# COFFEE VALUE CHAIN ANALYSIS; THE CASE OF GIMBO DISTRICT OF KAFFA ZONE, SOUTHWEST ETHIOPIA

**MSc THESIS**

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# COFFEE VALUE CHAIN ANALYSIS; THE CASE OF GIMBO DISTRICT OF KAFFA ZONE, SOUTHWEST ETHIOPIA

**By**

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**Msc Thesis**

*Submitted to Jimma University, College of Agriculture and Veterinary Medicine, Department of Agricultural Economics and Agribusiness ManagementIn partial fulfillment of the requirements for the Degree of Master of Science in agriculture (Agribusiness and value chain management)*

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**October, 2018**

**Jimma, Ethiopia**

# DEDICATION

I dedicate this thesis manuscript to my father **BIRHANU ABAGOJAM ABADIKO** and my mother **MARISHET AYELE ATO** as well as to all my family for nursing me with affection and love and for their dedicated partnership in the success of my life.

# STATEMENT OF THE AUTHOR

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Date of Submission: **September, 2018**

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# BIOGRAPHICAL SKETCH

The author was born on June19, 1992 in Gawa Gerepa Kebele, Gimbo Woreda  Kaffa Zone of Southern Nations Nationalities and People Regional State, Ethiopia. He attended his elementary school, high school and preparatory level education at Gawa Gerepa elementary School, Gimbo secondary school and Bonga secondary and preparatory school respectively. After passing University Entrance examination, he joined Jimma University in 2012 and graduated with B.Sc Degree in Agribusiness and value chain management in 2014. After his graduation, he was employed in Konda Woreda office of Marketing and Cooperative Promotion as development planner starting from January 2015 and he served Konda Woreda for seven months. After seven months of duration in Konda Woreda, he was recruited to serve Semera University as a Graduate Assistant starting from August 2015. He served Semera University for one year and four months until he joined Jimma University to pursue MSc degree study in Agribusiness and value chain management.

# ACKNOWELEDGEMENTS

# LISTS OFACRONYMS

| | |
|---|---|
| ARI: | Agricultural Research institute |
| ATA: | Agricultural Transformation Agency |
| ATT: | Average Treatment on Treated |
| BLUE: | Best Linear Unbiased Estimation |
| CIA: | Conditional Independence assumptions |
| CLR: | Classical Linear Regression |
| CM: | Caliper Matching |
| CLR: | Classical Linear Regression |
| DA: | Development Agents |
| DWH: | Durbin-Wu-Hausman |
| ECX: | Ethiopian Commodity Exchange |
| EP: | European Parliament |
| FCA: | Federal Cooperative Authority |
| FDRE: | Federal Democratic Republic of Ethiopia |
| GDCPO: | Gimbo District Cooperative Promotion Office |
| GDOAM: | Gimbo District Office of Agricultural marketing |
| GDOARD: | Gimbo District Office of Agriculture and Rural Development |
| GDOEP: | Gimbo District Office of Environmental protection |
| GDOOM: | Gimbo District Office of Omo Micro |
| GDOTI: | Gimbo District office of trade and industry |
| GDP: | Gross Domestic Product |
| GIZ: | Gesellschaft für International Zusammenarbeit |
| ICA: | International Cooperative Alliance |
| ILO: | International Labor Organization |
| KFCCU: | Kaffa forest coffee cooperatives union |
| KM | Kernel Matching |
| KZADO: | Kaffa Zone agricultural development office |
| KZAMO: | Kaffa Zone Agricultural Marketing Office |

# LISTS OF ACRONYMS *(Continued)*

| | |
|---|---|
| MLR: | Multiple Linear Regressions |
| MoFED: | Ministry of Finance and Economic Development |
| MOT: | Ministry of Trade |
| NNM: | Nearest Neighbor Matching |
| NGO: | Non-governmental Organization |
| OLS: | Ordinary Least Square |
| PSM: | Propensity Score Matching |
| PS: | Propensity Score |
| 2SLS: | Two Stage Linear Estimation |
| SNNPR: | South Nation Nationalities and People Region |
| SWOT: | Strength, Weakness, Opportunities and Threats |
| UNECA: | United Nations Economic Commission for Africa |
| UNIDO: | United Nation Industrial Development Organization |
| USAID: | United State Agency for International Development |
| USDA: | The United States Department of Agriculture |
| VC: | Value Chain |
| VIF: | Variance Inflation Factor |
| WB: | World Bank |

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## ABSTRACT

*Coffee production is vital to the Ethiopian economy with about one-fourth of the country's population directly or indirectly deriving their livelihoods from it. Despite its potential capacity for coffee production, the sector in general faces various challenges which in turn affect its value chain actor benefit. This study was aimed at analyzing coffee value chain in Gimbo District of Kaffa Zone SNNPRS with specific objective of identifying coffee value chain actors and their role, identifying factors affecting market supply of coffee and comparing farmers' performance in conventional and cooperatives chain. Three stage stratifying sampling techniques were used to select small holder farmers. The data were collected from both primary and secondary sources. Primary data were collected from 181 randomly selected farm households, 47 coffee traders, 20 local coffee consumers and 28 local coffee processors. Descriptive statistics, value chain analysis, multiple linear regression and propensity score matching methods were used to analyze the data. Result of value chain analysis indicated that the major coffee value chain actors of the area are; farm input suppliers, small scale and large scale coffee producers, coffee collectors, retailers, local consumers, local coffee processors, coffee suppliers and primary coffee cooperatives. The result of econometric analysis of 2SLS regression shows that education level, membership to coffee cooperative, transport ownership and quantity of coffee produced positively and significantly affected market supply of coffee in the study area. However, distance to the nearest market affected market supply of coffee negatively and significantly. Estimation result of logit model shows that, age of household head, land allotted for coffee and educational level of household head positively and significantly affects producers' likelihood of being coffee cooperative member. But distance from cooperative office and family size under productive age negatively and significantly affects producer's likelihood of joining coffee cooperative in the area. Result from computation of average treatment on treated (ATT), indicated that producers who are members of coffee cooperatives on overage supplies between 3.926 and 4.228 quintal of higher coffee than non-members and also they receive more birr which is between 2.203 and 2.228 birr/kg than non-members from sell of coffee. With respect to cost of transaction member producers on average incurs less cost which is between 0.382 and 0.405 birr/kg than non-members. Therefore policy implication drawn from this study aimed at strengthening farmers coffee cooperatives, improving producers' knowledge through expanding adult education and experience sharing with coffee producers from other areas and improving producers' productivity through strengthening supportive packages and institutions.*

**Key words:** Value chain, Coffee, Gimbo, 2sls, PSM, Multiple Linear Regressions.

# 1. INTRODUCTION

## 1.1. Background of the study

Coffee is one of the most important traded commodities in the world (USAID, 2014). The sectors global value chains are quickly transforming because of shifts in demands and an increasing emphasis on product differentiation in importing countries (Ponte 2012).

In Ethiopia, coffee has both economic and social value (Birhanu *et al.,* 2009). The subsector accounts for over 35% of agricultural foreign exchange earnings and about 4% of agricultural Gross Domestic Product (David and Christian, 2013). With respect to creating job opportunity, coffee generates a considerable number of jobs on-farm, in the processing plants and in the transport sector. Consequently, Ethiopia stood fifth in the world and first in Sub-Saharan Africa in terms of the share of GDP that stems from coffee (World Bank, 2015).

According to Alemseged & Getaneh, 2013, Ethiopia is the center of origin for *Coffea Arabica and* is endowed with a good production environment for growing coffee. Ethiopia produces a range of distinctive Arabica coffees and has considerable potential to sell a large number of specialty coffees; but little of the lower-value Robusta coffee is produced in the country because it is better suited for production in lower altitude equatorial climates (Nure, 2010). Coffee production in Ethiopia is almost exclusively situated in Oromia and the Southern Nations, Nationalities, and People Region (USAID, 2014). In the areas indicated, smallholder farmers produce 95 percent of coffee under several types of production systems, including forest, semi-forest, garden, and plantation coffee (Taye, 2013).

According to the report of (SNNPR culture and tourism bureau, 2017), the main coffee growing areas in SNNPs region include Sidama, Gedeo, Kaffa and BenchiMaji Zones. According to report of (Ethiopian Coffee and Tea Authority, 2010) share of coffee production in SNNPR is about 44.2% of the total production of the country and out of total volume of coffee marketed in Ethiopia, about 122,678 metric ton comes from the region. Coffee marketing in Ethiopia occurs at three different marketing levels which are primary level coffee transaction, the ECX and the usual international coffee market where exporters sell coffee to importers (Getu, 2011). Primary level coffee transaction includes both

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conventional chain and cooperative chain. Conventional chain is a usual route through which coffee is marketed, but co-operative development in Ethiopia is considered in start of 2010 in line with the start of Growth and Transformation Plan (GTP), which is geared towards fostering broad-based development in a sustainable manner to achieve the Millennium Development Goals (MoFED, 2010). Now days, cooperatives play a vital role in agricultural value chain by enhancing bargaining power of small scale producers and ensuring their market participation.

Coffee value chain in Ethiopia is composed of a large number of actors (USAID, 2010). It includes coffee farmers, collectors, different buyers, processors, primary cooperatives, cooperative unions, exporter's and various government institutions (USAID, 2010). The major portion of volume of products mobilized, value adding functions, market share and capital owned in coffee value chain of the country is under the hands of producers especially the large-scale private coffee plantations and state farms of coffee plantations (USAID, 2010). This indicates that the small scale producers are not well participating in the coffee value chain. This is due to various challenges, including limited improvement in productivity, low returns for farmers, poor agricultural practices, less attention to the branding of differentiated coffees, long supply chain and related transactional costs from farm to port of discharge and lack of access to capital at the bottom end of the value chain (UNDO, 2012).

So that, there should be some intervention which helps to utilize the potential of coffee for enhancing income of smallholder producers and other actors involved in the coffee sub-sector. However, such intervention requires background information on the existing production and marketing situations along the value chain. To this end, the study has made attempts to provide relevant information on the overall performance of coffee value chain in the study area.

## 1.2. Statement of the problem

Coffee production is vital to the Ethiopian economy with about one-fourth of the country's population directly or indirectly deriving their livelihoods from it (Abu Teffera and Michael, 2015). According to Coffee annual report by (Teddy, 2013), coffee is a strategic commodity to Ethiopia that covers 24-26% of the total income of its earning and it is a source of income to a quarter of the population. Despite high coffee production potential of Ethiopia, the market supply of coffee is low as compared to its potentiality due to limited infrastructure, socioeconomic, production, market and institution related factors.

According to (Getu, 2011), due to coffee improvement opportunities which are related to market growth of specialty coffee industry and wide range of market options, the countries level of coffee production as well as marketing is increasing from time to time. Specific to the area of investigation, being center of origin and genetic diversity for coffee Arabica, kaffa is an important source of coffee and is one of potential areas of production. Even if the significance of coffee in Ethiopian economy and its current income generating capacity is increasing, the share of coffee from kaffa in world market is very limited (KZAMO, 2017). Not only this but also at domestic level, small scale producing farmers of the area not beneficial of the chance at the level expected due to non existence of well integrated value chain system(KZAM, 2017).

Coffee value chain and its marketing system is one of the most important issues to be considered while thinking over sectors development (Meijernik *et al*., 2014). On the base of this fact, different studies have been conducted about agricultural marketing system of Ethiopia in general and of coffee in particular. According to (Alemu and Meijernik, 2010), linking small scale producers to markets are widely recognized as a valuable for value chain development. But in Ethiopia agricultural markets are fragmented and not well integrated into a wider market system, which leads to weak value chain integration as well increases transaction costs and reduces farmers' incentives to produce for the market (Aklilu and Ludi (2010). They also indicated that even though the government deals with coffee marketing, still the country has been constrained by poor marketing performance of the coffee sub-sector. This fact traces one back to assess the overall value chain system of the sector starting from production.

Since coffee is marketed both in convectional chain and cooperative way, it becomes unbiased to look over both of the routes by which coffee reaches its final destination. The conventional chain incorporates various actors and is most of the time the long route with in which the probability of both losing and gaining of value of the commodity is very high (Zerihun and Tadesse 2013). Agricultural co-operatives play an important role in the provision of agricultural inputs (fertilizers, improved seeds and pesticides) to smallholders, distributing 95 per cent of all fertilizers used (FCA, 2015). But their involvement in output marketing is still low, this is due to low member participation, weak leadership, dependence on supporting organizations and a lack of working capital (Borda-Rodriquez et al., 2016).

Moreover, some case studies were undertaken regarding coffee value chain as well as impact of cooperatives as stake holder in coffee value chain in different parts of Ethiopia so far by different authors. For instance, Mohammed (2013) conducted study on value chain analysis of coffee in Nensebo District, West Arsi Zone of Ethiopia. Solomon *et al.,* (2016) conduct a study on factors affecting farmers' coffee market outlet performanc in Jimma zone Ethiopia. Alemayehu *et al.* (2015) conducted a study on the existing forest coffee market channel of Essara Woreda of Dawuro Zone Ethiopia. Dessalegn (2014) conducted a study on analysis of coffee marketing cost and margins in South West, Ethiopia. Zekarisa *et al.,* 2015 conducted study on impact of coffee cooperative membership in Southwest Ethiopia. Engida, 2017 conducted study on analysis of coffee market chain in Gewata District of kaffa zone, Southwest Ethiopia.

Even if some related studies were carried out in different part of the country, there are no enough studies that are able to provide empirical evidence for improving the value chain system of coffee and cooperatives visible significance in parallel to conventional chain undertaken in the study area. Therefore, assessment of value chain is an essential prerequisite to find out the likely reasons that limit the overall performance of value chain and marketing of coffee and come up with specific workable solutions. It is for this very critical reason that the study is designed and conducted in Gimbo District of Kaffa Zone, SNNPRS.

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**1.3. Research Questions**

1. Who are the actors of coffee value chain in study area and what are the functions of each actor along the chain?
2. What are the factors that affect market supply of coffee by farmers in the area of study?
3. What difference exists in volume of coffee supply, price received and transaction costs incurred between farmers in the conventional and cooperative chain?

**1.4. Objectives of the Study**

**1.4.1. General Objective**

Generally, this study is conducted to analyze coffee value chain in case of Gimbo District, Kaffa Zone of South west Ethiopia

**1.4.2. Specific objectives**

To identify coffee value chain actors and their roles in the study area

To identify factors affecting market supply of coffee by the small scale producers of the area

To undertake comparative analysis between coffee farmers in the conventional and cooperative chain

**1.5. Significance of the Study**

The result of the study is expected to be helpful and can serve as input for planners and policy makers in designing intervention strategies for developing a novel value chain for coffee. It can also serve as an input for development actors in structuring demand based intervention programs to improve production and supply of coffee. More over the result of the study can serve as background information for a further and detailed study on coffee value chain at different levels especially at the region level. Farmers and other coffee value chain actors are also expected to be beneficiary from demand based intervention which will be made using the information from this study as input.

## 1.6. Scope and Limitations of the Study

This study focused on value chain analysis of coffee in Gimbo district. Area coverage, being only one District in terms of locations selected for the study was taken as one of the study limitation. On other hand, due to time and resource constraints, the study focused on specific location and information to characterize coffee value chain and also due to the problem of availability of time series data, the study used cross sectional information collected in the year. So, extrapolation of the results of the study for wider location and time horizon should be made with cautious.

## 1.7. Organization of the thesis

This thesis is organized into five chapters. The first chapter introduces the background of the study, statement of the problem, research questions and objectives, significance of the study and scope and limitation of the study. The second chapter covers relevant literature review. The third one deals with the research methodology. The findings of the study were presented and discussed in the fourth chapter. Finally, chapter five deals with summary, conclusion and recommendations from the findings.

# 2. LITERATURE REVIEW

This part of the document is generally concerned with the review of both theoretical and empirical literature related to the subject under consideration.

## 2.1. Theoretical review

### 2.1.1. Concepts related to value chain and value chain analysis

According to World Bank (2010), "The term *value chain* describes the full range of value adding activities required to bring a product or service through the different phases of production, including procurement of raw materials and other inputs"

According to UNIDO (2012) definition, a value chain refers to "actors connected along a chain producing, transforming, and bringing goods and services to end-consumers through a sequenced set of activities". Value chains are a strategic network among a number of independent business organizations, where network members engage in extensive collaboration.

According to (Evans, (2004) value chain includes product development, quality control, cost management, research and development, facilities management, customer service, order fulfillment, product commercialization and many others. ILO (2006) defined value chain as: a sequence of target oriented combinations of production factors that create a marketable product or service from its conception to the final consumption. This includes activities as design, production marketing distribution and support services up to the final consumer. The activities that comprise a value chain can be contained within a single firm or divided among different firms, as well as a single geographical location or spread over wider areas.

According to (Anandajayasekeram and Birhanu, (2009), the value chain concept entails the addition of value as the product progresses from input suppliers to producers and consumers. A value chain, therefore, incorporates productive transformation and value addition at each stage of the chain. At each stage in the value chain, the product changes hands through chain actors, transaction costs are incurred, and generally, some form of

value is added. According to their conclusion, value addition results from diverse activities including bulking, cleaning, grading, and packaging, transporting, storing and processing.

Porter (1986) went even further by linking up the value chains between firms to form what he called a value system. In this way, a value system integrates a firm's VC (value chain), a firm's suppliers value chains and firm's customers value chains. However, in the current context the linkage between multiple firms' value creating processes has more commonly become known as the value chain. As this name implies, the primary focus in value chains is on the benefits accruing to the participants especially companies: effective value chains generate profits.

According to FAO (2005) a' value chain 'in agriculture identifies the set of actors and activities that bring a basic agricultural product from production in the field to final consumption, where at each stage value added to the product. A value chain can be a vertical linking or a network between various independent business organizations and can involve processing, packaging, storage, transport and distribution.

Value chain is a specific type of supply chain where the actors actively seek to support each other so they can increase their efficiency and competitiveness. They invest time, effort and money, and build relationships with other actors to reach a common goal of satisfying consumer needs so they can increase their profits (KIT*et al*., 2006). Value chain is a market oriented approach that is used to explain why the poor may face barrier to trade and how to overcome these (Mitchell *et al,* 2009).

Thus, value chain consists of all value-generating activities, sequential or otherwise, required to produce, deliver and dispose of a commodity (UNECA, 2009). More specifically, it describes the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformations and the input of various producer services), to delivery to the final consumer and final disposal after use (Kaplinksy and Morris, 2007 as cited in UNECA, 2009). Particularly, in the context of food production, value chain

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activities include farm production, trade and support to get food commodities to the end consumers (EP, 2012).

Value chain is approach, where all points in the chain are directed towards markets and coordination of actors is the key to achieve systematic competitiveness. Thus, it's a framework to understand how the poor people in rural areas of developing countries can engage, or improve their terms of engagement with trade. It is a way of understanding how people and firms interact with markets. It recognizes that firms are critical determinants of trade.

In addition it recognizes that trade takes place in a more coordinated way than standard trade theory would suggest, often involving close coordination between parties in the chain which have no equity links with each other. As chain coordination allows driving 'agents to institute measures which reduce costs and risks while increasing the speed and reliability of supply, or which increase sales (Gibbon 2005 as cited in Mitchell, et al, 2009).The idea of the value chain is based on the process view of organizations, the idea of seeing a manufacturing (or service) organization as a system, made up of subsystems each with inputs, transformation processes and outputs.

Inputs, transformation processes, and outputs involve the acquisition and consumption of resources money, labor, materials, equipment, buildings, land, administration and management. How value chain activities are carried out determines costs and affects profits. Most organizations engage in hundreds, even thousands, of activities in the process of converting inputs to outputs. According to Porter (1985) these activities can be classified generally as either primary or support activities that all businesses must undertake in some form.
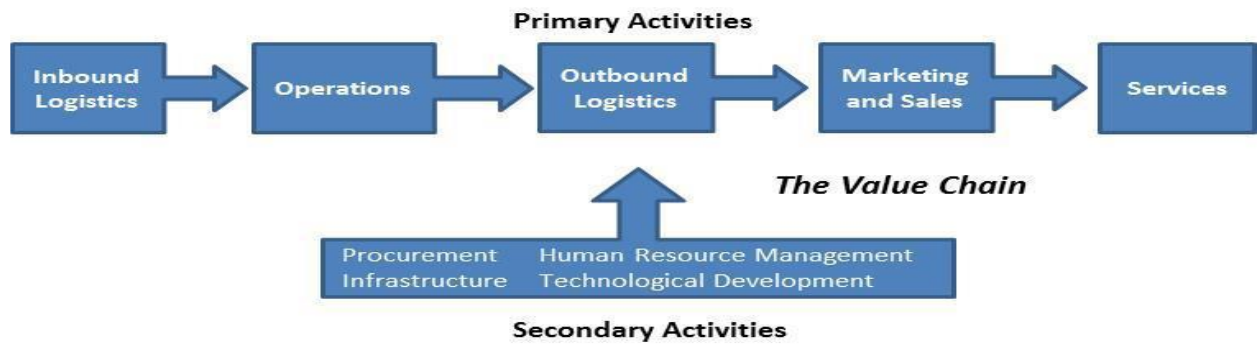
Fig2. General value chain activities

Source: Porter (1985

According to McCormick (2001), the concept of the global value chain recognizes that the design, production and marketing of many products now involve a chain of activities divided among enterprises located in different places. The value chain describes the activities required to bring a product from its conception to the final consumer. Figure below offers a stylized view of a typical chain. The chain includes all of a product's stages of development, from its design, to its sourced raw materials and intermediate inputs, its marketing, its distribution, and its support to the final consumer.



Design       Raw Materials       Production       Distribution
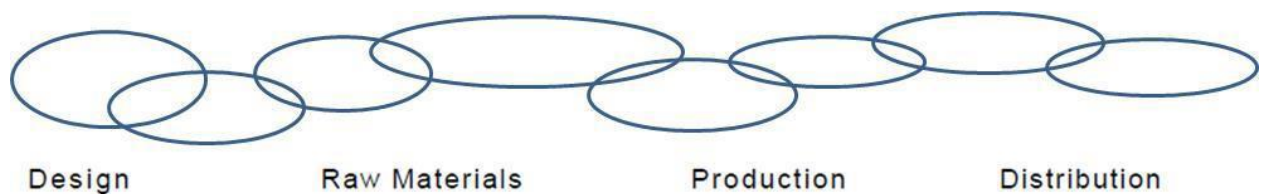
Fig3. Basic concept of global value chain

Source: McCormick (2001)

2.1.1.1. Dimension and level in value chain

According to (D and Schmitz 2001), the value chain concept has several dimensions. The first is its flow, also called its input-output structure. In this sense, a chain is a set of products and services linked together in a sequence of value-adding economic activities. A value chain has another, less visible structure. This is made up of the flow of knowledge and expertise necessary for the physical input-output structure to function. The flow of knowledge generally parallels the material flows, but its intensity may differ. The second dimension of a value chain has to do with its geographic spread. Some chains are truly

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global, with activities taking place in many countries on different continents. Others are more limited, involving only a few locations in different parts of the world. The third dimension of the value chain is the control that different actors can exert over the activities making up the chain. The actors in a chain directly control their own activities and are directly or indirectly controlled by other actors. Since value chains are basically constellations of human interaction, the possible varieties of governance are endless. According to GTZ 2007, value chain concepts, there are four levels; namely, micro, meso, macro and meta levels in which relevant survey topics for the analysis of a value chain are embedded.

At the Micro level, value chain operators perform basic functions in the value chain be it as input suppliers, primary producers, processors or distributors (wholesalers, retailers, transporters, exporters). At the meso level, one finds public and private service providers' like regional associations, rural banks, agricultural government institutions, local civil society organizations. At the Macro level such as national, policymakers, regulatory bodies, federations of associations provide enabling framework conditions for businesses that may be pro-poor. This may relate to legislation, standards, infrastructure etc. Finally, the Meta level describes Socio-cultural factors facilitating or hindering business linkages, business attitudes and trust among the value chain actors.

### 2.1.1.2. Value chain mapping and actors

A value chain map presents, in graphical form, all the major actors in a targeted value chain. It presents the different supply channels that transform raw materials into finished products and then distribute those products to final consumers; and the different markets or market segments to which products are sold. Draft value chain maps can be developed using information provided by key informants (individual's very knowledgeable about the value chain) and then later refined as more information is gathered. They are very useful for identifying value chain actors to interview (Frank and Henry, 2007).

Value chain actors are those who involved in supplying inputs, producing, processing, marketing, and consuming agricultural products (Getnet, 2009). They could be those who are directly involved in the value chain (rural and urban farmers, cooperatives, processors, traders, retailers, cafes and consumers) or indirect actors who provide financial or non-

financial support services, such as credit agencies, business service and government, researchers and extension agents (KIT*etal.,* 2006). Actors in a value chain may include input suppliers, producers, collectors(small and mobile traders who visit villages and rural markets), assembly traders(also called primary wholesalers who normally buy from farmers and itinerant collectors and sellto wholesalers),wholesalers (who deal with larger volumes than collectors and assemblers and often perform important storage functions), retailers (who distribute products to consumers) and processors (firms and individuals involved in the transformation of a product (Kapliniskyand Morris, 2001).

### 2.1.1.3. Value chain analysis and its purposes

Value chain analysis disaggregates the international structure of production, trade and consumption of commodities and allows for identification of actors and geographical division (Tuvhag, 2008). Value chain analysis also reveals the dynamic flow of economic, organizational and coercive activities involving actors within different sectors. It shows that power relations are crucial to understand how entry barriers are created, and how gain and risks are distributed.

It analyses competitiveness in a global perspective. By revealing strengths and weaknesses, value chain analysis helps participating actors to develop a shared vision of how the chain should perform and to identify collaborative relationships which will allow them to keep improving chain performance. The latter outcome is especially relevant in the case of new manufacturers – including poor producers and poor countries – that are seeking to enter global markets in ways that can ensure sustainable income growth (UNIDO, 2009). A value chain analysis is important to assess the existing vertical and horizontal linkages within the sub-sector as well as functions and roles of actors from input supply to the final consumers. It also gives a clear picture of the actors, activities and existing relationships across the board (SNV, 2010).

Value chain can be analyzed through mapping value chain which describes the full set of activities required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation, and the input of various producer services), and delivery to final consumers (Kaplinsky and Morris,

2001).With its emphasis on the coordination of the various stages of a value chain, value chain analysis attempts to unravel the organization and performance of a commodity system. The issues of coordination are especially important in agricultural value chains, where coordination is affected by several factors that may influence product characteristics, especially quality (Anandajayasekeram and Berhanu, 2010).

Value chain analysis is conducted for a variety of purposes; the primary purpose of value chain analysis is to understand the reasons for inefficiencies in the chain and identify potential leverage points for improving the performance of the chain, using both qualitative and quantitative data. In general, agricultural value chain analysis can be used to understand how an agricultural value chain is organized (structure), operates (conduct) and performs (performance) (Anandajayasekeram and Berhanu, 2010).

Value chain analysis facilitates an improved understanding of competitive challenges, helps in the identification of relationships and coordination mechanisms, and assists in understanding how chain actors deal with powers and who governs or influences the chain. Developing the value chain is often about improving access to markets and ensuring more efficient product flow while ensuring that all actors in that chain benefit.

2.1.1.4. Framework for value chain analysis

Basically, there are two different frameworks for value chain analysis. They are theoretical framework and methodological frameworks both of which are discussed below in detail.

**Theoretical framework**

Value chain approach is used by many organizations across the globe. Following the pioneering contributions of (Porter, 1985) that focused on how individual firms can create value and build up their competitive advantage and Gereffi (1994) who focused primarily on the economic governance patterns in "global" value chains, different institutions and individuals applied value chain approach. A value chain approach presents a number of features which can serve to expand financial services into underserved rural areas (Charitonenko*et al*., 2005), and an analysis of the entire value chain needs to be conducted in order to better understand the extent to which financing is a constraint, where in the

chain it may be a constraint, and whether there are other pre-disposing conditions impeding the access and best use of capital (Jansen, 2007).

The main aim of a value chain approach is to produce value added products or services for a market; by transforming resources and by the use of infrastructures within the opportunities and constraints of its institutional environment. However, developing countries face many challenges that hinder from achieving value chain development. The constraints are related to market access (local, regional, international), market orientation (Grunert*et al.,* 2006), available resource, physical infrastructures and institutions (Scott, 1995). Therefore, to be able to participate in high value adding value chains, various parties in the chain up to the primary producer should have knowledge of and be willing to comply to demands in the value chain's end-market (Grunert*et al.*, 2006). Therefore, a key condition for producers to be included in successful value chains is that they have access to market information and possess the ability to translate it to market intelligence.

Actors' networking value chain theory suggests that the value chain map should be simple, easy and clear. But the real world can be much more complex than mapped because of the involvement of different actors and channels. In order to simply understand the ground situation, the map should simply describe the flow of inputs, product and information among the actors. The analysis also should to recommend on how to strength the relationship among the actors (Kaplinksy and Moris, 2001). The value chain map of maize also has many channels and different integrations among the actors either vertical or horizontal.

**Methodological framework**

It involves an assessment of the relationships between the different stakeholders which, coupled with the effective flow of information, enables the economic and environmental optimization of material flows, allocating time, people and technology appropriately and with minimal impacts on the environment. According to Webber (2010), the value chain analysis methodology focuses on three key issues: The dynamics of information in the value chain from final consumption through to primary production and input suppliers, the creation and flow of value at each stage in the eyes of the final consumer, and the nature of relationships among the actors. Value chain

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analysis model integrates analysis of commodity supply chain and associated enabling environment with entry point of product and process flow, information and money flow, and the enabling environment.

According to Bernet *et al*., (2006) the value chain approaches apply six tools and steps. The analysis starts with prioritizing a commodity for value chain development and then mapping of the value chain; analysis of the value chain performance in terms of costs, prices and margins; analysis of technology, knowledge and upgrading possibilities through assessment of gaps in technology and knowledge and existing or future opportunities; value chain governance which is used to identify stakeholders influencing governance, rules and regulations and their enforcement and finally linkages and relationships among the stakeholder is analyzed.

Value chain can be analyzed through mapping value chain which describes the full set of activities required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation, and the input of various producer services), and delivery to final consumers (Kaplinsky and Morris, 2001).

Value chain mapping helps to illustrate and understand the process by which a product goes through several stages until it reaches the final customer (i.e. the core transactions). Understanding about the different levels in a value chain is also a precondition for identifying bottlenecks that are preventing the achievement of certain targets. Value chain maps can explore market opportunities and it also shows up different market channels through which products and services reach the final customer. These maps can also provide additional information on the relevance of individual market channels and the nature of relationships existing between actors.

However value chain analyses have provided a number of important insights, it has a number of limitation. Webber (2009), observed as value chain analysis too often focuses simply on improvements within the given value chain, rather than on how value chains can be shifted to target different, more attractive markets and business strategies and also it lacks the ability to analyze specific, chain-level upgrading strategies and

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assessment of their impacts. More specifically, objective assessment and ranking of impacts of upgrading strategies and optimal entry points for intervention are lacking.

According to Raikes *et al.* (2000), value chain analysis lacks quantitative analysis or methods embedded in the approach. It mainly focuses in the analysis of profitability and margins within the chain whose measurement of profits within the chain is problematic and confined to abstraction rather than quantification. Lalonde and Pohlen (1996) observed that available performance measures do not cross boundaries between functions in the chain, and are not focused on individual products or relationships. Qualitative approaches recognize that value chain and their relationships are dynamic.

Value chains are not fixed in terms of composition, relationships, or market positioning, and that there is a competitive need to alter and improve the value chain in light of strategic choices that businesses can make regarding the markets in which they compete. While a value chain's purpose is to link production to the target market advantageously, it is the private sector that decides which markets and where to compete and alters the value chain accordingly. So it is better to consider its variability.

But, less attention has been paid to the potential unintended consequences of interventions or changes to one part of the value chain over time (Lee *et al.*, 1987). Therefore, considering its dynamics is very important for policy intervention. Still another important drawback is that value chain analysis is resource (finance and time) demanding to generate baseline information to identify and prioritize chain constraints and come up with upgrading strategies. This is because it deploys both participatory and analytical tools to concretize policy based interventions.

2.1.1.5. The relevance of value chains for the poor

In many parts of the world, agriculture continues to play a central role in economic development and to be a key contributor to poverty reduction. However, agriculture alone will not be sufficient to address the poverty and inequality that are so pervasive in today's world. It is becoming increasingly crucial for policy makers to focus immediate attention on agro-industries. Such industries, established along efficient value chains, can increase

significantly the rate and scope of industrial growth. Agro-industrial products offer much better prospects of growth than primary commodities. In addition, the marked trend to break down production processes into specific tasks opens up new opportunities for developing countries to specialize and take a more profitable part in global trade provided they meet increasingly stringent market requirements (UNIDO, 2009). In developing countries, a significant proportion of national funds are used to support agricultural production inputs – primarily seeds, fertilizers and irrigation systems.

Traditionally, little attention has been paid to the value chains by which agricultural products reach final consumers and to the intrinsic potential of such chains to generate value added and employment opportunities. However, participation in value chains implies both opportunities and pitfalls for developing countries. The prospect that lead firms such as brand owners, innovators and system integrators may appropriate increasing shares of rent and therefore further widen the gap is very real (Altenburg, 2006). Furthermore, value chains may increase the risk of marginalization faced by areas with poor infrastructure and small farms since chain development may favor larger farms and processing plants which can invest in infrastructure and increase their production capacity.

### 2.1.2. Basic concepts related to cooperatives

2.1.2.1. Definition of cooperative

The definitions for cooperatives are numerous and varied. The International Cooperatives Alliance (ICA) defines a cooperative as "An autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democratically-controlled enterprise". This suggests that cooperatives are, first and foremost, voluntary business associations formed by people of limited means through contribution of share capital that forms the basis of sharing out the profits that accrue from the business. In addition, the income generated from the enterprise can as well be used to meet other social and cultural needs and aspirations as determined by the members (Wanyama et al, 2008).Agricultural cooperatives are user owned and user controlled business from which benefits are derived and distributed equitably on the basis of use and the members are mostly agricultural societies. There are about 15,568 agricultural cooperatives in Ethiopia during 2015(FCA, 2015).

Agricultural co-operatives play an important role in the provision of agricultural inputs (fertilizers, improved seeds and pesticides) to smallholders, distributing 95 per cent of all fertilizers used (FCA, 2015). But their involvement in output marketing is still low. Experts emphasized that most co-operatives are also engaged in output aggregation, value addition and other agribusiness activities. Despite impressive growth figures, the development of co-operatives is not without challenges. Common problems for co-operatives in developing countries are low member participation, weak leadership, dependence on supporting organizations and a lack of working capital (Borda-Rodriquez *et al*., 2016).

2.1.2.3. Cooperatives versus conventional chain

Agricultural cooperatives are nowadays playing significant role in enhancement of development by smallholder farmers. Therefore government is also giving great focus on expansion of cooperatives to realize the reestablished developmental goal of the country. In parallel to cooperatives, there are also other conventional chain through which majority of agricultural products are being transacted. So comparing of cooperatives with conventional chain in terms of price, cost of transaction, volume of supply and other criteria gives clear distinction to deal about benefits of cooperatives. One of the key elements of agricultural transformation towards more commercial agriculture is that the market mechanism becomes more important for many aspects of the farming business; not just for selling farm products but also for obtaining proper inputs, credit, equipment and temporary labor, markets become the dominant coordination mechanism.

As the cost of using the market mechanism is relatively high for smallholders collective action may be a beneficial strategy for realizing economies of scale and scope (Dorward*et al*., 2010). Providing inputs like fertilizers, feed, agrochemicals and seeds has traditionally been one of the main economic functions of agricultural co-operatives. They facilitate input access for farmers through bulk purchase, which lowers prices, or affiliation with larger group members (Kaganzi *et al*., 2009). Given that physical availability of inputs is often an important constraint to access, with thin and unreliable rural distribution networks in most African countries. Kindness *et al*., (2001) claim that co-operatives act as a vehicle

for input distribution. Dorward, (2010) emphasize the effectiveness of co-operatives in coordinating the provision of various services to smallholders. In addition to supplying inputs, co-operatives often provide technical assistance about the use of those inputs and also provide credit by supplying inputs on loan to be paid back when the harvest has been sold.

Many studies on African agri-food markets have shown that high transaction costs are a serious constraint on smallholders' market participation (Gebre-Madhin, 2001). These transaction costs result from small size of the farm, lack of market information, weak bargaining position and perish ability of many agricultural products (Royer, 2006). Collective action in the form of a co-operative allows smallholders to pool resources to overcome the risks related to asset specificity, to realize economies of scale and to gain countervailing power in sales transactions (Staatz, 1987).This problem of transaction costs in selling farm products is even more serious in modern (or high value) supply chains. When the quality requirements go up and additional investments in quality improving assets and activities are needed, farmers' vulnerability to market risks increases. In other words, farmers become more dependent on particular buyers and particular markets for earning back their investments.

For many farmers, this development towards more strictly coordinated value chains is an incentive to set up collective action organizations. Narrod *et al.* (2009) found that co-operatives in India were able to increase smallholder access to higher value markets by reducing transaction costs. Other studies have also shown that co-operatives are successful in improving countervailing power and linking smallholders to modern value chains (Heerink, 2012).Most recently co-operative development in Ethiopia is geared towards fostering broad-based development in a sustainable manner to achieve the Millennium Development Goals (MoFED, 2010). The GTP foresees a central role for agricultural co-operatives in increasing the productivity and household incomes of smallholder farmers (ATA, 2012). Through vitalizing input and output markets, agricultural co-operatives are important for the implementation of the Agricultural Growth Program.The state has formulated several strategies to increase commercialization of smallholders (Gebremedhin & Jaleta, 2010). For instance, in 2008, the Ethiopian Commodity Exchange (ECX) was established as a formal institution to improve coordination in agrifood markets and to

enhance smallholders' market integration (Alemu*et al.*, 2010). Experts explained that the ECX became mandatory for the commercialization of coffee and other major industrial crops since 2010. They further explained that co-operative unions, particularly in coffee and sesame, should be major actors in connecting smallholders to remunerative regional and global markets.

One example of the enhanced involvement of co-operatives in marketing farm products can be found in the malt barley value chain (Slingerland*et al*,.2016). Because of increasing beer consumption, there is a large demand for domestically produced malt barley (Rashid *et al*., 2015). Breweries and malting factories are sourcing malt barley through developing value chain agreements with primary co-operatives and unions. In addition, Woreda officials and NGOs are involved in the agreement to provide technical assistance, credit and other services. Through such a public–private partnership, the coordination problems present in value chain upgrading can be solved as each partner provides a part of the complementary services.

The increasing importance of co-operatives in output markets also has implications for internal governance and leadership. When co-operatives engage in value chain coordination agreements with (large) buyers of food and cash crops, a higher level of member commitment is needed as well as better bargaining skills of the co-operative managers (Schuurman, 2016). Co-operatives face a number of internal and external conditions that make their transformation to more market-oriented business challenging. External factors are particularly related to a lack of working capital, which leads to delayed payment and reduced member commitment, and a high state interference in the strategic decisions. Internal challenges relate to poor managerial capabilities and a lack of accountability and transparency (Hannan, 2014). Transaction cost theory predicts that agricultural co-operatives can play an important role in reducing the transaction costs for smallholder producers.

Our review of the empirical studies on the impact of co-operatives provides positive evidence of this transaction cost-reducing function in input markets. On reducing transaction costs in the output market, there the evidence is less clear. One explanation could be is that co-operatives only recently started to step up their marketing activities.

Another explanation could be is that the coordination between primary co-operatives at village level and co-operative union at district level is not always efficient. While the unions are the main commercial organizations with their links to domestic and foreign buyers, the primary co-operatives have the relationships with the farmers. In theory, this is an effective division of labor, but in practice, it encounters organizational challenges.

### 2.1.3. Market supply of agricultural commodities

The market supply refers to the amount actually taken to the markets irrespective of the needs for home consumption and other requirements. Whereas, the marketed surplus isthe residual with the producer after meeting the requirement of seed, payment in kind, and consumption by farmer (Thakur *et al.*, 1997).

Marketable Surplus is a theoretical ex ante concept which represents the surplus which the farmer producer has available with himself for disposal once the genuine requirements of the farmers family consumption, payment of wages in kind, feed, seed and wastage have been met. Marketed Surplus as compared to Marketable Surplus is a practical ex-post concept and refers to that part of the marketable surplus which is marketed by the producer i.e., not only the part which is available for disposal but that part which is made available to the market or to the disposal of the non-farm rural and urban population.

The farmer, in case of commercial agriculture is motivated by profit considerations, so he takes his whole produce to the market and purchases his requirement from the market, but in the case of subsistence agriculture the concept of marketed and marketable surplus becomes relevant as the farmer generally produces for his own subsistence and it is only the remainder left after meeting his own requirements, that is taken to the market for sale. The concept of "Marketable Surplus" is subjective because the feature of retention of the farmer is a matter of subjective guess. The concept of "Marketed Surplus", on the other hand, is objective, because it refers specifically to the marketed amount i.e., to the actual quantity which enters the market.

In most cases the marketed part may be more than the theoretically marketable part because out of the marketable part the farmer may be willing to sell only a part. He may hoard part of it in anticipation of rising price of the grain or for some other reasons. In

certain cases, marketed surplus may be greater than the marketable surplus. This happens when the farmers are driven to distress sales. There may be in the case of a subsistence farmer who has produced just to meet his family consumption requirements. But he may take some portion of his produce to the market to meet his immediate cash obligations. In such cases, the marketed surplus released by the farmer will not be the real one also the portion marketed will be greater than what he considers marketable because of distress sales. (Sadhu and Singh, 2002)

## 2.2. Empirical literature review

### 2.2.1. Empirical evidence on comparison of cooperative farmers with noncooperative

Smallholders in developing countries could benefit from increased market participation and commercialization. Smallholders' access to urban and export markets would offer them higher output prices. Thus, increased market access could push sustainable increase in production and enhance food security. However, smallholders cannot access those markets individually and need collective action to improve their bargaining position and reduce transaction costs. In other words, agricultural co-operatives can be instrumental in mitigating market imperfections. So far the theory, but empirical evidences are also available on the impact of co-operatives on smallholders' commercialization in Ethiopia.

Based on a case study on the coffee farmers' cooperatives, Myers (2004) concluded that cooperatives helped to successfully position Ethiopian smallholder farmers in the international coffee market. Bernard *et al*., 2013analyzed the impact of coffee co-operative membership on access to output markets. The results indicated that co-operative members on average received 7.2–8.9 per cent higher prices for their agricultural products than non-members. They also reported that membership and commercialization depend on a number of demographic and socio-economic factors. For instance, large farms have a better position for membership and commercialization than small farms. Bernard *et al*. (2013) showed that the commercialization service of agricultural co-operatives is still low and depends on the type of commodity, the specialization of the co-operative, the group homogeneity, member commitment and the decision-making process.

Francesconi and Heerink (2010) investigated the impact of membership by focusing on the organizational characteristics of co-operatives. As empirical setting, they used two types of organizational forms of co-operatives: market-oriented and livelihood-oriented. The main difference between these two relates to their key function; marketing co-operatives allow members to sell their produce collectively and are linking farmers to output markets, whereas livelihood co-operatives are active mainly in input provision and members are free to sell their product wherever they want.

The authors found that co-operative membership increases the commercialization rate particularly for members of marketing co-operatives. But, membership in the livelihood co-operatives had a negative or no significant impact on commercialization. These findings were supported by (Jena et al.; 2012) who studied the impact of coffee co-operatives on members' livelihood. They reported that fair trade does not have a significant impact on coffee producers in Ethiopia unlike in other countries where it provides guaranteed markets and improved remuneration (Wollni & Zeller, (2007).)

Jena *et al*. (2012) also highlight that the fair trade strategy in their study area has low impact mainly because of the poor governance of co-operatives and the lack of awareness among members. The authors suggest that a fair trade strategy could contribute to strengthening smallholder commercialization if the institutional environment and co-operative organizational structure are improved

Coffee co-operatives in Ethiopia are considered as fast growing agribusiness co-operatives and have become more market-oriented (Ruben & Heras, 2012; Meskela & Teshome, 2014). The latter studies also indicated that coffee co-operatives have provided higher profits to members and that they are economically viable. However, Bernard et al., (2013) suggest that even though the number of marketing co-operatives is growing in Ethiopia, the majority of co-operatives continue to be livelihood co-operatives, providing inputs and engaging in social services.Because commercialization is not the key function of livelihood co-operatives, membership has no clear advantage for improved output market access (Bernard & Spielman, 2009).To sum up, smallholder integration into the emerging agri-food value chains has been claimed to be important to reduce poverty and increase welfare.

## 2.2.2. Empirical review on factors affecting market supply of coffee

Majority of studies were conducted on factors affecting market supply of coffee in different parts of Ethiopia by using multiple linear regression models. Some of such studies are presented below together with their respective area and time of conduct.

Wendmagegn (2014) identified that the major factors that affect market supply of coffee by using multiple linear regression analysis in Dale District of SNNPRS. The result of OLS regression model analysis pointed out that eight variables namely sex of the household head, education level of household head, quantity of coffee produced, access to extension service, price of coffee, distance to the nearest market, household non-farm income and access to market information were found to be significantly and positively affecting the market supply of coffee at household level. However, distance to the nearest market and household non-farm income affect market supply of coffee negatively in the area of study.

Bizualem *et al*. (2015) used multiple linear regressions to analyze marketed surplus of coffee by smallholder farmers in Jimma zone, Ethiopia. The result of OLS regression showed that: sex of household head, coffee farming experience, access to credit, adequacy of extension services, attractiveness of coffee price, cooperative membership and non/off farm income are factors significantly and positively affecting marketed surplus of coffee in the area specified.

Jemal (2013) conducted a study on coffee value chain analysis in Meta district, East Hararghe zone of Oromia, Ethiopia. Using multiple linear regressions, he identified that years of farming experience, extension contact, market information and land holding positively affect market supply of coffee in the district.

Zekarias *et al*. (2012) conducted a study on determinants of forest coffee market supply in South Western Ethiopia. Result of multiple linear regression models pointed out that price, educational level of household, transportation cost and level of production have significant impact on the market supply of the coffee in the study area.

Elias(2005)conducted study on determinants of marketed supply of sun dried coffee and identified that cost of farm labor, price of sun dried coffee and red cherry, distance to nearest market of coffee plantations, average age of plantations and availability of extension service are factors affecting market supply of sub dried coffee in the area of study.

Mohammed (2013) identified the major factors affecting market supply of coffee in Nensebo district of Oromiya region using 2SLS regression econometric model. The results of his econometric analysis shows that output, access to market information, family size and distance to market as the main factors affecting coffee supply to the market. Family size and market distance affects the quantity supply negatively.

# 3. RESEARCH METHODOLOGY

This chapter presents the research methods employed in the study including location and description of study area, sampling procedure and sample size determination, type and sources of data and methods of data collection and analysis.

## 3.1. Description of the study area

This study was conducted in Gimbo District, Kaffa Zone of SNNPRS. Gimbo District is one of the 10 Districts of the Kaffa Zone of SNNPRS located at 496km from Addis Ababa and 18 km west of Bonga. Gimbo is bordered on the Southwest by Shebe Woreda on the North by Decha Woreda, on the Northwest by the Addiyo Woreda and on the Southeast by Gawata Woreda. There are 31 rural kebeles and four urban kebeles which are developing towns namely Ufa, Diri, *Gojeb and Wushwush.*  According to the information from Woreda agriculture and rural development office adopted from CSA, total population of the District was 117,588 of whom 58,559 were men and 50059 were women in year 2017. Of the total population of the District, about 13,438 were urban dwellers. The population composition is about 85% kaffa and the rest includes Amhara, Oromo, and other people of south (GDOARD, 2018).

Agriculture is the main source of income for majority of rural population in the area. Except for few hills, the District has agriculturally suitable land in terms of topography. Coffee is major cash crop in the area. Nowadays, it is assumed that more than 40% farmers are engaged in coffee cultivation. In general the district produce from1300 to1600 tons of coffee annually out of which from 1400 to 1500 tons dry coffee has been sent to the central market every year, while the remaining ones are consumed locally (GDOAM, 2018). According to the District Agriculture Office, among the total area of the District, it is estimated that about 21,508 hectare is covered by plantation coffee in 2017 production year. The mean annual temperature is 25°C. The mean annual rain fall for the area ranges from about 900 to around 1150mm (GDOARD, 2018).

The district is relatively with limited access to different agricultural production and marketing infrastructures like road, electricity and water. Therefore out of thirty one rural kebeles of the District, only twelve of them have perfect road access. The district in general has about 11 multipurpose coffee cooperatives and about five coffee processing machines which are owned both privately and in cooperative (GDOARD, 2018).
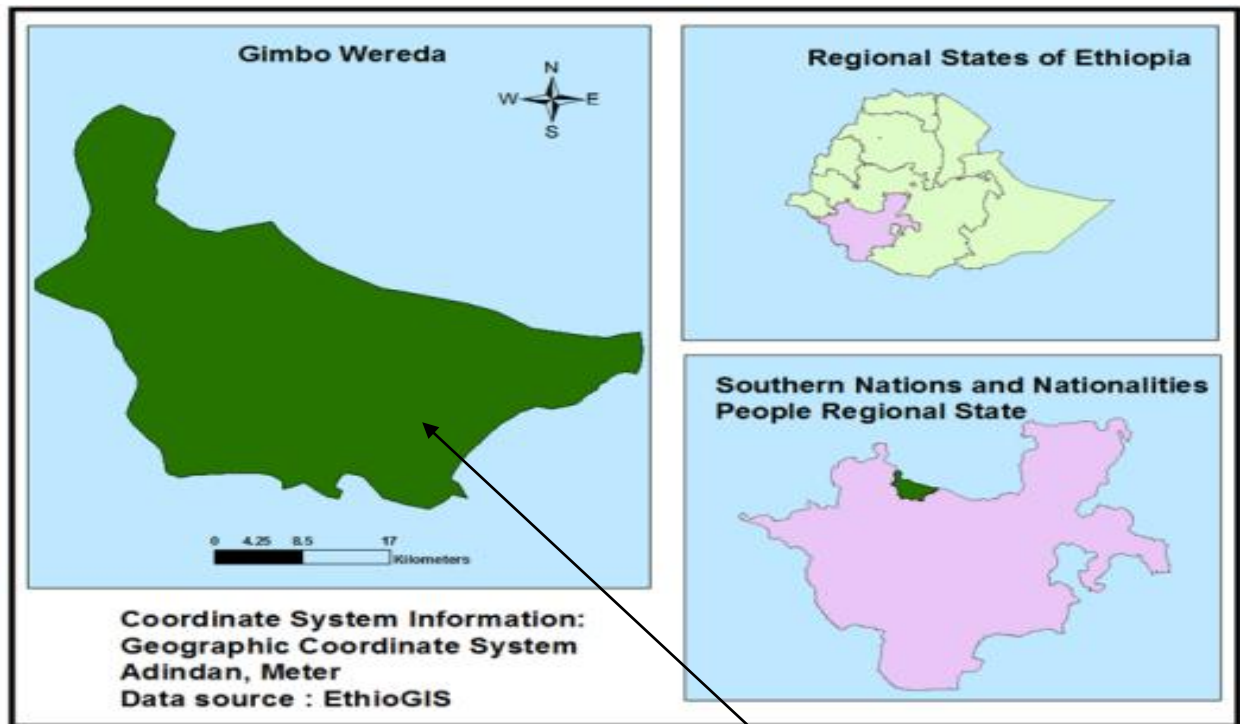


Fig4. Administrative map of the study are

Source: Adapted from Yakob et al., (2015)

*Area of study*

## 3.2. Data type, sources and methods of collection

### 3.2.1. Data types and sources

Qualitative, quantitative as well as cross sectional data were used for this study. All of the mentioned data were collected from primary and secondary sources. Primary sources of data include small scale coffee producers' traders and consumers at different levels. Data obtained from primary source includes all socio-economic and demographic information of respondents, factors affecting coffee market supply; specifically distance from nearest market, cooperative membership, credit access, access to transport, size of land allotted for coffee, extension service and all relevant information to address coffee value chain analysis. Moreover, data from traders includes buying and selling strategies, capital

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requirement and capital ownership source of market information as well as demographic characteristics. Secondary data sources were documents review from Gimbo District office of Agriculture and rural development (GDOARD), office of trade and industry (GDOTI), the District cooperative and marketing office (GDCMO), office of environmental protection (GDOEP), Ethiopian Commodity Exchange (ECX), Kaffa forest coffee cooperatives union (KFCCU) and Kaffa Zone agricultural development office (KZADO). In addition, websites were also used as other secondary sources of information to generate relevant data about coffee value chain.

### 3.2.2. Methods of data collection

Questionnaires, personal interview, personal observation and focus group discussion were the tools applied to collect the data. Questionnaires were designed for producers, traders and consumers. The questionnaire was designed as semi structured questionnaire. Before the data collection, the questionnaire was pre-tested on ten farmers to evaluate the appropriateness of the design, clarity and interpretation of the questions, relevance of the questions and to estimate time required for an interview. Subsequently, appropriate modifications and corrections were made on the questionnaire. The questionnaire covered different topics in order to capture relevant information related to the objectives of the study. Focus group discussion incorporated 14 participants of which 4 representatives from model coffee farmers, 4 Agricultural site professionals(DAs), 4 more experienced large scale producers (private investors) and 2 representatives from the District agricultural marketing and cooperatives promotion offices.

### 3.3. Sampling procedures and sample size determination

Three-stage stratifying sampling technique was used to draw an appropriate sample for this study. In the first stage, out of 10 Woredas of Kaffa zone, Gimbo Woreda/District was purposively selected on basis of its coffee production capacity and concentration of coffee cooperatives. After selection of the District, out of 31 coffee producing kebeles of the District, four rural *kebeles were* purposively selected based on their coffee production potential.

Following this, the households of selected kebeles were stratified on the basis of their membership status and a total of 181 household heads (79 members and 102 nonmembers) were randomly and proportionally selected from identified rural kebeles with the help of experts from bureau of agriculture and rural development. Sample size was determined following a simplified formula provided by Yamane (1967). Accordingly, the required sample size was identified at 95% confidence level and level of precision equal to 7 % to represent the population.

$$\mathbf{n = \frac{N}{1 + N(e2)} = 181}$$

Where:    n = sample size for the research use, N = total number of households in the selected producing Kebeles, e= margin of errors at 7%. Detail information about producers sample distribution is indicated in the (appendix table 1).

**Table1.** Sample distribution of coffee producers in the selected kebeles

| Sample kebeles | Total producers | Sample households |
| --- | --- | --- |
| KUTI | 416 | 47 |
| TULA | 400 | 45 |
| BEYEMO | 524 | 59 |
| MICHITI | 264 | 30 |
| **Total** | 1604 | 181 |

Sources; GDOARD (2018)

In addition to producers, sample from coffee traders (collectors, retailers and suppliers), consumers and local processors were also used as part of this study. Since there is large number of local coffee consumers in the study area, 20 samples are randomly taken from civil servants and other consumers in the town who have no any coffee plantation at all but consuming coffee by purchasing from producers and retailers or collectors.

According to the information obtained from the District office of trade and industry as well as agricultural marketing, the following representative sample were taken for each group of actors other than producers and local consumers.

**Table2.** Sample distribution of selected coffee value chain actors

| Traders | Total number per district | Sampled | Percent |
|---|---|---|---|
| Collectors(Sebsabi) | 7 | 7 | 100 |
| Suppliers(Akrabi) | 25 | 25 | 100 |
| Retailers | 15 | 15 | 100 |
| Local processors | | | |
| CPTCHs | 35 | 20 | 57 |
| C.Coop | 11 | 4 | 36 |
| LSPIs | 10 | 4 | 40 |

where: CPTCHs = Clay poet tea and coffee houses, Coop = Coffee cooperatives, LSPIs = Large scale private investors

Source; GDAMO (2017)

## 3.4. Methods of Data Analysis

In this study, descriptive statistical analysis, value chain analysis and econometric tools were used to analyze the empirical data collected. Descriptive statistics such as mean, standard deviation, range, frequency, and percentage were applied to describe the characteristics of the respondents. In the econometric part, multiple linear regression and propensity score matching were used.

### 1.4.1. Descriptive statistical analysis

This method of data analysis refers to the use of ratios, percentages, means, variances and standard deviations using which socio economic and demographic characteristics of sample producers and traders are described. Also t-test and chi-square test were used to test whether there are significant mean and percentage difference between two groups' of households in terms of their socioeconomic characteristics.

### 1.4.2. Value chain analysis

There are a number of published hand books on value chain research; Kaplinsky and Morris (2001) stress that there is no"definite"method to carry out a value chain analysis. Basically, the methodology to be applied relies on the research questions that are to be answered. This fact is due to the complexity of value chains. Nonetheless, the four steps (Mapping the value chain to understand the characteristics of the chain actors and the relationships among them, identifying the distribution of actors' benefits in the chain,

defining upgrading needs within the chain and emphasizing the governance role) of value chain analysis, summarized by M4P (2008) are essential when applied to the agricultural/agro-industrial sector. In case of this study the same approach was applied to address value chain analysis.

### 3.4.3. Econometric model specification

Econometric models applied in this study are multiple linear regression models and propensity score matching whose detailed description and specification is separately written as follow.

3.4.3.1. Multiple linear regressions (MLR)

For studying factors affecting coffee market supply in the study area, multiple linear regression models is used since all sample coffee producers (small scale farmers) participated in coffee marketing during 2017/18 production year. Multiple linear regressions (MLR) are a statistical technique that uses several explanatory variables to predict the outcome of a response variable. Its goal is to model the relationship between the explanatory and response variables.

In case of this study, market supply of coffee and other factors affecting these supply are those respective dependent and explanatory variables under consideration. It is based on the least squares concept and the model is fit such that the sum of squares of differences of observed and predicted values are minimized. It is the most widely used method and different scholars have used to know the effect of different factors on market supply of agricultural product.

**Model equation:** The model expresses the value of a dependent variable (market supply of coffee) as a linear function of more than one independent variables and an error term: which is specified as; $Y_i = \beta_i X_i + U_i$, where, $Y_i$ = quantity of coffee supplied, $\beta$ = a vector of estimated coefficient of the explanatory variables, X = a vector of explanatory variables, $U_i$ = disturbance term.

Hypothesized explanatory variables represented by "X" are described as follows. $X_1$ = Access to market information, $X_2$= Education level of household, $X_4$ = Size of land holding, $X_5$ = Sex of the household head, $X_6$ = Household size, $X_7$ = Amount of credit received, $X_8$=Quantity of coffee produced, $X_9$=Membership to coffee cooperative, X10 =Frequency of extension contact.

## 3.4.3.2. Propensity score matching method

Propensity score matching were employed to find quality match covariate among households who are members of coffee cooperatives and non-members for purpose of comparing them in terms of selected performance indicators. Becker and Ichino (2002) argue that deploying propensity score matching reduce the high dimensionality challenge of observable characteristics in impact evaluation to specific direction since it reduce dimension of covariate and can balance observables between treated and untreated. Beyond reducing the dimensionality of observables characteristics of treated and untreated groups, it also reduces bias. Dehejia, R.H. and Wahba, S., (2002) work using PSM is an evidence for this suggestion.

Similarly, Rubin (1983) defined propensity score as conditional probability of treatment given pretreatment characteristics suggest that PSM as a method to reduce bias in the estimation of treatment effects with observational data set. Therefore, based on the idea that the bias is reduced when the comparison is performed using treatment and control who are as similar as possible. This study applied the propensity-score matching method to match each treatment client with control clients who had the same probability of joining cooperative. A group of control client was selected in this way which can then serve as an accurate control group to correct for selection bias.

A particular challenge in comparing the performance of small scale producers working in conventional and cooperatives chain is the need for a counterfactual; a control group of farmers who are not members of a cooperative due to the existence of self-selection among members which may lead to pseudo conclusion (Heckman *et al*., 1997). Therefore this study focused on propensity score matching. It is a technique which has been applied also by Bernard*et al*., (2008a) for evaluating the impact of cooperative membership

among Ethiopian farmers. In this technique, the farmers in both treated and control samples are matched based on their observable characteristics. The impact is compared by using the difference in performance between pairs of treated and control farmers. This enforces to control for non-random selection of cooperative members (Caliendo and Kopeinig, 2008; Imbens, 2004). Members are matched with non-members in order to search for differences in performance or the average treatment effect on the treated (ATT) in terms of identified performance indicators.

As a first step the probability of being member of the cooperative was estimated as a function of observable pre-treatment covariates, using a logit model that included different sets of confounding variables that may explain the non-random distribution of cooperative membership among the population.

The second step is estimation of propensity score. Therefore the predicted values of the logit model generate propensity scores for all treatment and control units. Mathematically, this is written as;

PS = Prob (Z=1(X)

Where PS is the propensity score obtained through a logit regression of observable covariates on cooperative membership, Z is the probability of sample farmers being members of cooperatives and the variables considered in vector X (age, sex, year of schooling, active family labor, land allotted for coffee, off-farm income, credit used for coffee production, coffee farming experience and distance from cooperative coffee collection point).

The third step of comparison was matching the producers from both conventional chain (nonmembers) and cooperative chain (members) based on their propensity score using matching algorism. This is because in simple comparison, there are a number of biases that one can face. The fact that samples drawn from the same areas might constitute a source of potential bias, arising from possible spillover effects. Non-members may obtain indirect benefits from cooperatives' activities in the region. In addition, members and non-members differ in several observable characteristics (such as age, education, family size and land size), which may influence the probability of cooperative membership.

Furthermore, cooperative members and non-members may differ along unobservable variables, which might have a direct influence on performance (the selected impact

indicators). Therefore, a simple comparison of these two groups may result in serious of biases and misleading conclusions.

**Choice of Algorithm**

After the estimation of propensity score, in PSM is choosing among different matching estimators. In theory, several matching estimators of PSM are available. However, only the most commonly applied estimators are compared to select one that best fit for own data.

**Nearest neighbor matching (NNM): -**Is the most straightforward matching estimator. This match treated household with untreated household individual which is closest in terms of covariate (Caliendo and Kopeinig, 2008).

**Caliper matching (CM): -** Caliper matching means that an individual from the comparison group is chosen as a matching partner for a treated individual that lies within a given caliper (propensity score range) and is closest in terms of propensity score (Caliendo and Kopeinig, 2005). If the dimension of the neighborhood is set to be very small, it is possible that some treated units are not matched because the neighborhood does not contain a control unit. On the other hand, the smaller the size of the neighborhood the better is the quality of the matches (Becker and Ichino, 2002).

**Kernel matching (KM): -** Is used to match treated group with untreated by using weighted average covariates of all individuals in untreated group in order to construct counterfactual (Caliendo and Kopeinig, 2005). This method uses more information and hence advantageous in lowering variance rather than others.

Among the existing different methods, this study employed two algorithms: (1) nearest neighbor (NN) matching 'with replacement' and (2) kernel matching. In the NN matching, the individual from the control or comparison group is chosen as a matching partner for a treated individual that is closest in terms of propensity score. Unlike matching 'without replacement', matching 'with replacement' allows an untreated individual to be used more than once as a case. This is the main reason why the later is being applied. However, matching without replacement involves a trade-off between bias and variance. Kernel matching is a non-parametric matching estimator that uses weighted averages of all

individuals in the control group to construct the counterfactual outcome. In this method, each treated household is matched with the entire sample of controls. This approach uses more information, thus lowering variance. However, its drawback is that it might include observations that are bad matches. Using both methods (nearest neighbor matching with replacement and kernel matching) provides a robustness check to the disadvantages of the two matching procedures.

**Common support**

Imposing a common support condition ensures that any combination of characteristics observed in the treatment group can also be observed among the control group (Becker and Ichino, 2002). The common support is the region where the balancing score has positive density for both treatment and control units. No matches can be formed to estimate the ATT parameter when there is no overlap between the treatment and control groups.

To ensure maximum comparability of the treatment and control groups, the sample is restricted to the common support region, defined as the values of propensity scores where both treatment and control observations can be found (Caliendo and Kopeinig, 2008). By imposing a common support condition, one can minimize the main limitation of the kernel matching approach and improve the quality of the matches. Observations outside the common support are not considered in the model, by imposing a common support condition and by eliminating the 5% of the treatment observations for which the propensity density of the control observations is the lowest. This implies that after units are matched, the unmatched comparison units are discarded and are not directly used in estimating the treatment impact.

This step is followed by testing whether the matching procedures yield true match or not. This is because unless the final comparable groups are well matched, the final identified difference (ATT) may not be due to being members of the cooperative/not. Therefore in order to make sure that the matching procedure is true, making sure that the means of each covariate between the treated and control groups did not vary after matching is the feasible approach. In this study, four matching quality indicators which are; standardized bias, T-test, joint significance and Pseudo-R2 are employed.

After matching the two groups, comparison proceed by calculating the average treatment effect on the treated (ATT). The impact of coffee cooperative membership on performance indicators which is denoted by following Caliendo and Kopeinig (2005) notation   as;

ATT = E[Y (1) – Y (0) |Z=1] = E[Y (1) |Z=1] – E[Y (0) |Z=1]

Where E[Y (1) |Z=1] is the mean value of the outcome variable in the treatment group, and E[Y (0) |Z=1] is the mean value of the outcome variable in the matched control group.

The choice of the independent variables in the model is crucial in the analysis. Only variables that are unaffected by participation should be included in the model. Hence, Caliendo and Kopeinig (2005) suggest that these variables should either be fixed over time or measured before participation. Following their suggestion, the following independent variables were selected for the model: age of household head, year of schooling, size of family under productize age, household experience on coffee farming, land allotted for coffee, off farm income and distance to office of cooperative. The other category of variable is dependent variables in case known by performance indicators. Three variables are used as performance indicators based on which comparison between two groups is carried out. They are volume of coffee supply; price received and amount of transaction cost incurred.

**Sensitivity analysis**

The other important step in the implementation of PSM is checking for sensitivity of the estimated result of ATT. Recently, checking the sensitivity of the estimated results becomes an increasingly important topic in the applied evaluation literatures (Caliendo and Kopeining, 2008). Matching method is based on the conditional independence or unconfoundedness assumption, which states that "the evaluator should observe all variables simultaneously influencing the participation and outcome variables." This assumption is basically non-testable because the data are uninformative about the distribution of the untreated outcome for treated units and vice versa (Becker and Caliendo, 2007). Estimation of treatment effect with matching estimator is based on unconfoundness or selection of observable assumptions.

However, if there are unobserved variables which affect assignment into treatment and the outcome variable simultaneously, hidden biases might arise (Rosenbaum, 2002). In other word, if treatment and outcomes are also influenced by unobservable characteristics, then CIA fails and the estimation of ATTs is biased. The size of the bias depends on the strength of the correlation between the unobservable factors and also treatment and outcomes, on the other hand. It must be obvious that matching estimators are not robust against such hidden biases. Different researchers have become more and more aware that it is important to test the robustness of results to departures from the identifying assumption. Because it is not possible to estimate the magnitude of selection bias with non-experimental data, the problem can be addressed by sensitivity analysis.

Rosenbaum (2002) proposes using Rosenbaum bounding approach in order to check the sensitivity of the estimated ATT with respect to divergence from the CIA. The basic question to be answered here is whether inference about treatment effects may be altered by unobserved factors. In other words, one wants to determine how strongly an unmeasured variable must influence the selection process in order to undermine the implications of matching analysis.

Ultimately, using predicted probabilities of participation in the program that propensity score match pairs are constructed using alternative methods of matching estimators. Then the impact estimation is the difference between simple mean of outcome variable of attention for participant and non- participant households. The difference in the contribution of coffee cooperative between treatment and control households. The ATT is obtained by averaging these differences in coffee cooperative ($Y$i) across the $k$ matched pairs of households as follows:

$$\text{ATT} = \frac{1}{K}\sum_{i=1}^{k}[yi = D = 1 - yi = D = 0]$$

A positive or negative value of ATT suggests that households who have participated in coffee cooperative have higher or lower outcome variable $Y$i than non –participants.

## 3.5. Hypothesis and definitions of variables

In order to identify factors influencing market supply of coffee and coffee cooperative membership decision in the area of study, both continuous and discrete variables are hypothesized based on economic theories and the findings of different empirical studies. Accordingly, in order to investigate the determinants of mentioned dependent variables, the following variables were assumed.

### 3.5.1. Hypothesis and definition of variables used in 2SLS

3.5.1.1. Dependent variables

**Quantity of coffee supplied (QSUP):** It is a continuous dependent variable used in the multiple linear regression model equation. The actual quantity of coffee supplied in the 2017/18 production season by individual households to the market, measured in quintal. It was converted into logarithm during analysis to overcome the effect of outliers.

3.5.1.2. Independent variables for quantity of coffee supply

*Sex of the household head*:  Is a dummy variable that takes a value of 1 if the household head is male and 0 otherwise. In mixed farming system, both men and women take part in crop production and management. Sex is determining factor in different agricultural production and marketing decision of rural households of Ethiopia. This is because women are considered as less influential in main agricultural activities rather than supporting others activity. Different socio economic services are also related with productivity and volume of market supply of agricultural commodities. Bizualem *et al.,* (2015), found that marketing infrastructures are less accessed by female headed than male headed coffee producing household. Therefore, in this study, being female house head is expected to affect market supply of coffee negatively.

*Education*: It is continues variable measured in terms of years of formal schooling that the household head has attended. Education plays an important role in the adoption of innovations/new technologies. Furthermore, education is also believed to improve the readiness of the household to accept new idea and innovations, and get updated demand, supply as well as price information, which in turn enhances producers' willingness to produce more and increase coffee market entry decision and volume of sale.

A study conducted by Holloway *et al.* (2002) indicated positive relationship between education and producer household coffee market entry decision and volume of coffee marketed. Similarly, studies conducted by Getachew (2009) and Rehima (2006) showed that formal education was positively related to household market participation and marketed volume of agricultural commodity. A study conducted by Zekarias *et al.* (2012) indicated that, education positively and significantly affected the market supply of coffee. Therefore, in case of this study, education was expected to affect market supply of coffee positively. This is due to the fact that farmer with good knowledge can adopt better practices and would increase marketable supply.  CIAT

*Frequency of extension contact (service)***:** Is a continuous variable which is frequency of contact with extension workers i.e. for how many times farm family contacted with extension agents during the crop year. Different studies confirmed the existence of relationship between extension contact and market supply of different agricultural crops in general and of coffee particularly. Study conducted by Wendmagegn (2014), indicated that extension service positively and significantly related to the volume of coffee supplied to the market, Engidaw (2017) found positive relationship between market supply of coffee and extension contact. Therefore, in case of this study, it is hypothesized that extension service in coffee production and marketing would have positive relationship with market supply of coffee. This is because such services are rendered to farmers to increase their technical knowledge on coffee production and marketing.

*Size of land allotted for coffee production***:**  Is continuous variable which refers to the proportion of total land employed for coffee production measured in hectare. Land is important factor of production which highly determines agricultural productivity; and also as producers employ more land, they produce more and are highly likely to supply more keeping other factors constant. This assumption is supported by different empirical evidences. Samuel *et al.,* (2016) found positive and significance relationship between sizes of land allotted for coffee and volume of its market supply.  Therefore, this variable is expected to affect market supply of coffee positively.

*Family size*: It is a continuous variable referring to number of family members in the household. Family is an important source of labor supply in rural areas. It is expected that households with large family members have better advantage of being able to use labor resources at the right time, particularly during peak harvesting period. Accordingly, families with more household members tend to have more labor which in turn increase coffee production and then increase coffee market supply. On the other hand, family size may also decrease market supply because high proportion of the product would be used for consumption. Samuel *et al.,* (2016) found negative and significance relationship between family size and volume of market supply. But in case of this study, family size is expected to positively influence the volume of coffee supplied to the market.

*Coffee farming experience:* Is a continuous variable measured in number of years. A household with better experience in coffee farming and processing is expected to produce more amounts of coffee than the one with less experience and, as a result, is expected to supply more amounts of coffee to market. Jemal (2013) found that number of years that a farmer had been growing coffee is positively and significantly associated with market supply of coffee. Therefore, in case of this study, farming experiences is expected to affect market supply of coffee positively.

*Amount of credit received*: This is a continuous variable which refers to the amount of credit taken by an individual household for coffee production purposes measured in birr. Credit is a key financial instrument to break low level of production and marketing problems which enhance the financial capacity of the farmers to purchase inputs, thereby increasing production and market share. Hence, it was hypothesized that farmers 'who receive credit would supply more.

*Quantity of coffee produced*: It is a continuous variable dealing with total amount of coffee produced by households in 2017/18 production season. Most of the time, quantity produced determines the amount of commodity to be consumed as well as to be marketed because producing households adjust their plan accordingly. Engida (2017) found that quantity of coffee produced is positively and significantly associated with market supply of coffee. Therefore, quantity produced is assumed to affect the volume of market supply

of coffee positively, because a farmer who obtains high yield are expected to supply more to the market than a producer who obtains fewer yields.

*Distance to the nearest market*: It is a continuous variable and is measured in km by which farmers are far from the market. If the farmer is located closer to the market, the lesser would be the transportation cost and time spent to travel and vice versa. A study conducted by Mohammed (2013), Jemal (2013), Engida (2017) identified that distance from the nearest market affected quantity of coffee marketed significantly and negatively. In case of this study, it is also expected that distance from the nearest market would affect market supply of coffee negatively.

*Membership to coffee cooperative*: It is a dummy variable and takes the value of 1 if the household is member of coffee cooperative and 0 otherwise. Cooperatives are expected to improve understanding of members about market and strengthen the relationship among the members. Bizualem et al. (2015) found that those who are members of cooperatives might are motivated with double payment (dividend payment besides actual price of commodity) than non-members and motivated to increase the quantity of coffee marketed. Therefore, this variable was expected to be associated to market supply of coffee positively.

*Non/off-farming income*: It is continues variable measured in birr dealing with income obtained from non-farming activities or income out of own farm generated by the household head. This income may strength farming activity or reluctant to produce coffee to generate money from coffee rather than getting income from other activities. Bizualem et al. (2015) found an increase in non/off-farm income, increase amount of coffee marketed and income obtained from businesses other than farm activities would finance the production and enhanced marketed surplus. Hence, off/nonfarm incomes were expected to influence market supply of coffee either negatively or positively.

*Ownership of means of transportation*: It is a dummy variable which takes a value of 1 if the household owned transportation facility and 0 otherwise. The availability of transportation facilities helps farmers to supply their product from long distance and remote area to the available market easily. In case of this study, it is expected to have positive effect on market supply of coffee.

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**Table 3:** Summary of type, measurement and expected sign of variables used in 2sls

| Variables | Types | Measurement | Sign(expected) |
|---|---|---|---|
| **Dependent Variable** | | | |
| Volume of supply of coffee | Continuous | Quintal | |
| **Independent variables** | | | |
| Ownership of means of transportation | Dummy | 1 for HH having means of transportation and 0 otherwise | + |
| Education status of HH head | Continuous | Number of schooling years | + |
| Extension contact | Continuous | Number | + |
| Land allotted for coffee | Continuous | Hectare | + |
| Sex of the household head | Dummy | 1 for male and 0 for female | + |
| Family size | Continuous | Number | + |
| Amount of credit received | Continuous | Birr | + |
| Quantity of coffee produced | Continuous | Quintal | + |
| Distance to nearest market | Continuous | Km | _ |
| Membership to coffee Cooperative | Dummy | 1 if the farmers are members and 0otherwise | + |
| Coffee farming experience | Continuous | Years | + |
| Non/off farm income | Continuous | Birr | + |

Source: Own computation; (2018)

### 3.5.2. Hypothesis and definition of variables used in PSM

### 3.5.2.1. Outcome Variables

**Volume of coffee supply (QCS):** Is continuous variable measured in kg which refers to amount of marketed berries and dry coffee during 2017/18 seasons.

**Price received (APR):** Is continuous variable which refers to price in (birr/kg) received from sale of coffee in 2017/18 season.

**Cost of transaction (ACT):** Is continuous variable referring to cost in (birr/qt) of coffee incurred by producer household during 2017/18 marketing season.

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3.5.2.2. Dependent variable

**Participation in coffee cooperative (PCC):** It is a qualitative and dummy dependent variable used in logit model before PSM. Coffee cooperative membership decision is expected to be taken by producers based on the existing socio economic situation and their personal attitude towards collective action. It takes value of 1 if household is member of coffee cooperative and 0 otherwise.

3.5.2.3. Independent variables

The variables expected to affect household's participation in coffee cooperative are used in the model based on economic theories and the findings of different empirical studies.

**Sex**: Is dummy variable which takes value of 1 if the household head is male and 0 otherwise. It is important social factor based on which different socio economic issues are determined. In case of Ethiopia, female are less exposed to external social setting than males. Different studies confirm that sex of household head determines probability of people membership in agricultural cooperative in general and of coffee cooperative in particular. Bernard *et al.* (2008), Bernard and Spielman (2009) and Abebaw and Haile (2013) found that sex of household head significantly effects cooperative membership and indicated that male-headed households are more likely to participate in agricultural cooperatives than female-headed households. Therefore in case of this study, it is hypothesized that female headed household would have less probability of membership for coffee cooperative than male headed households.

**Age:** Is continuous variable measured in year and it refers to the age of household head. When rural people become aged they prefer collective action than youth. Zekarias Shumeta and Marijke D'Haese (2015), Bernard *et al.*, (2008), Bernard and Spielman (2009) and Abebaw and Haile (2013) have shown that the age of the household head is positively correlated with the likelihood of cooperative membership. They found that older household heads were more likely to be members of cooperatives. In case of this study, it is assumed positive relationship between age of household head and coffee cooperative membership.

**Number of active family labor:** Is continuous variable which in case of this study refers to family members aged between 15-65 with in household. Family member is an important factor based on which different socio economic decisions are made in different parts of our country. Previous studies also showed that family size is another variable that affects the membership decision positively (Zekarias*et al.* 2015 and (Bernardand Spielman, 2009). In this study, negative relationship between number of productive family and coffee cooperative membership is assumed.

**Education**: Education is continuous variable which refers to year of formal schooling (grade completed of household head. Education is very important issue in all aspects of human life. This is because when people learn, they are more likely to make rational decision based on logical reasoning. Different studies have previously conducted on the effect of education for cooperative membership. Among which, Bernard and Spielman (2009) and Verhofstadt and Maertens (2015) illustrate a positive relationship between education level and the probability of cooperative membership. In case of this study it is hypothesized that education would have positive effect on producer's decision to join coffee cooperative.

**Land allotted for coffee:** Refers to the portion of total land holding by producer household covered by coffee plantation and measured in ha. Zekarias Shumeta and Marijke D'Haese (2015), Bernard *et al.* (2008), Bernard and Spielman (2009), Fischer and Qaim (2012) and Abebaw and Haile (2013) have found a positive relationship between the size of landholding and cooperative membership. According to the result of their finding, having more land allotted to coffee was positively and significantly correlated with the probability of being a cooperative member. In case of this study positive relationship is assumed between coffee land and coffee cooperative membership.

**Off/non-farm income:** Is continuous variable which refers to the proportion of total income of households generated from nonfarm activities measured in birr. Different studies have done previously with regard to this issue; accordingly Fischer and Qaim (2012) and Abebaw and Haile (2013) found a positive relation between off-farm income and cooperative membership. Opposite relation between this two variable is assumed in case of this study since having diverse sources of income makes farmers less vulnerable to

poverty and potentially less likely to engage in collective action to safeguard their income from coffee.

**Coffee farming experience:** Is continuous variable which refers to the number of year by which the household head engaged in coffee production. It is expected that those people having more experience are with more skill of production than those less experienced. In this study, positive relationship between coffee farming experience and coffee cooperative membership is assumed.

**Distance from cooperatives coffee collection point:** Is continuous variable measured in km by which household are obliged to walk from their home to the cooperative office/ market center. Zekarias Shumeta and Marijke D'Haese (2015), and Verhofstadt and Maertens (2015) found a significant and negative effect of market distance on cooperative membership. They found that households further away from the cooperatives coffee collection points were less likely to be members. In this study, an inverse relation between the distance to the cooperative's coffee collection point and the probability of cooperative membership were assumed.

**Use of credit:** Is dummy variable which takes value of 1 if the household uses credit and 0 otherwise. Most of the time, all people have their own goal when participating in certain system. Participation in coffee cooperative has multi purposes so, in addition to creating smooth atmosphere for marketing their coffee produce, they also provide the members with services like credit, extension and related trainings. Therefore in this study, it is hypothesized that households who use credit from sources other than cooperatives are less likely to be member of coffee cooperative and vice versa.

**Ownership of transportation:** Is dummy variable which takes value of 1 if the household has their own transportation facility and 0 otherwise. Transportation is very crucial especially for people living in rural areas. In Ethiopia in general and specific to SNNPRS, there is great transportation problems hindering producers from getting their produce marketed. This indicates effectiveness of transportation and positive relationship is hypothesized to exist between ownership of transportation facility and coffee cooperative membership.

**Table 4.** Summary of type, definitions and measurement of variables used in PSM

| Variables | Types | Definitions and measurements |
|---|---|---|
| **Treatment variables** | | |
| Cooperative membership | Dummy | 1 if household is member of cooperative and 0 otherwise |
| **Outcome variables** | | |
| Total volume of coffee supply(both berries and dry coffee) | Continuous | Amount of marketed berries and dry coffee in kg in the 2017/18 season |
| Volume of berries supplied | Continuous | Amount of marketed berries in kg in the 2017/18 season |
| Price received | Continuous | Price(birr/kg) received from sale of coffee in 2017/18 |
| Cost of transaction | Continuous | Cost in birr/kg of coffee incurred by producer household in 2017/18 |
| **Confounding** | | |
| Age | Continuous | Age of households in year |
| Sex | Dummy | 1 if household head is male and 0 otherwise |
| Number of active family labor | Categorical | Family members aged between 15-65 with in household |
| Education | Continuous | Year of schooling (grade completed of household |
| Land allotted for coffee | Continuous | Proportion of land covered by coffee tree |
| Off/non-farm income | Continuous | Amount of annual income generated by households from non-farm activities |
| Ownership of transportation | Dummy | 1 if household head has transportation facility and 0 otherwise |
| Use of credit | Dummy | 1 if household use credit and 0 otherwise |
| Distance from the cooperatives coffee collection point | Continuous | Distance in km by which households are far from cooperatives coffee collection point |
| Coffee farming experience | Continuous | Households experience(in years) on coffee farming |

Source: Own computation; (2018)

# 4. RESULTS AND DISCUSSION

This chapter presents the study findings discussed under different sections. The section starts with description of demographic and socio economic characteristics of sampled coffee producers, traders and consumers. Following this, different aspects related with coffee value chain analysis are incorporated and finally econometric result of the study, specifically factors affecting market supply of coffee and result of comparative analysis between farmers working in cooperative and conventional chain are discussed. From the collected sample data, descriptive statistics of the household characteristics with respect to socio-economic and institutional variables were assessed and the following results were obtained.

## 4.1. Descriptive Analysis of Sampled Households' Characteristics

**Sex of the household head:** Out of the 181 sampled respondents, majorities (82.3 percent) of them are male-headed and 17.7 percent are female-headed households (Table5). With regard to the sex composition across the members (treatment) and non-members (control) groups, 82.3% and 82.4% of the members and nonmember groups respectively were male headed households. Similarly 17.7% of the members and 17.6% of the non-member households were female headed. However, the statistical test analysis shows that there is no statistically significant difference in the sex of the household head between beneficiary and non-beneficiary households ($\chi 2= 0.682$).

**Religion of sampled households:** With respect to religion composition of the sampled respondents 70.2% were orthodox, 12.7% Muslim and the remaining portion covered by households following Catholic and Protestant religion whose share are 7.7% and 9.4% respectively. Analysis of religion composition between members and nonmember household indicates that majorities (68.4%) of members are follower of Orthodox followed by Muslim with 20.3% of share and the remaining members are follower of Catholic and Protestant. Majorities (71.6%) of nonmember households are also followers of Orthodox followed by Protestants with share of 12.7%. Moreover, the statistical test analysis shows that there is statistically significant difference in the religion of the household head between members and non-members ($\chi 2= 9.50$).

**Marital status:** Statistical analysis of the marital status of sampled households indicates that out of the total sample, 72.9% are married, 3.9% single, 12.7% divorced and 10.5% are widowed. The same analysis indicates that out of 79 sampled members of coffee

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cooperatives (members), 73.4% are married, 13.9% are divorced and the remaining 12.7% are widowed. Out of 102 nonmembers (non-beneficiaries), 77.5% are married, 5.9% are single 11.8% are divorced and the remaining 4.8% are widowed households. Moreover, there is statistically significance difference in marital status between members and nonmember households as it is indicated by chi-square test where ($\chi$2= 8.13).

**Ownership of transportation facility:** Out of 181 sampled households, 63.0% of them have their own transportation facility and 37% of them have no their own transportation. Furthermore out of 79 sampled members of coffee cooperatives, 84.8% have their own means of transportation and 15.2% households have no their own transportation facility. According to the same analysis, among 102 nonmember households, 46.1% have their own transportation facility and the remaining have no their own transportation. The chi-square test shows that there is statistically significant difference between members and non-member households in their status of ownership of transportation facility at 1% significance level (where $\chi$2=28.64). Moreover, the results revealed that the main means of transport used and owned by sample respondents was traditional animal transport (appendix table 2).

**Age of household head:** As indicated in Table 5, the average age of the sampled household heads was 50.55 years with a standard deviation of 6.03. The result of the same analysis revealed that the mean age of member households was 51.99 years with a standard deviation of 4.60, whereas, the average age was 41.82 years for the non-member households with a standard deviation of 5.97. This indicates that member households on average are aged than nonmembers. The result of the t-test for the differences in age distribution between members and non-member groups was found statistically significant with (t= 3.13).

**Family size (number):** The result in Table 5 shows that the average family size of sample households was 4 with a standard deviation of 1. With respect to number of productive family members, sample households on overage have 3 active family members with standard deviation of 1. The mean family size of members is similar with the total sample as well as with the same standard deviation which are 4 and 1 respectively and that of non-members is 3 with a standard deviation of 1. Even though, it seems that beneficiary households have larger family size than non-beneficiary households, the t-test shows that there is no significant statistical difference in family size between two groups (t= 0.77).

**Education (Formal grade completed):** The survey result shows that, the average educational level of the sample respondents was found to be grade 4 with a standard deviation of 2 with maximum and minimum grade completed of 9 and 0 (illiterate) respectively. The mean educational level of the member households was grade 3 with standard deviation of 1 and for the non-member households; the mean grade completed was 3 with standard deviation of 2. The result of t-test for the difference in educational level between the two groups confirmed that there is a statistically significant mean difference in educational level between the two groups at 1% probability level (t = 5.62). This indicates that education positively influences producers' probability of being member of coffee cooperatives in the study area.

**Farming experience/Coffee farming experience (years):** The average years of farm experience for sample respondents was found to be 25.61 years with standard deviation of 6.203 and with minimum and maximum farm experience of 6 and 28 years respectively. The mean farm experience of coffee cooperative member households was found to be 21.73 years with standard deviation of 0.55 years. Average year of farm experience of nonmembers of coffee cooperatives (non-beneficiaries) were found to be 16.20 years with standard deviation of 6.03. Moreover, there is significant difference in farm experience between members and non-member households with (t = 6.80).

**Distance to the nearest market (Km):** Table5 depicts statistical results of the mean distance by which producer households are far from the nearest local market and the result of analysis shows that they are living on an average distance of 5.02Km from the nearest market place having a standard deviation of 0.90. The minimum and the maximum distance that sampled coffee producing respondents have to travel to nearest market centers was 0.5 km and 9 km, respectively (Table 5). However comparative analysis of the distance of the nearest market place between the cooperative members and non-member households shows that coffee cooperative members on average are living about 3.68 km far from the nearest market with standard deviation of 0.23 and non-member households on average are living about 4.05km far from the nearest local market with standard deviation of 0.97. The result of the t-test for the difference in the distance from the nearest market place between the beneficiary and non-beneficiary groups was found to be statistically significant at 5% probability level (t=10.02).

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**Land allotted for coffee (hectare):** Statistical analysis of proportion of total land allotted for coffee indicates that the average area of land covered by coffee plantation per household was 2.48 hectares with standard deviation of 1.12. The minimum and maximum land allocated for coffee production was 0.25 and 3 hectare respectively. Comparative analysis between cooperative members and non-members with regard to land allotted for coffee indicates that on average land allotted for coffee by cooperative members was 2.40 hectare with standard deviation of 0.62 and of non-members were on average 1.73 hectare with standard deviation of 0.72.

**Use of credit and amount of credit received by users in (Birr):** Use of credit may reduce the effect of financial constraints and able to buy the necessary inputs which improve their coffee productivity more readily than those with no did not use credit. Therefore, it is expected that use of credit can increases the production of agricultural crops in general and of coffee in particular. According to survey result table 4 below, out of total sampled respondents majorities (70.7%) are credit users and few of the respondents did not use credit. With respect to members and non-members, majority of both members and non-members are user of credit services.

According to the same analysis, the mean credit received by sample households was found to be 2,571 birr with standard deviation of 2,319 and the amount of credit received ranges from 1,500 to 15,000 birr. With respect to credit utilization between members and non-member households on overage member households received 3,165 birr with standard deviation of 1,528 and the mean credit received by non-member households was found to be 2,165birr with standard deviation of 828. There is statistical difference between coffee cooperative members and non-members with respect to amount of credit received with (t= 3.72).

**Off/non-farm income (Birr):** Table 5 indicates that the mean off/non-farm income of the sampled respondent households was 2210 ETB (Ethiopian Birr) per annum during the study period with a standard deviation of 2583 ETB. Furthermore the average off/non-farm income for the member (beneficiary) households was found 2,418.99 ETB having standard deviation of 2879.77 and the mean off/non o farm income for the non-member (non beneficiary) household was found 2049.02 ETB having standard deviation of 2330.92. The

statistical test result shows that there is no significant mean difference in non/ off farm income between the two groups as indicated in table 5 below.

**Number of extension contact/month:** The mean number of extension contact by the DA's on sample respondents was found to be 1.97 times/month; meaning approximately 2 times per a month with standard deviation of 0.65. For the member households, the number of extension contact was 2.24 times approximately 2 times per a month having a standard deviation of 0.60. Similarly the number of extension contact was 1.76 times approximately 2 times per a month for the non-member households with standard deviation of 0.61. However, the statistical test for the equality of the mean extension contact of the two groups shows no statistically significant difference (Table 5).

**Table 5:** Descriptive statistics of sampled household characteristics

| Variables | Category | Members (79) | | Nonmembers(102) | | Total sample(181) | | |
|---|---|---|---|---|---|---|---|---|
| | | Freq | Percent | Freq | Percent | Freq | percent | χ2-value |
| Sex | Male | 65 | 82.3 | 84 | 82.4 | 149 | 82.3 | 0.682 |
| | Female | 14 | 17.7 | 18 | 17.6 | 32 | 17.7 | |
| Religion | Orthodox | 54 | 68.4 | 73 | 71.6 | 127 | 70.2 | 9.50 |
| | Muslim | 16 | 20.3 | 7 | 6.9 | 23 | 12.7 | |
| | Catholic | 5 | 6.3 | 9 | 8.8 | 14 | 7.7 | |
| | Protestant | 4 | 5.1 | 13 | 12.7 | 17 | 9.4 | |
| Marital status | Married | 58 | 73.4 | 79 | 77.5 | 137 | 75.7 | 8.13 |
| | Single | - | - | 6 | 5.9 | 6 | 3.3 | |
| | Divorced | 11 | 13.9 | 12 | 11.8 | 23 | 12.7 | |
| | Widowed | 10 | 12.7 | 5 | 4.8 | 15 | 8.3 | |
| Ownership of transportations | Owned | 67 | 84.8 | 47 | 46.1 | 114 | 63.0 | 28.64 |
| | Not owned | 12 | 15.2 | 55 | 53.9 | 67 | 37.0 | |
| Use of credit | Yes | 65 | 82.28 | 63 | 61.77 | 128 | 70.7 | 7.76 |
| | No | 14 | 17.72 | 39 | 38.23 | 53 | 29.3 | |

| Variables (Continuous) | Total sample | | Member HHs | | Nonmember HHs | | |
|---|---|---|---|---|---|---|---|
| | Mean | Std.dev. | Mean | Std.dev | Mean | Std.dev | t-value |
| Age of household head | 50.55 | 6.03 | 51.99 | 4.60 | 41.82 | 5.97 | (3.13)*** |
| Family size(number) | 4 | 1 | 4 | 1 | 3 | 1 | (0.77) |
| Number of productive family | 3 | 1 | 3 | 1 | 3 | 1 | |
| Education(Grade completed) | 4 | 2 | 3 | 1 | 3 | 2 | 5.62*** |
| Farming experience(Years) | 25.61 | 6.203 | 21.73 | 0.55 | 16.20 | 6.03 | (6.80)*** |
| Distance to the  market(Km) | 5.02 | 0.90 | 3.68 | 0.23 | 4.05 | 0.97 | |
| Distance from coops coffee collection point (Km) | 0.78 | 0.24 | 0.68 | 0.26 | 1.69 | 0.97 | (-10.02) *** |
| Land allotted for coffee | 2.02 | 0.74 | 2.40 | 0.62 | 1.73 | 0.73 | |
| Amount of credit received(Birr) | 2,571 | 2,319 | 3,165 | 1,528 | 2,165 | 828 | |
| Off/non-farm income(Birr) | 2210 | 2583 | 2,418.99 | | 2049.02 | 330 | (0.354) |
| Number of extension contact/month | 97 | 65 | 2.20 | 0.60 | 1.76 | 0.61 | 1.149 |

**, **and * significant at 1%, 5% and 10% probability level respectively.
Source:  Own calculation based on household responses (2018)

### 4.1.1. Descriptive statistics of sampled households in terms of volume of coffee sold, price received and cost of transaction

Table 6 presents' descriptive statistics results of sample households based on volume of coffee they supplied to the market in 2017/18 marketing season, price they received from sale of coffee during the same year and total cost of transaction they incurred in selling coffee at the same time. To examine the volume of coffee supplied between the two groups, households were asked about the total volume of coffee produced and proportion of coffee consumed out of total produced amount and the remained is regarded as the sold amount.

Moreover, in the analysis both coffee berries and dry coffee are considered by using local conversion factor as obtained from survey where 50kg of coffee berry is equivalent with 30kg of dry coffee(GDOAM). So it should be considered that the volume of coffee supplied is average of both coffee berries and dry coffee but the price is separately analyzed. The mean volume of coffee sold by the sampled respondents was 21.48 quintal per household per year with standard deviation of 7.85. Similarly the mean volume of coffee sold by cooperative member and non-member households were 28.05 and 16.38 quintal respectively with respective standard deviation of 4.51 and 5.83. The statistical test of the mean difference in volume of coffee sold between cooperative members and non-members shows statistically significant difference at 5% probability level with (t=15.16).

The mean price received from sell of coffee by sample households during 2017/18 was found to be 18.84 ETB per kg with standard deviation of 2.204 for dry coffee and 7.55 ETB per kg with standard deviation of 1.52 for coffee berry. The result also shows that mean sale price of dry coffee was found to be 20.37 ETB for the member households with a standard deviation of 1.31 and it was found to be 17.66 ETB per kg for non-members with standard deviation of 2.02. But the mean sale price of coffee berry was found 8.8 ETB per kg for members with standard deviation of 1.02 and 7.23 ETB per kg for non-members with standard deviation of 2.05. The statistical test result shows that there is statistically significant mean difference between the two groups in terms of price received from sale of both dry and coffee berry at 1% probability level with t value of 10.89 and5.56 respectively.

The mean transaction cost incurred by sample households from sale of coffee was found to be 15.52 ETB per quintal with standard deviation of 1.13. The result also shows that it was found to be 10.76 ETB per quintal for the member households with a standard deviation of 0.67; on the other hand for the non-member households, the mean cost of transaction incurred from sale of coffee was found to be 13.23 ETB per quintal with standard deviation of 1.03. The statistical test result shows that the mean difference between the two groups has been statistically significant at 1% level of significance (t= 11.1) (Table 6).

Table 6: Descriptive statistics of outcome variables

| Variables | Total HHs N=181 | | Member HHs N=79 | | Nonmember HHs N=102 | | |
|---|---|---|---|---|---|---|---|
| | Mean | Std.dev | Mean | Std.dev | Mean | Std.dev | t –value |
| Volume of coffee sold in Qt | 21.48 | 7.75 | 28.05 | 4.51 | 16.38 | 5.83 | 15.16 |
| Price received/kg for dry Coffee | 18.84 | 2.20 | 20.37 | 1.31 | 17.66 | 2.02 | 10.89 |
| Price received/kg for red berries | 7.55 | 1.52 | 8.5 | 1.02 | 7.23 | 2.05 | 5.56 |
| Cost of transaction/Qt | 15.52 | 1.13 | 10.76 | 0.67 | 13.23 | 1.03 | 11.1 |

**and * significant at 5% and 10% probability level respectively.

Source: Own calculation based on household responses, (2018)

## 4.2. Descriptive statistics of coffee traders 'local processors

Coffee traders are also part of coffee value chain. After production and local processing, the title of ownership of coffee is transferred to the next actors. But more shares are covered by traders followed by coffee cooperatives in the area of study. Therefore it is indispensable to discuss the different characteristic of coffee traders as part of the value chain. Therefore this section deals with demographic and socio-economic characteristics related with coffee traders and consumers.

### 4.2.1. Demographic and socio-economic characteristics of traders

The survey (Table7) below revealed that in the area of study, coffee trading activity is dominated by male headed traders. This is due to the nature of the business and personal attitude of the traders themselves. Accordingly, about 87.23% of traders are male and the remaining 12.77 percent share is covered by female headed traders with average age of

40.25 years old. With respect to their marital status, majority of the traders are married and very small proportion (11.64%) of the existing traders are not married. Regarding the religion which traders follows, majority of the traders (48.93%) are orthodox religion followers followed by Muslim with 31.91 percent of share. The remaining 19.16% of the traders are under fellowship of protestant. The average family size of traders is about 4 with maximum and minimum of 7 and 3 people in each household respectively. Mean educational grade completed by the traders is 7.55 which is approximately grade 8 with corresponding standard deviation of 2.16. With respect to the source of capital, 65.95% of coffee traders start up their business by their own capital and about 34.05% of them start with loan.

**Table 7.** Demographic and socio-economic characteristics of sampled traders

| Socio demographic (dummy and categorical variables)N=47 | | | | | | |
|---|---|---|---|---|---|---|
| Variables | | Frequency | | Percent | | |
| Sex | Male | 41 | | 87.23 | | |
| | Female | 6 | | 12.77 | | |
| Marital status | Married | 42 | | 89.36 | | |
| | Single | 5 | | 11.64 | | |
| Religion | Orthodox | 23 | | 48.93 | | |
| | Muslim | 15 | | 31.91 | | |
| | Catholic | - | | | | |
| | Protestant | 9 | | 19.16 | | |
| **Socio economic (continuous variables)** | | | | | | |
| | | Min | Max | Mean | Std.dev. | |
| Age | | 33 | 45 | 40.25 | 3.726 | |
| Family size | | 3 | 7 | 3.9 | 1.29 | |
| Education(grade completed) | | 5 | 11 | 7.55 | 2.16 | |
| **Financial asset ownership and sources** | | | | | | |
| Source | No | % | Mean | Std.dev. | Min | Max |
| Own capital | 31 | 65.95 | - | - | - | - |
| OMFI | 16 | 34.05 | - | - | - | - |
| Initial capital | - | - | 176,700 | 67,184.03 | 100,000 | 320,000 |
| Working capital | - | - | 567,600.00 | 151,659.04 | 400,000 | 1,000,000 |

Sources: Own survey result (2018)

**Initial capital**: The result indicated that the mean initial capital of the coffee suppliers for engaging in coffee business is 176,700 birr with standard deviation of 67,184.03. The minimum and maximum initial capital of sampled coffee traders was 100,000 and 320,000 birr respectively.

**Working capital**: The result revealed that mean working capital of the sample coffee traders is 567,600.00 birr with standard deviation of 151,659.04. The minimum and maximum working capital of sampled coffee traders was400,000 and 1,000,000 birr, respectively.

### 4.2.2. Socio demographic characteristics of sampled local processors (CPTCHs)

As it is indicated in table 8, majority of sampled L.processors (75%) were femalesand the remaining 25% were males. This implies that females' involvement in the local coffee processing activities was high. The mean education level and family sizeof such L. processor was found to be 4.4 with a standard deviation of 1.72 and 1 respectively. The minimum and maximum family size of such L. processors was found to be 2 and 5 people per household respectively. Regarding marital status of the L. processors, majorities (60%) of them were married while the remaining 40% were single.

**Table ma8.** Distribution of sampled local processors by their socio demographic characteristics

| Variables | Frequency | Percent | Min | Max | Mean | Std.dev. |
|---|---|---|---|---|---|---|
| **Sex**  Male | 5 | 25 | - | - | - | - |
| Female | 15 | 75 | - | - | - | - |
|  |  |  | - | - | - | - |
| **Marital status**  Married | 12 | 60 | - | - | - | - |
| Single | 8 | 40 | - | - | - | - |
| **Religion**Orthodox | 11 | 55 | - | - | - | - |
| Muslim | 6 | 30 | - | - | - | - |
| Protestant | 3 | 15 | - | - | - | - |
| **Education level** |  |  | 2 | 9 | 4.4 | 1.72 |
| **Family size** |  |  | 2 | 5 | 2.8 | 1.04 |

Source (Own survey result, 2018)

## 4.4. Coffee Value Chain analysis

Value chain in general refers to interlinked chain of people products and servicers intended to provide users with full utility. This part of coffee value chain consists stake holders' analysis where different coffee value chain actors of the area are described, qualitative analysis dealing with chain coordination, quantitative analysis under which cost and benefit share of actors is discussed and finally SWOT analysis under which analysis of internal and external aspects of coffee value chain is discussed.

### 4.4.1. Coffee value chain mapping

A value chain map resents, in graphical form, all the major actors in a targeted value chain, their functions, support service providers and their respective roles as well as the existing enabling environment that facilitates the smooth functioning of the chain for a given place and specified commodity. It presents the different supply channels that transform raw materials into finished products and then distribute those products to final consumers; and the different markets or market segments to which products are sold. Draft value chain maps can be developed using information provided by key informants (individuals very knowledgeable about the value chain) and then later refined as more information is gathered). Therefore based on the survey data and information gathered from different key informants as well as group discussion, coffee value chain map of Gimbo District was compiled as follow.
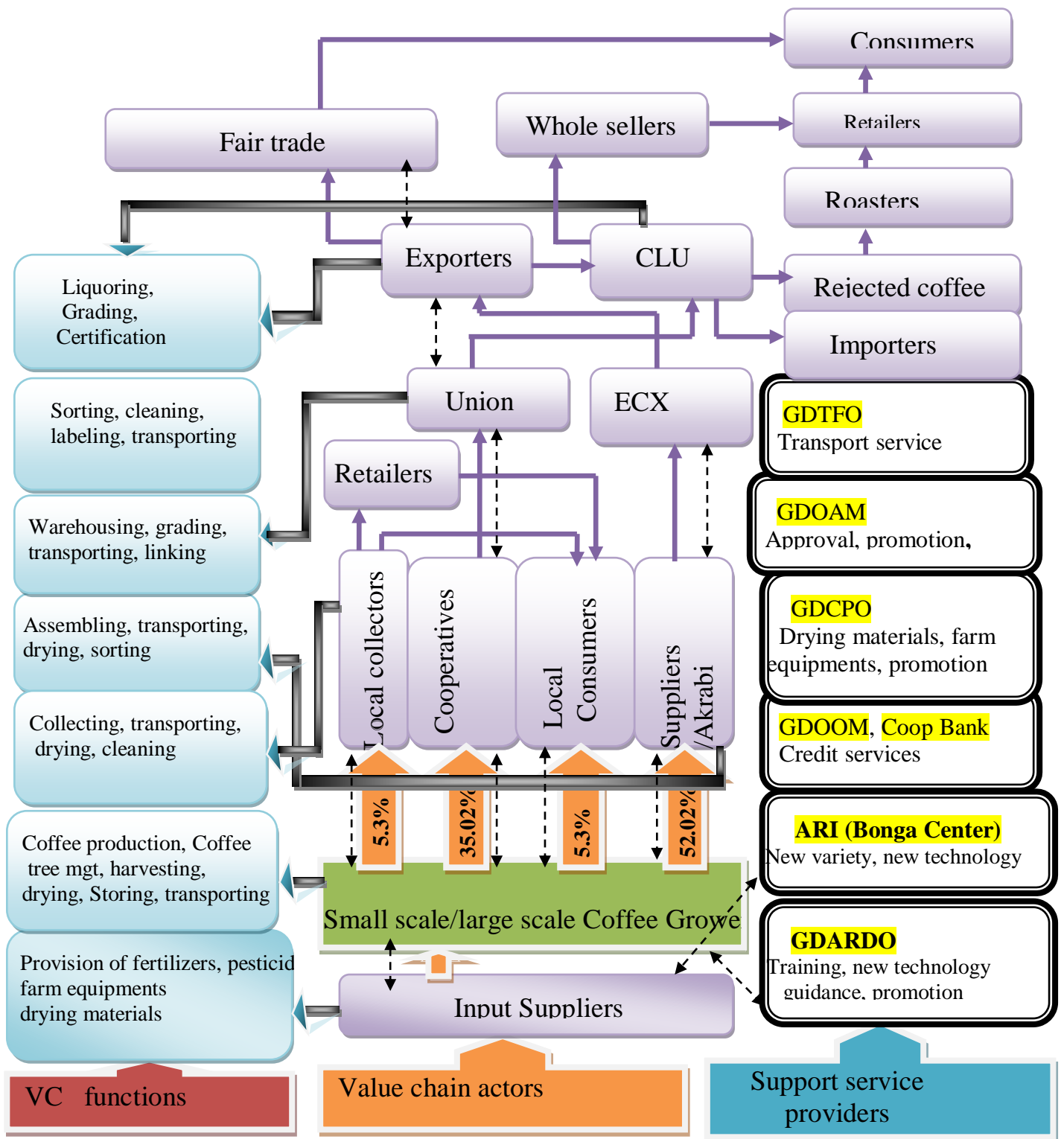
Fig 5. Coffee value chain map of Gimbo District

Source: Own survey sketch (2018)                    **KEYS**

→ Physical flow of products,   **GDCPO** (Gimbo District cooperative promotion office
**GDARDO** (Gimbo Disrict agricultural and rural development office,   **GDOAM** (Gimbo District office of
agricultural Marketing        ◄ - - ► flow of information
**ARI** (Agricultural research institute), **GDTFO** (Gimbo District Transportation facility Owners
**GDOOM** (Gimbo District office of Omo Micro         ⟹ represents flow of inputs, ECX= Ethiopian
commodity exchange                          **CLU:**Coffee liquiring units

### 4.4.2. Coffee value chain actors (core actors)

**Input suppliers**: Input suppliers prepare, and provide small scale farmers with different types of agricultural inputs when and where necessary. Agricultural inputs are of different types with most commonly known including seedling, seed, new variety, pesticide, and herbicide, fertilizer, farming equipments, cultivating machines and harvesting machines. In Gimbo District, agricultural input in general and specifically input for coffee production is supplied more by government body. The main types of inputs used for coffee production are coffee seedlings, fertilizer, herbicide, pesticide, pruning materials and storage materials. Therefore this study identified the major input suppliers and the specific input supplied by each supplier as summarized in table 9. Gimbo District office of agriculture, Cooperative promotion, Omo-micro, farmers training center and Agricultural Research Institute of Bonga center are the major input suppliers for small scale coffee producers of the area.

**Table 9.** Coffee input suppliers and types of inputs supplied in Gimbo District

| Input suppliers | Input supplied |
| --- | --- |
| Gimbo District office of agriculture and rural development (GDOARD) | Fertilizers(Dap, Urea), pesticide, herbicide, equipment's (hoe, pruning scissors, cutting saw, machetes and spade, training |
| Gimbo District office of Cooperative promotion (GDOCP) | Drying materials, equipment's (hoe, pruning scissors, cutting saw, machetes and spade), storage materials like "Kesha" |
| Gimbo District office of micro finance (GDOM | Financial inputs(credit) |
| Gimbo District Farmers Training Center | Seedlings, |
| Bonga, Agricultural research center | New coffee varieties |

Source: Own survey (2018)

**Small holder coffee farmers**: The term farmer usually applies to a person who grows field crops, and/or manages orchards or vineyards, or raises livestock or poultry. In this study, the term farmer' refers to a person who has been growing and selling coffee. Hence, they are the producer of coffee in the coffee value chain. After input suppliers, farmers are other value chain actors who plant and manage coffee trees and sell coffee cherries to different

actors at farm gate or nearby market. They are responsible for growing and harvesting coffee, thereby determining the amount and quality of coffee produced. They produce coffee primarily for earning cash and household consumption purpose. In Gimbo District there are total of 10,444 small holder coffee producers who produce coffee in limited plot of land.

**Large scale private coffee investors**: In addition to small scale coffee producers, there are also large scale private coffee investors in the study area who produce coffee in large plot of land. According to the survey data there are 10 large scale private coffee investors in the District. As identified by survey, in addition to coffee production, some local coffee processing functions are also carried out by such large scale producers. Among local coffee processing functions, coffee washing, pulping and sorting are the major functions undertaken by such private investors.

**Coffee collector's ("Sebsabi"):** Are representatives who buy coffee from producers on behalf of the local suppliers.Coffee collectors ("sebsabi') play an essential role of bringing coffee from very remote areas to the market by adding value throughaugmenting the volume of coffee (USAID, 2010).

There are seven coffee collectors in the Districts who are legally represented by coffee suppliers. They have recognition from agricultural market development office and buy coffee from primary coffee market on behalf of coffee suppliers who made them their agent. However there are also some illegal coffee collectors in the district as data obtained from agricultural market development office indicated. They do not take title of ownership and have no warehouses of their own and therefore transfer the coffee to suppliers immediately. The main functions of such collectors is just collecting coffee from each producer and compiling together till it reaches its standard of volume and delivering it to their respective suppliers. There is no any legal requirement for being collector rather it depends on personal relation existing between two partners (supplier and collector). But they start their operation after they are legally recognized as legal traders from the concerned body (agricultural market development office).

**Retailers:** According to the result of this study, in the District there are also coffee retailers. These actors are those private traders who have no license for coffee trading. Rather they have legal license of trading for other cereal commodity. Therefore they are illegal traders for coffee through which majority of local consumers' access coffee. There is no structured and documented data of such traders but information from personal interview and focus group discussion on basis of information from the District office of trade and industry shows the existence of 15 such kind of illegal actors (shops) in the area. The main coffee value chain functions undertaken by such retailers of the area are collecting, transporting, processing (sometimes) and packing. But the functions they are carrying out depend on the source where they purchase the produce.

**Local consumers**: Consumers are the ultimate users of the commodity (coffee). In the coffee value chain of Ethiopia, there are two general categoriesfor consumers of coffee. These are domestic consumers and foreign consumers. The consumers present in domestic country consume directly from small-scale farmers and coffee collectors or retailers throughout the country (MOT, 2012). According to the survey result, in Gimbo District, there are number of coffee consumers other than producers and traders who consume coffee by purchasing from either producers or retailers/collectors. As it is identified through survey, the main category of such local consumers in the study area are civil servants and other people living in urban who have no any coffee plantation at all. Their main function along coffee value chain is purchasing, transporting and consuming coffee.

**Suppliers/ whole sellers/ private traders ("Akrabi"):** Suppliers are actors in the coffee value chain who have license from districts trade and market development office and took certificate of capability in coffee trade from districts agriculture office.  They buy coffee either from farmer on primary coffee market or from collectors or from their agent. Then after processing such as cleaning and drying they supply to ECX warehouse for inspection of quality and grading thereby they sell their coffee to export though their agent in ECX.

According to the Gimbo district trade and industry office, the requirements to be met to qualify as a traders are a working capital of 100,000 Birr, a coffee drying cemented field and a store, and their license is subject to renewal every year on a condition of good performance in the coffee market(GDOAM, 2018). Also, they process purchased coffee

from different part of the district before supplying to auction market (ECX) warehouse of Bonga branch for inspection of quality and grading. The result of this study revealed that there are 30 legal coffee suppliers in the district who exercise in the way described above.

**Coffee cooperatives:** Coffee cooperatives are established by farmers from different kebeles. There are 11 coffee cooperatives in the District performing, collecting, locally processing, transporting and selling functions. They buy coffee from member and non-members and supply to Kaffa forest Coffee farmers Union.

**Local processors:** In the Districts, simple local processing of coffee is carried out by large scale private investors, traders and coffee cooperatives. Both dry and wet processing is carried out at the processing station by the indicated actors. Major coffee processing carried out in the study area includes hulling, pulping, sorting, grading, packing and weighing. The result of this study shows that 10 coffee cooperatives, 4 private coffee traders and 5 large scale private coffee investors carry out such local processing in the District. Therefore such processing is undertaken using total of 16 coffee processing machines owned by private traders, large scale investors and cooperatives. Out of 16 coffee processing machines, 3 are dry processing and 13 are washing machines. Moreover, in the District there are 35 clay poet tea and coffee houses carrying out local processing function. Other than the processing function mentioned above, such houses purchase coffee from either producers or retailers and changes the form of coffee to the simplest edible product through usual processing.

**Union:** There is one union named Kaffa forest coffee farmers union in the Zone which is formed by the primary coffee marketing cooperatives of Kaffa zone. The coffee purchased by the cooperative is delivered to a union from different districts. The union purchases coffee from cooperatives at a price equivalent to ECX market price. The unions perform different function like: providing transport for produces, providing saving and credit facilities, supplying different inputs to cooperatives, exporting its member produces and promoting coffee processing.

**ECX:** ECX is expected to create market integrity through: introduction of viable products with certified grade and standards; membership based trading; enforcement of standardized terms and conditions for enforcement of contracts in accordance with trading rules.

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**Exporters:** Exporters are traders who buy coffee at ECX trading floor through auction. They are relatively well equipped with the necessary capital, facilities and knowledge. Exporters reprocess and export coffee bean. Exporters are not allowed to directly buy coffee from farmers, collectors and suppliers. Those exporter mainly concentrated at the central market (Addis Ababa) and they purchased coffee based on the given quality criteria's. They are only allowed to buy from ECX through auction floor in Addis Ababa.

Buyers and sellers need to register as a member or agent to trade through ECX. After exporters buy and process up to export standard they sell it to importers. Coffees that does not meet export standard are sold in the domestic market to wholesalers through ECX auction for rejected coffee. Wholesalers sell the coffee to retailers, and retailers sell to local consumers. Therefore by assuming those importer countries, as coffee consumers, we can say that exporters are the last link in the domestic coffee value chain.

### 4.4.3. Chain supporters/influencers

Value chain supporters are those actors under value chain who facilitate smooth functioning of the chain but not take title of ownership for the commodity under the consideration. This study identified different coffee value chain supporters taking part in the area of study (Table10).

Such actors are those enablers who determine the smooth functioning of coffee value chain in the area. They are of different types and also performing different functions. As it is already indicated in the table (10) below, some of them take part in provision of farm inputs like fertilizers, improved variety, pest/herbicides some of them provides technical services like market information, training, transfer of new technology and some others take part in provision of financial support like loan and others.

**Table 10**: Chain supporters and their functions

| Supporters | Function/roles |
|---|---|
| Gimbo District Agriculture and rural development office | ➡ Provides selected variety seedling distributional support for the producers |
| | Gives extension and technical advisory services(production packages, quality aspects and proper use of chemicals to the producers) |
| | ➡ Provides information related with production sustainability |
| Gimbo District office of agricultural marketing | ➡ Performs quality and standard checkupbefore coffee leaves the district for export Provides market related information for the producers as well as traders |
| Gimbo District office of micro finance and Cooperative bank of Ethiopia | ➡ Provides farmers, traders and cooperatives with necessary financial support and loan services |
| Agricultural research institute(Bonga center) | ➡ Provides produces with selected high quality, high yield and disease resistant variety of seedlings |
| District transportation facility owners | ➡ Provides farmers and traders with transportation services |
| Ethiopian commodity exchange(ECX), (Bonga Branch) | ➡ Provides coffee trade information, lobbies, policies and suppliers technical support to its suppliers |

Sources; Own survey (2018)

**Coffee marketing channels**

The analysis of marketing channels was intended to know the alternative routes that the product follows from the point of origin to its final destination. As stated in Mendoza (1995), marketing channels is the sequence of intermediaries through which coffee passes from farmers to ultimate consumers. During the survey, the following six alternative channels were identified for coffee marketing.

As it is identified through the study, there are four different ways through which coffee leaves producers hand. They are through rural collectors, local consumers, coffee suppliers/private traders and coffee cooperatives where the share of each from total sale volume is listed below.

Total amount of coffee supplied by sampled respondents in 2017/18 production season = **(388,700kg),** distributed through the following channels; where suppliers= private traders

Channel 1: Producers $\Rightarrow$ local Consumers (5.3%)

Channel 2: Producers $\Rightarrow$ Rural Collectors $\Rightarrow$ Retailer $\Rightarrow$ Local Consumer (7.56%)

Channel 3: Producers $\Rightarrow$ Rural Collectors $\Rightarrow$ suppliers $\Rightarrow$ Auction (ECX) $\Rightarrow$ Exporters

Channel 4: Producers $\Rightarrow$ Coffee Cooperatives $\Rightarrow$ Union $\Rightarrow$ Auction (ECX) $\Rightarrow$ Exporters (35.02%)

Channel 5: Producers $\Rightarrow$ Private traders/Suppliers $\Rightarrow$ Auction Market (ECX) $\Rightarrow$ Exporters (52.12%)

Channel 6: Producers $\Rightarrow$ Coffee Cooperatives $\Rightarrow$ Union $\Rightarrow$ Exporters

As it is shown above, there are six alternative market channels identified in the study area through which coffee is being marketed through. As it is depicted by percent in the bracket, majority of coffee produce leaves from producers hand through suppliers/ private traders which accounts for 52.12% of the total produce. The second channel through which majority of coffee leaves from producer is cooperative channel by which about 35.02% of the total produce leaves producers hand. The other channel through which coffee is supplied from producer is local collectors and local consumers by which the proportion of total coffee supplied through them accounts for 7.56 and 5.3 percent respectively. Therefore, those channels through which majority of coffee supplied are considered in cost and benefit analysis of this study.

### 4.4.4. Chain coordination and actors relation

According to the information obtained from survey and focus group discussion, there are two major category of coffee supply chain in the study area. They are Conventional chain and cooperatives chain. Conventional chain is one which is dominated by private traders. This chain incorporates collectors, retailers and suppliers. According to the survey result, there are seven legal coffee collectors and thirty coffee suppliers in the District. The other chain is cooperatives chain. In the District, there are eleven primary coffee cooperatives in which 35% of small scale coffee producer farmers are member off. According to the survey data, chain coordination in case of conventional chain is dominantly carried out by traders because they have an access to market information for prices and quality needed at the end market, unlikely to producer farmers, who don't access. Large scale producers have hierarchical chain governance structure in which the entire chain is coordinated by them. In the cooperative organized farmers, the cooperative union has the chain coordination role, because all operational related rules as well as supportive services like training are being adjusted and held by union in cooperatives chain. Establishment of co-operatives in most part of coffee producer areas represents a significant improvement in chain relations.

The cooperatives and large scale commercial producers can utilize new markets opportunities directly through negotiation with end buyers, which can be from local or global. But the other traders who collected coffee from farmers need to pass through ECX auction market for any marketing function. The farmers/producers are the most vulnerable actors in the chain. They lack adequate market information so that traders take higher margin share than the farmers/producers. Producer farmers are the disadvantaged parts. As a result of this study, environment change contemporarily such as wilts coffee diseases and less production due to rainfall erratic distribution causes for loss of the productivity.

### 4.4.5. Analyzing cost and benefit share of actors

This part of value chain analysis deals with the cost and benefit structure of different actors of coffee value chain in the study area. Specifically cost of production and marketing for small holder farmers, marketing cost of collectors, suppliers and cooperatives with their respective share of benefits were analyzed.

4.4.5.1. Production and marketing cost structure

It's really important to know the coffee farmers cost of production, and earns a decent (in every sense) of profit margin. Coffee being a perennial crop, its life time extends over a period of many years and computing actual amount of spent on establishment of coffee farm was difficult due to poor record keeping and shortage of data availability on cost structure starting from seed preparation at smallholders farm level. Therefore, operation and maintenance costs were those costs which were incurred during the bearing stage in the survey year were taken as production cost. Expenditure on labor, cultivation practices in terms of human labor, compost preparation, plant protection, weeding, land tax and drying bed preparation were taken as a production cost, forming the cost of operation and maintenance of coffee farm.

**Table 11**.Cost of production incurred in the year 2017/18 coffee production season

| Production costs | Estimated cost of production (Birr/ Qt) |
|---|---|
| Cost of compost preparation | 70 |
| Cost of cultivation | 126.4 |
| Weeding cost | 25.4 |
| Land tax | 16.0 |
| Harvesting cost | 150 |
| Cost of drying bed preparation | 18.7 |
| Total production cost | 406.5 |

Source; Own survey result (2018)

Analysis of the level of marketing margins and their cost components could help to evaluate the impact of the structure and conduct characteristics on market performance. Marketing margin is defined as the percentage of the final weighted average selling price taken by each of the market chain actors. The margin must cover the cost involved in transporting the produce from one place to the other and provide a reasonable return to those doing the marketing.

**Table 12.** Marketing cost for different channels (Birr/17Qt)

| Classes of marketing cost | Produce | Collectors | Suppliers | Cooperatives |
|---|---|---|---|---|
| Labor/unloading cost | 91.47 | 27.58 | 28.94 | 24.41 |
| Transport cost | 79 | 19.57 | 103.29 | 103.29 |
| Material cost | 27.47 | 25 | 21.17 | 20.29 |

| | | | | |
|---|---|---|---|---|
| Wastage loss | 7.64 | 6.58 | 10.58 | 9.64 |
| Municipality tax | 16.82 | - | 1.70 | - |
| Telephone cost | - | 1.82 | 3.52 | - |
| Personal expense | - | 1.29 | 4.23 | - |
| Hulling cost | - | - | 33.17 | 33.17 |
| Miscellaneous expenses | - | - | 1.70 | 2.11 |
| Brokering fee | - | - | 11.17 | - |
| Total marketing cost | 222.40 | 81.84 | 219.47 | 192.91 |

Source, Survey result, 2018

In the table (13) below it is shown that the differences between the total income from coffee trade and the costs incurred in the process of coffee trading which gives the profit margin of each actor namely producers, rural collectors, cooperatives and private traders. The results showed that coffee producers' profit margin was highest when they direct sell to private traders in channel II which is 1386.66 birr/qt and to cooperatives in channel IV which is 1400.59 birr/qt while take lowest profit margin when they direct sell to rural collectors, which is 1324.03birr/qt.

This implies that producers are more profitable if they sale to private traders and cooperatives. Among traders, private traders shared the highest profit of 219.18 birr/qt when they made direct purchase from producers in channel IV. Rural coffee collectors made a profit of 119.63birr/qt on channel II. This implies that private traders were receiving the highest remuneration from coffee market in the study area while rural collectors took the smallest profits shares (Table13).

As indicated in Table 13, total gross marketing margin (TGMM) was highest in channel II which was 23.12% and lowest in channel IV which was 17.99%. Producers share (GMMp) was highest in channel I from the total consumer price and lowest in channel-II which was 76.89%. This difference might support the theory that as the number of marketing agents increases the producers share decreases. The district agricultural office and ECX reported that currently they developed a law to encourage the direct transaction between coffee growers and private traders in order to improve farmers benefit and coffee quality.

**Table 13.** Cost and benefit share of actors in birr/Qt

| Actors | | CH I | CH II | CH III | CH IV |
|---|---|---|---|---|---|
| **Producers** | Production cost | 406.5 | 406.5 | 406.5 | 406.5 |
| | Marketing cost | 222.40 | 81.84 | 219.47 | 192.91 |
| | Selling price | 1979.17 | 1875.0 | 1950.0 | 2000 |
| | Market margin | 1572.67 | 1468.50 | 1543.5 | 1593.5 |
| | % s share of margir | 25.46 | 23.77 | 24.98 | 25.79 |
| | Profit margin | 1350.27 | 1386.66 | 1324.03 | 1400.59 |
| | % share of Profit | 24.72 | 25.39 | 24.24 | 25.65 |
| **Suppliers/Private traders** | Purchasing price | | | 2076.47 | 2000 |
| | Marketing cost | | | 196 | 219.52 |
| | Selling price | | | 2438.70 | 2438.70 |
| | Market margin | | | 362.23 | 438.70 |
| | % s share of margir | | | 7.24 | 8.73 |
| | Profit margin | | | 166.23 | 219.18 |
| | % share of Profit | | | 3.13 | 5.12 |
| **Rural collectors** | Purchasing price | | 1875 | | |
| | Marketing cost | | 81.84 | | |
| | Selling price | | 2076.47 | | |
| | Market margin | | 201.47 | | |
| | % s share of margir | | 4.102 | | |
| | Profit margin | | 119.63 | | |
| | % share of Profit | | 2.85 | | |
| **Cooperatives** | Purchasing price | | | | 1950.0 |
| | Marketing cost | | | | 192.94 |
| | Selling price | | | | 2399.41 |
| | Market margin | | | | 449.41 |
| | % s share of margir | | | | 8.92 |
| | Profit margin | | | | 256.47 |
| | % share of Profit | | | | 5.94 |
| **TGMM** | | 0 | 23.12 | 18.74 | 18 |

Source, Survey result, 2018

## 4.4.6. Analyzing challenges and opportunities of coffee production and marketing

Value chain analysis is a wide concept under which examining constraints as well as opportunity under the areas in which the chains operates is one of the main concerns and it also helps different stake holders to identify the existing gap and to reshape the way of operation according. Moreover, identification of challenges and existing opportunities helps policy makers by clearly showing them the areas requiring attention for intervention. Accordingly, this study identified different challenges and opportunities of coffee value chain in the area of study (Gimbo District) using simple descriptive analysis which is clearly discussed by categorizing them as challenges and opportunities at producers and traders' level.

### 4.4.6.1. Challenges/constraints and opportunities at producer's level

### 4.4.6.1.1. Production challenges and opportunities

Constraints at producer's level are categorized as both production and marketing related constraints. As it is identified by this study (in table14), there are different productions related constraints at producers' level in the study area. Production constraints are further categorized as ecological/ environmental related, economic, technical and social/cultural related constraints. According to the response of sampled producers, coffee disease, climate change and unpredictable rain and shortage of suitable irrigation are identified as the major environmental problems challenging coffee production in Gimbo District.(Table 14).

Table: 14 Production challenges and opportunities

| PRODUCTION CHALLENGES | | |
|---|---|---|
| **Ecological/ environmental related** | **Fre** | **%** |
| Coffee disease | 153 | 84.5 |
| Climate change & unpredictable rains | 137 | 75.5 |
| Shortage of suitable irrigation | 128 | 70.7 |
| **Economic** | | |
| High cost of fertilizer | 114 | 62.9 |
| Limitation of land | 125 | 69.06 |
| Shortage of improved variety | 78 | 43.09 |
| Shortage of coffee drying facility | 75 | 41.43 |
| Shortage of proper storage with adequate facilities | 156 | 86.18 |
| **Technical (Result of FGD)** | | |
| Weak linkage between research, extension services and producers | 14 | 100 |
| Limited communication, infrastructure and logistics | 11 | 78.57 |
| **Social/cultural related (Result of FGD)** | 14 | 100 |
| Utilization of old coffee tree over time/weak management | 10 | 71.42 |
| Poor initiative for utilization of new agricultural technologies | 14 | 100 |
| Poor harvest and post-harvest practices | 14 | 100 |
| Weak experience on exploitation of locally available production inputs | 12 | 85.71 |
| **PRODUCTION OPPORTUNITIES (Result of both survey and FGD)** | | |
| Existence of suitable soil type and topography | 145 | 80.11 |
| Availability of local seedlings | 125 | 69.06 |
| Regular professionals follow up | 157 | 86.18 |
| Proximity to Agricultural Research Institute(Bonga center) | 14 | 100 |
| Government encouragement of model coffee producers | 14 | 100 |

Source: Own survey result, 2018

There are many research findings documented that coffee diseases and insect pests situation in coffee production pose great treat. There are three major coffee diseases namely coffee berry diseases (Colletotrichum kahawae ), coffee wilt disease (Gibberella xylarioides ) and coffee leaf rust (Hemileia vastatrix ). Among which, coffee wilt disease

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is the second distractive disease dramatically limiting coffee production in Ethiopia (Eshetu *et al.*, 2009).

In the area of study, more than 84% of the respondents confirmed the existence of coffee disease and said that the problem is both short and long term which even kills the coffee tree at all. But according to their response, the short term effect of such disease is making the new coffee cherries out of use by changing its color and forcing the coffee cherries to dry before maturation and fall down on the land. In such way it highly minimizes the productivity and leads the farmers from visible economic loss to morale declination. In addition to survey result, key group discussion also supported the existence and severity of this problem in the area of study.

Climate change and unpredictable rain are another environmental issue identified challenging coffee production in the study area(Table 14). According to (Technoserve, 2011) rising temperatures and erratic rain fall are threatening sustainable coffee production by enabling outbreak of diseases and infestations of insect pests that decrease the quality and yield of coffee berries. Producers have no power over changes in the environment, but when their harvest suffers as a result, they do too. They need their harvest season to cover the fixed costs they've incurred throughout the year.

As it is identified by this study, problem related with change in climate is limiting coffee production and its productivity especially unpredictable rain during harvest. There are four main species: Arabica, Robusta, Excelsa, and Liberica. Among which Arabica is widely considered to be more sensitive to temperature increases, which reduce its growth, ability to flower, and consequent ability to produce fruit which is also true in the case of study area as it is confirmed by majority of sampled respondents(75.5%). It needs to grow at cooler temperatures than the other species. This means it's usually cultivated at higher altitudes. As climates change, the available fertile land for Arabica decreases.

Heavy rain during harvesting and processing can cause cherries splitting on the tree and losing their mucilage, fermentation during processing, and more. This is a particular concern when producers are naturally /dry processing their coffee; since these need lots of time under direct sunlight to thoroughly dry. They can also lead to unpredictable harvests.

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Coffee cherries ripen nine months after the coffee flowers blossom (with Arabica – it varies from species to species).

Other environmental problem identified though this study is shortage of suitable irrigation (Table 14). During survey, most of coffee producers (70.7%) in the study area showed their interest for irrigation and in parallel they raised absence/shortage of irrigation. According to their response, irrigation is necessary for coffee production especially during sunny season. With respect to this issue the respondents also said that before ten years ago the problem was not their concern but nowadays due to deforestation and other related problems shortage of rain is visible during time of cultivation and alternative irrigation system is required. High price for fertilizer, shortage of land, shortage of drying material, shortage of improved coffee variety and shortage of proper storage facility are other category of factors which are against coffee production in the study area (Table14). Factor of production (inputs) are indispensable to ensure productivity. But unless they are not easily affordable and are over the capacity of the users they become problem. Fertilizer is one of agricultural production inputs which highly determine agricultural productivity. But in the study area, about 63% of the sampled respondents reply that price of fertilizer is high and is one of production related challenges in the area.

Land is another factor of production and is the most important input without which agricultural production cannot be considered. Shortage of land is the common problem in different areas of the country. This is because of dramatic increase in population number. The issue is also common in the study area which affects coffee production as it is identified by this study (Table14). Coffee production is widely expanded agricultural activity throughout the world. Therefore nowadays producing countries are highly competing with quality rather than quantity. This is because the living standard of people is changing continuously and preference of people is shifting towards quality products. To this end, one of the ways by which coffee quality can be maintained is through use of improved variety. In order to use improved variety, there would be adequate supply from the concerned bodies.

But in case of Gimbo District, there is shortage in supply of such improved variety of coffee which is highly hindering the producers of the area from producing quality coffee (Table14). Post-harvest handling is the most important issue which determines the quality

of coffee. Coffee processing starts from drying. Drying coffee requires proper space and material with limited standard. Unless coffee is dried by paying due attention, there would be high probability of losing its quality. Among coffee drying material, drying wire is the most common and widely used by producer in different regions of the country. But this study identified that some of coffee producers (41.43%) in the study area are facing problem of shortage of such drying material. The other most common economical factor against coffee production in the area of study is shortage of proper storage with adequate facility (Table 14).

There are also technical related problems of coffee production as identified by this study (Table 14). Weak linkage between research, extension services and producers and limited communication, infrastructure and logistics services are the common types of technical problems. Linkage between stake holders is very important and modern approach to ensure sustainable development. In case of agricultural production, research, extension service and producers are non-separable stake holders. This is because research center plays great role by identifying producer's level problems through scientific approach and extension service providers teach and train producers about new technologies and current issues and the producers realize all through practice. Therefore this natural chain requires being as strong and continuous as possible. But through this study, it is identified that there is weak bond between this stakeholders in the study area.

Another category of production problems is personal/social related problems. Therefore, through survey, utilization of old coffee tree over time/weak management, poor initiative for utilization of new agricultural technologies, poor harvest and post-harvest practices reducing coffee quality, limited skills in modern coffee production and weak experience on exploitation of locally available production inputs are identified as major personal problems challenging coffee production in the study area.

On other hand, the study also identified coffee production opportunities in the study area; therefore as it is obtained from FGD and indicated in table 14 above, existence of suitable soil type and topography, availability of local coffee seedlings, regular professional follow up, proximity to agricultural research institute of Bonga center and governmental encouragement of model farmers are the main opportunities for coffee production in the study area.

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As indicated in the (Table 14) above, about 94.4% sample respondents raise the existence of suitable soil and topography as one of the existing opportunities which enhances them to produce coffee. This is also supported by an observation during survey data collection. Existence of locally available seedlings is also identified as one of the opportunities which save small scale producers from incurring high cost of seedling purchase. When they justify this opportunity, they raised that there is very huge public forest around the area where there is local coffee seedling what they locally called "Cafee shookketo" meaning the one sowed by birds. According to the data, about 70% of the respondents still use this coffee seedling together with specialized variety and of their own. Regular professional follow up and governmental encouragement of the model farmers are another opportunities for producing coffee identified by this study.

### 4.4.6.1.2. Marketing challenges and opportunities

Table15: Producers level coffee marketing challenges and opportunities

| Marketing challenges | Frq | % |
|---|---|---|
| Price fluctuation | 152 | 83.97 |
| Limited access to market information | 125 | 69.06 |
| Inadequate transportation access | 121 | 66.85 |
| Delay in payment for dividend(for cooperatives) | 67 | 84.81 |
| Delay in opening of marketing(for cooperatives) | 59 | 74.68 |
| **Marketing opportunities** | | |
| Expansion of private coffee traders | 175 | 96.68 |
| Availability of alternative market route | 137 | 75.69 |
| Nonperishable nature of the produce | 178 | 98.34 |

Source: Own survey result (2018)

Price fluctuation and unreliable income is one of the marketing challenges at producer's level identified in the study area (Table15). Price for coffee is determined by world market and is not constant throughout the production period. According to the response of the sampled producers, price for coffee is unstable regardless of the production situation and it sometimes mis- matches with their expectation. Therefore when they expect high price it becomes low and vice- versa. Moreover when the price for coffee is low it becomes

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difficult to cover their production cost and leads them to loss.This price volatility has significant consequences for those who depend on coffee for their livelihood, making it difficult for growers to predict their income for the coming season and budget for their household and farming needs.

When prices become low, farmers have neither the incentive nor resources to invest in good maintenance of their farms by applying fertilizers and pesticides or replacing old trees. When prices fall below the costs of production, farmers struggle to put adequate food on the table and pay medical bills and school fees a major reason for children taken out of school to contribute to the family income by working on the farm or in the informal sector.

In adequate transportation access is another marketing problem challenging coffee producers in the study area (Table 15). Transportation ensures linkage between producers and traders and facilitates marketing system. Total marketing cost also includes transportation cost and those coffee producers with inadequate transportation access are more likely to incur high marketing cost. In the study area, majority of coffee producers are far from marketing center and inadequate transportation access is one of their common marketing problems. Those coffee producers who are member of coffee cooperative also rose delay in payment of dividend after selling their coffee and delay in opening of market as their major coffee marketing problems.

There are also other factors which can be considered as marketing opportunities in the study area as the response of sampled producers. Therefore, non-perishable nature of the produce to store for long time, availability of alternative market route, expansion of private coffee traders are the major marketing opportunities for coffee in the study area (Table 15).

4.4.6.2. Challenges/constraints and opportunities at traders' level

At trader's level, there are different challenges as well as opportunities of coffee marketing identified through this study (Table 16). Generally, Dynamic nature of coffee supply, shortage of coffee processing machine, administrative problems, shortage of working capital and over taxation are the main coffee trading related problems identified in the area of study (Table16).

Table16: **Coffee value chain challenges and opportunities at traders' level**

| Challenges | Freq | Percent |
|---|---|---|
| Shortage of coffee processing machine | 30 | 94 |
| Dynamic nature of coffee supply | 29 | 90.6 |
| Administrative problems | 30 | 94 |
| Shortage of working capital | 18 | 56 |
| Over taxation | 25 | 78 |
| Price volatility | 23 | - |
| **Opportunities** | | |
| Availability of market center at each corner of the District | 32 | 100 |
| Proximity to ECX | 28 | 87.5 |
| Regular professionals support | 30 | 94 |
| Increase in international coffee demand | 25 | 78 |

Source: Own survey result (2018)

It is obvious that there is great difference between value of processed and non-processed coffee. In order to carry out local processing, and to minimize such differences, adequate processing equipment is necessary. But, in Gimbo District there are only 2 privately owned coffee processing machines and 9 cooperatives owned coffee processing machines. Therefore this small number of machines is not as enough as possible to meet the demand of traders. Dynamic supply of coffee is another problem at traders' level which hinders their operation from being regular. According to the response of traders, coffee supply becomes high during harvesting time and it extremely becomes low afterward. Therefore this leads them to stop their operation for certain period of time when the supply is low. But such on /off like activity directly relates with over taxation and bureaucratic act. The respondents said that even if the tax laid is fair, they are forced to pay regardless of the market situation. Meaning whatever they buy and sale in on off mode they are obliged to pay on regular basis. Finally shortage of working capital is another problem identified at traders' level. Due to this problem some of private traders are limited to expand their operation to the extent they want. Global coffee production varies from year to year according to weather conditions, disease and other factors, resulting in a coffee market that is inherently unstable

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and characterized by wide fluctuations in price and the result of such global issue is also challenging coffee traders at different level of the country.

In addition to production opportunities, the following market related opportunities are also identified at trader's level through this study. Accordingly,(Table16) above shows the summarized opportunities at trade's level. Availability of market center at each corners of the district is one of the overweighting market related opportunity identified by this study. In addition to the data obtained from respondents, observation result also shows availability of such market center at different area of the district. Accordingly by clustering neighboring kebeles one market center is built in between. Therefore there are 8 different market centers at different corners of the District which makes smooth marketing environment for traders. Proximity to ECX is another opportunity identified by this study which saves coffee traders of the area from incurring high transportation cost. Not only this but also they rose that such proximity helps them to exercise their operation on regular basis without any delay. Regular professional support and increase in international demand for coffee is another trader's level opportunities identified by this study.

## 4.5. Results of econometric estimation

### 4.5.1. Determinants of quantity of coffee supplied to market

Since, coffee is a perennial and cash crop, coffee farmers' primary decision to produce it for sales purpose in order to earn cash as well as for household consumption purposes. According to the result of this study, all sample households are suppliers of the coffee to the market. Therefore, multiple linear regression models were employed to identify the factors affecting market supply of coffee. For the parameter estimates to be efficient, unbiased and consistent, assumptions of classical linear regression (CLR) model should hold true. Hence, Multicollinearity, Endogeneity and Heteroscedasticity detection test were performed using appropriate test statistics.

**Test of multi-collinearity**: Before fitting important variables into the regression models for analysis, it is necessary to test multicollinearity problem among variables and check associations among discrete variables, which seriously affects the parameter estimates.

According to Gujarati (2003), multicollinearity refers to a situation where it becomes difficult to identify the separate effect of independent variables on the dependent variable because of existing strong relationship among them. The measures that are often suggested to test the existence of multicollinearity are Variance Inflation Factor (VIF). As a rule of thumb, if the VIF is greater than 10, the variable is said to be highly collinear (Gujarati, 2003). Therefore test of multicollinearity was carried out and all VIF values are less than 10. This indicates absence of serious multicollinearity problem among independent variables (Appendix Table 5).

**Test of heteroscedasticity**: Violation of Classical Linear Regression assumption saying "the disturbance terms has constant variance" causes the model problem called heteroscedasticity. When such problem happens in the data set, the parameter estimates of the coefficients of the independent variables cannot be BLUE. There are number of test statistics for detecting heteroscedasticity. For simplicity, heteroscedasticity was detected by using Breusch-Pagan test in STATA and the result indicates the presence of the problem of heteroscedasticity. Therefore, to overcome the problem, Robust OLS analysis with heteroscedasticity consistent covariance matrix was estimated.

**Test of endogeneity**: In order to identify whether the model suffers from the problem of endogeniety caused due to either variable omission or correlation of independent variables with error term or not, one can simply use estat ovtest in STATA and if p- value<alpha, the null hypothesis is rejected indicating that the model has no omitted variable (no endogeniety) and vice versa. In addition, one can simply identify the presence of endogeniety problem using coefficient after regression. Therefore, when the coefficients are unusually large (or small) or have an incorrect sign not conforming to economic intuition it is indication of the presence of endogeniety causing biased coefficient estimates. An appropriate measure advised to overcome such model diagnosis is using 2SLS method. Application of (2SLS) requires instrumental variable/s which is/are used to cut correlations between the error term and independent variables. The method involves two successive applications.

The first stage is made by regressing the suspected endogenous variables over the pre-determined or pure exogenous variables to get their predicted values. Then the predicted values of the endogenous variables in the first stage are used to estimate the supply equation. The instrumental variable should fulfill two requirements to be used as instrument. One the instrument must be uncorrelated with error term and second requires the linear projection of endogenous variable onto all the exogenous variables. So the instrumental variables were selected by checking its correlation with the endogenous and exogenous variables.

In case of this study, testing for endogeneity of quantity of coffee produced was carried out in the model using both Hausman test and Durbin-Wu-Hausman (DWH) test and endogeneity problem was found in quantity produced variable. Hausman test result indicated that, the predicted productivity was statistically significant with (p= 0.000) when included as additional explanatory variable in the model which implies hypothesized quantity produced variables is endogenous due to its correlation with error term. Durbin Wu Hausman test results also shows that the null hypothesis of exogeneity of the quantity $\chi$ produced was rejected at 1% probability level ($\chi$ 2=5.55 and P-value = 0.000) using estat endogenous STATA command after ivregress.

Therefore, two stages least square (2SLS) method was used to address the endogeneity problem. The F test result for quantity of coffee produced was "62.50" (a general rule of thumb is that if F test is less than 10 there is cause for concern). So the null hypothesis is rejected indicating non- presence of weak instruments hence our statistics greatly exceeded the critical values (Appendix Tables 7). Over identifying restrictions test was also tested using Hansen Sargan test and Basmann test using estat overid command. The results of Basmann test show a P-value of 0.448, which indicated the model is correctly specified and the instruments are valid (Appendix Tables 6). Therefore, 2SLS methods were applied to overcome the endogeneity problems.

In the first stage of 2SLS method, regressions was run and analyzed using eleven explanatory variables including instrumental variables which were (land allotted for coffee and farming experience of house hold head) used to instrument quantity produced and the result showed that, (education level of household head, cooperative membership, distance

to the nearest market, land under coffee, years of farming experiences, extension contact, ownership of transportation facility and amount of credit received) significantly affects quantity produced of coffee (Appendix Table 6). Land under coffee and years of farming experiences are used as instruments for quantity produced.

As shown in Table 15, in second stage of 2SLS ten explanatory variables were used to influence the volume sales of coffee; from those, five variables (quantity of coffee produced, education level of household, cooperative membership, distance to the nearest market and ownership of means of transport) were found to significantly affects the amount of quantity of coffee supplied to the market. The result shows that the model was statistically significant at 1% level indicating the goodness of fit of the model to explain the relationships of the hypothesized variables. Coefficient of multiple determinations ($R^2$) was used to check goodness of fit for the regression model. Hence, $R^2$ indicates that 93.47% of the variation in the farm level market supply of coffee was explained by the explanatory variables included in the model.

**Table 17:** Determinants of farm level volume sales of coffee (2SLS estimates)

| Variables | Coef | Std.err (Robust | Z | P>|z| |
|---|---|---|---|---|
| Quantity produced | 0.27*** | 0.052 | 8.16 | 0.000 |
| Sex of household head | -0.450 | 0.489 | -0.92 | 0.357 |
| Family size | 0.156 | 0.168 | 0.93 | 0.351 |
| Education | 0.0360* | 0.087 | 1.84 | 0.066 |
| Cooperative membership | 0.157*** | 0.411 | 2.59 | 0.000 |
| Off/non-farm income | -8.91e-06 | 0.004 | -0.21 | 0.837 |
| Extension contact | 0 .392 | 0.398 | 0.99 | 0.324 |
| Distance to the nearest market | - 0.166* | 0.087 | -1.91 | 0.056 |
| Amount of credit received | 0.065 | 0.007 | 0.86 | 0.392 |
| Ownership of transportation | 0.0899* | 0.482 | 1.86 | 0.062 |
| Constant | (0-.963)*** | 0.418 | -2.30 | 0.000 |

Number of observation = 181, R-squared= 93.47, Prob>F=0.0000***

Note: Dependent variable is quantity of coffee supplied in kg (transformed in ln)

***, ** and * significant at 1, 5, and 10 probability levels respectively

Source: Survey result: (2018)

**Quantity produced**: As it was hypothesized that quantity of coffee produced is positively and significantly related with market supply of coffee. The positive and significant relationships between the two variables indicate that coffee produced is very important variable affecting volume of coffee supply by household head. The coefficient for quantity of coffee produced implies that an increase in productivity of coffee by one quintal resulted in an increase in farm level market supply of coffee by 0.27qt keeping other factors constant. This is in line with the finding of Bosena, (2008) Bosena and Addisu (2016) showed that cotton and potato productivity significantly and positively affected the market supply of each of the commodities, respectively.

**Educational level of the household head**: Educational level of the household head was found to have positive and significant relation with the quantity of coffee supplied to the market. It influences household market supply of coffee at 10% significance level. The model output shows that a one year increase in formal education level leading to an increase in market supply of coffee by 0.036qt keeping all other variables constant. The positive and significant relationship indicated that education determines the willingness to accept new ideas and innovations, and easy to get supply, demand and price information which enhances farmers' willingness to produce more and increase volume of sales. This is consistent with the finding by Zekarias et al. (2012) who studied market chain analysis of forest coffee in south western Ethiopia and found that education level has significant and positive effect on market supply.

**Cooperatives membership:** Membership in coffee cooperative affect volume of coffee supplied positively at 1% significance level. As compared to those household who are not a member of coffee cooperatives, those household who are a member of coffee cooperatives market supply of coffee increase by 0.157qt considering all other variables remains unchanged. They were motivated to supply more quantity of coffee with the expectation of future benefit from profit dividend than non-members. Farmers in groups have a strong bargaining power when marketing their products and in turn receive better returns for their produce. The result is in line with Bizualem et al. (2015) who indicated that being a member in coffee cooperative increase marketed surplus positively and significantly.

**Distance to the nearest local market**: The result obtained from the model output indicates that distance from the nearest market was found to be one having negative and significant influence on the market supply of coffee at 5% significant level. An increase in distance from nearest coffee market by a unit kilometer decreases quantity of coffee supplied to the market by 0.166qt keeping other factors constant. This implies that an increase in market distance increase producers marketing cost and this in turn reduces market supply of coffee. It is in line with Wendimagegn (2014) who reported that market distance affects volume of coffee market supply negatively.

**Ownership of means of transportation**: Transportation was also another factor, which was hypothesized to affect the volume of coffee supplied positively. The variable's coefficient is positive and statistically significant at 10% significance level. The positive and significant relationship between variables indicate that, for farmers having their own means of transportation, the quantity of coffee supplied to the market increase by 0.089qt keeping other factors constant. This is concurrence with the study of Agete (2014) who found that ownership of transportation means significantly enhanced in red bean market supply of households.

### 4.5.2. Comparing farmers performance under cooperatives and conventional chain

This part of the study focused on comparing small scale coffee farmers' performance who exercises in conventional and cooperative chain. Both conventional chain and cooperative chain are the alternatives routes in the area through which coffee is marketed to its target destination. The existing conventional chain in the area are already identified and reported in the value chain analysis section of this study. Conventional chain is open chain which all producers can easily access regardless of additional requirement like membership. But in case of cooperative chain, even if it is open for all producers, non-members cannot easily access the additional services beyond selling their produces.

Therefore, the section explains estimation of propensity scores, matching methods, common support region, balancing test and also explains the treatment effect of the coffee cooperatives across the member households.

### 4.5.2.1. Estimation of Propensity Scores

The logistic regression model was employed to estimate propensity score for matching the treatment household with control households. As indicated earlier, the dependent variable in this model is a binary variable which refers to whether the household is member of coffee cooperative (take treatment) which takes a value of 1 and 0, otherwise (untreated). Table 16, below shows the estimation results of the logit model. The estimated model appears to perform well for the designed matching exercise since the pseudo-R2 value is 0.514. A low R2 value shows that the allocation of the program has been de facto random (Pradhan and Rawlings, 2002). In other words, a low R2 value means that program households do not have much distinct characteristics overall and as such finding a good match between program and non-program households becomes easier. The pseudo-R2 indicates how well the regressors explain the participation probability. After matching, there should be no systematic differences in the distribution of covariates between both groups and therefore, the pseudo-R2 should be fairly low (Caliendo and Kopeinig, 2005).

**Table 18**: Logit model estimation of factors affecting producers likelihood of being member of coffee cooperatives in the study area

| Variables | Coefficients | Std .Err. | Marginal effect | p-value |
|---|---|---|---|---|
| Age | 0.0042*** | 0.028 | 0.0078216 | **0.005** |
| Sex | 0.399 | 0.379 | 0.0576768 | 0.292 |
| Education | 0.0246*** | 0.080 | 0.0475224 | **0.002** |
| Family size under productive age | -0.0328* | 0.235 | -0.0571123 | **0.080** |
| Land allotted for coffee | 0.0405*** | 0.335 | 0.01829173 | **0.005** |
| Credit use | 0.0154 | 0.230 | 0.0245612 | 0.883 |
| Ownership of transport | 0.0179 | 0.320 | 0.036605 | 0.574 |
| Coffee farming experience | 0.033 | 0.040 | -0.072523 | 0.405 |
| Non/off farm income | 0.000 | 0.000 | 0.0000121 | 0.194 |
| Distance from cooperative coffee collection point | -0.0581*** | 0.562 | -0.04827598 | **0.000** |

***, ** and * are statistically significant at 1%, 5% and 10% probability levels respectively.LRchi2 (12) = 127.54 Prob>chi2= 0.0000 PseudoR2= 0.514, No of obs =181.

The result of simple comparison of two groups based on observable covariates cannot be used to draw inference about the impact of the system (coffee cooperatives) on the performance of member farmers since other confounding factors would need to be controlled for. Out of the 10 variables included in the logistic regression model for assessing factors affecting farmers/producers likelihood of joining coffee cooperative, only 5variables were found to be significant (Table 18). This variables are (Age of household head, family size under productive age, land allotted for coffee, level of education/grade completed by household head and distance to coffee cooperative office). This indicates that cooperative membership was directly correlated with some socio economic characteristics of households and the finding of each significant variable are discussed below where the effect of each of significant variables was interpreted in terms of their marginal effect.

**Age of household head:** As shown in table 16 above, age of household head shows positive and significant relationship with being member of coffee cooperative at 1% levels of probability with a marginal effect of 0.0078216. With its marginal effect it implies that as age increase by a unit year, the probability of producers' participation in coffee cooperative increases by 0.78%, keeping other variables constant. This is in line with the finding ofZekarias Shumeta and Marijke D'Haese (2015), Bernard *et al.*, (2008), Bernard and Spielman (2009) and Abebaw and Haile (2013) who have shown that the age of the household head is positively correlated with the likelihood of cooperative membership. The finding of this study confirms that when compared to younger households, older households are more likely to participate in coffee cooperative of the area.

**Education level of household head:** Education is another important variable identified as one of the determinant for being member of coffee cooperative in the study area. Therefore the result of this study revealed positive and significant relationship between these two variables (table 18); according to which, as the educational status of households increase by one class, the likelihood of joining coffee cooperative increases by 4.75% keeping other factors constant. This is in line with the finding of Zekarias Shumeta and Marijke D'Haeseb (2015) which shows positive and significant relationship between education and probability of joining agricultural cooperative in general. This is because educated people are wise in thinking than non-educated people and are more likely to widen their benefit through participating in different social system.

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**Family size under productive age:** Family size is an important social issue determining different household decision in different parts of our country. In case of this study member of household aged between 15 and 45 are considered as productive group and the result of this study shows significant and negative relationship between family size under productive age and producers' probability of joining coffee cooperative at 10% probability level in the study area. Accordingly, households with more number of productive families are less likely to be members of coffee cooperatives and as number of productive family increase by a unit, the probability that producers' households join the cooperative decreases by 5.71% keeping other factors constant. This is because producer households with more number of active families are more likely to access different market route and their consideration of cooperative as important system is low.

**Land allotted for coffee:** Land allotted for coffee was hypothesized to have positive effect on producers' likelihood of joining coffee cooperative. It was confirmed with the finding of the study in which having more land covered by coffee was found positively and significantly correlated with the probability of being coffee cooperative member at 1% probability level. Therefore, increase in land allotted for coffee by one hectare, results in increment of producers' probability of being member of coffee cooperative by 1.82% keeping other factors constant in the area of study. This result is consistent with the findings of Abebaw and Haile (2013) who reported the existence of positive and significance relationship between land allotted for coffee and producers' probability of joining cooperative.

**Distance from cooperative office:** Is other variable expected to have effect on producers' likelihood of being member of coffee cooperative. The result of the study also ensures that there is negative and significant relationship between distance from cooperative office and coffee cooperative membership at 1% level of significance. Therefore, households further away from the cooperatives' coffee collection points (cooperatives office) were less likely to be members.

The result of estimation indicated that, for each additional hour of travel to the coffee collection point, the likelihood of belonging to a cooperative decreases by 4.82 % keeping other factors constant. Other variables such as sex of households, marital status, ownership

of transportation facility, credit and availability of off/ non-farm income were not significance in explaining coffee cooperative membership in the study area.

**The distribution of the propensity score**

For each household included in the treated and control groups, propensity score were computed based on the above participation model to identify the existence of a common support. Figure.5 below depicts the distribution of the household with respect to the estimated propensity scores. It shows that most of the treated households were found in the middle and partly in the right side near wide area in which the propensity score of both the treatment and the control groups are similar.

The distribution of the estimated propensity scores for the above covariates of rural household is presented below in figure 5. In the figure, red color represents distribution of propensity score of treated households while the green color represents the distribution of propensity score for control households. Most of treated group households have propensity score around 0.9 whereas significant majority of the control households have propensity scores around 0.1
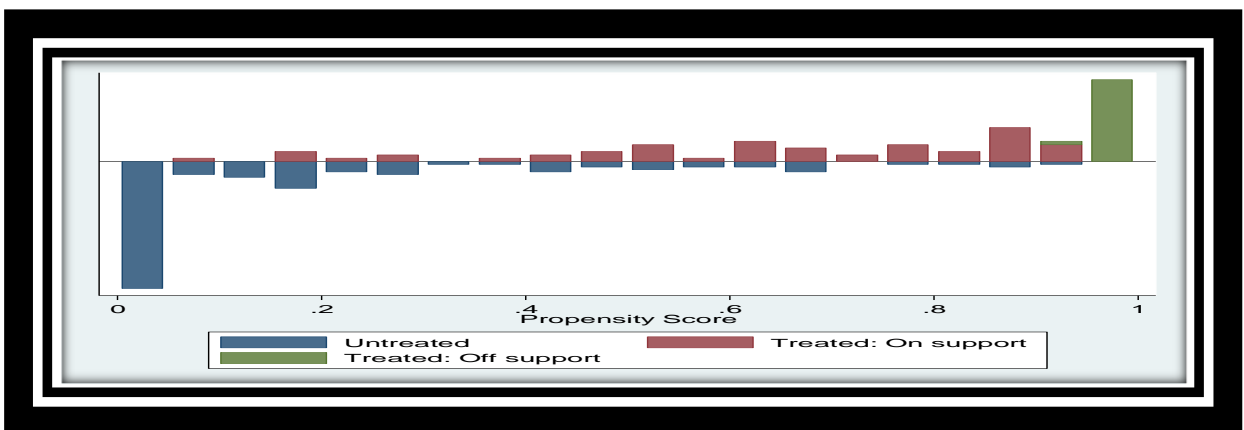


Fig7. Distribution of propensity scores

**Matching members and non-members**

For matching, members and non-members based on the observed covariates, there are three most important tasks to be accomplished first. They are estimating the predicted value of participation in the program for all households following this, imposing a

common support condition on the propensity score distributions of household with and without the program and lastly discarding observations whose predicted propensity scores fall outside the range of the common support region. The basic criterion for determining the common support is to remove all observations whose propensity score is smaller than the minimum of the program and larger than the maximum in the opposite group (Caliendo and Kopeinig, 2008).

As shown in (Table 19) below, the estimated propensity scores vary between .0848231 and 0.984998 with (mean=0.7540723) for cooperative members and between 4.18e-12 and 0.9366282 with (mean=0.1904734) for non-members (control) households. The common support region would therefore, lies between 0.848231 and 0.9366282 which means households whose estimated propensity scores are less than 0.848231 and larger than 0.9366282 are not considered for the matching purpose. As a result of this limitation, 25 participant (treated) households were discarded. Fortunately, all non-participant households lie within common support region. This shows that the study does not have to drop any non-participant households from the sample in computing the impact estimators.

**Table 19:** Distribution of estimated propensity scores

| Group | Obs | Mean | Std. Dev | Min | Max |
|-------|-----|------|----------|-----|-----|
| Total household | 181 | 0.4364641 | 0.4973225 | 4.18e-12 | 0.984998 |
| Treatment households | 79 | .0.7540723 | 0.2407977 | .0848231 | 0.984998 |
| Control households | 102 | 0.1904734 | 0.2534157 | 4.18e-12 | 0 .9366282 |

Source: Own survey result, 2018

4.5.2.2. Choice of Matching Algorithm

There are three different criteria's to be fulfilled to choose matching algorithm suggested by Dehejia and Wahba (2002). First, equal means test (referred to as the balancing test) which suggests that a matching estimator which balances all explanatory variables (i.e., results in insignificant mean differences between the two groups) after matching is preferred. Second, looking in to pseudo-R2 value i.e.; smallest value is preferable. Third, a matching estimator that generates larger number of matched sample size is preferred.

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Below in (Table 20), the estimated outcome of tests of matching quality based on the three performance criteria is summarized. After looking into the result of the matching quality, kernel matching of bandwidth (0.1) was found to be the best estimator on basis of criteria's described above. Hence, the estimation results and discussion for this study are the direct outcomes of the kernel matching algorithm with a bandwidth (0.1).

Table 20: Matching performance of different estimator

| Matching estimators | Performance criteria | | |
|---|---|---|---|
| | Balancing test* | Pseud-R2 | Matched sample size |
| **NN(Nearest neighbor** | | | |
| NN(1) | 9 | 0.388 | 156 |
| NN(2) | 10 | 0.029 | 156 |
| NN(3) | 10 | 0.039 | 156 |
| NN(4) | 10 | 0.034 | 156 |
| NN(5) | 10 | 0.032 | 156 |
| **Kernel Matching** | | | |
| Band width 0.01 | 10 | 0.035 | 141 |
| Band width 0.1 | 10 | 0.037 | 156 |
| Band width 0.25 | 10 | 0.045 | 156 |
| Band width 0.5 | 9 | 0.069 | 156 |

* Number of explanatory variables with no statistically significant mean differences between the matched groups of program and non-program households.
Source: Own computation result (2018)

4.5.2.3. Propensity score and covariate balance test

After choosing best performing matching algorithm, the next task is to check the balancing of propensity score and covariate using different procedures by applying the selected matching algorithm band width 0.1 in case of this study. It should be clear that the main intention of estimating propensity score is not to get a precise prediction of selection into treatment. Rather, to balance the distributions of relevant variables in both groups. The balancing powers of the estimations are determined by considering different test methods such as the reduction in the mean standardized bias between the matched and unmatched households, equality of means using t-test and chi-square test for joint significance for the variables used. The balancing powers of the estimations are ensured by different testing methods. Reduction in the mean standardized bias between the matched and unmatched

households, equality of means using t-test and chi-square test for joint significance of the variables were employed.

The fifth column of table 21 below show the mean standardized bias before and after matching, while column six reports the total bias reduction obtained by the matching procedure. The standardized difference in covariates before matching is in the range of 0.2 percent and 141.5 percent in absolute value whereas the remaining standardized difference of covariates for almost all covariates lies between 0.7 percent and 22.2 percent after matching. This is quite below the critical level of 20 percent suggested by Rosenbaum and Rubin (1985). Hence, the process of matching thus creates a high degree of covariate balance between the treatment and control samples that are prepared to use in the estimation procedure.

The same to that, t-also reveal that before matching nine of chosen variables exhibited statistically significant differences, while after matching all of the covariates are balanced. As indicated in table 6 the values of pseudo-R2 are very low. As discussed in the previous section the low pseudo-R2 value and the insignificant likelihood ratio tests support the hypothesis that both groups have the same distribution in the covariates after matching. These results indicate that the matching procedure is able to balance the characteristics in the treated and the matched comparison groups. Therefore, these results can be used to assess the impact of PSNP among groups of households having similar observed Characteristics. This enables researcher to compare observed outcomes for treatments with those of a control groups sharing a common support.

**Table 21:** Propensity score and covariate balance test

| Variable | Sample | Mean T | C | Bias (%) | Red bias % | t- test | p |
|---|---|---|---|---|---|---|---|
| P score | U | 0.75151 | 0.19261 | 209.3 | | 13.3 | **0.000** |
| | M | 0.65764 | 0.65162 | 2.4 | -95.54 | 0.13 | 0.895 |
| Age | U | 49.405 | 42.902 | 97.0 | | 6.46 | **0.000** |
| | M | 48.056 | 46.887 | 17.4 | -82.0 | 1.06 | 0.290 |
| Sex | U | 0.82278 | 0.82353 | -0.2 | | -0.01 | 0.990 |
| | M | .87037 | .86763 | 0.7 | -268.0 | 0.04 | 0.967 |
| Religion | U | .96203 | 1.2745 | -42.7 | | -2.83 | **0.005** |
| | M | 1.037 | 1.0059 | 4.3 | 90.0 | 0.23 | 0.818 |
| Marital status | U | 1.3924 | 1.1569 | 36.1 | | 2.44 | **0.016** |
| | M | 1.2222 | 1.3671 | -22.2 | 38.5 | -1.24 | 0.216 |
| Education | U | 4.962 | 3.4706 | 84.3 | | 5.62 | **0.000** |
| | M | 4.537 | 4.2622 | 15.5 | 81.6 | 0.88 | 0.378 |
| Productive family size | U | 4.1266 | 3.2059 | 73.0 | | 4.90 | **0.000** |
| | M | 3.963 | 3.8561 | 8.5 | 88.4 | 0.45 | 0.657 |
| Land allotted for coffee | U | 2.4051 | 1.7353 | 102.8 | | 6.74 | **0.000** |
| | M | 2.2593 | 2.2341 | 3.9 | 96.2 | 0.26 | 0.796 |
| Credit | U | 3268.4 | 2031.4 | 55.5 | | 3.68 | 0.235 |
| | M | 3003.7 | 3004.4 | -6.56 | 99.9 | -0.00 | 0.999 |
| Ownership of transportation | U | .8481 | .46078 | 88.7 | | 5.80 | **0.000** |
| | M | .81481 | .80316 | 2.7 | 97.0 | 0.15 | 0.879 |
| Coffee farming experience | U | 21.734 | 16.196 | 100.6 | | 6.63 | **0.000** |
| | M | 20.648 | 19.531 | 20.3 | 79.8 | 1.26 | 0.210 |
| Off/ non-farm income | U | 2419 | 2049 | 14.1 | | 0.96 | 0.341 |
| | M | 2305.6 | 2587.3 | -10.8 | 23.9 | -0.45 | 0.651 |
| Distance to CCCP | U | .68367 | 1.6905 | -141.5 | | -8.94 | **0.000** |
| | M | .76222 | .7805 | -2.6 | 98.2 | -0.37 | 0.711 |

Where **T**= treated group, **C**= control group CCCP= Cooperatives coffee collection point, t= t-value, p= p-value

Source: Own computation (2018)

**Table 22:** Chi-square test for the joint significance of variable

| Sample | Pseudo R2 | LR chi2 | p>chi2 |
|---|---|---|---|
| Unmatched | 0.514 | 127.54 | 0.000 |
| Matched | 0.035 | 5.28 | 0.948 |

Source: Own survey result, 2018

All of the above tests suggest that the matching algorithm that has been chosen is relatively best with the data at hand. Consequently, it is possible to precede estimation of ATT for households

4.5.2.4. Estimates of the average treatment effect on treated (ATT)

This sub section deals with the final result from PSM which is related with computation of average treatment on treated (ATT); that is the mean impact that coffee cooperative has on its members along a number of selected variables. The result indicatesthat; Participation in coffee cooperatives has brought significant and positive impact on members in terms of selected performance indicators which were volume of coffee supply, price received from sale of coffee and transaction cost. Accordingly, those farmers working under coffee cooperatives on average suppliers between 3.926 and 4.228 quintal of higher coffee than those operating under conventional chain. With respect to price received from sell of coffee, coffee cooperatives on overage receives between 2.203 and 2.228 birr/kg than non-members from sell of coffee and farmers exercising under coffee cooperative on average incurs less cost which is between 0.382 and 0.405 birr/kg than those exercising out of cooperative(non- members)

**Table 23.**Estimates of the average treatment effect on treated

| Variables | Matching algorithms | Treated | Control | ATT | SE | t-value |
|---|---|---|---|---|---|---|
| Volume of coffee | Nearest neighbor | 26.7407 | 22.8148 | 3.9259 | 0.7944 | 4.34 |
| supply | Kernel | 26.7407 | 22.5124 | 4.2282 | 0.7844 | 4.25 |
| Coffee selling price | Nearest neighbor | 20.3703 | 18.1666 | 2.2037 | 0.4531 | 4.86 |
| | Kernel | 20.3703 | 18.1418 | 2.2284 | 0.4728 | 4.71 |
| Cost of transaction | Nearest neighbor | 3.0125 | 3.4178 | -0.4052 | 0.1872 | -2.16 |
| | Kernel | 3.0125 | 3.3954 | -0.3829 | 0.1713 | -2.23 |

Source: Own survey result, 2018

# 5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

## 5.1. Summary

The study was aimed at analysis of coffee value chain in Gimbo District, Kaffa Zone of Southwest Ethiopia. It was undertaken with specific objectives of identifying coffee value chain actors and their role, identifying factors affecting volume of market supply of coffee and comparing market performance of farmers exercising in cooperatives and conventional chain. In order to conduct the study, sample coffee producing households' were selected through multistage stratifying sampling methods and using which 181 sample small scale coffee producers were identified. Both primary and secondary data were used to conduct the study. The primary data were collected through different methods from a total of 276 respondents (181 producers (both participant and non-participants), 47 traders, 20 consumers, 28 local coffee processors) where use of semi-structured questionnaires was the dominant method.

Descriptive statistical analysis, value chain analysis and econometric model were used to analyze the data collected. Multiple linear regression models was used to analyze factors affecting volume of market supply of coffee by small scale producers and PSM was used to undertake comparative analysis between farmers working in conventional and cooperatives chain using volume of coffee supplied, price received from sale of coffee and transaction cost as performance indicators.

Descriptive statistical analysis showed that there is statistically significance mean difference between member and non-member households in terms of both demographic and socio economic and institutional characteristics. Accordingly, age of HH, level of education, coffee farming experience and distance from cooperatives coffee collection point are those characteristics based on which such difference between the two groups were observed. Finding from value chain analysis shows that the core coffee value chain actors in the area of study are small scale farmers, large scale private investors, local coffee consumers, retailers, coffee collectors, local coffee processors, coffee suppliers/private traders, coffee cooperatives, cooperative unions and ECX. Chain supporters are the District office of (Agriculture and Rural Development, Agricultural

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Marketing, Cooperative Promotion, Micro Finance) and Agricultural Research Institute (Bonga center).

Qualitative analysis of the value chain analysis identified nature of chain governance and coffee market channels in the study area. With respect to value chain governance, chain coordination role in case of conventional chain is dominated by private traders and is dominated by cooperative union in case of cooperatives chain and there are six alternative coffee market channels in the study area through which the produce reaches its ultimate consumers.

Value chain analysis also identified coffee production and marketing constraints and opportunities in the study area. Accordingly, coffee disease, high cost of inputs, shortage of land, and shortage of proper storage facility, poor production practice, limited infrastructure and climate change are identified as major coffee production bottlenecks. The same analysis also shows that limited access to market information, inadequate transportation facility, price fluctuation, delay in market start up and dividend payment(for members), shortage of coffee processing machine, managerial problems and over taxation are identified as the major constraints of coffee marketing.

Econometric result of 2SLS model indicated that education level of household heads, cooperative membership, distance to nearest market, quantity of coffee produced and ownership of transportation access to transport significantly determined the quantity of coffee supplied to market. However, from those mentioned significant variables, distance to nearest market was significantly and negatively affected market supply of coffee.

Result from logistic regression model indicated that, among ten variables used in the model, five variables were significant in determining farmer's likelihood of being member of coffee cooperative. They are Age of household head, family member under productive age, educational level of household head, land allotted for coffee and distance to coffee cooperative office.

After controlling for confounding factors, 79 treatments and 102 control sampled households were conditioned in such a way that 54 treatment households were matched with 102 controls using kernel matching estimator with band widths of 0.1. The result showed that only 156 sample households were identified to be measured in the estimation

process after discarding households whose propensity score value is out of the common support region.

According to the result of computation of ATT, participation in coffee cooperatives has brought significant and positive impact on members  in terms of selected performance indicators which were volume of coffee supply, price received from sale of coffee and transaction cost. Accordingly, those farmers working under coffee cooperatives on average supplies between 3.926 and 4.228 quintal of higher coffee than those operating under conventional chain. With respect to price received from sell of coffee, coffee cooperatives on overage receives between 2.203 and 2.228 birr/kg than non-members from sell of coffee and  farmers exercising under coffee cooperative on average incurs less cost which is between 0.382 and 0.405 birr/kg than those exercising out of cooperative(non- members).

## 5.1. Conclusions and Recommendations

From the findings of this study the following recommendations are drawn:

➡ The result of the study shows that education was an important variable positively affecting both market supply of coffee and producers likelihood of being member of coffee cooperative in the study area. This result confirms that education improves the readiness of the coffee producing households to accept new idea and innovations as well as get updated demand, supply and price information which in turn enhances their willingness to produce more and also supply more to market. Therefore, The District extension agents together with the District Office of cooperative promotion should give emphasis on encouraging farmers to learn adult education and make the environment conducive for small scale producers to expand their understanding through both formal and informal learning. Among informal learning, experience sharing with producers of other area known by high production is more recommendable in addition to providing short and intermediate practical based training.

➡ Membership in coffee cooperative is an important determinant of market supply of coffee by the producers in the study area. This is because when producers join together, they are more likely to gain different knowledge through experience sharing and working together. More over working together boosts their bargaining power and encourages them to

produce and sale more. Therefore, cooperatives promotion office of the District as well as regional policy makers with respect to cooperative, should work more on encouraging the existing cooperatives members and announcing non-members about the importance of being cooperative member and make non-members take part of the benefit. Moreover, for sustained effectiveness of the cooperative its self, the federal agricultural cooperative rules and regulations requires to be deeply assessed in order to protect small scale producers from being harmed of the managerial and interpersonal problems in the name of cooperatives.

➡ Quantity of coffee produced highly determines market supply of coffee in general and is also true specific to the study area. It is obvious that as producers produce more they are highly likely to supply more. This fact traces one back to assessing factors affecting volume of coffee produced. As it is identified through this study, education level of hh head, extension contact, Land allotted for coffee as well as farming experience are those socio demographic factors affecting volume of coffee produced in the study area. Among these variables, land allotted for coffee affects both volume of market supply of coffee and producers probability of being member of coffee cooperatives. Therefore, The District Office of Agriculture and rural development together with all other stakeholders should work on identification of producers land holding status and provision of land for those households without any plot of land at all and with little amount of land to ensures their productivity. On other hand land is one of the most important and scarce resource for agricultural production. Therefore, better farm land management practices and use of recommended fertilizers and crop ratio should be give more attention for further improvement of land fertility thereby increases the production and productivity of coffee in order to increase volume of coffee marketed.

➡ Ownership of transportation facility and distance to the market place are another important factors effecting market supply of coffee by small holder producers of the area. On the other hand, inadequate transportation facility is one of production bottlenecks in the area. More over the bulky nature of the commodity obligates the producers to have transportation facility. But it is impossible to make all producers with their own transportation facility. Therefore, searching for inclusive solution that is able to benefit all producers regardless of their economic status is more feasible approach. To this end it is

recommendable that, the District road and transport agents should give priority to the rural road construction and mentainance to solve the problem of the area. Not only this but it is also recommended that the users/ the producers should properly and responsibly utilize the road and other existing infrastructures to ensure their sustainability and quality.

SWOT analysis of this study identified different constraints of coffee value chain in the area both at producers and traders level. Therefore government intervention is very crucial to deal with each identified bottlenecks as recommended below.

➡ Coffee disease is identified as one of the common production bottleneck in the area. As it is identified through the study, the problem was long lasted and highly hindering coffee productivity in the area. This indicates that joint action is required to deal with the problem. Therefore The District DAs should work with Producers and Bonga Agricultural research institute to identify the problem from its base root and put sustainable solution. Therefore, the types of coffee disease should first be identified and those coffee varieties capable of resisting such disease and harsh atmospheric condition should be distributed and adopted in the area for the long run.

➡ Poor production practice together with poor storage and post-harvest handling are other category of production problems identified. Poor production practice is more related with producers' lack of experience on utilization of locally available factors of production. For instance producers experience on using organic fertilizer instead of inorganic fertilizer is weak. On other hand there is weak experience on recycling of old coffee trees through pruning and other indigenous practices. With respect to post harvest handling, selection of coffee storage area and material is less visible which make their produce with poor quality at the end. Therefore, The District DAs should work more on teaching small scale producers on how to use locally available production inputs together with inorganic one, how to use existing coffee trees for long time through proper coffee tree management practices and how to store the produce after harvesting in order to ensure its quality.

➡ Limited access to market information, shortage of coffee processing machines, over taxation and delay in market start up and dividend payment are the major coffee marketing related problems identified.

➡️ Market information is very important tool for producers as well as for traders. This is because the world is becoming very dynamic and the rate of change in different socio economic situation is becoming high. So unless producers are well informed about such dynamic world situation, they cannot be competent. There are different categories of market information. But all information may not add value to producers. As it is identified through this study, information related with supply condition and price is very crucial at producers' level. To this end, The District Office of Agricultural marketing and Trade and industry should make the atmosphere smooth for small scale producers to be informed of such market related issues. More specifically, producers should be given short term training at least once per five months about the existing market condition to make them familiar about existing market related issues.

➡️ In order to deal with problem related with limited coffee processing machine, the District office of marketing should use clustering approach to address those all searching for the use of machine. Over taxation is related with charging of non-reasonable tax on traders. As their response, they are enforced to pay tax regardless of their operation situation. Therefore when the general marketing of the season is weak, they become less profitable and also they may incur loss. But the taxation remains unchanged. In order to deal with this issue it is recommended that the District Office of trade and industry should work with the District office of finance and economy as well as with the all concerning bodies at regional and federal level and protect traders from such overhead cost.

➡️ At the cooperative organized farmers' level, the major coffee marketing related problems identified through this study are delay in market start up and dividend payment. For small scale producers, there is very rare probability of having diverse income source. Majority of them wait for income to be generated from sale of their agricultural produce. Even if they have uni- dimensional source of income their expenditure is multi-dimensional. Therefore in order to cover different social needs they need cash on time. But in the study area most of the member producers are strongly complaining of the issue. So the District office of cooperative promotion requires working with the unions and member producers at managerial level to solve the problem.

# 6. REFERENCES

Abebaw, D. and M.G. Haile. 2013. The impact of cooperatives on agricultural technology adoption: empirical evidence from Ethiopia. *Food Policy* 38: 82-91.

Abu Tefera and Michael, G. F. 2015. Ethiopia coffee annual report. GAIN report number ET1514, Addis Ababa, Ethiopia. GAIN Report Assessment of Commodity and Trade by USDA, USA

Agete Jerena. 2014. Analysis of factors influencing participation of smallholder farmer in red bean marketing in Halaba Special District, Ethiopia. MSc Thesis, University of Nairobi, Nairobi, Kenya.

Aklilu A, Ludi E (2010). The Effect of Global Coffee Price Changes on Rural Livelihoods and Natural Resource Management in Ethiopia. A  Case study from Jimma area. NCCR North-South Dialogue 26. Bern, Switzerland

Alemayehu Asfaw, Amamo Zekarias S. Ali M(2015), MSc The Existing Forest Coffee Market Channel of Essara Woreda and Actors Involved in the Chain the Case of Dawuro Zone, SNNPR, Ethiopia Department of ABVM, Jimma University, School of Graduate Studies, P.O.Box 307, Jimma, Ethiopia.  ISSN 2222-1905 (Paper) ISSN 2222-2839 (Online) Vol.7, pp.25, 2015

Alemseged Assefa, Getaneh Arega, 2013. Ethiopian Coffee Exporters Association ECEA:

Alemu, D., Meijerink, G., 2010. The Ethiopian Commodity Exchange: An overview. WageningenUniversity, The Netherlands.

Altenburg, T. 2006. The Rise of Value Chain Governance and Its Implications for UNIDO's Development Policy, presentation on behalf of the German Development Institute, Bonn, 2006

Anandajayasekeram, P. and Berhanu Gebremedhin. 2009. Integrating innovation systems perspective and value chain analysis in agricultural research for development: implications and challenges. Improving Productivity and Market Success (IPMS) of Ethiopian farmers project working paper 16. ILRI (International Livestock Research Institute), Nairobi, Kenya.

ATA, 2012.Agricultural Cooperatives Sector Development Strategy 2012–2106. Ethiopian Agricultural Transformation Agency: Addis Ababa, Ethiopia.

Becker, S. and A. Ichino. 2002. Estimation of average treatment effects based on propensity scores. The Stata Journal 2: 358-377.

Bernet T, Thiele G and Zschocke T. 2006. Participatory market chain approach (PMCA) userguide.Lima,Peru:InternationalPotatoCentre(CIP)http://www.cipotato.org/pmca/ index.htm.

Bernard T, Spielman D, Tafesse A, Gabre-Madhin E. 2013. *Cooperatives for staple crop marketing: evidence from Ethiopia* IFPRI Research Repor 166. International Food Policy Research Institute: Washington, DC

Bernard, T. and B.J. Spielman. 2009. Reaching the rural poor through rural producer organizations? A study of agricultural marketing cooperatives in Ethiopia. *Food Policy* 34: 60-69.

Bernard, T., A.S. Taffesse and E. Gabre-Madhin. 2008. Impact of cooperatives on smallholders' commercialization behavior; evidence from Ethiopia. *Agricultural Economics* 39: 147-161.

Borda-Rodriguez A, Johnson H, Shaw L, Vicari S. 2016. What makes rural co-operatives resilient in developing countries?*Journal of Internationa development* DOI:10.1002/jid.3125

Bosena Tegegne. 2008. Analysis of Cotton Marketing Chains: The Case of Metema Woreda, North Gonder Zone, Amhara National Regional State. MSc Thesis, Haramaya University, Haramaya, Ethiopia.

Birhanu Teferra and Shiferaw Bekele, Trondheim, 2009. The effects of fair trade on coffee producer. Case study of Ethiopian Coffee Cooperatives, the 16th International Conference of Ethiopian Studies, Ed. By SveinEge,Harald Institute of Developing Economies, Japan.

Bizualem Assefa, Degye Goshu and Zekarias Shumeta. 2015. Analysis of marketed surplus of coffee by smallholder farmers in Jimma zone, Ethiopia. *Journal of Biology, Agriculture and Healthcare,* 5(5): 2224-3208

Caliendo, M. and S. Kopeinig. 2008. Some practical guidance for the implementation of propensity score matching. Journal of Economics Survey 22: 31-72

Charitonenko, Stephanie, et al. (2005) Value Chain Finance. Washington, D.C.: USAID, Rural and Agricultural Finance Initiative notes, Issue 2 (www.microlinks.org)

D and Schmitz, H (2001), Manual for Value Chain Research on Homeworkers in the Garment Industry, Institute for Development Studies, p.17–19.

David B, Christian C (2013).Competitiveness and determinants of coffee exports, producer price and production for Ethiopia. Corvinus University of Budapest, Hungary, University of Reading, UK. http://mpra.ub.uni-muenchen.de/48869/

Dehejia, R. and S. Wahba. 2002. Propensity score matching methods for non-experimental causal studies. Review of Economics and Statistics 84: 151-161.

Dessalegn Gachena. 2014. Performance of coffee marketing in SW Ethiopia: The case of Bench Maji Zone. MSc Thesis, Haramaya University, Haramaya, Ethiopia.

Dorward, P., Shepherd, D. and Galpin, M. (2010), Participatory Farm Management: Methods for Analysis, Decision Making and Communication, Food and Agriculture Organisation of the United Nations (FAO), Rome. [Google Scholar]

Elias Abebe, 2005. Economics of coffee marketing: A Case Study of Goma District in Jimma Zone of Ethiopia, An MSc Thesis presented to the School of Graduate Studies of Haramaya University Pp. 56.

Engida Gebre, 2017. Market chain analysis of coffee A Case Study Gawata woreda, Kaffa Zone of SNNPRS, An MSc Thesis presented to the School of Graduate Studies of Haramaya University. Pp. 42.

EP (European Parliament) resolution of 19 January 2012 on the imbalances in the food supply chain (RSP 2011.

Eshetu Derso and Waller, J.M. (2009), Variation among Colletotrichum isolates from diseased coffee berries in Ethiopia. Elsevier Science crop protection. 22: 561-565.

Evans, R., 2004. Marketing in the 21st century-8th Edition, Atomic Dog Publishing. Pp. 35.

Ethiopian Tea and Coffee authority (ECTA), 2010: report on general national production and marketing performance of coffee and tea; annual conference agenda.

FAO, 2005. FAO Global Information and Early Warning System on Food and Agriculture World Food Program: Special Report FAO: Crop and Food Supply Assessment Mission to Ethiopia

FAO, 2011. Development Economics Division the Food and Agriculture Organization of the United Fund I. M, 2013. The federal democratic republic of Ethiopia

FCA. 2015. Cooperative movement in Ethiopia: performances, challenges and intervention options. *Annual bulletin report*, FCA. Addis Ababa, Ethiopia.

Fischer, E. and M. Qaim. 2012. Linking smallholders to market; determinants and impacts of farmers' collective action in Kenya. *WD*40: 1255-1268.

Frank, L. and P. Henry, 2007. Value chain program design: promoting market-based solution for msme and industry competitiveness Submitted to Office of Microenterprise Development USAID/G/EGAD/MD Washington, D.C. Pp. 63.

Francesconi, G. N. and N. Heerink. 2011. Ethiopian agricultural cooperatives in an era of global commodity exchange: does organization form matter? *Journal of African Economics* 20: 153-177.

Gabre-Madhin E. 2001. Market institutions, transaction costs, and social capital in the Ethiopian grain market, International Food Policy Research Institute. Research Report 124, Washington, DC.

Gebremedhin B, Jaleta M. 2010. Commercialization of smallholders: Does market orientation translate into market participation? Improving Productivity and Market Success (IPMS) of Ethiopian farmers' project. ILRI Working Paper 22. Addis Ababa, Ethiopia: International Livestock Research Institute.

Getachew Nigussie, 2009. Honey market chain analysis: The case of Burie Woreda, WestGojjam Zone, Amhara National Regional State. M.Sc thesis presented to the School of Graduate Studies, Haramaya University. 30p.

Getnet Kindie, Verbeke, W., Haese, M., Viaene, J. and D,Haese. L. 2009. The farm decision role of price information from commodity exchanges: An Ex-ante Evaluation Using Quasi-rational Price Expectations in Ethiopia. African Journal of Agricultural Research, 6(15): 3610-3618.

Getu Bekele Gedefa, 2011. National Coffee Research Project Coordinator and Researcher 8th Eastern African Fine Coffees Association Conference and Exhibition19th FebruaryArusha,TanzaniaNgurdotoLodge,VictoriaHall.*http://www.ico.org/sustainini tasp#sthash.GjvzSjvy.dpuf*

GDAMO (Gimbo District Agricultural Marketing office) 2017 annual report submitted to Kaffa Zone Agricultural Marketing Office June, 2017. Gimbo District, SNNPRS, Unpublished report.

GDOARD (Gimbo District Office of Agriculture and Rural Development), 2017. Annual report submitted to Kaffa Zone Agriculture Office. June, 2017. Gimbo District, SNNPRS, Unpublished report.

Gibbon, P and S. Ponte, 2005. Trading down: Africa, value, chains and the global economy Temple University Press.

Greffi, G., 1994. The organization of buyer driven global commodity chains: how US retailers shape overseas production networks', in G. Gereffi and M. Korzeniewicz (1994); Greenwood Press. Pp. 95.

Grunert,K.,L. Fruensgaard Jeppesen,K.Risom Jespersenand A. Sonne(2006). 'Market orientation of VC analysis: A conceptual framework based on four case studies from the food industry.' *In European journal of marketing* 39(5/6), pp.429-455.

GTZ, 2007, Value Links Manual – The Methodology of VC Promoti on. The Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) [online]. Available: htt p://www.value-links.de/manual/distributor.html [Accessed M 2010].

Gujarati, D.N (2004) .Essentials of Econometrics: 4th edition. Mc-Graw-Hill Companies. p1003.

Hannan R. 2014. Good co-operative governance: the elephant in the room with rural poverty reduction. *Journal of International Development* **26**: 701–712. DOI:10.1002/jid.2989

Heckman J., Ichimura, H., Smith, J., dan Todd, P. 1997. Matching As An Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Programme. Review of Economic Studies, Vol.64 605-654.Wiley Online Library Web of Science®Google Scholar

Heerink N. 2012. Ethiopian ACs in an era of global commodity exchange: Does organizational form matter? Journal of African Economies 20(1): 153–177

Holloway, G. and Ehui, S. 2002. Expanding market participation among smallholder livestock producers: A Collection of Studies Employing Gibbs Sampling and Data from the Ethiopian highlands. *Socio-economic and Policy Research Working Paper 48. ILRI*, Nairobi, Kenya. 85.

ILO (International Labor Organization), 2006. An ILO Guide for Value Chain Analysis and Upgrading, Geneva, Switzerland.

Imbens, G. W. (2004). Nonparametric estimation of average treatment effects under exogeneity: The Review of Economics and Statistics, 86, 4–29.

Jansen, A., Pomeroy, T., Antal, J. Shaw, T., and A. Campion. (2007). Mali Value Chain Finance Study: Using a Value Chain Framework to identify Financing Needs, Lessons Learned from Mali. Micro report #81 prepared by DAI for USAID through the AMAP-FSKG Project.

Jema Haji. 2008. Economic Efficiency and Marketing Performance of Vegetable Production in the Eastern and Central Parts of Ethiopia. Doctoral dissertation, Sweden University of Agricultural Science, Sweden.

Jemal Hashim. 2013. Coffee value chain analysis: The case of Meta District, East Hararghe Zone of Oromia Regional State, Ethiopia. MSc Thesis, Haramaya University, Haramaya Ethiopia.

Jena P. R. Bezawit B.C. Stellmacher T. and Grote U. 2012. The impact of coffee certification on small-scale producers' livelihoods:a case study from the Jimma Zone, Ethiopia. Agricultural Economics 43: 429–440

Kaganzi, E., Ferris, S., Barham, J., Abenakyo, A., Sanginga, P. and Njuki, J., (2009). Sustaining Linkages to High Value Markets through Collective Action in Uganda. Paper presented at the Research Workshop on Collective Action and Market Access for Smallholders held on October 2-5, 2006, in Cali, Colombia.

Kaplinsky, R., and M. Morris, 2001. A handbook for value chain research. Ottawa, Canada, International Development Research Center.

Kindness, Heather, and Ann Gordon.2001. Agricultural marketing in DCs The role of NGOS and CBOs. "Policy series 13". Social and economic development department. Natural resource institute.  University of greenwhich, Chatham, U.K.

KIT, Faida and IIRR.2006.chain empowerment. Supporting African producers to develop market. Royal tropical institute, Fida Market Link and International Institute of Rural Reconstruction.

KZAMO, (2017(Kaffa Zone Agricultural Market Development Office), 2017 annual report submitted to SNNPRS regional Bureau of Agricultural Marketing, June, 2016 Kaffa Zone SNNPRS, unpuplished report

Lalonde, B. J. and T. L. Pohlen (1996). Issues in supply chain costing. International Journal ofLogistics Management, 7(1), 1-12

Lee and Mowday, 1987, voluntarily leaving an organization: an empirical investigation of Steers and Mowday's model of turnover Academy of Management Journal, 30 (1987), pp. 721-734

McCormick, D. and Schmitz, H. (2001): Manual for Value Chain Research on Homeworkers in the Garment Industry. http://www.ids.ac.uk/ids/global/pdfs/wiegom anualendnov01.pdf (accessed: January 2008)

Mendoza G. 1995. A primer on marketing channels and margins. Lyme Rimer Publishers Inc., USA. 425p

Meijerink G, Bulte E, Alemu D. 2014. Formal institutions and social capital in value chains: the case of the Ethiopian commodity exchange. Food Policy 49: 1–2.

Meskela T, Teshome Y. 2014. From Economic Vulnerability to Sustainable Livelihoods: The Case of Oromia Coffee Farmers Cooperative Union in Ethiopia. International Food and Agribusiness Management Review 17: 103–108.

Mitchell J, Keane J, Coles C (2009). Trading up: How a value chain approach can benefit the rural poor. Overseas Development Institute: COPLA Global.

MoFED, 2010. Plan for Accelerated and Sustained Development to End Poverty (PASDEP). Ministry of Finance and Economic Development: AA, Ethiopia

Mohammed Hassan. 2013. Coffee value chain analysis: the case of Nensebo District, West Arsi Zone, Oromia Region, Ethiopia. MSc Thesis, Haramaya University, Haramaya, Ethiopia.

MOT (2012). Coffee opportunities in Ethiopia. Ministry of Trade, Federal Democratic Republic of Ethiopia. February 2012. Addis Ababa, Ethiopia

M4P (Purcell, T., S. Gniel and R. van Gent). 2008. Making value chains work better for the poor: A toolbook for practitioners of value chain analysis, Agricultural DevelopmentInternational.http://aciar.gov.au/files/node/14580/making.

Myers, Amy, 2004. "Old Concepts Revisited: Are Cooperatives the Way Forwardfor Smallholder Farmers to Engage in International Trade?" unfinisheddoctor's dissertation manuscript (Cited by ILO and others). London School ofEconomics & Political Science,

Narrod, C. , Gulati, A., Minot, N., Delgado, C., 2005. Food Safety Research Priorities for the CGIAR – A Draft Concept Note from IFPRI for the Science Council, Washington, DC.

Nure, D. 2010. Mapping quality profiles of Ethiopian coffee by origin, in Eds. Adugna, G., Bellachew, B., Shimber, T.

Pradhan M, Rawlings LB (2002). The Impact and Targeting of Social Infrastructure Investments: Lessons from the Nicaraguan Social Fund, World Bank Econ. Rev. 16(2):275-295. Rosenbaum PR, Rubin DB (1983).

103

Ponte, S. 2012.The late revolution regulation, markets and consumption in the global coffee chain, World Development, 30 (7): 1099-1122

Porter, M., 1986. Competition in Global Industries: A conceptual framework, Harvard Business School Press, Boston.

Raikes, P., Jensen, M.F., and Ponte, S. (2000) GCC Analysis and the French Filière Approach: Comparison and Critique, Economy and Society, 29 (3), pp. 390-417

Rashid S, Abate GT, Lemma S, Warner J, Kasa L, Minot N. 2015. *The Barley Value Chain in Ethiopia*: International Food Policy Research Institute (IFPRI).

Rehima Musema. 2006. Pepper marketing chains analysis: the case of Alaba and Siraro districts, Southern Ethiopia. M.Sc. Thesis, Haramaya University, Ethiopia.

Rosenbaum, P. R., 2002. Observational studies. 2nd ed. New York: Springe

Royer, S. (2006): strategic management and online selling: Creating competitive advantage with Intagible web Goods; "Routledge advance in management and business studies" London / Newyork (Routledge)

Ruben R, Heras J. 2012. Social capital, governance and performance of Ethiopian coffee cooperatives. Annals of Public and Cooperative Economics 83(4): 463–484.

Rubin, 1983. Reducing bias in observational studies using sub classification on the propensity score: Journal of the American statistical association September, volume 79, number 387 Application section

Sadhu, A.N. and Singh, A. (2000), Fundamentals of Agricultural Economics, Himalaya

Selamta, 2014. The inflight magazine of Ethiopian airlines Volume 13, number 2 apriljune1996 copyright © www.selamta.net

Samuel Diro, Solomon Aseffa and Beza Erko.2016. Trends and determinants of coffee commercialization among smallholder farmers in Southwest Ethiopia. Journal of Agricultural economics and rural development vol3 (2), pp112-121.

Schmitz (2005) Local Enterprises in the Global Economy, Edward Elgar Publishing Limited: UK.

Scott, W.R. (1995). Institutions and organizations.London Sage.

Schuurman J. 2016. Cooperatives, Economic Democratization and Rural Development. Edward Elgar: Cheltenham, UK.

Slingerland, M. A. Jos, B., & Tefera, D. A.. (2016). Agricultural Cooperatives inEthiopia: Evolution,Functions and Impact. Journal of ID,60-75.

SNNPR Culture and Tourism bureau), 2017), annual report submitted Federal minister of culture and tourism

SNV, (2010). Private Sector Development in Ethiopia: SNV takes up the challenge in the value chains. The Netherlands Development Organization (SNV): http://www.business-ethiopia.com.

Solomon Endris and BehailuWeldsenbet. 2010. The quality of Arabica coffee influenced by depth of Parching and Covering Periodvduring drying. 21st ISC on Coffee science (ASIC).11-15 2006, Montpellier, France September. pp. 544- 548

Staatz JM. 1987. In Farmers' incentives to take collective action via cooperatives: a transaction cost approach. In Cooperative Theory: new approaches, Royer JS (ed). USDA, Agricultural Cooperative Service: Washington, DC; 87–107.

Taye Kufa. 2013. Status of Arabica coffee germplasm in Ethiopia center director & senior coffee researcher EIAR Jimma, pp. 3-11.

Technoserv(2011), Photo: Image Used with Permission from Technoserv. http://www.flickr.com/photos/50183375@N08/ 5546602122/in/photostream/

Teddy, T. (2013), Assessments of Commodity and Trade issues,by USDA Staff GAIN Report Number: ET- 1302, Ethiopia annual coffee report

Thakur, D.S, Harbans Lal, D.R., K.D. Sharma and A.S. Saini. 1997. Market supply response and marketing problems of farmers in the hills. *Indian journal of Agriculutral Economics*, 52(1):139-150.Timothy,

Tuvhag, E. (2008). Value Chain Analysis of Fair Trade Coffee: With Special Focus on Income and Vertical Integration. Department of Economics. Lund University.

UNECA, 2009. Sustainable Development Report, UNECA. Addis Ababa, Ethiopia.

UNIDO (United Nations Industrial Development Organization), 2012. Agro-value chain analysis and development:

The UNIDO Approach. A Staff Working Paper, Vienna, 2009, United Nations Industrial Development Organization.

USAID (The US Agency for International Development), 2010.Ethiopian CIVCA. Profiling the actors, their interactions, costs, constraints and opportunities. Pp.16.

USAID 2010. Ethiopian Coffee Industry Value Chain Analysis Profiling the Actors, Their Interactions Costs Constraints and Opportunities Chemonics International

USAID.2014. Coffee annual report by Abu Teffera and Teddy Teffera(co-authors),GAIN report number ET1402

Verhofstadt, E. and M. Maertens. 2015. Can agricultural cooperatives reduce poverty? The heterogeneous impact of cooperative membership on farmers' welfare in Rwanda. Applied Economic Perspectives and Policy 37: 86-106.

Wanyama, F. O. (2008). Some positive aspects of neo-liberalism for African development: The revival of solidarity in co-operatives. International Journal of Arts and Commerce, 2(1), 126–148

Webber, C. M., and P. Labaste. 2010. Building Competitiveness in Africa's Agriculture: A Guide to Value Chain Concepts and Applications. Washington, DC: WB .

Wendmagegn, B. 2014. Market Chain Analysis of Coffee in Dale District Of Southern Ethiopia. A Thesis Submitted to the College of Agriculture Department of Agricultural Economics and Agribusiness, School of Graduate Studies Haramaya University, Haramaya, Ethiopia

Wollni M, Zeller M. 2007. Do farmers benefit from participating in specialty markets and cooperatives? The case of coffee marketing in Costa Rica. Agricultural Economics 37(2-3): 243–248.

World Bank, 2010. Budgeting for effectiveness in Rwanda: From reconstruction to reform.Africa human development series, working paper.

World Bank. 2015. Risk and finance in the coffee sector. A compendium of case studies related to improving risk management and access to finance in the coffee sector.

Zerihun Gudeta and Tadesse Kumma, 2013. Price transmission and adjustment in the Ethiopian coffee market. Contributed paper prepared for presentation at the IAAE Conference, Beijing, China, and August 16-22, 2009. (DBSA) & University of the Free State, South Africa. Pp. 3.

Zekarias Shumeta, Kaba Urgessa and Zerihun Kebebe 2012. Analysis of market chains of forest coffee in southwest Ethiopia, Department of agricultural economics and extension, natural resource management, Ethiopia, Academic Journal of Plant Sciences 5 (2): 28-39, 2012ISSN 1995-8986© IDOSI Publications, DOI: 10.5829/idosi.ajps.2012.5.2.2748

Yemane Taro. 1967. Statistics: An Introductory Analysis, 2 nd Ed. New York: Harper and Row.

# 7. APPENDIX

**Appendix Table1**: Sampling mechanism and the required sample from each kebele

| Sampled kebeles | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| Michiti | | Kuti | | Tula | | Beyemo | | |
| TP=264 | | TP=416 | | TP=400 | | TP=524 | | |
| CM=115 | | CM=195 | | CM=153 | | CM=237 | | |
| NM=149 | | NM=221 | | NM=247 | | NM=287 | | |
| Sampling | | | | | | | | |
| M | Nm | M | Nm | M | Nm | M | Nm | |
| 13 | 17 | 22 | 25 | 17 | 28 | 27 | 32 | **181** |
| 30 | | 47 | | 45 | | 59 | | |

Where:  TP=total producers $CM$=cooperative members NM= non-members of cooperatives

Generally, sample from members are of 79 and from non-members are of 102 of which 32are female headed households.

**Appendix Table 2:** Means of transport used by sampled producers

| Means of transport | Number | Percent |
|---|---|---|
| Head carrying | 51 | 28.2 |
| Pack animal | 76 | 41.9 |
| Animal cart | 22 | 12.2 |
| Both cart and pack | 25 | 13.8 |
| Public car or truck | 7 | 3.9 |

Source: Own computation from survey result, 2018.

**Appendix Table 3**: Volume of coffee exported from Gimbo District to the central market in 2017

| | By private traders(Kg) | By cooperatives(Kg) | By Investors(Kg) | Gross total |
|---|---|---|---|---|
| Washed coffee | - | 18960 | 56040 | 75000 |
| Unwashed coffee | 509543 | 18445 | 117374 | 645632 |

Source: GDOAM (2018

**Appendix Table:4:** Coffee export by value and volume

| No | Country | Volume(MT) | Value (USD) | % share(in volume |
|----|---------|-----------|-------------|-------------------|
| 1 | Jermany | 40,680 | 130,970,587 | 20 |
| 2 | Saudi Arabia | 37,340 | 113,934,887 | 18 |
| 3 | Japan | 18,489 | 57,486,113 | 9 |
| 4 | USA | 17,870 | 94,974,207 | 9 |
| 5 | Belgium | 14,213 | 57,033,315 | 7 |
| 6 | France | 12,598 | 35,139,926 | 6 |
| 7 | South Korea | 9,469 | 41,480,264 | 5 |
| 8 | Sudan | 8,726 | 17,909,628 | 4 |
| 9 | Italy | 8,353 | 34,881,581 | 2 |
| 10 | UK | 4,789 | 25,006,463 | 1 |
| 11 | Australia | 3,884 | 17,571,575 | 1 |
| 12 | Sweden | 2,485 | 9,122,176 | 1 |
| 13 | Russia | 2,389 | 7,141,632 | 1 |
| 14 | Spain | 2,200 | 10,711,703 | 1 |
| 15 | Jordan | 1,56 | 8,646,399 | 1 |
| 16 | Kanada | 1,431 | 6,763,756 | 1 |
| 17 | Israel | 1,016 | 2,722,545 | 0.5 |
| 18 | Others | 16,144 | 77,503,243 | 100 |
|  | Total | 204, 030 | 749,000,000 |  |

Note: These figures include both official and post estimated informal coffee trade
Source: GAIN report (2016)

**Appendix Table 5.** Test for multicollinearity of explanatory variables

| Variable | VIF | 1/VIF |
|----------|-----|-------|
| Quantity produced(ln) | 3.24 | 0.133816 |
| Distance | 2.01 | 0.261333 |
| Family size | 1.25 | 0.377452 |
| Extension service | 1.22 | 0.384892 |
| Cooperative membership | 1.25 | 0.473439 |
| Ownership of transportation facility | 1.64 | 0.608443 |
| Education | 1.46 | 0.683137 |
| Amount of credit received | 1.32 | 0.756160 |
| Sex | 1.08 | 0.929877 |
| Nonfarm income | 1.10 | 0.908531 |
| Mean VIF | 1.72 |  |

Source: Own computation from survey result, 2018

**Appendix Table 6**Factors affecting quantity produced of coffee

| Variables | Coef | Robust Std.error | t-value | P>|t| |
|---|---|---|---|---|
| Land allotted for coffee | 0.132*** | 0.049 | 2.66 | 0.008 |
| Distance | -0.032** | 0,008 | -0.92 | 0.019 |
| Farm experience | 0.016*** | .0.005 | 3.26 | 0.001 |
| Family size | -0.015 | 0.016 | -0.92 | 0.354 |
| Extension service | 0.075* | 0.042 | 1.77 | 0.07 |
| Cooperative membership | 0.118*** | 0.034 | 3.45 | 0.001 |
| Ownership of transportation facility | 0.232*** | 0.037 | 6.17 | 0.000 |
| Education | 0.201** | 0.008 | 2.37 | 0.019 |
| Amount of credit received | .0000138* | 7.77e-06 | 1.78 | 0.077 |
| Sex | 0.028 | 0.050 | 0.57 | 0.572 |
| Non-farm income | -2.19e-06 | 6.18e-06 | -0.35 | 0.724 |
| Cons | 2.17*** | 0.104 | 20.87 | 0.000 |

Note: quantity of coffee produced is dependent variable.

Land under coffee and years of farming experience are instruments for quantity of coffee produced.

Source: Own computation from survey result, 2018

**Appendix Table 7:**1st-stage regression summary, endogeneity and over identification t

| Test of endogeneity for quantity produced | | | | | |
|---|---|---|---|---|---|
| Ho: variables are exogenous | | | | | |
| Durbin (score )chi2(1) | 5.55992 (p = 0.000) | | | | |
| Wu-Hausman F(1,169) | 5.35582 (p = 0.000) | | | | |
| First regression summery statistics | | | | | |
| Variable | R-sqr | Adj-sqr | Partial R-sq | F(2,169)) | Prob > F |
| Quantity produced(log) | 0.8662 | 0.8575 | 0.0763 | 62.5062 | 0.0001 |
| Minimum eigenvalue statistic = 137.006 | | | | | |
| Critical Values | | # of endogenous repressors:1 | | | |
| Ho: Instruments are weak | | of excluded instruments: 2 | | | |
| | 10% | 15% | 20% | 25% | |
| 2SLS size of nominal 5 % wald test | 19.93 | 11.59 | 8.75 | 7.25 | |
| LIML size of nominal 5 % wald test | 8.68 | 5.33 | 4.42 | 3.92 | |
| Over identifying restriction test | | | | | |
| Sargan chi2(1) | = .634(p=0.425) | | | | |
| Basmann chi2(1) | = .574(p=0.448) | | | | |
| Score chi2(1) | = .828 (p = 0.362) | | | | |
| | | | | | |

Source: Own computation from survey result, 2018

**Appendix Table 8.** Support and off support region of respondent households

| psmatch2: psmatch2: Common | | | |
|---|---|---|---|
| Treatment | Support | | |
| Assignment | On support | Off support | Total |
| Untreated | 0 | 102 | 102 |
| Treated | 25 | 54 | 79 |
| Total | 25 | 156 | 181 |

Source: Own computation from survey result, 2018

# Jimma University, College of Agriculture and Veterinary Medicine, Department of Agricultural Economics and Agribusiness Management

**Interviews questioners'**

## "COFFEE VALUE CHAIN ANALYSIS: THE CASE OF GIMBO DISTRICT, KAFFA ZONE, SNNPRS ETHIOPIA"

**Prepared by: Abera Birhanu**

**School of Agribusiness and Value Chain Management**

**Jimma University**

**A. Producers' Survey Questionnaires( members of cooperatives)**

**General instructions for Enumerator**

➡ Make brief introduction before starting any question, introduce yourself to the farmers, greet them in local ways, and make clear the objective of the study.

➡ Please fill the interview schedule according to the farmers reply (do not put your own feeling).

➡ Please ask each question clearly and patiently until the farmer gets your points.

➡ Please do not use technical terms and do not forget local units.

➡ Put the answer on the space provided.

## I. General information

District: **Gimbo**
Questionnaire number: _____
Name of Enumerator: _____
Telephone: _____
Date _____ _____/_____ ____/2018
Gimbo District/ _____ Kebele_____
Name of respondent/optional _____
1. Age____
2. Sex of household head: ___ **1**=Male **2**=Female
3. Marital status **1**= Single **2** = Married **3** = Widowed **4** = Divorce
4. Household size: _____ male_____female_____

House hold members under productive age (15-20yrs)_____
5. Education level of household head: _____(formal education grade completed)
6. Religion **1**=Orthodox **2**= Catholic **3**= Muslims **4**= Protestant **5**=others (specify) ___

## Cooperative specific information

1. What is the name of your cooperative? _____
2. When did it established?_____
3. When you join the cooperative_____
4. Is the cooperative you are in licensed?   **1.** yes   **2.** No
5. The distance of cooperative office from your home_____km or_____ walking hr
6. What service (s) do you receive from the cooperative you belong to?(√)(Multiple responses are possible)  **1**. [ ] Savings**2**. [ ] Credit**3**. [ ]profit dividend**4**. [ ] training  **5**. Marketing information **6**. [ ] others, specify):_____

## Production related information

1. Total land holding suitable for different activities  ----------*h/t (timad)*
2. Farming experience of household head: _____ years*(timad)*
3. Total   land   allocated   for   cash   crops(like   chat,   coffee,   and like)_____ht*(timad)*
4. Land allocated for coffee_____ht*(timad)*
5. Total land allocated for vegetable production _____ht*(timad)*
6. Total land allocated for production of food crops_____ht*(timad)*
7. Total   land   allocated   for   plantation   like(mango,avocado,   bahirzaf etc)_____ht*(timad)*
8. Total land allocated for grazing if any_____ht*(timad)*

(Note: 1 ha = 4 timad/kert or 1 timad/kert = 0.25 ha)

## Major crops and livestock produced

**1.**  Major food crops produced **1**. Maize      **2**. Sorghum        **3.** Wheat   **4.** Barely
**5**. Teff   **6.** Boloke **7**. If others specify_____
**2**. Major types of vegetable produced **1**. Tomato **2**. Onion **3.**Cabbage                    .
   Potato    **5**. Carrot    **6**. If others specify_____
**3**.  Have you engaged in livestock production? **1**. yes     **2.** No
**4.** If your answer is yes for Q3, what are the major livestock you are producing?
**1**. Cattle     **2**. Sheep  3. Goat  **4.** Mule **5**. Donkey  **6**. Horse  **7.** Poultry
   8. If others specify_____
*Average annual income from livestock production _____birr*

## Market related information

1. Did you sell coffee in 2017/18 E.C production season? **1**. Yes **2**. No1.
2. Ifyour answer forQ*1isyes, how did you sale your produce in2017/18 E.C? **1**=Direct to the coffee suppliers (buna akrabi) **2**. Through cooperative 3. Direct to consumer **4**. Direct to rural collector (sebsabi) **5**. Other (specify) _____
3. What is the distance from home to coffee market?   in Km_____ in hrs_____
4. Who sets the selling price of coffee? **1.** Producer [ ] **2.**Buyer [ ] **3.**Negotiated [ ] Personal observation **5.** Others (specify) [ ]_____
5. Are you satisfied with the price settled in the year 2017/18? **1**. Yes **2**. No

**6.** Did you know the nearby market price before you transport your coffee to market? **1**=Yes **2**= No

**7.** If your answer for Q*3 is yes, what is the source of such information? **1**. Other producers **2**. Media  **3**. if others specify_____

   **8.** Have you plan for how much to supply to the market in 2017/18 production season?  **1**. yes **2.** No

**9.** If your answer for Q*3 is yes, what percent of your total production you planned to supply in 2017/18 production season?_____

**10.** Have you achieved your plan during the same season **1**.yes   **2**. no

   If you failed to achieve your supply plan what are those factors affected your plan?

   **1.** Market condition **2**. Natural condition   **3**. Political case **4**. Personal case 5.

   Others specify_____

**11.** Did you think the price you are selling is fair?  **1**. Yes  **2**. No

**12.** Ifyour answer forQ*12isyes what would be your reaction to supply your coffee produce to the concerned market?_____

**13.** How much produced amount  you sell in 2017/18?

i.Quantity consumed (kg) _____

ii.Quantity sold (kg) _____

iii..Total Quantity Produced (kg)_____

iv.Average selling price (Birr/kg in 2017/18)_____

**14.** Have you your own transportation facility? **1.** Yes  **2**. No

If your answer is yes for the question above, what type of transportation facility you own? **1**. Traditional **2**. Modern  **3**. Both

**15.** What is the specific transportation facility you are utilizing to transport your coffee produce to the market? _____

**16.** How did you transport your coffee produce from home to market places? **1**. Head carrying [] **2**.OwnPackanimal []**3**.Animal cart []**4.** Public transport [ ]**5.** Other (specify) [ ]_____

**17.** Who are the major Coffee market chain actors? **1.** Private trader **2**.cooperatives 3. Consumer **4**. Rural collectors**5**. Others (specify_____

**18.** To sell your coffee products, which market channel do you use? (Multiple responses is possible)(√) **1**.[] local/private traders**2**.[]Cooperatives**3**. []direct sell to end consumers **4**. Rural collectors **5.**[ ] Other (Specify_____

**Market information**

1.  Have you any access to market information? **1**.yes  **2.**no

2.  If your answer for Q*1 is yes, what kind of market information you are accessed for? **1**. Price  **2**. Supply  **3**. Demand  **4**. Completion  **5**. Others specify_____

3.  What tool you use to have such market information? **1.** Radio **2**. Phone **3**. TV **4**. Others

specify _____

4. Among the above information tools, for which one you have an access (which one you are utilizing)(multiple response is possible),? **1.** Radio **2.** Phone **3**. Both radio and phone **4**. Tv **5**. All **6**. Other specify_____

5. Do you think market information has an effect on supply of coffee **1.**yes **2.**no

**Marketing cost**

| No | Marketing cost | Unit | Cost per unit | Amount used | Total cost |
|----|---------------|------|---------------|-------------|------------|
|  | Hulling and drying |  |  |  |  |
| 2 | Packing |  |  |  |  |
| 3 | Loading and Unloading |  |  |  |  |
| 4 | Transportation |  |  |  |  |
|  | Modern transport |  |  |  |  |
|  | Labor |  |  |  |  |
| 5 | Storing |  |  |  |  |
| 6 | Commission or brokerage fee |  |  |  |  |
| 7 | If others specify |  |  |  |  |
|  | Total |  |  |  |  |

**Coffee production input related information**

| No | Inputs | | Input supplier | Units | Cost per unit | Amount used in 2017/18 production season | Total cost |
|----|--------|--|----------------|-------|---------------|------------------------------------------|------------|
| 1 | Seedling | |  |  |  |  |  |
| 2 | Farm Equipment | |  |  |  |  |  |
| 3 | Irrigation | |  |  |  |  |  |
| 4 | Labor | Family labor |  |  |  |  |  |
|  |  | Hired Labor |  |  |  |  |  |
| 5 | Chemical/pesticide and fungicide | |  |  |  |  |  |
| 6 | Other specify | |  |  |  |  |  |
| 7 | **Total cost** | |  |  |  |  |  |

**Grading**

1. Do you grade your coffee? **1**.yes **2.**no
2. If you grade your coffee what grading citeria you use? **1**. Size **2**. Color **3.** Variety **3.** Matutity **4.**quality **5**.others specify

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**Storage**
1.  Do you store your coffee? **1**.yes    **2**. No
2.  If yes how long did you store? _____
3.  Describe your storage facility **1**. Own  **2**.rented

    If your storage facility is rented, what is basis of payment? **1**. Monthly **2.** Annually

4.  How much did you pay for storage per year? _____

**Credit service**

1) Did you have access to credit in the year 2017/18 E.C? (√) **1**. [] Yes **2.**[ ] No

2) If yes, have you received credit in 2017/18E.Cforcoffeeproductionpurpose? **1.**[] Yes**2**. [ ] No

3. If no to question#2 what are the reasons? **1.** Lack of collateral **2.**Unfavorable bureaucracy **3**. Don't need/want to take credit **4**. Others (specify) _____

4. Ifyes, how much did you take for coffee production purpose? _____Birr

5. For what purpose did you take the credit in relation to coffee production?

**1.**[] To purchase fertilizer for coffee **2.** [] To rent in land to extend coffee production **3**.[ ] To purchase seedlings of coffee **4**.[] To purchase transporting animals **5.** Others _

6. From whom did you get credit for coffee production? (√)(Multiple responses are possible)
    **1**. [] Friends **2**.[] Bank**3**.[] Microfinanceinstitution**4**.[] Traders**5**.[] NGO**6**.[] cooperatives **7**.Others (specify) _____

**Extension services**

1) Did you have extension contact in relation to coffee production in the 2018 cropping season? (√) **1.** [] Yes **2.** No []

2) If your answer for Q.1 is No, why? (√) (Multiple responses are possible)

**1**. No service provider nearby [ ]2 **.** Possessed the required information [] 3 **.** [] Availability of contact farmers **4**. [ ] Do not have time to get the service**5.** Others_____

3). If yes, how often the extension agent contacted you? _____

4).What was the extension advices specifically on coffee production? (√)(Multiple responses are possible)1. [ ] Fertilizer (compost) applications2. [] Harvesting 3. [] Marketing of coffee 4.[] Post-harvest handling 5. Others (specify) _____

5. Who provides the advisory service? (√)(Multiple responses are possible) 1[]

Developmentagents2.[] NGOs 3. [] Woreda OARD experts 4.[] Research centers 5. [ ]
Neighbors and friends 6. [ ] Others (specify) _____

**Off-farm/Non -farm activities and their incomes**

1. Did you participate in non-farm or off-farm activities to generate income? (√)**1**.[]Yes
**2**. [ ] No

2. If your answer for Q1 is yes, what are they?

| No | Off farm/ nonfarm activities except coffee production | Yes=**1**, no=**2** | If yes any monthly income in birr |
|----|-------------------------------------------------------|---------------------|-----------------------------------|
| 1 | Charcoal production | | |
| 2 | Petty trade | | |
| 3 | Salary | | |
| 4 | Pension | | |
| 5 | Remittance | | |
| 6 | Income from construction work | | |
| 7 | Others specify | | |
| | Total | | |

3. What percent of your house hold expenditure was covered by these incomes generating
activities? _____describe in terms of local units.

4. What is the estimated amount of income you obtain from non-farm or off-farm
activities annually? _____ Birr.

5. Is your family labor adequate for farm activities? **1**. [] Yes   **2**. [] No

6) If no, total amount of hired labor for the production year 2017/18:_____

**Challenges and opportunities related with coffee production and marketing**

| | Production related | | Marketing related | |
|---|---|---|---|---|
| | **Challenges** | **Opportunities** | **Challenges** | **Opportunities** |
| **1** | | | | |
| **2** | | | | |
| **3** | | | | |
| **4** | | | | |
| **5** | | | | |
| **etc** | | | | |
| | | | | |

## *"COFFEE VALUE CHAIN ANALYSIS: THE CASE OF GIMBO DISTRICT, KAFFA ZONE, SNNPRS ETHIOPIA"*

**Prepared by: Abera Birhanu**

**School of Agribusiness and Value Chain Management**

**Jimma University**

**B.  Producers' Survey Questionnaires**
**General instructions for Enumerator**

➡ Make brief introduction before starting any question, introduce yourself to the farmers, greet them in local ways, and make clear the objective of the study.
➡ Please fill the interview schedule according to the farmers reply (do not put your own feeling).
➡ Please ask each question clearly and patiently until the farmer gets your points.
➡ Please do not use technical terms and do not forget local units.
➡ Put the answer on the space provided.

### I.General information

District:**Gimbo**

Questionnaire number: _____

Name of Enumerator: _____

Telephone: _____

Date _____ ____/_____ ____/2018

Gimbo District/ _____ Kebele_____

Name of respondent/optional _____

1. Age____

2. Sex of household head: ___ **1**=Male **2**=Female

3. Marital status **1**= Single **2** = Married **3** = Widowed **4** = Divorce

4. Household size: _____ male_____female_____

House hold members under productive age(15-20yrs)_____

**5. Education level of hous**ehold head: _____(formal education  grade completed)

6. Religion **1**=Orthodox **2**= Catholic **3**= Muslims **4**= Protestant **5**=others (specify) ___

**Production related information**

9.  Total land holding suitable for different activities  ----------*h/t (timad)*
10. **Farming experience of household head: _____ years***(timad)*
11. Total land allocated for cash crops(like chat, coffee, and like)_____ht*(timad)*
12. Land allocated for coffee_____ht*(timad)*
13. Total land allocated for vegetable production _____ht*(timad)*

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14. Total land allocated for production of food crops_____ht*(timad)*
15. Total land allocated for plantation like(mango, avocado, bahirzaf etc)_____ht*(timad)*
16. Total land allocated for grazing if any_____ht*(timad)*

(Note: 1 ha = 4 timad/kert or 1 timad/kert = 0.25 ha)

**Crops and livestock produced**

2. Food crops produced(if any) **1.** Maize **2.** Sorghum   **3**. Wheat  **4.** Barely
   **5.**Teff   **6**. Boloke   **7**. If others specify_____

   2. Vegetable produced(if any) **1**.Tomato **2**.Onion **3**.Cabbage                    .

   Potato   **5**. Carrot   **6.** If others specify_____

   3.  Have you engaged in livestock production? **1**. Yes     **2**. No

   4. If your answer is yes for Q3 what are the major livestock you are producing?

   **1**. Cattle   **2**. Sheep  **3.** Goat  **4**. Mule 5. Donkey  **6**. Horse  **7.** Poultry

   **8**. If others specify_____

   *Average annual income from livestock production _____birr*

   **Market related information**

19. Did you sell coffee in 2017/18 E.C production season? **1**. Yes **2.** No
20. If your answer for Q*1 is yes, how did you sale your produce in 2017/18 E.C? **1**=Direct to the coffee suppliers (buna akrabi) **2**. Through cooperative **3.** Direct to consumer **4**.Direct to rural collector (sebsabi)**5**. Other (specify) _____
21. **What is the distance from home to coffee market?     in Km_____ in hrs_____**
22. Who sets the selling price of coffee? **1**. Producer [ ] **2.** Buyer [ ] **3**. Negotiated [ ] Personal observation **5**.Others (specify) [ ]_____
23. Are you satisfied with the price setted in the year 2017/18? **1**. Yes**2.** No
24. Did you know the nearby market price before you transport your coffee to market? **1**=Yes **2**= No
25. If your answer for Q*3is yes, what is the source of such information? **1**. Other producers 2**.** Media   **3**. if others specify_____
26. Have you planned for how much to supply to the market in 2017/18 production season? **1**. Yes **2**. No
27. If your answer for Q*3isyes, what percent of your total production you planned to supply in 2017/18 production season?_____
28. Have you achieved your plan during the same season **1**.yes   **b**. no
29. If you failed to achieve your supply plan what are those factors affected your plan? **1**. Market condition **2**. Natural condition   **3**. Political case **4**. Personal case **5**. Others specify_____

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**30.** Did you think the price you are selling is fair?   **1**. Yes   **2**. No

**31.** Ifyour answer forQ*12isyes what would be your reaction to supply your coffee produce?_____

**32.** How much produced amount  you sell in 2017/18?

       i.Quantity consumed (kg) _____

       ii.Quantity sold (kg) _____

       iii..Total Quantity Produced (kg)_____

       iv.Average selling price (Birr/kg in 2017/18)_____

Have you your own transportation facility? **1**. Yes   **2**. No

If your answer is yes for the question above, what type of transportation facility you own? **1**.  Traditional **2.** Modern 3. Both

**33.** What is the specific transportation facility you are utilizing to transport your coffee produce to the market? _____

**34.** How did you transport your coffee produce from home to market places? **1**.Headcarrying [] **2.**OwnPackanimal [] **3**.Animalcart[] **4**.Public transport [ ] **5.**Other (specify) [ ] _____

**35.** Who are the major Coffee market chain actors? **1**. Private trader **2**.Cooperatives **3**.Consumer **4**. Rural collectors **5**. Others (specify_____

**36.** To sell your coffee products, which market channel do you use? (Multiple responses are possible)(√)**1**.[] local/privatetraders**2.** []Cooperatives **3**.[] direct sell to end consumers **4.**Rural collectors **5.**[ ] Others (Specify_____

**Market information**

**1.** Have you access to market information? **1**.yes   **2**.no

**2.** If your answer for Q*1 is yes, what kind of market information you are accessed for? **1**. Price     **2**. Supply     **3**. Demand     **4**. Completion     **5.** Others specify_____

**3.** What tool you use to have such market information? **1**. Radio 2. Phone **3**. TV **4.** Others specify _____

**4.** Among the above information tools for which one you have an access (which one you are utilizing) (multiple response is possible)? **1.** Radio **2**. Phone **3.** Both radio

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and phone **4.** Tv **5.** All **6**. Other specify_____

5. Do you think market information has an effect on market supply of coffee **1**.yes

   **2**.no

6. **Marketing cost**

| No | Marketing cost | Unit | Cost per unit | Amount used | Total cost |
|---|---|---|---|---|---|
| 1 | Hulling and drying | | | | |
| 2 | Packing | | | | |
| 3 | Loading and Unloading | | | | |
| 4 | Transportation | | | | |
| | Modern transport | | | | |
| | Labor | | | | |
| 5 | Storing | | | | |
| 6 | Commission or brokerage fee | | | | |
| 7 | If others specify | | | | |
| | Total | | | | |

7. **Coffee production input related information**

| No | Inputs | | Input supplier | Units | Cost per unit | Amount used in 2017/18 production season | Total cost |
|---|---|---|---|---|---|---|---|
| 1 | Seedling | | | | | | |
| 2 | Farm Equipment | | | | | | |
| 3 | Irrigation | | | | | | |
| 4 | Labor | Family labor | | | | | |
| | | Hired Labor | | | | | |
| 5 | Chemical/pesticide and fungicide | | | | | | |
| 6 | Other specify | | | | | | |
| 7 | Total cost | | | | | | |

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8. **Grading**

3. Do you grade your coffee? **1**.yes   **2**.no
4. If you grade your coffee what grading citeria you use? **1**. Size  **2**. Color  **3**. Variety  **3**. Matutity  **4.**quality  **5**.others specify

9. **Storage**

5. Do you store your coffee? **1**.yes   **2**. No
6. If yes how long did you store? _____
7. Describe your storage facility **1**. Own  **2**.rented
8. If your storage facility is rented, what is basis of payment? **1.** Monthly **2.** Annually
9. How much did you pay for storage per year? _____

## 10. Credit service

1) Did you have access to credit in the year 2017/18 E.C? (√) **1.** [] Yes **2**. [ ] No

2) If yes, have you received credit in 2017/18 E.C for coffee production purpose?**1**.[] Yes**2**. [ ] No

3.If no to question#2 what are the reasons? **1.** Lack of collateral 2.Unfavorable bureaucracy **3**. Don't need/want to take credit **4**. Others (specify) _____

4.If yes, how much did you take for coffee production purpose? _____Birr

5.For what purpose did you take the credit in relation to coffee production?

**1**.[] To purchase fertilizer for coffee **2**.[] To rent in land to extend coffee production **3**.[ ]To purchase seedlings of coffee **4**.[] To purchase transporting animals **5.** Others _

6. From whom did you get credit for coffee production? (√)(Multiple responses are possible) **1.** [] Friends **2**.[] Bank**3.** [] Microfinance institution **4**.[]Traders**5.** [] NGO**6**.[] cooperatives **7**.Others (specify) _____

**Extension services**

1)Did you have extension contact in relation to coffee production in the2018 cropping season? (√) **1**. [] Yes **2**. []No

2) If your answer for Q.1 is No, why? (√) (Multiple responses are possible)

**1.**[] No service provider nearby **2.**[] Possessed the required information **3**.[]  Availability of contact farmers **4**. [ ] Do not have time to get the service**5.** Others_____

3) If yes, how often the extension agent contacted you? _____

4) What was the extension advice specifically on coffee production? (√)(Multiple

responses are possible) **1**.[] Fertilizer (compost) applications **2**.[] Harvesting**3**.[] Marketing of coffee **4**.[] Post-harvest handling **5.**Others (specify) _____

5)Who provides the advisory service?($\sqrt{}$) (Multiple responses are possible)1[] Development agents **2**.[]NGOs**3**.[] Woreda OARDexperts **4**.[]Research centers **5**. [] Neighbor and friends 6. [ ] Others (specify) __

**Off-farm/Non -farm activities and their incomes**

1. Did you participate in non-farm or off-farm activities to generate income?($\sqrt{}$)**1**.[]Yes **2**. [ ] No

2. If your answer for Q1 is yes, what are they?

| No | Off farm/ nonfarm activities except coffee production | Yes=**1**, no=**2** | If yes any monthly income in birr |
|----|----|----|----|
| 1 | Charcoal production | | |
| 2 | Petty trade | | |
| 3 | Salary | | |
| 4 | Pension | | |
| 5 | Remittance | | |
| 6 | Income from construction work | | |
| 7 | Others specify | | |
| | Total | | |

3. Whatpercentofyourhouseholdexpenditurewascoveredbytheseincomesgenerating activities? _____

4. What is the estimated amount of income you obtain from non-farm or off-farm activities annually? _____ Birr.

5.Is your family labor adequate for farm activities? **1**. [] Yes **2**. [] No

6) If no, total amount of hired labor for the production year 2017/18:_____

**Challenges and opportunities related with coffee production and marketing**

| | Production related | | Marketing related | |
|---|---|---|---|---|
| | Challenges | Opportunities | Challenges | Opportunities |
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| | | | | |
| | | | | |
| | | | | |

**"COFFEE VALUE CHAIN ANALYSIS: THE CASE OF GIMBO DISTRICT, KAFFA ZONE, SNNPRS ETHIOPIA"**

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**Traders interview schedule**

**General instructions for Enumerator**

➡ Make brief introduction before starting any question, introduce yourself to the farmers, greet them in local ways, and make clear the objective of the study.

➡ Please fill the interview schedule according to the farmers reply (donotputyour own feeling).

➡ Please ask each question clearly and patiently until the farmer gets your points.

➡ Please do not use technical terms and do not forget local units.

➡ Put the answer on the space provided.

**Trader's questioners**

Questioner numbe_____Name of enumerator_____

Date_____/_____/_____

**I Area information**

1.1 Name of Market_____

1.2 .Distance from residence to the market_____Km (walking time in minutes)_____

**II Socio-demographics**

1. Name of trader_____

2. Age of trader_____Years

3. Sex of trader **1** Male_____**2** Female_____

4. Marital status of trader? **1** Single **2** Married **3** Divorced 4 Widows

5. Total family size_____

6. Educational level of trader? Grade completed_____

7. Total number of family members in own business_____

8. Total number of persons employed in your business in 2012/13?

| Employee | Permanent | | Temporary | |
|---|---|---|---|---|
| | M | F | M | F |
| Family members | | | | |
| Non family members | | | | |
| Total | | | | |

9. What type of business you are involved in?

**1**. Supplier to exporter **2**. Coffee collectors **3**. Retailer **4**. Broker/commission agent. **5**. Local collector **6**. Retailer & Broker **7**. Agent of coffee supplier **8**. Other specify

10. How did you come to this business?
_____

11. Did you have coffee trade license? **1**= Yes **2**= No

12. If your answer for Q*11 is yes, how much did you pay for the trade license? _____

13. How much is the renewal payment? _____birr

14. For how long have you been in this business? _____years

**III Capital**

**III. 1 Fixed business capital**

| No | Asset | quantity | Unit price | Total price |
|---|---|---|---|---|
| 1. | Store | | | |
| 2 | Milling/processing machine | | | |
| 3 | Truck | | | |
| 4 | Weighing scale | | | |
| 5 | Moister tester | | | |

**III. 2 Financial capital**

1. What was the amount of initial working capital when you start this business? ---------- Birr

2. What was the source of the working capital in 2017/18? **1** own **2** loan **3** gift **4** Share **5** others (specify)_____

3. If it was loan, from whom did you borrow? **1** Relative/family **2** other traders **3** private money lenders 4 micro finance institution **5** NGO **6** Bank **7** Friends **8** other, (specify) -------

4. How much was the rate of interest? _____Birr for formal and --------------birr for informal

5. What was the reason behind the loan? **1** to build store **2** to purchase a car **3** for working capital 4 other (specify)_____

6. How was the repayment schedule? **1** Monthly **2** Semi-annually **3** other (specify) _____

## IV. Purchasing and selling activities

1. Where do you buy coffee and in which form (Also, specify amount of coffee sold and price per)?

| No | Sellers | Amount in quintal | Price/kg | Place/ market | Terms of trade(cash, credit, & both) |
|---|---|---|---|---|---|
| 1 | Famers | | | | |
| 2 | Collectors | | | | |
| 3 | Agents of coffee suppliers | | | | |
| 4 | Coffee suppliers | | | | |
| 5 | Cooperatives | | | | |
| 6 | Brokers | | | | |
| | Other specify | | | | |

2. What are prices of coffees during scarce and abundant seasons? Prices of coffees during scarce seasons?

| Price | Maximum | Minimum |
|---|---|---|
| Selling price | | |
| Purchase price | | |

Prices of coffees during abundant seasons?

| Price | Maximum | Minimum |
|---|---|---|
| Selling price | | |
| Purchase price | | |

3. Where do you sell your coffee and in which form (Also, specify amount of coffee sold and price per kg)?

| No | Buyer | Amount in quintal | Price/kg | Place/market | Terms of trade (cash, credit, & both) |
|---|---|---|---|---|---|
| 1 | Agent of coffee suppliers | | | | |

| 2 | Coffee supplier | | | | |
|---|---|---|---|---|---|
| 3 | Cooperative | | | | |
| 4 | Local consumer | | | | |
| 5 | Exporter | | | | |
| | Other specify | | | | |

Marketing costs involved

| No | Marketing cost | Amount in birr/quintal |
|---|---|---|
| 1 | Processing | |
| 2 | Bagging | |
| 3 | Packing | |
| 4 | Loading and unloading | |
| 5 | Transportation | |
| 6 | Agents | |
| 7 | Others specify | |

4. Did you process your coffee? **1**. Yes        **2**. No

5. The Coffee Bean Processing Activities and Costs Involved

| S/No. | Coffee Beans Processing | Cost (Birr/kg) | | Margin (Birr/kg) | | Price at (Birr/kg) |
|---|---|---|---|---|---|---|
| | | Range | Average | Range | Average | |
| 1 | Drying | | | | | |
| 3 | Hulling & grading | | | | | |
| 4 | Cleaning | | | | | |
| 5 | Machine sorting | | | | | |
| 6 | Hand sorting | | | | | |

6. How do you attract your suppliers? **1**. By giving credit to purchase inputs **2**. By visiting them 3. By giving better price relative to others **4**. By fair weighing   **5**. Other specify

7. How do you attract your buyers **1**. By giving fair price relative to others  **2**. by quality of product  **3**. by giving bonus  **4**. Other specify

8. Did you use brokers to purchase coffee?  **1**. Yes **2**.No

9. If brokers were used, what problems did they create?

**1**. Cheating quality **2.** Wrong price information **3**. Cheating scaling (weighing) 4. Charged high brokerage **5**. Other (specify _____

10. What was the advantage of using brokers? **1.** You could get buyers and sellers easily **2**.reduce transaction costs **3**.purchased at lower price **4**.save your time **5**.sell at higher price 6.other (specify) _____

11. Did you use commission agents to purchase coffee? **1**. Yes **2.**No

12. If you used commission agent, what problems created by them?

**1.**Less quantity **2**. Cheating on price **3**. Cheating on quality **4**. Cheating scaling (weighing)

**5.**Charged high commission 6. Other (specify) _____

13. What was the advantage of using commission men? **1**. to get enough quantity **2**.

Purchase at lower **3**. Sell at higher price **4**. Reduce transaction cost. **5**. Save your time **6**.

could get quality coffee **7**. Specify

other_____

14. At which season of the year was preferable to purchase coffee in terms of price?

_____

_____

15. Is your purchasing price higher than your competitors? **1.** Yes **2**.No

If your answer is yes, what was the reason? **1**.to attract more suppliers **2**.to buy more quantity 3.to kick out you competitors from market **4**.to get better quality coffee **5**.other (specify) ____

16. How do you measure your purchase? **1**. By weighing (kg) **2**.by traditional weighing materials 3.other (specify)

17. Do you pack your purchase? **1**. Yes 2.No
18. If yes, what were your packing materials? _____
19. What is the cost of packing? _____Birr/qt
V. 1 Grading
1. Did you grade your coffee? **1**. Yes **2**. No
2. Did you have the knowledge of national coffee grading? **1**. Yes **2**. No
If Yes, Could you mention it? What are the standard indicators?

_____

_____

3. Description of coffee Processed Volume, Grades and it identified Standards, and Prices

| S/ No. | Type of Coffee | Quantity | National Coffee (Standards) Grades | Grade of Coffee | Geographical Location | Coffee Specialty Category | Who Does Grading | Prices/Each Grade |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

4. Please would you mention the factors that make your coffee vary with the selling price against the market price?

_____
_____

5. What was basis of your grading?

**1**. Color **2**. Size **3.** Taste **4.** Other specify_____

**V. 2 Transport**

1. How far is the purchasing market place from your residence?

**(1)**District Market_____ **(2)** Regional Market _____ kms **(3)** ECX _____Kms

2. What is the most frequently used mode of transport to transport coffee from purchasing sites to hulling/washing Centre?

_____

_____


**1).**Head loading **2)** Pack animals **3**) Animal cart **4)** Trucks **5**) Others

3. Average cost of transportation you incur to transport coffee from purchase centre to hulling or pulping centre? _____Birr/100kg per km

4. How did you determine transport cost of trucking? (Circle the answer(s))

Cost per quintal from collection point to store………….Birr/qt per km

From store to the nearest market (Gimbo market center)  ......Birr/qt per km

From store to Addis Ababa………………………Birr/qt per km

From Addis Ababa to the port…………………..Birr/qt per km

  How much was the loading and unloading expenses?

_____
   5.  After buying coffees, mention the activities you do as a value addition before you sell it

| Activities | Estimated cost | Remark |
|---|---|---|
| | | |
| | | |
| | | |
| | | |


**V. 2 Market system**

1. Relationship

| No | Relation b/n you and buyer | | | Relation b/n you and seller | | |
|---|---|---|---|---|---|---|
| 1 | The same religion | 6 | Regular buyer (customer) | 2 | The same ethnic | 6 | Regular buyer (customer) |

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| 2 | The same ethnic | 7 | contractual | 3 | The same origin | 7 | contractual |
|---|---|---|---|---|---|---|---|
| 3 | The same origin | 8 | Close relative | 4 | No relationship | 8 | Close relative |
| 4 | No relationship | 9 | Other, specify | 5 | Meet socially | 9 | Other, specify |
| 5 | Meet socially | | | 2 | The same ethnic | 6 | Regular buyer (customer) |

2. How often do you meet your buyer(s) to discuss business related matters and exchange new information?

| Daily | Once per a week | At least once per a month | At least once every three months | Other (specify) |
|---|---|---|---|---|
| | | | | |
| | | | | |

3. How do you collect the products?

**1**. I buy directly from farmer at coffee marketing center **2**. I have agent **3**. at my store  **4**. Other
specify_____

4. Is there competition between you and other collectors for suppliers here in the same region? **1**. yes   **2**. no

5. If yes, what measures you take to with stand this competition?

**1**. Increasing   many   agents   **2**. Increasing   price   **3**. Giving   loan   **4**. Other
specify_____
_____


6. What kind of services do you provide your suppliers with?

| Information about market requirements and developments | Equipment and input factors for production | loans | Technical assistance and training | Others, specify |
|---|---|---|---|---|
| | | | | |
| | | | | |

7. What kind of information do you get from your buyer(s)?
_____
_____

8. Did you pay tax for the coffee you purchase in 2017/18? **1**= Yes **2**=No

9. Did you pay tax for the coffee you sell in 2017/18? **1**= Yes **2**=No

10. What was the basis of tax?

**1** Per sack-------Birr **3** per basket-------Birr **5** Per kg-----Birr

**2**   Per   quintal-------Birr   **4**   Fixed   payment-------Birr   **6**   other
(specify)_____

11. How long does it take to fulfill the order of a buyer (days between order and delivery)

| 1-3 days | 3-5 days | A week | Two weeks (specify why) | More (specify why) |
|---|---|---|---|---|
|  |  |  |  |  |

12. Can you always fulfill the order (i.e. meet the buyers' requirements in terms of quantity and time)?

**1**. Yes **2.** No

13. Is the supply reliable _____

14. With regard to available business support services (government extension, BDS, Banks, etc.) and the policy and regulatory framework for your sector, what are the opportunities and constraint?

_____
_____
_____

15. What kinds of business services are available? And which ones do you make use of?

_____
_____
_____

16. Are financial resources available?

_____
_____

17. What kind of support does the government provide?

_____
_____
_____

18 Are regulatory issues obstacle for your business? **1**. Yes **2.** No if yes, what are these regulations?

_____
_____
_____

19. What do you suggest for improvement of the coffee business?

_____
_____
_____

20. What did you think as a major challenge in coffee trading and processing?

a)_____
b) _____
c)_____
d)_____

 What do think as major opportunities in coffee trading and processing?

a)_____
b) _____
c) _____
D)_____

22. Do you have any suggestions/ comments on:

a) Trading_____
b) Marketing_____
c) Processing _____
D) Others (please specify)_____

# "COFFEE VALUE CHAIN ANALYSIS: THE CASE OF GIMBO DISTRICT, KAFFA ZONE, SNNPRS ETHIOPIA"

**Prepared by: Abera Birhanu**

**School of Agribusiness and Value Chain Management**

**Jimma University**

**Consumers interview schedule**
**General instructions for Enumerator**

➡ Make brief introduction before starting any question, introduce yourself to the farmers, greet them in local ways, and make clear the objective of the study.
➡ Please fill the interview schedule according to the farmers reply (do not put your own feeling).
➡ Please ask each question clearly and patiently until the farmer gets your points.
➡ Please do not use technical terms and do not forget local units.
➡ Put the answer on the space provided.

District: **Gimbo**

Questionnaire number: _____

Name of Enumerator: _____

Telephone: _____

Date _____ _____/_____ _____/2018

Gimbo District/ _____ Kebele_____

Name of respondent/optional _____

1. Sex of household head: ___ **1**=Male **2**=Female

2. Marital status **1**= Single **2** = Married **3** = Widowed **4** = Divorce

3. Household size: ___

4. Education level of household head: _____

5. Religion **1**=Orthodox **2**= Catholic **3**= Muslims **4**= Protestant **5**=others (specify) ___

6. Linkage with coffee chain actors :(√)( Multiple responses are possible).**1**.[] Rural Collectors**2**.[] Farmers**3**.[] Retailers**4.** [] private traders **5**.[] Cooperatives **7**.Others (Specify) _____

7. Do you think coffee market chain is complex and has intermediaries?

**1**. [ ] Yes **2**.[ ] No

8. Do you think traders of coffee marketing are efficient and competitive ?(√)**1**. Yes [ ]**2.** No [ ]

9. If your answer for Q.8 is No, what is the problem of traders?(√)**1**.[] High

Competition with unlicensed traders **2**.[] Supply poor quality **3**.[] Cheat scaling weighting **4**.[] Price setting problem **5**.[] Government policy problem 6.Others(specify)_____

10.As a buyer, do you have difficulty in obtaining sufficient supplies?(√)**1**.[]Yes**2**.No[]

11. As a buyer, do you have a particular seller? (√) **1**. [ ] Yes **2**.[ ] No

12 Average purchasing price of Coffee_____

13. Do you consider any quality requirements to purchase coffee? (√) **1** .[ ] Yes **2**.[ ] No

14. If yes for Q.13, what quality requirement do you consider _____,

15.Do you think that the price of coffee is reduced "If linkage is

Improved? (√) **1**. [ ] yes **2**. [ ] No.

16. If your answer for Q.15 is No, why? _____

17. If your answer for Q.15 is yes, where intervention should is needed_____

18. What challenges you face with respect to coffee consumption?_____
_____

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**Prepared by: Abera Birhanu**

**School of Agribusiness and Value Chain Management**

**Jimma University**

**Exporters interview schedule**

**General instructions for Enumerator**

➡ Make briefintroductionbeforestartinganyquestion,introduceyourselftothe farmers, greet them in local ways, and make clear the objective of the study
➡ Please filltheinterviewscheduleaccordingtothefarmersreply(donotputyour own feeling).
➡ Please ask each question clearly and patiently until the farmer gets your points.
➡ Please do not use technical terms and do not forget local units.
➡ Put the answer on the space provided.

Exporters Questionnaire

**II. Demographic Characteristics**

Name of trader: _____

Age: _____ years old Sex: **1.**Male **2.**Female Religion: **1**.Orthodox **2**.Muslim **3.**Catholic **4.**Protestant **5.**Other (specify) _____

Marital status: **1**. Single **2**.Married **3**. Divorced **4**. Widowed

Education level of business owner (Circle the answer(s) **1**. Illiterate **2.**Formal education grade/Years
_____

**3**. Read & write **4**.Others (specify) _____

**II. Subject Matter Questions**

1. What type of business were you involved in?
_____
_____
2. For how long have you been in operation in the business? _____Years

3. Out of the occupations you have, what is the percentage of income obtained from coffee trade? _____% income

**IV.Purchasing activities**

4. The Quantity bought, Price, Cost incurred, and the marketing margins (quantities purchased, prices, costs, at each buying market) and quantity, price, costs at sales markets

| S/N o. | Types of Coffee Purchased | Quantities Purchased | Prices | | | | Cost | | | | At Which Market |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Unit Price | | Total Price | | Unit Price | | Total Price | | |
| | | | Birr | Cen. | Birr | Cen. | Birr | Cen. | Birr | Cen. | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

**V.Export Markets and buyer relationship**

5. To which countries do you export? Who are your buyers there? (Name 5 main export markets)

1_____2_____3_____4_____5_____

6. How do you find a foreign buyer?

| They find me

Personal friendship | introduced on a conference | by coincidence | International fair/ exhibition Business platform (online portals) | By BDS providers (e.g. export development board) | chambers etc | Other |
|---|---|---|---|---|---|---|
| | | | | | | |

7. What opportunities are there on the export markets? (e.g. new markets, new products and services, increasing demand, etc.)
_____

8. What kind of requirements do your buyers have? (E.g. in terms of quantity and quality, delivery time and frequency, standards and certifications,)_____

9. What kind of problems do you face, when supplying to export markets?
_____
_____

10. How do you interact with your foreign buyers?

**1**. I visit them personally **2.** Phone calls, emails etc. **3**. Intermediary **4**. If others specify_____

11. Do you regularly exchange information and knowledge with your buyers? **1**. Yes **2.** Not Only sometimes

12. What kind of information do you get from your buyer(s)

| Information about market requirements and developments | Equipment and input factors for production | loans | Technical assistance and training | Other |
|---|---|---|---|---|
| | | | | |

What is the nature of relationship between you and your foreign buyer(s)?
**1**. Formal contract **2**. Verbal agreement **3**. Buyer dictates the terms **4**. Equal rights relationship
**5**. You can easily find another buyer **6**.You are bound to a particular buyer (for various reasons)

13. How long does it take to fulfill the order of a buyer (days between order and delivery)

| 1-3 days | 3-5 days | A week | Two weeks (specify why) | More (specify why) |
|---|---|---|---|---|
| | | | | |

14. Can you always fulfill the order (i.e. meet the buyers' requirements in terms of quantity, quality, price and delivery time)? **1**. Yes   **2**. No,

15. Is there any occasion when you had to reject some orders? **1**. Yes   **2**. No,
 If yes, Why? _____

16. Do your foreign buyers provide you with certain services? **1**. Yes   **2**. No,
 If yes, what kind of services (e.g. loans, training, maintenance services, equipment, marketing support etc.)_____

_____

## VI. Product quality and specifications

17. Describe the product/service which you sell_____
_____

18. What is the price to which you sell one item (or the price for your different coffee types?)_____
_____
_____

19. Do you have product categories? Means do you grade products according to quality?
**1**. Yes   **2.** No,
If yes, what are these grades? And what are the selection criteria?

_____
_____
_____

20. Are you aware of international/national standards and regulations for your field of business (e.g. ISO norms, GAP, GMP, quality standards and laws, etc. **1.** Yes   **2.** No, if Yes. What are these standards?

_____

_____

21. How do you transport your products to the buyer/market and how you calculate your transportation cost? describe it

**VII. Supply**

22 Which are the main regions from which you source your products for export?_____
_____

23. What kind of difficulties do you face in working together with your suppliers (especially those of
The target region)?_____
_____
_____

24. Do the products from the target region meet international market requirements? (in terms of quantity, quality, price, design, delivery time etc) and if so what is your evidence
?_____
_____
_____

25. Do you provide any services to your suppliers?

| Technical assistance (e.g. training) | Equipments (input supply) | loans | Information about market requirements and demand conditions | Research and devt |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

**VIII. Competition**

26. Who are your main competitors on the world market?
_____
_____

27. What makes your product different from that of competitors?
_____
_____
_____

28. What is the local competitive advantage of products?

**IX. Business environment and support services**

29. With regard to the legal and regulatory framework, have you experienced any difficulties to grow?
Your business? If yes, what were these difficulties?

_____
_____

30. What kind of services does the (local) government provide to exporters? Are these services up-to date and useful?

_____

_____

_____