. 4). Informants who engage in such diverse fishery- related activities stress that their households' wellbeing is highly tied to the sustainability of lake's fishery. This was expressed by an informant who said: *"we are alive because of the lake and its fishery"*. Informants also indicated the importance of the continuity of the fish production and marketing, which attracts diverse local communities to the practice and customers to the fish market sites to buy fish for home consumption or to serve in hotels/restaurants, or to consume fish products at the fish market.

[15] Data is locally prepared spice to eat fish and also other foods.

Gashaw & Wolff (2014) reported the potential fish production of Lake Hawassa to vary from 484 to 600 tons per year, which accounts only 7% of the total fish production of Ethiopia. These estimates considered some variables such as, lake total area, shore line length which are remotely related to the fish behavior and growth. Unlike other Ethiopian rift valley lakes, such as Lake Chamo and Abaya (they are known to harbor 18-20 fish species), the fish diversity of Lake Hawassa is limited to 6 species, of which all are nearly indigenous to the lake. However, observation for this study shows that, only three fish species were harvested, i.e. Tilapia, Cat Fish and Barbus accounting for 90%, 8% and 2% of the lake's total production respectively.

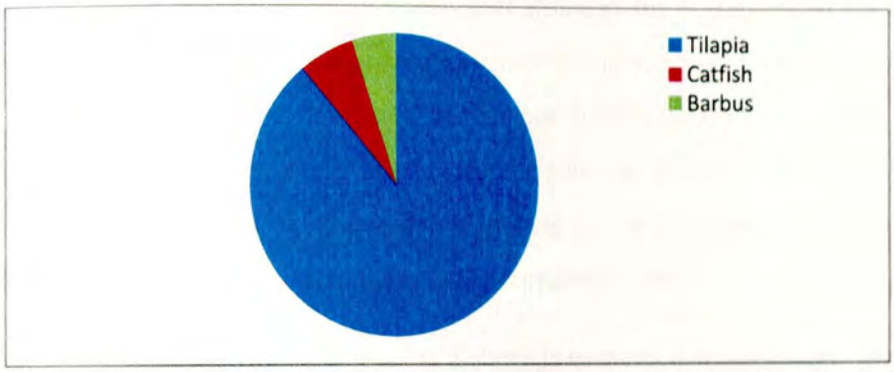


Fig. 5: % contributions of the three fish species in Lake Hawassa between 2001 and 2006 E.C. (SNNPR BoA 2006).

The dominance of Tilapia in the volume of production is attributed to it having two breeding seasons: the major spawning occurs between February and May and the minor peak between July and August (Demeke 1994). The onset of fish spawning in such periods is usually triggered by environmental factors mainly rain and the subsequent increase in primary productivity of the lake. Fishing in Lake Hawassa has been practiced since the 1950s (LFDP 1996) and was predominantly artisanal and subsistence type for family consumption and local market. For decades, fishing has been practiced and still operational by wooden boats and gill nets in different mesh size. The fishermen fish all year round with relatively intensive fishing activity during the Ethiopian Tewahdo Orthodox followers' fasting period where demand for fish increases drastically.

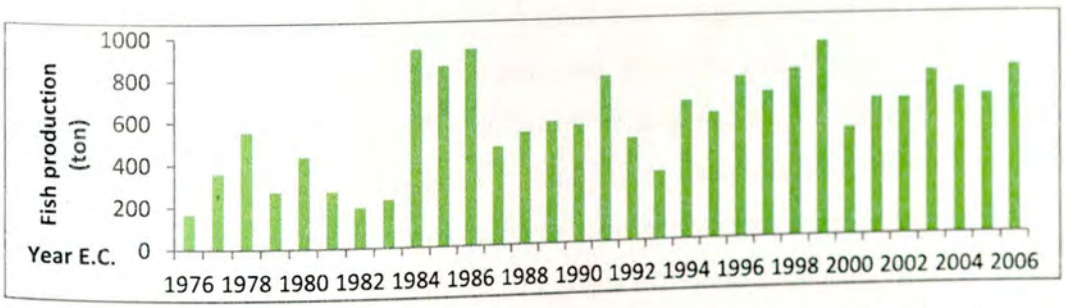


Figure 6: Fish production projection of Lake Hawassa in the past three decades (LFDP 1996; SNNPR BoA 1996)

In the above figure, over the past three decades, there has been a considerable fluctuation in fish production. In the period before 1984, fishery was mostly practiced by individuals, while there was only one cooperative composed of about 10 members who engaged in fishing. However, a sign of overfishing exceeding over 900 tons per year was recorded in the mid-1980s, which was above the lake's estimated maximum production potential of 484-600 tons/year. Such increased production was attributed to the demand for the fish that went beyond Hawassa city as fish was supplied to Addis Ababa Fish Market Corporation and to other regional towns on contractual agreements and wholesale market.

After 1986, the production declined by nearly half although the fishing effort remained the same. This is mainly because the lake had been overfished in the previous three consecutive years as a result of the increasing demand, number of fishers and related policy and strategy changes. In the 1990s and 2000s the fish production fluctuated between 500 and 900 tons (Fig. 6). It shows that the socio-legal issues competing each other regarding the ratification of new water policies and strategies and passed through the struggling socioeconomic aspects.

As the survey result, the livelihood values of fishery is expressed with contrary perceptions with a number of informants literally by saying "የውሃ ብር ተመልሶ ውሀ ነው" meaning, the income of water resource or fishery is the same as the elusiveness of water. 27% of respondents are in this category (79% of them are individual-based fishers) perceives the livelihood value of fishery as cannot goes beyond daily subsistence/survival rather than the household well being and sustainable development.

The other 73% of respondents' (21% of them are cooperatives), experienced perception is literally expressed as "የውሃ ብር እንደ ውሃው አይነት ነው", meaning the income of water body/fishery depends either on the season, quality, management or access to such resources, but not its illusiveness, because fishery needs both of the human as well as environmental coexistence in its sustainable aspects. The Focus Group Discussion respondents in this category refuse the above perception, because if such natural and human made are relatively good, the livelihood value of fishery over poverty and household well being is efficient. Therefore, it is not often a matter of income, rather the level of awareness and lack of initiation to think out of this profession, because, such fishers obtained 200-500 birr on average per day based on their position, experience and equipment, but most of them are in the same life style due to the influence of socio-ecological factors.

3.2.1. Organizational Patterns of Fishery Production: Actors Involved in the Practice

There are diverse fishery groups accessing the fish resources of Lake Hawassa in different scale either operating the practice formally or informally. Currently operating fishermen are mainly categorized into two groups in the specific context of Lake Hawassa, i.e., cooperative-based /formally organized and informally organized/ and unorganized individual-based fishers /full-time and part time fishers/. In this regard, formally organized cooperatives are the Amora Gedel fishery cooperatives, they consist 270 members other than over 200 daily laborers, and they are recognized by concerned bodies as 'Lake Hawassa Fishery cooperative' having a license from the city's cooperative agency to operate fishing over the lake.

On the other side, there are also the so called 'informal' cooperatives (currently they are five in number other than the newly organizing claimants) in other landing sites all around the lake including *'Dagim'* potential cooperative at Fiker Hayik. Such cooperatives are organized by themselves and have the license claiming the Micro and Small Enterprises of their localities with different socioeconomic reasons, but it is not formally recognized by the other major concerned bodies. The number of such informal cooperative members is increasing time to time. For instance the Fiker Hayik *('Dagim')* cooperative was organized by five individuals, but currently it reaches to 35 permanent members other than more than 100 daily laborers. This is mainly due to the relative open access to the resource than the formal one.

The other fishery group (individual-based) are engaged in lake's fishing individually with their private fishing equipments as a full-time and part time activity. The full-time individual-based fishers are those who based their livelihood on fishery and operate commercial-based fishery all around the year utilizing their maximum effort; whereas, the part-time individual-based fishers are often the lakeside teenagers/youths who practice fishing for the consumption and commercial purposes. Most of they are students and they often come to the lakeside with their equipments in free time. But, they purposely operate commercial fishing in fasting periods to cover their school and other expenses. Unlike the full-time ones, their number decreases in non-fasting periods due the relative low market.

The number of individual-based fishers may approximately reaches 1000 during fasting periods, but their number will decrease by more than half in non-fasting periods. The Social-Ecological System Framework's fourth variable (Actors) clearly defines such different involved agents' socioeconomic profile and demographic attributes regarding fishery practices.

The total number of fishermen is increasing time to time at Lake Hawassa. Catch data records through the LFDP project shows that there were 95 fishermen in 1984 E.C., which increased to 156 in 1986 E.C. The number of fishermen all around Lake Hawassa remained below 300 until 2004 E.C. and suddenly increased to over 800 in 2005 and 2006 E.C. (Fig. 7). In this regard *Amora Gedel* and *Fikir Hayik* areas take a lion's share in comprising 70-75% fishermen

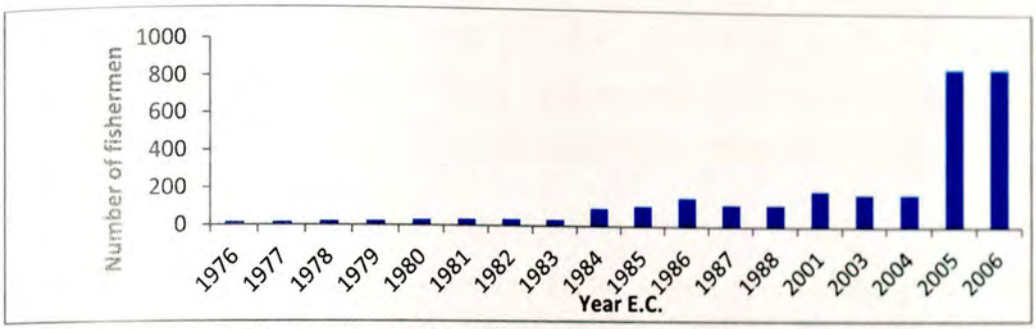


Figure 7: Number of fishermen engaged on full time fishing in Lake Hawassa 1976-2006 (LFDP 1997).

The figure shows that fishers-lake interaction at Lake Hawassa is increasing through time. There was the increasing of market price and demand, especially since 1984, in line with the policies and strategy changes with giving relative access for private businesses in paving the way for cooperatives and different individuals in coming to the sector. In the period before 1984 very limited number of fishermen was engaged in fishery due to low market demand and relative access to the other livelihood sources. In the next one decade after 1984, the number of fishermen shows a sort of some increasing with specific livelihood issues.

Yet, its number exclusively increased since 2005 mainly due to the emerging claims of resource ownership and access control issues are increasing all around the lake in line with the decreasing of alternative local livelihood means. Following this, a number of cooperatives are organizing in their localities to safeguard their livelihood sustainability and access to the resource in addition to the individual-based fishers. As Ermias, management committee member at *Amora Gedel* fishery cooperative illustrates:

> *The number of fishermen is increasing in recent years mainly due to the increasing demand (and price) of fish related to increasing awareness of consumers about the various values of fish products. In early 1980s a single cooperative could fulfill the demand of Hawassa people and nearby cities with a great production potential and surplus on the daily basis. But, nowadays the lake's fish production can't fulfill even the city's demand despite the existence of five fisheries cooperatives. The decline in production is due over fishing by the formal and informal fishing to fulfill their livelihood interest without considering fish breeding season, place, maturity and lake's recovery*[16].

16 Interview with Ermias, 12 April 2017.

On the other hand, the SNNPR fisheries development, management and control regulation 78/2004:3 puts that, "Any inhabitant who lives on islands or 3 km far from the water bodies has the right, except closed areas, to fish without license up to 1 kg whole fish for family consumption using only hook and line." Therefore, a number of individuals from surrounding *kebeles* are practicing fishing as a major livelihood strategy without license by using the 1 kg permission. In the past 3-4 decades, due the minimal awareness of the local communities on the various values of fish and fish products, there were few young individual fishers usually for the consumption and recreational purposes. Whereas, most of the local communities were mostly depend on intensive agriculture as was no scarcity of resources and competitions on ownership as today.

Case Study (1) with Abreham[17] reveals it more as follows:

> *The production, price and market of fish and fish products is almost changed from the previous three decades; we were five in number organized as a sole fishery cooperative on the lake, but we harvest much surplus production above the city's demand and sold our products for the neighboring towns and we had contract in Addis Ababa with the previous 'Fish Marketing Corporation'. Due to high production, we sold one basket full of fish in one birr and even we cast aside the unsold surplus products. In most households, fish not considered and consumed as Ethiopian food, because it was mostly consumed by foreigners and it was assumed as a lower cast profession by the residents. Therefore, the social status of fishermen were at the lower level, for instance, if I loves a girl and wants to marry her, the girl's family doesn't easily allow giving their daughter due to the lower social status of the man and few income of fishery. In so far as, the profession was challenging, risking and inconvenient for the family and other social life activities as it is working throughout the night, unless you create other livelihood options.*

However, due to the increasing awareness of residents and visitors, especially in the last one decade, the demand and price of fish becomes increasing with the relative decreasing of supply and increasing number of individual and other officially unrecognized cooperative fishers. Nowadays, fishery practice at Lake Hawassa becomes a relatively better income generating and socially accepted "profession" due to the increasing awareness of communities.

3.2.2. Fish Handling, Processing and Consumption

Fishery practices in Ethiopia, since its methods of production, the handling and processing for consumption is mostly artisanal due to socioeconomic and legal aspects. Fish is known to be highly perishable products and thus require proper handling and care from the production all the way until it reaches to the consumer.

[17] The former member of Amora Gedel fishery cooperative, 14 April 2017.

Thus, fish post-harvest loss has been estimated to be around 30% of the total catch. Post-harvest loss in Ethiopian Rift Valley lakes such as Ziway, Koka and Hashengie varied from 27-30% (Yared Tigabu 2007, 2012). The demand for fish consumption is high in big cities and production areas, while the domestic consumption out of such areas is low due to the access, religious issues and diet trend of such societies (Assefa Janko 2014: 460-61).

Fish handling and processing at Lake Hawassa is somewhat different from other Ethiopian rift valley lakes in using the value and supply chain. Individuals with different skills are engaged in the overall practice to reduce the post-harvest loss in the quality and quantity of the products. The fishing process among cooperatives is usually practiced by two hired fishers in the daily basis; such fishers fish and bring it to the owner in spending the whole night in the lake. Then, the owners supply their fish catch for the cooperative to be sold in wholesale for the firms.

In line with this, such owners may also sell their products on the spot in retail form by themselves. Another two hired teenagers will also take their duty of net and boat preparation for the next operation after the products are collected and handled in such ways. The harvested products are transferred to other processors to make it ready for market and consumption in line with different values and consumers' demand.

The processors are usually among the hired fishers being with the owner, Markos[18] said that, "we categorize the product in line with their distinctive usage, such as for row, fillet and roast fish products and distribute for another processors and business firms by set the daily selling price for each products." Yet, the fillet fish is usually processed by such hired fishers based on the local consumers needs coming to the fish market. The remained filleted fish are not thrown on the ground like what is commonly observed in most Ethiopian Rift Valley lakes Ziway, Koka, Chamo, rather it sold to soup makers which is popularly consumed by fishermen and local residents at the lakeshore of Lake Hawassa, especially *Amora Gedel* and *Fiker Hayik* landing sites along the lake shore. In line with the fish soup, boiled fish also consumed by the daily laborers and some local consumers in a relative cheaper price, because is by product of the soup. The roasted fish, which is processed by other business owners, is primarily demanded by the visitors and therefore most of the lake shore business firms are majorly practicing it.

[18] One to five team leader of the Amora gedel fishery cooperative, 25 April 2017.

Figure 8: Fish Handling, Processing and Consumption Channel among Cooperatives at Lake Hawassa.

According to the result, fishing, processing and marketing process (Fig. 8) is conducted by diversely accessed/ equipped participants, in which each activity has its own actual significance in their livelihood. The fishing (handling) process usually demands the effort of cooperative members and/or hired fishers (two youths) as well as day laborer (usually teenagers for net and boat preparation). As the survey result, it takes 65-70% of labor force of total participants. Processing and marketing for consumption (includes assign the catch fish for different market purpose, filleting, cooking and supplying) is the next step demands the members, hired fishers and value add participants. It accounts 30-35% of total labor force with diverse livelihood values for the participants depending on their access to the resource and capacity to do so.

Whereas, fish handling and processing channel among individual-based fishers is shorter than the cooperatives. As Yosef, an individual-based fisherman at Fiker Hayik landing site explains:

> *Most of the time, I collect the product individually by working in the day time usually after the cooperatives have done their daily practice until I can collect enough fishes and called by the customers from the nearby grass part of my fishing area for selling and processing of my products. Then, we deal on the price of mass products with my customer either for fillet or row fish selling*[19]

The processing is usually conducted for fillet by them based on the agreement with consumers in the lakeshore ground. Therefore, fish handling and processing in the individual-based fishers have no value chains as the cooperatives.

[19] Interview with Yosef, 23 April 2017, Hawassa.

Even though the post-harvest loss is relatively minimal in the processing with the increasing consumption needs of fish/fish products in line with the fish market tourism and domestic demand, but most fishermen are still process the fish on the ground with poor sanitary conditions and which is exposed for pollution (Fig. 9).

Fig. 9: Fishermen filleting fish under poor sanitary condition at *Amora Gedel* market (field survey April 2017).

This filleting process (fig. 9) could attract flies and cause health problems for the consumer. This problem was observed on the main study areas mainly among fishermen who are not cooperative members. Fish contamination, spoilage and the general unhygienic handling and processing at landing sites were identified as major problems affecting fish market in Lake Hawassa. Improving quality and sanitation issues during fish handling and processing is critical for improving market opportunities across the country as quality standards are becoming an important requirement for market. Because, regionally harmonized quality standards should increase competitive access for the fishers/suppliers and help to ensure improved quality of fish for consumers.

Recently the cooperative has got a mini shade which was built by the Lake Fisheries Development Project and the new construction for the same purposes is ahead nearby the lakeshore in collaboration with the city's administration. Hence, lack of proper awareness, skills and the ability to invest in new equipment and ideas is still causing contamination/spoilage of fish products and loss of income as fish are sold for a low price. Most fishermen, processors and traders may know what they are doing is not the best, but find it difficult to change what they practice. Especially when faced with lack of potable water, electricity, roads, equipment and landing site facilities.

Due to that, fish consumption either at landings, surrounding hotels or home by the local communities and visitors is different based on the availability of facilities and level of awareness or experiences of suppliers and consumers. Fish consumption at the landing sites is usually covered by the local communities for their fillet, soup and roasted fish consumption needs with open space areas and relatively cheaper price and fresh supply. Therefore, most of the time residents, especially youths are the primary customers of such areas.

The frequency of customers at hotels is more inclined to the visitors/passengers mostly with the roasted fish consumption and supplies due to they usually access what they can get in their hotels rather than going to the landing sites as the residents. Fish consumption at home is somewhat differ from others in making the row fish to whatever food type they want, but still it can't be fresh as the landings. Seemingly, Zelalem and Biniam[20], explain their experience as follows:

> *We prefer to use fish products in the landing sites than the hotels or home, because we can get more fresh, distinctive and quality products there. But, you have to come early in the morning to get fresh products with various options, unless it becomes less optional both in quality and price. Therefore, we often come to this area since 1 o'clock to use the products enough and enjoy ourselves too.*

On the other hand, the household fish consumption trend in most of informants of fishery communities reveals that it is not purposely consumed in regular ways to reduce under nutrition and secure the physical/mental health. The survey result reveals that 77 % of respondents bring 4-6 fish to their families twice a week on average depending on its production and market; meaning in peak market seasons, such as fasting and weekends the rate of fish consumption in household is low, and the reverse is true in high production and low demand periods. This is mainly due to that such relatively high income can fulfill a diverse household demands rather than consume it within the family. The rest 23 % are not often consume fish within a week, rather by coincidence.

While, in both cases, the fishers have much access to consume it in their work place, consequently it decreases their initiation to bring fish to their family. Yet, the direct consumption of fish for food has a vital role in reducing seasonal vulnerability by enhancing protein and micronutrients in local communities, and fishery also has indirect value on food security through employment and income generation in giving access to purchase other food stuffs for the household.

[20] Residents of Hawassa, *22 April 2017.*

Role Division by Status Diversities

Tietze (1985) distinguishes five functions in the division of the traditional fishing economic production, i.e. catching fish, processing, marketing, finance and credit, and manufacture of the means of production, e.g. boatbuilding, engine repair and net making. Obviously, in some cases, these functions are interwoven and performed by the same category of people; they are separate and performed by different groups, depending on the development of particular communities. While fishing activities are largely carried out by traditional fishing communities, shore-based activities, are pursued and even dominated by people of non-fishing castes. The study areas' fishery practice also comprises diversely accessed and confined individuals depending on their socio-economic, physiological and psychological statuses within the localities. Division of labor by gender and age is the usual status differences in accessing the lake's fish resources.

Case Study (2) with Teshale[21] more illustrates the role division in lake's fishery:

> *In my experience, commonly, male children and teenagers participate in net/boat preparation for fishing, filleting and brokerage other than their infrequent individual-based fishing, whereas, youths and adults are categorized under the permanent main fishers group both in individual-based and cooperatives. Fish processing and preparing/supplying fish consumption related stuffs are often taking as the role of females depending on their access, age and skill.*

According to Teshale, this role division is becomes a known social status among such local communities regarding age, sex and other socio-economic statuses. In the consecutive observation and survey, I have also noted that numerous women were selling fish soup, boiled and roasted fish, *'Datta'* (a spice to eat fish), bread, water, soft drinks and other essential stuffs in fish market. Even though, they dominantly involved in processing and consumption stage, it is seldom to see women in the production due to socio-cultural and physiological/ biological reasons.

Among the 270 *Amora Gedel* fishery cooperative members, 8 of them are women, but still they doesn't operate their share practically, rather they run it with hired fishers with controlling the overall process. But, in *Fiker Hayik* site, no women are involved in the cooperative other than processing and marketing. Whereas, the lake's individual-based fishery in both study areas is totally dominated by fisherman. In past days, fishery was practiced by males and continued with their access and dominance, currently it is also related with males with the bio-physiological reasons, as it demands strong muscular endurance, resistance and high energy for the successful fishing and fighting-winning some natural and human-made on-shore coincidence and challenges.

[21] Senior cooperative member in Amora gedel site, 8 May 2017.

Other socio-cultural statuses, such as family, experience, economy, education and psychobiological acceptability also has a great role in making differences to get an access to the resource with relatively better operation. Dawit[22], explains status-based role division as follows:

> *As I am not married, no have much years experience in this area with unaffordable capacity to pay a share as well as my age and physiological capacity inhibit me to join the cooperative. Even though I am striving to fulfill some of those criteria, they usually prefer a person in leading his own household for motivation, responsibility and management of his duty in the cooperative. I have been working for the last 5 years in this site since my age of 18 years as a daily laborer and with other related activities, but as I can't afford 4,500 birr share payment and no have well-equipped experience in fishing (in their eyes), now it is not my right time to join the cooperative with my physical strength to face challenges and fish effectively. My own case (education) also hinders me to join, because now I am attending my grade 8th class, and it is not safe to be part of the cooperative for me with such reasons. Instead, I decide to keep going with my role division in the current status and come back later when I compliance with the cooperative's diverse status related criteria.*

Therefore, beyond the written rules and regulation, there is clear status differences in giving role one to another. This is not uniform among and between the cooperatives, but it is practical in most aspects, because fisheries needs daily direct engagement, control and follow up of the overall performance for the proper management and fishery practices. In such a way, both of culture and nurture related issues matters the division of labor in the lake's fishery practice with a diversely implementing status differences. Such socio-cultural and biological status differences are favoring the overall activity in making it all-inclusive and cooperatively running diverse practice rather than a single firm-based one way activity. In all of such participants' in the lake's fishery related activities, the role of their strong social network is significant in favoring for its social order and cohesiveness with the value/supply chain system and culturally-patterned employment opportunities among them depending on their status and working role division.

3.3. Fish Marketing and Value Chain Dynamics at Lake Hawassa

Fishery, as a human and environment based practice; the methods of fishing may also vary in time and place in accordance with the population pressure, taste preference and food culture dynamics as well as local ecosystem variability. The method of fishing at Lake Hawassa is diverse regards to the landing sites and time changes; besides the observed variations in the catch from the present study, it could also be attributable to natural variations between the sampling stations (*Amora Gedel* and *Fiker Hayik*) in the methods of fishing.

[22] Daily laborer at Amora Gedel site, 25 April 2017.

As indicated in the LFDP (1997b) report, the lake is not a homogeneous water body and thus, there are differences in the method of fishing, for example, in terms of the extent of aquatic vegetation cover, the nature of the bottom substrate (the level of rock and gravel, muddy, etc), and the relative species composition.

The changes, particularly between that of *Amora Gedel* and *Fiker Hayik* landing sites, may be ascribed to the intensity of fishing activity at or around their respective areas on the lake. In this regard, *Amora Gedel*, which is the major landing site of the lake where the fishing intensity is expected to be comparatively higher than other stations, had the lowest number and weight of fish in the present study than the *Fiker Hayik* one. In past days, fishery at Lake Hawassa was mostly practiced with reed boats and hooks for the purpose of both consumption and commercial to secure their subsistence. However, it becomes changed to geared boats and nets with organized cooperatives to survive the changing natural and human-made pressures. Hired fishers at Amora Gedel site[23] explain their daily experiences as follows:

> *Every morning we moves the boat to the imaginatively specified target fishing area for about 2-3 hours; after setting the net, we have to protect the net from robbers by spending the whole night on the water with the fishing gill nets with protecting it from the thieves and come out with the collected fishes in the early morning for market at around 6AM GMT, and we move back to the market place on the daily basis. After we hand over the collected products and fishing materials we earn 75-100 birr and some fish gifts for our daily work duties depending on the production and market from the cooperative members. But, previously we collect enough fish for ourselves due to relative surplus production and lowest number of fishermen.*

In the current status, they are not mostly come back with adequate number and size of fishes. This enforces them to increase the number of boats and the gill nets with considerable number of man power. Hence, high number of catch may be related to the number of gears operated. Higher proportion of catch was conducted in January, March, April and May due to it is the maturity stage of most larvae fishes (EFASA 2010).

This could show its high livelihood significance with 70% share of its values, which might include consumption, employment and other livelihood values. While, in the case of individual-based fishers, the method of fishing is different from cooperatives; as individual-based fishers at Fiker Hayik site[24] explain their fishing practice:

[23] Interview with Lalango and Tariku 29 April 2017.

[24] Interview with Daniel and Bereket 2 May 2017.

We use reed boats and fish hooks to fish and we usually starts to fish after the cooperatives fishers have done their morning fishery practice to get wide production and market access in conducting it freely. Since early morning we began to prepare earth worms from the inside part of the grass and other foods to place them on the tip of the hook so as to easily attract and captured fishes when they try to eat them. In such a way we may spend the whole day in the lake unless we catch enough fish and buyers of products for daily income depending on the changing production and market seasons.

In this case, the method, purpose and value of fishery are different among the cooperatives and individual-based fishers with the main reasons of access, equipment, experience and awareness in the production and market. During the first round of this survey, as it was the main fasting season with high production and market, the whole cooperative boats and gill nets as well as almost every individual-based fisher were practicing fishery in both study areas. But, they reduced their equipment and energy effort in the second survey period and start to engage on other alternative jobs due to low production and market regards to it was non-fasting period. Therefore, the purpose and goal of fishery within most of cooperative members is commercial fishery to make it a major livelihood strategy by surviving with its changing values via updating compatible methods of fishing within its dynamics. As Lukas[25] illustrates the value of fishing in *Amora Gedel* site:

Currently, 200 new members are on the way to join our cooperative in addition to the early registered 270 members with the purpose of reducing illegal fishing activity and secure their claims resource sharing and ownership right. Due to so, currently Amora Gedel Landing site becomes a daily bread for more than 1000 people in different stage, comprising of the main fishers, employed fishers, daily laborers and fish/fish product processors. However, it ultimately resulting with changing of the fishing method among some of our members in using small mesh size nets with the illegitimate number and type to increase their income and compete with others, as the purpose each is enhancing their livelihood value within access and level of fishing operation dynamics.

In this case, the income of currently working members is affected by different formal and informal participants. They are allowed to use maximum of 15 nets in one boat and the income is divided for the one to five teams in a weekly basis after the cooperative deduct their dividend from each fish catch. Beyond the main members, there are also daily laborers supporting them in different activities and then, the main fisher's daily income divided into all participants, but some of them are operating it by themselves to minimize their expenses and sabotages by the daily laborers.

If a daily gross income of one team (5 members) is 1,500 birr,

150-200 birr paid for 2 employed fishers

30-50 birr paid for 2 net preparation laborers

1-2 birr deducted from each fish as dividend

[25] The Hawassa fishery cooperative management committee leader, 04 May 2017.

Therefore, the net income of each member will be around 200-250 birr per day. The livelihood value of fishery at this site becomes decreasing comparatively from the other landing sites, because the fishing effort is limited with maximum of 3 nets/ person. However the selling prices of fish in this site are relatively expensive from the others due to it is well known fish market area with regular customers. It makes them consistently accessible with market values and also the flow of visitors to this fish market and the adjacent tourism place. Fishery practice in *Fiker Hayik* site is dominantly covered by different individuals and groups mostly in small-scale methods corresponding of the main gate of *Fiker Hayik* recreational center to Haile Resort. While, there is one potential cooperative in this area with the name of 'Dagim Fishery Cooperative'. As Solomon[26] explains:

> *Dagim fishery cooperative was established in 2013 with five fishers with my initiation. I was operating fishery at Amora Gedel fishery cooperative since its establishment. Through time, different individuals joined us due its increasing importance. Currently, this cooperative is operating fishery with the current capacity of 35 members, 35 boats and over 350 gill nets as well as over 100 daily laborers. Therefore, it is becomes a means of daily subsistence for over 200 surrounding communities in daily labor, assistant fisher, processor and other related activities. However, the increasing of participants becomes cause for the changing of fishing strategies to secure the usual values from fishery.*

In addition to the practice and number of participants what Solomon mentioned, there are also individual-based fishers in this site with the estimate number of 150-250 in which they are operating with low and high production and market seasons differing from the other sites for the purpose of fulfilling their expenses, not usually for major livelihood purpose. While, in the observation and survey period, I noted that the Fiker Hayik fishery cooperative have used 15-25 formal and 74% of them are informal gill nets (a narrow mesh size and commonly known as '*Monofilament*' nets, which affect the reproduction and healthy maturity of fish species in catching every fish type) in a single boat with the ownership of one cooperative member.

Under this ownership and equipments, the main fisher usually hired two assistant fishers as a day laborer to undertake the overall fishing process and control. In such away, every cooperative member may fish one up to twice a day, because such '*Monofilament*' nets are similar with the color of the water so as it can catch numerous fish even at sunny day, then using these methods they can fish and obtain more income than the *Amora Gedel* fishers. Tesfaye[27] explains the reason of such practical differences in such landings as follows:

---

[26] The founder and former chairman of the cooperative, 06 May 2017.
[27] Expert of Hawassa city administration fish resource development bureau, 14 May 2017.

I can confirm you that the differences in method and value between these cooperatives is mainly the result of inconsistent management and lack of cross checking of informal practices and equipments among the concerned sub cities, the city and zonal administrative bodies in clear means of ruling access and level of fishing operation, where as the purpose of fishery is differed in those cooperatives due to their social organization, trends and level of awareness.

Therefore, the methods, purpose and value of fishery at *Fiker Hayik* landing site is differ from that of *Amora Gedel* in related with the differences in understanding and applying of the social and legal aspects by the diverse local and concerned officeholder communities in a compatible manner with the production and market changes to keep continue its livelihood values.

3.3.1. Determinants of Fish Marketing: Cooperatives and Individual-Based Fishers

As one of the Ethiopian Rift Valley lakes, Lake Hawassa plays vital role in providing fish to the local community and the city of Hawassa. The lake's fishery, since 1960's has been serving as a major source of livelihood strategy for the local communities with the increasing number of dependents through time. As the Hawassa city fish resource development bureau estimation, nowadays more than 3000 individuals are directly or indirectly depending on lake's fishery in general. In the major landing sites (*Amora Gedel* and *Fiker Hayik*) about 1500-2000 people are using fishery as a means of income. Therefore, the livelihood value of fishery for members of the local communities who are either working in cooperatives or as individuals- appears significant.

The FGD (April 25, 2017) and survey with the individual fishers reveals that 'differences in economic benefit from fishing can be manifested through fishing ability, equipments and the length of time spent on fishing activity per day (which shares 43%, 22% and 35% respectively) depending on the season, knowing specific potential fishing areas (usually based on experience) or the number of constant customers.

Their fish production capacity with fish hooks may vary depending on fish reproduction and growth periods, which in turn is influenced by such factors as season and load of fishing on the lake. As they usually fish around the grassy edge of the lake, they mostly catch small and fertile fish; because fishes are spawn their eggs coming to grass areas. In this regard, differences in quality and quantity of production among the individual-based fishers are a matter of awareness, responsibility or decision to practice formal or informal fishing. On the other hand, Asmamaw and Tigabu[28] mentioned factors influencing their production as:

[28] Interview with members of the Amora Gedel fishery Cooperative 21 April 2017.

Our livelihood/income from fishing is mainly determined by seasonal variations, the amount of nets on the boat/day, number of skilled man power, probability of net thefts and conflicts and using informal fishing materials as well as administration issues. But, not all fishers are influenced equally, even though we are operating in the same lake.

All informants emphasize the importance of stable weather condition for fish production since it creates a comfort zone for fishes to "relax" and move to the upper layer of the water where they could be easily trapped. Seasonal variations, such as storms, instable temperate warm and cold weather, night rains and bright moon lights are said to be not suitable for fishing. The catch fish by individual fishers and cooperative fishermen are mainly sold fresh at the landing sites. Accordingly, as SES, the Outcome (O) or actual livelihood significances of fish production and marketing is relied on the interaction of the other four variables, as it is the integrated result of resource system, unit, governance and actors multidimensional interaction.

In the case of the cooperatives, the survey result showed that there are three marketing channels in Lake Hawassa (Fig. 10). In the first channel, each member/team of the cooperative fishers supply their catch to the cooperative so as to sell all collected products in wholesale and deposit their net income by subtracting 1-2 birr dividend from each product for the cooperative. The cooperatives will sell the fish to the hotels and the hotels also sell to the final consumers in adding values. The cooperative also sell their products for the local consumers and other supplier merchants in the landing sites. In the second channel, each cooperative member may directly sell their catch to the local consumers, and in the third channel they may sell to the hotels/restaurants in Hawassa city and also neighboring towns abroad depending on the product and market access. Therefore, the main actors in this market channels are fishers, cooperatives, supplier merchants, local consumers, hotels/restaurants and visitors.

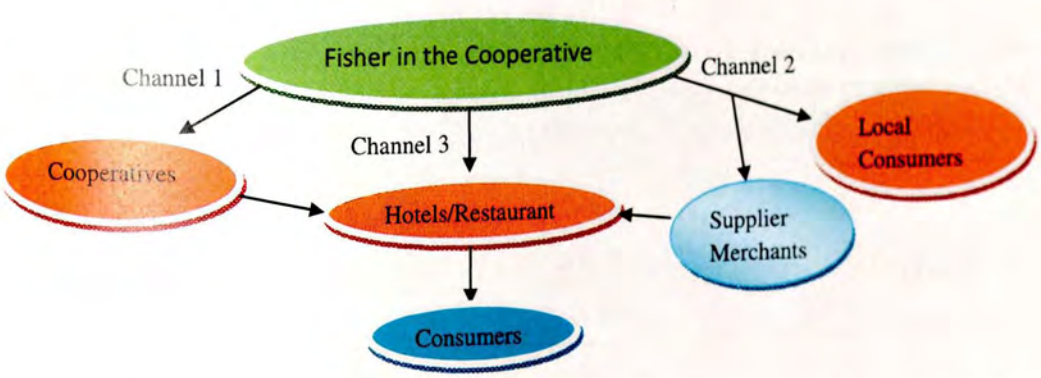


Figure 10: Fish Marketing Channels in Lake Hawassa Fishery Cooperatives (field survey 2017).

Whereas, there is no market channel among individual-based fishers, rather it is conducted directly. An individual-based fisher at Fiker Hayik landing site[29] explains their system:

> *We usually sold our products directly to the local residents on the spot; because it is highly needed than the cooperatives due to it is fresher than them for fillets and other use. Because of this, our products can be sold immediately with relatively expensive price than the cooperatives. Thus, there is no chain of market among us unless we sometimes sold it for the other processors, especially when there is surplus production.*

Therefore, as the cooperatives and individual-based fishers' livelihood mostly is depends on the production capacity and market access, fish marketing and livelihood strategies among them on and after the fasting time is mainly determined by the season, legal issue and a number of potential customers. However, similarity the level of their fish market doesn't make each of their livelihoods similar, because it may also differently determined by the issues of awareness, lived experiences and other socio-ecological factors. In this case, not all cooperative members' livelihood is uniform the same as to the individual-based fishers.

Fasting Season: the Peak Period of Fish Market

Fishery, as human-environment interaction, can be subjected to society and ecosystem related seasonality; meaning, fish production potential is mostly related with ecosystem based seasonality, whereas, fish market in the study areas is dominantly determined by culture based seasonality such as, Religion. The Hawassa city and lake's catchment is resided with diverse religious communities and out of them 27% are the followers of Tewahdo Orthodox religion (HCA 2008). There are different fasting seasons in this religion in which meat and other animal products is not allowed to eat, at these seasons numerous domestic consumers of this and other religion followers comes to lake's fish market and other value added areas to have it in supplement with animal products.

Table 8: Selling Price of Fish at the Main Fasting (Lenten) Season at Lake Hawassa Fish Market

No.	Fish Type	Average Price of Fish by Size		
		Small	Medium	Large
1.	Tilapia *('Qoroso')*	8 birr	10 birr	15 birr
2.	Cat Fish *(Ambaza)*	25 birr	35 birr	45 birr
3.	Gold Fish *(Bilcha)*	5 birr	8 birr	10 birr

Field survey result (April 2017).

[29] *Interview with Worku, 24 April 2017.*

Different discussions with officeholders, experienced and beginner fishers also reveals that among a number of factors in favoring the fish market, fasting seasons (especially, the Great Lenten) takes a lion's share and the other fasting seasons such as Communion, Apostle's and Dormition *(Filsetta)* fasts also have their own distinctive role depending on their length of time. Population pressure with the increasing awareness of feeding habit of fish, inter-migration and urbanization is another favoring factor beyond the fasts having its own contribution for fish market. Lukas[30] illustrates the favoring factor of Lenten fasting season more as follows:

> *Even though there is different fasting seasons within a year which favors for our fish market, the main fasting season ('Kudade')[31] takes a lion's share. This is mainly due to such period (55 days) is fortunately joined with high production of lake's fishing, in which it can fulfill the continuous demand of such consumers. Therefore, fasting seasons are exclusively good for fish market, as it have better selling prices and income for the local communities, but exclusively Lenten.*

The fish production potential of Lake Hawassa is varied with seasons and the work man as well as number of fishing material also goes in line with the lake's seasonal fishing capacity. Among the lake's peak breeding seasons, for instance, the major fish type, Tilapia in Lake Hawassa has two peek breeding seasons from January-March and during July-September (Demeke 1996). These two seasons directly joined with the Lent and Dormition fasting periods, so that it favor for fish market than other periods.

The FGD discussants Danbe, Zerihun and Matheos[32] elaborate this differing situation as follows:

> *The main fasting is our major production and market period; due to relatively good production at this season, not only the price, but also the work man power, number of gill nets and boat becomes increased to effectively utilize the pick production potential as well as continual market. Therefore, it is our best period for collecting better income to use it for the next non-fasting periods, while the next two months after the great lent will be fast-free and then fish market decreases due to the availability of animal products.*

During the other lean periods, many cooperative and individual-based fishers involves in other income generating activities other than fishing due to its relative low production resulting from lower demand and income. The livelihood pattern of fishers is diverse due to the seasonality of fishery. In two different observation periods (on and after the Main Fasting period), the man power engaged in fishing, quantity of equipment needed as well as production and market were totally different. At the fasting period the lake was occupied with numerous fishers and boats, but it immediately reversed after the Easter Holiday.

---

[30] Chairman of Amora Gedel fishery cooperative, 13 April 2017.
[31] Kudade is the main (Lenten) fasting season among the Coptic Orthodox Christians covering a 55 days span.
[32] Cooperative-based fishers at Amora Gedel landing site, 10 April 2017.

It reveals that the livelihood significance of fishery at fasting seasons accounts 58% of its values for cooperatives and 70% for individual-based fishers. Because of cooperatives have common customers rather than individual-based ones, most of individual fishers are working in full time during fasting seasons to utilize its peak market access. But, fasting season has significant value for both fishing group's fish market and livelihood.

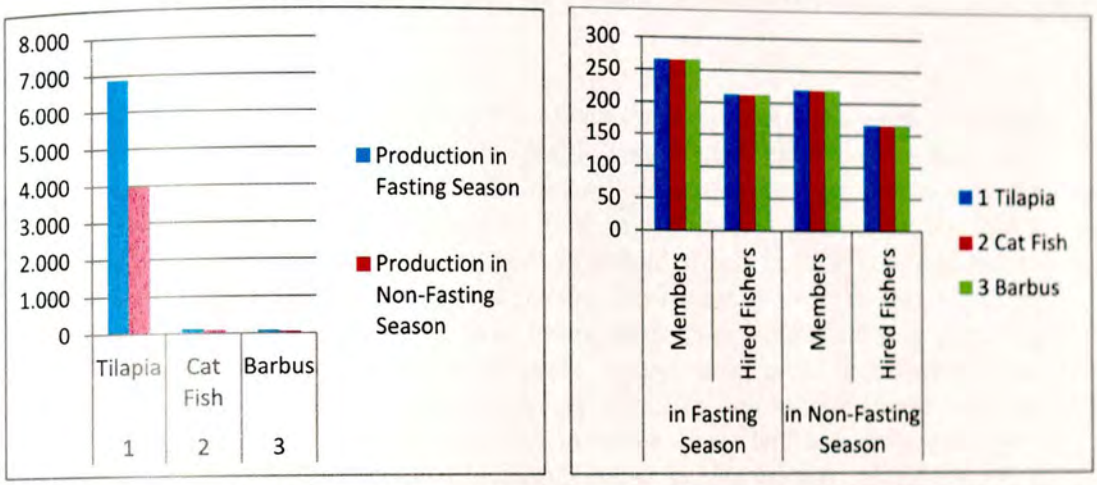


Figure 11: Fish production and labor difference during fasting and non-fasting seasons among cooperatives at Lake Hawassa (field survey 2017).

It is expected for the fishers to face such kind of production differences within those two different periods so as it can cause for low income (Fig. 11). Therefore, at non-fasting periods, many of the cooperative members and hired fishers involve in other supplementary income generating activities, such as horticulture, cash crop, daily labor and other individual-based businesses to safeguard their households' well being. Therefore, the livelihood diversity of such local communities is one of the results of the seasonal feature of fishery. While, due to most fishers have low educational background and updated awareness, the range of their alternative livelihood diversity and total transformation to other livelihood activities is very limited with specific sectors. 27% survey respondents, who are above grade 8^{th,} are involving in alternative livelihood activities, while the rest, who are below grade 8 and low awareness, are utilizing fishery as their last resort.

3.3.2. Access to the Resource and Market Differences

Fishery practice, beyond its general livelihood value, such privileged water bodies may affect the local communities differently depending on their structure and functioning strategies. In such a way, most of lake's fishery comprises the individual-based and cooperative local communities so as to perform with their own distinctive equipment, man power, level of awareness on fishing operation and ruling as well as market access contexts and relativity.

As their household social services are mostly secured by their level of income, it may not evenly space throughout the year due to seasonality in fishing. Therefore, they early deposit their income from the peak seasons (mostly December-June) for the lean periods (July-November) to be secured from indebtedness with such uneven pattern of earnings. Even though the income between the individual and cooperative fishermen is dynamic, some livelihood diversities help the study area's community to survive the lean periods. As Tilahun[33] explains the social and legal aspect of fish production and market:

> *Cooperative fishers have more acceptance than the individual-based ones with their coordinated equipment, knowledge, legal conformity, extensive human and ecological roles in their localities. As they are organized by compliance with the required socio-ecological pre-requisites, they have dominance power on the lake's fish production and market through their legitimate access in their confined places and value chains than the individual fishers. Fish market since its beginning, is primarily bounded up with cooperative fishery with its age old (over four decades) lived experiences, therefore socio-culturally, cooperatives at Lake Hawassa have more sound influence on the general fishery practices and market issues than the individual fishers. However, working in cooperatives is not without challenges, some of the challenges include: internal management problems, partiality, abnormal competition over the resource and market, thefts and conflicts. It is still my relative livelihood option beyond a tool of good social relation*

The economic gains from lake's fishery vary even among them based on their fishing capacity and market access differences. The Catch Per Unit Effort (CPUE) of each individual-based fisher matters the livelihood destiny through time with developing experiences and techniques of production and market. This case is somewhat similar with the cooperative fishers around the lake.

Case Study (3) with Tarekegn[34] reveals their production and market situation with his ten year experience as follows:

> *I may sell the fish I catch relatively cheaper compared with the price of fish caught by my partners who have recently joined us. I sell it relatively cheaper since I know that I can catch more fish in a short period of time given my Ten-year experience in fishing that helped me know potential productive fishing areas at different seasons. Therefore, in our realm experience matters a lot the difference between individual fishers in their economic gains. That is, even though I sell my product in a relatively cheaper price, my daily income is usually greater than the income of those who have shorter experience in fishing.*

The survey result in both *Amora Gedel* and *Fiker Hayik* fishers also reveals that there is a selling price differences due to the production, fishing equipments and access to resource and market differences among them.

[33] Hawassa city fish resource development bureau coordinator, *10/05/2017.*
[34] Individual-based fisher at Fiker Hayik landing site, 28 April 2017, Hawassa.

For instance, selling prices of the same fish type in *Fiker Hayik* landing is relatively cheaper than that of *Amora Gedel* due to there is a potential fishing areas, numerous and effective fishing materials at *Fiker Hayik* site than *Amora Gedel*. Therefore they usually sold their products by 2-5 birr differences than the *Amora Gedel* sometimes by taking their products to *Amora Gedel* site due to the relative market access than the *Fiker Hayik* one.

Table 9: Average Selling Price Differences among the *Amora Gedel* and *Fiker Hayik* Cooperatives.

No.	Fish Type	Selling Price	
		Amora Gedel	*Fiker Hayik*
1.	Tilapia (*'Qoroso'*)	9	7
1.1.	Small Tilapia	6	4
1.2.	Medium Tilapia	8	6
1.3.	Large Tilapia	13	11
2.	Cat Fish (*'Ambazza'*)	24	18
2.1.	Small Cat Fish	17	12
2.2.	Medium Cat Fish	25	18
2.3.	Large Cat Fish	30	24
3.	Barbus (*'Bilcha'*)	6	4
3.1.	Small Barbus	4	3
3.2.	Medium Barbus	6	4
3.3.	Large Barbus	8	5

Field survey result (2017).

These selling price differences among such cooperatives (Table 9) primarily come from the determinant factors of access to resource and level of fishing operation, and each of them has 64% and 36% share. The major reason in market access difference is that *Amora Gedel* is a well known fish market area in attracting many consumers to this site than the *Fiker Hayik*. Therefore, both of individual-based and cooperative fishers products at *Amora Gedel* site is relatively expensive than the *Fiker Hayik* ones. The difference among the individual-based and cooperative fishers in both areas is the applicability of a relative fixed selling price for a piece of fish among cooperatives than the conditional agreement-based selling in mass within the individual-based fishers.

Consequently, the economic aspect of lake's fishery in such two realms may vary depends on the fishers' access and capacity and socio-environmental issues. It happens due to the internal factors (fishers-lake interaction) and external factors respectively, because not only the production but also market access is mainly determines their economic gains. According to the Focus Group Discussion result, the individual fishers' product is more needed by the local consumers, especially small and medium fish for the fillet, because such consumers believes that their product is more fresh than the cooperatives, as it is fished with hooks and immediately accessed for market than the net fished and spent over night on the water.

On the other hand, cooperative's product is more needed by different hotels and other firms for the roast and other related food stuffs due to it is large in size and numerous than the individuals. In so far as, they have common customers with their relatively constant supply in fishing throughout the night on the daily basis than the individuals' inconsistent production. Yet, fishery is continuing being a source of daily bread and social security for both fishing communities differently.

3.3.3. Coping Strategies of Individual-Based Fishers in Changing Operation and Market

Although individual-based fishers supply most of the fish consumed in the developing world, many of them are extremely food-insecure and lack access to the resources and opportunities they need to lift themselves out of extreme poverty (Mills et al., 2011). Individual-based fishers at Lake Hawassa relatively have low income and living status than the cooperative members due to the equipment, man power and access of operation. Even though they have significant contribution in consumption and subsistence, their minimal competitive power in production and market makes them socioeconomically inferior and vulnerable.

Individual-based fishers at Lake Hawassa operating fishery with different level of motives, skills and dependence; some are practicing it either with the motive of major livelihood strategy, some others as a seasonal supplementary means of income or recreational and consumption purposes. Yet, their skill and range of responsible dependence determines their survival through changing time and the operations of lake's fishery. 69% of full time individual-based fishers are using diverse survival strategies to cope up with the seasonal market via fishing surplus product by spending more time on the lake at the lean season than the peak; while, the others 31% are surviving the low product or market season by engaging in other livelihood activities.

Case Study (4) with Simon[35] more reveals the issue his six year experiences as follows:

> *I have been engaged on other monthly paid job (company security), but, I come to this profession because it has a daily income for me and my household rather than other jobs. Previously there was relatively surplus production and market due to minimum number of individual fishers, while currently if you want to make fishery as your major livelihood strategy, you have to know potential fishing areas specifically, for instance I usually used the foot prints of Hippos to catch large size of fish, because their foot print creates a hole and it is becomes safe zone for fish production and growth. I also used more than one hook in the same harpoon to catch more fish by carefully watching its movements all the time. Yet, such changing operations are mainly depends on the level of production, competition and market, because cooperatives and my senior individual fishers have more customers than me, therefore my only option for now is fishing more products by applying such kind of efforts and skill to get better income.*

[35] Full time individual-based fishermen at Amora Gedel Landing site, *29 April 2017.*

Even though the production is decreasing with the increasing competition, most individual fishers, including part timers are agreed that it is relatively guaranteed to obtain daily subsistence income. Because, as they are fishing beyond the cooperatives, where the fish market is conducted, they have a chance to get different consumers on the daily basis, usually after cooperatives have done their daily activity. However, at some pick production season with low demand, we can't get enough market at the spot, and then we used door-to-door market system by round in the villages literally calling "አለ ትኩስ አሳ ለምሳ", meaning, *'there is fresh fish for lunch'*. Because, most residents aware of that fish is usually catch in the morning and its freshness determines its selling price and rate of demand by such consumers.

Therefore, their coping strategies are bilateral, i.e. experience the changing local ecosystem and environs competition by updating their surviving methods. However, the practice faces a number of challenges often arising from developments outside the sector and also stem from the internal dynamics. Ayinadis[36] said that, "even though the city's development with infrastructure and tourism activities creates new fish market for such individual-based fishers, it has double impact both on the resource and their long lasting access paving a way for informal fishery practices."

On the other hand, an individual-based fisher at Amora Gedel site[37] elaborates the challenge of the seasonal variability in his regular access to the resource as follows:

> *The period of heavy rainfall, storm and cold weather condition predominantly affect my fishing and market activities, because most of the time my fishing material allow me to practice fishery around the grass areas of the lakeside. As such periods are not suitable for fishes to play on the upper layer of the water, and my fishing materials couldn't access them to fish and even I can't sell the subtly catch products, because I have no common customers as the cooperatives other than local residents.*

Therefore, most of them change their strategy either towards the other fishery practice or other outside activities to survive such challenges. Here, the actors make their own decision either to continue or come out of the practice with their decision in the exploitation of available natural resources. Consequently, their survival within the changing environment determined by their decision either depending on shared values or beliefs.

[36] Hawassa city fish resource development officer, 10 May 2017.
[37] Interview with Bereket, 07 May 2017.

3.3.4. Other Changing 'Faces' of Fishery and Value Chain at Lake Hawassa

As fishery is an open access or common property of the surrounding communities, it usually comprises large number of poor people in different access to the resource and level of performance with its communal nature of practice in which every member or stakeholder contributes efforts in capital. Yet, such kind of traditionally working fishers at Lake Hawassa becomes negatively affected when new developmental dimensions began to apply in the sector, such as changing the subsistence oriented fishery to profit oriented business transactions by reducing the indigenous manual efforts and differently applied knowledge to center-based marketing and distribution system via wholesale merchants. Matheos[38] illustrates the current changes in the social values of lake's fishery as follows:

> *Current status of fishing at Lake Hawassa mostly inclined to business with relatively less social responsibility from the previous decades. Nowadays most of fish products collected and distributed by few merchants to hotels and other consumption destinations by adding values for the sake of their profit maximization than the fishers. On the other hand, developmental and technological changes of the lake side and the city is benefiting some few individuals engaged in fish market differently from the lake's fishers by practicing a delivery system in the mean time it demands, creating business networks both with the fishers and receivers and acting as a 'broker' with their market information.*

Therefore, lake's fishing becomes run by some individuals in monopolizing an access to resource with marginalizing some stakeholders and facilitating their new methods using their socioeconomic status. Following this, many fishers are becoming wage earners and others seeks for alternative livelihood strategy due to the dominance of such bigger players and informal fishers practices, (such as net thefts and informal fishing) in the lake's fishery. Even though such practices are becomes a responsible factor for the increasing levels of poverty, food insecurity and vulnerability in local fishing communities, basically it is the gradual result of steep decline in availability of fish in terms of quantity, quality and variety over the last decade.

It is continuing due to the increasing population in production and market as well as the shore's socioeconomic activity's adverse effect. Consequently, the previous varieties of fish species currently become uncertain and habituated with two or three fish varieties. Such various factors have resulted in the spreading of catches more thinly across a larger number of people and/or increasing prices to high levels and thereby reducing access to fish many others.

[38] Expert of Hawassa City Administration social and labor affairs, 12 May 2017.

Thus, many fishers, even the *Amora Gedel* and *Fiker Hayik* cooperative members and hired fishers are in searching of alternative livelihood means other than fishing to safeguard their household well-being, because the current income or wages from fishing and trade leaves very little surplus. Even those households that generate some surplus use it up during the lean periods or for ongoing production and consumption needs, but a majority of fishers are perpetually indebted. The cooperatives' saving and credit association and dividend beyond their strong socio-cultural co-op bond critically rescuing them from worsen situations.

The survey result shows that, 54% of cooperative members and 71% of individual-based fishers usually engages in another alternative livelihood strategy at the lean period and non-fasting seasons to cope up such changing situations. While, the rest 46% and 29% are keep going within it by changing their fishing strategy and length of time in fishing to obtain relative income. On the other hand, Focus Group Discussion (FGD) data reveals that, livelihood diversification among such fishers' views in two dimensions. Firstly, fishermen may engage in diverse occupations when the livelihood vulnerability and level of poverty becomes critical in the household level due to either the technique of survival within fishery or other external factors beyond. Secondly, he/she may run diverse livelihood sectors via investing his/her different assets as entrepreneur other than fishery. Therefore, the level of livelihood vulnerability and diversity is varied among such fishers based on their socio-cultural background, intellectual capacity and decision making distinctions.

3.3.4.1. Child's Daily Dependence

Lake's ecosystem and resources have close attachment with surrounding local communities in their daily livelihood activities. Fishery is one of the major livelihood activity depends on lake's resource used as a source of income, food or health protection for the consumer households. Regardless of such activities and prospects for the surrounding communities, fish market at Lake Hawassa is convoluted with different families' socioeconomic issues. In my observations and survey, every morning, when fish market begins at *Amora Gedel* and *Fiker Hayik* sites, it is usual see dozens of children mixing with the sellers and buyers of fish and fish products.

Beyond its tourism and livelihood value, fish market has the hidden "face" source of food for many children who are obtaining their daily meal from the consumers' leftover. These children move around carefully watching the last move of consumers having fish foods to immediately outrun each other and secure the leftover. Their competition to secure left over may seem to be another impressive part of fish market, but it is the other face of poverty and social crisis.

Fig. 12: Childs in search of their daily work and having their daily meal (field survey, May 2017).

According to such children (Fig. 12), the root cause of their vulnerability includes economic incapability within the household, family breakdown and death, lack of proper awareness of parents on the management of family, large number of dependents within the family. Such kind of socioeconomic crisis becomes a factor for the termination of such children's education and the increasing number of the street children and psycho-socially affected teenagers around such socioeconomic and tourism attraction areas to secure their basic needs by engaging in a daily labor works at these relatively the ease accessible area. Lukas[39] explains child's forms of dependence as follows:

> *Due to fishery practice comprises different age, skill and experience statuses, through time, such children are also starts to obtain income by participate in fishery practice with providing different supports for our main members as they spent more time in such area, they develop skill and exposure to fishery in watching their seniors. In this case, most of them break up their education from primary level due to socioeconomic problems and the luring factor of its daily income, but they hopes to continue their education when their basic needs to some extent becomes fulfilled.*

Therefore, due to fish product leftover are relatively easily accessed in these areas, it becomes the source of daily meal for such children. Consequently, hundreds of children came to this area with two major reasons, i.e. children under the responsibility of their family, but in food security problems, and children, who are out the family care ("streets") to obtain their daily basic needs. The survey result reveals that they accounted 67% and 33% respectively. Bereket and Mesha[40] illustrate their experiences in this aspect as follows:

[39] The chairman of Amora Gedel fishery cooperative, 27 April 2017.
[40] Vulnerable Childs comes from the rural area of Hawassa, 20 May 2017.

We came to this area with our family problems (socioeconomic and death).We collect the leftover the whole day and take it back home to share it with our families/friends. Through time, we start to work as assistant or daily laborer for members of cooperative fishers: But this opportunity is not constantly available. If we got some money, we buy boiled fish (which is byproduct of fish soup) from the soup makers with a relative cheap price. Since, getting of this job access needs daily coming to this area and practicing it from the relatively easy task of getting ready of nets for the next fishing as a daily laborer with the senior friends. Therefore, now we are developing such skill from time to time to be able to work as hired fisher by the cooperative member fishermen and then the main member to reduce our family's problem and lead relatively better life.

In this case, most of such children hope to become fishers in the near future in participating either in the daily labor or individual-based fishing through time. However, Elsabet, tourism development officer said that, "the increment of vulnerable children in such areas is causing for a negative image of fish market and its tourism value in increasing load on the lake's resource utilization and getting the customers in frustration with their unusual activities." Therefore, taking responsibility for such generations beyond the fish production and market has great role on lake's fishery in decreasing the load, because when those children grow up without education only relying on lake's resource, the environs social and natural aspects will come under question.

CHAPTER FOUR

THE SOCIO-LEGAL CONTEXTS INFLUENCING FISHERY AT LAKE HAWASSA

Biological and physical resources must be managed in the contexts of particular socioeconomic and politico-legal that influence human use, development, and dependence on these resources. Since lakes are open-access public domain resources, not the sole dominion of a given resource user groups, there are increasing appeals for more transparency and broader stakeholder involvement in the sustainable management of lakes resource (e.g., Pomeroy et al. 2001).

The social and legal (policy) context may put either positive or negative influence not only on the management of natural resources but also on the livelihood of the local communities depending on the diverse interests of participants and dynamic elements of the local ecosystem. The basic premises in theory of political ecology actively works with the socio-legal dichotomy of fishers-lake interaction at Lake Hawassa, as it argues that there is a clash between individuals' interest and political economy and ecology in the continuously changing interaction. Therefore, socioeconomic and environmental changes influence the distribution of power in the productive activity and bio-ecological relationship. Similarly, different aspects of fishers-lake interaction also rely on those social and legal positive and negative influencing factors.

In utilizing the lake's resource either for tourism or other commercial purposes the role of social network is significant in bonding the local communities for their common goals. For instance, social network is critically important in the employment and value chain aspects of the lake's fish production and marketing. Another prospect for fishery is fasting season; as it becomes a means for great demand of fish, the fishing communities are specially benefited in this period. Thus, lake's cooperatives and individual-based fishers are primarily accessing in different level for food security, household wellbeing and overall livelihood. However, as the resource is open access, the increasing flow of diverse communities is challenging lake's fishery. The social and legal dichotomy is raising claims of resource ownership which is expressed through making imaginary lines, 'informal' and overfishing, net thefts and conflicts among the watershed communities. Such diverse communities practiced different livelihood activities relying on lake's resource with their socio-cultural values and beliefs to fulfill their interests. Therefore, their struggling interaction to answer their needs come to clash with legal issues thereby it may results in positive or negative influence in the livelihood of local communities and ecological/ legal aspects of the lake.

The Social-Ecological System (SES) Framework is deals with those interacting variables; as the Actors' (A) changing livelihood interests and claims on lake's resource and Governance Systems' (GS) changing rules of access and level of fishing operation is influencing the participants' livelihood on the one hand and lake's resource sustainability on the other hand. Moreover, the interacting issue of claims/claimants and competing views/conflicts at Lake Hawassa fishers, which is discussed below, is also under the two variables (Actors and Governance System) interaction, thereby it affects both human relation and lake's resource sustainability differently.

4.1. Fishery as a Common Pool Resources: Livelihood Vulnerability

The fisheries are considered as common pool resources due to lack of efficient alternative livelihood strategies and are thus difficult to protect from the challenge of over-exploitation. As a root cause, the surrounding socioeconomic and environmental changes take its own role in making a livelihood difference with most of such community and vulnerable for socioeconomic development. As a result, fishing is frequently undertaken when alternative employment opportunities are unavailable. Another common pool attributes is that fishing by one user reduces the size of fishing stocks available for others. Many fish stock are not "*owned*" by a fishermen association but are instead fished by several fishermen cooperatives. The common pool nature of fisheries resources while results in overfishing and lack of interest in maintaining fish habitats. In addition, fish is relatively expensive compared with the local price of vegetables and other cereal crops on a unit weight basis, though it is yet less costly than other animal protein sources.

Therefore, with increased marketing efforts, the demand for food fish has increased enormously in Hawassa. If fishing efforts by commercial and individual-based fishermen continue to experience unmonitored and unregulated growth in all sectors, Lake Hawassa will experience rapid loss of profitable fisheries, exacerbate overfishing, and threaten the livelihood of thousand's. Therefore, different forms of property rights enforcements have to be used to limit access to common pool resources and define rights and responsibilities of beneficiaries. However, inadequate enforcement, inappropriate incentives and knowledge deficiencies regarding the fishery may result in overexploitation despite a property rights framework. During my field observation, I noted that most of overfishing is caused by lack of awareness amongst fishers of the impact of destructive fishing and having the viewpoint that "if *I don't exploit the fishery, someone else will*". Therefore, unmanageable/ informal fishermen cooperatives resulted in overfishing and destructive fishing practices, thereby reduced catch per unit effort.

4.2. Land Use Change

Land cover change is highly affected by human-induced activities rather than natural events. Intensive agricultural expansion, urbanization and population growth in the lake basins, deforestation activities, free animal grazing and other reductions in the vegetation of the catchment areas of Lake Hawassa, which have expanded considerably during recent years, has exerted great pressure on the management of the fisheries resources of Lake Hawassa (Gebremariam, 2003a). Such changes have great impacts on the catchment by altering the hydrological process such as infiltration, groundwater recharge, base flow and surface run-off, which has increased sedimentation and nutrient load of the water contributing to loss in fish habitat, fisheries and biodiversity in Lake Hawassa. As the study of remote sensing on the land cover of the catchment of Lake Hawassa (Shewangizaw and Michael 2007), natural vegetation decreased by 11, 768 ha (about 9.1% of the total natural vegetation) from 1995-1998, which is mainly attributed to the expansion of agricultural fields and urbanization in the drainage basin of lake Hawassa (Table 10).

Table 10: The Change in Land Use in Lake Hawassa Catchment/Hectare at 2017.

Land use type	Land use of 1965	Land use of 1998	Land use of 2017
Urban	490	1800	2554.242
Cultivated land	40586	61247	73142.73
Natural vegetation	67198	55430	48654.48

Source: Shewangizaw and Michael (2007).

Therefore, all the possible causes that lead to land use change and catchment degradation are happening in and around the lake thereby causing for pollution of the lake ecosystem as well as negatively influence the livelihood activities of the fishermen in affecting the quality and quantity of the lake's fish production. Therefore, it signified that precautionary measures have to be taken swiftly to protect the lake from pollution, siltation and the subsequent loss in fish habitat.

4.3. Informal Fishery and Over Fishing

Fishery, as a relatively open-access resource, it pulls continuously increasing communities to the sector without the specifically amended standard and over its carrying capacity. Overexploitation of such particular resource becomes real when fish and other living aquatic resources are caught at a rate which exceeds the maximum harvest that allows the population to be maintained by reproduction. One of the key challenges to the fisheries of most freshwater fisheries in Ethiopia has been how to sustainable management of the fisheries resources.

Even though the fisheries policy in the country is to ensure increased and sustainable fish production and utilization in reducing poverty, most fisheries in Ethiopia are unfortunately declining and some others collapsed. Fishing effort in most of Ethiopian lakes was originally low due to low number of fishermen, poor fishing crafts, inefficient fishing gear and limited markets.

Fishing effort on virtually all the lakes has increased with increase in human population, improvement in fishing crafts to types that can move faster and venture the offshore, introduction of more efficient and in some cases destructive fishing gears and methods and expansion of markets with improvement in means of communication. The decline in the fish stocks on some of the lakes has been attributed to: excessive fishing effort; use of destructive fishing gears and methods; capture of immature fish; ineffective management and extension systems; inefficient packaging and dissemination of management information; outdated fisheries laws and regulations; inadequate capacity to enforce laws and regulations and limited commitment of stakeholders in management of fisheries resources and the fish habitats. The lake's fishing effort has increased from 200 nets during early 1980s to about 400 to 700 nets per/day in 1990s (LFDP 1993).

Currently, more than 1000 nets are set per day mainly to exploit the tilapia stock (Kassahun Mereke, 2015). Destructive fishing gears including gillnets of mesh sizes which can catch immature fish were encountered during a field survey of the lake recently (January, 2015). Although there have been efforts to eliminate the destructive fishing gears and methods, the number of fishing canoes on the lake has continued to increase and policies still emphasize increased fish production. Since the fisheries are still open access and informal fishermen cooperatives are also vastly engaged in fishing activity at Lake Hawassa, restrictive measures, such as licensing to sustain the fishery in the lake needs to be taken. The excessive fishing effort and fishing malpractices as a result of unemployment and poverty has to be addressed not only due to population pressure but also based on alternative livelihood strategies away from fishing.

Competing Claims and Conflict over Fishing Sites in Lake Hawassa

Access to (or claims over) natural resources in view of their livelihood or economic values may be framed in the context of local norms based on culture and identity of a certain community or formal rules instituted by the state. Claims, unequal access to resource, competition and conflict over such resources may also express power differences among stakeholders, such as local communities, government and outside actors (USIP 2007).

However, it is now clearly accepted some of these formal rules may end up creating open access scenario to a resource. In this regard, absence of effective governing rules on fish resources constitute an issue which cannot be ignored. The FAO (1992) Report *The State of Food and Agriculture* acknowledged that:

> *Economic waste has reached major proportions; there has been a general increase in resource depletion, as fishing efforts have moved down the food chain; the lake's environment has become increasingly stressed; conflicts have become widespread; and competing interests makes the plight of the fishermen intensified.*

The current socio-legal and ecological status of Lake Hawassa indicate that some features of open access resource prevail. This shows potential challenge to sustainability of fish resource of the lake, which is already under pressure from increasing demand for fish and its economic and livelihood value. Competing claims and sometimes conflict over the right to access the lake's resource (mainly fish resource) are occurring among diverse actors in the context of prior access/ownership to resources on one hand, and government policies and laws on the other hand. Since competition and conflicts over fish resources are attributed to two issues: - (1) that more and more people (as individuals and in cooperatives) are depending on the activity and (2) that formal management and regulations are either inadequate or inconsistent. These are intensifying not only fishing activities in the Lake, but also creating competitions and conflicting interest over fishing rights in which some of these regulations are creating power differences among groups of fishers- by providing legal recognition and support for some and denying the same for others.

Case Study (5) with Daniel[41] more illustrates the issue with his lived experience as follows:

> *I grew up close to the shore of the lake practicing fishery. I eventually have become a hired fisher in the cooperative. Now, I am one of the 35 members of this cooperative and I am currently operating 16 gill nets and one boat for my daily fishery practice. But, my life path in the past seven years to have those properties and pay a share of more than 5,000 birr to join the cooperative was so challenging that I dropped out of school at grade eight. Currently, my daily income can support my household in addition to creating employment opportunity for the other 2-4 daily laborers. However, the senior Amora Gedel cooperative members intimidate us to leave the lake using their prior access in the lake saying, 'we are the only legitimate cooperative in this lake'. Nowadays, such disputes over the lake's resource are becoming our daily experience. Yet, since I sacrificed a lot to be here, by discontinuing my education, got injured with conflicts and loose other livelihood opportunities while totally immersing in fishery, I didn't fear of any conflict, because my household livelihood is depending on it, because I don't want to be a robber like my former friends who left this practice.*

[41] Member of Dagim Fishery Cooperative at Fiker Hayik, 20 May 2017, Hawassa.

The above interview expert shows the importance of fishing as a source of livelihood and the ups and downs that young individuals go through while establishing themselves as fishers. It also shows that claims of fish resource based on prior access to the lake's fishery resource using formal 'legitimacy' are becoming source of disputes between those who organized themselves earlier and those who have come to the fishing business recently. Such claims based on formal status or ho got formal recognition earlier, is challenged by other young fishers working individually or organized into cooperatives only recently.

Many of the young members of the lakeside community are closely related with lake and engage in fishing activity both as livelihood and recreational/cultural practices since their childhood. They often eventually move from fishing for consumption to a commercial one by devoting their energy, time and resource. They may end up totally relying on the practice as a major livelihood strategy with the common understanding in utilizing of the lake's resource as a commonly accessed open resource of the local community. Their claim to access is thus based on not only "legal status", but also their longstanding prior relationship with the lake and its resources. That is why claims of some cooperatives for exclusionary fishing rights based on "legal" seniority (referring to the time they were organized as cooperative) don't make sense for these youth. It is in this context that disputes and conflicts are occurring over fishing rights in the lake.

Competing claims and dispute over fishing rights is also apparent between formally organized cooperatives. In this regard, the issue of power difference is clearly observed between *Fiker Hayik* and *Amora Gedel* fishers' cooperatives due to different politico-legal responses of the local administration and resulting from internal struggle among fishers in each cooperative due to differences of the socio-economic status, (such as internal management), seniority or experience, ownership of economic resource/fishing equipments or ethnic identity. For instance, Dagim fishery cooperative (operates at Fiker Hayik) was founded by the key initiative of one influential person, Solomon[42], who said that: "I was a founding member of Amora Gedel fishery cooperative, until I left the organization being disappointed by power struggle of ethno-political nature. As a result, I formed new cooperative in Fiker Hayik landing site being with other four youths."

Each fishery cooperative at Lake Hawassa is dominated by individuals who come from one ethnic group (and even a clan), which creates strong social network among members on one hand, and potential grounds for conflict with non-members or cooperatives organized by members of other groups on the other hand.

[42] Interview held on 12 May 2017, Amora Gedel, Hawassa.

This situation creates power difference between cooperatives who membership constituted different ethnic identities on one hand, and between members of a given cooperative when members may claim different status along a certain layer of identity. It is important to note that differences in identities may also create difference in access to formal local administration and securing decisions that affect access to fish resource. Therefore, identity related claims, beyond the diverse economic interests in a right to have more access to fish resource, have become source of broader conflict in the area. Conflicts are also expressed in or exacerbated by trying to define some boundary for fishing by 'drawing' imaginary lines and by stealing fishing nets of the competing groups when such imaginary boundaries are crossed.

4.4. Imaginary Lines and Net Thefts: an Expression of Conflict

Local communities living around the lakeshore sharing across zonal water resource usually have their own changing imaginary lines (boundary) beyond the geographic delimitation and historical role depending on the dynamics of the water resource availability and their livelihood pattern in the practice. Lake Hawassa also comprises different socio-economic communities with diverse interests, roles, access and level of operation all around the lake. Even though the lake crosses different ethno-political zones, there are no clearly demarcated official fishing boundaries between each of the diverse communities. Instead, different fishing communities are asserting their right to access of fish resource in accordance with the imaginary boundaries claimed vis-à-vis their neighboring fishing communities. Such imaginary lines are not fixed or clearly negotiable ones; rather they are fluid in line with seasonal changes, and state of fish production and situation of fish market at a particular time.

In the case of cooperatives operating at the two major land sites (Amora Gedel and Fiker Hayik), each cooperative is operating fishing with the awareness of informal line to protect their net from being stolen and prevent conflicts. The boundaries generally correspond to the location and relative proximity to their respective fish markets (land sites). For instance, *Amora Gedel* cooperative operates in southern section of the Lake up to the edge of Hawassa Referral Hospital. The other cooperative (*Dagim* fishery cooperative), at *Fiker Hayik* landing site has its own major fishing area towards the northern section of the lake, beginning from its location at the end of the road the runs through Piassa (center of Hawassa town) ending at the lake side, and extending to Hawassa millennium park but short of reaching *Tikur Wuha* landing site. The lines set in this way are usually respected by the neighboring cooperatives to keep going their fishing peacefully.

Net thefts may occur when members of one group cross to the fishing zone claimed by others. This could trigger serious conflicts between and even among cooperatives, especially in recent years. Daniel[43] explains his experience in this regard;

> *I have seven years of experience in fishing. I lost over 15 nets because of net theft so far. As we set our nets throughout night, when we get tired and fall asleep usually after the mid-night, other fishers steal our gill nets. But, when we noticed them stealing our nets fighting begins on the spot. We even use our standby guns and unfortunately serious injuries and deaths may happen. I got injured seriously twice in such conflicts. We have lost over 4 members of our cooperative, beyond the material loss, due to this conflict. The imaginary lines are not mostly applicable due to production variability in different sites in the Lake. Therefore, conflict now has become our major threat to be able to remain engaging in the fishing activities.*

The above is an indication of the level of competition over access to major fishing sites in the Lake and emerging consequences of such competition. The consequences have both economic (livelihood) and safety dimensions. On the one hand, serious bodily injuries and loss of human life are reported. On the other hand, loss of net due to net theft seems to have staggering economic or livelihood consequences. According to informants, the current market value for a piece of gill net ranges between 1500 and 2000 ETB, depending on the quality and seasons. Such amount of money cannot be easily raised by fishermen to replace their lost nets.

Therefore, repeated net thefts may causes for some fisher to out of the business thereby seriously affecting their livelihood. Yet, such relatively high market value of gill net is also tempting some individuals who could not engage in fishing because of lack gill net (do not afford to buy it) to engage in net theft disguising defending the imaginary boundary crossed by their opponents. Such individuals attempt to secure their own livelihood at the expense of others who lost their source of livelihood.

However, such informal boundary is not always respected by members of each cooperative. They may transcend to the other's relatively accessible fishing area, especially at the lean production seasons, thereby net thefts and conflict happened among cooperatives. Net theft and conflict, according to informants from the *Amora Gedel,* could create a cycle of revenge. For instance, if one group's gill net is stolen today leading to confrontation and injury, members of the victim group would respond in kind and even attempt to cause more harm upon the opponent. These informants pointed to an incident where three members of their cooperative lost their life and many injured in the past two years, the time where net theft and conflict reaches to climax.

[43] Member of Dagim Fishery Cooperative at Fiker Hayik, 17 May 2017, Hawassa.

On the other hand, the highest overfishing and fish resource depletion thereby happened due to the newly emerging informal cooperatives was utilizing the resource using their maximum effort and by repeatedly stealing nets from the seniors to strengthen their fishing capacity and become competitive. With these repeated occurrences, every cooperative began to watch their specified fishing areas carefully with respective imaginary lines so as to rescue their landing share, their life and equipments from their opponents. Currently, net thefts is becomes usual with different degree of disputes between cooperatives as a result of the increasing number of fishermen all around the lake and the decreasing share of the previous access to the resource. The seriousness and context of conflict over competing claims of fishing sites as presented by fishers above were also confirmed by experts working in the area. Accordingly, Elias[44] elaborates this issue as follows:

> *Informally setting imaginary lines of specific fishing areas by the cooperatives has become an issue in recent years. In the past, they were fishing freely across the lake. But recently claims over specific sites or portions of the lake are becoming a serious issue. This is happening due to the increasing number of fishermen while the fish resource is decreasing. Disputes between Amora Gedel fishery cooperative that claims more access to fish resource in line with their legally recognized legitimacy and seniority on one hand, the recently organized ones, including Fiker Hayik (Dagim cooperative) who insists on resource sharing as means of employment and livelihood can be explained in this context. These contradictory claims among members of competing cooperatives are triggering net thefts and conflicts, especially when members of one cooperative fishes across sites claimed by members of another cooperative.*

The presence of boundaries and their fluid nature seem to be challenging the livelihood and safety of the people whose life is tied to the fisheries. As these boundaries and access to potential fish production areas is also related with settlement patterns along the lakeshore, and sometimes on the seniority among different cooperatives, some groups may better benefit at the expense of others. This calls for rules that could create fair access to resources among different groups of people and also to prevent physical injuries and lose of life. This competition between different groups of fishers may also have negative consequence to the fish resources in view of possible overfishing.

4.5. Changing Rules of Access and Level of Fishing Operation

Fisheries production and marketing are differently determined by changing rules of access and operation with a number of factors including bio-physical (environmental), technological, socio-cultural and economic ones. (FAO 1997). Lake Hawassa is currently accessed and controlled by different parties with the contextual interpretations of the resource utilization.

[44] Expert of Hawassa City Environmental Conservation Office, Interview held on 19 May 2017, Hawassa.

As the lake is bounded by the South Nation, Nationalities and People Region (SNNPR) and Oromia National Regional State (ONRS), and different sections of the lake lie in different local *kebeles*, there are increasingly changing interests in the lake's resources utilization and mandate both from the local communities and government agencies. Such interest is advanced; for instance, through the establishment of cooperatives in order to legally exploit fish resources in the lake.

The Proclamation no. 111/2007, which provides guidelines for the establishment of cooperative societies in the SNNPR does not allow and give license for more than one primarily registered cooperative to operate similar activities in one specified area of the water body. However, with the prime ethno-political and livelihood interests of different stakeholders at hand, fishery at Lake Hawassa is being practicing with diverse interpretations of the legal documents in the context of each landing site. This situation seems to create challenges to the sustainability of lake's resources.

Nowadays there are five cooperatives are operating fishing all around the lake formally and informally with different equipments, methods and level of operation over the carrying capacity of the lake following the respective administrative body's contextual consent to engage them in the lake's fishery practice. For instance, the Cooperatives' Agency Proclamation (2007) puts that only one formally organized cooperative will have an access to the specific water body resource for the limited period (five years) full right to operate on the resource keeping the specified carrying capacity of the lake.

Even though they are expected to leave the sector for the new comers/claimants after five years stay, it is not properly implemented at Lake Hawassa fishery cooperatives due to claiming the socio-economic reasons, such as livelihood vulnerability and prevention of informal fishers. In line with this, different lakeside community groups are claiming to access the resource with such socioeconomic reasons having the will of their localities' Micro and Small Enterprise based on the socio-legal assumption of reducing unemployment, livelihood vulnerability and informal actions on the lake.

In this regard, the *Amora Gedel* fishery cooperatives were organized by the Hawassa City Cooperatives Agency with specified members and fishing equipments considering the lake's carrying capacity and sustainability of the resource keeping both of the socioeconomic and ecological-legal aspects. Whereas, the Fiker Hayik and other fisher cooperatives are organized by the Micro and Small enterprises and operated/managed by their own contextually changing rules of access and level of fishing operations.

Therefore, such dynamics in rules of access and regulations on the level of operation are differently interpreted and practiced within the respective administrative bodies and local communities in considering the social-economic questions of the local communities, while it is now contradicting with the legal-ecological aspect in making the lake unmanageable and over-exploited due to the unspecified flow of local communities to the area for the sake of livelihood. Abera[45] illustrated the case as follows:

> *Currently more than 200 individuals are asking us to join the cooperative by fulfilling the standards of 4,500 birr share payment and legitimate fishing equipments. They want to join the cooperative due to their socioeconomic problems and claims of resource. If we accept them, the present members' benefit from the share can decline thereby creating socioeconomic crisis. On the other hand, when such new members join, the fishing activity becomes above the lake's carrying capacity (acceptable amount with lake's resource) of 750 nets per day and which is already reached by the currently working 270 members.*

Amid these challenging circumstances, the cooperatives are now considering to accept 200 new members after making some adjustment to the existing rules. These include the reduction of the present 2-3 nets/ person share to 1-2 net/ person for the new members. The decision to admit such new members was explained by the cooperatives from the point of view of discharging the social responsibility of the organizations. Other more practical reasons include, these newly accepted individuals have been engaging in individual-based informal fishing anyway; that some of them were using banned types of fishing practices that could have negative outcome to the sustainability of fish resources and the activity of the cooperatives, and that some of these applicants had engaged in sabotaging the fishing activity of the cooperatives by stealing their nets and sometimes engaging in disputes with the cooperatives. Seen from these points, the decision to accept new applicants to the cooperative seem emanate from practical issues of profitability and sustainability of cooperative's fishing than the issue of "social responsibility" as such. But it is also clear that these measures may put more pressure on the lake and threaten the sustainability of fishers there.

Despite this and other similar attempts by the cooperatives to accommodate the interest of some individuals in the fishing activity; dispute (conflict of interests) between the livelihood needs of members of the local communities who often see access to the lake and resources in it as a matter of right on one hand, and the official rules and regulations designed to manage the lake resources and trying to prevent/ reduce pressure that could be exerted by uncontrolled fishing appears to prevail.

[45] Chairman of Amora Gedel site, 29 April 2017, Hawassa.

In this context, whenever rules and regulations applied at the expense of the livelihood interest of members of the local community – by giving right only to those organized cooperative, this has been leading to compete with the formally organized cooperatives thereby it has not managed solving competition and conflict over access to resources among claimant groups.

According to field data, in *Amora Gedel* site, there are specified number of gill nets per boat which are the property of five members of the cooperative as one boat is organized in 1 to 5 working team. While, at the *Fiker Hayik* land site, a single fisher might have unspecified number of gill net within a single boat depending on his capacity. The type of nets and their mesh size is also differs from one cooperative to another (some use officially permitted net type, while others use both formally permitted and banned types of net).

In this regard, their income varies between 250 and 500 birr, catching 67 and 89 fish per day in the month of April respectively. The Catch Per Unit Effort (CPUE) and daily income (Table 11) differs in such study areas due to the difference in access to resource and level of operation. The total net income from one boat in *Amora Gedel* site is divided among the five working team members based on rules and regulations, but it goes to a single member at Fiker Hayik cooperative.

Table 11: Sample members' daily access and resource sharing difference in both landings at April.

Landing Sites	Gill Nets/Boat	Mesh Size	CPUE	Ownership	Daily Income
Amora Gedel	13-15	7-8cm	67	5 persons	250/person
Fiker Hayik	15-25	6-7cm	89	1 Individual	300-500

Source: Field Survey result (April 2017).

Rules of organization/operation between such two major landing sites cooperatives that in Amora Gedel cooperative, one boat and 13-15 gill nets within it is managed by the one-to-five working team of the cooperative members, and then the daily production and income is also divided with those five individuals. Whereas, in the case of Fiker Hayik cooperative, one boat and 15-25 gill net as well as its daily income is owned by a single cooperative member. In this case, changing rules of access and operational organization for the resource between those two landing sites is affecting them differently in paving the way for different level of fishing operations.

4.6. Formal Vs Informal Cooperatives: Socio-Legal Dichotomy

Fishery cooperatives are organized with the expecting developmental, ecological and political roles within the local and national level. Their role in developmental and political activities of the localities is crucial in reducing the livelihood and developmental gap between the rural and urban areas in organizing the communications within such economy and fair distribution of resources based on the socio-cultural and political patterns (Samian et al. 2015).

Fiker Hayik and *Amora Gedel* landings are located in two different *kebeles* and dominant communities, Wolayita and Sidama respectively. As both study areas are administered by different *kebeles* with the dominance of such ethnicities in each *kebeles*, at *Amora Gedel* site, two new cooperatives are claiming to be organized having the will of Sidama Zone administration with the reason of livelihood vulnerability and rights of claiming for the resource sharing. Similarly, at *Fiker Hayik* site, more than 3 cooperative are also asking the kebele's Micro and Small Enterprise. As the fishery proclamation, issuing license for the nature-based work is the mandate of cooperative agency. While, as the 'Dagim' fishery cooperative was organized through the will of Micro and Small Enterprise with the reason of employment creation and decreasing of youth's dependency rate, the newly claiming cooperatives are also going through this line in clashing with their senior cooperative in visible power differences.

On the other hand, the *Amora Gedel* fishery cooperative is the earliest formally organized cooperative through the cooperative agency in accordance with the studied carrying capacity of the lake's fishing. Currently, they are operating fishery with maximum carrying capacity of the lake's fishing, i.e., 750 nets/day, it is recognized by all concerned bodies. Thus, the increasing claims of resource ownership rights from all around the catchment areas makes their sole resource ownership becomes out of the reality. Nowadays, more than five fishery cooperatives are practicing fishery in all directions of the lake's catchment other than the *Amora Gedel* one.

As the structured interview with the concerned officeholders, all of those cooperatives including the Dagim's are organized by the micro and small enterprise and the kebele's trade and industry without the recognition of the concerned city's cooperative agency. Therefore, now they are operating fishery with their methods, purpose and equipments without critically considering the lake's ecosystem, due to there is no control and organized follow up in their daily practice other than the *Amora Gedel* site. Alemu[46] explains the formal/informal dichotomy as follows:

[46] Expert of Hawassa City Administration cooperative agency, 19 May 2017, Hawassa.

As the Amora Gedel fishery cooperative were legitimately organized with our mandate, other cooperatives are also organized by other local bodies (we call them 'informal'). Such informally organized cooperatives without our recognition are becomes a means of conflict with the Amora Gedel ones in resource ownership issues and daily economic interests. Therefore, we facilitate to come them to common discussion with each locality's concerned officials with common perception of 'saving the lake's resource from destruction and transfer to the next generation' to make lake's fishery compatible with its carrying capacity and sustainable across generation. Yet, as most of such informants from both study areas, this is not becomes real unless there is no diverse alternative livelihood means in the surrounding with regularly aware those local communities to reduce the increasing flow of people to the area. The formal and the informal cooperatives are differently affected in livelihood and legal realms of the lake's resource.

As most of regulatory bodies are usually focuses on the *Amora Gedel* cooperatives, their livelihood is not comparable with the other cooperatives in the lake, because they operate with limited standard of net quantity, size and type, number of boats as well as other preconditions, while others not. Dagim fishery cooperative at *Fiker Hayik*, as the informal cooperative, is operating fishery with informal standards of fishers-lake interaction. Therefore, the livelihood and developmental value of fishery is increasing for the *Fiker Hayik* cooperative, but it is decreasing for the *Amora Gedel* ones due to such inconsistent management and follows up systems with the concerned regulatory bodies. Even though, the political administration of such diverse local communities is different, the *Amora Gedel* fishery cooperatives are more guaranteed than the others in the legal acceptability and political influence in fishery and common social development.

In this regard, the political dimension of lake's fishery mediates the two extreme perceptions in the livelihood and developmental role of lake's fishery, i.e. the income of water resource/fishery is the same as the illusiveness of the water and the income of the water varied with the quality and quantity of the water, literally 'የውሃ ብር ተመልሶ ውሃ ነው' and 'የውሃ ብር እንደ ውሃው አይነት ነው' respectively by putting its own legal influence on the diverse role of fishery beyond such two extreme perceptions. The legal aspect of lake's fishery always goes towards sustainability in conciliating extremes for the fair access to resource with regulation and awareness creation, formally operating cooperatives are in the reasonable benefits of the resource in the future grant.

As the FGD result with the *Amora Gedel* cooperative members, these different accesses to lake's resource will be managed both with the concerned officials' commitment and local community's awareness regards to the claims of resource ownership and access in the level of fishing operation. Meanwhile, some are practicing fishery for additional income, but most others for daily livelihood purpose of their household considering the legal issue. Therefore, as a mediatory perspective, most of such fishers are hoping the politico-legal's sound influence in the lake's sustainable fishery.

4.7. Inadequate Fishery Resource Management System

Lake Fishery monitoring is the continuous or periodic collection, organization and analyses of catch effort data and information for purposes of effective management of fisheries. Physical and socioeconomic data are required for proper management and optimum use of fishery resources. However, for Lake Hawassa, regular fishery monitoring is not generally carried out, or if so, the data are not available to users of such information. Impacts of the lake on the livelihoods of intended beneficiaries, like farmers, fishermen and domestic water consumers have not been evaluated at all for Lake Hawassa. On the other hand, the increasing informal livelihood dependence on the lake's resource becomes affecting the Lake Ecosystem as well as livelihood of local communities. Therefore, insufficient scientific knowledge and lack of awareness by fishers and consumers are major obstacles for improving policies and management, and changing the behavior of consumers and producers.

Inadequate statistics on catch effort data hamper fisheries activity and management, particularly in Lake Hawassa. Fishery management models establish allowable catch quotas based on stock biomass, size/age composition, mortalities caused by fishing and natural causes, and catch data. The status of a fishery is difficult to monitor and assess due to natural and fishing-induced fluctuations in fish populations, and the influence of pollution and climate change. Lake Hawassa lacks updated and adequate exploitation models and information on stock dynamics to make informed decisions.

During my field observation, I recognized that even when accurate data are available and analyzed, the information is often not conveyed to key stakeholders, such as fishers. As a result, fishers lack awareness on the impacts of their actions on fish stocks and their subsequent prosperity. Therefore, adequate and regular management systems have to be implemented considering the socio-economical compatibilities with the local communities' livelihood structure and ecologically conformable with the lake's ecosystem.

CHAPTER FIVE

CONCLUDING REMARKS

Lake Hawassa has been exploited by diverse actors for diverse livelihoods and developmental activities. Such activities may have varying consequences both to the Lake's ecosystem and long term livelihood interest of the people inhabiting the lake's catchments. The continuously increasing of such local communities' interaction with the lake is changing through changing livelihood related values and socio-legal dynamics.

The livelihood values of Lake Hawassa have, therefore, been becoming increasingly diverse in nature and extensive in scope as can be witnessed by observing activities unfolding on the lake and its shorelines. The study reveals that Lake Hawassa provides diverse services including scenery for tourism and associated diverse businesses, and water for irrigation and city beautification, all contributing for people's livelihood in one way or another. The two major fish landing sites, *Amora Gedel* and *Fiker Hayik,* which are the focus of the present study, serve not only as major market settings where fishing and related businesses constitute major livelihood activities but also as major attractions for local and international tourists.

This thesis focuses mainly on activities related to fishing as a major means of livelihood for several groups of people. Fishing, processing and marketing demands individuals with different skills and capacity and, such individuals often get access to the opportunities in the context of existing social networks in line with their common settlement, lineage, ethnic identity and long stand engagement of their seniors in fishing activities. Fishery thus serves as source of income, value chain and employment as well as social cohesion among people from similar background. Social-Ecological Systems (SES) Framework, utilized for this concept, argue that the four major variables (fig. 2) are the central agents in people-ecosystem interaction in which they interact with one another to safeguard and keep going their social system, because it is all about them, and its outcome has bilateral interaction with the related ecosystems other than the main actors. As such fishers have a dialectical relationship with the lake's resource, they strive to adapt the changing inputs comes from the ecosystem using their culturally patterned structures in response to the socio-environmental influences to survive together with their changing interaction with the lake's fishing. Therefore, the actors' (A) close social system is favoring them to practice fishing with common understanding with coping changing situations together as one community.

Lake's fish market is favoring for tourist attraction and local communities' social cohesion thereby continuities of their livelihood. Fasting periods are said to be the peak for fish marketing in attracting many customers and all this factors are contributing for their livelihood, such as food security and household wellbeing differently. However, various agents, including livelihood questions increasing number/rate of informal fishers/practice and seasonal variation are causing for the changing of methods, purpose and such value of lake's fish production and marketing; thereby many fishers decide to continue fishing coping the dynamics with different alternatives, and some others are diversifying their livelihood means other than fishing. Thus, the SES Framework perspectives were critically works as it is depends on the actor's knowledge and attitude towards available resource utilization as survival strategies either by stay or not and by modifying their livelihood mechanisms within such environmental dynamics to safeguard the patterns of their continuous interaction with the lake. However, it is not running totally with the individuals' rational choices, but also other external factors as the socio-ecological and politico-legal issues in putting their influence.

Currently, fishing is undertaken on Lake Hawassa in two main ways: are by being organized in (and operate as) cooperatives, on one hand, and operate individually on the other. Although individual-based fishers are seen as informal ('illegal) operators by the cooperatives and government officials, there also is difference among different cooperative groups based on the government office in charge of organizing and giving them permission to engage in fishing 'legally'. Consequently, those cooperatives that were established earlier and organized by the cooperative agency see those cooperatives recently established by the micro and small enterprise thereby it leads them to competition over access to the resource ownership and conflict. Such competitions by the increasing surrounding communities' participants (claimants) is also became a treat for the resource sustainability in accelerating over-fishing due to its open-access nature on the one hand and irregular management system on the other hand. Thus, it makes the lake's fish production and marketing dichotomized under those socio-legal contradictions.

As equipment, methods of fish production and human resources are different between cooperatives on one hand, and cooperatives and individual fishers on the other hand, their marketing system and the contribution of fishing to their livelihood also varied. In my finding, there are three fish marketing channels in the cooperative fishers: which is among the cooperative members and the cooperative (the members supply their daily products to the management committee of their cooperative with specific supply price); cooperative members and

hotels/restaurants; and cooperative members and local consumers. In the case of individual-based fishers, there is no regular market channel, because they sold their products for every buyer needs their product. In this regard, fishery's livelihood value for both fishers and their households may vary in accordance with access to fish resource and, fishing materials, and their level of awareness of and access to cope up external socio-legal dynamics affecting the lake's fishers. However, the livelihood values of lake's fishery still expanding as a source of value chain and employment through their social network.

Due to such and other cases, the livelihood differences among the individual-based fishers can be manifested through either the fishing ability/technique, equipments, the length of time spent on fishing activity per day depending on the season, knowing/fishing on the specifically potential fishing areas (usually it is a matter of experience) or the number of potential customers. While, in cooperatives, it is a matter of seasonal variations, the amount of nets on the boat, number of skilled man power, the proximity/probability of illegal actions, such as net thefts, conflicts and using informal fishing materials as well as administration issue with a common denomination of seasonal variations, fasting periods, socio-legal variations/consistency and skill of the fishers.

The study further depicts the socio-legal contradictory dichotomies, such as currently various claims on access to the resource and competing interests are emerging among different fishing groups and other stakeholders from the point of getting access to the livelihood and prior ownership which puts an influence on the fishers-lake interaction being with inadequate implementation of rule and regulation streaming from the ethno-political interests and awareness related problems of the management bodies.

The study area's livelihood aspect of fishers-lake interaction has come under the pressure of different claimants, i.e. surrounding communities' access to livelihood and ownership interests in the one hand, and the management bodies' ethno-political and legal implementation interests on the other hand. For instance, only one cooperative is legally registered by the cooperative agency to practice fishing on Lake Hawassa, but currently another five fishery cooperatives are running fishery all around the lake having the will of their localities. Therefore, different parties' livelihood and legal interests are conflicting each other thereby it is causing fish resource of the lake to be overfished and stakeholders interaction unhealthy. Due to such surrounding socio-legal parties' changing interests and other ecological reasons, the rate of informal fishing practices (e.g. using *Monofilament,* informal and harmful net type) became increased.

On the other hand, seasonal variability and decreasing of fish resource are basically causing for net thefts and conflict between cooperatives to compete and win the production and market one over the other through better accessing and owning the resource as their means of livelihood and figure of ownership, thereby inter-human relation and fish resource sustainability became influenced.

The SES Framework used in this issue also deals about the clash of actors and governance interests either in utilizing the resource or run the livelihood under it, because there are inequalities and/or unequal access and ownership to the resource. The socio-legal issues contradictions among different stakeholders on fishery of Lake Hawassa are also go in line with the central points of this framework in encompassing the issue of fishers-lake interaction (as social world-natural world relationship) is under the influence of internal (dynamics of fishing practices) and external (changing legal implementations) factors to keep the needs of interesting parties.

Therefore, implementing community-based fishers-lake interaction considering the respective stakeholders' livelihood and legal interests may reduce such contemporary challenges of lake's fishery, including livelihood vulnerability and diverse people's increasing dependence on lake's resource, fish production and market system, overfishing and lakeshore degradation due to open-access and competing claims, net theft and conflict as well as inadequate management system. It becomes properly implemented for good if each of such concerned bodies takes their homework respectively with common perceptions of co-management for the social development of the whole community-lake interactions.

Generally, the livelihood aspects of fishers-lake interaction at Lake Hawassa is going with varying consequences depending on the changing socio-economic interests of the participants, seasonality of fishing and contextual interpretations of socio-legal issues with the dynamics of related variables. Currently, the lake's fishing is serving the participants with diverse livelihood aspects differently based on their access to the resource and surviving mechanisms of changing socio-legal contexts. Open-access nature of the lake is attracting diverse people to the area and as their interaction is bilateral with lake's resource and among themselves, it is resulting with positive and negative outcomes. For instance, the so called 'formal' and 'informal' cooperatives are accessing the resource differently due to the irregularity in rules of resource access and level of operation among the respective management bodies, thereby the share of access to such resource is different. Thus, the increasing interaction is affecting human relations with emerging competing views and conflict on the one hand and fish resource sustainability with formal/informal practices on the other hand.

References

Abera, J. M.
2015 Assessment of Climate Change Impacts on Drought Conditions of Lake Hawassa Watershed, Ethiopia. MSc, Hawassa University.

Allan, J. D, Abell, R, Hogan, Z, Revenga, C, Taylor, B. W., Welcomme, R. L., and Winemiller,K.
2005 Overfishing of Inland Waters. BioScience 55: 1041–1051.

Allison, E. H.
2001 Big laws, Small Catches: Global Ocean Governance and the Fisheries Crisis. Journal of International Development, 13(7), 933-950.

Allison, E.H. & Badjeck, M-C.
2004 Fisheries Co-Management in Inland Waters: a Review of International Experience. Sustainable Fisheries Livelihoods Programme (SFLP) report.

Allison, E. & Horemans, B.
2006b Putting the Principles of the Sustainable Livelihoods Approach into Fisheries Development and Practice. Marine Policy, 30(2006): 757-766.

Ashley, C., & Carney, D.
1999 Sustainable Livelihoods: Lessons from Early Experience. London: Department for International Development.

Assefa Mitike Janko
2014 Fish Production, Consumption and Management in Ethiopia. Research Journal of Agriculture and Environmental Management. Vol. 3(9): Apex Journal International.

Ayers, W., Busia, A., Dinar, A., Hirji, R., Lintner, S., McCalla, A., and Robelus, R.,
1996 Integrated Lake and Reservoir Management: World Bank Approach and Experience. World Bank Technical Paper No.358. Washington, DC: World Bank.

Basurto, X, Gelcich, S and Ostrom, E
2013 The Social-Ecological System Framework as Knowledge Classificatory System for Benthic Small-Scale Fisheries. *Global Environmental Change* 23(6): 1366–1380.

Behailu Birhanu, Bekele Lemma, Yosef T/Giorgis, Kefyalew Sahle, and Wondwossen Sintayehu.
2010 Environmental Impact Assessment and Policy on Lake Hawassa, SNNPRS. SOS-Sahel, Ethiopia.

Béné, C., & Friend, R. M.
2011 Poverty in Small-Scale Fisheries: Old Issue, New Analysis. Progress in Development Studies, 11(2), 119-144.

Bernard, H. Russell
2006 Research Methods in Anthropology: Qualitative and Quantitative Approaches. 4th Edition. New York: Altamira Press.

Binder, C, Hinkel, J, Bots, P and Pahl-Wostl, C
2013 Comparison of Frameworks for Analysing Social-Ecological Systems. *Ecology and Society* 18(4): 26.

BNP
2008 Big Numbers Project. Small-Scale Capture Fisheries: A Global Overview with Emphasis on Developing Countries. Food and Agriculture Organization and World Fish Centre.

Botsford, L.W., J.C. Castilla and C.H. Peterson.
1997 "The Management of Fisheries and Marine Ecosystems". Science, 277: 509-515.

Chambers, R., Conway, G.R.,
1992 Sustainable Rural Livelihoods: Practical Concepts for the 21st Century. In: IDS Discussion Paper No. 296. Institute of Development Studies, Brighton.

Chapman, D. (ed.)
1996 "Water Quality Assessments: A Guide to the Use of Biota, Sediments and Water." Environmental Monitoring. 2nd Ed. UNESCO, WHO, and UNEP. E & FN Spon, London UK.

Chowdhury, M. S. N., Hossain, M. S., Das, N. G., & Barua, P.
2011 Small-Scale Fishermen along the Naaf River, Bangladesh in crisis: a Framework for Management Mesopot. J. Mar. Sci., 26(2), 146 – 169.

Conroy, C. and Litvinoff, M. (Eds.),
1988 The Greening of Aid: Sustainable Livelihoods in Practice. Earthscan, London.

Creswell, W.J.
2009 Research Design: Qualitative, Quantitative and Mixed Methods Approaches. 3rd Edition. London: Sage Publication.

Daniel Fitamo, Lalisa Gemechu, Meskelu Tumiso and Yohannes Yona
2015 Assessment of the Current Management System of Lake Hawassa Watershed in Terms of Major Socio-Economic Activities, Fishery and Macrophyte Diversity, Hawassa, SNNPRS, Ethiopia.

Davis, J.R. and Hirji, R., eds.
2003 Lake Management. Water Resources and Environment Technical Note G2. Washington, DC: World Bank.

Dawson, Catherine
2007 a Practical Guide to Research Methods: a User-Friendly Manual for Mastering Research Techniques and Projects. Third Edition. Spring Hill House, How to Books Ltd: Begbroke, Oxford.

Demeke Admassu
1994 Maturity, fecundity, brood size and sex ratio of Tilapia (Oreochromis niloticus L.) in Lake Hawassa. SINET: Ethiop. J. Sci. 17:(1) 53-69.

1996 The Breeding Season of Tilapia, Oreochromis niloticus L. In Lake Hawassa (Ethiopian Rift Valley). Hydrobilogia 337:77-83.

Dereje, T.K.
2014 Spatial and Temporal Distributions and Some Biological Aspects of Commercially Important Fish Species of Lake Tana, Ethiopia: J. Coastal Life Med.

Dessie, G. & Christiansson, C.

2008 Forest Decline and Its Causes in the South-Central Rift Valley of Ethiopia: Human Impact over One Hundred Year Perspective. Ambio 37, 263-271.

Drevnick, P. E., Engstrom, D. R., Driscoll, C. T., Edward B. Swain, Balogh, S. J., Kamman, N.C., Long, D.T., Muir, D.G. C., Parsons, M. J. Rolfhus, K. R. & Rossmann, R.
2012 Spatial and Temporal Patterns of Mercury Accumulation in Lacustrine Sediments Across the Laurentian Great Lakes Region. Environmental Pollution 161, 252-260.

EFASA (Ethiopian Fisheries and Aquatic Sciences Association)
2010 Management of Shallow Water Bodies for Improved Productivity and Peoples' Livelihoods in Ethiopia. Paper Presented at the Proceeding of the Second National Conference of the Bahir Dar, Ethiopia.

Elias Dadebo
2000 Reproductive Biology and Feeding Habits of Catfish *Clarias Gariepinus* Burchell (Pisces:Clariidae) in Lake Hawassa, Ethiopia. SINET: Ethiop. J. Sci 23:231-246.

Ellender, B.R., Weyl, O.L.F., and Winker, H.
2009 Who Uses the Fishery Resources in South Africa's Largest Impoundment? Characterizing Subsistence and Recreational Fishing Sectors on Lake Gariep. Water SA 35.

Ellis, F
1999 Rural Livelihood Diversity in Developing Countries: Evidence and Policy Implications. London: ODI Natural Resource Perspectives no. 40.

Entwisle, B.
2007 Putting People into Place. Demography 44, 687–703.

European Commission Water Framework Directive (EC)
2000 Framework for Community Action in the Field of Water Policy.

FAO
1992 Code of Conduct for Responsible Fisheries. Food and Agriculture.

2006 Trends in Poverty and Livelihoods in Coastal Fishing Communities of Orissa State, India. Fisheries Technical Paper. Kakinada; Andhra Pradesh, India.

2008 The State of World Fisheries and Aquaculture. Pp 176.

Federal Negarit Gazeta
2003 Proclamation No. 315/2003. Fishery Development and Utilization Proclamation. 9th Year No.32. Federal Democratic Republic of Ethiopia. Addis Ababa.

Finn, M., M. Elliot White, M. Walton
2000 Tourism and Leisure Research Methods. Essex: Pearson Education Limited.

Forum for Environment (FfE)
2007 Harnessing the Water Resources of Ethiopia for Sustainable Development in the New Ethiopian Millennium, Addis Ababa.

Freshwater Society
2004 Guide to Lake Protection and Management. Minnesota Pollution Control Agency. 2500 Shadywood RD. Excelsior, MN 55331.

Gashaw T. and Wolff, M.
2014 The State of Inland Fisheries in Ethiopia: a Synopsis with Updated Estimates of Potential Yield. Ecohydrology & Hydrobiology 14: 200-219.

Getachew Meca, Alemayehu Bekele, Hagernesh Sankura and Hunachew Beyene
2015 Assessment on Pollutants on Ground and Surface Water, Fish, Sediment, Macrophytes and Industrial Effluents in Lake Hawassa Catchment, Ethiopia. RiPPLE: Hawassa, SNNPR, Ethiopia.

Guba, E.G. and Lincoln, Y.S.
1981 Effective Evaluation. San Francisco, CA: Jossey-Bass.

Hanna, S.
1995 Efficiencies of User Participation in Natural Resource Management. In Property Rights and the Environment - Social and Ecological Issues. Beijer International Institute of Ecological Economics and the World Bank. Washington DC.

HCA (Hawassa City Administration): Culture, Tourism and Communication Affairs Department
2008 Tourism Potential of Hawassa City. Bulletin for Urban Forum. Hawassa: Ethiopia.

Hawassa City Administration Finance and Economic Development Department
2008 the Socioeconomic Profile of Hawassa City Administration. Annual Bulletin. Hawassa: Ethiopia.

Hawassa University
2010 Proceedings of the National Symposium on Lake Hawassa. 2-3 September. The Research and Dvelopment Directorate, HU. Hawassa: Ethiopia.

Hollup, O.,
2000 Structural and Socio-Cultural Constraints for User Group Participation in Fisheries Management in Mauritius. Mar. Policy 24, 407–421.

Ifejika Speranza C, Wiesmann U, Rist S.
2014 An Indicator Framework for Assessing Livelihood Resilience in the Context of Social-Ecological Dynamics. Global Environmental Change. doi: 10.1016/j.gloenvcha.2014.06.005.

IUCN
2004 Freshwater Biodiversity Assessment Program. Centre for Mediterranean Cooperation.

ILEC
1999-2017 World Lake Database: International Lake Environment Committee Foundation.

Jacobus Vijverberg, E. D., Abebe Getahun and Leopold A.J. Nagelkerke
2011 The Composition of Fish Communities of Nine Ethiopian Lakes along a North-South Gradient: Threats and Possible Solutions. Animal Biology.

Janssen, M and Anderies, J
2013 A Multi-Method Approach to Study Robustness of Social-Ecological Systems: The Case of Small-Scale Irrigation Systems. *Journal of Institutional Economics* 9: 427–447.

Jentoft, S.
1989 Fisheries Co-management: Delegating Government Responsibility to Fishermen's Organizations. Marine Policy, Pp. 137 - 154.

Kassahun Mereke
2015 Prediction of Yield and Optimum Fishing Effort for the Tilapia (Oreochromis niloticus, Linnaaeus, 1758) Stock of Lake Hawassa, Ethiopia. 2(3): 56-59.

Kébé, Moustapha and Muir, James
2008 The Sustainable Livelihoods Approach: New Directions in West and Central African Small Scale Fisheries. FAO Fisheries and Aquaculture Technical Paper.

Kühlmann, K. J.
2002 Evaluations of Marine Reserves as Basis to Develop Alternative Livelihoods in Coastal Areas of the Philippines. Aquaculture International 10: 527–549.

Hawassa City Administration Cooperatives Agency
2005 Lake Hawassa Fishery Cooperative Rules and Regulations. Hawassa City Cooperatives Agency. Hawassa: Ethiopia.

Lamiso Shura Bute
2015 Assessment and Simulation of Sediment Transport Process in Tikurwuha Sub-Catchment of Lake Hawassa. Hawassa University. Institute of Technology.

Lewis, W. M., JR.
1987 Tropical Limnology. Annual Review of Ecological Systems 18: 159–184.

LFDP
1996 Lake Management Plans. Lake Fisheries Development Project, Working Paper No. 23. Ministry of Agriculture, Addis Ababa, Ethiopia. 31 pp.

1997 Lake Fisheries Management Plans. Lake Fisheries Development Project, Phase II pp. 23). Addis Ababa, Ethiopia: Ministry of Agriculture (MOA).

McCay, B. J., and Acheson, J. M. (eds.)
1987 The Question o f the Commons. The Culture and Ecology of Communal Resources. University of Arizona Press, Tucson.

McGinnis, M. D and Ostrom, E
2014 Social-Ecological System Framework: Initial Changes and Continuing Challenges. *Ecology and Society* 19(2): 30.

McManus, J. W.
1997 Tropical Marine Fisheries and the Future of Coral Reefs: A Brief Review with Emphasis on Southeast Asia. Coral Reefs 16: S121–S127.

Mars
1998 Fisheries Development in Ethiopia-Which Way Now?. Bulletin Vol. 11, No. 1. Lake Fisheries Development Project. Addis Ababa: Ethiopia.

Marten, Gerald D.
2003 Human Ecology – Basic Concepts for Sustainable Development. USA/Canada: Earthscan Publications

Miles, M.B. and Huberman, A.M.
1994 Qualitative Data Analysis. 2nd Edition. Newbury Park, CA: Sage.

Millennium Ecosystem Assessment (Board)
2005 Ecosystems and Human Well-Being: Wetlands and Water; Synthesis. World Resources Institute: Washington, DC.

Mills, D.J., Westlund, L., DeGraaf, G., Kura, Y., Willmann, R. & Kelleher, K.
2011 Underreported and Undervalued: Small-scale Fisheries in the Developing World. In R. Pomeroy and N. Andrew, eds. Small Scale Fisheries Management: Frameworks and Approaches for the Developing World, pp. 1–15. Wallingford, UK, CABI.

Mocrman, M.
1968 Agricultural Change and Peasant Choice in a Thai Village. Berkeley: University of California Press.

National Research Council
1986 Proceedings of the Conference on Common Property Resource Management. National Academy Press: Washington, D.C.

NRC (National Research Council)
1992 Committee on Restoration of Aquatic Ecosystems: Science, Technology and Public Policy, Restoration of Aquatic Ecosystems. National Academy Press, Washington, D.C.

Ostrom, E.
1990 *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press.

2007 A Diagnostic Approach for Going beyond Panaceas. *Proceedings of the National Academy of Sciences of the United States of America* 104(39): 15181–15187.

2009 A General Framework for Analyzing Sustainability of Social-Ecological Systems. Science 325:419-422. http://dx.doi.org/10.1126/Science.1172133.31.

Panayotou, T.
1982 Management Concepts for Small-Scale Fisheries: Economic and Social Aspects. FAO Fishery Technical Paper 228, 53 p.

Pattnaik, D. B. S. R.
2014 Species Diversity of Lake Hawassa, Ethiopia. International Journal of scientific research.

Pearse, P. H.
1992 From Open Access to Private Property: Recent Innovations in Fishing Rights as Instruments of Fisheries Policy. Ocean Development & International Law, 23(1), 71-83.

Pomeroy, R. S., Katon, B. M., & Harkes, I.
2001 Conditions Affecting the Success of Fisheries Co-management: Lessons from Asia. *Marine Policy*, 25(3), 197-208.

Pomeroy, R., Thi Nguyen, K. A., & Thong, H. X.
2009 Small-Scale Marine Fisheries Policy in Vietnam. Marine Policy, 33(2), 419-428.

Samian, Masoud, Saadi, Heshmatollah Asadi, Masoud and Mirzaei, Khalil, Ansari, Elham, Ahmadihagh, Esmaeil, Soleymani, Ateieh
2015 The Role of Fishing Cooperatives on Social – Economic and Cultural Development of Rural Areas of Bord Khun city of Bushehr. Iran: King Saud University.

Sen, A.K.,
1981 Poverty and Famine: An Essay on Entitlement and Deprivation. Oxford University Press.

Simegn Serka
2014 Contribution of Effluents from Factories in the Distribution of Trace Metals and the Status of Physio-Chemical Characteristics to Lake Hawassa, SNNPRS, Ethiopia. Hawassa University. College of Natural and Computational Science.

Small, C., and Cohen, J. E.
1999 Studying Climatically Sensitive Large Lakes. J. Gr. Lakes Res. 21 (3).

SNNPR (Southern Nation, Nationalities and People Region)
1999 Proclamation to Provide for the Establishment of Cooperative Societies in the Southern Nation, Nationalities and People's Regional State. Proc. No. 111/2007. Hawassa; Ethiopia.

Tietze, U., ed.
1985 Artisanal Marine Fisher Folk of Orissa. Cuttack, Vidyapuri.

Tigist Tadesse
2009 Water Resource Utilization and its Related Effects: Lake Abiyata and the Surrounding. MSc Thesis. Department of Env'tal Science, Addis Ababa University.

United Nations Environment Programme (UNEP)
2006 Challenges to International Waters – Regional Assessments in a Global Perspective. Nairobi, Kenya. Retrieved February 2, 2010.

1994 The Pollution of Lakes and Reservoirs. UNEP Environment Library No 12. Nairobi: United Nations Development Program.

UN General Assembly
2012 Fisheries and the Right to Food. Note by the Secretary-General, 30 October 2012.

USIP (United States Institute of Peace)
2007 Natural Resources, Conflict, and Conflict Resolution. A Study Guide Series on Peace and Conflict. USA. Washington, DC.

WCED
1987 Our Common Future. World Commission on Environment and Development, Oxford.

Weimin, M., Silva, S. D., & Davy, B.
2010 Inland Fisheries Enhancement and Conservation in Asia: FAO Regional Office for Asia and the Pacific. Bangkok: Thailand. RAP Publication 2010/22, 189 pp.

Wyborn, C and Bixler, P
2013 Collaboration and Nested Environmental Governance: Scale Dependency, Scale Framing and Cross-Scale Interactions in Collaborative Conservation. Journal of Environmental Management 123: 58–67.

Yared Tigabu
2012 Post-Harvest Losses of Fish in Lake Hashengie. In: Proceedings of the Livestock Research Processes of the Ethiopian Institute of Agricultural Research.

Yemane Gebreegziabher
2004 Assessment of the Water Balance of Lake Hawassa Catchment, Ethiopia. MSc Thesis: International Institute for Geo-Information Science and Earth Observation Enschede, the Netherlands.

Yeneneh Atnafu
2014 Characterization of Groundwater-Lake Water Interaction in Lake Hawassa. Addis Ababa University. Institute of Technology.

Yin, R.K.
1989 Case Study Research: Design and Method. Newbury Park, CA: Sage.

Appendices 1: Data Collection Checklist

A. Observation Checklist

- The overall working environment of fishery at Lake Hawassa.
- The working condition and human relation regarding fishery at different landing sites.
- The fish handling, processing and marketing process at landing sites.
- The cooperation and role division among fishers with different status.
- The rate of fishers' interaction in fishing and marketing during fasting/ non-fasting seasons.

B. Semi-Structured Interview Questions for Fishers

Full profile of the informants (name, age, sex, occupation, educational, family, income statuses)

How the lake's resource or fishery values you/your family as a livelihood (either as a source of income, consumption or health protection)?

In what activities are you involved other than fishing for livelihood, depending on lake's resource? If so, how each are value you differently?

In which sections of fishing activity are you involved and what are your experiences?

Do you have your own specified fishing area and fishing materials as a livelihood means?

How do you perceive the livelihood value, fish variety with production and market of lake's fishing through time?

What fish species most commonly do you catch /easily available/, more needed in the market and who are dominant customers in your daily activities?

Are there changes in recent years in the method, purpose and value of Lake Fishery production/ market compared with the past periods in your experiences?

Which season/time is more convenient to collect more fish and how do you sell your products? Does fish price, demand and supply increasing or decreasing through time? If so, why?

Is there a change on lake's individual-based fishers in technology, value and goal of the fishery?

How do you perceive changes on the lake quality and quantity regarding to fish production and market with the socioeconomic and legal dynamics through time?

How do you survive the changing situations in production, market and rules of access and operation in competing with cooperatives?

How do you examine the recent livelihood value of individual-based/individual fishery comparing with the cooperatives in the changing times and landing sites for your survival in the future?

What prospects and challenges are you mostly encountering in recent years within this sector?

How does the local ecological setting, lake's situation and fish availability favors and challenges you recently in fishery business?

How the surrounding developmental projects and tourism favors/challenges fish production, price and market?

How does a seasonal variability and market dynamics challenge fish production and market?

How claims of resource ownership, competitions and conflicts expressed among the cooperative fishers either regarding landing sites, fishing materials or market access?

How government policies and strategies favors and challenges registered and organized cooperative and individual fishers' production and market?

What factors more favors and challenges fish production and market than others? Why?

How do you cope up the challenging situations in the production and market to survive and continue in the sector recently?

Thank you very much for your time and great cooperation!

C. Structured Interview Questions for Officeholders

When and how the fishery of Lake Hawassa started (time, purpose and equipment)?

What is the number of individual-based and cooperative fishers in the lake?

How much is the total production of lake's fishery (daily, monthly and yearly)?

What are the basic criteria/rules to cooperate/give license for access to operate fishing in the lake?

How does legally registered/organized and 'other informal' fishers distinguished and treated?

What current socio-legal factors are influencing lake's fishing and inter-human relations?

What kind of government measures are practicing in the management fisher?

D. Focus Group Discussion (FGD) Questions

Full profile of the informants (name, age, sex, occupation, educational, marital, family, income statuses, etc.)

Is your livelihood and lake's fishing mutually/harmfully interacted and how is its value through time? How?

Do you think the lake status and fishing through time and landing sites (Amora Gedel and Fiker Haiq) changes? If so, in what factors?

How individual and cooperative fishers get access to utilize lake's fishing differently?

How access to lake's resource, competition and power differences expressed among individual and cooperative fishers?

Does price, demand and supply of fish increasing or decreasing? Why?

How seasonal and rules of access/operation dynamics, challenges individuals and cooperative fisheries production and market of the lake's fishery past to recent years?

In what ways the surrounding development activities (such as tourism, trade, industry) and government rules/policies challenges the production/favors the market?

In what manner government supports your activity (technically and materially) and how it treats individual and cooperative fishers in production and market access?

In what ways fishery activities harms/favors the local environmental protection and take its share in livelihood in its sustainable development?

What socioeconomic and political opportunities and challenges you faced with being cooperate or not through time?

How could you cope up various changing natural and human made challenges and survive through time within the sector?

How do you perceive the "healthy" continuity of Lake Hawassa and the livelihood values its fishing in the future?

Thank you very much for your time and great cooperation!

E. Survey Questionnaire

Verbal Consent

Dear respondents, welcome to this survey and thank you for your participation within it. My name is Tesfatseyon Yosef; I am doing surveys on the livelihood and fishing strategies at Lake Hawassa with the opportunities and challenges of fishers-lake interaction in its overall changes and continuity through time. Your household/business is randomly selected to answer some open and close ended questionnaires related to your activities on the lake and its watershed. Your participation in this interview is voluntary. Nevertheless, it's important to tell you that in case you participate, the information collected here is entirely confidential. At any circumstance your name will be matched with the provided answers. Please encircle your best answer from the choices and specify your further answers for the open-ended questions. If you have questions, please contact me at Josef.andualem@gmail.com Your contribution will help me to assess the potential fishers-lake livelihood and developmental interactions with its mitigation measures.

Once again thank you very much for your participation in our survey! Shall we continue?
Region code (1 SNNPR, 2 Oromiya)_____Woreda_____Site_____Household No._____
Name of Respondent_____
Enumerator _____ Date_____ Signature _____
Checked by: _____ Date _____ Signature _____

Socioeconomic and demographic characteristics

1. Sex of the interviewee? 1. Male 2. Female
2. Age of the interviewee? _____
3. What is the marital status of the informant? 1. Married 2. Divorced 3. Widowed 4. Unmarried 5. Other
4. How many are your family size/ number of children? 1. 1 2. 2 3. 3-5 4. 5-10 5. >10
5. Educational level of the interviewee? 1. Illiterate 2. 1-4 3. 5-8 4. 9-10 5.11-12 6. 12^{+}
6. How many of your family members are educated to college, high school or elementary level? 1. 1 2. 2 3. 3 4. 4 5. 5 6. 6 7. 7 8. >8 9. None
7. Religion of the household head? 1. Protestant 2. Tewahdo Orthodox 3. Muslim 4. Other
8. Ethnic group of informant? 1. Sidama 2. Oromo 3. Wolaita 4. Amhara 5. Kambata 6. Tigre 7. other;_____
9. How much is your income/month? 1. 500-1000 2. 1-2000 3. 2-3000 4. 3-4000 5. > 5000
10. What is your staple food? 1. Enset 2. Cereals 3. Animal Products 4. Fruits 5. Vegetables 6. Combination of these

Fishery Industry

11. In which operation section is you are undertaking this fishing activity? 1. Individual-based 2. Cooperatives 3. Other; specify_____
12. For how long have you been involved? 1. <1 2. 1-3 3. 3-5 4. 5-7 5. 7-9 6. >10
13. How many people are involved under your specified fishing activity area? 1. 1 2. 2-5 2. 5-10 3. 10-15 4. >20
14. What do you use to catch fish? 1. Net 2. Hooks 3. Spear 4. Other, specify_____
15. If your answer for Q 14 is Net, how many nets do you have? 1. 1 2. 2 3. 3 4.4 5.5 6. >5
16. What fish species mostly do you catch? 1. Tilapia 2. Catfish 3. Large Barbus 4. Other
17. Do you have a fishing boat? 1. Yes 2. No
18. If yes to Q 19, what type of boat do you have? 1. Geared 2. Manual 3. Read Boat 4. Other
19. How many fishing boats do you have? 1. 1 2. 2 3. 3 4. 4 5. >5
20. What is the average number of bigger fish captured at once? _____, medium fish_____ and small fish_____
21. At what time of the year is high fish productivity available? 1. Spring 2. Winter 3. Autumn 4. Summer 5. All year round
22. For what purpose do you use fishery? 1. As source of income 2. Subsistence purpose 3. Health protection 4. Other; specify_____
23. Do you use a fish product for consumption within the family? 1. Yes 2. No if yes, How much per day and why (the main purpose)?

    _____
24. Do you own specified fishing area? 1. Yes 2. No
25. If yes for Q 26, why is it important to specify your fishing area? 1. Zoning and control 2. Minimize impact 3. Taxing 4. Other; Specify_____
26. Do you pay tax? 1. Yes 2. No If yes, how much is it per year_____?
27. Who are your potential customers? 1. Domestic tourists 2. Foreign tourists 3. Residents 4. Firms 4. Other; specify_____
28. How do you sell your fish and fish products? 1. on the spot 2. Door to door 3. Via transport 4. Contract 5. Other; specify_____
29. Which fish type is more needed in the market? 1. Tilapia 2. Large Barbus 3. Cat Fish
30. Is there shift of demand overtime to those fish species? 1. Yes 2. No
31. What is the average price of small_____, medium_____ / large fish in each type_____?

32. If yes to Q 33, why? 1. Shortage of fish products 2. Taste of the preferred fish 3. Biology of the fish 4. Other (regards to pollution, endangerment of the rejected fish)

33. Is the price decreasing or increasing? 1 Increasing 2. Decreasing

34. If your answer for Q 35 is increasing, why do you think is it? 1. Increasing demand 2. Decreasing supply 3. Economic inflation 4. All of the above 5. Other, specify____

35. Which factor more favors fish market? 1. Mass tourism 2. Fasting season 3. Urbanization 4. Population pressure 4. Other, specify_____

36. Is fish demand/supply increasing or decreasing? 1. Increasing/Decreasing 2. Decreasing/ Increasing 3. Both increasing 4. Both Decreasing

37. If your answer for Q 38 is decreasing of supply, why? 1. Loss of species 2. Decreasing of the lake 3. Pollution 4. Increasing number of fishermen 5. Increasing demand of consumers 6. All 7. Other; Specify_____

38. How seasonal variability, limitation of modern fishing materials with fish species and changing rules and regulations affects fish production and market efficiency_____?

39. How lack of processing and preservation stations and waste disposals affects quality and quantity of fish and the lake_____?

40. Which natural and human made factors are more favoring/challenging you through time and how do you cope up with them_____?

41. How the environs socioeconomic activities, the absence of alternative jobs and the lake's grass affects the quality and quantity of fish and the lake_____?

42. What socioeconomic and political opportunities and challenges you faced with being cooperate or not through time_____?

43. How do you perceive the status and resource utilization of the Lake Hawassa? 1. Good 2. Fair 3. Poor 4. Irresponsible /not manageable/

44. If poor for Q 45, why don't you take care of it? 1. Lack of facility 2. Absence of waste handlers 3. Both 4. Lack of awareness 4. Other, Specify_____

45. What possible solutions do you suggest for the continuity of the lake and its sustainable fishery?_____

Thank you very much for your time and great cooperation!

Figure 13: Appendices 2: Researcher's Fieldwork at Lake Hawassa (April and May 2017).

Figure 14: Appendices 3: Different Socio-Legal Secondary Sources Regarding Fishers-I Interaction at Lake Hawassa.

በሀዋሳ ከተማ አስተዳደር ግብርና መምሪያ የሀዋሳ ሀይቅ ዓሣ

አስጋሪዎች ማህበር የ [illegible] ወር 200 [illegible] ዓ/ም የእለት

ምርት መሰብሰቢያ ቅጽ

ተ/ቁ	የእለቱ ዓሣ ምርት በቁጥር		የመረብ ብዛት	የተሰማራ ጀልባ ቁጥር	ወደ ሥራ የተሰማራ የማህበሩ አባል ቁጥር	የተቀጠሩ የቀን ሰራተኞች	
	ቆሮሶ	አምባዛ				ጀልባ ሹፌር	መረብ ጫኝ
1	4266	-	[illegible]	54	[illegible]	102	102
2	4596	26	[illegible]	>>	>>	>>	>>
3	4320	15	[illegible]	>>	>>	>>	>>
4	3960	-	592	52	260	104	104
5	4020	10	592	52	260	104	104
6	3950	-	564	50	250	100	100
7	3000	05	564	50	250	100	100
8	2250	-	564	50	250	100	100
	4250	21	564	50	250	100	100
10	4560	16	564	50	250	100	100
11	3750	12	564	50	250	100	100
12	5000	32	564	50	250	100	100
13	4945	25	564	52	260	104	104
14	3320	-	564	52	260	104	104
15	4336	11	592	52	260	104	104
16	5200	-	592	52	260	104	104
17	4420	30	592	52	260	104	104
18	2645	45	560	49	245	98	98
19	4606	36	560	49	245	98	98
20	3969	22	560	49	245	98	98
21	4692	-	588	51	255	102	102
22	2142	50	588	51	255	102	102
23	4182	30	588	51	255	102	102
	4326	47	588	51	255	102	102
25	[illegible]	60	672	48	240	96	96
26	3120	[illegible]	[illegible]	48	240	96	96
27	4275	10	[illegible]	48	240	96	96
28	4121	[illegible]	[illegible]	48	240	96	96
29	2312	24	672	48	240	96	96
30	3240	43	672	48	240	96	96

ቅፁን የሞላው የሂሣብ ሰራተኛ ስም [illegible] ያረጋገጠው የማህበሩ ሊቀመንበር ስም

ፊርማ [illegible] ፊርማ

ማሳሰቢያ:- ይህ ቅጽ በትክክል ተሞልቶ በየወሩ መጨረሻ 1 ገጽ ለከተማ ግብርና 1 ኮፒ በማህበሩ ፋይል ተከፍቶ ይቀመጣል።

የሐዋሳ ሐይቅ ዓሣ አስጋሪዎች
መሠረታዊ ሁለገብ ህብረት ሥራ
ማህበር

መተዳደሪያ ደንብና ዉስጠ ደንብ

ሐዋሳ

ታህሳስ 2005

የደቡብ ብሔሮች፣ ብሔረሰቦችና ሕዝቦች ክልል መንግሥት የዓሣ ሀብት ልማት፣ አስተዳደርና ጥበቃ ማሻሻያ ደንብ

በክልሉ ባሉ የውሃ አካላት ውስጥ ያለውን አምቅ የዓሣ ሀብት የመጠቀም እንቅስቃሴን ሕጋዊ በማድረግ የተፈጥሮ ሀብቱ ሚዛኑን በጠበቀ መልኩ ስትውልድ መተሳሰፍ ስላለበት፣

ጥራቱን የጠበቀ የዓሣ ምርት አቅርቦትን ለማሳደግና ሕብረተሰቡና መንግሥት ከሀብቱ ማግኘት የሚገባቸውን ጥቅም ማግኘት ስላለባቸው፣

በተሻሻለው የደቡብ ብሔሮች፣ ብሔረሰቦችና ሕዝቦች ክልል ሕገ-መንግሥት አንቀጽ 66 ንዑስ አንቀጽ 6 መሰረት ይህ ማሻሻያ ደንብ ወጥቷል

ክፍል አንድ

ጠቅላላ

1. አጭር ርዕስ

ይህ ደንብ "የደቡብ ብሔሮች ብሔረሰቦችና ሕዝቦች ክልል መንግሥት የዓሣ ሀብት ልማት፣ አስተዳደርና ጥበቃ ማሻሻያ ደንብ ቁጥር -----19/---" ተብሎ ሊጠቀስ ይችላል::

2. ትርጓሜ

የቃሉ አገባብ ሌላ ትርጉም የሚያሰጠው ካልሆነ በስተቀር በዚህ ደንብ ውስጥ:-

1. የደቡብ ብሔሮች፣ ብሔረሰቦችና ሕዝቦች ክልል መንግሥት የዓሣ ሀብት ልማት፣ አስተዳደርና ጥበቃ ደንብ ቁጥር 78/1977 ስተዘረዘሩት ቃላት የተሰጡት ትርጓሜዎች በዚህ ማሻሻያ ደንብ ተፈጻሚ ይሆናሉ
2. "መገደብ" ማለት በተፈጥሮ ውሃ ውስጥ የሚገኝን የዓሣ ሀብት በማስገር መጠቀም የሚቻልበትን ጊዜ ስለመወሰን የሚያመለክት ነው::

Southern Nations, Nationalities and Peoples Regional Government fisheries development, management and control Regulation amendment

WHEHEAS, rational utilization of the region's existing fishery resources is required;

WHERAS, it has become necessary to promote the supply of quality fish and fisheries products and strengthening of the region's source of income;

NOW, THEREFORE, in accordance with Article 66(6) of the revised constitution 2001 of the Southern Nations, Nationalities and Peoples Reginald State, it is here regulated as follows

PART ONE

General

1. Short Title

This regulation can be cited as "Fisheries Development, management and control regulation amendment No. -----/------- of the Southern Nations, Nationalities and Peoples Regional Government"

2. Definition

Unless the context requires, otherwise in this regulation:

1. Words and definitions in the Southern Nations, Nationalities and Peoples Regional Government fisheries development, management and control Regulation 78/2004 are also applicable for this amended regulation.
2. "Restriction" means determining the duration of fishing license for commercial fishing

የደቡብ ብሔሮች፣ ብሔረሰቦችና ሕዝቦች ክልላዊ መንግሥት

ደቡብ ነጋሪት ጋዜጣ

DEBUB NEGARIT GAZETA

OF THE SOUTHERN NATIONS NATIONALITIES AND PEOPLES'S REGIONAL STATE

ዘጠነኛ ዓመት ቁጥር ፲፩
አዋሳ ነሐሴ ፲፱ ቀን ፲፱፻፺፮

የደቡብ ብሔር ብሔረሰቦችና ሕዝቦች ክልላዊ
መንግሥት ምክር ቤት ጠባቂነት የወጣ

9th Year No 11
Awassa - 15th August, 2004

ማውጫ

CONTENTS

በደቡብ ብሔሮች፣ ብሔረሰቦችና ህዝቦች ክልል መንግሥት የዓሣ ሀብት አስተዳደር፣ ልማትና ቁጥጥርን ለመወሰን የወጣ አዋጅ

በክልሉ በዓሣ ምርታቸው ከፍተኛ የሚባሉ የውሃ አካላት የሚገኙ መሆኑ በመታመኑ፤

በእነዚህ ውሃ አካላት ለምግብነትና ለሌላ ኢኮኖሚያዊ ጠቀሜታቸው የታወቁ የተለያዩ የዓሣ ዝርያዎች ያሉ ቢሆንም ከጊዜ ወደ ጊዜ ቁጥራቸው እየጨመረ ባሉ ሕገ ወጥ የዓሣ ዓሥጋሪዎች እንዲሁም ባልተፈቀዱ የማጥመጃ መሣሪያዎችና ሥርዓትን ባልተከተለ ሁኔታ በሚፈጸም የዓሣ አስጋገር ዘዴ የዓሣ ሀብቱ እየመነመነ መሆኑን በመገንዘብ፤

የአምቅ ሀብቱንና ተዛማጅነት ያላቸውን ህይወታዊ ሀብት አጠቃቀም እንቅስቃሴ ህጋዊ በማድረግ የተፈጥሮ ሀብቱ ሚዛኑን በጠበቀ መልኩ ለትውልድ መተላለፍ አስፈላጊነቱ በመታመኑ፤

ህብረተሰቡና መንግሥት ከሀብቱ ማግኘት የሚገባቸውን ጥቅም ማግኘት እንዲችሉ ለማድረግና ሀብቱንም ከጥፋት ለመታደግ የዓሣ ሀብት ልማት፣ ጥበቃና አጠቃቀም ሥርዓትን የሚደነግግ ሕግ የማውጣት አስፈላጊነቱ በመታመኑ፤

የደቡብ ብሔሮች፣ ብሔረሰቦችና ሕዝቦች ክልል ሕገ መንግሥት አንቀጽ ፶፩ (፫) (ሀ) ለክልል ምክር ቤቱ በሰጠው ሥልጣን መሠረት የሚከተለው ታውጇል።

Southern Nations, Nationalities and Peoples' Regional Government

Proclamation Issued to Determine Fish Resources Management, Development and Control

Whereas it is believed that there are several water bodies which are rich in fishery resource in the region

Whereas the number of the various fish species in the region known for their nutritional and economic values are being depleted as a result of the ever-rising illegal fishermen and irregular fishing practices carried out by illegal fishing equipment;

Whereas it is believed important to legalize the utilizatio of the potential fish resources and related biodivesity t maintain ecological balance and pass the resources t posterity;

Whereas it has become necessary to issue fish resource development, protection and utilization directive to enhanc the supply of quality fish products, enable the society and t government to fully relish the fish products and protect t resources from depletion;

Therefore, the regional council has issued the follow proclamation acting on its power vested on it by article 51 S article 3 (A) of the Southern Nations, Nationalities a Peoples' Regional State constitution.

ደቡብ ነጋሪት ጋዜጣ ፖ.ሣ.ቁ. ፩
Debub Negarit G.P.O Box 5

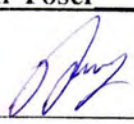
ያንዱ ዋጋ 2.80
Unit Price

DECLARATION

I, the under signed, hereby declare that this thesis entitled: Anthropological Study in the Livelihood Aspects of Fishers-Lake Interaction at Lake Hawassa: Practices, Opportunities and Challenges, is my original work done under the guidance of Mamo Hebo (PhD) and to the best of my knowledge and I belief this thesis contains no material previously published by any other person and university except where proper citation and due acknowledgement has been made. All sources of materials used for the thesis have been also duly acknowledged.

This is a true copy of the thesis.

Name Tesfatseyon Yosef

Signature 

Place Addis Ababa University

Date of Submission 05-12-2017