ST. MARY'S UNIVERSITY

INSTITUTE OF AGRICULTURE AND DEVELOPMENT STUDIES

Comparison of the Livelihood of primaryAgricultural Cooperatives member and non-member Households: TheCase of DugedaWoreda, OromyiaRegional State, Ethiopia

By

TigistWorku

A Thesis Submittedto Institute of Agriculture and Development Studies, St. Mary's University in Partial Fulfillment for the Requirement of the Master of Arts Degree in Development Economics

Advisor: Dr. MaruShete (Assoc. Professor)

Addis Ababa

December 2016

ST. MARY'S UNIVERSITY

INSTITUTE OF AGRICULTURE AND DEVELOPMENT STUDIES

This is to certify that the thesis entitled: Comparison of the Livelihood of primaryAgricultural Cooperatives member and non-member Households*: The Case of Dugeda Woreda, Oromyia Regional State, Ethiopia*, which is prepared and submitted by Tigist Worku for the partial fulfillment of the requirements for the master of arts degree in Development Economics complies with the regulation of St. Mary's University and meets the accepted standards with respect to originality and quality.

Approved by Board of Examiners

Advisor: _____Signature_____Date_____

InternalExaminer:_____Signature_____Date_____

ExternalExaminer:_____Signature_____Date_____

Dean, IADS:_____Signature_____Date_____

TABLE OF CONTENTS

Contents   Page

Statement of Author

I declare that this thesis is my own original work and that all sources used for this thesis have been duly acknowledged. This thesis has been submitted in partial fulfillment of the requirements for the M.A. degree in Development Economics at the St. Mary University and is deposited at the University Library to be made available to borrowers under rules of the Library. I solemnly declare that this thesis is not submitted to any other institution anywhere for the award of any academic degree, diploma or certificate.

Name:TigistWorkuAlemu   Signature_____

Place: St.MaryUniversity,Addis Ababa

Date of Submission: December, 2016

Acknowledgments

Acronyms and list of Abbreviations

ACDI /VOCAAgricultural Cooperative Development International/ Volunteers in Overseas Cooperative Assistance
ATT   Treatment effect on the treated
CSA   Central Statistics Agency
CUP   Cooperative union project
DFIDDepartment for International Development
ECX   Ethiopian commodity Exchange
ETB   Ethiopian birr
FAOFood and Agricultural organization
FCA Federal Cooperative Agency
FCC   Federal cooperative commission
FDRE   Federal Democratic Republic of Ethiopia
FGDFocus group discussion
GDP   Gross Domestic Product
ICA   International co-operative alliance
IDE   International Development Enterprise
ILO   International labor organization
MoFEDMinistry of Finance and Economic Development
MSC   Meki Catholic Secret
NGO   Non-Governmental organization
PSM   Propensity Score Matching
SDGS   Sustainable development goals
SDPRP   Sustainable Development and poverty reduction program
TLU   Tropical livestock unit
UN   United Nations
UNDP   United Nations Development Program
USAID United States Aid for International Development

List of Tables and Figures

Abstract

This study is designed to identify the impacts of membership in primary agricultural cooperatives in terms of income, level of agricultural input expenditure and livestock holdings of member households in DugedaWoreda were the specific objectives of the study. A random sample of 98 cooperative member'sprimary agricultural cooperatives and 131 non-membersliving in three kebeles of the district were selected. Data were generated using a structured questionnaire, key informants interview and focus group discussions. Primary data were complemented through secondary sources. Descriptive statistics and the Propensity Score Matching (PSM) technique were used for analyzing the data. Estimation of average treatment effect on the treated (ATT) using the PSM technique showed that farm households who are members of primary agricultural cooperatives, on average, generated ETB 13029 per annum compared to the counterfactuals who are non-members but comparable to the members based on observable covariates. But it showsmembership in agricultural cooperative brought no significant impact on the agricultural input expenses and livestock holding of its members, compared to the non-members given that there is no bias due to unobservable covariates. This could be attributed to the fact that since one of the objectives of cooperatives is lowering down input costs through scale effects (low unit transaction cost) and better negotiation power, the insignificant result of agricultural input expenses is not thus surprising. Also insignificant impact of membership on household's livestock holding could be attributed to preference and technology.The finding shows that cooperatives improved the livelihoods of service user farmers through impacting better income, and reduced input costs. In view of such evidence, further promotion, Development of agricultural cooperatives development policy, Establishment of agricultural cooperative fund, deepening and supporting of agricultural cooperatives is recommended.

Keywords: Primary Agricultural Cooperatives; Impact; Livelihood outcome; Income; Agricultural input expenditure; Tropical Livestock Unit; Ethiopia

CHPTER ONE: INTRODUCTION

1.1.Background of the Study

 Ethiopian agriculture is virtually small-scale, subsistence-oriented and crucially dependent on rainfall in which 90 percent of the country's agricultural output is generated by subsistence farmers that use traditional tools and farming practices (MoFED, 2008; Dercon et al., 2009; Ejeta, 2011). To facilitate the marketing of agricultural products, the government in collaboration withUnited Nations Development Program (UNDP) has just introduced the Ethiopian Commodity Exchange (ECX system with its own separate regulatory body named the Agency for Commodity Exchange. Under this system, is expected that both the private sector and small farmer through cooperatives would participate and will be beneficiaries (GoE portal, 2016).

There is an emerging consensus among many actors of development including UNDP, that the cooperative enterprise is one of the new forms of organization that meet all dimensions in the reduction of poverty. The United Nations resolution on the role of cooperatives in social development recognizes the potential contributions of cooperatives in social development and encourages member states to establish an environment conducive to their development (UN, 2009).

The spirit of self-help and co-operation has long been a part of the farming community inEthiopia. There have been mutual organizations in urban areas, too. When communities faceproblems, they devise ways of addressing these problems based on their values, culture andbeliefs. In Ethiopia, various self-help co-operatives still exist. They are local level institutionswith an organizational base that are indigenous, such as *Debo, Mahiber, Iddir,* and *Iqub*. Thesetraditional informal cooperatives would be a base for formal cooperatives. The Federal Democratic Republic of Ethiopia (FDRE) launched the formation of new agricultural cooperative societies by proclamation No.147/1998. The government has been trying to promote cooperatives with the objective of developing them into autonomous self-help institutions. (Federal NegaritGazeta, 1998).

The various poverty-reduction strategy papers developed by the government of Ethiopia also reflect its support for cooperatives. For example, Sustainable Development and Poverty Reduction Program(MoFED,2002:43)included cooperatives as one of its main goals for agricultural development: "to organize, strengthen and diversify autonomous cooperatives to provide better marketing services and serve as a bridge between small farmers (peasants) and the non-peasant private sector" (Bernard et al, 2010:16).Hence, it is indicated in SDPR strategy paper of the Government of Ethiopia (GoE) that the government had recognized the developmental role of cooperatives and given them due emphasis for their establishment (MoFED, 2002:107).Accordingly, Proclamation No. 147/1998 was issued for the establishment of cooperatives which was amended later on by Proclamation No. 402/2004.The favorable condition created by proclamation No. 147/ 1998 has helped the co-operatives to organize and reorganize themselves voluntarily. In the year 2001, for instance, there were 7,366different types of co-operatives in the country with 3,684,112 members and with a capital of515.7 million Birr (FCC, 2005). Furthermore, the new proclamation has helped the cooperatives to organize themselves into unions by pooling their resources together. As a result, 22 grain marketing unions, and 2 coffee marketing unions have been established in Amhara, Tigray,Oromiya and Southern Regions.

Woldetsadiq(2007) discussed as few smallholder farmers are engaged in out-growers arrangements after the establishment of farmers association unions, like MekiBatu and Alemaya, in the Rift valley and eastern part of the country respectively, where approximately 600 farmers are supplying their products (tomato, onion, potatoes) to the unions under contractual agreements. The union supplies the out-growers with inputs like seed and fertilizer and sometimes pesticides.

According to Ellis (2000) livelihood does not just mean the activities that people carry out to earn a living. He meant all the different elements that contribute to, or affect, their ability to ensure a living for themselves and their household that includes: (1) the assets that the household owns or is able to gain access to- human, natural, social, financial and physical; (2) the activities that allow the household to use those assets to satisfy basic needs; (3) the different factors that

the household itself may not be able to control directly, like the seasons, natural disasters or economic trends, that affect its vulnerability; and (4) policies, institutions and processes that may help them, or make it more difficult for them, to achieve an adequate livelihood.

The livelihood strategies that households develop depends on how they can combine their livelihood assets, and takes into account the vulnerability context in which they live, and the policies, institutions and processes that affect them. The livelihood outcomes that households achieve through livelihood strategies in turn depends on any or all of these elements (DFID, 1999).The study compared the livelihood of the MekiBatuVegetables and Fruit growers cooperative union individual household cooperative members and nonmember. As the report from the union indicated MekiBatu Vegetables and Fruits growers' cooperative union was established in 11 May 2002 in Oromia regional state, East Showa Zone, Dugda district Meki Town. It is located 135km south East of Addis Ababa and 60km from the nearby Mojo town.It has150 Primary Agricultural cooperatives and 7,994(6580 male and 414female) members. Their operational areas areAdami Tulu, Dugda, Bora, ZiwayDugda, Adama district, Dodota but the study focusedon cooperative members in Dugdaworeda (MekiBatu Vegetables and Fruit Growers Cooperative Union, 2015).

1.2.Statement of the Problem

The main objective of promoting agricultural cooperatives in Ethiopia is to help achieve rapid rural development and enhance food security through the development and promotion of modern business-oriented cooperatives under free market principles (ACDI /VOCA, 2005). The Federal Cooperative Agency (FCA) reported that there are approximately 40,000 cooperatives in Ethiopia, of which about 10,000 of them are agricultural cooperatives. Of which about 3,000 of them focus on a single agricultural commodity (e.g. coffee, dairy, livestock) or irrigation, and the majority of them (about 7,000) are established as multipurpose cooperatives despite they concentrate primarily on agriculture. The Agency further reported that about 70% of the 6.7 million cooperative members throughout Ethiopia are members of agricultural or multipurpose cooperatives (FCA, 2011).

Yehuwalashet (2014) reported that there has been encouraging progress in recent years in improving some basic aspects of life in Ethiopia in which cooperatives, as economic enterprises

and self-help organizations, played meaningful roles in improving the socio-economic conditions of their members in particular and their local communities in general.

Following this achievement there is renewed interest in cooperatives in Ethiopia, and subsequent expansion ofcooperative businesses activity in the country, especially of agricultural cooperativeswith a main trust on their role in terms of smallholder commercialization and rural livelihood development. Although cooperatives are considered as an appropriate tool of rural development they are facing critical problems, which retain them from their positive role. Some of the constraints of cooperatives are: Most of them do not sufficiently help members improve their yields and incomes, Cooperatives' provision of services is often financially unsustainable no complete data exists, but many stakeholders assert that a subset of primary coops sustains losses in any given year. Most cooperatives do not attract substantial membership. Country-wide, only 17% of Ethiopian farmers are members of cooperatives though many relatively successful cooperatives attract higher numbers in the areas they cover (Bernard et al., 2010). In addition, to this our understanding about the roles of cooperatives on rural member livelihoodsis scantyin Ethiopia. Most importantly, the impact of the cooperatives on the livelihood of members have not been yet studied and analyzed for MekiBatu Vegetable and Fruit GrowersPrimary Agricultural Cooperative Union whose operational area is located in East Showa Zone, Dugda district Meki Town, ofOromiya Regional State.

1.3.General Objective

1.3.1The general objective of the study was tocompare the livelihood of MekiBatu Vegetable and Fruit Growers primary Agricultural cooperative member and non-member

1.3.2 Specific Objectives

1. To compare cooperative member and nonmember household's income levels.
2. To compare cooperative member and nonmember household' level of agricultural input expenditure
3. To compare cooperative member and nonmember household' livestock holding

1.4.Scope and Limitations of the study

Attempting to analyze the entire cooperatives in the whole country was an impossible attempt given the limited finance and time. Thus, the study focused on the cooperatives members under MekiBatu Vegetable and Fruit GrowersCooperative, Woredaof East Showa Zone. Moreover, the studyfocusedon assessing how being a member in cooperatives contributed to some aspects of the livelihood of its members.Even though,livelihoods includebroadaspects, this study focused on access to human capital, financial capital and social capital.

1.5.Significance of the Study

Agricultural cooperatives have been organized to provide different benefits to their members. One of the aims of establishing multi-purpose cooperative in the rural area is to render different services like improved seed, fertilizers, credit, benefits in the form of dividends, marketing services, storage service etc. Thus, they are meant to improve the living standard and promote agricultural development in the rural sector of the country's economy. The benefits and livelihood improvement of the members are dependent on the performance of cooperatives.The study will contribute to the understanding of the contribution of cooperatives in improving the livelihood of the members, and also shows the challenges of cooperatives and the members. Thus, it will pinpoint interventionsto be considered by policymakers, practitioners and non-governmental and governmental organizations.

1.6.Organization of the Thesis

This study contains five chapters. The introductory chapter of the thesis mainly discusses about the background, gaps and the contribution of the study. Chapter two reviews detailed literature on relevant topics on the study of cooperative and livelihoods. Chapter three presents, the methodology adopted by the study including research approach and design,variables, data Sources and data Collection methods, population and sampling and data Analysistechniques. Chapter four explains results and discussion including data presentation which describes the empirical results, findings and discussions of the study. Chapter five summarizes the main findings of the study and draws conclusion and appropriate recommendations.

<center>**CHAPTER TWO: LITERATURE REVIEW**</center>

2.1Theoritical Review
2.1.1The Concepts, Values and Principles of Cooperatives

According to International Cooperative Alliance (ICA, 1995), "a cooperative is an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democratically controlled enterprise". In addition to this, the Federal NegaritGazeta (1998), proclamation No 147/1998, defined cooperative as associations formed by individuals on voluntary basis and who have similar needs for creating savings and mutual assistance among themselves by pooling their resources, knowledge and property. In Ethiopia, it is common for people to be inter-dependent and help each other in traditional cooperatives like *Edir*, *Equb*, *Debo*, and *Senbete* which could be a basis for modern forms of cooperatives.

2.1.1.1Cooperative Values and Principles

The cooperative values compass-common values on which all cooperatives are based; but they may be interpreted by different traditions of cooperatives according to their operating conditions and specific environments. But still, it is possible to identify certain common characteristics and features of cooperative organizations though there are distinctive traits for every type of cooperative. Cooperatives are private sector enterprises set up to meet their members' needs. They are owned and democratically controlled by their members - a governance model distinguishing them from private firms. In principle, they are based on values of self-help, self-responsibility, democracy, equality, equity and solidarity. They cover a wide range of activities including: agriculture, financial services, manufacturing, transport, utilities, health care and funerals (DFID,2010).

As Ortmannand King (2007) and ICA (2006 cited in Baarda, 2006:11) argued, there are seven internationally recognized cooperative principles. These are:

1. **Voluntary and open membership**; Cooperatives are voluntary organizations, open to all persons able to use their services and willing to accept the responsibilities of membership, without gender, social, racial, political, or religious discrimination.

2. **Democratic member control**; Cooperatives are democratic organizations controlled by their members, who actively participate in setting their policies and making decisions. Men and women serving as elected representatives are accountable to the membership. In primary cooperatives members have equal voting rights (one member, one vote) and cooperatives at other levels are organized in a democratic manner,

3. **Member economic participation**; Members contribute equitably to, and democratically control, the capital of their cooperative. At least part of that capital is usually the common property of the cooperative. They usually receive limited compensation, if any, on capital subscribed as a condition of membership. Members allocate surpluses for any or all of the following purposes: developing the cooperative, possibly by setting up reserves, part of which at least would be indivisible; benefitting members in proportion to their transactions with the cooperative; and supporting other activities approved by the membership,

4. **Autonomy and independence**; Cooperatives are autonomous, self-help organizations controlled by their members. If they enter into agreements with other organizations, including governments, or raise capital from external sources, they do so on terms that ensure democratic control by their members and maintain their cooperative autonomy,

5. **Provision of education, training and information**; Cooperatives provide education and training for their members, elected representatives, managers, and employees so they can contribute effectively to the development of their cooperatives. They inform the general public, particularly young people and opinion leaders about the nature and benefits of cooperation,

6. **Cooperation among cooperatives**; Cooperatives serve their members most effectively and strengthen the cooperative movement by working together through local, national, regional, and international structures,

7. **Concern for the community;** while focusing on member needs, cooperatives work for the sustainable development of their communities through policies accepted by their members

2.1.1.2Types of Cooperatives

There are different criteria like area of operation for classification of cooperatives. For example urban cooperative, rural cooperative (grain, livestock.) and marketing cooperatives. Cooperatives also can be classified based on their organizational level like primary cooperatives with limited area of operation, secondary cooperatives with the interest of the people (member) and tertiary cooperatives formed by secondary cooperatives. Cooperatives on the other hand, can be agricultural co-operatives, marketing co-operatives, housing co-operatives, industrial co-operatives, fishermen co-operatives, dairy co-operatives, banking and credit co-operatives, consumer co-operatives, multipurpose co-operatives, etc. (Chukwu, 1990).

1. Agricultural co-operatives these co-operatives are formed by group of farmers to who pool their resources together to improve their agricultural production with better services. The co-operatives provide valuable services to the member farmers by making available to the seeds, fertilizers, implements, animal feeds, pesticides and all other agricultural requirements at a reasonable price. Theses co-operatives also assist farmers to get credit on the security of their standing crops (Chukwu, 1990).

2. Marketing co-operatives the village marketing co-operatives assist the farmers/ producers in selling out their produce. These co-operatives collect the agriculture produce from farmers, weigh them, store, process and grade them. These co-operatives sell out these produce either to the government or to the open market on behalf of the members and make the payments through their office (Chukwu, 1990).

3. Housing co-operatives: Housing co-operatives exist in growing number in several countries and are also two-sided. The members of housing or building co-operatives are probably people who want to have built by themselves or to borrow money for that purpose (Chukwu, 1990).

5. Industrial co-operatives these co-operatives begin in earlier stages in Europe as part of industrialization. These co-operatives are formed generally by skilled workers specialized in particular field, namely handicrafts, pottery, weaving etc. In Africa these types of co-operatives supply loans, raw material, and assistance to purchase equipment for common use or arrange market to their produce (Chukwu, 1990).

6. Fisherman and Dairy co-operatives these types of co-operatives are also formed to help their respective members by providing necessary credit, equipment and markets for their products (Chukwu, 1990).

7. Banking and Credit co-operatives with a purpose of promotion of thrift, the banking and credit co-operatives are formed in majority of the countries in the world. The major services provided by these co-operatives include providing credit to their members; encourage thrift and savings and providing facilities for personal property insurance (Chukwu, 1990).

8. Consumer co-operatives in the field of distribution of goods, the main co-operative achievement has been the creation of consumer co-operatives. These c-operatives are running single shop or chain of shops, super markets, shopping centers, offering good quality goods at a fair price to the public. Theses co-operatives procure goods from their members and assure better price to them (Chukwu, 1990).

9. Multipurpose Co-operatives In many countries all the above services are undertaken under one roof, which is called multipurpose societies. They provide credit, procure goods, distribute consumer goods, assist in purchase of agricultural inputs by farmers etc (Chukwu, 1990).

2.2. Cooperative Movement in Ethiopia

2.2.1. Cooperatives during the Imperial Regime (Before 1974)

In Ethiopia, successive regimes, starting from the Imperial period to the EPRDF government, gave due recognition to the role of coops and made deliberate effort to promote the same. However, the principles and approaches followed were markedly different, reflecting the political thinking and ideology of the regimes. In its Five Year Development Plan, the Imperial regime envisaged an important role for coops in transforming smallholding agriculture. Thus, it set the stage by providing the first legal framework (the Farmer Workers Cooperative Decree No. 44 later replaced by the Cooperative Societies Proclamation No. 241/1966). The legal framework was relatively comprehensive and contained most of the essential contents of the legal framework issued more than three decades later in 1998 and coops were rightly viewed as

primarily voluntary under takings .However, success was limited during the period (Tesfamariam, 2015).

2.2.2. Cooperatives during the Military Regime (1974-1991)

The Military regime, which viewed coops as a key instrument to build a socialist economy pursued the cooperatives agenda more aggressively. The approach followed combined coercion with extensive support including priority access to resources, goods and services (such as land, irrigation, bank loans at lower interest rate, capital goods, inputs and extension services, and consumer goods). Whereas number of coops and membership size were relatively large, it is not regarded as a particular success for a number of reasons (for details see Partners Consultancy and Information Services, 2006). Coops were so unpopular that following the demise of the Derge regime in 1992 most of them disappeared quickly. What is worse is that they dissolved in such a disorderly manner (e.g. bank loans and other obligations were not settled; no distribution of assets between members; etc.) that it created a lasting suspicion and distrust of cooperatives the stigma of which is haunting cooperatives until today. In an attempt for a fresh start with promotion of cooperatives, the incumbent government issued a new legal framework (Proclamation No. 147/1998 and 402/2004). In addition to being comprehensive it incorporated universally accepted principles of cooperatives (Tesfamariam, 2015).

In the history of cooperative movement in Ethiopia, the government has taken serious measures after1996. The measures include, organizing and reorganizing different types of agricultural cooperatives and establishing Cooperative Promotion Bureaus in regions. At the Federal structure the government has been established the cooperative promotion desk under the Prime Minister office. A proclamation No. 147/ 1998 to provide for the establishment of cooperative societies had also declared by the Federal Government to bring all types of cooperative societies under one umbrella. The Federal Cooperative Commission (currently Federal Cooperative Agency) based on proclamation No. 274 / 2002 was established in 2002. More over to correct the short comings in the proclamation 147/1998andamendment 402/2004 and regulation number 106/2002 became an important instrumental document in the cooperative movement of the country (Tesfamariam, 2015).

2.2.3. Cooperatives under the present Government (Since 1991)

The present government provided a legal framework which is both comprehensive in many respects (includingits ability to accommodate coops in various sectors/sub-sectors) and incorporates universally accepted principlesof cooperatives including voluntary membership (Proclamation No. 147/1998 and 402/2004). As a result some improvements have been seen in cooperative societies in the country. Cooperative societies started to distribute inputs, provide loan to their members, market produces of members in the domestic and foreign market, Unions(secondary cooperatives) were formed with the assistance of Cooperative Union Project (CUP) funded by VOCA/Ethiopia/USAID), dividend payments were made by the unions as well as primary cooperatives. The number of Primary and secondary cooperatives of different types with significant increase in number of member beneficiaries is achieved (Tesfamariam, 2015).

Both Agricultural Development-Led Industrialization and the Marketing Strategy explicitlyenvisaged cooperatives to play a critical role in the development and poverty reduction efforts of the country (see Ministry of Finance and Economic Development 2003; Ministry of Agriculture and Rural Development, 2005). In line with this a general legislation setting out the formal rules and procedures by which the Journal of Economics and Sustainable Development and activities of all types of co-operatives in the country are to be guided (Proclamation No. 147/1998 and402/2004) was issued. As such, it constitutes the incentive structure that shapes the behavior of Co-operatives and their members. According to the proclamation, the objectives of Co-operative Societies are to create savings and mutual assistance among its members by pooling their resources, knowledge and property, to enable them to actively participate in the free market economic system (Proclamation. No. 147/1998) (Tesfamariam, 2015).

2.3. Roles of Cooperatives

In Ethiopia, cooperatives play crucial roles in the country's economic and social development. Cooperatives, both multipurpose and financial, are key grassroots level organizations and critical instruments in implementing the objectives of the various development programs and strategies such as rural development, poverty reduction, and food security programs in Ethiopia. The participation of cooperatives in agro-processing, marketing and finance (saving, credit and banking) is increasing. For instance, they created approximately 82,074 jobs and generated approximately half a billion Ethiopian Birr in wages during 2008. The social role of cooperatives

is promoted through voicing of common goals, enhanced participation in value chains, and protection of producers from unfair pricing. Cooperatives also create opportunity for networking and working in partnership with other agencies (Bezabih, 2009).

Agricultural cooperatives have been used for implementing agricultural development policies directed specifically towards smallholders' agriculture of the country. They are also organized to render economic benefits such as economies of scale, market power, risk pooling, coordination of demand and supply and guaranteed access to input and output markets to these smallholders. They increase the income of the farmers by raising the general price level through increasing bargaining power for the products sold and by 14 lowering the costs of supplies of purchased input (Daniel, 2006). Currently, agricultural cooperatives market more than 10 percent of farmers' produce and supply farm inputs for all farm households irrespective of membership in Ethiopia (Abate et al., 2013).

According to Bezabih (2012), there are various roles of cooperatives that they play to mention them; In the economic role cooperatives enhance production by providing inputs such as Fertilizer, Improved seeds, Pesticides, Machinery (Tractor renting), Marketing of output(collecting ,assemble or sell agricultural commodities), Increasing income(through price stabilization and dividend),Poverty reduction (Impacting income and access to credit from RUSACCOS to engage in income generation activities), economicgrowth(value chain), provision of consumer goods, provision of storage services, creation of employments, capacity building for its members, social protection services (price stabilization, protecting members from exploitation condition, and serve as voicing (serve as institution through which the voice of poor is heard).

ILO and ICA (2015) described the roles of cooperatives in realizing SDGs (Sustainable Development Goals), poverty reduction, gender equality, quality education and learning, health, food security and nutrition , access to water and sanitation, employment creation livelihood and equitable growth, sustainable energy and sustainable natural resource management, good governance, promotion of sustainable and peaceful society

2.4. Livelihoods

The concept of livelihood is widely used in contemporary writings on poverty and rural development, but its meaning can often appear elusive either due to vagueness or to different definitions being encountered in different sources (Ellis, 2000). A popular definition is that provided by Chambers & Conway (1992) where in a livelihood comprises the capabilities, assets (including both material and social assets) and activities required for a means of living. Briefly, one could describe a livelihood as a combination of the resources used and the activities undertaken in order to live (DFID, 2000).

2.5. Cooperative and Asset Pentagons

According to Holmgren,The asset pentagon is at the core of the sustainable livelihood model and lies within the vulnerability context‖ (Holmgren, 2011). The pentagon can be used to illustrate differences in livelihood assets, with the middle point representing a stage of no access to any kind of asset. The more assets a person has access to, the bigger is the range of strategy options available to that person. This is where the role of cooperatives comes in. By increasing their member'saccess to assets, they can help them to acquire for them positive livelihood outcomes. Cooperatives can help members to access all types of assets, but most importantly to human, financial and social capital.

Human capital: People health and ability to work and the knowledge and skill they have acquired over generation of experience and observation, constitute their human capital, education can help to improve people's capacity to use existing assets better and create new asset and opportunities(FAO 2003).

Human capital can be acquired either formally or informally. Formal acquisition is generally done through the established programs and institutions where knowledge and skills are transmitted in educational environments. Human capital can also be acquired informally, through a variety of social organizations, personal contacts, work experience (learning by doing), and through self-teaching (Lachoreet al, 1998). Investing in education and training is crucial for increasing human capital. Life skills, public education and health services are also vital in developing human capital (Ellis, 2000).

Cooperatives exist to serve their members. They provide goods and services to their members, who are not mere customers, but also the member- owners of the enterprise. Credit cooperatives,

for example, often include financial literacy and business management training among the services they provide to members, and as democratic organizations, co- operatives are an ideal training ground in the development of governance and leadership skills (Ferguson, 2012).

Financial capital: The financial capital available to rural households may come from the conversion of their production into cash in order to cover periods when production is less or to invest in other activities. They may make use of formal and informal credit to supplement their own financial resources (FAO 2003).

Cooperatives address the financial needs of members through credit unions, cooperative microfinance institutions, micro- insurance and mutual benefits associations. Agricultural cooperatives provide credit, commercialization and or marketing support to their members. Cooperatives also create employment with worker cooperatives specifically focusing on employment creation (Ferguson, 2012).

Poverty is too often measured solely by a person's access to financial capital. However, the sustainable livelihoods model demonstrates how cooperatives, among other transformative structures can also generate wealth, building on one asset category while also strengthening other assets (Ferguson, 2012).

Financial capital is a very versatile asset since it can be converted into many other types of capital. For instance, money might be needed to afford schooling and healthcare (human capital), and investments in equipment and infrastructure (physical capital). Being in control, feelings of self-esteem, the physical security of household members, and access to services are factors that are likely to influence well-being and access to secured income is vital for obtaining them (DFID, 1999).

Social Capital: The way in which people work together both within the household and wider community, is of key importance to the household. In many communities different households will be linked together by ties of social obligation, reciprocal exchange, trust and mutual support all of which can play a critical role, particularly in a times of crises this can be thought of as social capital which forms part of a household's livelihood capabilities (FAO, 2003).

Cooperatives can serve as mechanism of building social capital which has to do with their very nature of mutual association working for common good the members. Holmgren (2011) argues that being a member of a cooperative may create feelings of belonging and purpose, as well as to improve interpersonal relations and trust. The building of networks, which is based on trust, in general is also related to security. Often, farmers build kin and friendship networks as their principal defense in case of a shock. Cooperatives are among friendship networks where members share benefits and risks together (Bacon, 2005 cited in Holmgren, 2011).Cooperatives have also been found to be good partners for linking farmers with governments, NGOs and other higher organizations (Myers, 2004 cited in Holmgren, 2011).

Natural Capital: Natural capital refers to natural resource stock that affects livelihoods. Such may be intangible public goods or assets used directly in production (like land). A sustainable usage of natural capital is necessary in order to maintain its value and secure future benefit. Natural resources are indispensable for livelihood, since safe foods and water are affected and many, including farmers, live directly of natural resources (DFID, 1999).

Clearly, cooperatives cannot create natural assets – land, water, or other natural resources, but through cooperatives members properly manage natural resources in the surrounding community, or provide access to those resources for people who would otherwise not have that access.Examples include cooperatively managed irrigation systems for farmers, or co- operatives formed to provide fair and equitable access to land. By assessing the impact of activities on the physical environment, cooperatives have shown that viable businesses must take into account stewardship of natural assets (Ferguson, 2012).

Physical capital: Physical capital may include tools and equipment, as well as infrastructure such roads, ports and landing place and marketing facilities, Access to these as well as other forms of infrastructure, such as water supply or health care facilities will influence people's ability to earn an adequate livelihood(FAO, 2003).

Ferguson (2012) stated that as viable businesses, cooperatives increase member equality through shared ownership of physical assets that serve as a spring board for further income generation and provide for basic human needs. Such assets may range from central storage or value added processing facilities for agricultural produce to a safe for secure storage of savings as found in

many rural credit unions. Cooperatives also provide mechanisms to acquire safe, affordable housing and equipment required for income generation

Livelihood strategies

According to DFID (1999), the term livelihood strategies are defined *as* the range and combination of activities and choices that people make in order to achieve their livelihood goals, including productive activities, investment strategies, reproductive choices, etc. Livelihood strategies are composed of activities that generate the means of household survival and are the planned activities that men and women undertake to build their livelihoods (Ellis, 2000).

Livelihood outcomes

Livelihood is the end result of the livelihood activities and various structures and institutions interacting the livelihood framework. The outcome of these interactions could be sustainable or vulnerable (Degefa, 2005; Devereux, 2003).Livelihood outcomes are the achievements of livelihood strategies, such as more income (e.g. cash), increased well-being (e.g. non material goods, like self-esteem, health status, access to services, sense of inclusion), and reduced vulnerability (e.g. better resilience through increase in asset status), improved food security (e.g. increase in financial capital in order to buy food) and a more sustainable use of natural resources (e.g. appropriate property rights) (Scoones, 1998).

2.6. Review of Empirical Studies

Holmgren (2011) studied the impacts of membership in cooperatives on the well-being of the individual members in Bolivia. Subjective measures of life satisfaction and family health were used as measures of well-being. Using face to face surveys among member farmers, data was collected and analyzed with ordinary least square linear regression methods. A small, positive relation between membership length and life satisfaction was found. Thus it seems that cooperative membership does impact positively on overall well-being. It is possible that the relation is caused by reversed causality, since early joiners may have certain socio-economic characteristics that make them more satisfied with life. This is argued to be unlikely, since the long-term members do not have better averages of education or sociability than others, and also seem to be less satisfied than middle-term members.On the contrary to life satisfaction,

membership appears to impact negatively on family health. A possible explanation for this may be aging parents causing what appears to be a negative relation, when in fact it is positive. In general, it seems that cooperatives are better prepared to improve member's life satisfaction, rather than health.

Getenet and Anullo(2012) evaluated the livelihood impact of agricultural cooperatives in Sidama zone, Ethiopia. Using a matching technique on rural household income, saving, agricultural input expenditure and asset accumulation as indicator variables, the finding shows that cooperatives improved the livelihoods of service user farmers through impacting better income, more savings and reduced input costs. In view of such evidence, further promotion, deepening and supporting of agricultural cooperatives is recommended.

Tamirat(2015) studiedthe roles of agricultural cooperatives in building sustainable livelihood for rural women in Bolloso Sore Woreda by using longitudinal survey research design. It also employed both quantitative and qualitative methods of data collection and analysis, the finding of the study has revealed that the cooperatives provided women with various services including supply of agricultural inputs, credit services, marketing of agricultural input and output. Access to these services in turn enabled women to improve their productivity, augment their income, and build livelihood assets which are capable of withstanding risks and shocks. Despite these benefits it yielded to women, the cooperative encountered various problems that hampered the potential benefit of women, which calls for the due attention of concerned bodies.

2.7. Conceptual Framework of Livelihood Study

The livelihoods framework is a way of looking at the complexity of people's livelihoods, especially the livelihoods of the poor, whether they be rural or urban. It seeks to understand the various dimensions of a person's livelihood; the strategies and objectives pursued, and associated opportunities and constraints (FAO, 2003). There are various ways of conceptualizing the components of a livelihood and the influences upon it there are a variety of livelihood frameworks and diagrams, and many analyses based on the concept seek to elaborate or refine it in one way or another. Among these frameworks, the DFID's framework of sustainable livelihood is best suited for the purpose of this study since it allows analysis of vulnerability context under which people make their livelihood (Turner, 2001). Since the framework provide

an analytical structure to facilitate a broad and systematic understanding of the various factors that constrain or enhance livelihood opportunities, and to show how they relate to each other (Krantz, 2001), it is best suited to assess role of cooperatives in enhancing livelihood opportunities. The DFID framework used in this study is presented below:

Figure 1: The Sustainable Livelihoods Framework developed by DFID
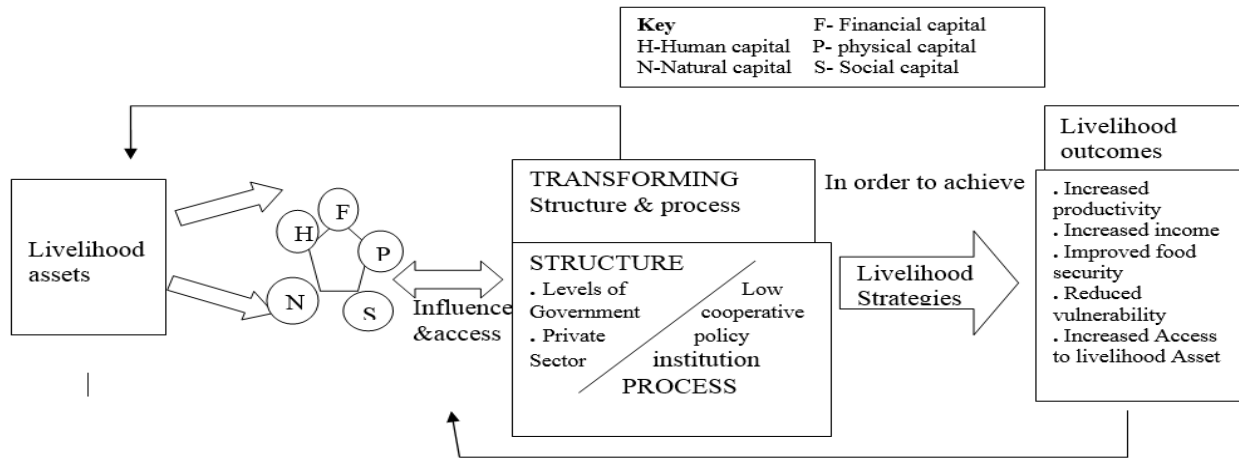
Source: Adapted from Holmgren (2011)

CHAPTER THREE: RESEARCH METHODOLOGY

3.1.Description of the Study Area

Dugda*Woreda*is located at central rift valley in East Shoa zone of Oromia region (Figure 3.1). The capital city of this *Woreda*is Meki town, which is located at 134 km from Addis Ababa along the main asphalt road that leads through Mojjo to Hawassa. The *Woreda*is bordered with SNNPRS to the west, ZewayDugda to the East, Bora *Woreda*to the North and AdamiTulluJiddoKombolcha*Woreda*to the south. The *Woreda*has a total of 36 rural and three urban *kebeles*. Its total population and households were estimated at 157,818 and 17,156, respectively. Of the total *Woreda*population of 157,818, about 81,186 were males and 76,632 were females. Amongst the total 17,156 rural agricultural households, 14,721 and 2,435 were male and female headed households, respectively (CSA, 2011).
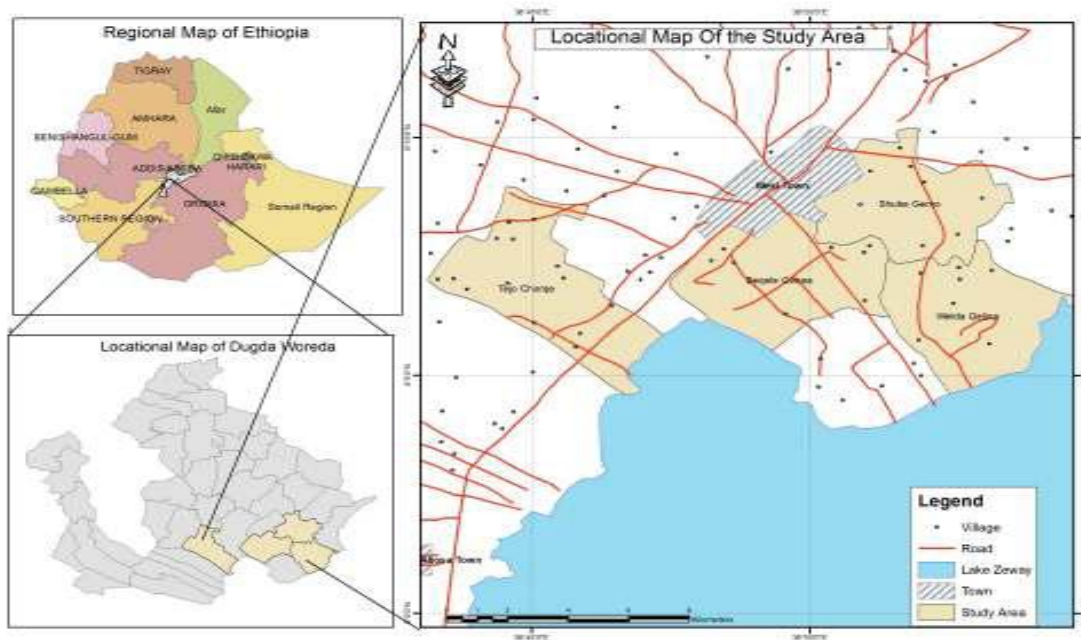
Figure 2: Map of the Study Area,

Source: Agricultural Investment Agency (2015)

The *Woreda*has a total area of 95,945 hectare and is situated 80 01'to 8025'N Latitude and 38032'to 39004'E Longitude. From the total area, cultivated land, grass land, forest area, water body, mountain and stone areas, and others account 52490, 13417, 3411, 12032, 298, and 14297 hectares, respectively. Soil type is 70% sandy, 20% clay, and 10% salty. The topography of the

*Woreda*is 96.38% plain and 3.46% mountainous. The altitude of the *Woreda* rangesbetween 1600 to 2000m above sea level. The mean annual temperature and rainfall are 22 to 28^0c and 700 to 800mm respectively (CSA, 2011).

The major water resources in the *Woreda*include Meki and Dembel rivers, ground water, and Batu Lake. These rivers and ground water play quite a vital role in operation of agricultural practices. Mixed farming system characterizes agriculture in the *Woreda*. The diversified agro-ecology of the area creates an opportunity for the production of different crops such as cereals, pulses, oil crops, vegetables, onion, tomato, papaya and cabbage (BoARD, 2008).

3.2.Variables, Data Sources and Data Collection Methods

The study collected information on different variables. Data on household income, level of agricultural input expenditure and household livestock holding/ownership were collected.

3.2.1. Data Sources and Data Collection Methods

Both qualitative and quantitative data were collected from primary sources (respondents) using structured and semi-structured questionnaire. Quantitative data were collected from members with close-ended questions, and some qualitative data were also collected using open-ended questionnaire interview on a wide range of important variables such as livelihood activities, livelihood assets, and the services offered by the cooperatives. In addition, the study alsoemployed focus group discussion and key informant interview to collect qualitative data.Secondary data were also collected from national and regional cooperatives office documents.Both published and unpublished were assessed and analyzed for the purpose of obtaining relevant data about cooperative history and performance. Before the actual data collection, structured schedule was developed, For the data collection purpose enumeratorswere recruited from the sampled Kebeles and trained how to approach cooperative members, and how to ask questions.Interviews were made with responsible person from MekiBatuCooperative Union,*Woreda* cooperative experts, *Woreda* agriculture experts, *kebele* manager and development agents. The researcher was supervising the overall data collection process to ensure the quality of data collected.

3.3.Sampling technique

Multi-stage sampling technique was employed. At the first stage, the study area,Dugda*Woreda*, was selected purposively out of the five*MekiBatu* Vegetables and Fruits Growers Cooperative Union operational areas for the reason that the Woreda was the first place where the Union has been established and studying impact in this Woreda justifies the technical requirement. TheHead Office of the Union is also located in this *Woreda*. At the second stage, three *kebeles* (*WeyoGebrel*,*TephoChorke* and *DodotaDenbel*) wererandomly selected out of the 39 *kebeles* found in Dugeda*Woreda*. At the third stage, a list of all fruit and vegetable producers in the three kebeles were obtained and stratified into two groups: Cooperative members and Non-members. Then, at the fourth stage all primary agricultural cooperatives (9 in number) which were members of the union and found in thethree kebeles (DodotaDenbel (4), TephoChorke (2) and WeyoGeberele(3) were selected. Then, a total sample size of 98 households who werememmbers of the primary agricultural cooperatives were selected from a total population of 297 who were found in the three kebeles (DodotaDenbel (101),TephoChorke (86) and WeyoGeberele(110). As a counterfactual (comparison group) a total of 131 households who are not members of the primary agricultural cooperatives wereselected from a total 1159 fruit and vegetable producers who werefound in the three kebele (DodotaDenbel (305),TephoChorke(420) and WeyoGeberele(434). The sample size was determined following the formula suggested by Kothari (2004).Individual households in both categories (members and non-members) were selected by using simple random sampling technique. The details are presented below.

$$n= \frac{z^2 \, xNpq}{(N-1) \, e^2+Z^2pq}$$

Where n= required sample size=98

N=Population

Z= Confidence interval at 95% which is 1.96

e= 8%

P= 0.5

q= 0.5

Z=95% confidence interval under normal curve 1.95.

The samples of respondent were taken from each PAs on the basis of the formula given by Kothari (2004).

e= acceptable error term (0.08), P and q are estimates of the proportion of population to be sampled and N=total population

Which is $\underline{3.8025 \times 297 \times 0.5 \times 0.5}$ = $\underline{282.335}$ = 98

      $296 \times 0.0064 + 3.8416 \times 0.5 \times 0.5$ 2.8545

Accordingly, 98 cooperative member respondents were selected out of the total 297 from DodotaDenbel (101),TephoChorke(86) and WeyoGeberele (110)kebeles using the approach of Proportional to the size of the Population. The following is the detail about the cooperative member sample respondents from each kebelespresented below.

Cooperative member sample respondentsNon-member sample respondents

Weyogeberele 110/297*98 =36Weyogeberele   434/1159*131 =49

Tephochorke 86 /297*98 =29   Tephochorke   420/1159*131=47

Dodotadenbel 101/297*98=33 Dodotadenbel   305/1159*131=35

Total =98   **Total =131**

Focus Group Discussion (FGD): was also held with selected members from all sampled cooperatives and non-cooperativefarmers so as to collect information on the type and magnitude of real and perceived role of membership of cooperative on their livelihood. Six FGDs were conducted in two mixed groups composed of male and female per each sampled kebele. One group from cooperative member and the other group from non-members. Each FGD group hadeight (8) members from all sampled cooperatives and non-members at each kebele.The FGD participants were selected based on their number of years stay in the kebeles and who has been a member for more than a year in the cooperatives and who didn't participate in the household survey.

3.4.Method of Data Analysis

Both descriptive and econometric analyses were used to measure the objectives of the study. The descriptive analysis was performed using frequency, percentage and mean values. In addition inferential statistics (E.g. t-test) was used to compare the socio-economic characteristics of cooperative member and non-members. To estimate the role of cooperative on household income, Livestock holding and Agricultural input expense the Propensity Score Matching (PSM) technique was used.Adetail about the PSM technique is presented below.

3.4.1. The Propensity Score Matching (PSM) Technique

In this study, the PSM technique is used to evaluate the role of primary agricultural cooperative in the livelihood of members by using propensity score (p-score).Propensity score matching is a way to correct the estimation of treatment effects controlling for the existence of confounding factors based on the idea that the bias is reduced when the comparison of outcomes is performed using treated and control subjects who are as similar as possible (Becker and Ichino 2002). The method has been applied by previous studies to assess impact of cooperatives in Ethiopia (Francesconi and Heerink 2010; Bernard et al., 2008;Getenet and Anullo, 2012). Given the fact that cooperatives in Ethiopia are mostly promoted by government, the chance of self-bias due to observable characteristics of members is limited (Bernard et al., 2008) and this makes it appropriate to use matching techniques to comparatively assess impacts between cooperative service users and non-users.

To calculate the p-score, a step by step process was followed: First, logit model wasestimated in order to see observable covariates. Second, a balancing propensity test ismade in order to check whether there is a significant difference between the control groups. The treatment group refers to fruit and vegetable producer farm households in the study areawho make use of cooperative services and the control group refers to fruit andvegetable producer farm householdsin the study area who do not use cooperative services. Third, ATT wasestimated based on theaverage difference in the outcome variable (in this study, income) between the treated (in this study, member of the primary agricultural cooperative) and the non-treated (in this study, non-members of primary agricultural cooperative).

1. Two choices have to be made in estimating the p-score. The first choice is concerning the model to be used for the estimation. The second choice involves the variables to be included in the model. In principle, any discrete choice model could be used for such purpose. However, there is a strong preference for logit or probit models in p-score estimation. For estimating the probability of participation versus nonparticipation, logit and probit models usually yield similar results. Hence, the choice is not too critical and the logit model is used in this study.

2. Nearest neighbor matching,Probability-score matching and Inverse-probability weight which are appropriate matchingestimators out of the following six types of algorisms were used in the estimation process of the ATT in order to make sure that the results obtained are robust. Becker and Ichino(2002) briefly mentioned that there are four types of matching methods as follows. Each type of algorism has their own strength and weakness.

     i.   **Nearest neighbor matching**: each treated observation is matched with an observation in the control group that exhibits the closest propensity score. In nearest neighbor matching, it is possible that the same household in the control group can neighbor more than one household in the treated group. Therefore, after matching, the difference between their incomes is calculated as the Average Treatment effect on the Treated (ATT).

     ii. **Inverse-probability weights:-**This method calculates the weighted average differences of treated and non-treated groups. Differing from other matching algorithms, it puts the common differences of participants and non-participants instead of the actual value of the two groups in this case, cooperative member and non-member

     iii. **Weighting on Propensity Score method:** Here, if the propensity score is known, the estimator can directly be implemented as the difference between a weighted average of the outcomes for the treated and untreated individuals.

     iv. **Kernel matching**: all treated observations are matched with households in the control group based on the weighted average that is inversely proportional to the distance between the propensity scores of the treated and control groups.

v. **Radius matching**: is each treated unit is matched only with the control units whose propensity score falls in a predefined neighborhood of the propensity score of the treated unit. If the dimension of the neighborhood (i.e. the radius) is set to be very small it is possible that some treated units are not matched because the neighborhood does not contain control units. On the other hand, the smaller the size of the neighborhood the better is the quality of the matches.

vi. **Stratification matching**: the data set is divided in to intervals having, on average, the same propensity score. The treated and control groups within that intervals are placed under one block, and the mean difference of the outcome between the treated and control groups provides the average treatment effect on the Treated (ATT).

3. Then, the ATT is calculated, which is the average difference in the outcome variable between the two groups (treated and non-treated).

The impact based on PSM is defined as the average effect of treatment on the treated (ATT) and it is calculated as follows:

$$ATT = E(Y1 - Y0/D = 1) = E(Y1/D = 1) - E(Y0/D = 1)$$

Where

Y_1 = the outcome in the treated condition;

Y_0 = the outcome in the control condition; and

D = indicator variable denoting membership in cooperative business

3.5. Variables and Hypotheses

3.5.1. Research Hypothesis

Hypothesis 1:H_0: Membership in MekiBatu Vegetable and Fruit Cooperative doesn't have any impact on the income of member households

H_A: Membership in MekiBatu Vegetable and Fruit GrowersPrimary Cooperative is expected to have positive impact on the income of member households

Hypothesis 2:H_0: Membership in MekiBatu Vegetable and Fruit GrowersPrimary Cooperative doesn't have any impact on agricultural inputs expenses of the member household

H_A: Membership in MekiBatu Vegetable and Fruit GrowersPrimary Cooperative is expected to have positive impact on agricultural inputs expense of the member household

Hypothesis 3: H_0: Membership in MekiBatu Vegetable and Fruit GrowerPrimary Cooperative doesn't have any impact on the livestock holdings of the members' household.

H_A:Membership in MekiBatu Vegetable and Fruit GrowersPrimary Cooperative isexpected to have positive impact on the livestock holdings of the members household.

3.5.2. Definition of Observable Covariates and Outcome Variables

Household Annual Gross Income: this is one of the outcome variable of this study measured in Ethiopian Birr. Income from all different sources such as crop production, livestock production, wage employment, and petty trading were considered both for members of the cooperative and non-members.Greek (2011) also conceptualized total annual income as gross income obtained from sale of agricultural products such as crop, livestock and livestock products off-farm and non-farm activities of the household after meeting family requirements.

Agricultural Inputs Expenditure: This is the second outcome variable expected to be affected by membership in a cooperative. It is measure in Ethiopian Birr.

Livestock ownership: This is the third outcome variable expected to be affected by membership in a cooperative. It is measured using a composite figure of Tropical Livestock Units (TLU). To convert animalsownedbyhouseholds into TLU, theconversionfactorssuggestedbyStorcketal.(1991) was adopted

Sex of the household head: This is a dummy variable that takes the value of 1 for males and 0 for females. Sex of household head could serve as a covariate since the variable is expected to affect membership in a cooperative as well as the outcome variables such as income, input expenditure and livestock holding.

Education level of the household head: this variable was measured as a dummy variable in which four different levels were identified. This includeread and write, primary school (1- 8 grade), secondary school (9-12 grade) and college. Household head's education level is a covariate that determines membership in a cooperative, and it is also expected to affect outcome variables of this study.

Age of the household head: It is a continuous variable measured in years. Elder people in the one hand have seen the benefits of growing individually and in groups where different resources are mobilized and shared. On the other hand, they are tradition bound and resistant to modern and scientific ideas. Youth on the other view are flexible and realized the need for working together where resources can be shared. Thus, the variable is expected to serve as a covariate as it determines membership in a cooperative.

Access to credit: This is dummy variable taking the value of 1 if respondent has access to credit and 0 otherwise. Access to credit can relax the financial constraints of farmers (Edlu, 2006). It was expected that the variable will have a positive relationship with the dependent variable as households having credit access can afford expenses for agricultural inputs.

Access to Market: it is a dummy variable with a value of 1 when respondents use and receive better prices from the cooperative when compared with other market actors and 0 otherwise. Therefore, it is hypothesized to have positive relationship with livelihood impact of cooperatives.

Participation in Training: this is a dummy variable with value 1 if the respondent gets training from the cooperative and 0 otherwise. Provision of trainingfor the members increases their awareness and understanding about modern and scientific ideas this will increase their productivity. Therefore, participation in training is hypothesized to have positive relationship with livelihood impact of cooperatives.

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the main findings of the study concerning the impact of membership in primary agricultural cooperatives on household's livelihood outcomes. The results presented in this chapter seek to achieve the objective of the study, which is to evaluate the impact of cooperatives on household income, agricultural input expenditure, and livestock holding (measured in TLU). The propensity score matching technique was used to address the objectives of the study. Descriptive statistics (frequency and percentages) as well as inferential statistics (t-test) were used to compare the socioeconomic characteristics of member and non-members**.**The first section presents results of and descriptive statistics and t-test. The results from PSM analysis are then presented in the subsequent sections.

4.2. Socioeconomic Characteristics of Cooperative Members and Non-members

4.2.1.   Descriptive Statistics

Age of the household headis one of the household's personal and demographic characteristics, which is measured by years and used to compare cooperative members and non-members. The survey result indicates that age of respondent's ranges from 23 to 80 years for both cooperative member and non-cooperative members. The average age difference for members and non-members shows that there is no statistically significant difference between the two groups, justifying that the variable can serve as a covariate to match the two groups (Table 4.1).

Table 4.1: Comparison of Quantitative Variables between Cooperative Members and Non-members

Covariate	Members/Non-members	n	Mean	Std. Dev	t-test
Age (Years)	Members	98	40.88	13.68	1.07
	Non members	131	42.7	12.15	
Fertilizer use (Quintals)	Members	98	3.7	3.25	0.001[***]
	Non-Members	131	2.6	1.4	

[***]Significant at 1%;

Source: Sample survey (2016)

Amount of fertilizer used increases the productivity of a given land and hence increases household income. The survey result indicated that cooperative members used, on average, 3.7 quintals of fertilizer compared to the non-member, which was 2.6 quintals. The difference in fertilizers input use between the two groups is statistically significant at 1% level of significance (Table 4.1).

Table 4.2: Comparison Dummy Variables between Cooperative Members and Non-members

Variables		Cooperative Members	Cooperative Non-members
Highest level of education	Never schooling	14(14.3%)	34(26.2%)
	Religious or traditionally schooling	18(18.4%)	37(28.5%)
	Primary Education incomplete	40(40.8%)	43(33.1%)
	Primary Education complete	18(18.4%)	10(7.7%)
	Secondary Education incomplete	8(8.2%)	6(4.6%)
	Total	**98 (100%)**	**131 (100%)**
Sex of respondents	Male	88(89.8%)	117(90%)
	Female	10(10.2%)	13(10%)
	Total	**98 (100%)**	**131(100%)**
Livelihood activities	Farming	98(100%)	131(100%)
	Petty trading	9(9.2%)	4(3.1%%)
	cattle rearing	58(59.2%)	56(43.1%)
	daily labor	2(2%)	7(5.4%)

Source: Sample survey (2016)

The other variable used to match cooperative member households with non-members was their education level. The result indicated that out of 98 cooperative members 14.3% did not attend any schooling and thus, neither read nor write. On the other hand, out of 131 non-cooperative

member, 26.2% of them did not attend any schooling and can neither read nor write. The proportion of households with this level of education in both categories is not much different and comparable. Similarly, while 18.4% of the member households can read and write but without a formal education and 28.5% of the non-members fall in this educational category (Table 4.2).

Cooperative member households and non-members were also compared based on the sex of the household head. Male headed households are more likely to be a member of a formal institution, and thus expected to benefit from services provided by cooperatives. Close to 90% of the households in both members and non-members are headed by males, showing the comparability of the two groups.

The survey further enquired participation of cooperative member and non-member households on different livelihood activities. The result showed that, all members and non-members take farming as their dominant livelihood activity. In terms of difference, however, it was observed that relatively higher proportion of cooperative member households participated in petty trading compared to the non-members, and relatively large number of non-members participated in daily wage employment compared to the members (Table4.2)

4.2.1.2. Services provided by the Cooperatives to Their Member

Regarding the services of the cooperatives in the study area, there are about 4 types of services that sample members got from the cooperatives though the extent and coverage varies which are essential in understanding the impact of cooperative on the livelihood of the member. The respondents were asked what services they get from participating in cooperative

Table 4.3: Services provided by cooperatives

Service Access	Service Type	Frequency	Percent
Access to service	Supply of Agricultural input	97	99.0%
	Credit/ loan services	95	96.9%
	Training, guidance and advice	89	90.8%
	Market information and Bargaining for better prices	42	42..9%

Source: Own field survey, 2016

As the multiple response analysis survey result further stipulated that (Table 4.3), almost all (99%) and 95 % of the respondent reported of getting Supply of Agricultural input and Credit/ loan services respectively. Also 89% of the respondent assured that they got Training, guidance and advice, 42.9% of respondents got Market information and Bargaining for better prices and very small non-zero percentage of the respondent mentioned that they got saving service.

Agricultural Input Service

Among the respondents who get agricultural input service from the cooperatives(Table 4.4), while 96.9% said that the cooperative provides fertilizers to them, mainly UREA and DAP, 65.3% replied that the cooperative provide them with high yielding seeds also 44.9%   and 30.6% of respondent replied that they obtain water pump service and verity of input services from the cooperative

Table 4.4: Access to Agricultural input serviceby cooperatives and use of member

Service Access	Service Type	Frequency	Percent
Access to Agricultural input service	Fertilize	95	96.9%
	High yield crops	64	65.3%
	Water pumps	44	44.9%
	Variety of inputs	30	30.6%

Source: Own field survey, 2016

The KII conducted with woreda experts also complements the survey result.

> *".... The fertilizers were provided by the multipurpose cooperatives based on the willingness of member, their farm land size, and purchasing power. Since the cooperative subsidize the price of the fertilizers, it is not costly and many can afford it. High yield seeds and water pump including variety of inputs were delivered to members by the cooperative."KII,* TolchaDeqebo, Dugeda*woreda*marketing and cooperative dev't office

FGD Respondents have also respond that they obtain fertilizers and some of high yield seeds for better prices by doing so the cooperative enhanced their productivity and saved their money from unwanted expenses. They can access the service based on their farm land size and the following demand for the intended production, they also stipulated that they get water pump from cooperative to use by sharing with other member Even if they still buy most of the seeds from the market, yet some of them complain that the input delivery is not timely and the distribution is not fair.

Access to Credit service

The study result in (Table 4.4) conveythat 56.2 % of the sample households get credit service from the cooperative theyget both in kind (agricultural input like seed) and in cash.

Table4.5: Access credit service by cooperatives and use of member

Service Access	Service Type	Frequency	Percent
Do you access credit service	Yes	57	56.2%
Use of credit	For home consumption	6	9.8%
	To pay debts	36	36.7%
	To buy farm inputs	57	91.9%
	For trading purpose	7	11.3%

Source: Own field survey, 2016

The KII conducted also complements the survey resultthat the cooperative used to provide credit to its members but now it is facing difficulties in delivering the service.

> *"One of the main services of* MekiBatuUnion *was to provide credit service to its members. …. But the inadequate capital of the* union to reach all the 60 fruit and vegetable producer primary agricultural cooperatives in the DugedaWereda*limited the service delivery to only 12 cooperatives among them too few members. As we look for way-out from the problem, we found working with Oromia cooperative bank as better solution. We borrow money from the bank so as to provide credit services to the member"*KII with AtoAnteneh ,Mekibatu union agronomist.

FGD discussants also mentioned that they get credit from the cooperative in kind with hybrid seeds like onion, Bean (G/beans& H/beans) and maize and also in cash. as respondents mentioned those who get the credit in seeds will have agreement with the cooperative to purchase the product to the union but those who take the credit in cash can sell the product to whoever they want but they prefer selling to the cooperative because they buy from them with better price that the ongoing market price.

As shown in(Table 4.5)from respondents who get credit service from the cooperative 91% of them replayed that they use the credit to buy farm inputs and 36.7 % of responded that they use it for debt repayment the remaining 11.3% and 9.8% of the respondents replied that they use the credit for trading and home consumption purpose.

Training and Education

For 74.5% of the respondents (Table 4.6), there was education, training or information given by their cooperatives. However, the rest 25.5% of the respondents got neither of them.

From those who got training from the cooperatives 96.3% get training about how to generate income from different sources, 55% reported that the training was focusing on cooperative natures and benefits and 16.3% reported the focus was on how to apply new technologies. On the other hand, none of them reported as the cooperatives involved in political trainings.

Table 4.6: Access to Training and Education service

Service Access	Service Type	Frequency	Percent
Do you access to training and education service	yes	73	74.5%
Focus Points for training and education	Cooperative nature and benefits	44	55%
	How to generate income from different sources	77	96.3%
	How to apply new technologies	13	16.3%

Source: Own field survey, 2016

As the interview with officials from dugedaworeda cooperative office, has exposed, training is rendered to members with objective of ensuring better benefit for members who are participating in the cooperatives. Human capital development is at the center of the service provision. Training is rendered on different aspects. the rules and regulations, and organizational structure of the cooperatives is with intention to attain the better understanding of members so that they can participate in the cooperative in effectively, and get benefit in sustainable way

The cooperatives office and MekiBatuUnion also provide training on agricultural activities with the aim of inducing the agricultural productivity of member. Consequently, they provide training regarding appropriate use of fertilizers, conservation of soil, trees, grazing areas, water bodies and other natural resources, utilizing effective farming system, efficient use of financial resources, creating business and investing further, accumulation of assets and resources as aspects of the livelihood of the member. In carrying out these activities, the cooperative closely works with the *woreda*agricultural and rural development office

Since producing fresh fruit and vegetable, is one of the main sources of earning livelihood for the members, the cooperatives train the members, about producing quality fruit and vegetable. The members are equipped with skills for producing and keeping quality fruit and vegetable so that it can meet international standards. By doing so, the cooperative is ensuring the fair benefit of the members.

The DugedaWoredaMeki town cooperative office works with other stakeholders so as to develop the human capital of the cooperatives through training and financial support. As the irrigation cooperative organizer of the office has discussed, among these organizations are MSC (Meki Catholic Secret), SNV, IDE, (Melkasa, Bako and Ambo) Research institutes and are the outstanding ones. While the SNV and MSC provide training and input service for women and youth cooperative members only, IDE, (Mlkasa, Bako and Ambo) research institutes and provide both training and financial and material assistance to the members.

Also from the interview with Anteneh, Agronomist of MekiBatu Union the researcher understood that in addition to training and education the union provide technical and advisory support, mechanization and maintenance services to the member cooperatives

Table 4.7: Access to Marketing Service by Cooperatives and Use of member

Service Access	Service Type	Frequency	Percent
Access to marketing service	yes	42	48%
Types of Marketing service	Bargaining for better price	13	16.7%
	Purchasing for better prices	69	88.5%
	Providing market information	34	43.6%
cooperative purchase products	yes	74	75.5%
Ways of purchasing products	On cash	21	21.4%
	On credit	42	42.9%
	Both on cash and credit	11	11.2%
	Total	98	100%
Timely and sufficient return (fund)to product	Yes	64	86.5%
Post-harvest Services	Warehousing	35	36.1%
	Grading	39	42.9%
	Packaging	44	60.3%
	Shipment/transportation	68	93.2%
	Market information	24	32.9%
	Total	98	100%

Source: Own field survey, 2016

Marketing Service

The marketing service which the cooperative provide to their members are bargaining for better prices, providing market information, and purchasing for better prices. As it is presented in (Table 4.7), out of 78% of respondents who replayed for marketing service from the cooperative 88% of the respondents replied that the cooperative provided them with Purchasing for better

prices. While 43% of respondents replied that they obtain market related information, 16% of the respondents replied that the cooperative provide them with Bargaining for better price

The marketing service which the cooperatives provide to their members mainly is marketing of agricultural input and output, the marketing of agricultural input include purchasing of farming input for better price and distributing them to the members. Accordingly in the study area marketing of agricultural input like fertilizer DAP and UREA are provided by multipurpose cooperativeswhich is member of horadenbelunion, which provide fertilizer for all member and non-member of the cooperatives in addition the cooperative purchase other input like seed ,Mechanization services/tractor and Motor pump and supply for their members with fair price

Also the cooperatives provides marketing of various types of agricultural output, by creating market linkage with domestic and export market the profit obtained from selling of products is distributed to the members in terms of their participation based on their share .

Cooperative Purchase products

For the question does the cooperative purchase products from you from all sampled respondents only 75.5% responded yes out of this respondents As of the (Table 4.7) shown, 42.9%of the respondents replied that the cooperative in the study area purchased products from their members on credit basis while for the remaining 21.4% and11.2% of the respondents the cooperatives purchased only in cash and on both cash and credit basis respectively.

All respondents those purchase to the cooperative responded that the cooperative buy their product with better price compared to ongoing market price and 86% of them replied that the cooperative give timely and sufficient return (fund) to their product.

According to the data from (Table4.7), most of (93.2%) of the respondents got Shipment/transportation from the cooperative, 60.3% got Packaging service,42.9% got Grading service, 36.1% Warehousing service and only 32.9 % got Market information service.

4.2.1.2 . Economic benefits of the cooperatives

Most of the respondents 88.8% thought that being member of cooperatives improved their expenditure. From which 81% said that the improvement is by smoothening consumption, 37% by investing in long term items, and 10% by increasing saving. Moreover, from those who invested in long term items, about 69.6% built house, about 60.9% purchased home equipment's and 55.4% purchased farm aids.

As presented in (Table 4.8), concerning greater expenditure areas by respondents, Expenditure on daily consumption accounts for 79.2%, expenditure on children schooling 70.7%, expenditure on family health care 73.9% and expenditure on long term assets 56% of the respondents

Table 6: Economic Benefits of the Cooperatives

Economic benefits	Response	Frequency	Percent
Does being member improved your expenditure	yes	87	88.8%
Reasons for improved expenditure	By increasing Saving	8	10%
	By Investing in Long term items	30	37%
	By Smoothing out consumption	60	81%
Asset Built through the improved expenditure	Built House	64	69.6%
	Purchase of farm aids	51	55.4%
	Purchase of home equipment	56	60.9%
Ways of creating Additional Income	By securing higher price for my produce	37	52.1%
	By creating employment opportunities	5	7.1%
	By introducing new and efficient technology	40	56.3%
	By providing training to increase productivity	23	31.1%
	By lowering input cost	57	80.3%

Source: Own field survey, 2016

As all the respondents agreed cooperatives created additional income for their members and regarding the way how cooperatives crated additional income, as shown in the (Table4.8), 80.3%% said by lowering input costs 56.3% by introducing new and efficient technologies,52.1% by securing higher price for their products,31.1% providing training to increase productivity and 7.1%% by creating employment opportunities

On the other hand, those respondents who said "our cooperatives are poor or unable to create additional income to their members" stated the basic reasons as low or no dividend distribution due to less profitability or return of the cooperatives, leader's embezzlement, capacity problem and narrow scope of services.

4.3. Comparison of outcome variables between cooperative members and Non-members Livestock ownership

In a mixed agricultural system livestock are kept primarily to serve as a source of oxen power and secondly as a source of heifers for replacement of stock and for milk production. Households with large number of livestock will not face draught power constraint and increases the possibility of maximizing output. Moreover, in cases where households own more number of livestock which could mean more number of oxen than they require, can hire or lease-out oxen so that households can generate addition income from the lease. Moreover, households that have got large number of livestock can fatten those that are not immediately used for draught powerand replacement and also produce milk for consumption and market. This allows them to generate additional income. Therefore, the number of livestock owned by a household will have direct relationship with improvement in income level. A crude comparison of cooperative member and non-member households on the basis of their livestock holding showed that cooperative members owned more livestock units (2.3 TLU) compared to the non-members (1.8 TLU). The difference is statistically significant at 5% level of significance (Table 4.9). Cooperative services could be one of the options to available to farmers to diversify their production and able them to have a large number of livestock ownership. However, from this crude comparison, it is not possible to attribute all the difference in livestock ownership between the members and the non-members to membership in cooperatives unless we control for other variables, which is the subject of discussion in the next section.

Table 4.7: Comparison of Outcome Variable between Cooperative Members and Non-members

Outcome Variable	Member/Non-member	Mean	Std. Deviation	Mean Difference	t-test
Livestock Ownership (TLU)	Member	2.3368	2.3	2	0.018[**]
	Non- member	1.7692	1.3		
Agricultural input Expenditure	Member	3673.9	3045.4	4166	0.001[***]
	Non- member	4658.4	4400.3		
Income	Member	32613.3	2430.6	266678	0.000[***]
	Non- member	20722.2	13624.8		

Source: Sample survey (2016), [***]Significant at 1%;**significant at 5%

The second livelihood outcome variable considered in this study was agricultural input expenditure of cooperative member households. Again a crude comparison between the members and non-members on this outcome variable showed that the non-members spend much more money (ETB 4658) compared to the cooperative member households (ETB 3674). The mean difference in agricultural input expenditure between the two groups was ETB 4166 per annum, which is statistically significant at 1% (Table4.9). Here it is logical to see non-members incurring high costs of inputs compared to the members who enjoy the privilege of accessing inputs such as improved seeds of tomato, haricot bean, pepper, maize, etcfrom cooperatives at reasonable price than the non-members who are buying from private suppliers at a relatively higher unit price. Given a certain quantity of agricultural input, cooperatives tend to sell it to service users at a low price compared to private traders. The possibility of a comparatively low input expenditure among cooperative service users is expected since one of the objectives of cooperatives is minimization of input costs through scale effects (low unit transaction cost) and better negotiation power.

A third livelihood outcome variable analyzed in this study was the annual household gross income of members of cooperatives. The benefits of cooperatives can be witnessed through income increment among service users. The survey result indicates that cooperative member households earnedhigher annual income (ETB 32613) than the non-member (ETB 20722). The average annual incomedifference between members and the non-members was statistically

significant at 1% level of significance. However, before examining the PSM result it is hardly possible to attribute all the difference to membership in the agricultural cooperative. The next section tries to quantify the impact of membership in primary agricultural cooperatives on income, livestock and agricultural input expenditure.

4.4. Estimation of Impact of Membership in Cooperatives using the Propensity Score Matching Technique

The second step of the econometric analysis is matching of treated households (in this case cooperative member households) with counterfactuals households from the control group (in this case non-member households) on the basis of their propensity scores. Then, by using different matching estimators such as the nearest neighbor, propensity matching and Inverse-probability weight, the causal effect of membership in agricultural cooperatives on different livelihood outcomes such as annual gross income, agricultural input expenditure and livestock holding (i.e. ATT) are estimated. The results of the estimation are presented in Table 4.6).

4.4.1. Impact of Membership in Cooperatives on Household's Livestock Holding

Although the crude comparison livestock holding in TLU between member and non-members showed the presence of significant difference in livestock holding, as presented in Table 4.9, cooperative service use brought no significant impact on livestock ownership. The focus group discussion and the key informants interview held with members of the cooperative revealed that those cooperative member households are inclined to make investment in non-agricultural activities such as buying houses in the nearby Meki town, invest on children education, pay for better health service, participate in petty trading, etc. compared to those non-members who invest on livestock.

The insignificant impact of cooperative service use on household's livestock holding could be attributed to preference and technology. Cooperative member households prefer tospend more on basic needs such as food, clothing and school fees for children and construction of modern house and save or accumulate cash income, which may shift investment away from livestock holding.Currently, government provides special attention for agricultural sector to serve as a transformation tool from rural-centered to urban-centered activities, and the contributions of

cooperatives in terms of shifting investment from livestock to urban-based activities is a change in the right order as per the plan in the growth and transformation of the nation.

Table4.8: Impact of Membership in Cooperatives on Household's Livelihood Outcomes

Outcome Variable	Estimator	ATT (Impact)	Standard Error	Z-value	P > |Z|
TLU	Inverse-probability weight	0.59	1.1	0.52	0.605
	Nearest neighbor matching	0.27	0.3	1.02	0.308
	Propensity matching	0.48	1.6	0.29	0.69
Agricultural Input Expenditure	Inverse-probability weight	971.4	706.2	1.38	0.169
	Nearest neighbor matching	1243	789.2	1.58	0.115
	Propensity matching	430.29	891.2	0.48	0.629
Income	Inverse-probability weight	13029.22	3302.3	3.95	0.000***
	Nearest neighbor matching	11645.82	3569.5	3.26	0.001***
	Propensity matching	14617.82	4505.264	3.24	0.001***

Note: ***denotes significance at 1% level of significance

Source: Sample survey (2016),

4.4.2. Impact of Membership in Cooperatives on Household Agricultural Input Expenditure

One of the key motives of organizing farmers along cooperatives is to fulfill the economic needs of their members. The two most important means by which the cooperatives in the study area create additional income to their members are through securing better price for their agricultural produce and charging lower costs for agricultural inputs. As shown in Table 4.10, membership in agricultural cooperative brought no significant impact on the agricultural input expenses of its members, compared to the non-members given that there is no bias due to unobservable covariates. This could be attributed to the fact that since one of the objectives of cooperatives is lowering down input costs through scale effects (low unit transaction cost) and better negotiation power, the insignificant result is not thus surprising.

4.4.3. Impact of Membership in Cooperatives on Household Income

The benefits of cooperatives can be witnessed through income increment among service users. Generally, cooperatives create business and income generating opportunities by supporting and encouraging surplus production and by providing information. Total income, as referred to in this study, is a composite income mainly from crop sales, livestock sales and petty trade. While crop sales and livestock sales could be direct results of cooperatives (as they promote commercial activities), petty-trade activities could be resulted from new opportunities created both for buyers and sellers due to the presence and functioning of cooperatives.

As presented in Table 4.10, theresults from the PSM estimation revealed that membership in agricultural cooperatives significantly increased the income of member households for all matching estimators. The impact (ATT) of membership in cooperatives was statistically significant at 1% level with the increase in income ranging between ETB 1165- ETB 13029 compared to the average income of counterfactual households. The possible explanations for this increment in total income could be fairly high prices paid by cooperatives for members' products and the encouraging extension services that enable farmers to use improved seeds through cooperatives, thus better crop yield and revenue. This is consistent with the findings of previous studies (Getenet and Anullo*et al*., (2012); and MulukenTamirat *et al*., *et al*., (2015).

CHAPTER FIVE: SUMMARY, CONCLUSION and IMPLICATIONS

5.1.SUMMARY

The study was conducted in Dugedaworeda of the East Showa zone to achieve three specific objectives: to assess impact of membership in primary cooperatives on household's income level, to assess the impact of membership in primary cooperatives on member's level of agricultural input expenditure and to assess the impact of membership in primary cooperatives on household's livestock ownership both quantitative and qualitative data were collected from 229 sample respondents,98 from cooperative member and 131 from non-cooperative households in the study area.

The analysis employed both descriptive statistics and econometric model. Descriptive statistics was employed to describe the characteristics of sample respondents, service and Economic benefit of the Cooperatives.PSM model was used to identify the impact of cooperative membership on household income, Agricultural input Expenditure and livestock holding. Propensity score matching (PSM) was favored because it minimizes problems associated with selection bias, Inverse-probability weight, nearest neighbor matching and Probability-score matching algorithms were used to estimate ATTs.

As the findings from survey sample, interview, and FGD discussions has revealed, to earn their livelihood practice activities consists of farming, cattle rearing, petty trading and daily labor activities. Despite the fact that farmer households employ combination of the livelihood activities, farming is still mainstay for majority of them.

The finding of study has also revealed that. The service modalities and supports which members obtained by participating in cooperatives helped them to improve their livelihood. The cooperative had enabling role by influencing the members' access to livelihood capitals. With training the cooperatives contributed to development of human capital of members. By increasing their profitability in market and by reducing costs of production, it augmented their income, building their financial capital. The credit service also improved member's access to financial capital. The cooperative served as social network by playing linking role between

member on one side, and the government and NGOs on the other side. With improved economic capability.

Although the crude comparison livestock holding in TLU between member and non-members showed the presence of significant difference in livestock holding,PSM Result shows cooperative service use brought no significant impact on livestock ownership. The insignificant impact of cooperative service use on household's livestock holding could be attributed to preference and technology. Cooperative member households prefer to spend more on basic needs such as food, clothing and school fees for children and construction of modern house and save or accumulate cash income, which may shift investment away from livestock holding. So contributions of cooperatives in terms of shifting investment from livestock to urban-based activities is a change in the right order as per the plan in the growth and transformation of the nation

One of the key motives of organizing farmers along cooperatives is to fulfill the economic needs of their members. The two most important means by which the cooperatives in the study area create additional income to their members are through securing better price for their agricultural produce and charging lower costs for agricultural inputs. PSM result shows that membership in agricultural cooperative brought no significant impact on the agricultural input expenses of its members, compared to the non-members given that there is no bias due to unobservable covariates. This could be attributed to the fact that since one of the objectives of cooperatives is lowering down input costs through scale effects (low unit transaction cost) and better negotiation power, the insignificant result is not thus surprising.

 The ATTs result shows that the average income of cooperative member was significantly higher compared to non-cooperatives. Positive and significant ATTs was reported in relation to the impact of cooperative scheme on farmer income. The income difference between member and non-member farmer was found to be 13029.22 ETB and 11645.82 ETB and 14617.82ETB using the Inverse-probability weight,nearest neighbor andProbability-score matching algorithms respectively. Thus, it can be concluded that cooperative schemes enabled farmers to increase yield, to minimize crop failure and hence to enhance productivity and farm income.

Towards this end, despite the noticeable opportunity the cooperative have provided to members, the study identified many bottlenecks and challenges that should be addressed such as low standard of performance, poor management, capacity limitations, corruption and misuse of funds by the executives of cooperatives and unions, narrow scope of services and lack of collaborative work. If the cooperatives work to avoid these bottlenecks, they can further develop and bring remarkable changes in the living standard of the rural poor.

5.2.Conclusion

In conclusion, the based on findings of the study it is possible to argue that cooperatives are important aspects of transforming structure within SLF(Sustainable Livelihood Framework) which increased access of members to livelihood capital and enabled them to build sustainable livelihood. Participation in cooperatives allowed members to improve their agricultural productivity, to augment their income in positive way. Increased income, increased food security, access to better education and health services are all outcomes of sustainable livelihood (DFID, 1999; Ellis, 2000). The study has revealed how cooperatives worked towards achieving these outcomes of sustainable livelihoods for members. Despite such significant improvements there are still bottlenecks which demand due attention of the concerned bodies.

5.3.Recommendations

Based on the findings of the study, the following recommendations are forwarded

1. Members should use the income they generated from their cooperatives not only just to meet their household consumption needs but also to enhance potential income generating capacity together with investing on education and health care requirements. For this, there should be continuous awareness creation schemes though education, training and other means so as to enable them diversify income generation.

2. Providing agricultural inputs to the farmers with fair and affordable price timely and support the production of more agricultural products is very important. Sufficient quantities of inputs need to be provided based on need assessment and there should not

be scarcity as well as surplus. Based on the needs assessment, all of the inputs required by the farmers need to be provided to the farmers.

3. To be effective and acceptable, cooperatives must take the members view and their felt needs into consideration, regular dialogue among farmers, cooperatives and market authorities should be undertaken to resolve problems. To this end, cooperatives should be lead and managed by energetic, professional and dynamic persons

4. Improvement in cooperative governance and management: These cooperatives are managed by cooperative management committees that lack modern cooperative management skills. It is, therefore, important to build the capacity of primary cooperative management committees and their staff. Moreover, awareness creation for policy makers and officers of government cooperative institutions at different levels should be given emphasis so as to effectively promote and develop cooperatives.

5. Development of agricultural cooperatives development policy: Formulation of agricultural cooperatives policy; so far there has been no policy that can guide and frame the growth and development of comparatives at the national level.

6. Establishment of agricultural cooperative fund: The study further analyzed that one of the basic challenge constraining the growth and development of cooperatives in Ethiopia is access to finance services like access to loan to widen their involvement in businesses and other value addition activities. Thus, it is crucial further study the local context and establish a specialized agricultural cooperative fund that can create access to loan services for agricultural cooperatives.

REFERENCES

Abate G. T., Francesconi G. N. and Getnet K. 2013. "Impact of agricultural cooperatives on smallholders' technical efficiency: evidence from Ethiopia", Euricse Working Paper n. 50 | 13

Baarda, J. 2006. Current Issues in Cooperative Finance and Governance: Background and discussion paper. Washington D.C. USA, Rural Development, Cooperatives program.

Bernard, T. *et al.* 2010. Cooperatives for Staple Crop Marketing: Evidence from Ethiopia. International Food Policy Research Institute, Washington D.C.

Bacon, Christopher, 2005. "Confronting the Coffee Crisis: Can Fair Trade, Organic, and Specialty Coffees Reduce Small-Scale Farmer Vulnerability in Northern Nicaragua?".*World Development*, Vol. 33, No. 3, pp. 497-511

BezabihEmana. 2009. Cooperatives: a path to economic and social empowerment in Ethiopia. Coop Africa working paper; no.9. International Labour Organization (ILO), Dare Salaam, Tanzania

BezabihEmana. 2012. Cooperative Movement in Ethiopia. Workshop on Perspectives for Cooperatives in Eastern Africa, October 2-3, 2012, Uganda.

Chukwu. 1990. Economics of the cooperatives Enterprise. Marburg, Germany

Daniel Belay. 2006. Performance of primary agricultural cooperatives and determinants of members' decision to use as marketing agent in AdaaLiben and LumeDistricts.masters thesis, Haramaya University, Ethiopia

DFID. 2010. Working with Cooperatives for Poverty Reduction, Department for International Development (DFID). UK.

DFID. 1999. ―Sustainable Livelihoods Guidance

Sheets.(http://www.google.com.et/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CCAQFjAA&url=http%3A%2F%2Fwww.eldis.org%2Fvfile%2Fupload%2F1%2Fdocument%2F0901%2Fsection2.pdf&ei=Uyd0VdGuOsvoUvibgJgP&usg=AFQjCNEsgwtwWSv_dCff6iVYYQ0A0W4c_mw&bvm=bv.95039771,d.ZGU)‖

DesalegnRahmato (1994). "After the Derg: An assessment of Rural Land Tenure issues inEthiopia." Institute of Development Research. Addis Ababa University.

Ellis, 1998. Rural livelihood diversity in developing countries: Evidence and policy implications

Ellis, Frank. 2000. Rural Livelihoods and Diversity in Developing Countries: Oxford University Pres

FAO. 2003, Rome. Rural development division food and agriculture organization of the united nations http://www.fao.org/docrep

FCA (Federal Cooperative Agency). 2005. Cooperative Annual Magazine. Addis Ababa, Ethiopia.

FCC (Federal Cooperative Commission), 2005. Annual report for the year 2004/2005.Unpublished document, Addis Ababa, Ethiopia

Federal NegaritGazeta of the Federal Democratic Republic of Ethiopia (1998). Cooperative Societies. Proclamation No.147/1998.

Ferguson. 2012. *"Generating Sustainable Livelihoods: The Role of Cooperatives."* Canadian Cooperative Association.
http://social.un.org/coopsyear/documents/FergusonAddispresentationonSustainableLivelihoods.pdf Retrieved on Monday, October 14, 2016

Holmes, Rebecca and Jones, Nicola. 2011. Gender inequality, risk and vulnerability in the Rural economy refocusing the public works agenda to take account of economic and social Risks. ESA Working Paper No. 11-13

Holmgren, Cecilia. 2011. Do Cooperatives Improve the Well-being of the Individual: A Case Study of a Bolivian Farmers' Cooperative. A Bachelor Thesis Submitted to Department of Economics, Lund University, Sweden

ICA (International Cooperative Alliance), 1995. Statement on the Cooperative Identity, in Review of International Cooperation 88(30).

KindieGetnet, K. and T. Anullo. 2012. Agricultural cooperatives and rural Livelihoods: Evidence from Ethiopia, Annals of Public and Cooperative Economics C _ 2012 CIRIEC. Published by Blackwell Publishing Ltd, 9600 GarsingtonRoad,Oxford OX4 2DQ, UK and 350 Main Street, Malden, MA, MA 02148, USA

Storck, H., B. Adenew, B. Emana, A. Birowiecki& S.W. Hawariate, 1991. Farming system and farm management practices of smallholders in the Hararghe highlands. Farming systems and resource economics in the tropics, Vol. II. Kiel: WissenschaftsVavk.

Tesfamariam, K. 2015. Cooperative Movement in Ethiopia: Development, Challenges and Proposed Intervention**,** Journal of Economics and Sustainable Development www.iiste.org ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online) Vol.6, No.5, 2015

Laroche, Mireille, Mérette, Marcel & Ruggeri, G.C. 1998. ―On the Concept and Dimensions of Human Capital in a Knowledge-Based Economy Context‖.

 ILO and ICA. 2015. Cooperatives and the Sustainable Development Goals. A contribution to the post 2015 Development Debate

Ortmann, G. F & R.P, King. 2007. *Agricultural Cooperatives I: History, Theory and Problems.* Agrekon, Vol 46, No 1

Aragaw, Y. 2014. The role of Agricultural cooperatives in accessing input and output markets: An overview of experiences of SRFCF, SNNPR, Ethiopia. http://www.fao.org/fileadmin/templates/gender/docs/Speech_IYC.pdf accessed on 2.sept.2014

Zerihun, A., 1998. Cooperatives Movement in Ethiopia. Unpublished Paper Presented in

the National Workshop in Addis Ababa, Ethiopia.

Annexes

Annex 1: Sample size of the study and number of respondents in Weyogeberel,tephochorekeand Dodotadenbel, 2016

Name of kebele	Name of cooperative	Number of Cooperative members HH		Number of non-cooperative member HH		Total Number of sampled HH
		Total HH	Sampled HH	Total HH	Sampled HH	
Weyogeberel	WeyoSariti	46	15	434	49	
	Malkabela	12	3			
	Weyo Gabre'el	58	18			
	Sub-total	**110**	**36**	**434**	**49**	**85**
Tephochorke	Tepho 140	40	13	420	47	
	OdaJidhaa	46	16			
	Sub-total	**86**	**29**	**420**	**47**	**76**
Dodotadenbel	Dodotadenbel	39	12	305	35	
	odachuba	15	5			
	Chelelekidenbel	20	7			
	gerbedenbel	27	9			
	Sub-total	**101**	**33**	**305**	**35**	**68**
Grand Total		**297**	**98**	**1159**	**131**	**229**

Annex 2: Survey Questionnaire Administered to cooperative member and non-memberof Weyogeberel,tephochoreke and Dodotadenbel, kebele,Dugedaworeda

DEAR RESPONDENT, THIS STUDY IS INTENDED TO EVALUATE THE ROLE OF PRIMARYAGRICULTURAL COOPERATIVES IN THE LIVELIHOOD OF THE MEMBERS. INFORMATION YOU PROVIDED WILL BE KEPT CONFIDENTIAL AND WILL ONLY BE USED FOR ACADEMIC PURPOSES. YOUR CO-OPERATION IN PROVIDING YOUR HONEST VIEW IS VERY MUCH APPRECIATED. Thank you!!

General information

1.Name of the keble_____   3.Name of the cooperative_____

2. Name of the Interviewer: _____   Sign:_____

 4. Name of the respondent: _____   HH ID _____

HOUSEHOLD DEMOGRAPHICS AND EDUCATIONS SECTION

1. BASIC HOUSEHOLD INFORMATION. We would like to ask a few questions about all members of the household (*Beteseb*). Please include everybody who usually lives in the household (including servants etc) **[Interviewer: Write members in this order: a) Head first b) Spouse(s) c) children of head/spouse(s) d) other]**

Id Code	1. Name	2. Sex of... {Name}... Male.. 1 Female..2	3.Age (in years) If Age < 1, age = 99	4. What was the highest level of schooling completed? (See the cods on the below)	5.can..{Name}. Read a letter? Yes..1 No…0	6.Can..{Name}. Write a letter? Yes…1 No…0	7.Does...{Name}. Have an adult literacy program Certificate? Yes..1 No..0
01							
02							
03							
04							
05							
06							
07							
08							

Code 1.2 Education codes

NEVER ANY SECHOOLING …………………………………………………………..**A**
RELIGIOUS/TRADITIONAL SCHOOL …………………………………………….**B**
PRIMARY SCHOOL (INCOMPLETE)………………………………………..…..**C**
PRIMARY SCHOOL (COMPLETE) …………………………………………….....**D**
GRADE 7 COMPLETE……………………………………………………………..**E**
GRADE 8 COMPLETE…………………………………………………………….**F**
GRADE 9 COMPLETE…………………………………………………………..**G**
GRADE 10 COMPLETE…………………………………………………………....**H**
GRADE 11 COMPLETE…………………………………………………………….**I**
GRADE 12 COMPLETE………………………………………………………….**J**
TECHNICAL/VOCATIONAL……………………………………………………**K**
COLLEGE DIPLOMA…………………………………………………………... ..**L**
FIRST DEGREE AT UNIVERSITY …………………………………………….....**M**
POST GRADUATE ………………………………………………………………..**N**
OTHERSPECIFY …………………………………………………………………**O**

8. In which of the following economic activity are you engaged to earn your livelihood?

a). Farming   d). Daily labor
b). Cattle rearing   e). Crafts work
c). Petty trading   f). Other (Please specify) _____

2. Input expenditure

9.The questions refer to all the land on which crops were harvested during 2008 using rain feed farm and irrigation. The input questions refer to all crops as a whole.

Activity	Did you hire in any labor from outside the household to work on your land during Last year/2008					
	No. of people (if none, write 0)	Total number of days worked	Total payment: sum of all payments in cash/birr to all workers	Total payment in kind: sum of all payments in kind to all workers		
				crop (a)	Amount	Unit (b)
Ploughing,Weeding						
Harvesting						

10. LIVESTOCK EXPENDITURE. During the last four months, have you had any of the following expenditures related to livestock?

NO	Type of expenditure	3 cash value (if in kind, give estimated cash value)
1	labor for herding	
2	Feed, including salt	
3	veterinary services/medicine	
4	Transport of animals feed or supplies	
5	Commission on the sale of animals	
6	Other expenses	

11.We want to ask you some further questions about the use of inputs for the production of crops during the last 2008season. We simply want totals for all crops

	Did you purchase any fertilizer for use on your fields?					Did you purchase improved seeds for use on your field?					Did you have any other expenses associated with crop production and the sale of crops, such as for plants, transport, tools, etc.			
	YES-1 NO-0	Amount	UNIT (b)	SOURCE (c)	Total Value	YES-1 NO-0	Amount	UNIT (b)	SOURCE (c)	Total Value	YES-1 NO-0	Amount in birr	SOURCE (c)	Total Value
total														

CODES FOR SECTION 2.1. AND 2.2

Code –A

codes	List of crop
1	tomato
2	onion
3	pepper
4	potato
5	cabbage
6	Bean(G/beans& H/beans)
7	Papaya
8	maize
9	other

Code -B

codes	Measurement units
1	KILOGRAMMES
2	quntal
3	seni
4	medeb

C) SOURCE OF PURCHASED INPUTS

Code	Source of Inputs
1	Service Cooperative
2	Ministry or Other Public Agency
3	Non-Governmental Agency
4	Friend/Relative
5	Trader/Market
6	Other

12. Membership in the Cooperative

13. Are youa member of any cooperative?

a) Yes   b) No, skip to Q. no 52

14. When did you join the cooperative to which now you are member? ------------------------------

15. What is your position in the cooperative?

a)Member only   c) Secretary
b) Chairman   d) Finance officer

16. How did you become member of the cooperative?

a) Willingly   c) Forced by government department
b). Forced by law   d). Forced by ` the society
                            e) Others (specify) _____

17. What was your purpose/objective of joining the cooperative? (Put the '_' mark in
Appropriate cell)
1. Not important   4. Highly important
2. Slightly important   5. Critically important
3. Moderately important

No	Degree	Reasons of importance				
		1	2	3	4	5
1	To get periodic dividend					
2	To get access to employment					
3	To get access to credit/loan service					
4	To get access to input market					
5	To get access to output/produce market					
6	To get access to consumer goods					
7	To get access to training					
8	For other reasons (specify& rate)_____					

18. What are the criteria to get the cooperative's membership status?
1. Not important   4. Highly important
2. Less important   5. Critically important
3. Moderately important

No	Degree	Reasons of importance				
		1	2	3	4	5
1	Ability to contribute the initial capital					
2	Ability to pay periodic payment					
3	Promise to buy goods/services from the cooperative					
4	Promise to sell production output to/through the cooperative					
5	Others (specify & rate					

3. Services of the Cooperative

19. What services does the cooperative render to its members? (More than one answer is Possible)

a), Supply of agricultural inputs   b), Credit/ loan services
c), Market information and Bargaining for better prices   d), Training, guidance and advice
e), saving services
f), other (Please specify) _____

20. If the cooperative provide you with agricultural inputs, what are the inputs supplied to you by the cooperative? (More than one answer isPossible)
a)Fertilize   c) Water pumps
b) High yield crops   d) Variety of inputs

21. Can you access the goods/services of the cooperative on credit?
a. Yes   b. No skip to Q.no 28

22.if your answer is yes for Q.25 ,What amount of money have you got from cooperative through credit service in the past one year) _____

23. For what purpose do you use the money you get from the cooperative through credit?(More than one answer isPossible)
a), For home consumption   d), For trading purpose
b), to pay debts   e), other (Please specify) _____
c), to buy farm inputs

24. Do you access the services of the cooperative on saving?
 a) Yes   b) No

25. Does your saving increased after joining the cooperative

a). Yes   b). No

26. How does the cooperative purchase your produce?

a). On cash   b).On credit   c). Both cash and credit

27. Does the cooperative provide you timely and sufficient return (fund)toyour produce?

a). Yes   b). No

28. How is the price rate the cooperative provide you for your product compared to the going market price rate

a) Better   c) less
b) equal   d)I don't know

29. What type of post-harvest services does the cooperative deliver? (More than one answer is Possible)

a). Warehousing   d). Shipment/transportation
b). Grading   e). Market information
c). Packaging   f). Others (specify) _____

30. Is there any education, training or information given to you by the cooperative?

a). Yes   b). No

31. If your answer to Q. No 34 is yes, what was the focus? (Multiple answers is possible)

a). Political issues   d). How to generate income from different sources
b). Cooperative nature and benefits   e) others (specify) _____
c). How to apply new technologies

32. If your answer for question no. '34'is 'No', what was the reason?

a)I couldn't attend training because of my personal problems
b). because I didn't want to participate in training
c). I don't know
d). other (specify) _____

33. What type of marketing services does the cooperative deliver to you? (Multiple response)
a), Bargaining for better prices   c), Providing market information
b), Purchasing for better prices   d), others (specify) _____

34. To see the impact that cooperative membership had on your asset accumulation, please fill the following table with the correct information

35. What amount of crops do you produce per year before and after joining the cooperative?

Type of crop	Measurement	Productivity			Remark
		Before joining	After joining	Current value in kintal	
	kintal				
Tomato					
onion					
pepper					
potato					
cabbage					
Bean(G/beans& H/beans)					
Papaya					
maize					
OTHER					

5. Economic Benefits

36. Does the cooperative pay you a regular dividend?
a). Yes   b). No

37. If your answer to Q. No. 40 is No, what do you think is the reason? (Multiple answers is possible)
a). The cooperative use the total surplus for investment purpose
b). No surplus is generated by the cooperative so far
c). the cooperative put the surplus in a bank for reserve
d). for some other reason (please specify) _____
e). I do not know the reason

38. If your answer to Q. No. 40 is yes,What was your income in 2008 from the cooperatives dividend to which you are member? --------------

39. How is the income you get as dividend in 2008 relatively to the income you get in the previous years?

a) Increasing   b) decreeing   c) the same

40. If your answer to Q. No. 40 is yes, the dividend payment is sufficient to fulfill the basic requirements of your household.

a). Strongly disagree   c). Agree
b). Disagree   d). Strongly agree

41. If your answer to Q. No. 40 is yes, what purpose did you spend the income received as dividend (multiple answers is possible)

a). for personal and family consumption   d). Purchase/building of fixed/capital assets
b). for repayment of debt/loan   e). Others (specify) _____
c). Deposited in a bank

42. Do you think that being a member of the cooperative improved your expenditure?
a). Yes   b). No

43. What are the basic assets you built or bought after you become member of the cooperative? (Multiple answers is possible)
a). Built House
b). Purchased farm aids such as machineries and oxen
c). Purchased home equipment such as TV and refrigerator
d). others (specify) _____

44. If your answer to Q. No. 46 is yes, which of your expenditure became better? (More than one answer is possible)
a). expenditure on daily consumption items
b). expenditure on children schooling
c). expenditure on family health care
d). expenditure on long term assets
e). others (specify)_____

45. Does the cooperative created additional income?

a)Yes   b) No

46.if your answer to Q 49 above is yes how much additional income ? _____

47. If your answer to Q. No.49 above is yes, in what way the cooperative created additional income? (Multiple answers is possible)

a). By securing higher price for my produce
b). by lowering input costs
c). by creating employment opportunities
d). by introducing new and efficient technologies
e). by providing training to increase productivity
e). others (specify) _____

48. Crop output produced and Sale –Each crop harvested during the last season [rain fed farm and irrigation harvest 20008 EC], can you answer the following questions?

Crop code (a) see the above	7.How much was your harvest from last season's crop?(2008)		8.have you given any part of the harvest to others as payment for kiray /rent and /or gift		9. Have you sold any of the last season's harvest? Yes...1 No...0	10.if you sale any part of your harvest, answer question on amount and revenue		
	Quantity	Unit (b)	Quantity	Unit (b)		Amount	Unit (b)	Total revenue in birr

49. LIVESTOCK OWNERSHIP, Can you tell us about your herd of livestock at before and after joining the cooperative

Type of Livestock bulls/oxen	1. Number owned at present	2 Number owned before joining the cooperative
young bulls/Oxen		
cows		
heifer		
calves		
sheep		
goats		
horses		
camels		
mules		
Donkeys		
Beehives		
Poultry		

50. Gross income from the sale of household's animal products during the last four months?

type	5 Did you sell any..[..]..? YES...1 NO....0	6 Amount sold?	7 Unit (b)	8 Total revenue obtained from the sale of... [..]..
meat				
hides/skins				
butter/cheese				
milk/cream				
dung cakes				
Eggs				
Honey				

(b) KUBAYA.........1, Number........2 , KILOGRAM........3, LITRES......4 OTHER...............5

CODE for Q.55: EMPLOYMENT FOR WAGES

Code (a) Type of employment Farm Worker (for pay) = 1; Traditional labor sharing = 2 Professional (teacher, government worker, administration, health worker, clerical) = 3 Laborer (skilled i.e. builder, thatcher, hair cutting or dressing) = 4 Trader = 5; Soldier = 6; Driver/Mechanic =7; unskilled worker = 8; Domestic servant = (yebetagelgay) = 9; Food/cash for work = 10; others = 11, specify _____

51. NON-FARM ACTIVITIES AND INCOME SECTION 2.7.1 EMPLOYMENT FOR WAGE In the last twelve months, did any of the household members work off the household's land either on someone else's land or in some other employment or Against payment in cash/kind? If yes give the following details. Yes ---- 1 No ----- 0

Id code of the HH member	Kind of work (code a)	Is it permanent(1) or temporary(2)work	3 Total amount earned in Birr		
			1st season (Tir-Miazia, 2008EC)	2nd season (Ginbot-Nehassie, 2003EC)	3rd season (Meskerem-Tahisas, 2004EC)

52. OWN BUSINESS ACTIVITIES

I would like to ask you about your income earning activities such as craft, trades, or other business, carried out by any of the household members this year. If any of the household members are involved in such activities fill the following:

Id code of the HH member	Kind of work	Is it permanent(1) or temporary(2)work	3 Total amount earned in Birr		
			1st season (Tir-Miazia, 2008EC)	2nd season (Ginbot-Nehassie, 2003EC)	3rd season (Meskerem-Tahisas, 2004EC)

End of the question for non-members

6. Overall views of respondents

53. Do you think that there is improvement in your agricultural input expenditure after being a member of thecooperative?

a). No change at all   c. To some extent
b). Insignificant change   d. To large extent

54. Do you suggest a cooperative business should continue?

a). Yes   b). No

55. Do you think that a cooperative business brought improvements in the living condition of The community?

a). Yes   b). No

Thank You

Annex 3: FGD Guides

1. How do you earn your livelihood?

2. What are the valuable assets and how you access them?

3. Why you decided to join the cooperative?

4. What role the cooperative had in increasing your access to these resources?

5. Did the cooperative benefit you with better income? How?

6. What sudden troubles and risks you faced in past times? How you responded to it before and after joining the cooperative?

7. How the cooperative helped you in coping with the troubles?

8. How you maintain social relationship with other members of the cooperatives?

9. How you perceive the role of cooperative in improving your livelihood?

10. What are the problems that you face in participating in the cooperative?

Annex 4. Official's Interview guiding questions

1. What are the criteria to be a member of the cooperative?
2. What are the rights and duties of the cooperative's members?
3. What services does the cooperative offer to the members?

4. What positive impact does these service made on the lives of the members?

5. How often you visit the cooperative?

6. How is the dividend distribution system?

7. How is the cooperative controlled?
8. To whom audit report is presented?
9. in what type of community development activities does the cooperative participated so far?
10. what about future plan?
11. What is the role of the cooperative in equity distribution of wealth?
12. Are there major factors that constrain efficiency and goal achievement of the cooperative?
13. What remedial action do you suggest to solve these problems?
14. What are the partner organizations to the cooperative?

Appendix 5. PSM Result

```
Treatment-effects estimation                Number of obs      =        229
Estimator      : propensity-score matching  Matches: requested =          1
Outcome model  : matching                                min =          1
Treatment model: logit                                   max =          4
```

totalexp	Coef.	AI Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
ATET						
statusmemb						
(2 vs 1)	-430.2977	891.2502	-0.48	0.629	-2177.116	1316.521

```
Treatment-effects estimation                Number of obs      =        229
Estimator      : nearest-neighbor matching  Matches: requested =          1
Outcome model  : matching                                min =          1
Distance metric: Mahalanobis                             max =          6
```

totalexp	Coef.	AI Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
ATET						
statusmemb						
(2 vs 1)	-1243.006	789.1846	-1.58	0.115	-2789.779	303.7677

```
Treatment-effects estimation                Number of obs      =        229
Estimator      : inverse-probability weights
Outcome model  : weighted mean
Treatment model: logit
```

totalexp	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
ATET						
statusmemb						
(2 vs 1)	-971.4403	706.1989	-1.38	0.169	-2355.565	412.6841
POmean						
statusmemb						
1	7812.356	615.8101	12.69	0.000	6605.391	9019.322

```
Treatment-effects estimation              Number of obs      =      229
Estimator      : inverse-probability weights
Outcome model  : weighted mean
Treatment model: logit
```

totalexp	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
ATE						
statusmemb						
(2 vs 1)	-1605.55	672.5105	-2.39	0.017	-2923.646	-287.4532
POmean						
statusmemb						
1	8307.095	579.0892	14.35	0.000	7172.101	9442.089
TME2						
sex	-.663609	.5198317	-1.28	0.202	-1.68246	.3552423
age	-.0672207	.0170311	-3.95	0.000	-.100601	-.0338404
educ	-.9763034	.1936529	-5.04	0.000	-1.355856	-.5967507
owenbuis	1.762562	.6843689	2.58	0.010	.4212236	3.1039
farming	0	(omitted)				
petytrade	0	(omitted)				
dailylabor	-1.28473	.7766999	-1.65	0.098	-2.807034	.2375735
cattleraring	.4917796	.3018896	1.63	0.103	-.0999131	1.083472
_cons	4.758483	2.423283	1.96	0.050	.0089351	9.508031

```
Treatment-effects estimation              Number of obs      =      228
Estimator      : propensity-score matching    Matches: requested =        1
Outcome model  : matching                                  min =        1
Treatment model: logit                                     max =        4
```

TLU	Coef.	AI Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
ATET						
statusmemb						
(2 vs 1)	-.4821883	1.640458	-0.29	0.769	-3.697427	2.73305

```
Treatment-effects estimation              Number of obs      =      229
Estimator      : nearest-neighbor matching    Matches: requested =        1
Outcome model  : matching                                  min =        1
Distance metric: Mahalanobis                               max =        6
```

tlu	Coef.	AI Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
ATET						
statusmemb						
(2 vs 1)	-.2677799	.2628562	-1.02	0.308	-.7829686	.2474088

```
Treatment-effects estimation                Number of obs      =        228
Estimator      : inverse-probability weights
Outcome model  : weighted mean
Treatment model: logit
```

TLU	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
ATET						
statusmemb						
(2 vs 1)	-.5941549	1.147296	-0.52	0.605	-2.842813	1.654503

```
Treatment-effects estimation                Number of obs      =        228
Estimator      : inverse-probability weights
Outcome model  : weighted mean
Treatment model: logit
```

TLU	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
ATE						
statusmemb						
(2 vs 1)	-1.471687	1.210632	-1.22	0.224	-3.844481	.9011077
POmean						
statusmemb						
1	14.68715	1.14184	12.86	0.000	12.44918	16.92511
TME2						
sex	-.6872723	.5228987	-1.31	0.189	-1.712135	.3375902
age	-.0692618	.0172707	-4.01	0.000	-.1031117	-.0354119
educ	-.9913112	.1960786	-5.06	0.000	-1.375618	-.6070043
owenbuis	1.804924	.6930444	2.60	0.009	.4465821	3.163266
farming	0	(omitted)				
petytrade	0	(omitted)				
dailylabor	-1.282927	.7838346	-1.64	0.102	-2.819215	.2533605
cattleraring	.5229428	.3035935	1.72	0.085	-.0720896	1.117975
_cons	4.794452	2.444543	1.96	0.050	.0032348	9.585668

```
Treatment-effects estimation                  Number of obs    =        229
Estimator       : inverse-probability weights
Outcome model   : weighted mean
Treatment model: logit
```

totalincom	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
ATE						
statusmemb						
(2 vs 1)	-13042.23	2744.507	-4.75	0.000	-18421.36	-7663.092
POmean						
statusmemb						
1	33182.01	2568.02	12.92	0.000	28148.78	38215.23
TME2						
sex	-.7614492	.528439	-1.44	0.150	-1.797171	.2742721
age	-.0610026	.0173399	-3.52	0.000	-.0949882	-.0270169
educ	-.9028573	.1986478	-4.55	0.000	-1.2922	-.5135147
tlu	-.1049216	.0904298	-1.16	0.246	-.2821607	.0723175
fertilize	-.0036686	.0015348	-2.39	0.017	-.0066769	-.0006604
employmen	-1.120867	.7577384	-1.48	0.139	-2.606007	.3642728
owenbuis	.9704934	.7125453	1.36	0.173	-.4260697	2.367057
_cons	7.477441	2.517692	2.97	0.003	2.542855	12.41203

```
Treatment-effects estimation                  Number of obs    =        229
Estimator       : inverse-probability weights
Outcome model   : weighted mean
Treatment model: logit
```

totalincom	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
ATET						
statusmemb						
(2 vs 1)	-13029.22	3302.301	-3.95	0.000	-19501.61	-6556.825
POmean						
statusmemb						
1	33638.99	3099.536	10.85	0.000	27564.01	39713.97

```
Treatment-effects estimation              Number of obs      =       229
Estimator      : nearest-neighbor matching  Matches: requested =         1
Outcome model  : matching                                 min =         1
Distance metric: Mahalanobis                              max =         2
```

totalincom	Coef.	AI Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
ATET						
statusmemb						
(2 vs 1)	-11645.82	3569.482	-3.26	0.001	-18641.87	-4649.762

```
Treatment-effects estimation              Number of obs      =       229
Estimator      : nearest-neighbor matching  Matches: requested =         1
Outcome model  : matching                                 min =         1
Distance metric: Mahalanobis                              max =         2
```

totalincom	Coef.	AI Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
ATET						
statusmemb						
(2 vs 1)	-11645.82	3569.482	-3.26	0.001	-18641.87	-4649.762

67