



**COLLABORATIVE GRADUATE PROGRAM BETWEEN GAMBELLA
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MANAGEMENT AND FOOD SECURITY)**

**Determinants of Fishery Productivity in Cooperative and Non-Cooperative Member
Households: The Case of Abobo District, Gambella, Ethiopia**

A THESIS SUBMITTED

**IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF ARTS IN
DEVELOPMENTAL STUDIES SPECIALIZATION IN DISASTER RISK MANAGEMENT AND FOOD
SECURITY**

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DEDICATION

I dedicate this thesis manuscript to the Almithy GOD and my family particularly to my wife Hana Fikru, my dearest man Addisu Sisay who has supported me all the time of working on this thesis.

STATEMENT OF AUTHOR

By my signature below, I declare and affirm that this thesis is my own work. I have followed all ethical and technical principles of scholarships in the preparation, data collection, data analysis and compilation of this Thesis. Any scholarly matter that is included in the Thesis has been given recognition through citation.

This thesis is submitted in partial fulfilment of the requirement for a Master of Science in Development studies (specialization in food security and Disaster Risk management). I solemnly declare that this Thesis has not been submitted to any other institutions where for the award of any academic degree, diploma or certificate.

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ACRONYMS AND ABBREVIATIONS

LIFDCs	Low-Income Food-Deficit Countries
ICA	International Cooperative Alliance
NGO	Non-Governmental Organization
G.N.R.S	Gambella National Regional State
NMSA	National Meteorological Services Agency
FAO	Food and Agricultural Organization
IGA	Income Generating Activities
GDP	Gross Domestic Product
ICA	International Cooperatives Alliance
EU	European Union
FGD	Focus Group Discussion
KII	Key Informant Interview
CSA	Central Statistical Agency

BIOGRAPHICAL SKETCH

The author was born on August 1978 in Bedessa town, Western Hararghe, Ethiopia. When he was six, he joined Bedessa Primary and Junior Secondary School at Bedessa town. Then, he transferred to Bedessa Senior Secondary School. After he completed grade 12 in 1995, he joined Wondo Genet College of Forestry to study General Forestry and graduated with diploma. He also graduated by Disaster Risk Management and Sustainable Development in BSC in 2011 from Bahir Dar university.

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ABSTRACT

The fishery productivity was exacerbated by limited choice of management and strategy. Therefore, it is believed that it is important to improve modernization of fishery practices and establishing farmer household under cooperatives. Therefore these mitigation measures were started to implement in various parts of the country. Thus, it was important to assess productivity of fish producers of the house hold in both cooperative household of productivity status in order to generate relevant information for policy making and fishery productivity intervention. This study was aimed to analyse the status of fishery productivity and choice of practices and strategies used by cooperative and non-cooperative members in Abobo district, Gambella region. Two *kebeles* from Alwero water reservoir were chosen randomly and samples of 90 farmers, 50 households from non-cooperative and 40 household from non-cooperative households were selected using proportional random sampling technique. To analyse the data both descriptive and inferential methods were employed. The findings indicated that, Even though, 95% of the respondents of cooperative members were accessed to training and material support, most of the members are not correctly utilized the resources and did not have timely update about the progress of their cooperatives at all. This indicated that as far as the cooperative concept is new to the people it needs making periodic monitoring to bring effective productivity of the fishes, Only 3% of the respondents replied that they have permanent market chain Therefore it is important to ensure and strengthen better market chain for the producers. Regarding resource access of financial support only 3% of the respondents are replied that they got financial access in terms of loan to spend on their fishery investment this indicated that the financial credit access has to be improved, the training and capacity building conducted with the members must be internalized and helpful for the improvement of fishery, the days of fishery practices also needs to improve because almost all cooperative members are not working more than 4 days throughout the week. Moreover, most cooperative members were supported by materials such as refrigerator and other inputs nevertheless only few number of respondents revealed that as they use refrigerator and store access. The impacts of fishery productivity on the livelihood of cooperative and non-cooperative members are 29% and 19% respectively. Even if the contribution for household livelihood is better in the non-cooperative members, it did not bring as such expected result. On top of this, cooperative and non-cooperative members have in significant regular customers to whom they have provided fish product, 16% and 6% respectively as a result both producers are negatively affected with less price due to lack of markets and formal buyers. This shows that not only non-cooperative members but also non-cooperative members did not bring the expected changes rather the House hold respondents are working on additional coping mechanisms for the survival and supporting their basic needs.

Key words; Cooperative and non-cooperative members, Livelihood, Fishery productivity, Fishery, practices, Households, Customers, coping mechanisms

1. Introduction (Background)

In many countries of the world fishery is one of the sectors, which plays an important role to community's lively hood and food security's improvement. Particularly in developing countries including Ethiopia for the poor farmer households, it contributes to enhance their income diversification. FAO 2010 stated that in developing countries 116 million benefited from the fishery sector and 90% of the population are working in the small-scale fishery sector.

Regarding the potential, at global level, based on the assessment of World Bank, in 2013 fish production is about 154 million ton per year to and the projection will indicate the aggregation of global fish supply 186 million tons in 2030. FAO reported, regarding the production practices of the world, aquaculture production of farmed aquatic animals has been dominated by Asia, with an 89 % share in the last two decades or so. Among major producing countries, Egypt, Chile, India, Indonesia, Viet Nam, Bangladesh and Norway have consolidated their share in regional or world production to varying degree over the past two decades Ojulu Cham Gilo, (2017)

Tamiru Chalchisa, 2019, revealed that in Ethiopia 45,610 tons of fish is produced that contributes only 0.58% of the total population in sub Saharan countries. In line with other African countries, Ethiopia's fishery practices is mostly depend on inland water bodies such as lakes, rivers and some reservoirs which are maintained for other intervention in different parts of the country.

As many African countries Ethiopia was confronting low production of fishes and contributing insignificant national economy while it is compared to its estimated fish production potentials. With similar circumstances of agricultural and livestock sectoral studies and report show that fishery has also huge production potential nevertheless the country have been seriously affected by recurrent food insecurity and the majority people also exposed to malnutrition

Regarding Fishery cooperatives, Initially the fishermen's co-operatives were established to deal with problems of management of coastal fisheries resources which are rapidly reducing and degrading and to improve the livelihood conditions of small-scale coastal fishermen and in some countries of world, the cooperative in fisheries was developed rapidly in 1940s

Ethiopia is one of the countries in which different agricultural cooperative practices including fishery is adapted in many parts of the country. Fishery cooperative is mostly on the spot of the area, where island-fishing activity experienced and used as a means to support livelihood of the community.

In Gambella region as other parts of Ethiopia, all fishing activities mainly island practices. The main sources of fish potentials in this region are perennial water bodies such as Alwero, Baro, Gilo and Akobo rivers. In addition to irrigation, fishery activity is one the intervention given attention as regional level to improve food security and livelihood of the farmer households. Following the fertile ground of this region to produce fishes, numbers of cooperatives and individual farmer households are involved in the fishery practices. Regarding fish potentials, according to author Dorghi, In Gambella National Regional State (G.N.R.S), the projected fish production potentials from rivers alone are found to be 3,720 tons per year. But the current reported annual production of fish in the region is about 380 tons per year whereby much of the production is expected to come from the floodplain areas including Lake Tata, Alwero dam, reservoirs, and ponds (Anuto David Ojulu, 2020).

As Ochan Dorgi cited in developing countries like Ethiopia, cooperative formation is a strategic intervention in a government to promote farmer household participation in the supply chain and are help full in overcoming access barriers to assets, information, service, inputs and output markets (Clegg, 2006).

In the case of Gambella region, as it was revealed by Ojulu's research article, fisheries cooperatives started in 2006 in Gog woreda, the total number of cooperatives in Gambella regional state was 10 and all of them are fisheries cooperatives with the total members of 263 of them 200 men and 63 women. Millions of people depend on fisheries and aquacultures around the world directly or indirectly for the livelihoods. During the pass three decade the numbers of fisheries and aquacultures faster grown than world population and employment in the fisheries (Berhan Asmamaw et al, 2021).

Currently, the status of Fishery cooperatives have significant difference than the previous study in many circumstances for instance, the current number of cooperatives involved in fishery practice in the proposed study area of Aliwero is reaching to 30. This indicate that Government and other NGO sectors give attention to the resource and invest their input resources to enhance and ensure the food security and livelihood status of cooperative members and households in the study area.

1.1 Statement of the Problem

With equivalent growing rate of world population, food production and productivity could not be growing equivalently instead, food insecurity is encountered as a major challenge to cover even the minimum nutrition requirement of the people. Particularly most of African countries are suffered by food insecurity and lack of livelihood diversification either as individual or household level. The problem is increasing and observed significantly in Africa because most of people's economic activity relays on agrarian agriculture practices.

In many countries of the world problems of fishery cooperatives are lack of capital, lack of access to loan and credit facilities, shortage of adequately trained and well-motivated fisheries extension workers, inadequate fishing input, low fish catch, high charges of fishing license, poor monitoring and supervision of cooperative society by cooperative worker. According to Suhass wasave's Journal, the fishing industry and practices are declining and on the level of gloomy level due to many factors such as over exploitation and pollution, which directly affects the prospective of fishery cooperatives, in some countries, where conditions are favourable for fishery (Suhass Wasave (June 2015).

In the agriculture sector cooperative is taken as a major tool in order to facilitate many hindering events in the intervention. In Ethiopian context the reason for food, insecurity and weak livelihood status have so many factors. Therefore establishing cooperative was taken as a major strategy to alleviate most challenges in the agriculture sector.

According to FAO, 2014 cited in Anuto, 2020 Ethiopian Economy the agriculture sector takes the lion's stake, 49% of the GDP and 80% of the total employment, out of each the aquaculture and fishery can contribute insignificant and its contribution-estimated that 0.1% of the GDP (Anuto 2020).

In Ethiopia, particularly Gambella in spite of resource potentials there are many challenges such as climate change, inappropriate policy and strategy implementation, mismanagement of resources, in appropriate technical and materials unavailability of market are some of the main problems (*Tola et al, 2018*). Regarding Agricultural cooperatives the major internal challenges revealed are members awareness about cooperatives, unsatisfactory members' participation and lack of conflict resolution, in addition the external challenges include access to training, government interference, access to market, availability of financial institutions, availability of infrastructure are encountered as main challenges in the region (Ochan, 2015).

Gambella is one of the region which has huge potentials of fish with the catch estimates from river 5000 tons, whereas the actual fish production potential is 12000 tons per year, nevertheless the current reported annual production is only 380 tons per year (Gatriay, 2020). In this region the challenges is not only low production but also numbers of additional constraints revealed in different parts of the region such as environmental degradation, poor fisheries development, increased illegal fisheries, traditional fishing system and climatic changes attributed to the low production in the country (Alebachew *et al*, 2016). Besides the facilities, lack of fish handling facilities (like refrigerator), poor postharvest handling, crocodile attack, and gear theft problem. fishers also added that they have faced marketing constraints like low price at the landing site, poor road access, high transportation cost, improper market place, lack of cold storage, and poor power supply (Gatriay Tut Deng;2020). Berehanu Asmamaw's research revealed in the study area, the contribution of fishing and fishery-related activities, and identifies its threats (Berehanu et al, July 2021). In addition, Ochan with his colleagues, in his research, he investigated some challenges such as lack of feasibility study, poor awareness about cooperative principles and values, inadequate access to training, inaccessibility to markets, poor credit services, incapable leadership skills, lack of audit and inspection, seasonal change and conflicts. Moreover, Ochan also mentioned that the main challenges on member participation of cooperatives were failure to conduct timely auditing and inspections, less budget allocation by the regional government and inadequate trained manpower, inadequate members' awareness about cooperatives, poor participation of members, poor members' involvement in decision making, unwillingness of members to involve in conflict resolution, inadequate managerial skills of the leaders, absence of training, interference of local leaders in the decisions and managerial affairs of the cooperatives, unavailability of financial institutions, inadequate infrastructures, inaccessibility to improved seeds and inadequate agriculture extension services. (Ochan Dorgi, March 2015)

After many studies have been taken in Abobo district number of changes were observed in regarding of number of fishery cooperatives, practices and related activities. More challenges mentioned were addressed in different ways. The intervention of different NGOs and development activities are increasing and tried to minimize the problems of infrastructures and have put many supports, which were able to enhance the productivity of fishery cooperatives and households around the study area.

As it was known, Abobo is one of the districts having the richest fish potential in Gambella region. However the potentials of the area and the actual production has still huge gap,

moreover, cooperatives which are more capacitated with equipment materials. Most of them could not bring the expected outcomes. Therefore, this proposal intended to address the status of current fishery cooperatives and to reveal why the expected positive impact was not observed. In addition to this, the level of engagement and working culture of cooperative members and non-cooperative producers, seasonality of fish production, and the existing challenges were explored. Despite, the previous researchers did not reveal extra changes between cooperative and non-cooperative members this research explored the basic disparity of fishery practices between cooperative members and non-cooperative members those are supporting their livelihood via fishery production in the study area, which have been not studied by any researchers

1.2 Objectives

1.2.1 General Objective

To assess the determinants of fishery productivity in the cooperative and non-cooperative households of Abobo district, Gambella, Ethiopia,

1.2.3 Specific objectives

- To assess the perception of the households about fishery cooperative in the study area..
- To identify the major factor which determine the fishery productivity in the study area
- To assess the status of livelihood of the households in the study area
- To evaluate the level of engagement of the households in the fishery in the study area

1.3 Research Questions

- What is the perception of the household about cooperative in the study area?
- What are the major factors that determine the fishery productivity in the study area?
- What is the livelihood status of the household in the study area?
- How is the engagement of the households in the study area?

1.4 Significance of the Study

throughout the country, food insecurity is one of the peoples challenge therefore the government has planned long term strategic program to alleviate the impact or triggering

factors of (natural and anthropogenic hazard) against sustainable livelihood improvement. One of the sectors Ethiopia has planned to improve the livelihood status of the people with in the coming recent years is irrigation activity to cover the need of diversified food at national level, thus good opportunity and indicate that to improve the production of fishery for both domestic consumption and export purpose (Summary and Statistical Report of the 2007)

The demand for fish consumption is increasing double in Ethiopia (Mathewos et, al 2016). In addition to this I will expect after the completion of the study findings are explored in regarding of supporting the productivity of cooperatives and farmer households in the study area and more over it will contribute the role for other researchers to redefine the problems to work more researches.

1.5 Scope and limitations (Delimitations) of the study

This study was conducted to explore fishery practices of both members of fishery cooperatives and the farmer households of the Gambella region at Abobo district and households of Abobo district those mainly produce fishes from the catchment of Alwero river. Beside to this, the data were collected at one time a season and may not represent the whole livelihood status of the households. In other regard, the scope of the study was restricted by time, budget and other resource limitations. Moreover, the study area did not represent wide area in regarding of working culture and level of engagement of wide range of the community at regional or national level and the result may not reveal the overall result of heterogeneous community.

2. Literature Review

2.1 Definition and Concept of Cooperatives

In the Guidance notes of COOP international Co-operatives are active in every sector of the global economy. A key distinguishing feature is that co-operatives create wealth for the many members of co-operatives who engage in co-operative businesses as service users, producers, independent business owners, consumers, and workers¹, not solely for the few who are rich enough to invest capital in investor-owned enterprises. According to Guidance Notes of Coop International Cooperative Manual, Co-operatives help counterbalance the massive growth of inequality between the rich and poor people; an issue that, if not addressed, has major economic, social, cultural, environmental, and political consequences

According to COOP international, co-operative is defined as ‘an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise.’

“Co-operatives are voluntary organisations”. A “voluntary organisation” is one that is formed by the free choice of the persons who are members of it. As voluntary organisations, co-operatives should have their rights and freedoms, and the freedom of their members to form them, protected in law.

“Open to all persons” affirms a general commitment to recognising the fundamental dignity of every person and their right to involvement in a co-operative, which has been a basic commitment of all co-operatives since their emergence in the 19th century. It affirms that If membership is compulsory, membership becomes tokenistic rather than an exercise of the fundamental human right to freedom of association. If members are forced to cease to be members, other than for breach of their responsibilities as members or because they no longer use the services of the co-operative, that too weakens co-operatives and is also a breach of this fundamental 1st Principle

In its role as custodian of the distinctive characteristic of co-operatives enterprise, the Alliance² adopted in 1995 the Statement on the Co-operative Identity, Values and Principles, (“the Statement”) that is reproduced in the Appendix to these Guidance Notes. The Co-operative Principles included in the Statement have been forged in the furnace of over 150 years of practical experience of what constitutes the foundational principles necessary for the successful operation of a sustainable co-operative (Co-operative Alliance 2015).

In the COOP international, the Rochdale Pioneers' in 1860 Rules of Conduct included an introductory paragraph, which said: "The present co-operative movement does not intend to meddle with the various religious or political differences which now exist in society, but by a common bond, is also not a characteristic that can be used to discriminate against those who wish to become members. Racial characteristics are superficial and do not constitute grounds for discrimination. Cultural differences are more significant, but these differences should be celebrated as the glorious rainbow of human diversity and not used to limit membership (Co-operative Alliance 2015).

According to European Parliamentary Research Service Cooperatives is a multi-faceted phenomenon. The International Cooperative Alliance (ICA) describes them as follows: 'A cooperative is an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democratically controlled enterprise (European Parliamentary Research Centre February 2019).

Bezabih Emana revealed, Modern forms of cooperatives were first introduced in Ethiopia in 1960 (Bezabih Emana, 2009). As Emana revealed, the new cooperative movement in Ethiopia was triggered by reforms made to the socio-political system. During the socialist government (the Derg regime), cooperatives were formed to assist in the implementation of the Government's policy of collective ownership of properties. Under this system, cooperatives were forced to operate in line with socialist principles, which meant that production and marketing of produce were undertaken through collective mechanisms. Membership to a cooperative was also compulsory, which contravened the basic cooperative principle of voluntarily participation. Currently, cooperatives are recognized as an important instrument for socioeconomic improvement of the community. This importance is recognized in their definition, which considers cooperatives to be:

'An association of persons who have voluntarily joined together to a common end through the formation of a democratically controlled organization, making equitable contribution to the capital required and accepting a fair share of the risks and benefits of the undertaking, in which the members actively participate.'

According to ICA 2005), cooperative defined as 'an autonomous association of persons united voluntarily to meet their common social, economic and cultural needs as well as their aspirations through a jointly owned and democratically controlled enterprise'. Considering the

above values, cooperatives can then be described as a distinct, mutual-based association or group with varied capital and membership base which is democratically managed. Dube (2017) explained that cooperative is distinct from a socio-professional body and its mission is to defend the interests of its members or a community development association whose activities are like those of a pressure group.

Related to this, Chitsike (1988) noted that the mutual commitment of each member involved is a necessary feature of cooperatives regardless of capital and cooperative size and location. Every member is responsible for the preservation of its autonomous identity, as an association of people formally engaged in private enterprise with a strict beneficial economic purpose.

As per Schwettmann (2004), at least 40% of the households in Africa are members of cooperative societies. Thus, the cooperative movement is taken to be Africa's biggest non-governmental organisation (NGO). The cooperatives play a significant role in many national economies and have created a great number of self-employment opportunities in Africa.

There are three different ways in which cooperatives can create employment. Firstly, cooperatives offer direct wage employment to people who work in both primary and secondary cooperatives. Secondly, cooperatives offer self-employment to their members, whose participation in the economic activities makes it possible for them to be guaranteed a decent income. Thirdly, cooperatives indirectly employ other people through the spill over effect of cooperatives' activities to non-members, who generate income through transactions and opportunities created by cooperatives. Thus, cooperatives should work for the sustainable development of their communities through enabling policies which are approved by their members. If properly followed and implemented, these principles would guide cooperatives towards the achievement of their objectives to sustain livelihoods of rural communities. Cooperatives empower people to improve their quality of life and to enhance their economic opportunities mainly through self-help projects (Dube, 2017).

Barton (2000), pointed out that the major reason why cooperatives are formed is to strengthen the bargaining powers of their members, help them in maintaining access to comparative markets and to capitalise on new market opportunities.

Looking at the Ethiopia context, though rural farmers were offered more efficient agricultural and cooperative extension services, more easily and at low costs, their efficiency is still minimal and face several challenges which prohibit them from operating at full capacity.

According to FAO (July) 2002, A Fishery is an activity leading to the harvesting of fish, within the boundaries of a defined area. The fishery concept fundamentally gathers indication of human fishing activity, including from economic, management, biological/ environmental and technological viewpoints.

2.2 Overview of Fishery Cooperatives

According to FAO (2016), fisheries remain important sources of food, nutrition, income, and livelihoods for hundreds of millions of people around the world. Thus, world per capita fish supply reached a record high of 20 kg in 2014. Although annual per capita consumption of fish has grown steadily in developing regions (from 5.2 kg in 1961 to 18.8 kg in 2013) and in low-income food-deficit countries (LIFDCs) (from 3.5 to 7.6 kg), it is still considerably lower than that in more developed regions. Over 80 percent of the world's population depends on fish for protein, hence, the need for improved fish production, preservation and distribution (ibid). Cooperatives, as business entities and as self-help associations, play a significant role in improving the socio-economic situations of the members and the communities.

Barton (2000) stated that cooperatives play a significant role in improving the livelihoods of rural communities the world over. Cooperation is a form of organization where individuals come together as human beings to meet their economic, social and cultural needs. They are expected to supply essential goods on one hand and services on the other hand, as close to cost as possible. Other than the provision of economic services in terms of cheap availability of goods to the community, the cooperatives are conceived as social organizations which educate the people in economic management.

The historical trend of cooperatives indicated that cooperatives originated in Europe, before they spread to other industrialised countries during the late 19th century. However, the development of these cooperatives was taken as a measure to counter extreme conditions of poverty. In the African continent, Kenya is one of the countries with the longest history of cooperative development that has been characterised by strong growth, such that it has made significant contributions to the overall economy of the nation since it attained its independence (Ortmann and King 2007). Membership contribution of all cooperatives in Gambella and fishery cooperatives are below 1.05% and 0.5% compared to national status of cooperatives. These percentages show that there is a poor participation of local communities to join fishery cooperatives membership due to poor performance of the regional cooperative promotion agency and inadequate studies carried out to identify the problems of fishery cooperatives.

According to Basurto et al (2013), since the ancient civilization, fish farming has been practiced in different parts of the world, particularly East Asia, China, Europe, Canada, Africa, and developing countries like Ethiopia and Nigeria and it remains an important sector for source of food, nutrition, income, and livelihoods for hundreds of millions of people around the world. Millions of individuals in many countries get their sources of income and livelihood from fish sector.

Fishery cooperatives played a significant role in helping small-scale farmers to cope with competitive and fluctuating market and high transaction cost to develop their communities and have the potential to empower small scale fishers against environmental and socio-economic shocks. They can: a) increases fishers' price negotiating power with market intermediaries, help stabilize markets and improve post-harvest practices and facilities, b) increase market competition by setting up auctioning systems, c) use their greater negotiating power to make cost-saving bulk purchases of fishing gears, equipment and d) facilitate micro-credit schemes for fishers to reduce their dependency on intermediaries and give them greater freedom in selecting buyers.

2.3 Fishery Cooperatives in Ethiopia

According to Ochan (2016), Girma et al (2014), Ethiopia is endowed with several water bodies that contain a high diversity of aquatic fauna. Reservoir fishery plays an important role in the economy of the country and the livelihoods of the people living adjacent to those reservoirs. Kebede et al (2017) noted that despite its significant contribution to poverty alleviation and food security, it is an unexploited natural resource. Artisanal fishery is one of the most significant economic activities in Ethiopia (FAO, 2012). Fishing has been the main source of protein supply for many Ethiopians particularly for those who are residing near major water bodies like Lake Tana, Ziway, Awassa, Chamo, Baro River, etc (FAO, 2016); thus improvements in fishery sector would reduce poverty and sustain the development in Ethiopia.

The Ethiopian government has been putting efforts to promote new generation cooperatives which distinct from their ancestors that were established under previous regimes. These new forms of cooperatives should depend on the members' choice to establish, ability to highly participate in the free market and free of government interference in their internal affairs (Proclamation No. 85/1994). Related to this, Bernard et al (2013) noted that Ethiopia's Sustainable Development and Poverty Reduction Program strives to organize, strengthen and

diversify independent cooperatives to offer improved marketing services and serve as a link between small farmers and other non-farmers private business sectors.

Berhane (2008) noted that fishery cooperative societies have huge potential to support in dealing with problems that occur in the fishery sector. A successful cooperative can persuade its members to linger in the organization as well as to recruit new members and thus continuously maximize its membership ratio. This ratio relies on increasing members' expectations and qualities of services and is thus an essential indicator of cooperative sectors abilities.

In Ethiopia, water bodies are a home of diverse aquatic life including more than 180 fish species of which about 40 are endemic (Birhanu, 2015). The annual exploitable fish potential of Ethiopia is 51,481 tons (Chekol, 2013, Hirpo, 2017).

According to Ochan (2016), Debebe (2016), Kebede et al (2017) Fishing in Ethiopia especially in the Gambella region is mainly artisanal. According to Hussien et al (2010), most fish caught is used for family consumption whereas a small amount is sold at a local market to obtain additional cash income. Thousands of people who live near water meet more of their animal protein requirements resulted from fish consumption. Fishery is practiced in a traditional way and tools as past time activity. Riverine fishing is seasonal, and the supply of fish is mostly available during dry season (November to May), however, rare fishers catch fish during the wet season (June – October). The importance of fishing in terms of economics, food security and employment opportunity is enormous (Dagninet et al 2015; Ojulu 2015).

People use to eat large amount of fish in fasting period whereas the domestic market for fish is very small. The reasons which account for this low level of local fish consumption are the following; (i) Fish was not integrated into the diet of many people, (ii) because of religious influences on consumption ion programs, fish demand is only seasonal and (iii) the other factors that contribute to the low consumption level are inadequate supply of fish product and its high price. There is a difference in the system of farming among the ethnic groups depending on cultural and geo-climatic conditions and settlement pattern (Ortmann, G.F. and King, R.P. 2007). Fishermen were price takers than price makers due to perishable nature of product, lack of harvesting material, and storage facilities, weak market linkage among actors, and improper filleting-might due the lack of knowledge of value adding.

According to Hussien et al (2010) Dagninet et al (2015), fishery cooperatives could be effective if support in the form of credit, training, fishing gadgets, information and so on,

given to fishers to boast their source of livelihood. When these are not provided or lacking, fishing activities suffer a great setback, and the members' livelihood hampers.

According to Dagninet et al (2015), in Ethiopia, particularly in Gamabella, Amhara (lake Tana) and Gamo Zone, many fishermen use fishing nets with small meshes that invariably catch many juvenile fishes and most times not sustainable. These fishermen inability to maintain sustainable fish farming could be linked to weak capital assets which include natural, financial, human and physical resources affecting their level of production and standard of living.

2.4 Determining factors for Effectives of Fishery Cooperatives

According to Clark (1991), factors essential for effective farmers' groups are regulatory of group meetings and level of attendance, (ii) shared leadership and member participation in group decision making, (iii) continuous growth in group savings, (iv) high rates of loans repayment, (v) group problem solving, and (vi) effective link with extension and other development services.

In addition to the above factors that mentioned, below are some of the factors that may affect members' participation in fishery cooperatives which could be either internal or external factors:

Awareness about cooperatives: Awareness is an important indicator of cooperation that can play a substantial role in cooperatives by doing things according the knowledge that is built about cooperatives through its principles and values. It is through the principle of education, training and information that awareness could be created to develop a sense of responsibility and an ability of members to take right decisions and to prepare them to exercise their rights and responsibilities and be vigilant to be active participant in their cooperative (Gnigwo, 2010).

Access to training: Training as one of the functions of human resource management and as a principle of cooperatives, defined as the systematic way of developing skills, knowledge and attitudes demanded by an individual to perform tasks given on the job. Training defined as the planned and systematic modification of behaviour, events, activities and programs through learning which result in the participants achieving the levels of knowledge and skills to perform their work effectively (Armstrong, 2006).

Leadership skills: In a world of business, global leadership effectiveness becomes a major issue (Harteis, 2012). Leadership is a key component of all organizations, but its function and

capacity get more complicated with the highest involvement in globalization and technology development. In a competitive business, a sustainable advantage of business depends on the skills and abilities of a leader who could manage and implement business strategies. In cooperative, leadership involves a process of reaching an agreement through a group's decisions. Internal leadership is very crucial in applying policies and tasks which constantly enhance the operations of the cooperatives. A cooperative, although being a democratic organization fails to adopt the most efficient policies for its members (Ochan, 2016; Okoro, 2012)

Decision making ability: Participation in decision making is a social and emotional involvement of person in a group situation which encourages him/her to provide group specific goals and allocate responsibility in a group activity (Berhane, 2008). Decision making is very essential for the activities of cooperative where every task to be done must be decided by the general assembly of the cooperative. Decision making of members in their cooperatives is determined by the level of education, communication, income, farm size and the level of technology they may use.

Conflict resolution: Conflict is a universal feature of human societies. It takes its origin in economic differentiation, cultural transformation, social and psychological development and political organizations – all of which are inherently conflictual and becomes apparent through the formation of conflict parties, which perceived to have mutual incompatible goals.

Access to credit: Credit is the pivot which the development of any sector rests on. Access is central to every public service in terms of productive assets such as credit and education, land and water, extension, and public health services. Cooperative through community action has been recognized by the state and collective action leads to better conditions.

Cooperatives are facing challenges, from globalisation, market pressure and non-binding international rules. International rules are becoming more relevant, but the legal dimension of cooperatives has yet to be sufficiently explored from a comparative perspective. The organisational form of cooperatives is changing in the direction of increasingly hybrid structures. In order to be more competitive and international, many cooperatives are introducing managerial entrepreneurship. In addition, they are becoming more product-based and less region-based (which has an impact on member representation). They are also tending to change their ownership structures in order to attract more equity capital. In the agricultural sector, for instance, federated cooperatives are tending to disappear or to become farmer-

owned as opposed to user-owned. Cooperatives and producer organisations often experience legal uncertainty in the context of competition law and rulings. Some countries, such as the United States, have more exemptions for cooperatives in competition law (in order to rebalance market power), than others.

Diverging national legislation complicates matters. Therefore, an additional challenge is the absence of a European legal framework enabling the transversal recognition of the cooperative business model across the different sectors of the economy.

While many policy- and lawmakers in the EU (and abroad) praise the role of the social economy (for instance in catalysing social cohesion), it has not yet secured recognition for its important share in the economy. National and EU policies on entrepreneurship, for instance, often do not take into account the specifics of the cooperative business model (e.g. in terms of financing or education). At global level, cooperatives are recognised as important players in international development cooperation (European Parliamentary Research Centre February 2019).

2.5 Fishing and Livelihood Diversification

According to Kim et al (2017), it is estimated that between 93 and 97 million of rural households in developing countries are either directly or indirectly involved in fishing or are into the processing and marketing of small-scale fish. Ortman et al (2017), noted that fishing is a highly gender-segregated profession, with men catching fresh fish, and women processing fish. Despite the importance of fishery to the rural economy, steady increases in the number of rivers being dammed have been reported to affect the aquatic ecosystems that provide important environmental and socioeconomic benefits.

According to FAO (2008), fish farming has become an alternative to agriculture which depends on seasonal rainfall like Ethiopia. This indicated that fishery resources in Ethiopia have a vital role in poverty reduction, food insecurity and employment creation, yet the sector is not given due attention to any degree of comparable status (Lemma, 2012).

Related to this World Bank (2017) noted that the fishery sector in Ethiopia has huge potential to contribute significantly to the national economy through employment generation, poverty reduction and food security support. In consequence, the livestock and fisheries sectors have given priorities in the government's second Growth and Transformation Plan (GTPII). Consistent with the agricultural sector policy objectives, fishery is increasingly recognized as an alternative means of addressing the problem of food insecurity and poverty in Ethiopia. But

fish production is underexploited with respect to its ability to achieve food security and poverty reduction. Similarly, fishing as a secondary or complementary activity can thus be indispensable for rural households both in terms of income source and food security (ibid).

According to Birara (2020), even though fishery gives many advantages to the economy of the country, currently the participation of farm households' in fish production is poor. Fisheries are important supplier of food and income and provide a diverse set of benefits to many households and communities. The small-scale fisheries and aquaculture sector provides both direct and indirect food and nutrition security, through providing fish to households and thus generating income (Dagninet et al, 2015).

In 2010, Ethiopia realized about USD 14 million from its capture fishery while a total of 40 000 livelihoods were positively impacted upon by the fishery sector in the same year (FAO, 2016). In Ethiopia, fisheries are acknowledged as an important strategy in the drive for poverty reduction. The per capita fish supply is around 200 g, significantly below the mean 2.6 kg per capita per year for the East African sub region. The contribution of fishery to the regional and national economy is expected to grow as local and international demand for fish and fishery products is growing (Ibid).

2.6 Determinants of Farm Households' Participation in Fish Production

Michael and Fantahun (2019) indicated that fish is an aquatic animal which serves as sources of food, nutrition, income and livelihood for millions of people in the world. Many small-scale artisanal fisheries in Africa are currently trapped in a vicious circle of over-exploitation and demise (Kim and Tony, 1997). However, with increasing pressure on the resource, fishing can play an important role in supplementing declining per capita food production and providing additional cash income. Despite the undoubted potential of fisheries and aquaculture, the sector faces serious challenges. Fisheries are at grave risk from human pressures, including overexploitation, pollution and habitat change. Climate change is compounding these pressures, posing very serious challenges and limiting livelihoods opportunities. It is transforming the context in which the world's fishers and fish farmers live and work, posing a major threat to their livelihoods and the ecosystems, especially reefs, on which they depend (International Fund for Agricultural Development (IFAD, 2019).

According to Birara et al (2020), in Ethiopia, the fishery sector plays an important role to improve food security, employment creation, IGA and poverty reduction. Despite the economic importance of fish farming at the household and national level, farm households

have paid little attention to the sector. Suffice to note the country has huge fish potential though the fishery sector is still underexploited.

Farm households' participation in fish production can be influenced by socioeconomic and institutional factors such as age, educational status and household size (Birara, 2020). Analysed with a gender lens, the men and women in this sector tend to engage in distinct activities that are strongly influenced by their social, cultural and economic contexts. In most regions, fish catching is male-dominated. Ocean-going boats for offshore and deep-sea fishing often have male crews, while in coastal artisanal fishing communities, women often manage smaller boats. Women are mostly responsible for skilled and time-consuming onshore tasks, such as making and mending nets, processing and marketing catches, and providing services to the boats ((International Fund for Agricultural Development (IFAD, 2019).

In many small-scale fisheries around the world, it is changes in the social, cultural and economic context in which the fishery is located which result in modifications to household production trends and behaviour (Kim and Tony, 1997). Thus, in the absence of alternative income-generating employment opportunities, small-scale fisheries exhibit certain characteristics.

Rhona et al (2011) noted that households' decision to participate in various income-generating activities like fishing farming was influenced by asset endowment, household structure and local institutions. A household's access to social networks increased participation in other livelihood occupations.

In regarding, foundation of formal cooperatives in Ethiopia it has encountered decades and the number was increasing time to time. According to Bezabih Emana in his publication by ILO, primarily the history of formal cooperatives came to the reality in 1960. However, traditional cooperative associations in Ethiopia have been existed centuries ago (Bezabih Emana, 2009). Actually the approaches of the cooperatives had been implemented differently in the three Ethiopian regimes such as Imperial, Derge and the current government and recently different written reports tells us the number of cooperatives are increasing at alarming rate time to time. As it is known the importance of cooperatives taken in to consideration by observing multiple challenges of social, economic and environmental issues are coming to the subject matter in regarding of affecting the livelihood of the communities negatively or positively. Regarding the fishery cooperatives

3. Material and Research Methods

3.1. Description of the study area

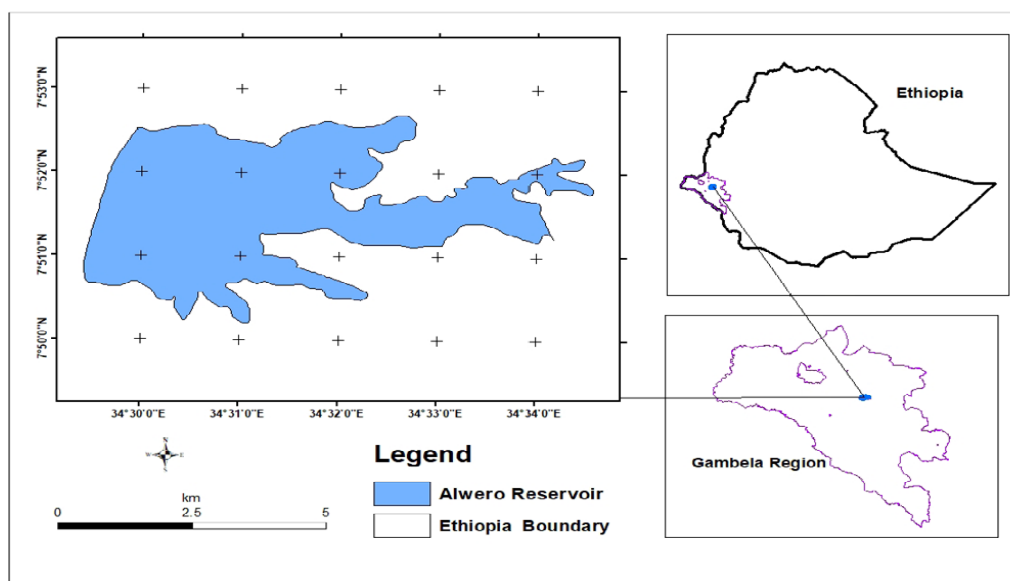
This study was conducted in Gambella region state, in Agnua Zone of Abobo woreda. The area is selected due to convincing reasons that it is one of the potential area of fish production and number of cooperatives and farmer households are involved in the production process hence this is convenient to explore the determinants of fishery production practices.

Location

Gambella Regional State, which is found in the south-western part of Ethiopia, is located between 7°00'N–8°17'N of latitude and 33°00'E–36°00'E of longitude. It is bounded by Oromia region to the North and East, SNNP region to the South and the Republic of South Sudan to the West (Ochan et al., 2016).

Regarding the administration, As Ochan et al., 2017 referred that in his study the region has three zones (Anywaa, Nuer and Mejang); which is further divided into 12 woredas and one town administration “Gambella” (GARDB, 2010). The region estimated to have a total population of 409,002 in 2015 of which 213,001(52.08%) is male and the remaining 196,001(47.92%) is female. Out of 409,002, 132,001(32.27%) and 277,001(67.73%) are urban and rural dwellers respectively (CSA, 2013)

: Map of the study area.



About the specific study area, according to Birhan et al, 2016, Abobo woerda, Alwero reservoir vicinity kebeles Anuak zone, Gambella National Regional State. The reservoir was built by the then United Soviet Socialist Republic (USSR) for irrigation purposes. It is located at 7.8631°N, 34.4939°E and has a total area of 22.1km². The reservoir has a water holding capacity of 74.6 million m³ and is found at a distance of 47km south of Gambella city (Hussien et al., 2010). Abobo district has a total human population of 15,741(CSA 2007).

Climate: In the paper of Anuto David Ojulu mentioned that, Abobo district has two Agro-climatic zone; these are woina dega (10%) and kola (90%). Accordingly, mean annual minimums and maximum temperature range between 18_ and 39_ respectively. Then the annual average rainfall range from 900mm to 920mm and the rainy season in the district is mid-April to the end of the October (NMSA Gambella branch, 2012).

Demography: Based on the 2007 Census conducted by the CSA, this woreda has a total population of 15,741, an increase of 12.65% over the 1994 census, of whom 8,184 are men and 7,557 women; with an area of 3,116.17 square kilometres, Abobo has a population density of 5.05, which is greater than the Zone average of 4.83 persons per square kilometre. The census reported 4,090 or 25.98% are urban inhabitants. A total of 3,867 households were counted in this woreda, which results in an average of 4.1 persons to a household, and 3,663 housing units. Many of the inhabitants said they were protestant, with 71.41% of the population reporting they observed this belief, while 10.77% were Catholic, 9.98% of the population practised Ethiopian Orthodox Christianity, and 6.12% were Muslim

Socio-economic activities: According to the assessment of MOA and Natural Resources Government of Federal Republic of Ethiopia The Agnuwahas are polygamous societies and favor living in extended family groups in settlements established here and there in isolated pockets on the banks of the Baro River, in front of their agricultural fields. A grass-roofed main hut for sleeping, a smaller version for grain storage and chicken coops comprise typical Agnuwaha family holdings. The Agnuwaha worship ‘Ochudho’. For them, Ochudho or god of the river is responsible for the origin of their kings and chiefs. Like 25 many other Nilotic people, Agnuwahas have a complicated age-system in which different generation groups bear names, which signify major happenings in their past

The communities in this zone are mainly cultivating crop (sorghum and maize) dependent people with fishing in the Akobo Rivers mainly in the dry season and hunting are used as their

supplementary dietary and income sources. Recession (riverside agriculture) is a common practice by nearby community along the existing rivers.

3.2. Research Strategy

In this study it is aimed to apply both qualitative interviews and quantitative survey. According to nature of the problem planned to study, multi-research strategies have been considered because various kebeles and groups are intended to include in the research thesis. In the target groups to be considered in the research are cooperative members and non-cooperative members therefore the nature of the study need to use multi-research strategies.

3.3. Research Design

This proposal is designed to assess determinants of fishery practices in cooperatives' members and Farmer Households in the Abobo district of Alwero reservoir thus both qualitative and quantitative methods of data collection are deployed. Questionnaires, key informant interviews, focus group discussion, and field observation methods were applied to collect the relevant data on determinant factors of fishery production.

3.4. Source of Data

In this study, both primary and secondary data were taken as an input. The primary data expected to collect from Questionnaires, KIIs, FGD, and field observation was cooked and used together with secondary data. The other option, Secondary data was collected from different parties those are directly or indirectly linked with Fishery practices such as official reports and assessments of governmental bodies at all levels such as Natural Resources and Agricultural Development Bureaus and offices, Livestock and fishery Development bureaus and offices including Kebele levels, Universities Keeble level of bureau and offices, Universities and research centres were most of the stakeholders to be addressed to collect important secondary data.

3.5 Methods of Data Collection

3.5.1 Field Survey

Key Informant Interview

Semi-structured interview was applicable for the key informant interviews. The informants was selected from elder peoples having knowledge about fishing background (4), Kebele leaders (4), and Livestock and Fishery development agents (4), Woreda Management Units (2), Woreda Agriculture and Livestock Units (2). The key informants were selected purposively to get general information about the study area. In this case, 16 individuals were interviewed.

Different interview guides were used for the various informants, but the content covered demands of the research questions. However, respondents will give the same context of questioning; both closed and opened ended questions. It also offers the interviewer the opportunity to examine further and to clarify issues relevant to the study.

Household Survey

One of the sources for primary data to this study was the household survey expected to collect from the field. A type of survey which was convenient to the nature of the problem is conducted to have essential information and knowhow about the study area and current social, economic, cultural and environmental status of the community. During in this assessment the traditional (previous) and the current fishery practice level, the basic discrepancy of fishery practices between the cooperative members and individual farmer households were considered. In addition to this the main challenges and the root causes for the productivity were exhaustively explored. To carry out the house hold survey questionnaires were developed and distributed through 4 data collectors on top of the researcher. The type of household survey was incorporated with both structured and semi structured questionnaires. In this survey 38 individuals from cooperative's members and 52 individual non cooperative members, totally 90 participants were selected and included from the vicinity kebeles, Aboro and Kire, out of 17 in which fishery practice is widely adapted.

Focus Group Discussion

Group discussion was also one of the tools which served for the field survey therefore in this regard including women & men individuals among fishery producers' assembly and in segregation, land and water use committee members, religious leaders, and extension staff workers directly with the farmers. In this case, 3 focus group discussions was conducted at the purposively selected kebeles of the Woreda. The findings from this stage used to refine the study objectives, sampling methods, and survey instrument.

Field Observation

Filed observation was also another important data collection technique to be used to generate qualitative data. Through this technique, first-hand information was collected in relation to the various aspects of the research questions. The researcher used this method for the systematic description of the existing events and natural and social settings of the study area. In this field

observation work, the researcher actively looked at the ground reality, informal interviewing, writing detail field notes, and capturing of photographs.

3.5 Sampling Frame and Technique

If a population from which a sample is to be drawn constitute a heterogeneous group (for our case members and non-members of farming cooperatives), stratified sampling is appropriate to be applied. The main advantages of stratified sampling were (i) more reliable information can be obtained from the same sample size if the population is stratified than from the population as a whole and (ii) comparisons between the two groups are easy as a separate but similar survey was done in each group. Hence, a multi-stage stratifying sampling technique was used to draw a representative samples for this study. Generally, one fishery production district in Gambella region, Abobo woreda was selected and from this woreda two kebeles were selected purposely, namely Abour and Kire. Households in each sample kebeles were categorized/stratified based on membership status into two as cooperative member and non-cooperative members by using, a total of 90 sample farmers (52 members and 38 non-members) were selected randomly and proportionately from the sample kebeles

3.6 Variables and Working Hypothesis

3.6.1 Dependent Variables

Fish Productivity

3.6.2 Independent Variables and Hypothesis

The independent variables could influence the dependent variable. Therefore, the following explanatory variables were hypothesized that could determine the fishery productivity of households in the study area.

- A. Family Size
- B. Education level
- C. off farm and Additional Income Activities other than fishing
- D. Financial Access
- E. Training and capacity building and perception of fishery cooperatives
- F. Fishing materials
- G. Impact of climate change
- H. Market and transport access
- I. Market chain
- J. Days spent for fishing

3.7. Model specifications

Model specification is the process of determining which independent variables to include and exclude from a regression equation. The factors that affect the monthly income of fishery community were estimated by using quantitative models of multiple linear regression analysis. Zellner, a. (2001), keep it sophisticatedly simple.

The general formula used for the model is:

$$y = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + \dots B_nx_n + \varepsilon$$

Where

Y- Average Income

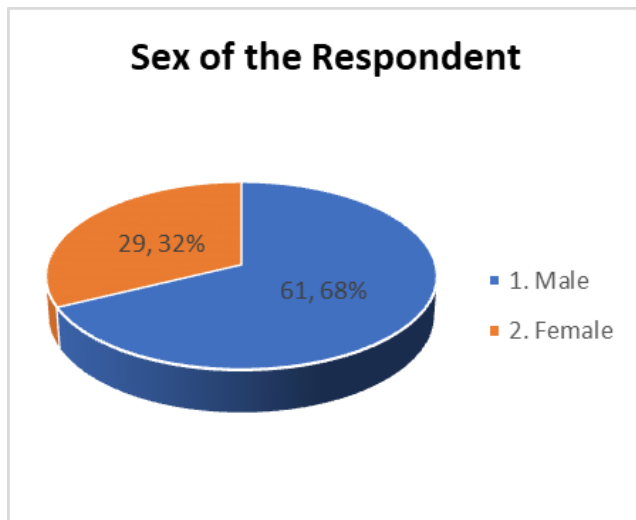
- B_0 -constant
- $b_1, b_2, b_3 \dots b_n$ - represent regression coefficients
- $x_1, x_2, x_3 \dots x_n$ (age, sex, family size, incomeetc)
- E - The model error term.

4 RESULT AND DISCUSSION

4.1. Demographic characteristics of the respondents

Sex segregation of house hold is determinant independent variable that equal participation of both sexes ensures cooperative productivity. Demographic characteristics of the respondents considered as determinants factors for the productivity of fishery cooperatives were taken and shown regarding of the below chart shows that sex and age of the respondent. Out of the respondents 61.68% were male and 29.32% were female, this shows that gender balance is not ensured and male fish producers are dominant. This also indicated that gender mainstreaming and empowerment is not considered in both cooperative and non-cooperative households. Regarding sex, the relationship between female headed household and food security status is negative, Ahmad (2015). Lack of family labor, low experience and weak access to technology was cited as cause for such problem. Hence, the hypothesis could be female-headed households were more likely to be less productive and as indicated in this result 29.39 % are female and therefore they need to capacitate and empower for equal resource access with male HHs.

Figure 1 Sex of respondents



Regarding the age, out of the total respondents 57 % of them were between ages 30 -50, 39 % were between the age 18-29 and the remaining 4% were elders. This shows that the participation level in regarding of age is the majority percentage is the productive group of the communities is incorporated in the fishery production activities.

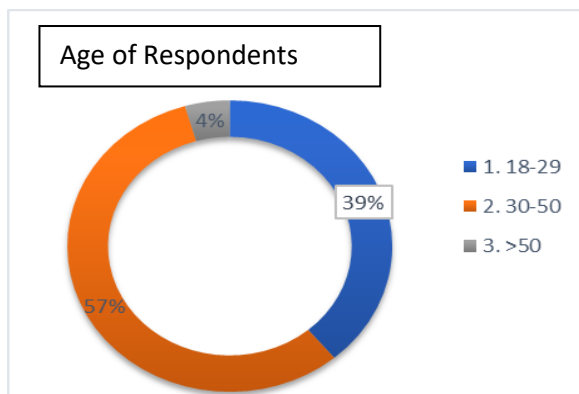


Figure 2 Age of respondents

4.1.1 Marital Status

As Mzuyanda et al., 2018 revealed, it is normally believed that married household heads tend to be more stable in Agricultural activities than unmarried heads. If this holds true, the marital status of household heads affects productivity and hence, marketing. The finding in the below table also shows that out of the total 90 respondents 78 of them (86.67%) are married and this helps them to run stable fishing activity. Regarding the remaining respondents, 6 of them (6.67%) are widowed, 5 of them (5.56%) are divorced and the remaining one respondent is single.

Table 1 Marital Status of respondents

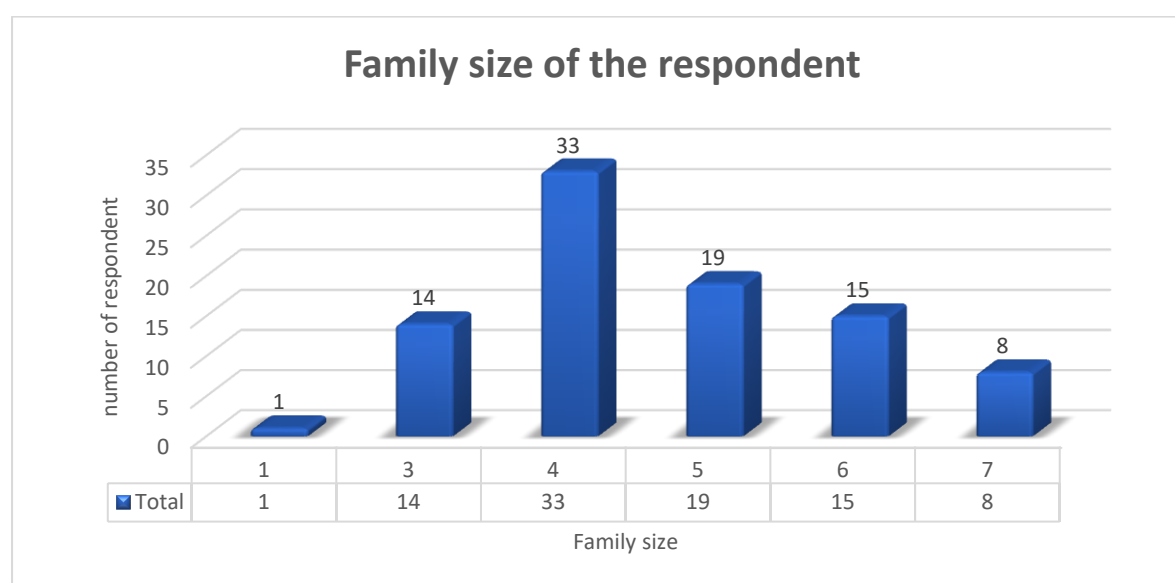
S.N	Marital status	Frequency of Marital status	% of Martial status of the respondent
1	Widowed	6	6.67%
2	Married	78	86.67%
3	Single	1	1.11%
4	Divorced	5	5.56%
	Grand Total	90	100.00%

4.1.2 Family size

The below graph indicates that the family size of the respondent and 14 respondent reported that they family size is three, 33 respondent reported that they family size is 4, 19 respondent reported that they family size is 5, 15 respondent reported that they family size is 6 and the remaining 8 respondent reported that they have 7 individuals family members leaving with respondent family and also the average mean of family size is 4,62, which means in average 4.6 individual members living in households of the respondent family.

According to Mzuyanda *et al*, 2018, the family size Availability of labor to carry out “labor-intensive” agricultural operations is greatly influenced by household size. The household size values have an influence on marketing since they affect consumption and production (Randela, 2005). Larger household size discourages selling because the household needs to supply household consumption before it decides to sell. Mzuyanda Christian *et al*, 2018

Table 1 Family size of respondents



4.2 Level of engagement and understanding for Farmer households about cooperative management.

4.2.1 Education Level of Fishery Producers

The below table is respondent's education level and out of the total respondents, 57 of them (63%) are illiterate and do not able to read and write only the remaining 33 respondents (37%) are literate therefore they have basic numeracy skills and able to read and write. As it is observed that literacy and numeracy knowledge and skills contribute significant roles because it needs daily book recording to control a balance sheet and exercise overall financial operations. Therefore this indicate that nearer to $\frac{2}{3}$ rd of the total respondents have no regular education access then resulted lack of registering and controlling income and expenses for fishery activity. Education plays an important role that to bring a significant change for the productivity of cooperatives.

Table 2 Number of literate and illiterate respondents

S/N	Level of Education	Frequency	Percentage
1	Literate	33	37%
2	Illiterate	57	63%
	Grand Total	90	100%

According to David Ojulu, 2020, Education is believed to improve the knowledge of the household to increase the quantity of production and supply to the market. Then Grover et al., (2012) found that level of education affected the marketed surplus positively and significantly (Analysis of Fish Market Chain: The Case of Abobo District, Agnawua Zone, Gambella, Ethiopia, David, 2022). As shown above table 37% of the total respondents did not attend regular education therefore contributes little for the success of productivity. Starting from the establishment of the cooperative most participants need active enrolment in regarding of business plan preparation book recording (income and expense) and additional work task distribution.

4.2.2 Cooperative and Non Cooperative Members

Table 3 below showed that whether the respondents were cooperative members or not included in the cooperative. Out of the total respondents, 52 of them are not cooperative members and the remaining 38 respondents (42%) are cooperative members.

Table 3 Number of cooperative members

4.2.3 Numeracy skills of Fish Producers

S/N	Are your cooperative member	Frequency	Percentage
1	yes	38	42%
2	No	52	58%
	Grand Total	90	100%

It was equivalent that In the below table as the same as the previous table shows similar percentage is observed, The majority households, 63% of the total respondents are not able to read and write therefore the described percentage of households unable to write and read are have an access to monitor and follow up their expense and income as well due to their absence of numeracy access.

Table 4 Numeracy skills of respondents

S/N	Able to read and write before you joined the cooperative	Frequency	Percentage
1	yes	14	37%
2	No	24	63%
	Grand Total	38	100%

Following the participant's response for they did not able to read and write they were requested how they have an access to follow balance sheet and income activity of the cooperative?

According to the report 24 (63%) of the respondent did not read and write before they joined the cooperative and following to that the researcher investigated how they follow balance sheet and income activity of the cooperative and 2(8%) of the respondent replied that they took training for numeracy and other capacity building training since they joined the cooperative, 5(21%) of them replied as they do not have any update about their cooperative progress and the remaining 12(50%) of them already replied that their cooperatives are not functional.

Table 5 Respondents with no Numeracy skills

S/N	Row Labels	Frequency	percentage
1	I took training for numeracy and other capacity building training since I joined the cooperative	2	8%
2	Other cooperative members follow and inform me	5	21%
3	I do not have update for the progress	5	21%
4	Our cooperative is not functional right now	12	50%
	Grand Total	24	100%

4.2.4 Period of cooperatives since established

The below table shows that how long time cooperative members have stayed in their respective cooperatives. In this interview Out of the total 38 respondents of cooperative members, 20 (53 %) of them are four years and above, 14 (37%) of them are three years and the remaining 4 respondents have stayed two years. In aggregate 34 (89%) respondents have stayed two years and above. Member's productivity has direct relationship with their period stayed in the cooperative. Particularly, productivity is expected for two years and above participation in the cooperative.

Table 6 Period of respondents since being cooperative members

S/N	Row Labels	Frequency	Percentage
1	2. two year	4	11%
2	3. three years	14	37%
3	4. Four years and above	20	53%
	Grand Total	38	100%

4.2.5 Meeting and coordination among cooperative members

Coordination is a key tool for productivity success in the cooperatives.

Coordination and meeting is one of the pillars for the success and productivity of cooperative it strengthen team esprit and synergy thus helps the challenges as occurred internally and externally. According to Mzuyanda Christian et al, 2018, Member's participation is the act of taking part in any activity of the society such as attending the general assembly meeting, involvement in the development of business plan, election process, decision making, exercising leadership responsibilities, monitoring and evaluation of activities related to cooperatives by all members Mzuyanda Christian et al, 2018. As shown in the below table 95 % of the total respondents do not hold meeting and have limited access of cooperatives progress. The reason why the respondents do not held regular meeting also have been surveyed and 58% of the total respondents replied that as their cooperative is not functional wright now, 25 % of the respondents replied as there is no leader or coordinator who take the responsibility and 14% of the respondents also do not have any update whether the meeting is being held.

Table 7 Respondents participation in regular meeting

S/N	Do you participate in regular meetings	Frequency	Percentage
1	1. Yes	2	5%
2	2. No	36	95%
	Grand Total	38	100%

4.2.6 Meeting Participation among cooperative members

Regular meeting is essential activity for the productivity of fishery cooperatives hence it enhances communication between the members and solves any arguments. As shown in the next table, 58% of the respondents said that their cooperatives are not functional now.

Table 8 Members Response not to participate in regular meetings

S/N	Why do not you participate in meeting	Frequency	Percentage
1	I do not have any update	5	14%

2	Our cooperative is not functional right now	21	58%
3	we do not have common agreement between the group members	1	3%
4	4. No one coordinate us	9	25%
	Grand Total	36	100%

4.2.7 Response of producers for Training and Capacity Building

As Abebaw Yenesew, et al (2019), *Challenges and Prospects of Cooperatives in Ethiopia with Reference Sough Gondar Zone- Ethiopia*) revealed, The other Principle of cooperatives state that cooperatives must provide education and training for their members, elected representatives, managers and employees so they can contribute effectively to the development of their cooperatives

Training and capacity building is a determinant factor that to fill the gaps of knowledge and skills for the cooperative members and other producers to ensure the productivity. In regard of this, 92% of the respondents replied that they have been conducted a training and only the remaining 8% failed to take the training. Gnigwo stated that, It is through the principle of education, training and information that awareness could be created to develop a sense of responsibility and an ability of members to take right decisions and to prepare them to exercise their rights and responsibilities and be vigilant to be active participant in their cooperative (Gnigwo, 2010).

Table 9 Number of respondents included in training and capacity building activities

S/N	Row Labels	Frequency	Percentage
1	Yes	35	92%
2	No	3	8%
	Grand Total	38	100%

4.2.8 Knowhow and knowledge of cooperative

Knowledge and know-how of individuals directly relevant to experience, training and in the below table the respondents have replied that 68% of the total respondents did not know the

about their cooperative's bylaw and business plan therefore this indicate that they have missed the fundamental procedures of cooperatives. This indicate that management of cooperatives are failed under the control of specific members therefore the rest of 68% did not directly controlled the cooperatives activity.

Table 10 Response of Fish Producers for knowhow of bylaw and business plan

S/N	Row Labels	Frequency	Percentage
1	Yes	12	32%
2	No	26	68%
	Grand Total	38	100%

The below table shows among all respondents 92% of them have the knowhow of physical and financial assets they own. But they did not assure that as they directly control over the resources.

Table 11 Producers Response whether they aware of the Inputs made as a cooperative members

S/N	Row Labels	Frequency	Percentage
1	yes	11	92%
2	No	1	8%
	Grand Total	12	100%

The following table shows that any support respondents multiple response they got due to being a member ship of their respective cooperative. Based on the responses Only 1 respondent (3%) of them has got an access for three multiple support that are training, material support and financial support.

Table 12 Knowhow and awareness for the Inputs supported for the cooperative members

S/N	Row Labels	Frequency	Percentage
1	Financial support 5. Material support 6. Training	1	3%
2	Material support	2	5%
3	Material support 6. Training	5	13%
4	Material support 6. Training 1. Financial	1	3%

	support		
5	Training 3. Market chain	1	3%
6	Training 5. Material support	27	71%
7	Training 5. Material support 1. Financial support	1	3%
	Grand Total	38	100%

The possible alternatives that contributes for cooperatives productivity described in the below table are analysed as below

Table 13 Support made due to being a membership of the cooperatives

S/N	What advantages you got since you are in a cooperative	Frequency	Percentage
1	What advantages you got since you are in a cooperative? /1. Financial support	3	8%
2	What advantages you got since you are in a cooperative? /2. Technical support	0	0%
3	What advantages you got since you are in a cooperative? /3. Market chain	1	3%
4	What advantages you got since you are in a cooperative? /4. Value Chain	0	0%
5	What advantages you got since you are in a cooperative? /5. Material support	37	97%
6	What advantages you got since you are in a cooperative? /6. Training	36	95%

Financial Support

As Mekonnen revealed, some transient problems have confronted the agricultural cooperatives in Ethiopia. Such as: financial constraints, transportation problems, shortage of skilled manpower, delay in provision of supplies like fertilizer, improved seed etc. (Mekonnen, 1992). In this survey also shown that only 3 respondents (8%) of them got an access for financial support this indicate that cooperatives with restriction to strengthen their activity. In the other way round financial institutions have no interest to provide a service of loan and saving for the poor farmer house hold and cooperative members due to fear and lack of trust to recycle money and run the health financial process.

Technical Support

Technical skills and regular follow up of producers which able to produce, dry, store and transport fish are the main the key activities to bring progressive result. In this observation, according to the above table none of them have responded as they got frequent technical support since they are involved in fishery cooperative activity in the study area.

Market Chain

As Anuto David Ojulu revealed, The market structure consists of the characteristics of the organization of which seems to influences strategically the nature of the competitions and pricing with in the market (Abaynehet al., 2018). Then the structure of fresh fish market was characterized by employing the following indicators: Market concentrations, market transparency (market information's), and market entry conditions. Based on this concept, as the respondents answer was seen in the above table, only 3% of respondents have replied that they have regular market chain and the remaining are providing fish products randomly to the vicinity buyers.

Value Chain

According to Michael Porter, "Value Chain" is defined as a representation of a firm's value-adding activities, based on its pricing strategy and cost structure. (Porter 1985). According to the response of the above participants none of them have gone under feasible value chain.

Material support

In the previous years, some researches in the study area revealed that one of the challenge in the study area was access for material support such as Fishing materials, bouts, refrigerator,

storage and others nevertheless in the above table respondents replied that 97% of them have been supported these materials under their respective cooperatives.

Training

The above table is shows that the multiple responses of the respondent reported that the advantages they got since they are in cooperative and the result indicates that 8% of them were reported they got financial support, 1 respondent (3%) of them got market chain, 36 (97 %) respondents replied that they have been conducted training, only a respondent (3%) of them got access to market chain and finally none of them have got access to value chain. The possible alternatives

4.3 The major factors, which determine fishery production practices

In the below table it was regarding the general trend of fishery productivity out of the total respondents of both cooperative members and non-cooperative households 61 of them (68%) replied that fishery productivity in the last recent years was increasing, 14 of them (16%) replied the productivity was decreasing and the remaining 15 respondents said that the productivity was remaining the same neither increasing nor decreasing.

4.3.1 The general trend of fishery production

As mentioned in the above table revealed the general trend of fishery production in the recent years. Following the survey, out of 90 total respondents, 61 (68%) of them replied that the fishery productivity is increasing, 14 respondents (16%) said that the productivity is decreasing and the remaining 15 producers said the productivity remains the same.

Table 14 General Trend of Fishery Production in The study Area

S/N	Row Labels	Frequency	Percentage
1	1. Increasing	61	68%
2	2. Decreasing	14	16%
3	3. Remains the same	15	17%
	Grand Total	90	100%

4.3.2 Fish Demand and Supply

In the below table the respondents replied that how it looks like demand and supply of fish products in the vicinity. Based on this 51 respondents (57%) said that the demand of the vicinity area is higher than the supply, 35 respondents (39%) of them replied that as demand and supply is equivalent and the remaining 4 respondents (4%) of them replied the demand is less than the supply.

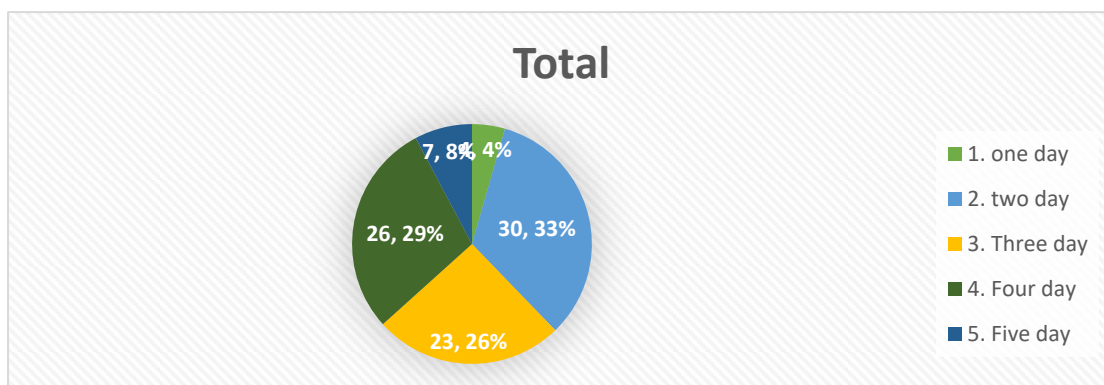
Table 15 Demand and Supply of Fish in the study Area

S/N	Row Labels	Frequency	Percentage
1	The demand is higher than the supply	51	57%
2	The demand is less than the supply	4	4%
3	Demand and supply are equivalent	35	39%
	Grand Total	90	100%

4.3.3 Production days throughout the week.

Number of working days is the main determinant factor for productivity. In this regard in the below pie chart shows that how long days the respondents used to work with in the week. Based on this out of total 90 respondents, 30.33 % replied 2 days a week, 26.29 % replied one day a week, 23.26 % replied as they work three days a week, 7.8 % of them replied five days a week and finally the remaining 4.4 % of respondents relied as they used to work 5 days a week.

Figure 3 Number of Days spent with in the week



4.3.4 Amount of money earned

In the table under here the respondents were requested that the amount of money they earn per week and thus the majority of them 50 (56%) replied that they used to earn 201-400 birr, 25 (28%) of them replied as they used to earn less than 200 birr, 12 (13%) of them have replied they used to earn 401-650 birr, only one person (1%) use to earn between 651-1000 birr and lastly only two respondents (2%) replied they use to earn more than 1000 birr per week. In this analysis.

Table 16 Amount of Cash earned per Week

S/N	Cash amount per week	Frequency	Percentage
1	> 1000	2	2%
2	<200	25	28%
3	201-400	50	56%
4	401-650	12	13%
5	651—1000	1	1%
	Grand Total	90	100%

4.3.5 Possible Mechanisms of storing or preserving Fish

The below table is also categorizing fish producers response that 84 of them (93%) are using means of drying technique to preserve fishes until they provide to the market or consumption and only the remaining 6 respondents (7%) are using refrigerator to preserve the fishes.

Table 17 Storage mechanism of fish

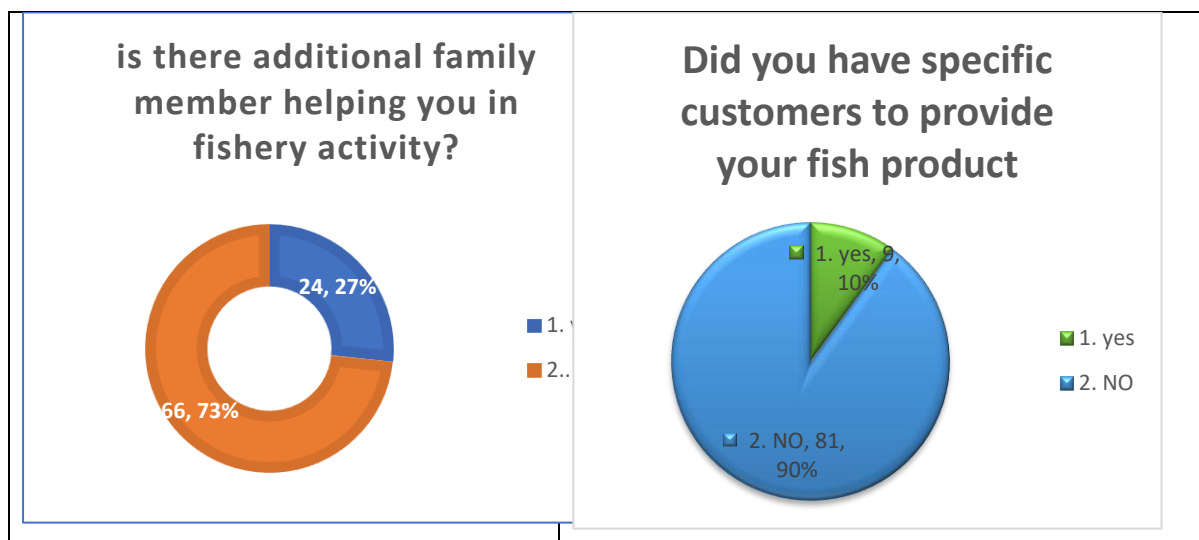
S/N	Row Labels	Frequency	Percentage
1	1. Store in the refrigerator 2. Drying	2	2%
2	2. Drying	84	93%
3	2. Drying 1. store in the refrigerator	4	4%
	Grand Total	90	100%

4.3.7 House hold Family Member's participation and customers Analysis

In the below figure, the respondents replied that 66.6 % of them have no family members supporting them in fishery activity and only 24.27 % are with family members supporting fishery activity. Moreover, Out of total respondents, 90 % of the respondents do not have permanent customer to provide their fish products and only 10 % are with customers.

Figure 4 Family members activity engagement and customers' linkage

Is there additional family member helping you in fishery activity?	Did you have specific customers to provide your fish product
--	--



The above pie chart indicates that the respondents were requested about man power among the family members participation and the second chart is also about respondents whether they have specific or regular customer to whom they provide fish products. Based on the survey as shown in the first chart out of the total participants 90 participants 66.73 % of them mentioned that no one is supporting or participating in fish production activity and only the remaining 24 % of them are working with additional family members. In the right pie chart it refers respondent's replication that 90 % of the total respondents mentioned that they do not have specific customers to sell their fish products and only 10 % of the respondents have constant customers.

The below two tables indicated that both cooperative and non-cooperative members response that only 16% of them have regular customers to provide their fish products and also non-cooperative members have 6 % regular customers that is less customers than cooperative members.

Table 18 Customers relationship with cooperative and non-cooperative members

Do you have regular customer for your fish product? cooperatives	Abour	Kire	Grand Total	%
1. yes	3	3	6	16%
2. NO	15	15	32	84%
Grand Total	18	18	38	100

Table 19 Customers relationship with Cooperative and non-cooperative members

Did you have specific customers for your fish product? non cooperatives	Abour	kire	Grand Total	%
1. yes	2	1	3	6%
2. NO	21	28	49	94%
Grand Total	23	29	52	100

4.3.8 Supply of Fish Production

According to the above pie charts respondent ratio, It is described that 10% of the respondents replied they have unbroken customers and these respondents also in the table below, 78% of them replied for multiple response that they supply the fish product to hotels and Restaurants the remaining 22 % replied they supply to individuals and communities in the vicinity.

Table 20 Supply of Fish Products

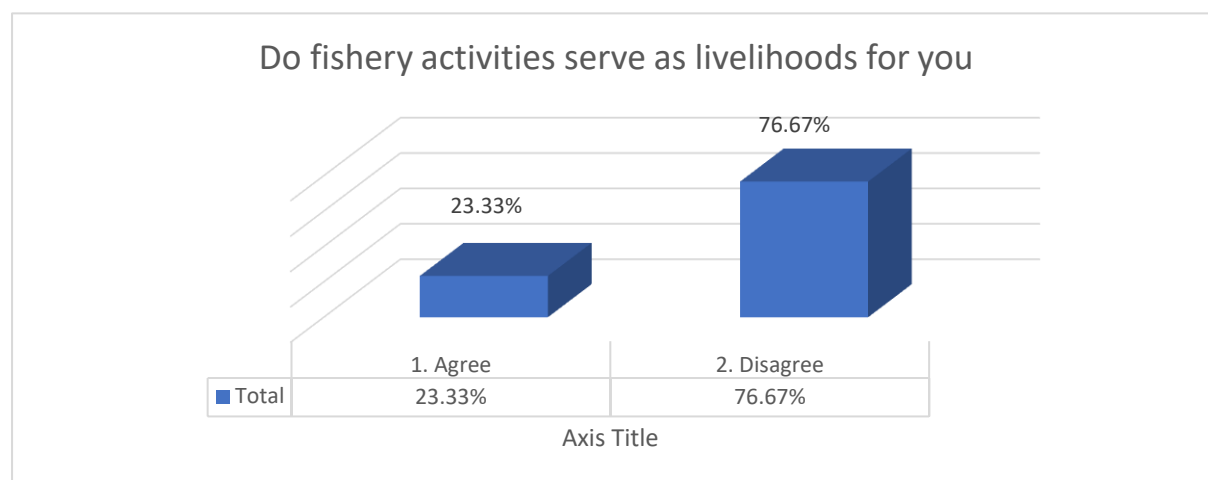
S/N	Row Labels	Frequency	Percentage
1	1. For Hotels and restaurants	7	78%
2	1. For Hotels and restaurants 2. For individuals and communities around the vicinity	1	11%
3	2. For individuals and communities around the vicinity	1	11%
	Grand Total	9	100%

4.4 Impacts on livelihood status on cooperative members and non-cooperative Farmer households

4.4.1 Fishery activity on the Livelihood of Producers

In this household survey the respondents were requested that whether fishery production is served as a means of livelihood. Based on that out of 90 total respondents 76.67 % of them replied they do not accept the fishery production is serving as means of livelihood and only 23.33 % of them agree that fishery production is covering as means of livelihood.

Figure 5 Impacts of Fishery productivity on farmer house holds



The below two tables indicated that the fishery activity has some impacts for their livelihood contributions. Cooperative member's response shows that 29% of their livelihood income is from fishery production and non-cooperative members have indicated that 19% of their income is relied on fishery production

In the below table the contribution of fishery production to improve livelihood of the HHs is shown for both cooperative and non-cooperative members. Out of the respondents only 29 % of them replied that fishery is contributing for their livelihood improvement and non-cooperative members replied only 19 % of and as less than cooperative members.

Table 21 Contribution of fishery production for HH livelihood of cooperative members

Do fishery activities serve as livelihoods for you? cooperative members)	Abour	Kire	Grand Total	%
1. Agree	7	4	11	29
2. Disagree	13	14	27	71
Grand Total	18	18	38	100

Table 22 Contribution of fishery production for HHs livelihood of cooperative members

Count of 39. Do fishery activities serve as livelihoods for you non-cooperatives	Abour	kire	Grand Total	%
1. Agree	7	3	10	19
2. Disagree	16	26	42	81
Grand Total	23	29	52	100

4.4.2 Basic Needs analysis

23% of the respondents in the above chart those replied their agreement as fish production covering their means of livelihood are also investigated under the table here below. Based on the assessment out of the respondents those agreed fish production covered their livelihood, 15 of them (71%) of them replied fish production activity cover food consumption, 19% of them replied multiple response, the fish production activity covers both food consumption to their family and covers school fee. and the remaining 2 respondents replied multiple response that they use to cover food, school and shelter expenses.

Table 23 Impact of Fish Products on producers

S/N	Impact of Fish productivity	Frequency	Percentage
1	Food consumption to my family	15	71%
2	Food consumption to my family 2. Saving money	4	19%
3	Food consumption to my family 2. Saving money 4. constructing shelter	2	10%
	Grand Total	21	100%

4.4.3 Experience of Fishery activity

Table 24 Experience of Fishery activity for producers

S/N	when have you started fishery practice	frequency	Percentage
1	1. Before I joined the cooperative	19	50%
2	2. After I joined the cooperative	19	50%
	Grand Total	38	100%
If you are cooperative member, which period is better in regarding of production and income for your means of survival?			
S/N	Productivity before and after?	Frequency	Percentage
1	After I joined the cooperative	18	47%
2	Before I joined the cooperative	1	3%
3	It remains the same	19	50%
	Grand Total	38	100%

In the above table cooperative members households were requested that whether they started fishery activity before or they joined their respective cooperatives. Based on the survey, out of 38 respondents 19 of them (50%) replied they practiced fishery activity and the remaining 50% were already started after they joined the cooperatives.

In the other way round based on the response of survey participants, out of 38 participants, 18 of their livelihood status and means of income was improved and only one respondents said that the livelihood status before joining the cooperative was better and 19 respondents (50%) replied it has no change or progress on their livelihood status rather it remains the same.

4.5. Inferential Statistics Analysis and Discussion

These inferential statistics analysis have includes independent sample t test, liner regression analysis and Analysis of Variance (ANOVA) and also it helps to convey the meaning of the collected data after it has been collected, evaluated, and summarized of the collected data and also its helps to determine if patterns found in a study sample may be extrapolated to the wider population from which the sample was drawn. And it is used to test hypotheses and study correlations between variables, and they can also be used to predict population sizes. Inferential statistics are used to derive conclusions and inferences from samples.

4.5.1. Sample T Test Analysis and Discussion

This Paired Sample t-test is used to compare two sample means from cooperative groups and non-cooperative groups. This means that there are different group of people generating income for each group and this independent sample t test is helps to determine if the samples are different from each other and to analysis this of independent sample t test 20 people have been selected/drown from each group of samples.

Hypothesis Testing

Null: The sample mean from non-cooperative Group is not different from the sample mean from cooperative Group

Alternative: The sample mean from Non cooperative Group is significantly different from the sample mean from cooperative Group

The Cooperatives Groups and non-cooperative groups of fishery incomes average indicates is 2460 and 1051.667 respectively. Hence by considering the independent sample t-test for

equality of mean assuming the difference in variance, it follows that the mean income of cooperative groups and non-cooperative groups are significantly difference (mean one –Mean two= 1,408.333, Generally, the average income of non-cooperative groups is less than the average income of cooperative groups, which means the non-cooperative groups is lower than cooperative groups.

Table 25 Sample T-test

t-Test: Two-Sample Assuming Equal Variances		
	<i>Cooperative Groups</i>	<i>Non-Cooperative Groups</i>
Mean	2460.00	1051.667
Variance	1150068.97	477497.1
Observations	30.00	30
Pooled Variance	813783.05	
Hypothesized Mean Difference	0.00	
df	58.00	
t Stat	6.05	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.67	
P(T<=t) two-tail	0.00	
t Critical two-tail	2.00	

4.5.2. Multiple Liners Linear Regression Analysis and Discussion

Multiple Regression models are used to describe relationships between variables by fitting a line to the observed data. Regression allows you to estimate how a dependent variable changes as the independent variable(s) change. The below table shows multiple linear regression analysis to estimate the relationship between two or more independent variables and one dependent variable.

Table 26 Multiple Linear Regression model summary

Model Summary				
Model	R	R square	adjusted r square	std. error of the estimate
1	.936a	.875	.858	3.2208

The result of coefficient of correlation (r) is 0.936 which indicates a good level of prediction, it means positive and strong correlation found between both dependent and independent variables and 85.8 % of the variation in average income are explained by the model.

Table 27 Coefficients of Multiple Linear Regressions

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	3084.621	479.001		6.440	.000	2131.906	4037.335
	Sex	-235.570	248.418	-.095	-.948	.346	-729.663	258.523
	Family Size	302.609	90.940	.328	3.328	.001	483.485	121.733
	Education Level (Uneducated 1)	-411.883	243.195	-.173	-1.694	.024	895.587	71.822
	Are you cooperative member (Yes 1)	864.893	223.244	.372	3.874	.000	420.869	1308.916
	Is there additional family member helping you in fishery activity	300.360	301.264	.116	.997	.322	-298.842	899.561
	Did you have specific customers to provide your fish product	-344.113	430.398	-.090	-.800	.426	-1200.156	511.931
a. Dependent Variable: Income								

After performing the necessary tests on normality and other assumptions related to multiple liner regressions the above table present the contribution of sex, family size, Education Levels, being Cooperatives Members, Received Help and Specific Customers, and from the listed variables Family size, Education, and members of cooperative groups ‘are significant variable at 0.05 level.

Average Income = $3084.621 + 235.570(\text{sex}) + .302.609(\text{Family size}) + -411.883 (\text{Education Level}) + 864.893(\text{Cooperatives Members}) + 300.360(\text{Received help from others}) + -344.113(\text{Specific Customers})$.

The above multiple linear regression result indicates that the relationships with average income of the fishery, Family size increases by one person, and the average income is increased by 302.609 ETB birr when other variables are kept constant and the results suggest that family size has positive and significant effects on average income at 0.05 levels. As per own observation in order to improve monthly income through increasing awareness, Education level of the respondents also has positive impact on average income at 0.05 intervals, also monthly average income is -411.883 lower when fishery people uneducated compared with educated cooperative member, other variables are unchanged, and the results suggest that education level is significant effects on monthly income cooperative members of the fishery peoples at 0.05 levels. This is because of those people who have learn, and they have opportunity to have collaterally learning with colleges and to increasing productivity, knowledge, skills and motivation through producing and generating incomes.

Monthly Average income is 864.893 Higher when the fishery has a members of cooperative groups compared with non-cooperative groups, when other variables are remained constant, and the results suggest that cooperative members is significant effects on monthly income at 0.05 levels. It is obvious that cooperative members with a good opportunity to work together with the colleagues to share skills and experiences. According to research conducted and important insights, and share their own experience which could positively contribute to the monthly income of the fishery cooperative members.

Monthly average income is 300.360 higher in the family who has a support from their additional household family support in that they get additional labour input for increasing income, when other variables are remained constant therefore the result support that family households having less family members for labour input or support have less monthly income and those having high family members are with better monthly income.

Multi-Collinearity Analysis

Two major methods were used to determine the presence of multi-Collinearity among independent variables in this research. These methodologies involved calculation of a Tolerance test and variance inflation factor (VIF) (Ahsan *et al.*, 2009; Sivesan, 2011).

Table: Multi Collinearity Analysis

Table 28 Collinearity Statistics

Collinearity Statistics			
		Tolerance	VIF
1	(Constant)		
2	Sex	.857	1.166
3	Family Size	.887	1.128
4	Education Level	.826	1.211
5	Are you cooperative member (Yes 1)	.933	1.072
6	Is there additional family member helping you in fishery activity	.639	1.565
7	Did you have specific customers to provide your fish product	.680	1.470

The results of this analysis are presented in table 29. Variance inflation factors (VIF) is used to detect the severity of multi-Collinearity in the ordinary least square regression analysis. Generally, a VIF above 4 or tolerance below 0.25 indicates that multi-Collinearity might exist, and further investigation is required. According to the above table 29, all variables of the tolerance level is >0.25 ; and VIF values are perfectly below 10. Thus, the measures selected for assessing independent variable in this study do not reach levels indicate of multi-Collinearity and also the acceptable results show that there were no auto correlation problems in the data used in this research.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study used socio economic data and field observation techniques to identify factors that determine productivity of fishery in cooperative members and non-members of Abobo district. The cooperatives in the study area faced many challenges that are internal and external in nature. The internal challenges such as wasting restricted working days with in a week, As a result of less coordination and communication, the cooperative member could not bring as such significant impact with that of non-cooperative members. lacking ownership and failure to follow up to control the resources over their cooperatives, weak culture of team work with in the cooperative members, lack of commitment of members in the cooperative, little awareness about cooperatives low participation of members in their cooperatives'

business transactions, members are not actively participating in the general assembly meetings, members suspect the management body and the management body also suspects members and some members' intention to sell their products to private merchants.

From the perspective of appropriate authority at zonal and woreda levels ; limited professional support and follow up to cooperatives; they fail to adapt the experience of other model cooperatives; there is lack of commitment to build better image of cooperatives at different levels, there is little effort to promote cooperative policies, strategies, proclamations, rules and regulations, lack of commitment to find out the problems of cooperatives and fill the gap; fail to organize and provide adequate, quality and timely information on cooperatives.

According to the respondents, only 11 (29%) and 10 (19%) of cooperative members and non-cooperative members respectively were agreed as the fishery activity is solely served for means of their livelihoods. This shows that the fishery practices for both cooperative and non-cooperative members did not ensure their means of income satisfactorily rather they revealed practicing additional negative and positive coping mechanisms.

5.2 Recommendations:

Generally the fishery productivity in Abobo district, Alwero resorivier is practiced by both Cooperative members and vicinity farmer households. Then the recommendations ended in this research are both internal and external.

- The fishery practices support for livelihood improvement is not significant for both cooperative and non-cooperative members with contribution of 29% and 19% respectively. Therefore this indicated that to explore additional means to escalate the sustainable productivity.
- To ensure productivity of fishery in the study area the numeracy skills, knowledge and lessons from previous failed and succeeded experiences should be considered to both cooperative and non-cooperative members of fish producers.
- Even if nearer to 95% of the respondents of cooperative members were accessed to training and material support, most of the members are not correctly utilized and have follow up about the activities are going on and did not have timely update about the progress of their cooperatives at all. This indicated that as far as the cooperative concept is new to the people it needs making periodic monitoring to bring effective productivity of the fishes

- Insignificant number of respondents (3%) only replied as they have permanent market chain. Hence important to ensure and strengthen better market chain for the producers.
- Regarding financial support also only (3%) only replied that they got financial access (Loaning) to spend on their fishery investments therefore this indicated that the financial credit access have to be improved
- The training and capacity building conducted with the members must be realigned with and helpful for the improvement of fishery
- The days of fishery practices also needs to improve because almost all cooperative members are not using more than 4 days throughout the week.

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Appendix

Appendix 1

The questionnaire used for the household survey

Determinants of Fishery Productivity in Cooperative and Non-Cooperative Member Households: The Case of Abobo District, Gambella, Ethiopia

Prepared by: Ermyas Girma

General instruction

1. Greeting and introduce yourself to the respondents.
2. Introduce the aim/purpose of the study for the respondents.
3. Do not use technical terms and the English language while interviewing respondents.
4. Circle the answers for closed type questions.
5. Check that all questions are asked and responses are filled accordingly.
6. Ask the researcher for any problems faced during interviews.
7. Present heartfelt gratitude and finally depart with greeting

General information

Name of respondent: ----- ID: -----

District: ----- Kebele -----

Name of interviewer: ----- Signature -----

Name of researcher: ----- Signature: -----

Date: ----- Code: ----- Village/Mender -----

Demographic and physical characteristics

1. Name of respondent
2. Gender: a. Male =1 b. Female=0
3. Age (years)

A, 18-29 B, 30-50 C, 50 and above clone

4. Marital status

a. Single b. Married c. Divorces d. Separated e. Widowed

5. Family size of the household head in number:

6. Education status of the household head:

A, illiterate

B. Literate

7. If literate for Q. 5, level of education for the household

1. Grade 1-4 2. Grade 5-8 3. Grade 9-10 4. > Grade 11

Assess the level of engagement and general understanding for Farmer households about cooperative management. (Objective 1)

8. Are you cooperative member?

A) Yes B) No

9. If you are a member, what is your position in the cooperative?

A) Chairperson

B) Secretary

C) Cashier

D) Member

10. If you are a member, are you able to read and write, if not how you follow your cooperative's business status?

A) Other members will tell me

B) I do not have any update

C) My family members

D) Our cooperative is not functional write now.

11. If you are a member, how long time you have stayed since you are a member in the fishery cooperative.

A) 1 year B) 2-year C) 3-year D) 4-year E) 5-year F) 6 year an above

12. If you are cooperative member, are you conducting regular meetings as a cooperative?

A) Yes B) No C) no one alerting us

13. If the answer is A to Q 11 in how long interval are you conducting a meeting

A) weekly B) Biweekly B) Monthly C) don't participate D) I don't know

14. If yes Q 11. By whom
- A) By government bodies (cooperatives, administration bodies,)
 - B) By NGOs
 - C) By financial institutions
 - D) I don't know
 - E) If other specify_____
15. Do you closely know about bylaw and business plan of your cooperative?
- A) Yes B) No
16. If yes to Q 14, do you know that all physical and financial assets, you own
- A) Yes
 - B) No
 - C) Initially yest it was but now don't have an access
17. If yes to Q 14, do you know that the amount of start-up capital.
- A) Yes
 - B) No
18. What are the advantages engaged in a cooperatives
- A) To get financial services.
 - B) To get technical support from institutions
 - C) to eliminate the unnecessary price exploitation by the whole sellers
 - D) To facilitate market chain
 - E) to protect the rights of people both as producers and consumers.
 - F) To promote mutual understanding and education among their members and people
 - G) All
 - H) I do not know

To identify the major factors, which determine fishery production practices and impacts on livelihood status in cooperatives' members and farmer households in the study area. (Objective 2)

19. How is the general trend of fishery production amount in the last recent years?
- A) Increasing
 - B) Decreasing
 - C) Remains the same

20. If the answer is B 'decreasing' to Q 19, what are anthropogenic (man made) impacts which restricts or negatively affects the fish productivity?
- A) Overfishing B) poor governance C) conflict D) recession farming E) lack of skill for fishing F) If other specify_____
21. If the answer is B to Q 19, which natural factors are noted to account for low productivity?
- A) Drought B) Flooding C) Sedimentation D) Seasonality D) if other specify_____
22. If the answer is A (Increasing) to Q 19 what is the reason?
- A) Technical Support provided due to being a member.
 B) Good management of Cooperative and governance
 C) Fishing materials availability
 D) Number of fishery cooperatives and individuals are increasing
 E) The availability of fish in the reservoirs is increasing
 F) All
23. How is your fish demand and supply of the produces around your vicinity?
- A) The demand is higher than the supply
 B) The demand is less than the supply
 C) Demand and supply are equivalent
 D) I do not know
24. If the answer is A to Q 23, what do you think the reason behind?
- A) Consumers are increasing
 B) Productivity is decreasing
 C) Productivity remains the same
 D) Do not know
 E) Depletion of the fishery resources
 F) If other specify_____
25. If the answer is B to Q 23, what is the reason?
- A) Surplus product
 B) Consumers number is not increasing
 C) Both
 D) If other specify_____

26. what types of assets or supports (natural, human, social financial, physical) have you gained?
- A) Fishing territory
 - B) Access to financial institutions (loan and saving)
 - C) Training and capacity building
 - D) Provision of Fishery production Materials like Refrigerator, generator, Store House
 - E) Access to market (market chain) and value chain
 - F) All
 - G) If other specify_____
27. Which of the following materials (services) do you have as cooperative member or as an individual?
- A) Generator
 - B) Refrigerator
 - C) Fishery store
 - D) Fishing territory
 - E) Boat
 - F) Financial access ()
 - G) All
 - H) None
28. How many days you use fishing within the week?
- A) 1 day B) 2 days C) 3 days D) 4 days E) 5 days F) 6 days G) 7 days
29. How much money you earn per day?
- A) >50-birr B) 51–100-birr C) 101-150 D)151 -200 E) 201-250 F) >251
30. How did you preserve fishes when there is remaining products from the daily market and consumption?
- A) store in the refrigerator
 - B) use to dry and store
 - C) take to the market immediately without preservation
 - D) Immediate Consumption
 - E) If other specify_____
-
31. From your perspective, what it looks like the income or the quantity of products members while compared with individuals to non-cooperative members?
- A) Income or fish product produced by cooperative members is higher than non-cooperative individual's farmer house holds

- B) Income or fish product produced by cooperative members is equivalent to non-cooperative individual's farmer house holds
 - C) Income or fish product produced by cooperative members is less than non-cooperative individual's farmer house holds
 - D) I don't know
 - E) If other specify_____
32. What do think that for unproductivity of cooperatives
- A) The cooperatives are not long lasting (Functional)
 - B) Members are not working in team due to lack of interest
 - C) Some members working at better position are not transparent for the rest of the members
 - D) Lack of trust building
 - E) Luck of Follow up and support
 - F) Others
33. What possible solution are you suggesting to solve the challenges you face?
- A) Borrowing production materials
 - B) Training and capacity building
 - C) Materials support
 - D) If other specify_____
34. Is there additional family member helping you in fishery activity
- A) Yes
 - B) No
35. Did you have specific customers to provide your fish product
- A) Yes B) No
36. If the answer is yes to Q 34, to whom are you going to sell (provide) the fish
- A. For Hotels and restaurants
 - B. For individuals and communities around the vicinity villages
 - C. For Retailers
 - D. For cooperatives

To assess impacts on livelihood status on cooperative members and non-cooperative Farmer households (objective 3)

37. Do fishery activities serve as livelihoods for you?
- A. Strongly agree

- B. Agree
- C. Disagree
- D. Strongly disagree

38. If the answer is C or D to Q 37, what is your additional means of income?

- A. Charcoal production
- B. Livestock
- C. crop production
- D. Ration support (Food and NFIs) from Governmental and non-governmental bodies
- E. Fuelwood collection
- F. Daily labour
- G. Income generating activities (off farm activities)
- H. Remittance
- I. Hunting
- J. If Others, specify -----

39. If the answer is A & B for Q 37 What are the changes brought in your life since you started fish production?

- 1. Saving money
- 2. Feeding diversified food and clothing
- 3. Covering school fee
- 4. Constructing shelter
- 5. If other specify_____

40. If you are cooperative member, when have you started fishery practice

- A) Before I joined the cooperative
- B) Since I joined the cooperative

41. If you are cooperative member, which period is better in regarding of production and income for your means of survival?

- A) Before I joined the cooperative
- B) Since I joined the cooperative
- C) I did not bring any change in either of the two
- D) It remains the same
- E) I do not know

Appendix II

Target: Regional & Woreda livestock and Fish Management Unit, Regional and Woreda Agriculture & Livestock Offices.

Data collection Method: interview guide.

Sampling: Purposive

Name of interviewer: -----

Name of interviewee: -----

(Optional)

Managerial Level of interviewee: -----

Date: ----- Interview code: -----

level of engagement, knowledge, and skill of cooperative concept for fishery cooperative's members and fishery production practices in cooperatives' members and farmer households in the study area. **(Objective 1 and 2)**

1. How many fishery cooperatives are found in Akobo woreda? (Producers, Restaurants, Retailers etc)

Cooperative types	Number of cooperatives	Functionality (say yes or no)
Direct Producers		
CIG		
Retailers		
Restaurants		
Others		

2. If the production is increasing in the last recent years Which broad elements are known to be the source of increasing fishery production?

- A) Fishery Cooperatives have Support from the government
- B) Fishery Cooperatives have Support from NGO
- C) Fishery Cooperatives have Access to financial institution
- D) Fishery Cooperatives have Access to market
- E) Fishery Cooperatives have Access to Fish store
- F) If other specify _____

3. What is the manifestation of the impact of climate change as a negative effect of fishery production?
 - A) Temperature
 - B) drought
 - C) Flood
 - D) Sedimentation
 - E) D) if other specify_____
4. Which livelihood activities may be described as the major drivers of against fish productivity?
 - A) Deforestation (removal of trees around water reservoirs)
 - B) Overfishing (exploitation)
 - C) Recession farming
 - D) If other specify_____
5. What number of Households their income is depend on fish productivity in the woreda (If any data)
6. What are the main legal and institutional policies to ensure the productive and protective functions of fishery resource management (in both cooperative members and non-members) in this community?
7. Which category of livelihood activities are **most important to** contribute to household livelihood development in addition to fishing?
8. What are the major factors which determines for fishery productivity in both cooperative and non-cooperative members?
 - A) Lack of skill
 - B) Lack of material and training support
 - C) Lack of interest by fishers
 - D) Poor governance
 - E) If other specify

Solutions for better Functioning Fishery production management (objective 4)

9. What is your working definition of Cooperative and fishery cooperative management?
10. Which of the known international criteria and indicators for explaining Cooperative and fishery cooperative?

11. What are the actual strategies you adopt to promote Cooperative and fishery cooperative management in this locality?
12. What kind of collaboration do you have with other stakeholders in promoting Cooperative and fishery cooperative management?
13. What are the known challenges which limit the management of Cooperative and fishery cooperative management?
14. What will be workable solutions you suggest to overcome to increase the productivity of fishery in the area

Appendix III

Target: Regional & Woreda livestock and Fish Management Unit, Regional and Woreda Agriculture & Livestock Offices.

Data collection Method: interview guide.

Sampling: Purposive

Name of interviewer: -----

Name of interviewee: -----

(Optional)

Managerial Level of interviewee: -----

Date: ----- Interview code: -----

level of engagement, knowledge, and skill of cooperative concept for fishery cooperative's members and fishery production practices in cooperatives' members and farmer households in the study area. **(Objective 1 and 2)**

15. How many fishery cooperatives or CIGs are found in Akobo woreda? (Producers, Restaurants, Retailers etc)

Fishery cooperatives	Number of Cooperatives	Members' Sex			Number of Cooperatives functional	Kebeles	Remark
		male	Female	Total			
Direct Producers							
Retailers							
Restaurants							
CIG							

total							
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16. How will you describe the difference between cooperative and non-cooperative members in the study area regarding of productivity?

17. If the production is increasing in the last recent years Which broad elements are known to be the source of increasing fishery production?

A) Fishery Cooperatives have Support from the government

B) Fishery Cooperatives have Support from NGO

C) Fishery Cooperatives have Access to financial institution

D) Fishery Cooperatives have Access to market

E) Fishery Cooperatives have Access to Fish store

F) If other specify_____

18. What is the manifestation of the impact of climate change as a negative effect of fishery production?

F) Temperature

G) drought

H) Flood

I) Sedimentation

J) D) if other specify_____

19. Which livelihood activities may be described as the major drivers of against fish productivity?

E) Deforestation (removal of trees around water reservoirs)

F) Overfishing (exploitation)

G) Recession farming

H) If other specify

20. What number of Households or populations are dependent on fish productivity in the woreda (If any data)

21. What are the main legal and institutional policies to ensure the productive and protective functions of fishery resource management (in both cooperative members and non-members) in this community?
22. Which type of additional livelihood activities (other than fish production) are contribute to household
- A _____
- B _____
- C _____
23. What are the major factors which determines for fishery productivity in both cooperative and non-cooperative members?
- F) Lack of skill
- G) Lack of material and training support
- H) Lack of interest by fishers
- I) Poor governance
- J) If other specify