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**COLLEGE OF SOCIAL SCIENCES, ARTS AND HUMANITIES**

**SCHOOL OF DEVELOPMENT STUDIES**

**CENTER FOR RURAL, LOCAL AND REGIONAL DEVELOPMENT STUDIES**

**THE IMPACT OF SAVING AND CREDIT COOPERATIVES MEMBERSHIP ON FARMERS' AGRICULTURAL INPUT UTILIZATION AND HOUSEHOLD WELFARE: THE CASE OF WELMERA WOREDA, WEST SHEWA ZONE, OROMIA REGIONAL STATE OF ETHIOPIA**

**MA THESIS**

**BY**

**GIZACHEW BEYERA CHEMEDA**

**ADVISOR: ABATE MEKURIAW (PHD)**

**A THESIS SUBMITTED TO THE CENTER FOR RURAL, LOCAL AND REGIONAL DEVELOPMENT STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN RURAL LIVELIHOODS AND DEVELOPMENT**

**JUNE, 2025**

**ADDIS ABABA, ETHIOPIA**

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## APPROVAL

As thesis advisor, I certify that I have read and evaluated the thesis prepared by Gizachew Beyera Chemedda entitled “The impact of saving and credit cooperative membership on farmers’ agricultural input utilization and household welfare: The Case of Welmera Woreda, West Shewa Zone, Oromia Regional State of Ethiopia” and recommended for open defense as part of fulfilling the requirements for the degree of Master of Art in Rural Livelihoods and Development.

Name of Advisor: Abate Mekuriaw (PhD) Signature \_\_\_\_\_ Date \_\_\_\_\_

As member of the examining board of this thesis open defense, we certify that we have read and evaluated the thesis prepared by Gizachew Beyera Chemedda entitled “The impact of saving and credit cooperative membership on farmers’ agricultural input utilization and household welfare: The Case of Welmera Woreda, West Shewa Zone, Oromia Regional State of Ethiopia” and recommended that it is acceptable as a thesis required for the degree of Masters of Art in Rural Livelihoods and Development.

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Final approval and acceptance of the thesis is contingent up on the candidate’s submission of the final copy of the thesis, incorporating all the comments by the examining board, to the council of Graduate Studies (CGS) through the Center of Academic Committee (CAC) of the center.

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Chairperson of the Center or Graduate Program Coordinator

## DECLARATION

I, Gizachew Beyera Chemed, declare that the thesis work entitled “The Impact of Saving and Credit Cooperative Membership on Farmers’ Agricultural Input Utilization and Household Welfare: The Case of Welmera Woreda, West Shewa Zone, Oromia Regional State of Ethiopia” is my original work and submitted to the College of Social Sciences, Arts and Humanities, School of Development Studies Center for Rural, Local and Regional Development Studies in partial fulfillment of the requirements for the award of the degree of Master of Arts in Rural Livelihoods and Development. To the best of my knowledge and belief, the idea or issue embodied in this thesis work has not been previously submitted for any academic recognition or award of any degree or diploma. I have also properly acknowledged all sources of materials used in this thesis work.

Name: Gizachew Beyera Chemed

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## **DEDICATION**

I dedicate this thesis to all the kind people and my family for their support in various ways during my research and pursuit of the MA program.

## **ACKNOWLEDGMENT**

Above all, I would like to thank Almighty God, who has supported me throughout the process of this thesis work. My Lord, you are always my energy source and have helped me overcome many challenges in this thesis work. Thank you again and again.

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## LIST OF ACRONYMS

ACCOSCA	African Confederation of Cooperative and Credit Associations
ATE	Average Treatment Effect
ATT	Average Treatment Effect on the Treated
CSA	Central Statistical Agency
ECC	Ethiopia Cooperative Commission
ERA	Ethiopia Road Authority
ETB	Ethiopian Birr
FAO	Food and Agricultural Organization
FCA	Federal Cooperative Agency
FGD	Focus Group Discussion
GO	Governmental Organization
GTP	Growth and Transformation Plan
HH	Household
Kcal	Kilo Calorie
KII	Key Informant Interview
NGO	Non-Governmental Organization
PSM	Propensity Score Matching
RUSACCO	Rural Saving and Credit Cooperative
SACCO	Saving and Credit Cooperative
SPSS	Statistical Package for Social Science
TLU	Tropical Livestock Unit
WHO	World Health Organization
WWCPA	WelmeraWoreda Cooperative Promotion Agency
WWFECO	WelmeraWoreda Finance and Economic Office
WWLAO	WelmeraWoreda Land Administration Office

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## ABSTRACT

*This study examined the impact of saving and credit cooperative (SACCO) membership on farmers' agricultural input utilization and household welfare in Welmera Woreda. Particularly, the study investigated determinants of household membership in SACCO, and analyzed the impact of SACCO membership on household savings, agricultural input utilization, household income and food security. The study used a mixed research approach with descriptive and explanatory cross-sectional survey design, multistage sampling techniques, and quantitative and qualitative data from secondary and primary sources. The data used for the study was collected from 388 sample households (194 members and 194 non-member households, and from the Woreda Cooperative Promotion Agency experts. Descriptive and inferential statistics, binary logistic regression model, propensity score matching (PSM) method, narration, summary, and interpretation were used for the analysis of data of the study. The result of the study indicated that the age of the household head, educational status of the household head, household land holding size and training accessibility were factors that positively influence household membership in SACCO, while the household family size and SACCO distance were factors that negatively influence household membership in SACCO. The result from PSM revealed that membership in SACCO has a positive and significant impact on household savings and food security, and the member households saved a difference of 8048.60 ETB per year and had a difference of 237.64 Kcal/AE/day of available food compared to non-member households. However, membership in SACCO does not have any significant impact on farmers' agricultural input utilization and household income. The result of the study suggests that the woreda cooperative promotion agencies and their kebele level branches need to work on the identified determinant factors that have a significant effect on household membership. In addition, the woreda cooperative promotion agencies should encourage farmers to join SACCO and promote SACCO to improve household savings and food security.*

**Keywords:** *Impact, Membership, SACCO, Agricultural input, Household Welfare, PSM*

## **CHAPTER ONE: INTRODUCTION**

### **1.1. Background of the study**

Globally, saving and credit cooperative (SACCO) was founded in the middle of the 19th century in Germany to solve the persistent problem of low-income people's inaccessibility to banks and investments, creating a self-financed society and thereby eliminating poverty (Galor, 1989). On the African continent, the first SACCO was established in Jipara town of Ghana country, in 1955 by an Irish Roman Catholic priest, Father John McNulty. After that, the Jipara achievement story has been broadly spread in other African countries (Alila&Obado, 1990 cited in Bwana, 2013). In Ethiopia, the first formal SACCO was established during the reign of Emperor Haile Selassie. At that time, the first SACCO was established in 1949 E.C. by the workers of the Ethiopian Road Authority (Chimdi et al, 2020).

The government of Ethiopia is promoting cooperatives, which are regarded as a vital tool for agricultural and rural development agenda advancement. As a result, the government targets cooperative promotion for three primary objectives in GTP I. The objectives include the provision of improved agricultural technology, agricultural marketing improvement, and financing through savings, credit, and banking (Mogues, et al., 2009). By supporting income-generating businesses and enhancing rural and urban people's access to nearby banking services, cooperatives have significantly contributed to the growth and poverty reduction strategy (Tesfamariam, 2015).

In Ethiopia, various cooperatives participate in many development activities. Among different cooperatives, SACCO is one of the types of cooperatives that emerged as a possible means of connecting the poorest people of Ethiopia with formal financial institutions since they lack access to formal financial institutions for their credit needs. The local economy is stimulated by the promotion of SACCOs because it provides neglected and impoverished farmers access to economic opportunities and helps them escape poverty (Assefa, 2000). As stated by Nigusie (2015), cited in Eneyew (2021), the

primary goal of SACCO development is to meet fundamental human needs while also looking for risk-free ways to save and borrow money without money lender burdens.

SACCO is one of the officially recognized cooperative organizations intended to provide basic financial services to low- and middle-income individuals who are unable to obtain these services through the available banking system. SACCOs are recognized for providing a means to acquire knowledge about the importance of regular saving and wise ways to use credit. As well, some people also view SACCOs as a form of economic empowerment because their members manage, control, and operate their financial organization that offers credit, saving, and financial management services (Tesfamariam, 2015). SACCOs provide financial services to a large segment of impoverished rural societies of both developed and developing countries (Ayele, 2014). SACCO is vital for the economic advancement of communities in developing countries, particularly, in Africa (Akerele&Adekunmbi, 2018). Likewise, SACCO is playing an immense role both in rural and urban areas of Ethiopia (Gemed&Zemedu, 2018). Particularly, rural saving and credit cooperatives (RUSACCOs) work as farmers' grassroots institutions, intended usually to fill the seasonal financial needs of their members, which other financial institutions do not fill (FAO, 2001, cited in Teka, 2008), and, in rural areas, SACCOs play a crucial role in mobilizing financial resources for a range of development activities (Bwana, 2013).

The promotion of saving and prudent use of credit, are primary considerations for RUSACCOs, and it might be expected that RUSACCOs would perform an important role in rural food security improvement (Gobezie, 2005 cited in Ayele, 2014). To increase savings magnitude of members, the membership of SACCOs should be increased and the poor should participate in RUSACCOs and save from their income (Teka, 2008).

In Ethiopia, SACCO membership, outreach, and saving capital are periodically growing. However, there are fluctuations, and the membership is still far lower than the potential population of the country (Tesfamariam, 2015). Even though cooperatives are recognized as the foundation for reducing poverty at the household level, and although the government offers numerous incentives and encouragements to people to join

cooperatives, some rural households do not join RUSACCOs (CPA, 2011 cited in Alehubel, 2022).

According to the Federal Cooperative Agency's official report of 2021, in Ethiopia, there are 21,328 primary SACCOs and they had 5,384,559 members (3,122,454 female and 2,262,105 male). Similarly, according to the 2023 annual report of the former “Federal Cooperative Agency” and current “Ethiopian Cooperative Commission”, until the end of January 2023, the number of SACCOs in the country has reached 23,963 with total members of 7,717,083 (3,782,962 male and 3,735,511 female) and total capital of 11,878,943,369 (ECC, 2023).

In Oromia Regional State, the number of SACCOs has reached 9254 with total members of 3,268,607 (1,516,216 male and 1,752,391 female) and a total capital of 1,848,994,362 as indicated in the same report of 2023 Ethiopian Cooperative Commission.

In the study area (Welmera Woreda), there are eight (8) SACCOs with a total of 913 members (633 male and 280 female) and a total capital of 13,281,777 (WWCPA, 2023). This report indicates that the number of SACCO members was low compared to the number of populations who live in the country, region, and study area (Welmera woreda). Therefore, this study was conducted in Welmera woreda to examine determinants of membership and impacts of SACCO membership on household savings, farmers' agricultural input utilization, and household welfare.

## **1.2. Statement of the Problem**

In Sub-Saharan Africa, cooperatives can significantly improve food security if they are rooted in societies and consider the needs and interests of their members and communities (Tenaw & Islam, 2009). Similarly, the Ethiopian government and development partners recognize the crucial role that rural cooperatives can play in fostering sustainable rural development and ensuring food security (Ayele, 2014).

Cooperatives serve as a vital instrument to bring economic growth and poverty alleviation by encouraging income-generating activities and providing banking services to both rural and urban communities (Tesfamariam, 2015). Particularly, RUSACCOs are

seen as effective and sustainable institutions that can offer accessible and affordable financial services to a large segment of the rural poor. Thus, SACCO serves as a financial solution for individuals with limited incomes (Tirfe, 2014).

In Ethiopia, over the past few decades, SACCOs have shown growth in terms of both numbers and membership. However, when comparing membership relative to the overall population size, the number of members remained low (Tesfamariam, 2015; Eneyew, 2021). In light of this, different researchers have examined the factors that influence household membership in SACCO, and have also investigated the impact of SACCO membership on household savings, agricultural input utilization and household welfare in different parts of Ethiopia. However, although a number of studies have been conducted on the impact of SACCO membership and determinants of membership, there are still important gaps that need further investigation.

**First**, in the study area, less than 8% of households were SACCO members (WWCPA, 2023) and the factors that may influence household membership is unknown. Even though different studies have identified factors influencing SACCO membership in different areas, there is a lack of empirical evidence regarding the specific factors affecting households' decisions to join SACCO in the study area. The influence of unique characteristics of each study area, such as cultural, economic, institutional, and livelihood activities that can influence SACCO membership necessitates research across diverse geographical and socio-economic contexts of Ethiopia in general and Welmera woreda in particular..

**Second**, though SACCO membership is anticipated to enhance household savings, there is a dearth of empirical studies on the actual effect of SACCO membership on household savings. Most of the existing studies have primarily focused on the determinants of members' savings without considering the effect of SACCO membership on household savings, and without comparing the savings of SACCO members and non-members. Besides, some of the existing studies were used only descriptive statistical methods, which limit the ability to generalize their findings.

**Third**, there is a lack of empirical studies on the impact of SACCO membership on farmers' agricultural input utilization. Previous studies have mainly focused on the financial services that SACCOs can provide for the use of agricultural inputs, such as credit services, rather than examining the impact of SACCO membership on farmers' agricultural input utilization. Thus, it is important to investigate the impact of SACCO membership on farmers' agricultural input utilization.

**Fourth**, while many studies have investigated the relationship between SACCO membership and household welfare indicators like income and food security, they often focus on a single indicator without considering the multifaceted nature of household welfare. Particularly, the impact of SACCO membership on household welfare has not yet studied in the study area. So, it is essential to examine the impact of SACCO membership on household welfare (income and food security).

Therefore, this study was initiated to fill these research gaps by systematically examining the determinants of household membership, and aimed to evaluate the impact of SACCO membership on household savings, agricultural input utilization and household welfare.

### **1.3. Objective of the Study**

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

The general objective of the study is to examine the impact of SACCO membership on farmers' agricultural input utilization and household welfare in WelmeraWoreda.

#### **1.3.2. Specific Objectives**

The specific objectives of the study are:

1. To examine determinants of household membership in SACCO.
2. To analyze the impact of SACCO membership on household saving amount.
3. To evaluate the impact of SACCO membership on farmers' agricultural input utilization and household welfare.

#### **1.4. Research Questions**

The following questions are prepared from the study objectives:

1. What are the reasons behind non-membership or membership of households in SACCO?
2. What is the effect of SACCO membership on household saving amount?
3. Does SACCO membership contribute to the improvement of farmers' agricultural input utilization?
4. What is the role of SACCO membership on household welfare?

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

The study evaluated the impact of SACCO membership on farmers' agricultural input utilization and household welfare. Therefore, the empirical information generated from the study's findings is useful for the people who live in the study area as it provides crucial information regarding the contribution of SACCO to farmers' agricultural input utilization and household welfare (income and food security). Particularly, the study provides essential information for non-member households who didn't understand the contribution of SACCO. In addition, the study generated critical information on factors that determine household membership in SACCO. This is important for woreda cooperative experts to provide better extension services or awareness creation for non-member households. Moreover, the study generated important empirical evidence for governmental and non-governmental organizations that need to promote and support SACCOs in the study area and other areas.

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

In the process of this research, it was impossible to cover the whole kebeles and SACCO member and non-member households in the study area (WelmeraWoreda), due to time and resource limitations. Therefore, the study was geographically restricted to one woreda and three rural kebeles. In terms of data, the study was based on cross-sectional data collected from 388 sample households (194 SACCO members and 194 non-member households). The content of the study also confined and emphasized the evaluation of the

impacts of SACCO membership on farmers' agricultural input utilization and household welfare with only three specific objectives.

### **1.7. Limitation of the Study**

This study has three limitations. One of the limitations is; the finding of the study cannot be generalized at the country level, because it was conducted in one woreda and from the woreda in three sample rural kebeles. The other limitation of the study is content limitation, which means, in terms of household welfare the study focused on household income and food security without considering other household welfare indicators. The third limitation is the lack of adequate literature related to the impacts of SACCO membership on farmers' agricultural input utilization.

### **1.8. Organization of the Study**

This study is organized into five major chapters. The first main chapter is the background of the study. The introduction, statement of the problem, objectives of the study, research questions, hypothesis of outcome variables, significance of the study, scope of the study, limitation of the study, and ethical considerations of the study are outlined in the first chapter. The second main chapter is about a review of related literature. Under this chapter; concepts, definitions, conceptual framework of the study, and theoretical and empirical literature review are discussed. The third chapter focuses on the research methodologies. In this chapter; the study area, research design, sampling procedures and techniques, source and type of data, method of data collection, and analysis are described. Chapter four presents and discusses the results obtained from descriptive statistics and econometric models. The conclusion and recommendation of the study are summarized and provided in the last chapter (chapter five).

## **CHAPTER TWO: REVIEW OF RELATED LITERATURE**

### **2.1. Review and Discussion of Related Concepts**

**Cooperative;** As defined by the Ethiopia Cooperative Societies Proclamation No.985/2016, a cooperative is an autonomous association with legal personality that is democratically controlled by people who have come together voluntarily to meet their common social, economic, and cultural needs, as well as other aspirations that could not be addressed individually. A Cooperative is a form of business organization that has limited returns on equity capital, offers low-cost services, and is democratically run by its members/patrons (McBride., 1986 cited in Krivokapic-Skoko, 2002).

According to Staatz (1984), a Cooperative is a type of collective action in which people work together to complete things that would be more expensive or impossible to complete alone. A Cooperative is a collection of persons or companies who collaborate to accomplish particular business goals (Le Vay., 1983 as cited in Krivokapic-Skoko, 2002).

**Saving and credit cooperative;** According to Ethiopia Cooperative Societies Proclamation No.985/2016, a saving and credit cooperative is an organization that was founded to offer life insurance, saving, and credit services to its members. A saving and credit cooperative (SACCO) is one type of cooperative that is democratically administered, distinctively member-driven, self-help, and not-for-profit financial cooperative. SACCO is owned and administered by members who have a common bond for providing financial services to members.

Saving and credit cooperatives (SACCOs) which are called credit unions in some other countries are defined as SACCO is a kind of cooperatives that provide their members with easy and safe ways to save money and get credit at fair interest rates. Saving and credit cooperatives are typically set up within an existing that is bound together by a common interest, such as employees of the same factory or residents of the same community who are reasonably well known to one another (Bailey, 2001 cited in Nibret, 2016). According to the African Confederation of Co-operative and Credit Associations/ACCOSCA., 1969 as cited in Aredo, 1993, the primary goals of saving and

credit cooperatives are to encourage members to save money and to offer loans for both productive and provident uses.

**Membership;** According to Ethiopia Cooperative Societies Proclamation No. 985/2016, membership is defined as any individual or a primary cooperative society or a cooperative societies union or cooperative society's federation who applies and is accepted for membership after meeting the minimum membership requirements specified and determined in the bylaws, by considering the cooperative society's nature.

SACCO's membership is open to all who belong to a group and are eligible to join a SACCO without considering color, creed, race, religion, and gender. SACCO members are actively saving their money and lending it to each other at fair interest rates. Members control their own money and make all decisions to maximize mutual benefit. Generally, members hold all of the authority to manage their own savings and credit cooperative operation (Anania, et al., 2015).

According to Proclamation No. 147/1998 of the Ethiopian Cooperative Society, anyone can become a member of a society if he/she meets the following criteria:

1. He/she must be at least 14 years old for a primary cooperative society.
2. He/she must be able to pay the required share capital and registration fee set by the society.
3. He/she must be willing to fulfill his/her responsibilities and adhere to the society's objectives and by-laws.
4. He/she must also meet any additional requirements specified in the regulations and directives related to this Proclamation.

Household welfare; The welfare of a household is contingent upon both income and standard of life, which includes things like balanced improvements in food and non-food item, education, health care, housing, investments, and so on. Therefore, the improvement of welfare cannot be restrained unless the level of life of people is raised (Kumar, 2021).

In general, a household's welfare indicates the overall state of health, safety, happiness, and affluence (Anderson, 2008). The main welfare indicators of a particular household

include income, food security, educational welfare, health welfare, and asset holdings, which can be categorized as monetary and non-monetary welfare indicators.

**Monetary welfare indicators (Income vs Consumption);** Income and consumption are the monetary welfare indicators. However, in this study, income was used as a measure of household welfare rather than consumption for a variety reasons. Income serves as a key monetary indicator of welfare, reflecting households' ability to access resources. It is frequently utilized to assess household welfare. A lack of sufficient income poses a critical barrier that often hinders households from acquiring essential goods necessary for a decent quality of life (Pal, 2000). Moreover, following Gradin et al. (2008) and others, there are limitations to using consumption as a measure of household welfare.

First, consumption patterns are highly influenced by individual habits and the demographic group the household is found in. For instance, young households tend to exhibit very different consumption behaviors compared to old households, likely due to different needs or intergenerational differences in preferences.

Second, additional issues that may arise when utilizing consumption as a welfare indicator are related to the different periodicity in which some expenditure are sampled in household surveys which imposes the simple annualisation of weekly or monthly purchases.

Third, many items considered in surveys are purchased infrequently, further complicating the accurate estimation of true household consumption levels.

**Non-monetary welfare indicator (Food security);** There are numerous non-monetary welfare indicators that linked to health, nutrition, social relationships, insecurity, literacy, low self-confidence, and powerlessness. For this study, food security was selected among a variety of non-monetary welfare indicators, in line with various researchers.

According to Chegini et al. (2021), there is a direct and strong correlation between food security and household welfare in rural areas.

Likewise, Widodo et al. (2024) documented the relationship between food security and farmer welfare. According to his analysis, the food security of farmer households is positively affected by the level of farmer welfare.

Therefore, this study utilized both income and food security (daily calorie intake per adult equivalent (AE)) as a household welfare indicators to understand the interdependence between different welfare indicators.

## **2.2. History of saving and credit cooperatives**

### **2.2.1. Global, African and Ethiopian Perspective**

The first SACCO was founded in the middle of the 19th century in Germany. Two men are considered the founders of the saving and credit cooperative: FreidrichReifeisen, who founded the rural saving and credit cooperatives, and Herman Schultze-Delitsche, who founded the saving and credit cooperatives for urban middle classes and the minor artisans. Between 1900 and 1930, both types of cooperatives expanded rapidly throughout Europe, North America, Latin America, and Asia and reached Africa after 1950. SACCO societies now play a major role in improving the socio-economic status of their members at the global level. To mention, in Western Europe, there are around 11,000 local and regional savings and credit cooperatives banks, with over 56,000 outlets, a 33 million strong membership, and a staff of more than 400,000. They rank third after commercial and savings banks, with a 17 percent market share in savings. The French SACCOs or Credit Union Agricole is the largest bank in the world outside of Japan, the German people's banks have over 28 percent of the savings market share, Rabobank Netherlands 25 percent, Ireland has a strong SACCOs or Credit unions movement, with 1.6 million people (44 percent of the population) in membership (Birchall, 2004). About 25% of US agriculture's credit needs are met by a few very large cooperative banks in the United States. Credit Unions are also well established; there are over 18,000 Credit Unions, serving 70 million members and with more than \$300 billion in assets. They have 13 percent of the consumer credit market and eight percent of consumer savings (Birchall, 2004 cited in Ayalew, 2016).

In African countries, the first SACCO is adopted by English-speaking countries. In this line, Tanzania, Ghana, Uganda, Kenya, and Nigeria have the largest share. From all Ghana is the first SACCO society novice in Africa since 1959. While non-English-speaking countries began to recognize the value of SACCOs in the 1960s, with

the foremost entry into the SACCO community in the 1970s (William, 2017 as cited in Eneyew, 2021). The development of SACCOs in Africa increased significantly in 1965, to the point where the Continental Association of SACCOs and the Africa Confederation of Cooperative Society Savings and Credit Association were founded (Olando et al., 2012, as cited in Eneyew, 2021).

From an Ethiopian perspective, the beginning of the modern SACCO counts for more than half a century. The first SACCO in Ethiopia was founded in 1964 by employees of Ethiopian Airlines on the initiative of interested individuals in Ethiopian society who have international exposure and peace-core workers of foreign descent. During the same period, employees of the Ethiopian Telecommunication Agency and Ethiopian Road Authority founded SACCOs (Dejen, 2016 cited in Alehubel, 2022). In Ethiopia, a national SACCO promotion committee called the Ethiopian Thrift and Credit Cooperatives Development Committee was established in 1970 to advance SACCOs throughout the country. According to Berhane (2010), this committee held the ninth African Conference on the mobilization of local savings and facilitated Ethiopia's affiliation with ACCOSCA. It helped to boost the quantity of SACCOs in Ethiopia and was successful in obtaining support for the expansion of SACCOs from several foreign donor organizations. Between 1974 and 1978, the average annual rate of membership growth was 12 percent, and during the same period, the average savings per member was Birr 268. The mean yearly rate of growth in the number of SACCOs was slightly more than 14.7 percent (Dejen, 2016 cited in Alehubel, 2022).

In Ethiopia, the Cooperative Societies Proclamation No. 138/1978 provides the legal foundation for SACCOs. Despite being socialist-orientated, the proclamation opened the door for the formation of SACCOs in addition to the three other cooperatives—housing cooperatives, service cooperatives, and producers' cooperative societies. Various governmental organizations were assigned to handle the regulatory and advertising tasks for these various cooperative forms. Through the creation of the Savings and Credit Cooperatives Development Office, the National Bank of Ethiopia has been the responsible state entity for the promotion and regulation of SACCOs since 1978. Among other limitations, Proclamation No. 138/1978 was urban SACCO's biased. Before the

passing of Cooperatives Proclamation No. 147/98 in 1998, the SACCO movement in Ethiopia was mostly concentrated in urban areas, with only one centre-Addis Ababa, where the office was located and offered technical and regulatory services. This new proclamation establishes a governmental organization with branches up to the woreda level, institutionalizing technical support and regulatory actions for various cooperative types. It also completely complies with internationally recognized cooperative principles. Even though attention and the establishment of the responsible organization differed, independent institutions are currently responsible for the regulatory, capacity-building, and promotional activities of various cooperative types across the country in each administrative region, city council, and federal cooperative agency (ALEHUBEL, 2022). There had not been a RUSACCO society in Ethiopia until 2001, following the establishment of the first SACCO society by an Ethiopian Air Line civil servant in 1964/65. Hidu Primary SACCO Society is the first RUSACCO society in Ethiopia. It is found at the "Hidu" farmers association (kebele) in "Error" Woreda, East Shewa Zone of Oromiya Regional State (Unpublished RUFIP' annual report, 2006 cited in LAMMAGO, 2020).

### **2.3. Types of saving and credit cooperative**

There are various types of saving and credit cooperatives based on the membership profile and the products offered to SACCO members (Bwana and Mwakujonga, 2013 cited in Feleke, 2016). In essence, saving and credit cooperatives fall into three broad categories:

1. **Community-based saving and credit cooperatives:** These savings and credit cooperatives can be found in cities or regional towns, but they are most commonly found in villages. There are a variety of group and individual loans available, such as women's solidarity loans, business loans for individual members, and loans for small and micro enterprises.
2. **Employee-based saving and credit cooperatives:** These are saving and credit cooperatives where all members are drawn from the same employer, and they are typically located in urban or regional areas. Salary-based loans are made available, which are frequently guaranteed by the employer.

3. **Agricultural saving and credit cooperatives:** This cooperative primarily consists of small-scale agricultural growers in rural areas. Individual farmers as well as farmer associations can be clients of savings and credit cooperatives. Loans are given out for a variety of purposes; including agricultural production loans.

Saving and credit cooperatives also classified into two based on the area of operation/location. These are:

1. **Urban saving and credit cooperatives:** its operational location is in an urban area or city and sub-city.
2. **Rural saving and credit cooperatives:** its operational location is in rural areas (FCA, 2013 cited in Feleke, 2016).

## **2.4. Theoretical review**

### **2.4.1. Theory of group formation**

The process of forming a group involves several stages. In line with this, rural saving and credit cooperatives (RUSACCOs) are one type of community-based group, and their process is evaluated based on group formation theory (Korvives and Tuckman, 1998). The group formation process is known as group dynamics, which emphasizes why groups behave in a specific way. This gives different views about how to develop over time; some groups may be represented as permanent, and other groups establish with sudden activities forward and then have periods with no change. They argue that all groups go through sequential stages of development, regardless of the alternate forms that each group displays. These stages can vary in length depending on the member or group (Nancy, 2013, cited in Alehubel, 2022). To sum up, as community-based organizations, rural saving and credit cooperatives (RUSACCOs) can be better understood through the lens of group formation theory. This theory emphasizes the complexity involved in the formation, evolution, and possible stagnation of these groups by laying out the sequential stages of group development. This understanding is crucial for encouraging productive teamwork and sustainable growth within RUSACCOs. Therefore, this theory implies that farmers join SACCOs to achieve common goals such as better access to financial resources, savings, access to credit, knowledge and information sharing.

### **2.4.2. Social Capital Theory**

The concept of social capital theory has been broadly discussed by various scholars. For instance, according to Bourdieu (1986), social capital is about the institutionalized relationships that enable members to access resources owned jointly by the group. This view highlights the importance of social connections in securing benefits for individuals. Similarly, Coleman (1988) views social capital as a means to improve members' socio-economic and political situation through their participation in social structures. Coleman's work emphasizes the role of social capital in facilitating individual advancement. Putnam (1993) also offers other views, focusing on the efficiency aspect of social capital. He argues that social groups can improve members' efficiency through coordinated actions, suggesting that organized collective efforts can lead to better outcomes for members. This opinion is particularly relevant for understanding how marginalized and disadvantaged groups can benefit from forming cooperatives.

Based on these scholarly opinions, two main features of social capital can be identified. The first feature is that social capital is about the established coordination and networks (Galunic et al., 2012). This feature is crucial because it enables individuals or groups to work together towards common goals. The second feature is that social capital is embedded with resources. These resources can be tangible or intangible that can be accessed through the social relationships and networks.

Social capital theory provides views that can be applied in practice in the context of SACCOs. SACCOs rely on the principles of mutual aid and cooperation among members, who pool their resources to provide financial services to one another. By forming such cooperatives, individuals can access financial resources more easily, improve their economic stability, and enhance their socio-economic status.

The efficiency aspect of social capital, as highlighted by Putnam (1993), is relevant in SACCO context. Saving and credit cooperatives demonstrate how organized collective action can lead to improved outcomes for members. By working together and sharing resources, members can achieve financial goals that might be difficult to attain individually.

In conclusion, the views of scholars like Bourdieu, Coleman and Putnam provide a comprehensive understanding of social capital theory. The key features of social capital like established coordination and networks, and being embedded with resources are evident in the functioning of saving and credit cooperatives. These cooperatives serve as a practical example of how social capital can be leveraged to improve socio-economic outcomes for their members. The application of social capital theory in SACCOs highlights its potential to empower members and enhance their economic well being through collective action.

### **2.4.3. Agency Theory**

A cooperative organization is fundamentally based on agency theory, which focuses on the relationship between agents (managers) and principals (members or owners). This theory seeks to optimize the relationship between these two groups to govern the organization and achieve its objectives effectively. Members of a cooperative are primarily concerned with increasing their capital, while managers possess a wealth of ideas on how to utilize that capital efficiently. Given that the members, who are also the capital owners, often lack the necessary expertise or time to manage the cooperative effectively, they delegate operational responsibilities to the managers. This delegation results in the separation of ownership from control and the attendant agency problems. The main stakeholders in this framework include the managers, management boards, and the members themselves. However, there are additional significant parties whose interests are influenced by the cooperative's activities, including employees, suppliers, customers, business partners, and the broader community. These relationships highlight the interconnectedness of the cooperative with its environment and underline the importance of aligning the interests of all stakeholders for sustainable success (Randall et al., 1997, as cited in Mulugeta, 2020). When agency problems are minimized through transparency and accountability within SACCOs, it enhances trust among members and encourages greater participation in SACCO activities. Therefore, agency theory highlights the necessity of efficient management techniques that harmonize the interests of managers and members.

## **2.5. Empirical review**

### **2.5.1. Determinants of membership in saving and credit cooperative**

In the Kyotera Sub-Country, Ssensagi (2022) examined factors influencing households' involvement in rural savings and credit cooperatives. The results of the study demonstrated that the people's participation in rural saving and credit cooperative activities was influenced by many factors, including gender, income, location of the cooperative or place of residence, age, educational background, and kind of work.

Afolabi & Ganiyu's (2021) study on the determinants of membership in Southwest Nigeria suggests that age, years of schooling, and land size are important factors in determining a person's decision to become a member of a cooperative.

Dayanandan (2016) found that many factors, including initial capital funding, information access, cooperative distance, religion, family size, educational attainment, marital status, cultural influence, and awareness of cooperative principles significantly determine participation in cooperatives.

Ayele (2014) conducted a study on factors affecting membership in the West Amhara Region of Ethiopia. The study found that major factors affecting membership in saving and credit cooperatives include gender, lack of confidence, past negative experiences with cooperatives, educational level, information, household head occupation, marital status, livestock size, participation in local leadership, and other income-generating activities.

Research on the variables influencing members' involvement in credit and savings cooperatives in Gambella town, South West Ethiopia, was carried out by Gnigwo (2010). The results of his study demonstrated that members' participation is negatively affected by many factors, including sex, large families, placing a higher priority on other businesses, low monthly income, members' failure to mobilize savings and repay loans on time or before, a lack of credit-granting institutions, ineffective leadership, operating the business without a business plan, and unexpected government intervention in certain matters about saving and credit cooperatives.

A study carried out in Hulet Ejju Enessie Woreda, East Gojjam zone, revealed that factors such as number of livestock, distance from SACCO office, sex, marital status, education level, participation in other microfinance institutions, involvement in local leadership, participation in different income generating activity are significantly influence farmers' cooperative membership (Yibeltal, 2019 cited in Eneyew, 2021).

In the Gozamin District of the West Amhara Region, Eneyew (2021) conducted a study on the socioeconomic factors influencing membership in saving and credit cooperatives. His study's findings demonstrated that age, education, awareness, information, and distance between the respondent's home and the market, as well as factors such as engagement in marketing activities, gross total income, family labor force, and occupation, were significantly affect saving and credit cooperative membership.

The study by Chimdi et al., (2020) in Gurage Zone of Southern Ethiopia identified the determinants of saving and credit cooperative participation by using logit model. The finding of this study verify that SACCO membership were significantly affected by the age of the household head, educational status, training opportunity, interest rate, access to credit services, the distance of market center and the number of income sources.

According to Alehubel's (2022) research, many factors affect a rural household's participation in rural saving and credit cooperatives in the South Achefer District of West Amhara. These factors include sex, age, income, land size, distance, tropical livestock unit, and involvement in local leadership.

### **2.5.2. Effect of SACCO membership on household savings**

Nwankwo et al. (2013) undertook study in Nigeria on the effect of cooperatives on the saving behaviour of members. The finding of the study indicates that about 88% of the mean savings of respondents were deposited in cooperatives, and the highest saver deposited 55% of their savings in cooperative, whereas the lowest saver deposited 95%. This result shows that individuals with lower savings due to their limited income may rely on cooperatives as their primary means of saving.

Tirfe (2014) assessed financial services offered by RUSACCOs in Tigray region of Ethiopia. The finding of the study demonstrated that saving service is among the services

offered by RUSACCOs in the region and most of the samples of RUSACCOs in the study areas did not provide enough information which could be used as basis for undertaking a detailed analysis of the amount of savings mobilized.

The study by Ayele (2014) in West Amhara Region of Ethiopia assessed members saving amount in RUSACCO. The result of the study shows that the mean members' saving amount in RUSACCO was 1,959.21 Birr and 27.74 % members were saved more than 2000 birr in RUSACCO.

### **2.5.3. Impact of SACCO membership on farmers' agricultural input utilization**

The study by Pasha (2017) the case of Mvomero SACCO in Tanzania, analyzed the attitude of rice growers' on SACCOs. The finding of the study confirmed that 39.2% respondents viewed SACCOs as financial cooperatives that assist rice growers in accessing important agricultural inputs like improved seeds, fertilizers and pesticides to enhance production efficiency. This finding suggests that credit and financial services offered by SACCO's are crucial factors for increasing rice productivity in the study area by enabling farmers to easily obtain the necessary agricultural inputs.

The study conducted in Mbarara district of Uganda by Nuwagaba (2012) reported four kinds of agricultural loan offered by SACCOs. According to the study's result, from the four agricultural loans provided by SACCOs, two of them, namely agricultural input loans and general agriculture loans were intended to support the farmer of the district to buy agricultural inputs like fertilizers in addition to other activities, and SACCOs were considered by members as a best source of financing for them.

Eshetu (2011) conducted thesis case study on the contribution of SACCO in food security of small scale of farmers in Arsi Negele district of Oromia region in Ethiopia by using a qualitative research method. The findings of the study suggest that SACCO plays a vital role in improving the food security of its members by empowering households to purchase essential farm inputs like fertilizer and seeds to enhance crop production and invest into diverse off-farm business activities. The study reveals that a significant

portion of the loans provided by SACCO is utilized by member households for the purchase of agricultural inputs like improved seeds and fertilizer.

Tirfe (2014) done study on the financial services offered by RUSACCOs in Tigray region of Ethiopia. The result of the study revealed that lending service is one of the services provided by RUSACCOs in the region and the RUSACCOs provide loans to their members mainly for productive purpose, like purchase of agricultural inputs (fertilizers, seeds, tools, etc), off-farm activities, food and beverage preparation, animal fattening and rearing.

#### **2.5.4. Impact of SACCO membership on households' income**

The study on the impacts of saving and credit cooperatives on rural women carried out by Chapagain (2015) in Nepal, specifically in the Chitwan district, demonstrates that members' incomes increase after joining the cooperative. It was because they participated in different income-generating activities after observing members' participation in the income-generating activities and their acquisition of knowledge and skills from them.

According to a study by Afolabi & Ganiyu (2021) on the impact of cooperative membership on the generation of rural income in Southwest Nigeria, income generated via cooperative membership is approximately 10% more than that generated by non-cooperative members.

Assenga et al. (2017) researched saving and credit cooperatives and women's poverty reduction in Morogoro District, Tanzania. The finding of the study indicates that members of the cooperatives earn three times as much as non-members. Conversely, according to Chimdi, et al., (2020), there is no significant difference between members and non-members interms of income.

In Gurage Zone, Wakoya (2014) conducted a study on the impacts of rural saving and credit cooperatives on individual households' income and food security. The study's findings showed that households that are members of rural saving and credit cooperatives have more disposable income than households that are not. The mean disposable income of household members is 2107.11 birr, whereas the mean disposable income of non-

member households is 952.05 birr. Therefore, there is a 1,155.06 ETB yearly income difference between the two categories of mean households.

### **2.5.5. Impact of SACCO membership on households' food security**

The impact of SACCO membership on the food security of households has been the subject of several studies. In Kachabira woreda of KembataTembaro Zone of Southern Ethiopia, Mulugeta (2020) conducted research on the impact of saving and credit cooperatives on rural households' poverty reduction. The results of his study show that food shortage is more common among non-members of savings and credit cooperatives.

Ayele's (2014) study on the impact of saving and credit cooperatives on food security in the West Amhara Region of Ethiopia confirms that membership in saving and credit cooperatives significantly and positively affects the food security of households.

According to Wakoya's (2014) study on the impacts of rural savings and credit cooperatives on individual household income and food security of Yenetsanet Fana Saving and Credit Union of Gurage Zone, food shortage is more prevalent in non-member households. His finding shows that 3% of RUSACCO member households consumed a low calorie (below 1660 Kilo calorie/person/day) which is significantly less than the WHO recommendation of 2600 kcal/AE/day. For the non-members in the same district, the rate is 13%. Furthermore, 87% of non-member households meet their energy demands following WHO standards, whereas 97% of RUSACCO member households meet their energy demands.

### **2.6. Conceptual Framework of the Study**

The framework indicates the different categories of the variables of the study, and how they affect the probability of membership in SACCO, and how they also impact farmers' savings, agricultural input utilization and household welfare in terms of income and food security. Saving and credit cooperative membership is the dependent variable of the study, whereas demographic, economic, and institutional factors are independent variables that affect household membership in saving and credit cooperatives. In addition, there are also outcome variables of the study like household saving amount,

agricultural input utilization and household welfare in terms of income and food security. Therefore, in the study, the interactions of explanatory, dependent, and outcome variables are depicted in the diagram (figure 1).

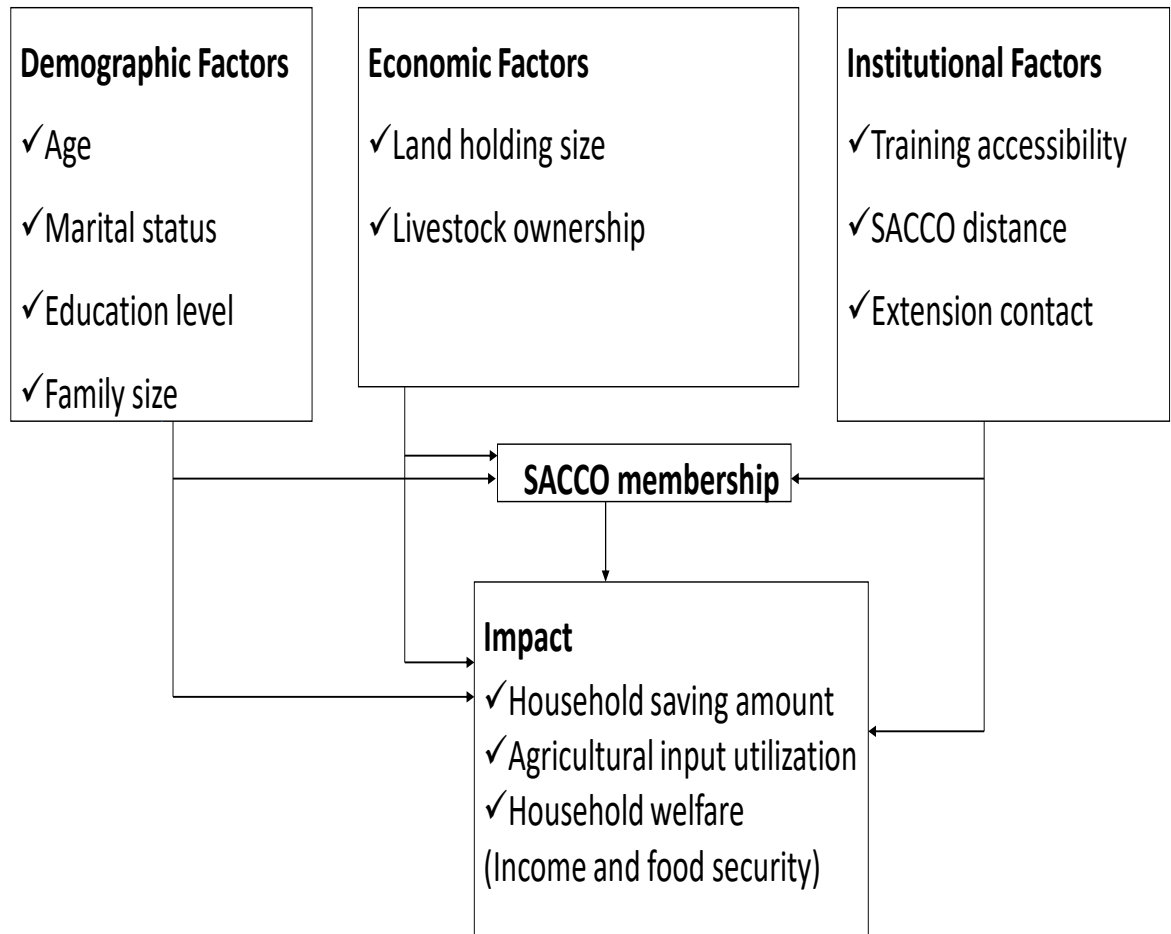


Figure 1: Conceptual framework of the study

Source: Researcher own design (2024)

## **CHAPTER THREE: RESEARCH METHODOLOGIES**

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

The study was conducted in Welmera woreda of West Shewa zone in Oromia regional state of Ethiopia (Figure 2). It was part of the former Finfinne Surrounding Oromia Special Zone, and it was structured under West Shewa Zone in 2015 E.C. The woreda has a total of 18 (eighteen) rural kebeles and 1(one) city administration. WelmeraWoreda is located at a distance of 29 km from Addis Ababa, the capital city of Ethiopia, and 89 km from the zonal town (Ambo). The woreda is bordered in the East direction by KoloboWoreda, in the West direction by Ejere Woreda, in the South direction by Sebeta Hawas Woreda, and in the North direction by MuloWoreda. The woreda is astronomically located between  $8^{\circ} 5'-9^{\circ} 5'N$  Latitude and  $38^{\circ} 4'-39^{\circ} 2'E$  Longitude and its altitude ranges from 2060-3380 meters above sea level. Agroecologically the woreda is 61% highland and 39% midland. The woreda annual average temperature ranges from  $0-27^{\circ}C$  and the average annual rainfall varies between 834 mm and 1300 mm. The woreda has a total area of 53702 hectares. From the total area, 41328 hectares are used for agricultural production, 8901 hectares are covered by forest and 3473 hectares are used for grazing land (WWAO, 2015/2023).

According to the 2007 population census, the woreda has a total population of 127,802. From this total population, the number of males and females are 64554 and 63266 respectively (CSA, 2007).

The main livelihood activity of the woreda population is mixed farming and many people make their livelihood from this activity. The crops grown in the woreda include cereals (barley, teff, wheat, and maize), pulses (bean and chickpea), fruits and vegetables (apple, cabbage, potato, and onion), and oilseeds like linseeds and nug. From the crops grown in the woreda; wheat, barley, and teff are important food crops and cultivated by many households. According to the WelmeraWoreda agriculture office report of 2015/2023, from the total land of 53702 hectares, 41328 hectares were cultivated by different crops in the 2014/2015 production year. In addition, livestock rearing is another important livelihood activity for the woreda population. According to the WelmeraWoreda

agriculture office report of 2015, the quantity of estimated livestock population is; 167343 cattle (158258 local and 9085 breed), 99130 sheep, 11468 goats, 8279 horses, 120 mules, 12363 donkeys, 216358 chicken (155878 local and 60480 breeds), and 7370 traditional, 3072 transitional and 2390 modern bee hives (WWAO, 2015/2023).

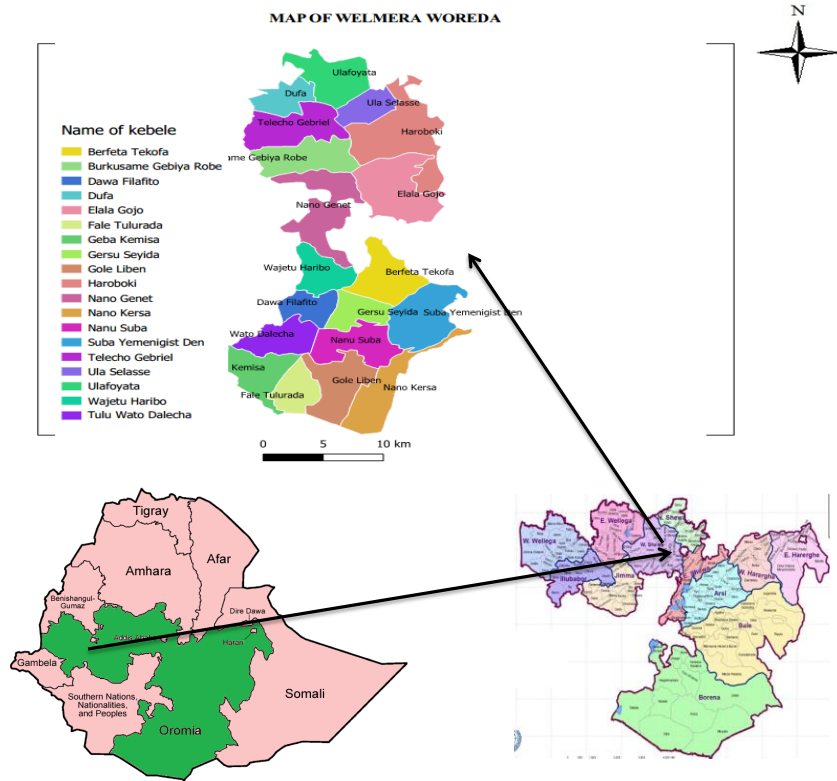


Figure 2: Map of the study area

### 3.2. Research Design and Approach

In this study, a descriptive and explanatory cross-sectional research design with qualitative and quantitative research approaches were employed to achieve the study objectives. These research designs and approaches were appropriate because they described the institutional, economic, and demographic characteristics of sample households and explained the relationships between the study variables. Additionally, the data required for this study was collected at a single time using a mix of quantitative and qualitative approaches.

### **3.3. Study Population**

The target population of this study is all rural households from which the sample study was selected. Accordingly, in the study area, there are 12183 households including both non-member and member households. So, the target population of this study is 12183 households.

### **3.4. Sampling Techniques**

In this study, a multi-stage sampling technique was applied for sample household selection (figure 3). At the first stage, Welmera woreda was purposively selected based on the proximity and accessibility of the woreda to the researcher and the availability of RUSACCO.

Although all eighteen (18) rural kebeles of Welmera woreda were expected to have saving and credit cooperatives, only eight (8) kebeles actually had SACCO. Therefore, three (3) sample kebeles were randomly selected from these eight rural kebeles in the second stage. Accordingly, Burkusame Gebiya Robe, Nano Suba, and Tulu Wato Dalecha kebeles were randomly selected from the woreda.

In the third stage, a stratified sampling technique was used. At this stage, in the three selected kebeles, households were stratified into two groups/strata; member and non-member households.

At the fourth/final stage, sample households were randomly and proportionally selected from the sample kebeles. However, within each kebele, sample households were equally selected from each stratum of both member and non-member households.

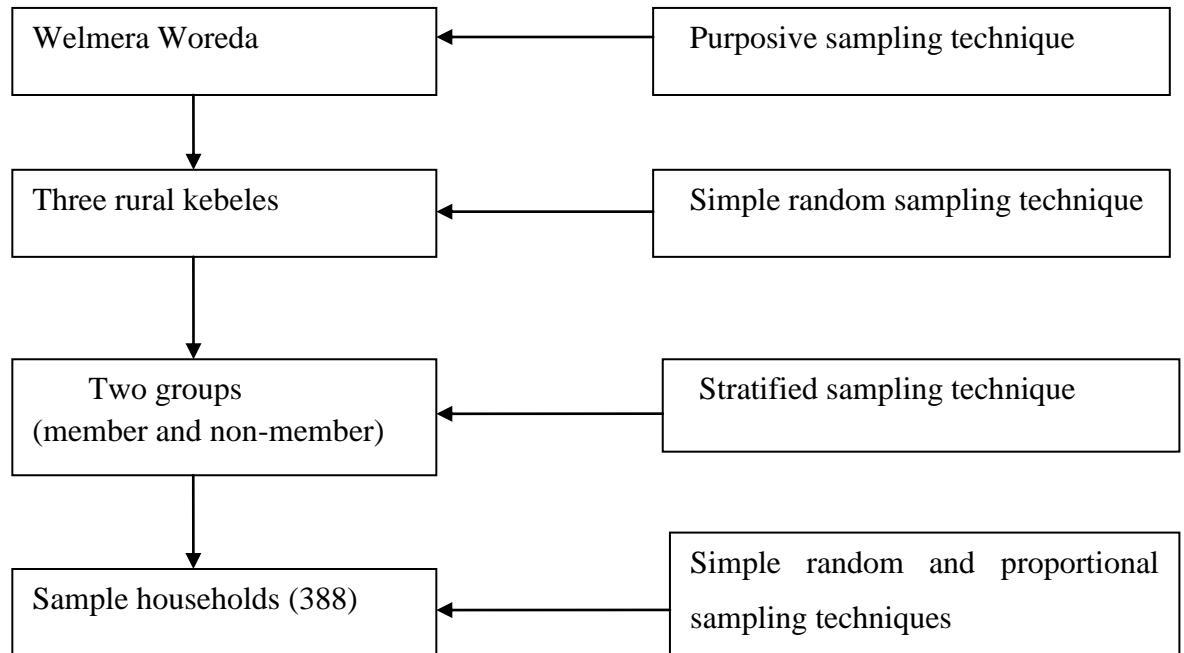


Figure 3: Sampling technique procedure

### 3.5. Sample size determination

To determine the sample size of the study, Yamane's (1967) formula was employed. The formula suggested by Yamane is: -

$$n = \frac{N}{1 + N(e)^2}$$

Where; N= Total population/total household of the woreda = 12183

e= is the level of precision = 0.05

n= is the sample size

Therefore;  $n = \frac{12183}{1 + 12183(0.05)^2} = 388$

So, the total sample size of the study is 388 households. From the total 388 sample households; 138, 132, and 118 households were proportionally and randomly selected from Burkusame Gebiya Robe, Nano Suba, and Tulu Wato Dalecha kebeles, respectively.

Table 1: Summary of selected kebeles with proportional household sample size

No	Name of selected kebeles	Total HH of the kebeles	Total sample HH of the kebeles	Member sample HH of the kebeles	Non-member sample HH of the kebeles
1	Bu/G/Robe	1261	138	69	69
2	Nano Suba	1198	132	66	66
3	T/W/Dalecha	1076	118	59	59
<b>Total</b>		3535	388	194	194

### 3.6.Data sources and types

In this study, both qualitative and quantitative data types were utilized from primary and secondary sources. The primary data was obtained directly from sample households who were selected from member and non-member households and also from the experts of the Woreda Cooperative Promotion Agency and DAs of the selected kebeles. Secondary data was collected from organizational reports of the study woreda.

### 3.7.Method of Data Collection

The household survey technique was utilized to collect the quantitative data, while FGD and KII were used for the qualitative data. To simplify the data collection process, survey questionnaires were translated from the English language to the local language (Afaan Oromo). Then, data was collected by the researcher himself and with four (4) enumerators who were hired from the woreda for data collection. In the study, FGDs and KII were also used to collect detailed information on the objectives of the study. In the FGD technique, one FGD per each selected kebele was conducted with 6, 7, and 6 representative households at Burkusame Gebiya Robe, Nano Suba, and Tulu Wato Dalecha kebeles, respectively. KII was conducted with the experts of the Woreda cooperative promotion agency and DAs of the selected kebeles. In addition, secondary data was obtained from different relevant sources through intensive reviews.

### 3.8. Method of Data Analysis

In this study, data analysis was conducted with descriptive and inferential statistical tools, as well as through econometric models by employing SPSS and Stata software.

#### 3.8.1. Qualitative data analysis

Qualitative data was analyzed, interpreted, narrated and summarized to supplement the quantitative findings of the study.

#### 3.8.2. Quantitative data analysis

##### 3.8.2.1. Descriptive and inferential statistics

Demographic, economic, and institutional characteristics of member and non-member households were described, compared, and summarized by using different descriptive and inferential statistics like mean, standard deviation, percentages, frequency, chi-square, and t-test.

##### 3.8.2.2. Econometric analysis

###### i. Binary logistic regression model

Determinants of household membership in SACCO were analyzed through the binary logistic regression model because this model is convenient for the analysis of dichotomous outcome variables and mathematically easy to use (Hosmer and Lemeshew, 1989), as well as logistic regression considers the fact that the dependent variable is categorical (Tranmer & Elliot, 2008).

Therefore, the logistic regression model was applied to estimate the probability of household membership in SACCO which was defined as 1 if a household is a member or 0 if a household is a non-member. According to Gujarati, D.N., (2003), the functional form of the logit model is presented as follows:

$$P_i = E\left(\frac{Y_i}{X_i}\right) = \frac{1}{1+e^{-(\beta_0+\beta_1X_i)}} \dots\dots\dots (1)$$

This can be written as:

$$P_i = E\left(\frac{Y_i}{X_i}\right) = \frac{1}{1+e^{-Z_i}} \dots\dots\dots (2)$$

Where  $P_i$  is the probability of membership in SACCO for the  $i^{\text{th}}$  household; ‘e’ represents the base of natural logarithms;  $Z_i$  is a functional form of ‘n’ explanatory variables (X) which is expressed as:

$$Z_i = \beta_0 + \sum_{i=1}^n \beta_i X_i, \text{ Where } i=1, 2, 3, \dots, n \dots\dots\dots (3)$$

Where;  $\beta_0$  is the intercept and  $\beta_i$  is the model's slope parameters. The slope tells how the log odds in favor of membership in SACCO change as independent variables change.

According to Hosmer and Lemeshew (1989), the logistic model is more understandable if we put it in the odds and log of odd style.

$$1 - P_i = \frac{1}{1+e^{Z_i}} \dots\dots\dots (4)$$

$P_i$  shows the probability of membership in SACCO, whereas  $1-P_i$  indicates the likelihood of non-membership. So, the odd ratio was calculated as follows:

$$\frac{P_i}{1-P_i} = \frac{1+e^{Z_i}}{1+e^{-Z_i}} = e^{Z_i} \dots\dots\dots (5)$$

By replacing the natural logarithm of equation (5), we can get the log odds specified as follows:

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = Z_i = \beta_0 + \beta_1 X_1 + \dots + \beta_n X_n + U_i \dots\dots\dots (6)$$

Where  $P_i$  shows the probability of household membership in SACCO with the function of explanatory variables of  $Z_i$  and  $n$ .

If the stochastic error term ( $U_i$ ) is introduced, the logit model becomes:

$$Z_i = \beta_0 + \beta_1 X_1 + \dots + \beta_n X_n + U_i \dots\dots\dots (7)$$

**ii. Propensity score matching (PSM) method**

The impact of SACCO membership on household savings, farmers’ agricultural input utilization and household welfare (income and food security) was analyzed by propensity score matching model. This model best suits the objective of the study as it enables us to

estimate the impact of SACCO on members through comparison to non-members having similar backgrounds. In the study area, SACCO membership does not randomize. So, propensity score matching is the best method to analyze the impact of SACCO as it creates control groups with similar characteristics so that the non-randomness bias is minimized. The PSM method adjusts the selection bias by matching each treated/member household to a control/non-member household based on similar observed explanatory variables (Rosenbaum and Rubin, 1983).

Therefore, the evaluation of SACCO membership impact on a given outcome (Y) is specified as:

$$T_i = Y_i(D_i = 1) - Y_i(D_i = 0) \dots\dots\dots 8$$

Where  $T_i$  is the treatment effect (effect due to membership in SACCO),  $Y_i$  is the outcome on household  $i$ ,  $D_i$  is whether household  $i$  has got treatment or not.

In this study, to estimate the average treatment effect at the population level rather than the individual level, the most important evaluation method-Average treatment effect on the treated (ATT) was used. ATT is the difference between the outcomes of the treated and the outcomes of the treated observations if they had not been treated (Katchova, 2013). Because of that, ATT focuses on the estimation of the effects of SACCO membership on member households. Thus, ATT is specified by:

$$ATT = E(T|D = 1) = E(Y_1|D = 1) - E(Y_0|D = 1) \dots\dots\dots 9$$

Finally, by rearranging and subtracting  $E(Y_0|D=0)$  from both sides of the equation (2), the ATT impact of SACCO membership was estimated as:

$$E(Y_1|D = 1) - E(Y_0|D = 0) = ATT + E(Y_0|D = 1) - E(Y_0|D = 0) \dots 10$$

**iii. Measurements of Household Welfare**

According to Anand & Harris (1994), there are five potential indicators of household welfare. These are household income per capita, household total expenditure per capita, household food expenditure per capita, household calorie intake per capita and household inverse food share. Accordingly, in the context of this study, from these five potential

indicators of welfare, the researcher used household income and food security (household calorie intake) to measure the impact of saving and credit cooperatives on household welfare in the study area.

### **1. Household Income measurement**

Household income is the total gross income of all members of a household and is calculated by adding together the income of all members within 12 months (Scott & Catalano, 2022). Household welfare can be measured either from an income or expenditure perspective. A study by Bezabih (2021) employed income as an outcome variable for measuring the welfare impact of agricultural cooperatives on smallholder farmers, and household welfare is measured using incomes from both farming and non-farming activities. In this study, household income was used to measure household welfare by using different sources of income (both farming and non-farming activities). Therefore, in this study, the total annual income of sample households was calculated/measured in birr and both member and non-member sample households were compared in terms of their annual income.

### **2. Food security measurement**

According to Meskerem (2011), food availability at the household level plays a crucial role, and household welfare status is directly and significantly associated with food security in rural areas (Chegini, et al., 2021). In this study, to measure food availability at each household level, the Household Food Balance Model (HFBM) was used. HFBM was adapted from the FAO Regional Food Balance Model and applied by various researchers in different studies of household food security status determination (Tolossa, 1996; Tolossa, 2002; Tefera, 2009; Abi and Tolossa, 2015; Geleta et al., 2018; Wondimagegnhu and Bogale, 2020; Hailu & Tolossa, 2022; Mekuria et al., 2019; Abera&Mekonin, 2022). To quantify the net available grain food by each of the sample households in the study area, the HFBM was used. All variables required for the HFBM were converted to a kilogram grain measurement unit.

HFBM specification is:

$$NGA_{ij} = (TGP_{ij}+TGB_{ij}+QFA_{ij}+TGG_{ij}) - (PHL_{ij}+QGR_{ij}+AGS_{ij}+AGV_{ij})$$

Where;  $NGA_{ij}$ : Net grain available by  $i^{th}$  household in year  $j$   
 $TGP_{ij}$ : Total grain produced by  $i^{th}$  household in year  $j$   
 $TGB_{ij}$ : Total grain bought by  $i^{th}$  household in year  $j$   
 $QFA_{ij}$ : Quantity of food aid obtained by  $i^{th}$  household in year  $j$   
 $TGG_{ij}$ : Total grain obtained through a gift by  $i^{th}$  household in year  $j$   
 $PHL_{ij}$ : Post-harvest losses by  $i^{th}$  household in year  $j$   
 $QGS_{ij}$ : Quantity of grain reserved for seed by  $i^{th}$  household in year  $j$   
 $AGS_{ij}$ : Amount of grain sold by  $i^{th}$  household in year  $j$   
 $AGV_{ij}$ : Amount of grain given to others by  $i^{th}$  household in year  $j$

The analysis of food availability at the household level was conducted through three steps. In the first step, the net food grain available for each household in kg was converted into equivalent total kilocalories by using the Ethiopian Health and Nutrition Research Institute food composition table (EHNRI, 1997). In the second step, the kilocalories available at the household level were calculated by dividing the total number of days in one year (365 days) and the adult equivalent. In the third step, using 2200 kcal/day/AE as the threshold point, the food security status of a household was determined by comparing calories available and required by the household. The Ethiopian government has set a minimum recommended daily calorie intake of 2200 kcal per adult equivalent (AE) (MOFED, 2008 cited in Dube, 2018). Therefore, a household with less than the recommended 2200 kcal/day/AE was considered food insecure, whereas greater than or equal to 2200 kcal/day/AE was food secure. In this model, all the data utilized for calculation is collected from field surveys, except for the estimates given for the amount of grain reserved for seed and post-harvest loss. Following different researchers, 5% and 10% were used for the estimates of grain reserved for seed and post-harvest loss, respectively (Tolossa, 2002; Abi and Tolossa, 2015; Tefera, 2009; Hailu&Tolossa, 2022; Abera and Mekonin, 2022). The assessment of household food balance covers a period between September 2022 G.C/2015 E.C and September 2023 G.C/2016 E.C.

#### **iv. Multicollinearity Test**

The existence of multicollinearity problems among independent variables was checked before starting the model analysis. Therefore, the existence of multicollinearity was

tested through the variance inflation factor (VIF) and the inverse of VIF (1/VIF) called Tolerance. According to Gujarati (2004), the larger value of VIF shows the existence of collinearity among independent variables. In other ways, if the VIF of a variable exceeds 10, that variable shows high collinearity. In addition, if the tolerance of one variable is close to zero (0), the degree of collinearity of that variable with other covariates is higher, whereas if it is close to one (1), that variable has no collinearity with other independent variables (Gujarati, 2004). Accordingly, the VIF and Tolerance test indicate that there was no multicollinearity problem among the independent variables of the study (Appendix table 5).

#### v. Heteroskedasticity Test

In this study, heteroskedasticity was checked using the Breusch-Pagan/Cook-Weissberg test. In the test, if the probability value of the chi-square statistic is less than 0.05, the null hypothesis of constant variance can be rejected at a 5% significance level. This indicates that the presence of heteroskedasticity. However, the result of the test reveals that the chi-square statistic of Breusch-Pagan was 0.0607. Therefore, the value is insignificant and leads to the acceptance of the null hypothesis (constant variance). This suggests the absence of a heteroskedasticity problem (Appendix Table 6).

### 3.9. Definitions of Variables and Hypothesis

#### 3.9.1. Dependent Variable

**SACCO membership:** In this study, SACCO membership was used as a dependent variable. It is a dummy dependent variable, and coded with a value of “1” for member households and “0” for non-member households.

#### 3.9.2. Outcome Variables

The following variables were used as outcome variables of the study.

**Household savings:** Household saving is the total amount of money saved by households in Ethiopian birr per year, and it is a continuous outcome variable.

**Agricultural Input Utilization:** It is the monetary value of the agricultural inputs that were used in the agricultural production in one production year or the total amount of money the household spent on agricultural inputs in Ethiopian birr per year. It is a continuous outcome variable.

**Household welfare (income):** It is the total amount of annual income obtained by the household in Ethiopian birr per year and it is a continuous outcome variable.

**Household welfare (food security):** It is the amount of food available for consumption per day per adult equivalent in kilocalories, and it is a continuous outcome variable.

### **3.9.3. Independent Variables**

Based on different literature and similar previous empirical studies on SACCO memberships, different variables that are expected to influence household membership in SACCOs were selected. These independent variables are categorized under three major variables which include demographic, economic, and institutional factors.

**Age of Household head (HH\_AG):** Age is a continuous variable and it was measured by the number of years a household lived. It was hypothesized that age is positively related with household membership in SACCO.

**Household Marital Status (HH\_MS):** Marital status is a categorical variable and it was expressed as married, widowed, and divorced. It was hypothesized that being married influences membership in SACCO positively.

**Education Level of Household head (HH\_EDU):** Level of education is a type of continuous variable, and it was measured by the number of grade a household attained. It was hypothesized that a household that attended better education status; the likelihood of membership in SACCO is high.

**Household Total Family Size (HH\_TFS):** It is a continuous variable, and includes all family members of the household who live in the same house. It was hypothesized that as the size of household family increases the membership in SACCO decreases.

**Household Land Holding Size (LAND\_SIZE):** It is the total farm size owned by the household. Land size is a type of continuous variable and is measured in hectare. It is expected that large land size positively influences membership in SACCO.

**Household Livestock Ownership (LIV\_OWNERSHIP):** It is the number of livestock owned by the household. It is a type of continuous variable and is measured by tropical livestock unit (TLU). It was hypothesized that a large number of livestock affects membership in SACCO positively.

**Training Accessibility (TRAIN\_ACC):** It is a dummy variable and expressed as a household that has accessed a training service or a household that has not accessed a training service. It was hypothesized that training accessibility is expected to influence membership in SACCO positively.

**Distance of SACCO office from Household Home (SACCO\_DIST):** This refers to the distance taken from the household home to the SACCO office or it measures the time taken to reach the SACCO office found in the study area. It is a continuous variable and is measured in minutes. Long distance to the SACCO office was hypothesized to have a negative effect on membership in SACCO.

**Extension Contact (EXT\_CONT):** This refers to the frequency of contacts the household had with extension agent or organization. It is a continuous variable and is measured by number of contacts. So, it was hypothesized that having better extension contact positively influences membership in SACCO.

Table 2: Summary of independent variables

No	Independent Variables	Variable Type	Unit of Measurement	Expected sign
1	Age of HH head	Continuous	Year	+
2	HH marital status	Dummy	1=married 2=Divorced 3=Widowed	+
3	HH education level	Continuous	Grade/year	+
4	HH family size	Continuous	Number	-

5	HH land holding size	Continuous	Hectare		+
6	HH livestock ownership	Continuous	TLU		+
7	HH training accessibility	Dummy	0=No 1=Yes		+
8	SACCO distance	Continuous	Minute		-
9	HH extension Contact	Continuous	Number		+

### 3.10. Ethical Consideration

This study was considered research ethics at every stage of the study. First of all, a letter that declares the researcher's participation in the research activities was taken from the university. Then, the researcher communicated and requested permission from the woreda and kebele officials, as well as household respondents, to access the study site and collect data. After that, the researcher obtained verbal consent from sample respondents' and confirms their willingness to participate in the study. The responses of all sample respondents were confidential to the researcher and data collectors. In the study, the privacy of individuals and the culture of the study area are respected, and the names of personalities and perceptions are not included in the report without their permission.

## CHAPTER FOUR: RESULT AND DISCUSSION

This chapter presents the findings and discussions of the study objectives, based on the results of descriptive, inferential, and econometric model analysis.

### 4.1. Descriptive and inferential analysis

In the descriptive and inferential analysis, various inferential and descriptive statistics like mean, standard deviation, frequency, percentage, t-test, and chi-square test were used to describe sample households' demographic, economic, and institutional characteristics.

#### 4.1.1. Demographic characteristics of member and non-member households

**Household marital status:** From the total three hundred eighty eight (388) sample households, about 360 (92.78%) sample households were married, 20 (5.15%) households were widowed and 8 (2.06%) households were divorced. Among member households, 182 (93.81%) were married households, 7 (3.61%) were widowed and 5 (2.58%) were divorced households. Among non-member households, 178 (91.75%) were married households, 13 (6.70%) were widowed and 3 (1.55%) were divorced households. The result of the chi-square test of marital status between SACCO members and non-members was found to be statistically insignificant at  $X^2(2, N=388) = 2.3444$ ,  $Pr = 0.310$ . This revealed that there is no significant association between household membership in SACCO and marital status at a 5% significance level (see table 3).

Table 3: Marital status of member and non-member HHs' ( $X^2$ -test)

Variables		Members (n=194)		Non-members (n=194)		$X^2$ -test	Total sample (n=388)	
		N <sub>0</sub>	%	N <sub>0</sub>	%		N <sub>0</sub>	%
HH	Married	182	93.81	178	91.75	2.34	360	92.78
marital	Widowed	7	3.61	13	6.70	INS	20	5.15
status	Divorced	5	2.58	3	1.55		8	2.06

Source: own survey, 2016/2024

**Note:** INS indicates insignificance at 5% probability level

**Age of household head:** The mean age of member and non-member households were 47.73 and 44.16 years with a standard deviation of 9.77 and 9.97, respectively (table 4). The result of the t-test analysis showed that the difference in mean age between the two groups (member and non-member households) is significant at 1% significance level. This implies that member households have older households compared to non-member households.

**Education level of household head:** The survey result indicates that the mean education level of sample households was 3.95 grades with the standard deviation of 3.24 (table 4). The member and non-member households mean education level were 5.08 and 2.83 grades with the standard deviation of 3.19 and 2.89 respectively, which is significantly different at 1% significance level. This indicates that the educational status of member households were higher than non-member households.

**Household family size:** The average family size of member and non-member households was 4.76 and 5.67 persons with a standard deviation of 0.93 and 1.37, respectively (table 4). The result of the t-test analysis showed that the difference in average family size between the two groups (member and non-member households) is significant at 1% significance level. This implies that non-member households have a large family size compared to member households.

Table 4: Age, family size and educational status of member and non-member households' (t-test)

Variable	Members (n=194)		Non-members (n=194)		t-test	Total sample	
	Mean	Std.Dev	Mean	Std.Dev		Mean	Std.Dev
HH Age	47.73	9.77	44.16	9.97	-3.56*	45.95	10.02
HH education Level	5.08	3.19	2.83	2.89	-7.27*	3.95	3.24
Household Family size	4.76	0.93	5.67	1.37	7.64*	5.22	1.25

Source: own survey, 2016/2024

**Note:** \* indicates significance at a 1% probability level

#### 4.1.2. Economic characteristics of member and non-member households

**Household land holding size:** In rural areas, land is the most important livelihood resource and the main economic activities of rural peoples depend on it. Particularly, for those rural people who depend on animal and crop production, land is everything. It was hypothesized that land size increases household membership in SACCO. As the result found in table 5 indicates, the mean land size of sampled member households was 1.72 ha with a standard deviation of 0.91, while for the non-members was 1.19 ha with a standard deviation of 0.73. The t-test result indicated that the land size mean difference between the member and non-member households is significant at a 1% significance level.

**Household livestock ownership (TLU):** It was hypothesized that livestock ownership positively influences household membership in SACCO. The mean livestock ownership of SACCO member households was 6.39 TLU with a standard deviation of 2.59 and for non-members; the mean livestock ownership was 4.82 TLU with a standard deviation of 2.27. The t-test revealed that the mean difference between the two groups is significant at a 1% significance level in terms of livestock ownership. This indicates that owning more livestock is correlated with membership in SACCO (table 5).

Table 5: Land size and livestock ownership of member and non-member HHs (t-test)

Variables	Members		Non-members		t-test	Total sample	
	Mean	Std.Dev	Mean	Std.Dev		Mean	Std.Dev
HH Land size (ha)	1.72	0.91	1.19	0.73	-6.22*	1.46	0.86
HH Livestock ownership (TLU)	6.39	2.59	4.82	2.27	-6.33*	5.60	2.56

Source: own survey, 2016/2024

**Note:** \* indicates significance at a 1% probability level

### 4.1.3. Institutional characteristics of member and non-member households

**Training Accessibility:** In line with training accessibility, from the total sample households, 157 (80.93%) of member households said ‘Yes’ to training accessibility, while the remaining 37 (19.07%) member households said ‘No’ to training accessibility. Among non-member households, 12 (6.19%) households said ‘Yes’ to training accessibility, while 182 (92.81%) households said ‘No’ to training accessibility (table 6). The chi-square test confirmed that there is a significant association between household membership in SACCO and training accessibility at a 5% significance level with  $X^2(1, N=388) = 220.4129, Pr=0.000$ . This result suggests that member households are found to have better access to training than non-member households.

Table 6: Training accessibility of sample households (X2-test)

Variables	Members (n=194)		Non-members (n=194)		$X^2$ -test	Total sample (n=388)		
	N <sub>0</sub>	%	N <sub>0</sub>	%		N <sub>0</sub>	%	
	HH Training accessibility	No	37	19.07	182	92.81	220.41*	219
	Yes	157	80.93	12	6.19		169	43.56

Source: own survey, 2016/2024

**Note:** \* indicate significance at 1% probability level

**Extension Contact:** Households who have extension contact are more likely to be aware of new practices, ideas, and technologies as they can easily get useful information from extension agents. In terms of extension contact, on average, member households had 2.42 contacts with extension agents, but non-member households had 1.17 contacts with extension agents. The result of the t-test analysis showed that the mean difference between the two groups is significant at 1% significance level in terms of extension contact (table 7). This implies that households who get better extension contact had more membership in SACCO.

**Distance of SACCO office from household home:** In this study, SACCO distance was measured in minutes and it was hypothesized to affect household membership negatively.

The mean distance of SACCO from the home of member and non-member households was 19.18 minutes and 43.56 minutes with a standard deviation of 15.62 and 31.26, respectively. The t-test analysis revealed that there is a significant mean difference between member and non-member households in terms of SACCO distance at less than 1% significance level (Table 7). This suggests that households who live near the SACCO office had more membership in SACCO than those who live far away.

Table 7: Household extension contact and SACCO distance from sample households' home (t-test)

Variables	Members		Non-members		t-test	Total sample	
	Mean	Std.Dev	Mean	Std.Dev		Mean	Std.Dev
HH extension contact	2.42	2.49	1.17	1.98	-5.44*	1.79	2.34
SACCO distance (minute)	19.18	15.62	43.56	31.26	9.72*	31.37	27.53

Source: own survey, 2016/2024

**Note:** \* significance at 1% probability level

## 4.2. Econometric Analysis

### 4.2.1. Determinants of Household Membership in SACCO

An econometric analysis was conducted to analyze the factors that determine household membership in SACCO. In the econometric analysis, a binary logistic regression model was utilized to estimate the effects of the hypothesized independent variables on the dependent variable (household membership in SACCO). The logit analysis indicated that out of the nine (9) hypothesized explanatory variables; six (6) variables significantly influenced the probability of household membership in SACCO. Among six (6) explanatory variables, four (4) variables (household age, household education level, household land holding size, and training accessibility) positively and significantly influenced the likelihood of household membership in SACCO. However, two (2)

variables (household family size and SACCO distance) negatively but significantly affected the probability of household membership in SACCO. The remaining three independent variables (marital status, livestock ownership, and extension contact) have no significant effect on household membership in SACCO.

**Age of Household Head:** The age of the household head was hypothesized to influence household membership in SACCO. As anticipated, the result of the logit model analysis revealed that the age of the household head has a positive and statistically significant influence on household membership in SACCO at a 5% level of significance (table 8). The marginal effect analysis indicated that other things were kept constant (*ceteris paribus*), as the age of the household increases by one unit/year the probability of household membership in SACCO increases by 0.0048013 (0.48%). This result suggests that old household heads were more likely to be members of SACCO than other household heads. This might be due to their understanding of the importance of saving from their life experience. The result of FGD that was conducted with member household heads' in the study area indicates that as old household heads had a better understanding of the advantage of saving than other household heads. The result of this study is agreed with the result of Eneyew (2021).

**Education level of household head:** Education provides knowledge and skills that help to understand the importance of saving and credit cooperatives. As expected, the educational status of the household head had a positive and significant influence on household membership in saving and credit cooperatives at a 1% significance level. The result of the marginal effect given in table 8 below indicates that keeping other factors constant, an increase in the level of education of a household by one unit/grade/year increases the probability of household membership in SACCO by 0.0200537 (2%). This implies that households who have better education were more members of SACCO than those who have no education. This result is supported by different previous findings like Girma & Alemayehu (2023), Eneyew (2021), and Ayele (2014) which show the positive and significant influence of household educational status on household membership in SACCO. The result of KII (Key informant interview) showed that better education

attainment of household heads could increase membership in saving and credit cooperatives.

The KII participants stated that:

*“Household membership in SACCO can be influenced by households’ education level because households with better education can understand the importance of membership in SACCO than households without education.”*

**Household family Size:** In this study, household family size negatively and significantly affected household membership in SACCO at a 1% significance level. This implies that those households who had large family sizes were less likely to be members of SACCO than those who had small family sizes. The result of marginal effect analysis indicated that keeping other factors constant, the probability of household membership in SACCO decreased by 0.0467144 (4.67%) as household family size increased by one unit or one person (table 8). This might be because as the family size increases the amount of expenses also increases. This in turn led those households with large family sizes unable to save money and if money is not saved it is difficult to become a SACCO member. This study result is in line with the result of Girma & Alemayehu (2023) which revealed the negative effect of family size on household membership in SACCO. The FGD participants also raised family size as one of the determinant factors of household membership in SACCO.

**Household Landholding Size:** As hypothesized, household land size positively and significantly affected household membership in SACCO at a 1% significance level. This suggests that those households who had large land size had more probability to be a member of SACCO than those households who had small land size. The result of marginal effect analysis showed that keeping other factors constant, the probability of the households being a member of SACCO was increased by a factor of 0.0743537 (7.43%) as the household land size increased by one unit or one hectare (table 8).

**Distance from SACCO office:** The distance of SACCO office from the household home or the time taken to reach the SACCO office was found to have a negative significant influence on household membership in SACCO and statistically significant at a 1% level

of significance. The result of marginal effect analysis shows that the probability of the household being a member of SACCO was decreased by a factor of 0.002185 (0.218%) as the distance of SACCO from the household home increased by one unit or one minute, by keeping another factor constant (table 8). The result is consistent with the result of the research conducted in Uganda on factors influencing households' participation in the SACCO (Mpiira et al., 2013). The finding of the study is also similar to the result of the study carried out in the Ginir woreda of the Oromia region by Girma & Alemayehu (2023).

**Training accessibility:** As expected, the result of the study shows that household training accessibility positively and significantly influences household membership in SACCO at a 1% significance level (table 8). The result of the marginal effect indicates that a one-unit increase in training accessibility increases the probability of household membership in SACCO by a factor of 0.545563 (54.55%), keeping other variables constant. This result was supported by the study of Girma & Alemayehu (2023)) which shows the positive and significant influence of training accessibility on household membership.

Table 8: Results of binary logistic regression model estimation on the determinants of household membership in SACCO

Explanatory Variables	Coef.	Std. Err.	P>z	Marginal Effects (dy/dx)
HH age (year)	.0817811	.0275996	0.003**	.0048013
HH marital status				
Divorced	-1.400325	2.007491	0.485	-.077282
Widowed	.8078452	.9408144	0.391	.048911
HH education level (grade)	.3415788	.0740549	0.000*	.0200537
HH family size (Number)	-.7956987	.1950188	0.000*	-.0467144
HH land holding size (Hectare)	1.266485	.3412744	0.000*	.0743537
SACCO distance (minute)	-.037218	.0098181	0.000*	-.002185
HH training accessibility				
Yes	5.025948	.6103983	0.000*	.545563

HH extension contact	.0526794	.1017644	0.605	.0030927
HH livestock ownership (TLU)	.0571306	.1187893	0.631	.0033541
_cons	-4.03619	1.547956	0.009	

Source: Own survey, 2016/2024

Number of observations = 388 LR chi2 (10) = 384.87 Prob > chi2 = 0.0000

Log likelihood = -76.50713 Pseudo R2 = 0.7155

Note that \* \*\* and \*\*\* indicates significance at 1%, 5 % & 10% level, respectively

#### **4.2.2. Impact of saving and credit cooperative (SACCO) membership**

In this section of the study, the impact of SACCO membership on households' savings, farmers agricultural input utilization and household welfare indicators (income and food security) were estimated by using Propensity score matching (PSM), and the method enables the estimation of the average treatment effect on the treated/ATT (Imbens, 2004). Therefore, the steps that applied in this impact evaluation are presented as follows.

##### **4.2.2.1. Estimation of propensity score**

To estimate the propensity score of member and non-member households, a binary logit regression model was used. In the estimation of the propensity score, the focus is not on the effects of covariates on the probability of membership (propensity score) as the intention is developing an index that can be used to match the two groups of sample households (member and non-members). Therefore, in the estimation of the propensity score, the study has used different pre-intervention household characteristics or observable household characteristics that bring variation in outcomes of interest among member and non-member households. Accordingly, various household economic, demographic and institutional characteristics/factors were utilized. The result of the propensity score estimation indicates, the Pseudo-R<sup>2</sup> value is 0.2285 and this low Pseudo-R<sup>2</sup> illustrates that the selected member and non-member households don't have many different characteristics and easy to get a good comparable group between member and non-member households.

#### 4.2.2.2. Choice of the matching algorithm

In choosing matching algorithm, there are different criteria that should be considered to assess the matching quality. These criterias include balancing test, pseudo-R<sup>2</sup> values, standard bias, mean bias and matched sample size. By following Rubin (2001) and Dehejia and Wahba (2002), the estimator that balances all of the independent variables with the lowest pseudo-R<sup>2</sup>, Low or less than 5% mean bias, largest sample size and standard bias less than 25 is a preferable matching algorithm. Accordingly, the result indicates that among estimators, NN (3), NN (4) and NN (5) fulfilled the criteria mentioned above. However, among the three nearest neighbor matching estimators that fulfilled the criterias, NN (4) was found to be the best estimator for this study due to its low percent of mean bias and other acceptable criterias (table 9).

Table 9: Analysis of the matching algorithms

Matching algorithm	Performance Criteria					
	Balancing test	Pseudo R <sup>2</sup>	MeanBias	MedBias	B	Matched sample size
<b>Nearest Neighbor</b>						
NN(1)	6	0.004	9.1	11.0	15.6	375
NN(2)	6	0.006	5.0	4.2	17.8	375
NN(3)	6	0.004	3.2	2.0	14.7	388
<b>NN(4)</b>	<b>6</b>	<b>0.001</b>	<b>2.6</b>	<b>2.2</b>	<b>7.2</b>	<b>388</b>
NN(5)	6	0.001	3.6	3.2	9.0	388
<b>Kernel matching</b>						
Band width 0.01	6	0.002	4.3	3.5	10.2	360
Band width 0.25	6	0.009	4.8	1.8	22.1	376
Band width 0.5	6	0.057	16.5	13.8	57.5*	375
<b>Radius caliper</b>						
<b>0.01</b>	6	0.003	4.5	2.3	13.7	338
<b>0.25</b>	6	0.004	9.1	11.0	15.6	375
<b>0.5</b>	6	0.012	10.8	7.8	26.4*	376

\*if B>25%

Source: Computed from own survey data, 2016/2024

#### 4.2.2.3. Common support region and propensity score histogram

As the result found in table 10 shows, the estimated propensity score of sample households varies between 0.0002193 and 0.9999002 with mean of 0.5 and standard deviation of 0.4379333. The mean p-score of members is 0.8826777 and ranges from 0.0255198 to 0.9999002 while that of non-members ranges from 0.0002193 to 0.9617746 with mean of 0.1173223.

Table 10: Distribution of estimated propensity scores

Group	Observation	Mean	Std.dev	Min	Max
Non-member	194	0.1173223	0.1995037	0.0002193	0.9617746
Member	194	0.8826777	0.2244128	0.0255198	0.9999002
Total HH	388	0.5	0.4379333	0.0002193	0.9999002

Source: Computed from own survey data, 2016/2024

Based on the distribution of estimated propensity scores, the region of common support was defined for both groups (member/treated and non-member/untreated households) and it lies between 0.0255198 and 0.9617746. Therefore, each treated unit is matched only with the control units whose propensity scores fall into a predefined common support region of the propensity score matching. In other ways, households whose estimated propensity scores are out of the common support region were not considered for matching.

Additionally, through subjective assessment or visual inspection of the graph of propensity scores across treatment and comparison groups, it is possible to verify if there is enough overlap or common support between the two groups (Bryson et al., 2002). As we can see from the graph or propensity score histogram of the study, there is enough overlap or common support between member and non-member households, and the two groups have got proper match (figure 4).

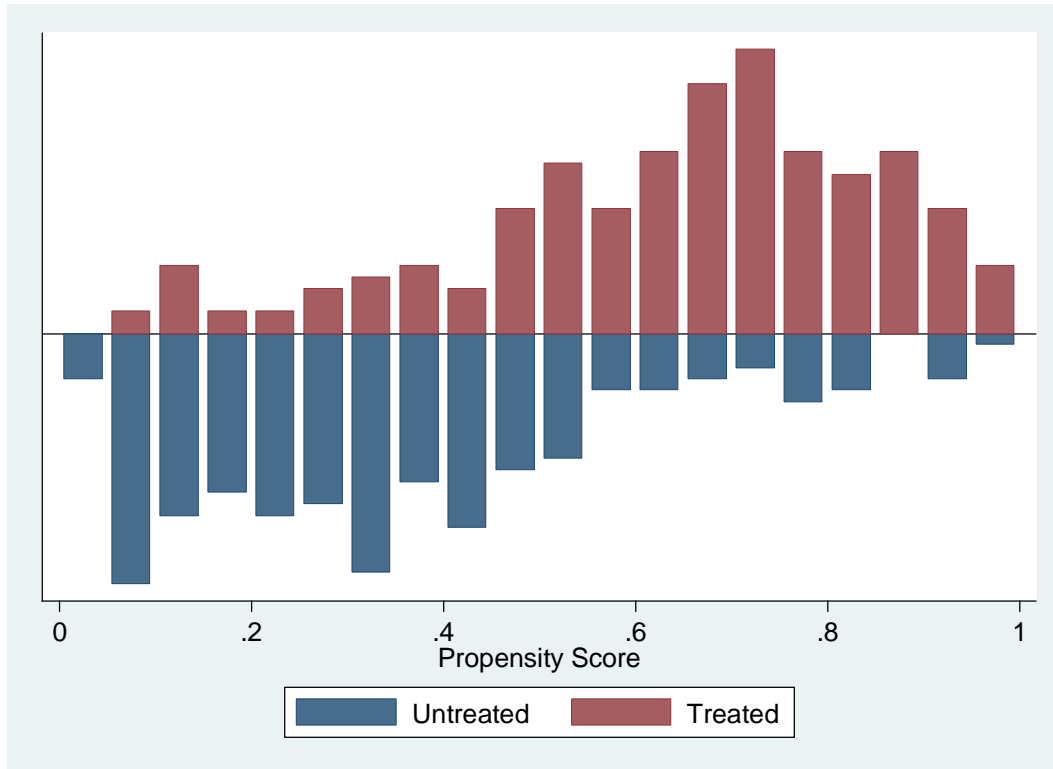


Figure 4: psgraph

(Source: own survey, 2016/2024)

#### 4.2.2.4. Testing the balance of propensity score and covariates

To verify the quality of balance or to test whether the matching quality was good or not, different tests were conducted before and after matching. Accordingly, the balancing quality was checked by using standard bias for the matched and unmatched households, a t-test for means equality, and a chi-square test for joint significance for the variables used. The result of balancing test shows that, before matching, the standard bias lies between -11.2 - 73.8 percent (table 11). However, after matching, the standard bias has been minimized and lies between -1.9 - 4.2 percent which is less than the critical level of 25% recommended by Rubin (2001). In the same way, the difference between the means of the treatments and the control/comparison groups has been decreased after matching when compared with before matching. The t-values revealed that the selected covariates show statistically significant differences before matching, but all the selected covariates indicate statistical insignificant after matching.

Table 11: propensity score and covariate balance

Variables	Unmatched	Mean		% reduction		t-test		V(T)/
	Matched	Treated	Control	%bias	bias	t	p> t	V(C)
HH_MS	U	2.0979	2.1495	-11.2		-1.10	0.271	0.61*
	M	2.0979	2.0889	2.0	82.5	0.22	0.826	0.98
HH_AGE	U	47.732	44.16	36.2		3.56	0.000	0.96
	M	47.732	47.358	3.8	89.5	0.38	0.707	0.99
HH_LEDU	U	5.0773	2.8299	73.8		7.27	0.000	1.22
	M	5.0773	5.1534	-2.5	96.6	-0.22	0.823	0.84
LAND_SIZE	U	1.7157	1.1946	63.2		6.22	0.000	1.54*
	M	1.7157	1.7041	1.4	97.8	0.12	0.902	0.92
NUMB_EX_	U	2.4175	1.1701	55.3		5.44	0.000	1.58*
CONT	M	2.4175	2.3222	4.2	92.4	0.35	0.725	0.78
LIV_OWNE	U	6.3882	4.8206	64.3		6.33	0.000	1.30
RSHIP	M	6.3882	6.435	-1.9	97.0	-0.18	0.856	1.09

Low or less than 5% mean bias, low Pseudo-R<sup>2</sup>, and insignificant p-value (p>chi<sup>2</sup>) support the assumption that both treatment and comparison groups have equally distributed independent variables after matching (Rosenbaum and Rubin, 1985). So, the ‘pstest’ shows that, after matching, the mean bias reduced to 2.6 % from 50.7 % before matching. The value of the Pseudo-R<sup>2</sup> and p-value (p>chi<sup>2</sup>) also became low (0.001) and insignificant (0.998) respectively after matching, as expected (table 12). Therefore, the result of all tests shows that a good balancing quality was achieved and implies that, we can evaluate the impact of SACCO membership on households’ saving, farmers’ agricultural input utilization and household welfare.

Table 12: Chi-square test for the joint significance of variables

Sample	Ps R2	LR chi2	p>chi2	Mean Bias	Med Bias	B	R	% Var
Unmatched	0.228	122.88	0.000	50.7	59.2	125.1*	0.89	50
Matched	0.001	0.50	0.998	2.6	2.2	7.2	1.07	0

\* if B>25%, R outside [0.5; 2]

Source: own survey, 2016/2024

#### 4.2.2.5. Estimating the impact of SACCO membership on household savings

The result of PSM estimation illustrates that the annual member household saving is relatively higher than non-members. As indicated in table 13, member households saved 8048.60 birr/year than non-member households which is significant at 1% significance level. This indicates that households who are members of SACCO tend to save more compared to those who are not members. The result of this study is consistent with the result of the study conducted by Girma & Alemayehu (2023), in Ginir Woreda of Oromia Regional State.

Therefore, it can be concluded that SACCO membership positively influences household savings, and it suggests that membership in SACCO may serve as an effective approach for enhancing the financial resources of households.

Table 13: Estimated impact of SACCO membership on household savings

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
HH	Unmatched	13848.8557	3662.8866	10185.9691	1102.75031	9.24
Savings	ATT	13848.8557	5800.25773	8048.59794	1506.58257	5.34

Source: own survey, 2016/2024

#### 4.2.2.6. Estimating the impact of SACCO membership on farmers’ agricultural input utilization

In this study, different agricultural inputs like fertilizer, seed, chemicals (herbicide, pesticide, and fungicide), irrigation facilities, farm machinery, labor, livestock feed, and medicine are considered and to simplify the estimation, all agricultural inputs used by sample households were converted to monetary value or cost of inputs (birr/year).

The estimated ATT indicated that membership in SACCO does not have any significant impact on farmers’ agricultural input utilization (table 14). This is probably because of lack of financial literacy of farmers. If farmers lack knowledge about the potential benefits of investing in agricultural inputs by taking loan from SACCOs, they may miss opportunities to invest in agricultural inputs that could increase yields and income. This result is in contradiction with the result of previous studies by Nuwagaba (2012), Musoma et al (2016), and Eshetu (2011).

Table 14: Estimated impact of SACCO membership on farmers’ agricultural input utilization

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
Farmers’	Unmatched	26140.232	19274.2062	6866.02577	1139.96975	6.02
Agri_ input utilization	ATT	26140.232	26516.5851	-376.353093	1733.41399	-0.22

Source: own survey, 2016/2024

#### 4.2.2.7. Estimating the impact of SACCO membership on household welfare

In this study, among different household welfare indicators, household income and food security were estimated.

The results of PSM estimate show that membership in SACCO has positive and significant impact on household food security. However, membership in SACCO does not have any significant impact on household income probably because households may not utilize savings for income generation. Instead, they could prioritize immediate household needs such as food.

The estimated ATT revealed that the available dietary energy of treated/member households' is higher than control/non-member households and statistically significant at a 1% significance level. As we can see from the ATT result, member households had a difference of 237.63807 Kcal/AE/day available foods over non-member households (table 15). This finding is supported by different previous studies like Ayele (2014), Eshetu (2014), and Wakoya (2014) that showed a positive and significant household food security impact of SACCO membership. Therefore, the result of ATT estimation suggests that membership in SACCO plays great role in household food security improvement.

Table 15: Estimated impact of SACCO membership on household welfare indicators

<b>Variables</b>	<b>Sample</b>	<b>Treated</b>	<b>Controls</b>	<b>Difference</b>	<b>S.E.</b>	<b>T-stat</b>
<b>HH income</b>	Unmatched	56695.6959	49666.6495	7029.04639	2150.9258	3.27
	ATT	56695.6959	59414.0271	-2718.33119	3338.25765	-0.81
<b>HH food security</b>	Unmatched	2420.67474	2086.50191	334.172827	48.7315456	6.86
	ATT	2420.67474	2183.03667	237.63807	80.0486228	2.97

Source: own survey, 2016/2024

In general, as we can understand from the study result, there is a positive significant difference between member (treated) and non-member (control) households in terms of household saving and food security. This implies that membership in SACCO has a great contribution to household savings and food security.

#### **4.2.2.8. Sensitivity analysis**

Sensitivity analysis measures the degree to which the unobserved factors influence the treatment and/or the outcome. In a non-experimental study, treated and untreated groups may diverge on an unobserved characteristic even after matching by observed characteristics. In other words, individuals who have the same observed covariates may not have the same unobserved covariates, which could affect their chances of receiving treatment. A sensitivity parameter is used to measure the difference in the odds of exposure for two individuals with the same observed covariates (or the same propensity score) but differs on unobserved covariates (Rosenbaum, 2002). In this research,

sensitivity analysis was conducted to test the sensitivity of the estimated impact of SACCO membership on household savings and household food security to unobserved factors and hidden bias. Accordingly, the sensitivity analysis for this study was conducted using 1.5 gamma values, which is consistent with the 1.5 gamma values used in the sensitivity analysis by Challa & Tilahun (2014). As shown in table 16 & 17, the significance level is unaffected even if the gamma values are relaxed in any desirable level even up to 50% (Challa & Tilahun, 2014).

The result of the sensitivity analysis revealed that the estimated impacts of the outcome variables of the study (household savings and food availability) are insensitive to unobserved factors and hidden biases (Tables 16 & 17). Therefore, it is possible to conclude that the positive impact of SACCO membership on farmers' agricultural input utilization and household welfare resulted from only households' membership in SACCO.

Table 16: Sensitivity test for outcome variable- household savings

<b>Gamma</b>	<b>sig+</b>	<b>sig-</b>	<b>t-hat+</b>	<b>t-hat-</b>	<b>CI+</b>	<b>CI-</b>
1	0	0	5837.5	5837.5	4675	7287.5
1.05	0	0	5650	6026.5	4500	7537.5
1.1	0	0	5500	6225	4350	7750
1.15	0	0	5350	6425	4187.5	7987.5
1.2	1.1e-16	0	5200	6600	4037.5	8187.5
1.25	4.4e-16	0	5037.5	6800	3875	8425
1.3	2.3e-15	0	4887.5	6975	3750	8625
1.35	1.2e-14	0	4750	7150	3625	8812.5
1.4	5.2e-14	0	4625	7325	3537.5	9000
1.45	2.1e-13	0	4526.5	7500	3425	9175
1.5	7.7e-13	0	4425	7650	3325	9400

\* gamma- log odds of differential assignment due to unobserved factors

sig+ - upper bound significance level

sig- - lower bound significance level

t-hat+ - upper bound Hodges-Lehmann point estimate

t-hat- - lower bound Hodges-Lehmann point estimate

CI+ - upper bound confidence interval (a= .95)

CI- - lower bound confidence interval (a= .95)

Table 17: Sensitivity test for outcome variable- household food availability

<b>Gamma</b>	<b>sig+</b>	<b>sig-</b>	<b>t-hat+</b>	<b>t-hat-</b>	<b>CI+</b>	<b>CI-</b>
1	2.0e-09	2.0e-09	241.473	241.473	164.965	313.792
1.05	1.1e-08	3.1e-10	230.116	252.078	153.608	325.482
1.1	5.3e-08	4.9e-11	218.574	262.543	143.095	336.346
1.15	2.1e-07	7.6e-12	208.848	272.23	132.494	345.301
1.2	7.6e-07	1.2e-12	198.554	281.182	122.756	355.728
1.25	2.4e-06	1.7e-13	189.42	290.742	113.715	364.92
1.3	6.9e-06	2.6e-14	179.271	299.065	103.958	375.62
1.35	.000018	3.9e-15	170.555	307.51	95.0174	384.67
1.4	.000043	5.6e-16	162.635	315.794	86.7246	393.223
1.45	.000095	1.1e-16	154.505	324.228	78.2131	401.651
1.5	.000198	0	147.746	330.63	69.511	409.574

\* gamma- log odds of differential assignment due to unobserved factors

sig+ - upper bound significance level

sig- - lower bound significance level

t-hat+ - upper bound Hodges-Lehmann point estimate

t-hat- - lower bound Hodges-Lehmann point estimate

CI+ - upper bound confidence interval (a= .95)

CI- - lower bound confidence interval (a= .95)

## **CHAPTER FIVE: CONCLUSION AND RECOMMENDATION**

### **5.1. Conclusion**

In Ethiopia, membership in SACCO is very essential to improve peoples' saving habits which can lead to people's livelihood and welfare improvement. By considering this, the study was conducted at Welmera woreda in Oromia regional state of Ethiopia to examine the determinants of household membership in SACCO, to analyze the effect of SACCO membership on household saving amount and to evaluate the impacts of SACCO membership on farmers' agricultural input utilization and household welfare in terms of income and food security. Therefore, the summary and conclusion of the descriptive and econometric analysis of the study objectives are presented as follows.

In the study, comparisons and analysis of the institutional, economic, and demographic characteristics of sample households were conducted using descriptive and inferential statistics. The chi-square analysis shows that there is a significant association between household membership in SACCO and training accessibility, whereas the household marital status has no significant association with household membership in SACCO. Likewise, the t-test analysis demonstrates that there is a significant mean difference between member and non-member households' interms of household age, educational status, family size, land size, household livestock ownership, extension contact and SACCO distance.

The binary logit regression model was utilized to identify the factors that influence a household's membership in a SACCO. According to the logit model results, household membership in SACCO was positively and significantly influenced by the educational attainment of the household head, age of the household head, amount of land holding and training accessibility. However, family size and SACCO distance were negatively and significantly affected household membership in SACCO. On the other hand, household marital status, livestock ownership, and extension contact did not significantly influence household membership in SACCO. Therefore, households with a higher level of

education, who are older, who have large land size, who have small family size, who have shorter distance to the SACCO office, who have more access to training opportunity are more likely to be SACCO members.

The study also evaluated the impact of household membership in SACCO on household savings, farmers' agricultural input utilization and household welfare using propensity score matching. The estimated ATT demonstrated that member households are significantly better than non-member households in terms of household savings and food security. Compared to non-member households, member households saved more money and had higher available dietary energy. Therefore, membership in SACCO has a positive impact on household savings and food security. However, there is no significant difference between member and non-member households' interms of agricultural input utilization and income.

Finally, it can be concluded that membership in SACCO is crucial to enhance households' culture of saving and food security.

## **5.2. Recommendation**

### **5.2.1. Practices and policy recommendation**

Based on the findings of the study objectives, the following recommendations are provided:

- To increase household membership in SACCOs, it is essential to improve household capacity through training and educational opportunities, because household membership in SACCO was positively influenced by household educational status and training accessibility.
- It is crucial to create opportunities and develop initiatives that encourage younger households to join SACCOs, because the age of the household head has a positive effect on household membership in SACCOs.
- To improve household membership in SACCO, interventions and support services should be implemented to assist small landowners, because household land size has a positive effect on household membership in SACCO.

- Distance from SACCO office was negatively affecting household membership in SACCO. Thus, the Woreda Cooperative promotion agency should pay attention to the provision of necessary information related to SACCO for households that live far away from SACCO.
- Family size was found to decrease the probability of household membership in SACCO. Therefore, to enhance household membership in SACCO, concerned bodies like health extension officers should emphasize family planning education.
- This study has demonstrated the positive impact of SACCO membership on household savings. Hence, the woreda cooperative promotion agency should promote the financial advantages of SACCO membership, such as increased savings and should facilitate best practice sharing among farmers of the study area.
- The positive impact of SACCO membership on household food security has been recognized through this study. So, in order to improve food security status, households should be encouraged to join a SACCO.

### **5.2.2. Suggestion for further studies**

This study was conducted with a limited scope, sample size, variables, and methodologies. This may limit its representativeness and generalization to a wider population. Therefore, it recommends further research on the impact of SACCO membership on farmers' agricultural input utilization, and household welfare, with a larger sample size, within a wider study area, with more different variables and methodologies. Particularly, the following suggestions are given for future studies:

- Investigation of determinants of SACCO membership with many variables in broad study areas to identify strategies for improving household membership.
- Assessment of welfare impacts of SACCO membership, by considering other welfare indicators in addition to income and food security.
- Evaluation of welfare impacts of SACCO membership using time series data to check the strength of the results over time.

## REFERENCES

- Ababa, A. (2006). Ethiopia: building on progress a Plan for Accelerated and Sustained Development to End Poverty (PASDEP). *Ministry of Finance and Economic Development (MoFED)*.
- Abera, N., & Mekonin, S. (2022). The status and determinants of rural household food insecurity in North Shewa Zone, Oromia Region, Ethiopia. *Turkish Journal of Food and Agriculture Sciences*, 4(1), 6-12.
- Abi, M., & Tolossa, D. (2015). Household food security status and its determinants in girarjarsoworeda, north Shewa zone of oromia region, Ethiopia. *Journal of Sustainable development in Africa*, 17(7), 118-137.
- Afolabi, S. N., & Ganiyu, Y. O. (2021). Impact of Cooperative Membership on Rural Income Generation in Southwest, Nigeria [Impacto de la membresía cooperativa en la generación de ingresos rurales en el suroeste de Nigeria]. *REVESCO: Revista de estudios Cooperativos*, (138), 75563-75563.
- Akerele, E. O., & Adekunmbi, S. A. (2018). Impacts of cooperative thrift and credit facilities on Members' business output in Ogun State, Nigeria. *Sustainable agriculture research*, 7(526-2020-481) 28-38.
- Alehobel, W. (2022). *Determinants of rural households' participation in rural saving and credit cooperatives: the case of South Achefer District, West Amhara Ethiopia* (Doctoral dissertation).
- Anand, S., & Harris, C. J. (1994). Choosing a welfare indicator. *The American Economic Review*, 84(2), 226-231.
- Anania, P., Gikuri, A., & Hall, J. N. (2015). SACCOS and members' expectations: Factors affecting SACCO's capacity to meet members' expectations. In *a Paper Presented to the Co-operative Research Workshop held on 24th March*.
- Anderson, E. (2008). Growth incidence analysis for non-income welfare indicators: evidence from Ghana and Uganda. *Chronic Poverty Research Centre Working Paper*, (2008-09).
- Aredo, D. (1993). The informal and semi-formal financial sectors in Ethiopia: a study of the Iqub, iddir and savings and credit co-operatives.

- Assenga, E. A., Mwageni, E. A., & Kayunze, K. A. (2017). SACCOS and Women's Poverty Reduction in Morogoro District, Tanzania. *Tanzania Journal for Population Studies and Development* 20 (1-2).
- Assefa, S. (2000). *A Study on Women's Participation in Saving and Credit Cooperatives Of Degua-Tembien Woreda, Tigray, Ethiopia* (Doctoral dissertation, Mekelle University).
- Ayalew, A. (2016). Role of saving and credit cooperative societies in improving agricultural production in Oromia National Regional State, the case of Lumme District.
- Ayele, Z. A. (2014). The impact of saving and credit cooperatives on food security in the West Amhara Region of Ethiopia.
- Baden, S., & Pionetti, C. (2011). Women's collective action in agricultural markets: Synthesis of preliminary findings from Ethiopia, Mali, and Tanzania.
- Bangdiwala, S. I. (2018). Regression: simple linear. *International journal of injury control and safety promotion*, 25(1), 113-115.
- Becker, S. O., & Ichino, A. (2002). Estimation of average treatment effects based on propensity scores. *The stata journal*, 2(4), 358-377.
- Berna, M., Lee, J. Y., & Lee, S. H. (2020). Impact of Saving and Credit Cooperatives (SACCOs) on the Income of Smallholder Farmers in Rwanda: A Case Study of Busasamana Sector. *Journal of Agricultural, Life, and Environmental Sciences*, 32(3), 239-254.
- Birchall, J. (1999). What Makes People Participate in Cooperatives? Towards a Theoretical Model. *Journal of Rural Cooperation*, 27(886-2016-64613), 3-15.
- Bryson, A., Dorsett, R., & Purdon, S. (2002). The use of propensity score matching in the evaluation of active labor market policies.
- Bwana, K. M. (2013). Issues in SACCOS development in Kenya and Tanzania: The historical and development perspectives.
- Central Statistical Agency (CSA). (2007). Population and Housing Census.
- Challa, M., & Tilahun, U. (2014). Determinants and impacts of modern agricultural technology adoption in west Wollega: the case of Gulliso district. *Journal of Biology, Agriculture and Healthcare*, 4(20), 63-77.

- Chapagain, P. (2015). *Impact of Saving and Credit Cooperative on Rural Women* (Doctoral dissertation, Faculty of Humanities & Social Sciences, Department of Rural Development, Saptagandaki Multiple Campus, Bharatpur Chitwan).
- Chegini, K. R., Pakravan-Charvadeh, M. R., Rahimian, M., & Gholamrezaie, S. (2021). Is there a linkage between household welfare and income inequality, and food security to achieve sustainable development goals?. *Journal of Cleaner Production*, 326, 129390
- Chimdi, S., Abafita, J., & Shallo, L. (2020). Participation in saving and credit cooperatives (Sacco's) and its impact on households' wellbeing in Gurage Zone, Southern Ethiopia.
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American journal of sociology*, 94, S95-S120.
- Cooperative Societies Proclamation No 985/2016. Federal negarit gazette 23<sup>rd</sup> No 7 Addis Ababa.
- Cooperative Societies Proclamation No. 147/1998. Federal negarit gazette No 27 Addis Ababa.
- Dayanandan, R. (2016). Determinants of Women Participation and the Implication on Saving and Credit Cooperatives' Development. *IRA-International Journal of Management & Social Sciences*, 5(3)385-401.
- Dehejia, R. H., & Wahba, S. (2002). Propensity score-matching methods for non experimental causal studies. *Review of Economics and statistics*, 84(1), 151-161.
- Dube, A. K., Haji, J., & Zemedu, L. (2018). Determinants of food insecurity and coping strategies of rural households: The case of Shalla District, West Arsi Zone, Oromia Region, Ethiopia. *Journal of Development and Agricultural Economics*, 10(6), 200-212.
- Eshetu, T. (2011). *The contribution of cooperatives in food security of small scale farm households: The case of SACCO, Ethiopia*.
- Ethiopian Cooperative Commission (2023). The annual report of 2023, Addis Ababa- Unpublished.
- Eneyew, A. (2021). *Socio-economic factors affecting membership in saving and credit cooperative societies the case of Gozamin District, West Amhar Region*,

- Ethiopia* (Doctoral dissertation).
- Feleke, Y. (2016). *Challenges facing savings and credit cooperatives societies in Addis Ababa* (Doctoral dissertation, St. Mary's University)
- Galor, Z. (1989). Credit and Saving Cooperatives: A new conceptual approach.
- Galunic, C., Ertug, G., & Gargiulo, M. (2012). The positive externalities of social capital: Benefiting from senior brokers. *Academy of Management Journal*, 55(5), 1213-1231.
- Geleta, D., Akmel, A., & Reddy, R. U. (2018). *Households Food Insecurity and Livelihood Strategies in the Central High lands: The Case of Abichu and Gnea Woreda, Oromia National Regional State, Ethiopia*.
- Gemeda, M., & Zemedu, D. (2018). *Impact of village saving and credit group on household wealth in Habro District, West Hararghe Zone of Oromia Ethiopia* (Doctoral dissertation, Haramaya university).
- Girma, B., & Alemayehu, M. (2023). *The Impact of Rural Saving and Credit Cooperative on Household Saving: The Case of Ginir District, Oromia, Ethiopia*.
- Gnigwo, G. G. (2010). *Factors affecting members' participation in SACCOs in Gambella town, south western Ethiopia* (Doctoral dissertation, Mekelle University).
- Gradin, C., Cantó, O., & Del Rio, C. (2008). Inequality, poverty and mobility: Choosing income or consumption as welfare indicators. *investigaciones económicas*, 32(2), 169-200.
- Gujarati, D.N. (2003), "Basic Econometrics", 4<sup>th</sup> Edition., New York, McGraw-Hill.
- Hailu, H., & Tolossa, D. (2022). Impacts of Adopting Improved Wheat Varieties on Household Food Security in Girar Jarso District, Ethiopia. *Review of Agricultural and Applied Economics (RAAE)*, 25(1), 73-86.
- Hosmer, D. W., & Lemeshow, S. (1989). *Applied Logistic Regression*. Willey & Sons, Hoboken, 373.
- Imbens, G. W. (2004). Nonparametric estimation of average treatment effects under exogeneity: A review. *Review of Economics and statistics*, 86(1), 4-29.
- Kagan, J., Howard, E., & Velasquez, V. (2022). What are savings? How to calculate your savings rate <https://www.investopedia.com/terms/s/savings.asp> Accessed March 16, 2023.

- Katchova, A. (2013). Propensity Score Matching, Difference-in-Differences Models, Treatment Evaluation in Stata.
- Krivokapic-Skoko, B. (2002). *The concept and classifications of agricultural co-operatives*. Australian Centre for Co-Operative Research and Development.
- Kumar, B. (2021). Construction of household welfare index and welfare impact of international remittances in Rural Bangladesh.
- Lammago, L. (2020). *The role of saving and credit cooperatives in empowering rural women in BensaWoreda, Sidama Zone, SNNPRS, Ethiopia* (Doctoral dissertation).
- Majulin, E. (2010). Promising practices: How co-operatives work for working women in Africa. *Cooperative Facility for Africa (COOPAFRICA) Dar es Salaam, Tanzania*.
- Marill, K. A. (2004). Advanced statistics: linear regression, part I: simple linear regression. *Academic emergency medicine*, 11(1), 87-93.
- Mekuria, W., Mekonnen, K., & Melese, T. (2019). Food production and consumption in the highlands of Ethiopia: the missing link in food systems. *Review of Agricultural and Applied Economics (RAAE)*, 22(2), 71-80.
- Mogues, T., Cohen, M. J., Lemma, M., Randriamamonjy, J., Tadesse, D., & Paulos, Z. (2009). Agricultural extension in Ethiopia through a gender and governance lens.
- Moratti, M., & Natali, L. (2012). Measuring Household Welfare: Short versus long consumption modules.
- Mpiira, S., Kiiza, B., Katungi, E., Staver, C., Tabuti, J. S., Kyotalimye, M., ...& Tushemereirwe, W. K. (2013). Factors influencing households participation in the Savings and Credit Cooperative (SACCO) programmes in Uganda.
- Mulugeta, M. (2020). Impact of saving and credit cooperatives on rural households' poverty reduction in KachabiraWoreda of KembataTembaro Zone, Southern Ethiopia (M.Sc.Thesis, Jimma University).
- Musoma, B. M., Chusi, T. N., & Mayaya, H. (2016). Impact of SACCOS on the Use of Improved Farm Inputs: An Empirical Evidence of Rural Micro-finance Schemes, in Geitaregion, Tanzania. *International Journal in Management & Social Science*, 4(6), 188-198.

- Nibret, B. (2016). Determinants of members saving behavior in rural saving and credit Cooperatives: The case of EnebseSarMidirWoreda (Master Thesis, Debre Markos University)
- Nuwagaba, A. (2012). Savings and credit cooperative societies (SACCOS) as a source of financing agriculture. Challenges and lessons learnt. *Journal of Environment and Earth science*, 2(11), 11.
- Nwankwo, F., Ewuim, N., & Asoya, N. P. (2013). Effect of cooperatives on the savings behaviour of members in Oyi Local Government Area, Anambra State, Nigeria. *African Research Review*, 7(1), 209-227.
- Pal, S. (2000). Economic reform and household welfare in rural China: evidence from household survey data. *Journal of International Development*, 12(2), 187-206.
- Pesha, J. C., Liu, Y., Ehsan, E., Addo, A. M., Ingabire, M. C., & Haidian, Q. D. (2017). The Role of Financial Cooperatives in Promoting Rice Production in Tanzania: A Case of Mvomero SACCO.
- Putnam, R. D. (1993). The prosperous community. *The american prospect*, 4(13), 35-42.
- Rosenbaum, P. R. (2002). Covariance adjustment in randomized experiments and observational studies. *Statistical Science*, 17(3), 286-327.
- Rosenbaum, P. R., & Rubin, D. B. (1985). Constructing a control group using multivariate matched sampling methods that incorporate the propensity score. *The American Statistician*, 39(1), 33-38.
- Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70(1), 41-55.
- Rubin, D. B. (2001). Using propensity scores to help design observational studies: application to the tobacco litigation. *Health Services and Outcomes Research Methodology*, 2, 169-188.
- Sathyamoorthi, C. R., Mbekomize, C. J., Radikoko, I., & Wally-Dima, L. (2016). An Analysis of the Financial Performance of Selected Savings and Credit Co-Operative Societies in Botswana. *International Journal of Economics and Finance*, 8(8), 180.
- Ssensagi, R. (2022). *Factors that influence households' participation in the rural saving and credit cooperatives: a case study of Kyotera Sub-County* (Doctoral

- dissertation, Makerere University).
- Staatz, J. M. (1984). *Theoretical perspective on the behavior of farmers' cooperatives* (Doctoral dissertation, Michigan State University. Dept. of Agricultural Economics).
- Tefera, M. M. (2009). Causes of rural household food insecurity: a case from Kuyu district, central Ethiopia. *Journal of Sustainable Development in Africa*, 11(4), 286-304.
- Teka, G., & Tekle, T. (2008). *Members' Savings Behavior and Determinants of Savings in Rural Savings and Credit Cooperatives in Alamata and Ofla Woredas of Tigray Region, Ethiopia* (Doctoral dissertation, Mekelle University).
- Tenaw, S., & Islam, K. Z. (2009). Rural financial services and effects of microfinance on Agricultural productivity and on poverty. *University of Helsinki Department of Economics and Management (Discussion Papers series)*, 1, 28.
- Tesfamariam, K. (2015). Savings and credit cooperatives in Ethiopia: Development and Challenges. *Journal of Economic and Sustainable Development*, 6(5), 140-146.
- Tirfe, A. G. (2014). Financial performance of rural saving and credit cooperatives in Tigray, Ethiopia. *Research Journal of Finance and Accounting*, 5(17), 63-74.
- Tolossa, D. (2002). *Household seasonal food insecurity in Oromiya Zone, Ethiopia: causes* (No.26). Organization for Social Science Research in Eastern and Southern Africa.
- Tolossa, D. (1996). Belg Crop Production as a Strategy of Households' Food Security: A Comparative Study of Belg Grower and Non Belg Grower Farmers in Munessa woreda, Arssi Region. *Unpublished MA Thesis. Dep. Geogr., Addis Ababa University*.
- Tranmer, M., & Elliot, M. (2008). Binary logistic regression. *Cathie Marsh for census and survey Research, paper*, 20, 90033-9.
- Wakoya, T. (2014). *Impact of Rural Saving and Credit Cooperative on Food Security and Income of Individual Households: In the case of Yenetsanet Fana saving and Credit Union of Gurage Zone, Southern Nations Nationalities and Peoples Region (SNNPR)* (Doctoral Dissertation, St. Mary's University).
- Welmera Woreda Cooperative Promotion Agency (2023). The annual report of 2023,

West ShewaZone,Welmera-Unpublished.

- Widodo, A. S., Widodo, W., Man, N., & Ulum, B. (2024). The Influence of Welfare Level on Food Security in Farmer Households. In *E3S Web of Conferences* (Vol. 595, p. 03016). EDP Sciences.
- Woldu, T., & Tadesse, F. (2015). *Women's participation in agricultural cooperatives in Ethiopia* (No. 1008-2016-80335).
- Wondimagegnhu, B. A., & Bogale, B. A. (2020). Small-scale irrigation and its effect on food Security of rural households in North-West Ethiopia: A comparative analysis. *Ethiopian Journal of Science and Technology*, 13(1), 31-51.
- Yamane, Taro. (1967). *Statistics: An introductory analysis*, 2<sup>nd</sup> Ed., New York: Harper and row.
- Yohannes, D. W., & Endale, N. (2014). Participation of women in rural cooperatives: Evidence from Gewane and Fentale Districts of Afar Region, Ethiopia. *Journal of Economics and Sustainable Development*, 5(15), 74-81

## APPENDICES

### Appendix 1: Household survey, FGD and KII questionnaires

#### Questionnaire for Household Respondents

Dear Respondent,

My name is Gizachew Beyera and I am a graduate student of Addis Ababa University, College of Development Studies at the Center for Rural Development. This Questionnaire is prepared to collect data for an MA thesis entitled “**The Impacts of Saving and Credit Cooperative Membership on Farmers’ Agricultural Input Utilization and Household Welfare: The Case of Welmera District, West Shewa Zone, Oromiya Region, Ethiopia**”. Since you are randomly selected to share your views and opinions, you are kindly requested to respond to all the questions honestly and patiently. Your participation in this study is voluntary and all the information you will share to me is secret and will be used for only academic purpose.

#### A. General information

1. Name of the kebele \_\_\_\_\_
2. Name of the respondent \_\_\_\_\_
3. Code of the respondent \_\_\_\_\_
4. Date of interview \_\_\_\_\_
5. Name of the enumerator \_\_\_\_\_

#### B. Demographic information of the household head

1. Sex of the household head    1. Male            2. Female
2. Age of the household head? \_\_\_\_\_ years
3. Marital status of household head?    1. Single        2. Married        3. Divorced        4. Widowed
4. Status of literacy of the household head?    1. Literate            2. Illiterate
5. If literate, the form of education which you attended is    1. Formal        2. Non-formal

6. If formal education in the above question (item no.5), what is the highest level of education attended by the household head?\_\_\_\_\_ years/grade.
7. What is the total family size of household including household head? Male\_\_\_\_\_ Female\_\_\_\_\_ Total\_\_\_\_\_
8. From total family size, what are the total family members below 15 years and above 65 years?  
Below 15 years \_\_\_\_\_ above 65 years\_\_\_\_\_ total\_\_\_\_\_
9. Are you a model farmer? 1. Yes 2. No

**C. Economic related information of the household head**

1. Do you have your own farm land? 1. Yes 2.No
2. If yes to question no.1, what is your land size in hectare? \_\_\_\_\_ha
3. Do you have livestock? 1. Yes 2. No
4. If you have livestock, please fill the information found in the next table (2015 E.C).

No	Livestock holding	Unit	Quantity (total owned)	Equivalence in cash (in birr)	Quantity sold in 2015 E.C	Total income received in birr/year (2015 E.C)
1	Oxen	No.				
2	Cow	No.				
3	Calves	No.				
4	Bulls	No.				
5	Heifers	No.				
6	Sheep	No.				
7	Goat	No.				
8	Horse	No.				
9	Donkey	No.				

10	Mule	No.				
11	Chicken	No.				
12	Other (specify)					
<b>Income from livestock products</b>						
1	From milk	Lit				
2	From butter	Kg				
3	From cheese	Kg				
4	From meat	Kg				
2	From egg	No.				
3	Other (specify)					

5. Do you participate in non-farm activities? 1. Yes 2. No

6. If yes, fill the annual income obtained from non-farm activities in 2015 E.C.

No	Type of non-farm activities	Mark (√)	Total income (Birr/Year)
1	Trade/ petty trade		
2	Daily laborer		
3	Handicraft		
4	Homemade drinks (tala, katukala, etc)		
5	Firewood/charcoal selling		
6	Employment (government and NGOs)		
7	Remittance		
8	Other (Specify)		

7. Do you participate in tree plantation? 1. Yes 2. No

8. If yes, please fill the annual income obtained from forest products in 2015 E.C.

No	Type of trees	Quantity consumed (in number)	Quantity sold (in number)	Total income from the sale (in birr )
1	Eucalyptus			
2	Cupressus lusitanica			
3	Other 1 (specify)			
4	Other 2 (specify)			

#### D. Information related to institutional factors

1. Distance of the SACCO office from the respondent's house \_\_\_\_\_ minutes.
2. Distance of the nearest market from the respondent's house \_\_\_\_\_ minutes
3. Do you have any information or awareness about SACCO? 1.Yes 2.No
4. If yes to question no.3, what is your source of information? 1. Radio 2. TV 3. Poster 4. Leaflets  
5.NGOs 6. DA at kebele level 7. Experts of Woreda cooperative office 8. Relative/Friend/Neighbor
5. Did you get SACCO training? 1. Yes 2. No
6. Do you have contact with agricultural extension agents? 1. Yes 2. No
7. If yes to question no.6, how frequently did you have contact with agricultural extension agents? \_\_\_\_number of contacts per year (in 2015 E.C).
8. What is the level of access to extension service? 1. Very good 2. Good 3. Medium 4. Poor 5. Very poor
9. If there is no contact with extension agent, what is the reason? If applicable, you may provide more than one answer.  
1. No need for service 2. I do not know the presence of extension agent 3. The office of extension agent is far from my home 4. The service is not in quality 5. Other (specify)\_\_\_\_\_

10. Did you access to credit service from formal financial institution other than saving and credit cooperative?  
 1. Yes 2. No
11. If yes to question no.10, what are these institutions? If applicable, you may provide more than one answer.  
 1. Oromia credit and saving share company 2. Commercial Bank of Ethiopia 3. Other (Specify)\_\_\_\_\_
12. If the answer of question no.10 is yes, for what purpose did you use the credit? If applicable, you may provide more than one answer.  
 1. To buy agricultural inputs 2. To buy food 3. For house construction  
 4. To buy livestock 5. To start business 6. Other (specify)\_\_\_\_\_

**E. Information related to agricultural input utilization**

1. Do you use agricultural inputs? 1. Yes 2. No
2. If yes, fill the agricultural input used in 2015 E.C.

List of agricultural inputs	Unit	Mark (√)	Quantity used	Monetary value/Equivalence in cash (in birr)
Fertilizer	kg			
Seed	kg			
Pesticide	Lit/kg			
Herbicides and fungicides	Lit/kg			
Irrigation system	birr			
Farm machinery (tractor, etc)	birr			
Livestock feed	kg			
Veterinary medicines	No			
Labor	No			
Other (specify)				

## F. Household food security measurements

1. Do you think that being a member of the SACCO improve household's food security status? 1. Yes 2. No
2. Please fill the following table that used to measure food security status of household (2015 E.C).

Type of Crop Grown	Land size in hectare	Amount of seed used in kg	Amount of fertilizer used in kg	Amount of chemical used in litre	Total grain produced in kg	Amount of grain kept for home consumption (in kg)	Amount of grain sold from total harvest (in kg)	Price Per/kg	Total income earned from sold grain in birr/year	Total Grain bought in kg	Quantity of food aid obtained in kg	Total Grain obtained through gift or remittance in kg	Post-harvest loosed in kg	Quantity of grain reserved for seed in kg	Grain given to others in kg
Teff															
Wheat															
Barley															
Chickpea															
Beans															
Lentil															
Sorghum															
Maize															

Others (specify)															
<b>Vegetables and fruits</b>															
Potato															
Tomato															
Onion															
Cabbage															
Other 1 (Specify)															
Other 2 (Specify)															

**G. Information related to household savings**

1. Are you a member of saving and credit cooperative? 1. Yes 2. No
2. If yes to question no 1, what is the name of your SACCO? \_\_\_\_\_
3. If yes to question no 1, how long have you been a member of the SACCO? \_\_\_\_\_ in years.
4. Are you saving money? 1. Yes 2. No
5. Do you save money at SACCO? 1. Yes 2. No
6. Has being a member of SACCO helped increase your household saving amount? 1. Yes 2. No

7. If yes to question no 6, what kind of savings do you have at SACCO? You may provide more than one answer (circling the applicable ones) 1. Compulsory savings 2. Voluntary savings 3. Contract savings (time deposits) or fixed deposit
8. What is the average amount of money you saved per year at SACCO? \_\_\_\_\_
9. What is the total amount of money you saved at SACCO until now? \_\_\_\_\_birr
10. What is the total amount of interest you got from the money you saved at SACCO until now? \_\_\_\_\_birr
11. What is the purpose of your savings? You may provide more than one answer (circling the applicable ones).  
 1. For emergency fund 2. For child education 3. To buy agricultural inputs 4. To buy food 5. For house construction  
 6. To buy house at urban area 7. Other (specify) \_\_\_\_\_
12. How does the SACCO encourage its members to save money? You may provide more than one answer (circling the applicable ones).  
 1. Through strong bylaws 2. By regular reminders 3. Through saving incentives  
 4. Through financial education programs 5. Other (specify) \_\_\_\_\_
13. How confident are you for the security of the money you saved at SACCO? 1. Very confident 2. Somewhat confident  
 3. Neutral 4. Somewhat unconfident 5. Very unconfident
14. Have you ever faced any challenges in accessing your saved money from the SACCO? 1. Yes 2. No
15. If yes to question no.14, what were the challenges?  
 1. \_\_\_\_\_
16. Would you recommend joining a SACCO to other households in your community? 1. Yes 2. No
17. Why **yes** to question no.16?  
 1. \_\_\_\_\_
18. Why **no** to question no.16?  
 1. \_\_\_\_\_
19. Do you save your money at other institution rather than SACCO? 1. Yes 2. No

20. If the answer of question no.19 is yes, where do you save your money? You may provide more than one answer (circling the applicable ones). 1. Commercial Bank of Ethiopia 2. Private Banks 3. Ikub 4. Idir 5. Home  
6. Small saving group in the village 8. Other (specify)\_\_\_\_\_
21. If the answer of question no.19 is yes, what is the total amount of money you saved at other institution until now?  
\_\_\_\_\_birr
22. Have you ever received any financial education or training on how to save money? 1. Yes 2. No
23. If yes to question no.22, where did you receive it from? You may provide more than one answer (circling the applicable ones).  
1. Bank 2. Woreda cooperative office 3. Kebele cooperative office 4. Microfinance 5. NGO 6. Other (specify) \_\_\_
24. If yes to question no.22, how helpful was the training to save money? 1. Very helpful 2. Somewhat helpful  
3. Neither helpful nor unhelpful 4. Somewhat unhelpful 5. Very unhelpful
25. Do you have access to climate information services? 1. Yes 2. No
26. Do you carry out adaptation strategies to climate change and variability? 1. Yes 2. No

**Question for only members**

27. Do you have the interest to continue as a member in SACCO? 1. Yes 2. No

**Question for only non-Members**

28. Do you have the willingness to be a member at SACCO in the future? 1. Yes 2. No

**Thank you for your patience and cooperation!**

### **Check List for Focus Group Discussion**

Dear participants,

My name is GizachewBeyera and I am a graduate student of Addis Ababa University, College of Development Studies at the Center for Rural Development. These Questions are prepared to collect data for an MA thesis entitled “**The Impacts of Saving and Credit Cooperative Membership on Farmers’ Agricultural Input Utilization and Household Welfare: The Case of Welmera District, West Shewa Zone, Oromiya Region, Ethiopia**”. You are purposively selected to share your perception and opinions on this study title. Your participation in this study is voluntary. If you agree to participate, all the data and information you will share to me is secret and will be used for only academic purpose.

1. How do you see household membership in SACCO? Is there membership variation among households? If yes, do you know the factors that create membership variation among households? What are those factors?
2. Do you know the demographic factors that affect household membership in SACCO? Explain how it affects household membership.
3. What are the economic factors that affect household membership in SACCO? Explain how it affects household membership.
4. What are the institutional factors that affect household membership in SACCO? Explain how it affects household membership.
5. How do you evaluate the impact of SACCO on household agricultural input utilization, income and food security?
6. When you compare member of SACCO with non-member households, who can use more agricultural inputs?
7. When you compare member of SACCO with non-member households, who can get more income?
8. When you compare member of SACCO with non-member households, who are more food secure?
9. Do you think that SACCO can improve saving culture? If yes, when you compare member of SACCO with non-member households, who can save more?

### **Check List for Key Informant Interview (Woreda Experts and DAs)**

Dear participant,

My name is GizachewBeyera and I am a graduate student of Addis Ababa University, College of Development Studies at the Center for Rural Development. These Questions are prepared to collect data for an MA thesis entitled “**The Impacts of Saving and Credit Cooperative Membership on Farmers’ Agricultural Input Utilization and Household Welfare: The Case of Welmera District, West Shewa Zone, Oromiya Region, Ethiopia**”. You are purposively selected based on your knowledge and experience to share your views and opinions on this study title. Your participation in this study is voluntary. If you agree to participate, all the data and information you will share to me is secret and will be used for only academic purpose.

1. When was SACCO started in your district/kebele?
2. How many rural SACCOS are there in your district/kebele?  
Please mention their numbers; RUSACCO\_\_\_ Members of RUSACCO; Male\_\_\_\_\_ Female\_\_\_\_\_ Total\_\_\_\_\_
3. Why was SACCO started in your district/kebele?
4. Can any household be a member of SACCO?
5. What are the criteria to be a member of SACCO?
6. What is the level of household membership in SACCOS in your district?
7. Do you think that all households are equally participating in SACCO membership? If no, what are the factors that affect household membership in SACCO?
8. Do you encourage all households to be a member of SACCO? If yes, in what way?
9. In your opinion, is SACCO contributes to the improvement of farmers’ agricultural input utilization? If yes, how?
10. Do you think that SACCOS contribute to household welfare improvement like income? If yes, how?
11. Do you think that SACCOS contribute to household welfare improvement like food security? If yes, how?
12. Does SACCO encourage household savings? If yes, how?

## Appendix 2: Conversion factor used to estimate TLU equivalents

Livestock Category	TLU
Ox and cow	1.00
Heifer	0.75
Bull	1.00
Horse	1.10
Calf	0.25
Donkey	0.70
Camel	1.25
Sheep and goat (adult)	0.13
Sheep and goat (young)	0.06
Chicken	0.013

Source: Storck et al., (1991)

## Appendix 3: Conversion factor used to estimate adult equivalents

Age category	Conversion factor	
	Male	Female
<10	0.6	0.6
10-13	0.9	0.8
14-16	1	0.75
17-50	1	0.75
>50	1	0.7

Source: Storck et al., (1991)

**Appendix 4: Conversion factors for grain produced**

<b>Grain</b>	<b>Calorie equivalent (Kcal/100g)</b>
Teff	358.8
Wheat	362.30
Barley	372.30
Maize	375.00
Sorghum	380.50
Beans	351.40
Chickpeas	372.30
Lentil	355.30
Potato	103.70
Tomato	30.70
Onion	71.30
Cabbage	20.5

Source: EHNRI (1997), Part III

### Appendix 5: Multicollinearity test

. estat vif

Variable	VIF	1/VIF
LAND_SIZE	2.50	0.399480
LIV_OWNERS~P	2.16	0.463245
HH_AGE	1.80	0.556252
TRAIN_ACC	1.46	0.686804
HH_LEDU	1.40	0.716690
SACCO_DIST	1.24	0.809353
NUMB_EX_CONT	1.23	0.815288
HH_TFS	1.22	0.821593
HH_MS	1.04	0.965555
Mean VIF	1.56	

### Appendix 6: Heteroskedasticity test

Breusch-Pagan/Cook-Weissberg test for heteroskedasticity	
Ho:Constant variance	
	Logit regression
Variables: fitted values of	Probability of Membership in SACCO
chi2(1)	3.52
Prob>chi2	0.0607



### Appendix 8: Marginal effect of logistic regression model

	Delta-method				
	dy/dx	Std. Err.	z	P> z	[95% Conf. Interval]
HH_MS					
Divorced	-.077282	.106642	-0.72	0.469	-.2862966 .1317325
Widowed	.048911	.0581274	0.84	0.400	-.0650166 .1628387
HH_AGE	.0048013	.0015482	3.10	0.002	.0017669 .0078356
HH_LEDU	.0200537	.0038782	5.17	0.000	.0124526 .0276547
HH_TFS	-.0467144	.01045	-4.47	0.000	-.0671961 -.0262328
LAND_SIZE	.0743537	.0182301	4.08	0.000	.0386235 .110084
SACCO_DIST	-.002185	.0005275	-4.14	0.000	-.0032189 -.0011511
TRAIN_ACC					
Yes	.545563	.0500219	10.91	0.000	.4475219 .6436042
NUMB_EX_CONT	.0030927	.0059717	0.52	0.605	-.0086115 .014797
LIV_OWNERSHIP	.0033541	.0069574	0.48	0.630	-.0102822 .0169904

## Appendix 9: Pstest of covariate balancing

```
. pstest HH_MS HH_AGE HH_LEDU LAND_SIZE NUMB_EX_CONT LIV_OWNERSHIP,graph both
```

Variable	Unmatched Matched	Mean		%reduct		t-test		V(T) / V(C)
		Treated	Control	%bias	bias	t	p> t	
HH_MS	U	2.0979	2.1495	-11.2		-1.10	0.271	0.61*
	M	2.0979	2.0889	2.0	82.5	0.22	0.826	0.98
HH_AGE	U	47.732	44.16	36.2		3.56	0.000	0.96
	M	47.732	47.358	3.8	89.5	0.38	0.707	0.99
HH_LEDU	U	5.0773	2.8299	73.8		7.27	0.000	1.22
	M	5.0773	5.1534	-2.5	96.6	-0.22	0.823	0.84
LAND_SIZE	U	1.7157	1.1946	63.2		6.22	0.000	1.54*
	M	1.7157	1.7041	1.4	97.8	0.12	0.902	0.92
NUMB_EX_CONT	U	2.4175	1.1701	55.3		5.44	0.000	1.58*
	M	2.4175	2.3222	4.2	92.4	0.35	0.725	0.78
LIV_OWNERSHIP	U	6.3882	4.8206	64.3		6.33	0.000	1.30
	M	6.3882	6.435	-1.9	97.0	-0.18	0.856	1.09

\* if variance ratio outside [0.75; 1.33] for U and [0.75; 1.33] for M

Sample	Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
Unmatched	0.228	122.88	0.000	50.7	59.2	125.1*	0.89	50
Matched	0.001	0.50	0.998	2.6	2.2	7.2	1.07	0

\* if B>25%, R outside [0.5; 2]

### Appendix 10: Estimation of ATT on household savings

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
TMN_SV_HH	Unmatched	13848.8557	3662.8866	10185.9691	1102.75031	9.24
	ATT	13848.8557	5800.25773	8048.59794	1506.58257	5.34

### Appendix 11: Estimation of ATT on agricultural input utilization

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
AGR_INPUT_MV	Unmatched	26140.232	19274.2062	6866.02577	1139.96975	6.02
	ATT	26140.232	26516.5851	-376.353093	1733.41399	-0.22

### Appendix 12: Estimation of ATT on household income

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
HH_INCOME	Unmatched	56695.6959	49666.6495	7029.04639	2150.9258	3.27
	ATT	56695.6959	59414.0271	-2718.33119	3338.25765	-0.81

### Appendix 13: Estimation of ATT on available dietary energy of household

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
AVAIL_DE_HHM	Unmatched	2420.67474	2086.50191	334.172827	48.7315456	6.86
	ATT	2420.67474	2183.03667	237.63807	80.0486228	2.97