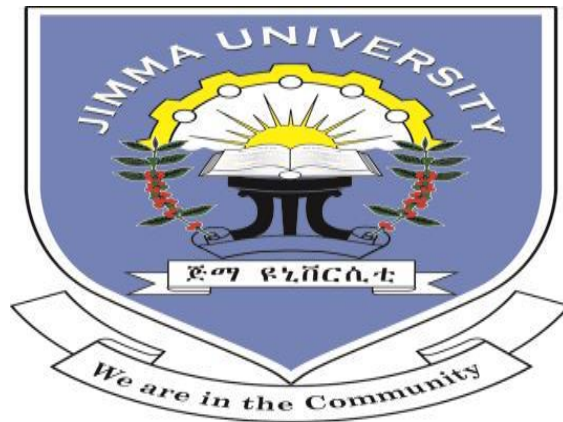# Determinates of avocado supply and its value chain analysis case study of Mana, Jimma Zone, Oromia National Regional State of Ethiopia

A Thesis submitted to the school of Graduate Studies of Jimma University in partial Fulfillment of the Requirements for the Award of the Degree of Masters of science in Economic Policy Analysis (MSC).

BY:

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MSC Program, Department Of Economics College Of Business and Economics,

Jimma University, Jimma, Ethiopia

September, 2018

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ABSTRACT

This study was aimed at analyzing value chain of avocado Mana Woreda, Jimma Zone. Avocado plays a significant role in increasing food security and income for the poor farmers of Ethiopia. Data for the study were collected from both primary and secondary sources. Primary data were collected using informal and formal surveys.This was supplemented by secondary data collected from different published and unpublished sources. The data was analyzed using the descriptive statistics, multiple linear regression model and Multinomial Logit model. STATA computer programs were used to process the data. Avocado value chain actors identified in the study include input suppliers, producers, rural collectors, brokers, retailers, wholesalers, processors and consumers. The chain is governed mainly by wholesalers with assisted by brokers. Six market channels were identified for avocado. The total gross marketing margin (TGMM) was highest in direct sell to locale collector in channel V and IV, respectively and lowest in direct sell to retailer in channel I.The multiple linear regression model results showed that six variables such as quantity of avocado produced, age of household head, family size of household head, access to market information, access to credit and lagged year price of avocado are significant determinants of the quantity of avocado supplied to the market.. The multinomial logit model results showed educational level, experience of household head, distance from home to nearest market, access to market information, current price of the commodity and access to credit services are significantly influenced the choice of avocado marketing outlets as compared to accessing consumer market outlet. Finally, policy implications drawn from the study findings include the need to improve the input supply system,, improving farmers' knowledge and experience on avocado production, encouraging adult education through extension service, improving productivity and volume sales of avocado, strengthening the linkage/interaction among fruit value chain actors, expanding accessibility of market infrastructure and strengthening supportive institutions.

Key words: Value chain, Marketing margin, multiple linear regressions, multinomial logit, market outlet.

DECLARATION

I, MekdesTamiru, hereby declare that this thesis entitled "Value Chain Analysis of Avocado for Mana Woreda, Jimma Zone, Oromia national regional state of Ethiopia"is my own work except where otherwise indicated and acknowledged. This thesis has been carried out by me under the guidance and supervision of Dr. JemalAbafita and AtoFikaduGutu.

The thesis is original and has not been submitted for the award of degree or diploma in any university or institution.

_____   _____   _____

Researcher's Name   Date   Signature

CERTIFICATE

This is to certify that the thesis entities "Value Chain Analysis of Avocado for Mana Woreda, Jimma Zone, Oromia national regional state of Ethiopia" submitted to Jimma University for the award of the Degree of Master of Science in economic policy analysis is a record of Valuable research work carried out by MekdesTamiruGarito, under our guidance and supervision.

Therefore, we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree or diploma.

Name of Advisors

1. Dr. JemalAbafita   Date …………………..   Signature ………………

2. AtoFikaduGutu   Date …………………...   Signature………………

Approval Sheet

As members of the Examining Board of the Final Open Defense, we certify that we have read and evaluated the thesis prepared by MekdesTamiru, entitled "Value Chain Analysis of Avocado for Mana Woreda, Jimma Zone, Oromia national regional state of Ethiopia" and recommend that it be accepted as fulfilling the thesis requirements for the award of the degree in Master of science in economic policy analysis.

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Name of Chairman   Signature   Date

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Name of Internal Examiner   Signature   Date

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Name of External Examiner   Signature   Date

ACKONWLEDGEMENTS

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ABBREVIATIONS AND ACRONYMS

ACET   African Center for Economic Transformation

BoA   Bureau of Agriculture

CC   Contingency Coefficient

CLRM   Classical Linear Regression Model

CSA   Central Statistical Authority

FAO   Food and Agricultural Organization

FAOSTAT   Food and Agricultural Organization Statistical Division

GMM_P Gross Marketing Margin of producer

GMM_{LC} Gross Market Margin of locale collector

$GMMR_R$ Gross Marketing Margin of retailer

GMM_W Gross Marketing Margin of Wholesalers

GVC   Global value chain

HHH   Household Head

IPMS   Improving Productivity and Marketing Success

JARC   Jimma Agricultural Research Center

MKT   Market

MLR   Multiple Linear Regression

MNL   Multinomial Logit

MoARD   Ministry of Agriculture and Rural Development

MSPA   Mauritius Sugar Producers Association

ACRONYMS AND ABBREVIATIONS (Continued …)

NGOs   Non- Governmental Organizations

RMA   Rapid market appraisal

SCP   Structure Conduct and Performance

TGMM   Total Gross Marketing Margin

UNCTAD   United Nations Conference on Trade and Development

UNIDO   United Nations Industrial Development Organization

VIF   Variance Inflation Factor

CHAPTER ONE

INTRODUCTION

This chapter consists of Background to the study, Statement of the problem, objectives of the study, Scope and limitation of the study, significance of the study and structure of the thesis.

1.1 Background of the study

Global fruit and vegetable production has experienced an outstanding increase. In 2011, almost 640 million tons of fruit were collected all over the world (FAOSTAT, 2013). As Lumpkin et al (2005) pointed out worldwide production of fruit and vegetable crops have grown faster than that of cereal crops. Between 1960 and 2000, the area under horticultural crops worldwide has more than doubled. Among the key reasons are attributable to the growth, high profit from horticulture as compared to cereals was the prime one. Per capita farm income from horticulture has been reported up to five times higher.Lumpkin and Moore(2005).

Most of the Sub Saharan farmers have small pieces of land for production of different agricultural products (0.9 to 3ha), and production is mainly rain fed. The production of fruits in sub-Saharan Africa has grown less than o.5% a year over 2005-2009, lower than the global average of 2.7%. Major fruits like bananas, mangoes grew highly at 2% a year and large in volume. In the region most fruits are produced by smallholder and many of these producers are not commercially oriented from the production (ACET, 2012). IFAD‟s regional strategy for sub-Saharan Africa emphasized on improving the income of smallholders within the context of trade liberalization. Smallholder production and the marketing of fruits and vegetables is a key focus (IFAD, 2003).

Avocado (Perseaamericana Miller) is native to Mexico. Because of its high calorific value, the fruit is proclaimed as the Globe's healthiest fruit (Guinness Book of Records, 2010) and the crop brings considerable net return per acre when compared to staple crops (FAO, 2005). In addition to its high nutritive values, avocados can also be used as shade trees, windbreaks, posts, and ornamentals (Albertin and Nair, 2004). Large plantations may play an important role in carbon storage and sequestration that mitigates environmental pollution (Kirby and Potvin, 2007).

Avocado was first introduced to Ethiopia in 1938 by private orchardists in Hirna and Wondo-genet and production gradually spread into the countryside where the crop was adapted to different agro-ecologies (Edossa, 1997; Woyessa and Berhanu, 2010; Zekarias, 2010). According to these sources, the center established the first avocado varietal orchard in 1969 with materials initially sourced from Wondo-genet and Debrezeit. Jimma is the 4th largest avocado producing zone of Ethiopia, after Wolayata, Sidama and Haditya zones. In Jimma zone, many households have relied on avocados as a major source of income (CSA, 2008).Avocados are the principal cash crop in South-western Ethiopia and large numbers of farming households rely on avocados for their livelihood (CSA, 2008; MoARD,2008).Avocados are second in total volume of production, next to banana, in Ethiopia (Joosten, 2007).

Although, avocado is relatively new fruit crop to the agriculture research system of Ethiopia, it is now being widely distributed in the country from lowland to highland area (1000-2300 masl) where there is no frost hazards (personal communication). There is a great demand for avocado in southwestern part of the country (Edossa, 1997). This demand is very high particularly at Mana woreda, which is located in the vicinity of Jimma town. Its present market value is continuously increasing much better than other available fruits. This indicates that avocado is a potential fruit crop not only for solving the problem of balanced diet but also for fetching sizable income for producers. It thus has become the potential fruit crops for diversification where farmer's income has been highly limited to coffee as the woreda is well known as major coffee producing area in Jimma Zone.

Ethiopia has a variety of fruit crops grown in different agro ecological Zones by small farmers, mainly as a source of income as well as food. The production of fruit varies from cultivating a few plants in the backyards, for home consumption, to large-scale production for the domestic and home markets. According to CSA (2009) the area under these crops (avocado, bananas, guava, lemons, mangoes, oranges, papayas and pineapples) were estimated to be 47987 hectares.

1.2 Statement of the problem

Agricultural production and agribusiness together constitute an average of around 45 percent of the economy of Sub-Saharan Africa. In Sub-Saharan African countries, the share of agribusiness (including logistics and retail) in gross domestic product (GDP) is typically around 20 percent, while the share of agricultural production is around 24 percent for low-income countries, although only a part of production is commercialized. (World Bank, 2013).Agricultural value chains in Africa are mostly made up of micro, small, and medium enterprises. Participants in a value chain may consist of micro-enterprises, small and medium enterprises (SMEs), and semi industrial and industrial enterprises distinguished not only by size but by their sources of labor, capital intensity, and the type of market they reach.

Ethiopia considers fruit crops as being high-value strategic, agricultural export commodities. Production of fruit crops is estimated at 780,000 metric tons. Domestic consumption stands nearly at 760,000 metric tons. Ethiopia's per capita consumption of fresh fruits equals around 7 kg per person per year, one of the lowest in the region. Export of fresh fruits is projected to reach 22,000 metric tons, which represent only 3% of the total productions. CSA,(2017/2018).

Ayelch (2011), conducted a study on market chain analysis of fruits for Gomma woreda, Jimma Zone.The study identified the major factors that affect the development of avocado and mango are found in all the stages of the chain. At the farm-level, lack clean seedlings and grafted seedlings have compelled farmers to use inferior and low yielding materials. Storage facilities and absence of collective bargaining power has also forced individual farmers to accept unfavorable deals.The marketable surplus of fruits by using OLS regression. She found that fruit marketable supply was affected by; education level of household head, quantity of fruit produced, fruit production experience, extension contact, lagged price and distance to market.

Muluken (2014) conducted a study on value chain analysis of fruits for Debub Bench Woreda.The study idtified the major problem that affect the development of fruit value chain such as low supply of fruits seed, low irrigation facility, lack of technical training, lack of credit access, low yield, storage problems, low price of fruits, price fluctuations, trader give same price and no market and infrastructure facilities. The major marketing problems of traders were low price of fruits, price fluctuations, trader give same price, too much competition and lack of credit

access. Transportation problem were the major problem for both farmers and traders. To conclude the production, marketing and transportation problems were the main bottlenecks that affected the value chain of fruits in the study area.

Adisu (2016), conducted a study on value chain analysis of vegetables: the case of Ejere district.The study identified the overall vegetable value chains are constrained by a number of factors which hinder the development of vegetable value chain. At farm level, the major production constraints are shortage of good quality seed, high cost of inputs, lack of availability of adequate pesticides/herbicides, reduction of irrigation water, low irrigation facility, limited knowledge on the proper plantation, harvesting and post- harvest handling activities, diseases and pest attacks, lack of storage, and inadequate credit service. At marketing/trading stage, poor road and transport facility, price setting problem, poor market information, product quality problem, presence of unlicensed traders, lack of product standard, price fluctuation and perishability of the product as the major problems of vegetable marketing.

Fikru et al. (2017)conducted a study on analysis of sesames marketing chain in case of Gimbi District. The study identified the major constraints hindering the development of sesame marketing are found in all the stages of the chain. At the farm-level, sesame producers are faced with lack of improved input supply and high postharvest losses. On marketing side, limited access to market, low price of product, lack of storage, lack of transport, and low quality of product are the major problems.

There are a number of studies conducted on value chain of different agricultural products. For instance Mulat (2000),Bezabih and Hadera (2007),Bezabih (2008),Yilma (2009),Bezabih (2010), Ferdous et al (2012),Getachew et al. (2014) Susanna and Amanda, (2014),Addisu (2016), and Sultan (2016), conducted their study on value chain analysis.

However, majority of these studies also mainly focused on value chain analysis vegetable crops, and there are only a few studies that focus on the fruit value chain issues in south western part of Ethiopia, Ayelch (2011) and Muluken (2014). However, none of them dealt with market outlet choice, which demand employing multinomial logit, thereby constraining the usefulness of their findings. In particular, no empirical evidence is available on the Value chain of avocado in Jimma zone, which is the most prominent avocado growing area in Southwestern Ethiopia

(Jimma zone agriculture, 2010). Thus, this study examines the fruit value chain focusing on avocado in Jimma Zone. Furthermore, the report of CSA (2013) showed that the produced fruits have low proportion to access market, and the farmers are not significantly beneficiary from the produced fruits. Even though, there are a high potential to produce different fruits and the low proportion to market in the area. But there are only one research done regarding avocado value chain in southwestern Ethiopia, especially as per the knowledge of the researcher there is no study conducted in avocado value chain in Mana woreda. Therefore, these inspire the researcher to conduct value chain analysis on the study area and believe that value chain analysis is essential.

> **Research Questions**

In this regard, the current study attempted to answer the following research questions:

1. Who are the major actors and what are their respective roles along avocado value chain in the study area?
2. What are the key challenges and opportunities along avocado value chain actors?
3. Who gets more benefits in the chain?
4. What are the determinants of quantity of avocado supply to the market in the study area?
5. What are the key determinates affecting farmer's avocado market outlet choice decision?

1.3 Objective of the study

1.3.1 General Objectives of the study

The general objective of the study is to analyze value chains of avocado in case of Mana woreda.

1.3.2 Specific objectives

- ➢ To investigate avocado value chain actors, their respective roles, challenges and opportunities in the study area.
- ➢ To analyze respective marketing costs and margins across market channels
- ➢ To examine the determinants of quantity of avocado supplied to the market in the study area; and
- ➢ To identify the determinants of market outlets choice decisions of avocado producers.

1.4 Significance of the Study

This study provides information on the determinants of avocado supply to the market, the determinants of market outlet choice decisions, marketing margin, benefit share of actors, and identifies opportunities and constraints of avocado value chain in the study area. The information is expected to have valuable input that helps market participants to understand supply potential and performance of avocado marketing and come up with important recommendations that helps in delivering required efforts to enhance the production and utilization of avocado at larger scale to bring about economic development in the area. The information generated in this study could help a number of organizations including: national and international research institutions, development organizations, traders, producers, policy makers, extension service providers, government and non- governmental organizations to assess their activities and redesign their mode of operations in study area.

1.5 Scope and limitation of the study

The study is based on cross sectional data and is limited to one woreda and to one most economically important fruit (avocados). Hence, the study is limited spatially as well as temporally to make the study more representative in terms of wider range of area and time horizon. Despite these limitations, the findings of the research provide important basis for relevant interventions for the study area. However, since Ethiopia has wide range of diverse agro-ecologies, institutional capacities, organizations and environmental conditions, the result of the study may have limitations to make generalizations and make them applicable to the country as a whole.

1.6 Structure of the thesis

The thesis has been organized under five chapters. Chapter two presents review of theoretical and empirical evidences to the study. Chapter three discusses research methodology (description of the study area, data types and sources, methods of data collection, sampling techniques and methods of data analysis) of the study. Chapter four presents result and discussions (descriptive, value chain analysis and econometric results) are presented and discussed in detail. Chapter five summarizes the main findings of the study and draws conclusion and appropriate recommendations.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

In this chapter, an attempt has been made to explain certain concepts used in this study. In addition, this part is intended to critically review the literature of the past research work in relevance to present study objective, so that theoretical views and empirical evidences of the reviews enables better understanding of the subject.

2.1. Definition and Basic Concepts

2.1.1. Concept of market value chain

Many organizations use the terms "value chain" and "supply chain" interchangeably; however, these are basically different.

Market chain analysis

A marketing chain is used to describe the numerous links that connect all actors and transactions involved in the movement of agricultural products from the farm to the consumer (Lunndy*et al.,* 2004). It is the path one good follow from their source of original production to ultimate destination for final use. Functions conducted in a marketing chain have three things in common; they use up scarce resources, they can be performed better through specialization, and they can be shifted among channel members (FAO, 2005). According to Hobbs et al. (2000), the term supply chain refers to the entire vertical chain of activities: from production on the farm, through processing, distribution, and retailing to the consumer. In other words, it is the entire spectrum, from gate to plate, regardless of how it is organized or how it functions.

Market chain is the term used to describe the various links that connect all the actors and transactions involved in the movement of agricultural goods from the producer to the consumer (CIAT, 2004). Commodity chain is the chain that connects smallholder farmers to technologies that they need on one side of the chain and to the product markets of the commodity on the other side (Mazula, 2006). Market chain analysis, therefore, identifies and describes all points in the chain (producers, traders, transporters, processors, consumers), prices in and out at each point,

functions performed at each point/ who does what?, market demand/ rising, constant, declining, approximate total demand in the channel, market constraints and opportunities for the products.

Market supply

Marketed supply refers to the amount actually taken to the markets irrespective of the needs for home consumption and other requirements. Whereas, the marketable surplus is the residual with the producer after meeting the requirement of seed, payment in kind, and consumption by farmer (Wolday, 1994). Marketed surplus is defined as the proportion of output that is marketed (Harris, 1982). Marketed surplus may be equal to marketable surplus, but may be less if the entire marketable surplus is not sold out and the farmers retain some stock and if losses are incurred at the farm or during the transit (Thakur *et al*., 1997). In the case of crops that are wholly or almost wholly marketed, the output and marketed surplus will be the same (Reddy *et al*., 1995). The importance of marketed and marketable surplus has greatly increased owning to the recent changes in agricultural Technology as well as social patterns. The decision to supply market is one big question but usually is taken after the product is at hand or if decided earlier some other decisions have to be considered.

Specifically, marketing of horticultural crops is quite complex and risky due to the perishable nature of the product, seasonal production and bulkiness. The range of prices from producer to consumer, which is an outcome of demand and supply of transactions between various intermediaries at different levels in the marketing system, is also unique for fruits and vegetables. Moreover, the marketing arrangements at different stages also play an important role in price levels at various stages (from farm gate to the final user). These features make the marketing system of fruits and vegetables to differ from other agricultural commodities, particularly in providing time, form and space utilities. While the market infrastructure is better developed for food grains, fruits and vegetables markets are not that well developed and markets are congested and unhygienic (Sharan, 1998).

Supply chain: It is taken to mean the physical flow of goods and process that are required for raw materials to be transformed into finished products. Supply chain management is about making the chain as efficient as possible through better flow scheduling and resource use, improving quality control throughout the chain, reducing the risk associated with food safety and

contamination, and decreasing the agricultural industry's response to changes in consumer demand for food attributes (Dunne, 2001). Kotler (2003) also defined supply chain as a longer channel stretching from raw materials to final products that are carried to final buyers. He shortly put a value-delivery network. He also separated supply chain from demand chain in that the later starts from thinking first the target market and move backwards from that point, as a backward orientation.

According to Andrew et al. (2006), the term supply chain is used internationally to encompass every activity involved in producing and delivering a final product or service, from the supplier's supplier to the customer's customer. The primary focus of supply chains is thus on cost and efficiencies in supply.

Value chain: describes the full range of activities required to bring a product or service through the different phases of production, including physical transformation, the input of various producer services, and response to consumer demand (Kiplanisky et al, 2000). As such, value chains include the vertically linked interdependent processes that generate value for the consumer. Value chains focus more on value creation, innovation, product development, and marketing.

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 value 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. Value addition results from diverse activities including bulking, cleaning, grading, and packaging, transporting, storing and processing (Anandajayasekeram and Berhanu, 2009) as shown in Figure 1 for the case of a typical agricultural value chain.
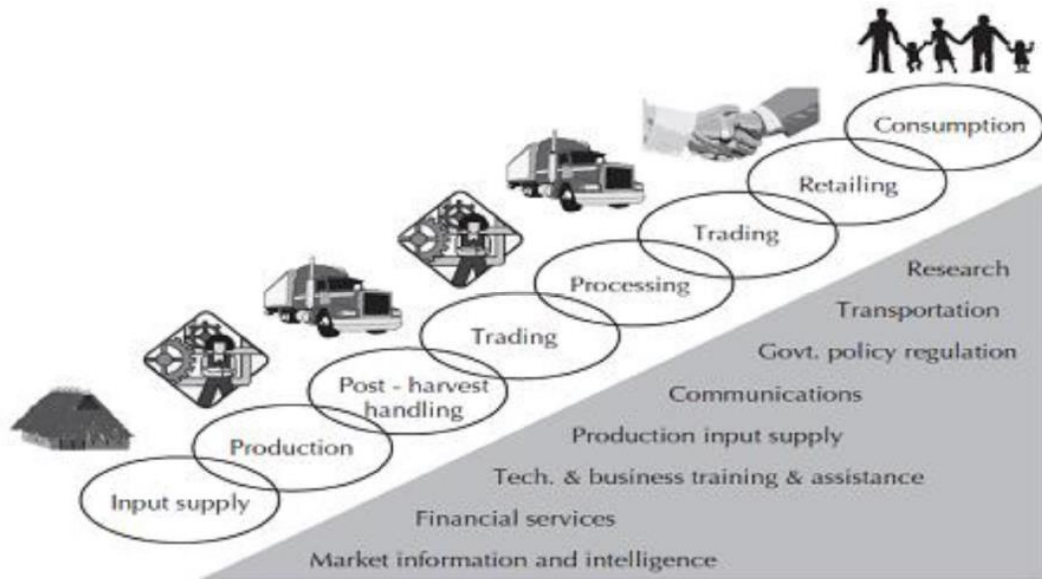
Figure 1: Typical agricultural value chain and associated business development services.
Source: Adapted from Anandajayasekeram and Berhanu (2009).

A defining feature of global economic systems is the shift from traditional units of production defined within national boundaries to the rise of global value chains, embodying networks of actors, tied together by contractual relationships. Value chains are defined as institutional arrangements linking producers, processors, marketers, and distributors –often separated by time and space that progressively add value to products as they pass along the chain (Nabi and Luthria, 2002).

2.1.2 Agricultural Value Chain

An agricultural value chain is usually defined by a particular finished product or closely related products and includes all firms and their activities engaged in input supply, production, transport, processing and marketing (or distribution) of the product or Products. Agricultural value chain analysis is a dynamic approach that examines how markets and industries respond to changes in the domestic and international demand and supply for a commodity, technological change in production and marketing, and developments in organizational models, institutional arrangements or management techniques. The analysis should look at the value chain as a set of institutions and rules; as a set of activities involved in producing, processing, and distributing

commodities; and as a set of actors involved in performing the value adding activities. Value chain analysis focuses on changes over time in the structure, conduct and performance of value chains, particularly in response to changes in market conditions, technologies and policies (Anandajayasekeram and Berhanu, 2009).

An agricultural value chain can be considered as an economic unit of analysis of a particular commodity or group of commodities that encompasses a meaningful grouping of economic activities that are linked vertically by market relationships. The emphasis is on the relationships between networks of input suppliers, producers, traders, processors and distributors (UNCTAD, 2000).

Agricultural value chains link urban consumption with rural production. Changing demand, as a consequence of urbanization, emergence of modern consumption patterns or new trends in international trade, impacts on rural areas along value chains and spills over to marketing and production systems. These rural urban linkages bear challenges but also mutual benefits for producers and consumers and can be promising entry points for development interventions (Hoffer and Maingi, 2006).

Agricultural value chains can include three or more of the following: producers, processors, distributors, brokers, wholesalers, retailers and consumers. The partners within the value chain will work together to identify objectives and are willing to share risks and benefits and will invest time, energy and resources to make the relationship work. Bammann (2007) has identified three important levels of value chain.

➢ **Value chain actors:** The chain of actors who directly deal with the products, i.e. produce, process, trade and own them.

➢ **Value chain supporters:** The services provided by various actors who never directly deal with the product, but whose services add value to the product.

➢ **Value chain influencers:** The regulatory framework, policies, infrastructures, etc

2.1.3 Approaches to the Study of Agricultural Marketing System

Studying agricultural marketing system requires different approaches for analyzing marketing performance, structure, conduct, functioning, challenges etc. The following are major and most commonly used once.

Functional approach

Studying marketing system using functional approach is just to break up the whole marketing process into specialized activities performed in accomplishing the marketing process (Kohls and Uhl, 1985). This approach helps to evaluate marketing costs for similar marketing middlemen and/or different commodities and costs and benefits of marketing functions (Kohls, Uhl, 1985; and Andargachew, 1990). The widely accepted functions are: exchange (buying and selling), physical (processing, storage, packing, labeling and transportation), and facilitating (standardizing, financing, risk bearing, promoting and market information). The exchange function involves pricing, buying and selling which is a transfer of title between exchanging parties.

Institutional approach

This approach relies on the description and analysis of different organizations engaged in marketing (producers, wholesalers, agents, retailers, etc) and pays special attention to the operations and problems of each type of marketing institution. The institutional analysis is based on the identification of the major marketing channels and it considers the analysis of marketing costs and margins (Mendoza, 1995).

Commodity approach

In this approach, a specific commodity or groups of commodities are taken and the functions and institutions involved in the marketing process are analyzed (Kohls and Uhl, 1985). This approach is said to be the most practical as it helps to locate specific marketing problems of each commodity and improvement measures. This approach follows the commodity along the path between producer and consumer and is concerned with describing what is done and how the commodity could be handled more efficiently (Purcell, 1979).

2.2 Framework for Evaluating Efficiency of Agricultural Marketing System Structure, Conduct and Performance (SCP) model

SCP model is also one of the most common and pragmatic methods for analyzing marketing system. It analyzes the relationship between functionally similar firms and their market behavior as a group and, it is mainly based on the nature of various sets of market attributes and relations between them and their performance (Scarborough and Kydd, 1992). This analytical method is based on the theory that market structure and market conduct determine the performance of a marketing system.

Market structure, conduct and performance (SCP) framework was derived from the neo-classical analysis of markets. The SCP paradigm was the brain child of the Harvard school of thought and popularized during 1940-60 with its empirical work involving the identification of correlations between industry structure and performance. This SCP hypothesis has led to the implementation of most anti-trust legislation. This was followed by the Chicago school of thought from 1960 (Edwards *et al.*, 2005). Accordingly, there are two competing hypotheses in the SCP paradigm: the traditional "structure performance hypothesis" and "efficient structure hypothesis". The structure performance hypothesis states that the degree of market concentration is inversely related to the degree of competition. This is because market concentration encourages firms to collude. More specifically, the standard SCP paradigm asserts relationship between the degree of market concentration and the degree of competition among firms. This hypothesis will be supported if positive relationship between market concentration (measured by concentration ratio) and performance (measured by profits) exist, regardless of efficiency of the firm (measured by market share).Thus, firms in more concentrated industries will earn higher profits than firms operating in less concentrated industries, irrespective of their efficiency. The efficiency structure hypothesis states that performance of the firm is positively related to its efficiency. This is because market concentration emerges from competition where firms with low cost structure increase profits by reducing prices and expanding market share. A positive relationship between firm profits and market structure is attributed to the gains made in market share by more efficient firms (Edwards *et al.*, 2005). Here, it is worthwhile to mention how much the power of SCP framework is relevant to analyses the marketing system of agricultural products. Accordingly, from its components it is evident that SCP paradigm enables us to study how a given marketing

system functions (in terms of the three elements of the model: structure, conduct and performance). It also helps us to identify the participants, size of market, product diversification, behavior of the market agents and their interactions. Moreover; it deals with the efficiency of the market through its performance aspect of the market.

2.2.1 Structure of the market

The term market structure refers to the number of buyers and sellers, their size distribution, the degree of product differentiation, and the ease of entry of new firms into an industry (Abbott and Makeham, 1981 Cramer and Jensen, 1982; and Branson and Norvell, 1983). Examples of such dimensions include:

 a) Degree of buyers and sellers concentration: Number and size distribution of buyers and sellers in the market.

 b) Barriers to potential entrants: Refers to the relative ease or difficulty with which new dealers may enter into market. Technological, economic, regulatory, institutional, and other factors that inhibit firms from engaging in new businesses or entering new markets, and

c) Degree of product differentiation: Refers to the extent to which competing products in a market are differentiated and it is expected to influence the competitive interrelationships of sellers in the market.

Market concentration can be defined as the number and size of sellers and buyers in the market. Concentration is believed to play a large part in the determination of market behavior within an industry because it affects the interdependence of action among firms. The relationships between concentration and market behavior and performance must not be interpreted in isolation. Other factors, such as firms' objectives, barrier to entry, economies of scale, and assumptions about rival firms' behavior, will be relevant in determining the degree of concentration and relationship between concentration and behavior and performance (Schere, 1980). Market structure can also be defined as characteristics of the organization of a market, which seem to strategically influence the nature of competition and pricing behavior within the market (Bain, 1968). Structural characteristics may be used as a basis for classifying markets. Markets may be perfectly competitive; monopolistic; or oligopolistic (Scott, 1995; Meijer, 1994). The organizational features of a market should be evaluated in terms of the degree of seller

concentration, entry barriers (licensing procedure, lack of capital, know-how, and policy barriers), degree of transparency and degree of product differentiation that condition or influence the conduct and strategies of competitors (Wolday, 1994).

2.2.2 Conduct of the market

Market conduct refers to the market behavior of all firms. In what way do they compete? Are they looking for new techniques and do they apply them as practicable? Are they looking for new investment opportunities, or are they disinvesting and transferring funds elsewhere? Market conduct also deals with the behavior of firms that are price searchers and are expected to act differently than those in a price-taker type of industry (Abbott and Makeham, 1981; Cramers and Jensen, 1982).

2.2.3 Performance of the market

It is reflection of the impact of structure and conduct on product price, costs and the volume and quality of output (Cramers and Jensen, 1982). If the market structure in an industry resembles monopoly rather than pure competition, then one expects poor market performance. According to Abbott and Makeham (1981), market performance is how successfully the firm's aims are accomplished, which shows the assessment of how well the process of marketing is carried out.

As a method for analysis the SCP paradigm postulates, there exists a relationship between the three levels distinguished. One can imagine a causal relations starting from the structure, which determine the conduct, which together determine the performance (technological progressiveness, growth orientation of marketing firms, efficiency of resource use, and product improvement and maximum market services at the least possible cost) of agricultural marketing system in developing countries (Meijer, 1994). The performance of a certain market or industry depends on the conduct of its sellers and buyers which, in turn, is strongly influenced by the structure of the relevant markets (Scarborough and Kydd, 1992).

Market performance can be evaluated by analyzing the costs and margins of marketing agents in different channels. A commonly used measure of system performance is the marketing margin or price spread. Margin or spread can be a useful descriptive statistics if it used to show how the

consumer's food price is divided among participants at different levels of marketing system (Getachew, 2002).

2.2.4 Marketing costs

It refers to those costs which are incurred to perform various marketing activities in the transportation of goods from producer to consumers. Marketing costs includes handling cost (packing and unpacking), costs of searching for a partner with whom to exchange, screening potential trading partners to ascertain their trustworthiness, bargaining with potential trading partners (officials) to reach an agreement, transferring the product, monitoring the agreement to see that its conditions are fulfilled, and enforcing the exchange agreement (Holloway and Ehui, 2002).

2.2.5 Marketing margin

It is a commonly used measure of the performance of a marketing system (Abbott and Makeham, 1981). It is defined as the difference between the price the consumer pays and the price that is obtained by producers, or as the price of a collection of marketing services, which is the outcome of the demand for and supply of such services (Cramers and Jensen, 1982 and William and Robinson, 1990; Holt, 1993). The size of market margins is largely dependent upon a combination of the quality and quantity of marketing services provided the cost of providing such services, and the efficiency with which they are undertaken and priced. For instance, a big margin may result in little or no profit or even a loss for the seller involved depending upon the marketing costs as well as on the selling and buying prices (Mendoza, 1995).

Under competitive market conditions, the size of market margins would be the outcome of the supply and demand for marketing services, and they would be equal to the minimum costs of service provision plus "normal" profit. Therefore, analyzing market margins is an important means of assessing the efficiency of price formation in and transmission through the system. There are three methods generally used in estimating marketing margin. 1. Detailed analyses of the accounts of trading firms at each stage of the marketing channel (time lag method); 2. Computations of share of the consumer's price obtained by producers and traders at each stage of the marketing chain; and 3. Concurrent method: comparison of prices at different levels of marketing over the same period of time (Mendoza, 1995 and Scarborough and Kydd, 1992).

2.3 Why Value Chain Analysis

Value chain analysis is a useful analytical tool that helps understand overall trends of industrial reorganization and identify change agents and leverage points for policy and technical interventions. Value chain analysis is the process of breaking a chain into its constituent parts in order to better understand its structure and functioning. The analysis consists of identifying chain actors at each stage and discerning their functions and relationships; determining the chain governance, or leadership, to facilitate chain formation and strengthening; and identifying value adding activities in the chain and assigning costs and added value to each of those activities. The flows of goods, information and finance through the various stages of the chain are evaluated in order to detect problems or identify opportunities to improve the contribution of specific actors and the overall performance of the chain (UNIDO, 2009). The value chain can help you answer questions regarding: 1) how the products you produce reach the final consumer. 2) The structure (economic relationships) between players in the chain. 3) How this structure is likely to change over time. 4) The key threats to the entire value chain. 5) The key determinants of your share of the profits created by your chain.

2.4. Agricultural Market Value Chain Analysis

According to Anandajayasekeram et al. (2009), there are four major key concepts guiding agricultural value chain analysis. These are effective demand, production, value chain governance, and upgrading.

1. Effective demand: Agricultural value chain analysis views effective demand as the force that pulls goods and services through the vertical system. Hence, value chain analysis need to understand the dynamics of how demand is changing at both domestic and international markets, and the implications for value chain organization and performance. Value chain analysis also needs to examine barriers to the transmission of information in the changing nature of demand and incentives back to producers at various levels of the value chain (MSPA, 2010).

2. Production: In agricultural value chain analysis, a stage of production can be referred to as any operating stage capable of producing a saleable product serving as an input to the next stage

in the chain or for final consumption or use. Typical value chain linkages include input supply, production, assembly, transport, storage, processing, wholesaling, retailing, and utilization, with exportation included as a major stage for products destined for international markets. A stage of production in a value chain performs a function that makes significant contribution to the effective operation of the value chain and in the process adds value (Anandajayasekeram and Berhanu, 2009).

Producing the required amount effectively is a necessary condition for responsible and sustainable relationships among chain actors. Thus, one of the aims of agricultural value chain analysis is to increase the quantity of agricultural production.

3. Value chain governance: Governance refers to the role of coordination and associated roles of identifying dynamic profitable opportunities and apportioning roles to key players (Kaplinsky and Morries, 2000). Value chains imply repetitiveness of linkage interactions. Governance ensures that interactions between actors along a value chain reflect organization, rather than randomness. The governance of value chains emanate from the requirement to set product, process, and logistic standards, which then influence upstream or downstream chain actors and results in activities, roles and functions.

Value chains can be classified into two based on the governance structures: buyer-driven value chains, and producer-driven value chains (Kaplinisky and Morris, 2000). Buyer-driven chains are usually labor intensive industries, and so more important in international development and agriculture. In such industries, buyers undertake the lead coordination activities and influence product specifications. In producer-driven value chains which are more capital intensive, key producers in the chain, usually controlling key technologies, influence product specifications and play the lead role in coordinating the various links. Some chains may involve both producer and buyer driven governance. Yet in further works (Humphrey and Schmitz, 2002; Gibbon and Ponte, 2005) it is argued that governance, in the sense of a clear dominance structure, is not necessary a constitutive element of value chains. Some value chains may exhibit no governance at all, or very thin governance. In most value chains, there may be multiple points of governance, involved in setting rules, monitoring performance and/or assisting producers.

Chain governance should also be viewed in terms of 'richness' and 'reach', i.e., in terms of its depth and pervasiveness (Evans and Wurster, 2000). Richness or depth of value chain governance refers to the extent to which governance affects the core activities of individual actors in the chain. Reach or pervasiveness refers to how widely the governance is applied and whether or not competing bases of power exists. In the real world, value chains may be subject to multiplicity of governance structure, often laying down conflicting rules to the poor producers (MSPA, 2010).

2.5. Fruit Production and Marketing in Ethiopia

Despite relatively early establishment, the avocado industry in Ethiopia is in its infancy and has not yet utilized the immense potential of this crop. According to World Bank Group (2006), lack of concerted public support, scanty information, and lack of systematically documented knowledge that is readily accessible are the main constraints hampering the development of this sector. If these hurdles are not overcome, it is obvious that Ethiopia's capacity to produce avocado will not improve. In the context of increasing the high value production of agricultural commodities, fruit tree and perennial crops play an important role. This commodity group includes tropical nuts, fruit trees, grapes, bananas, mango, pineapple, papaya, passion fruits, apples and others. Except table banana, tropical fruit trees like mango, avocado and the like were not well known and considered as diet by most Ethiopians (Yilma, 2009).However, Yilma (2009) indicated that the expansion of state farms in the past command economy and the prevailing expansion of private investors in different regions of the country have contributed a lot on the introduction of fruits as business. Avocado is a fruit from a tree that has a variable growth and development, reaching a height of 10 to 12 meters in its natural habitat Avocado trees may grow at different altitudes. Such habitat is classified as subtropical-tropical. The tree has a ligneous trunk that can reach up to 80 cm to 1 m in diameter in trees that are 25 to 30 years old (raceme), that can be axillaries or terminal. Avocado trees can be seeded or grafted. The seeded trees produce fruit after approximately 8 years and grafted trees, being the most common propagation method, produce fruit after only 2 years. Besides the longer juvenile period the seeded trees also have a larger risk of losses in yield and quality. The avocado trees could need irrigation during dry periods but not during rain seasons. Root rot is the most common failure in avocado production and too much irrigation is one of the causes of this. In

consideration of these facts, this work sought to identify impediments associated with the value chain of avocados in Jimma zone, South-western Ethiopia.

Ethiopia has a potential irrigable area of 3.5 million ha with net irrigation area of about 1.61 million ha, of which currently only 4.6 % is utilized (Amer, 2002). Fruits have significant importance with a potential for domestic and export markets and industrial processing in Ethiopia. The main fruits produced and exported are banana, citrus fruits, mango, avocado, papaya and grape fruits (Zeberga, 2010). In Ethiopia, fruits yields experienced a sharp decrease in the late 1990"s and late 2000"s (Nicolas et al, 2012). Know a day, efforts has being taken to improve the fruits yield in a country by growing in southern and southwestern highlands and recently in the cool highlands of Central and Northern highlands. According to Dayanandan (2012) Southern and South western part of Ethiopia has suitable agro ecological environment, receives adequate amount of rainfall that are suitable to produce sub-tropical or tropical fruits. Additionally, the presence of many rivers and streams helps the farmers to produce varieties of fruits. Despite this potential, however, production-market chore of fruits has stayed undeveloped in Ethiopia (Joosten, 2007) mainly due to traditional focus which was in favor of cereals. Serious lack of information and „on and off" productions have also played their deterring role (Naamani, 2007).

More than 47 thousand hectares of land is under fruit crops in Ethiopia. Bananas contributed about 60.56% of the fruit crop area followed by Mangoes that contributed 12.61% of the area. Nearly 3.5 million quintals of fruits was produced in the country. Bananas, papaya, mangoes and orange took up 55.32%, 12.53%, 12.78% and 8.35% of the fruit production, respectively (CSA, 2009).In Ethiopia, the existing income generating capacity of fruits as compared to its immense potentials at the macro and micro level is not encouraging. Thus, from the total 3.5 million quintals of fruits produced in Ethiopia, only less than 2% is exported (Joosten, 2007; MoARD, 2005). These fruits are typically cultivated to supplement household income from their main crops. The few state farms with about 3,000 ha mainly grow tropical fruits (banana, avocado, mango, orange, and papaya) and are mainly located in the eastern Rift Valley (Seifu, 2003). Apples are mainly grown in the highlands of Chencha, in the south, and are expected to expand to other highland areas in the country (Joosten, 2007).

Avocado: Endowed with wide range of agro-ecological Zones and diversified resources, Ethiopia is amid of the 10 major avocado producing countries of the world (FAOSTAT, 2004 and MoARD, 2009). With Global annual production of two to four million metric tons, avocado is produced in many countries ranging from Asia and South America to Africa. According to Mauro (2006), Ethiopia's international involvement in horticultural trade and production is growing at rate of 7 per cent per year by creating better opportunity to compete on lucrative export market. Owing to these realities, with its shortest introduction to Ethiopia, avocado is now produced by thousands of farmers and the mob has extended, these days, to more than 7000 ha of land with annual production of 80,000 tones (CSA, 2008; FAOSTAT, 2004; Joosten, 2007)). The crop is a bright source of household income and a shade for spice crops (MoARD, 2009).

Despite relatively early establishment, the avocado industry in Ethiopia is in its infancy and has not yet utilized the immense potential of this crop. According to World Bank Group (2006), lack of concerted public support, scanty information, and lack of systematically documented knowledge that is readily accessible are the main constraints hampering the development of this sector. If these hurdles are not overcome, it is obvious that Ethiopia's capacity to produce avocado will not improve. In consideration of these facts, this work sought to identify impediments associated with the value chain of avocados in Jimma zone, South-western Ethiopia.

Annual avocado production in Ethiopia is 80,000 tons. The crop is now produced by more than half a million farmers countrywide who collectively farm more than 7,000 ha of land (CSA, 2008; FAOSTAT, 2010; Joosten, 2007).

According to Mauro (2006), Ethiopia's international involvement in horticultural trade and production is growing at rate of 7 percent per year by creating better opportunity to compete on lucrative export market. Owing to these realities, with its shortest introduction to Ethiopia, These days the crop is produced in several countries where Ethiopia stands the 10th leading producer and 6th most important consumer in the world (FAOSTAT, 2010).

According to CSA(2012/ 2013) the total cultivated area for avocado in Ethiopia is 8938.24 hectares and production 256331.64 quintals more area coverage is expected in the south-western and other part of the country due to more conducive climate and edaphic factor.

According to W. Garedew (2010) even though avocado has economically and socially play a significant role its production is confronted by a number of constraints: This are Degeneration of fruits, Disease problem and absence of agronomic practice.

2.6. Review of Empirical Studies

2.6.1. Determinates of market supply

Study by Wolelaw (2005) found out the major factors that affect the marketable supply of rice at Fogera district using multiple linear regression model. He investigated the relationship between the determinant factors of supply and the marketable supply of rice and his study revealed that the current price, lagged price, amount of rice production at farm level and consumption at household level had influenced marketable supply of rice at the district.

Abay (2007) identified the major factors that affect the supply of vegetables (onion and tomato) at Fogera District. His study revealed that owned oxen number, family size, and distance from development agent and experience has affected marketable supply of onion and tomato. In similar way, Adugna (2009) identified major factors that affect marketable supply of papaya in Alamata District. Adugna's study revealed that papaya quantity produced influenced marketable supply positively.

Additionally, Bezabih and Hadera (2007) stated that a production of horticultural product is seasonal and price is inversely related to supply. During the peak supply period, the prices decline. The situation is worsened by the perishability of the products and poor storage facilities. Along the market channel, 25 percent of the product is spoiled the marketing channels.

According to Yilma (2009), the production potential of fruits is not widely and evenly distributed across the various regions of the country. The cultivation is also seasonal and the supply is scanty and volatile even in areas where irrigation is possible. The knowledge gap on fruit production techniques and processing technologies is wide. Also, knowledge of domestic consumers of the benefits of fruits is confined to very few varieties of fruits. Hence, domestic

demand, with the exception of few widely known tropical fruits, is generally small and, various studies show that people generally consume fruits and vegetables on a daily basis, without considering them as basic. These factors have adversely affected the growth and expansion of the fruit sub-sector in Ethiopia.

Ayelech (2011) identified factors affecting the marketable surplus of fruits by using OLS regression. She found that fruit marketable supply was affected by; education level of household head, quantity of fruit produced, fruit production experience, extension contact, lagged price and distance to market.

Study of Mohammed (2011), using multiple linear regression, has identified that quantity of teff produced, access to market information, access to extension and sex of the household head were found to have positive and significant influence on marketable supply of teff.

Pandey et al. (2013) conducted study on an economic study of marketed Surplus of chickpea in Rewa District of Madhya Pradesh using cross sectional data by adopted multiple linear regression. The studies came up with the finding that yield/ha, size of family, production of chickpea, size of holding and income from other sources variables are significantly affected on marketed surplus. In related studies, by Adenuga et al. (2013) on marketing efficiency and determinants of marketable surplus in vegetable production in Kwara state, Nigeria. This study indicated that the marketable surplus was found to be about (60%) of the total vegetable production. Household size, spoilage at farm level, education of the household head and farming experience were the significant determinants of marketable surplus in vegetable production in the study area.

Abraham (2013), using multiple regression model indicated that marketable supply is significantly affected by access to market information and quantity of tomato produced in the case of tomato; access to extension service, access to market information, vegetable farming experience and quantity of potato produced in the case of potato; and Woreda dummy, non/off-farm activities, distance to the nearest market and quantity of cabbage produced in the case of cabbage.

Mahilet (2013) applied two stages least squares (2SLS) regression model to analyze the determinants of marketable surplus of household's malt barley. Accordingly, the study found out that marketable supply of malt barley were significantly affected by output of malt barley, selling price, market information and distance to the market.

Addisu (2016) applied tow stage least squares (2SLS) regression model to analyze potato and onion quantity supplied to the market. Accordingly, the study pointed out quantity supplied to the market were significantly affected by productivity, sex of household head, distance to nearest market place, access to off/on farm income, and land allocated for potato and onion.

Sultan (2016) applied multiple linear regression models to analyze quantity of wheat supplied to the market. Accordingly, the study pointed out quantity of wheat supplied to the market significantly affected by quantity produced, size of land holding, livestock, and family size.

2.6.2. Determinants of market outlet choices

Bezabih (2008) conducted a study on horticultural value chain in Eastern parts of Ethiopia identified constraints on the chain. The study identified the major marketing constraints such as huge number of middlemen in the marketing system, lack of markets to absorb the production, lack of marketing institutions safeguarding farmers' interest, low price for the products, rights over their marketable produces, imperfect pricing system, lack of coordination among producers to increase their bargaining power, lack of transparency in market information communications and poor product handling and packaging.

According to Bezabih (2010), the major horticulture production constraints include lack of improved varieties and relying on own seed, high fertilizer cost and food prices and high price of fuel for pumping water for irrigation. Institutional factors in terms of provision of inputs and extension services and poor infrastructure are also limiting. The major constraints of marketing include lack of markets to absorb production, low price for the products, large number of middlemen in the marketing system, lack of marketing institutions safeguarding farmers' interest and rights over their marketable produces (e.g. cooperatives), lack of coordination among producers to increase their bargaining power, poor product handling and packaging, imperfect

pricing system, and lack of transparency in market information system mainly in the export market

Chalwe (2011) aiming at understanding Zambian smallholder bean producers and the factors that influence their choice of marketing channels by adopted a probit model. Results from the probit model indicated that the choice of marketing channel was directly influenced by the price of beans, scale of operation (as measured by the quantity of beans harvested, and quantity sold), distance to the market, farming mechanization used and livestock ownership. On the other hand probit results for decision to sell indicated that price, mechanization and farmers age significantly affected farmers" decision to sell. Meaning that price was very important in stimulating both selling decisions and channel selection.

According to Mamo and Degnet (2012), gender and educational status of the household head together with household access to free aid, agricultural extension services, market information, non-farm income, adoption of modern livestock inputs, volume of sales, and time spent to reach the market have statistically significant effect on whether or not a farmer participates in the livestock market and his/her choice of a market channel. They used binary logit and multinomial logit to explore the patterns and determinants of smallholder livestock farmer's market participation and market channel choice using a micro-lever survey data from Ethiopia.

Hailemariam et al. (2012) identified that the probability and extent of adoption of sustainable agricultural practices are influenced by social capital in the form of membership of rural institutions, credit constraint, spouse education, asset ownership, distance to markets, mode of transportation, rainfall and plot-level disturbances, the number of relatives and traders known by the farmer inside and outside his village, the farmer's belief in government support during crop failure, and confidence in the skill of extension agents. The study uses multivariate probit and ordered probit models to investigate factors that influence the adoption of sustainable agricultural practices in rural Ethiopia.

According toFerdous et al (2012), on value chain analysis for Fish Species in Bangladesh, the study employed simple statistical measures to examine the value chain analysis of different

species of fishes and the study find out the high involvement of intermediaries in fish marketing and the non-existence of good road and transport service deprive small-scale fishers to get fair price due to their inability to sell directly to the assembling points/landing centers. The study suggests the government to provide roads and infrastructures to make the small holder beneficiary by direct selling the produces.

Birhanu et al. (2013) analyzed milk market outlet choices in Wolaita zone, Ethiopia. Multinomial Logit model results indicate that compared to accessing individual consumer milk market outlet, the likelihood of accessing cooperative milk market outlet was lower among households who owned large number of cows, those who considered price offered by cooperative lower than other market outlets and those who wanted payment other than cash mode. The likelihood of accessing cooperative milk market outlet was higher for households who were cooperative member, who owned large landholding size, who had been in dairy farming for many years and who received better dairy extension services. Compared to accessing individual consumer milk market outlet, the likelihood of accessing hotel/restaurant milk market outlet was lower among households who were at far away from urban center and higher among households who accessed better dairy extension services and who owned large number of dairy cows.

Study by Abraham (2013) identified variables influencing producers' decision for channel choices. The analysis was based on variables affecting choices of vegetable marketing outlets. Accordingly, the result indicated that the probability to choose the collector outlet was significantly affected by access to extension service, owning transport facility, membership to any cooperatives and post-harvest value addition compared to wholesale outlet. Similarly, the probability of choosing retailer marketing outlet was affected by Woreda dummy, educational status of household head, access to extension services and owning transport facility compared to wholesale outlet.

Mukiama et al. (2014) used a multinomial logistic regression to assess factors influencing vegetable farmer's choice of marketing channel in KhonKaen, Thailand. The study pointed out that three main marketing channels for vegetables were 1) collector, 2) direct retailing, and 3) farmers" cooperative. Factor such as gender, income, experience, group membership, vegetable

land size, soil conservation practice, and type of pesticide used were found to significantly affect the farmers" choices of marketing channels.

Berhanu et al. (2014) conducted study on factors affecting milk market participation and volume of supply in Ethiopia adopted Heckman two-stage selection models. This study pointed out that milk yield per day, dairy farming experiences and numbers of members in household significantly affected volume of milk supply.

Getachew et al. (2014) reveals that wholesalers are making the highest net margin as they have short channels between producers and consumers, and as they relatively charge a higher price using their market power. The net margin for the smallholder farmers is highest only when vegetables are sold to individual consumers through unions via consumer cooperatives thereby reducing the numbers of middlemen across the market chain.

Tewodros (2014) , applied to multinomial Logistic Model to analyze the chickpea value chain and determinates of market options choice. The multinomial logit analysis results show that family size, landholding, access to market information and Income from crops was positively influences wholesale market participation as compared to farm gate. Similarly landholding, access to market information and extension services positively influence consumer market participation than farm gate while access to information and income from crops positively influences retails market participation than farm gate. On the other hand membership to cooperatives was negatively influences wholesale, retail and consumer market participation than farm gate market option. Households distance from nearest market negatively influences wholesale market participation than farm gate market option while off farm activities negatively influences retail market participation than farm gate.

Addisu (2016) , applied to multivariate probit models to analyze the market outlet choice pointed out market outlet choice in different outlet potato quantity sold was positively and negatively influenced the likelihood of choosing wholesaler and rural collector market outlet at 1% and 5% significance level, respectively. Family size is positively and significantly associated with selling potato to wholesalers at 1% significance level. Gender was positively and significantly associated with use of collector outlet at less than 1% significance level. Education level of households has negative and significant effect at less than 10% probability level on choosing of

consumer outlet. Distance from nearest market is negatively associated with likelihood of farmers selling to wholesalers at 5% level of significance. The likelihood of choosing wholesaler outlet was also positively and significantly affected by farming experience at 10% levels of significance. Price is associated negatively and significantly at 5% level of probability with choosing retailer outlet. Contrary to prior expectation, availability of off/nonfarm income has negative and significant relation with the likelihood of choosing collector outlet at 5% probability level. The variable was negatively and significantly associated with use of collector outlet at less than 5% significance level Ownership of motor pump has significant and negative relation with the likelihood of choosing collector outlet at 10% probability level. Therefore, the overall vegetable value chains are constrained by a number of factors which hinder the development of vegetable value chain. At farm level, the major production constraints are shortage of good quality seed, high cost of inputs, lack of availability of adequate pesticides/herbicides, reduction of irrigation water, low irrigation facility, limited knowledge on the proper plantation, harvesting and post- harvest handling activities, diseases and pest attacks, lack of storage, and inadequate credit service. At marketing/trading stage, poor road and transport facility, price setting problem, poor market information, product quality problem, presence of unlicensed traders, lack of product standard, price fluctuation and perishability of the product as the major problems of vegetable marketing.

Sultan (2016) to applied multinomial logit model to analyze market outlet choice pointed out market outlet choice Distance from the closest market place positively and significantly affected accessing millers/processors market outlet as compared with accessing assembler market outlet. Frequency of extension contact positively and significantly affected accessing wholesales market outlet choices as compared with assembler market outlet choices at 10% probability level. Price given by market outlets can negatively affect cooperative market outlet choice. Membership to cooperative it influences positively and significantly wholesaler market outlet as compared to accessing assembler's wheat market outlet. Ownership of market transport facilities affects negatively and significantly accessing processors wheat market outlet. The major wheat marketing constraints raised by farmers and traders of the study area were: unfair pricing and cheating of traders on balance; lack of timely and sufficient market information; low price of

commodities at harvest time; high price of seeds, chemical fertilizers and pesticides; weak market linkages among value chain actors and less bargaining power of farmers in the market.

2.7 Conclusion on the literature review and knowledge gaps

As shown in the above empirical review exhaustive researchers conducted their studies on value chain however, the paper intends to examine value chain analysis for avocado in Mana woreda with the aim of producing up-to-date evidence. Most the studies are focused on two or three market channel. Thus, this study attempts to fill weakest link of the avocado market channel gap. Furthermore, the report of CSA (2013) showed that the produced fruits have low proportion to access market, and the farmers are not significantly beneficiary from the produced fruits. Even though, there are a high potential to produce different fruits and the low proportion to market in the area. But there are only one research done regarding avocado value chain in southwestern Ethiopia, especially as per the knowledge of the researcher there is no study conducted in avocado value chain in Mana woreda. Therefore, these inspire the researcher to conduct value chain analysis on the study area and believe that value chain analysis is essential.

2.8 Conceptual framework of the study

- ➢ MLR model

Dependent variables Independent variables

| Quantity of avocado supplied to the market | → | Age of HHH

Family size

Experience of hhh

Education level

Distance from nearest mkt place

Access to credit

Market information

Lagged year price

Quantity produced

Extension |

➤ MNL model

Dependent variables Independent variables

Y1-wholsaller

Y2- retailer

Y3-Locale collector

Y4-consumer

Y5- processor

Family size

Education level

Experience of HHH

Distance for nearest market

Access to credit

Market information

Current year price

Extension
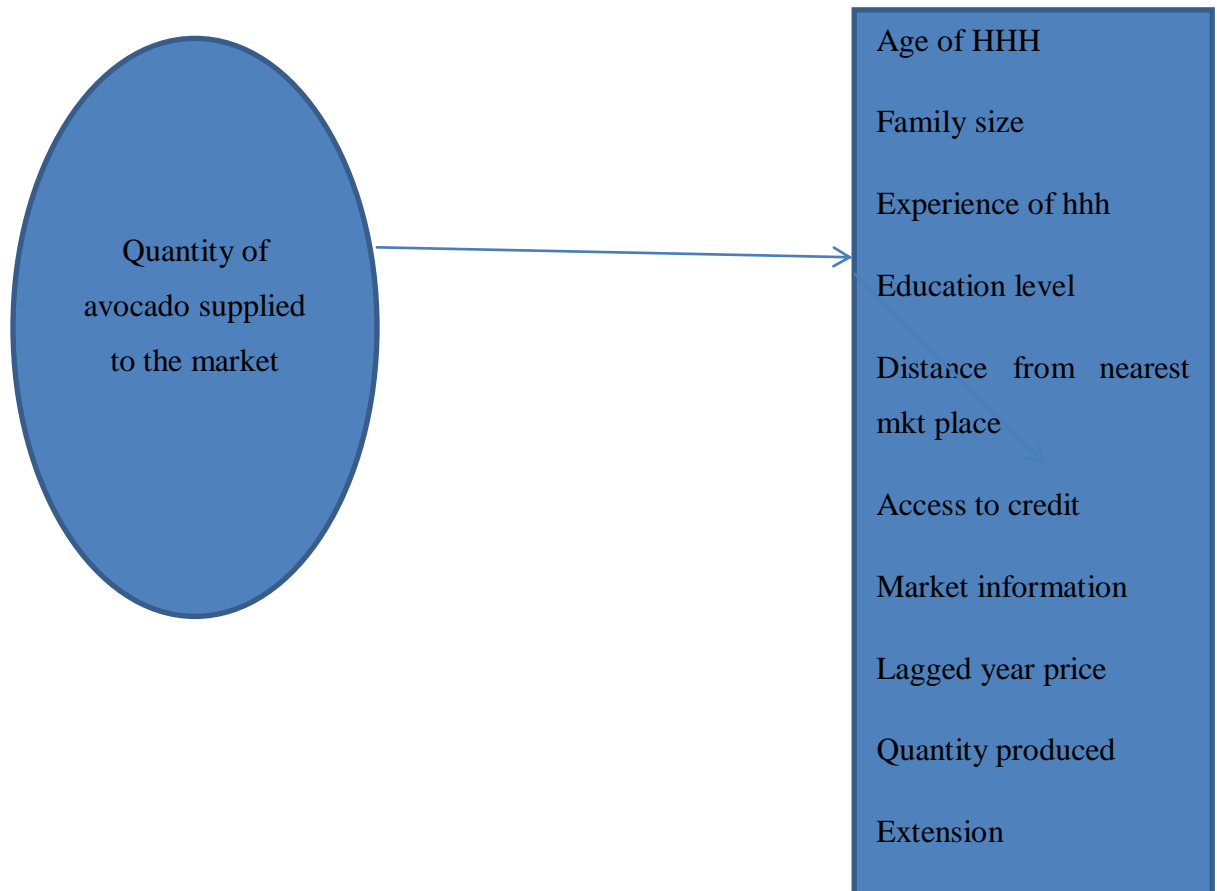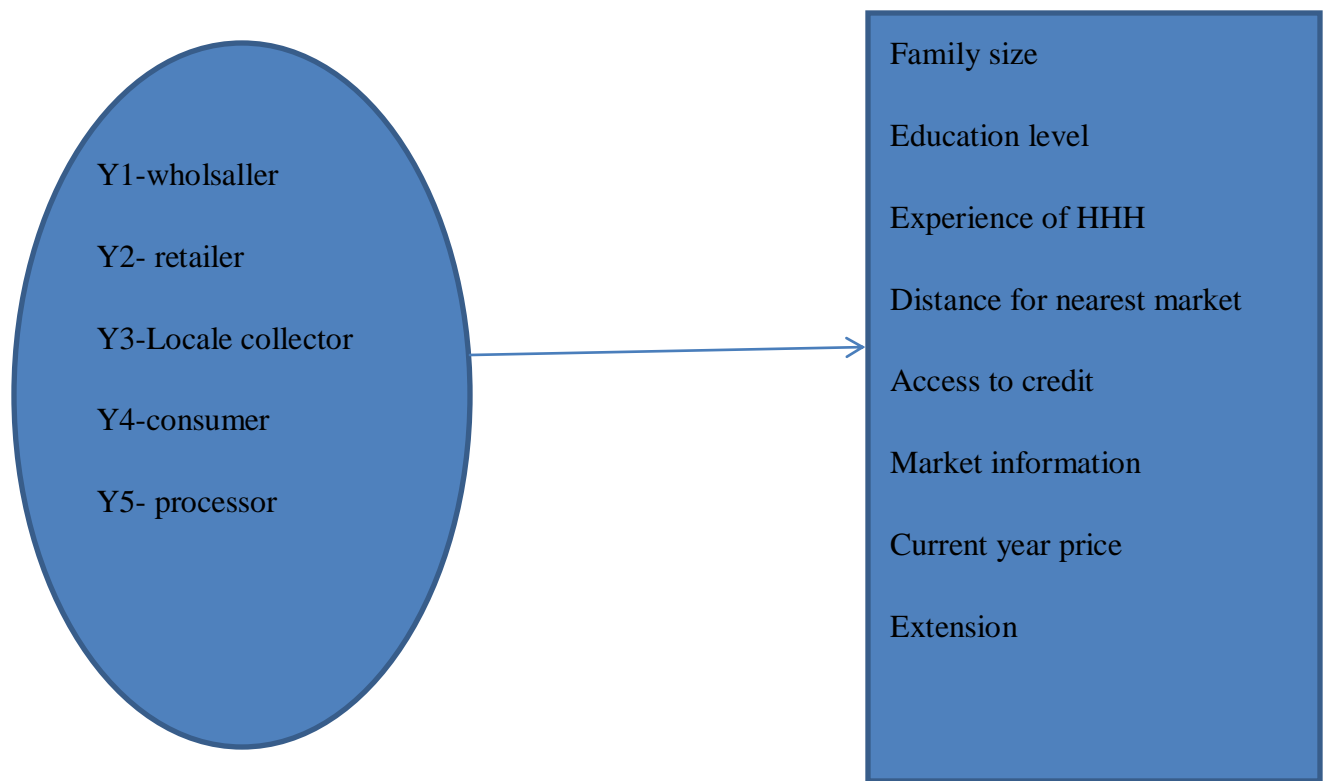
Figure: 2: Conceptual framework of the study

Source: Own sketch, 2018

CHAPTER THREE

3. RESEARCH DESIGN AND METHODOLOGY

This chapter presents the features of the study area where the research was conducted and the methodologies adopted in the sampling and data analysis including data types and data sources, methods of sampling, methods of data collection and analysis.

3.1 Description of the study area

Mana is one of the woreda in the Oromia Region of Ethiopia. Part of the Jimma Zone, Mana is bordered on the south by SekaChekorsa, on the west by Gomma, on the north by LimmuKosa, and on the east by Kersa. The administrative center of this woreda is Yebu. The altitudinal range of the woreda is between 1410 and 2610 m above sea level. The area has an average annual rainfall of 1467mm and the mean annual minimum and maximum temperature of 13 and 24,8°C,respectively. The landscape of Mana includes mountains, high forests and plain divided by valleys. Mountains include Weshi and Bebella. Rivers include Aniso, Doha, Wanja, Yebu and Sogibo. The woreda comprises 24 kebeles and one town which is 368 km far from metropolis and 22 km far from Jimma town. Mana woreda is one of the densely populated woreda of Jimma zone. The 2007 national census reported a total population for this woreda of 146,675, of whom 74,698 were men and 71,977 were women; 4,393 or 3% of its population were urban dwellers. It has a total area of 1342.52 ha. The woreda comprises 21,687 households of which 20,003 (92.23%) are headed by male and the rest 1683(7.77%) are headed by female households. The majority of the inhabitants were Muslim, with 90.23% of the population reporting they observed this belief, while 3.62% of the population said they practiced Ethiopian Orthodox Christianity, and 6.15% were Protestant.

3.2 Research Design

In order to achieve the objective of the research, the researcher has used **both explanatory and descriptive** type of research design.The study describedthe existing value chain situation of avocado fruits in Mana Woreda, Jimma Zone. These fruits hadtaken a high proportion in production capacity within the case area. An explanatory research design is used to identify the extent and nature of cause-and-effect relationships.

3.3 Source of data and Method of collection

In order to address the objectives of the study, both primary and secondary data were used. Primary data sources were smallholder farmers from four randomly selected kebele and wholesalers, collectors, retailers, processor and consumers. Primary data were collected using informal and formal surveys .For informal survey Rapid Market Appraisal (RMA) technique like focus group discussion. The formal survey was undertaken through formal interviews with randomly selected farmers and purposively selected traders and consumers using a pretested structured questionnaire for each group. Focus group discussions were held with based on predetermined checklists were interviewed from different organizations and institutions.

Enumerators who have college diploma were recruited and trained for data collection. Before data collection, the questionnaire was pre-tested on seven farmers, two traders and three consumers 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 study objectives.

Secondary data such as number of avocado producer, trader and consumer were taken from secondary sources. Secondary data are collected from different sources, such as: government institutions, the woreda Agricultural Office, reports, bulletins and websites. Published and unpublished documents were extensively reviewed to secure relevant secondary information. Both qualitative and quantitative data were collected and used for the study.

3.4 Sample size and Sampling strategy

The sample for this study was drawn from all actors involved along avocado value chain such as producers, collectors, wholesalers, retailers, processor and consumers. Three stages random sampling procedure was used for the selection of sample household heads. In the first stage, Mana woreda were selected purposively based on the potential it has for avocado fruit production and access to marketing. In the second stage, out of 24 kebeles of this woreda , 4 potential avocado fruit producers kebeles were randomly selected, 2 kebeles far from yebu town (korelalusa and kenteeri) and 2 kebeles is the nearest from yebu town (hundaatolii and kellaaguddaa)with the consultation of woreda agriculture office. In the last stage, from 3,145 avocado fruit producers" in Mana woreda about 120 samples of household heads were randomly selected, using probability proportionality size following a simplified formula provided by (Yamane, 1967). Accordingly, the required sample size at 95% confidence level with degree of variability of 5% and level of precision equal to 9% are used to obtain a sample size required which represent a true population.

$$n = \frac{N}{1+N(e2)} \quad , \qquad \frac{3145}{1+3145(0.09.0.09)} \sim 120 \ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

Where, n = sample size, N= population size (sampling frame) and e = level of precision considered 9%

Table 1: Sample distribution of avocado producers in selected kebeles

No	Kebeles	Number of avocado producer	Number of sampled household
1	Korelalusa	380	33
2	Kenteeri	330	28
3	Hundaatolii	380	33
4	Kellaaguddaa	300	26
	Total	1390	120

Source: woreda agricultural office, 2017

Data from traders and consumers were also collected. The sites for the trader surveys were market towns in which a good sample of avocado traders existed. On the basis of flow of avocado, three markets (yebu, Jimma and Menseraa) were selected as, the main avocado marketing sites for the study areas were selected purposely, which are the main avocado marketing sites in the study area. Congruently simplerandom sampling is employed to select traders and consumers. As a result, 14 avocado traders and 20 consumers were selected for the purpose of the study.

Table 2: Sample distribution of traders of avocado

Trader	Jimma		Yebu		Menseraa		Total
	Popn	Sample	Popn	Sample	Popn	sample	
Wholesaler	5	3	0	0	0	0	3
Retailer	3	2	6	4	0	0	6
Collector	0	0	3	2	3	2	4
Processor	3	1	0	0	0	0	1
Total sample	11	6	9	6	3	2	14
Consumer	0	0	23	20	0	0	20

Source: woreda agricultural office, 2017

3.5. Method of Data Analysis

Data from the field were edited, coded, and cleaned to ensure consistency, uniformity, and accuracy. Data was entered into computer software for analysis. STATA version 13 computer programs were used to process the data. Three types of data analysis, namely descriptive statistics, value chain analysis and inferential statistics were used for analyzing the data from producers, traders and consumers.

3.5.1 Descriptive analysis

This method of data analysis refers to the use of frequency, percentages, means and standard deviations in the process of examining and describing marketing functions, facilities, services, and market and traders' characteristics.

3.5.2 Value chain analysis

Value chain analysis is the process of breaking a chain into its constituent parts in order to better understand its structure and functioning. The analysis consists of identifying chain actors at each stage and discerning their functions and relationships; determining the chain governance, or leadership, to facilitate chain formation and strengthening; and identifying value adding activities in the chain and assigning costs and added value to each of those activities (UNIDO, 2009).

To understand the characteristics of the chain actors of fruits and the relationships exists between them, including the identification of all actors in the chain; the flow of product through the chain; the work features and the destination; information was obtained by conducting interviews, focus group discussion and by collecting secondary data from various sources. The study has employed value chain analysis which is very effective in tracing product flows, showing the physical value adding stages, qualitative and quantitative flow of product along the chain with identified key actors, their relationships with other actors in the chain and measured distribution of their benefits. To identifykey actors and relationship involved in the value chain. This analysis was undertaken in qualitative terms.

3.5.3. Structure conduct and performance (S-C-P) model

The model examines the fundamental relationships between market structure, conduct and performance.Wolday (1994), Rehima (2006),Bosena (2008),Ayelch(2011),Adisu(2016) and Sultan(2016) also used this model to evaluate food grain, pepper, cotton, avocado and mango market chain, vegetables and wheat value chain respectively. Therefore, the study used S-C-P model to evaluate avocado value chain analysis.

a) Market structure

Market structure in food marketing is analyzed based on the number of buyers and sizes of enterprises within the system, the degree of market transparency (market information), and the condition of entry to and exit from trade (Scarborough and Kydd, 1992; Pender et al., 2004).

Market concentration measure

The concentration ratio, in economics, is a ratio that indicates the size of firms in relation to their industry as a whole. The concentration ratio indicates whether an industry is comprised of a few large firms or many small firms. Low concentration ratio in an industry would indicate greater competition among the firms in that industry, compared to one with a ratio nearing 100%, which would be evident in an industry characterized by a true monopoly.

$$C = \sum_{i-1}^{r} Si \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.2$$

r=1,2,3,……..r

Where: C- is concentration ratio,

Si- is market share of the ith firm and

r- is the number of largest firms for which the ratio is going to be calculated.

Kohls and Uhl (1985) bring into play as a rule of thumb, the four largest enterprises' concentration ratio of 50% or more (an indication of a strongly oligopolistic industry), 33-50 % (a weak oligopoly) and less than that (competitive industry). The problem associated with this index is the arbitrary selection of r (number of firms that are taken to compare the ratio).

Degree of market transparency

The degree of market transparency refers to the timeliness and reliability of market information that the traders have for their marketing decision. In a transparent market, participants have adequate information about their competitors regarding their source of supply and buying prices for better decisions.

Barriers to entry

Barriers to entry is the economic term describing the existence of high startup costs or other obstacles that prevent new competitors from easily entering an industry or area of business. Barriers to entry benefit existing firms because they protect their revenues and profits. Common barriers to entry include special tax benefits to existing firms, patents, strong brand identity or customer loyalty, and high customer switching costs.

The ease with which potential participants can enter various functions is commonly used as a means of assessing the degree of competition in an industry (Scarborough and Kydd, 1992). Stigler (2005) suggests about four points that can create barriers to entry: legal barriers (license and patents), economies of scale, superior resources, and pace of entry. The modes of entry into trade, means of building capital, means of acquiring marketing skills and contacts, periods of apprenticeship, trader's perceptions of barriers, the origins and levels of initial capital required for traders of different sizes (functions, or commodities), and the degree of mobility between functions and commodities can be used as center of data to see the barriers to entry (Timmer et al., 1983).

In fact, interviewing traders about barriers to entry might be difficult since all have entered the market. Rather, observation of the age, gender, and ethnic distributions of owners, an employees of different sizes of enterprises and the extent to which fluctuations in the number of active traders follow rises and falls in profitability can be considered. Market structure is most commonly evaluated by examining trends in the numbers and sizes of firms relative to each other, and to number of consumers and producer, in particular times and places (Scarborough and Kydd, 1992).

   b) **Market conduct**

Market conduct refers to the patterns of behavior that firms follow in adapting or adjusting to the markets in which they sell or buy. There are no agreed up on procedures for analyzing the element of market conduct. It is a systematic way to detect indication of unfair price setting practices and the conditions under which such practices are likely to prevail. More specifically they cover the following topics: The existence of formal and informal marketing groups that perpetuate unfair price setting practices; Formal and informal producer groups that affect

bargaining power; The availability of price information and its impact on prevailing prices; The distance from the major market and its impact on prices; and the feasibility of utilizing alternative market outlets.

Market conduct definition given above implies to the analysis of human behavior patterns that are not readily identifiable, obtainable, or quantifiable. Thus, in the absence of a theoretical framework for market analysis, there is a tendency to treat conduct variables in a descriptive manner, or as a spill-over in the assessment of market performance. The features or elements of market conduct include (1) cooperation, (2) integration, (3) strategies, and (4) services. Generally the conduct of a market can be characterized by the following practices:

1. Pricing strategy – predatory, exclusionary, and collusive;

2. Product strategy;

3. Responsiveness to change; and

4. Research and innovation.

For this research the following few questions will be taken into consideration to systematically detect indicators of unfair price setting practices, conditions in places or areas, term of payment and method of attracting supplier. The issues that will be considered are the existence of formal and informal marketing groups that affect the bargaining power and the availability of price information as well as its impact on prevailing prices.

c) Market performance

Market performance refers to the impact of structure and conduct as measured in terms of variables such as prices, costs, and volume of output. By analyzing the level of marketing margins and their cost components, it is possible to evaluate the impact of structure and conduct characteristics on market performance. For most countries, it is generally acknowledged that a distribution system displaying acceptable performance is one that (1) allows technological progress, (2) has the ability to adapt, (3) innovates and utilizes resources efficiently, and (4) transmits prices that reflect costs.

Marketing efficiency is essentially the degree of market performance. It is defined as having the following two major components: (i) the effectiveness with which a marketing service would be performed and (ii) the effect on the costs and the method of performing the service on production and consumption. These are the most important because the satisfaction of the consumer at the lowest possible cost must go hand in hand with maintenance of a high volume of farm output (Ramakumar, 2001).

The major indicators or measures of market performance are: marketing margins; marketing costs and producer's share. A large number of studies have analyzed the marketing margins for different types of commodities to examine the performance of agricultural products marketing (e.g, Wohlengenant and Mullen, 1987; Schroeter and Azlam, 1995; Holt, 1993) and (Sexton et al. 2005 as cited on Jema, 2008) argued that even though variations in the margin over time might be attributable to marginal marketing costs under perfect competition, additional factors such as seasonality, technological changes, and sales volume may also explain the variations in the margin. For this study marketing margin is selected to analyze the performance of marketing systems in study area.

Marketing margin: Margin determination surveys should be conducted parallel to channel survey. To determine the channel, one asks the questions "From whom did you buy?" and "To whom did you sell?" Scott (1995) pointed out to obtain information concerning the margins, agents have to answer the question "what price did you pay?" and "what was the selling price?"

Marketing margin

Cost and price information is used to construct marketing cost and margin. Computing the total gross marketing margin (TGMM) is always related to the final price paid by the end buyer and is expressed as percentage (Mendoza, 1995).

$$TGMM = \frac{Endbuyerprice - Firstsellerprice}{Endbuyerprice} * 100 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots..3$$

Where, TGMM is total gross marketing margin. It is useful to introduce the idea of producers' gross margin (GMMp) which is the portion of the price paid by the consumer that goes to the producer. The producers' margin is calculated as:

$$GMMp = \frac{End\,buyer\,price - Market\,gross\,margin}{End\,buyer\,price} *100 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 4$$

Where, GMMp = the producer's share in consumer price.

$$PS = \frac{Px}{Pr} = 1 - \frac{MM}{Pr} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 5$$

Where

PS- Producer's share   Px- Producer's price of avocado

Pr-Retail price of avocado, and   MM – Marketing margin

3.5.4. Econometric model

Econometric models which are useful to analyze the determinates of supply of avocado to the market, factors determining choices of market outlet are specified below.

3.5.4.1. Determinants of market supply

Multiple linear regression models were appropriate to analyze the determinates of volume sales because all sampled households producing avocado participated in marketing.

Econometric model specification

(Quanitity ss) = βo+ β1ageofpro+ β2familysit + β3edulevel + β4 expofpro +

B5dismkt+β6acctocre+β7mktinfo+β8laggedyer+β9quantity+β10extentione+e............................6

Yi=F(X1, X2, X3, X4, X5, X6, X7, X8, X9, X10,)+e…………………………………………7

Where Yi= quantity of avocado supplied to market

X1=Age of household head   X2=Family size of household head

X3=Education level of household head   X4=Experience of household head

X5=Distance to nearest market   X6=Access to credit

X7=Access to market information   X8=Lagged year price of avocado

X9=Quantity produced   X10=Extension service

3.5.4.1.1 Diagnostic tests of the CLRM

Before fitting important variables into the regression models for analysis, it was necessary to test multicollinearity and heteroscedasticity problem.

3.5.4.2 Determinants of market outlet choice

The primary goal of the econometric model used in this study is to explain the effects of the independent variables Xi (i.e. farmers household, production and marketing characteristics) on the probability of choosing among the various market channels exist in our study: locale collector, wholesalers, processor, consumer and retailers. The outcome is nominal because the categories are assumed to be unordered. Therefore the most appropriate model to estimate farmers' decision to sell in one of these five different market channels is a strategy choice model, specifically a Multinomial Logistic Model (MNL). This model was used because it is the standard method for estimating unordered, multi category dependent variables. It also assumes independence across the choices, that is, it does not allow correlation or substitution between them (Wooldridge, 2008).In this model each household makes different choice from a group of available strategies, and this discussion is based on a number of exogenous factors. Those factors include household level and area-specific variables. For the ith farmer faced with j choices, suppose that the utility of choice j is:

Uij= Zijβ + εij …………………………………………………………………..12

If farmer makes choice j in particular, then we assume that Uij is the maximum among the j utilities. Hence the standard model will be driven by the probability that choice j is made which is,

Probability   (Uij>Uik) for all other K # j………………………………………..13

Assuming that Yi represents the choice taken, then with j disturbances being distributed identically and independently the multinomial logit model adopted. The multinomial logit is actually an extension of the binary logit model, having more than two values for the dependent variable. Let (p0, p1 … pm) be the probabilities of m+1 alternatives of choice. The probability of an individual i to choose the alternative j is given by

$$\text{Pro (Yi=j)} = \frac{\exp(xibi)}{1+\sum_{j=1}^{m}\exp(xibi)}\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots14$$

Where xi is the vector of the independent variables associated to the individual i, and bj is the vector of parameters associated to the alternative j.

Following Equation 14, the generalization of the logit model for the multinomial case is made by taking different parameters bj depending on the alternatives of choice, such that the independent variables xi remain constants depending on the products. Still, there is another possibility: the McFadden's conditional logit model which considers a constant vector of parameters b and allows the independent variables xij to depend on the alternatives (McFadden 1974, 1980). The probability of an individual i to choose the product j is given by:

$$p_{ij} = p(y_i = j) = \frac{\exp(xijb)}{\sum_{k=1}^{m} \exp(xikb)} = \frac{\exp(xijb)}{1 = \sum_{k=1}^{m} \exp(xikb)}, j = 1,2,,,,,,m \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 15$$

Where $x_{ij}^{*} = x_{ij} - x_{i0}$.

Based on Equation 15, according to Greene (2002) and Mugisha et al. (2004) and the fact that farmer's participation in different market options is categorized into alternatives, using those who participated in the village market option (selling to locale collector) as the base alternative. The other alternatives include selling to wholesalers, retailers and consumers options. The ratio of the probabilities, hence estimated as follows.

$$\frac{p(yi=j)}{p(yi=l)} = \frac{\exp(xijb)}{\sum_{k=1}^{m} \exp(xikb)} = \frac{\exp(xijb)}{\sum_{k=1}^{m} \exp(xikb)} \forall j, l = 1,2, \ldots\ldots m \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 16$$

Which, as in the case of the multinomial logit is independent of the other alternatives of choice i.e. selling at farm gate, wholesale, retailers or consumer market? The marginal effects are obtained from the multinomial logit regression results by the following Equation.

$$\frac{\partial Pji}{\partial Pji} = Pji \left(\beta i - \sum Pki\beta k\right) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 17$$

Where, β and P represents the parameter and likelihood, respectively, of the choices. Marginal likelihood gives better indications and represents changes in dependent variable for a given change in a particular explanatory variable whereas holding the other explanatory variables at their sample means. The models are estimated under maximum likelihood procedure which yield consistent, asymptotically normal and efficient estimate.

3.5.4.2.1 Test Result for Multinomial Regression Model

The model was tested for the independence of irrelevant alternatives (IIA) assumption based on Hausman test. The possible multicolleaniarity problems are also corrected. And also test goodness of fit.

3.6. Definition of Variables and Hypothesis

To identify the determinates of avocado supply to the market and choice of market outlets that actors involved in the marketing of the crop, the following variables were assumed to affect dependent variables and used for this study.

3.6.1. Dependent variables

Quantity of Avocado Supplied to the Market (quantity ss): A continuous variable that represents the actual supply of avocado by individual households to the market during the survey year, measured in kg (100kg).

Market Outlets (MktO): A categorical dependent variable measured by the probability of producers sells avocados to either of the alternatives market outlets. It was represented in the model as Y1 for those households who choose to sell avocados to wholesalers, Y2 for producers who choose retailers, Y3 for producers who choose consumers and Y4 for producers who choose rural collectors and Y5 for producer who choose processor to sell avocado

3.6.2 Independent variables

The independent variables hypothesized to affect the dependent variables are presented as follows.

Age of the household head (Ageofpro): Age of the household, a continuous variable, was taken as one of the explanatory variables. Aged household heads are believed to be wise in resource use, and it is expected to have a positive effect on market participation and marketable surplus. Tshiunza et al. (2001) used age as the major farmers' characteristics that significantly affected the proportion of cooking banana planted for market. He found that younger farmers tended to produce and sale more cooking banana for market than older farmers. On the other hand Abraham (2013) also proved that aged farmers provide more of their vegetable product to market. The result suggests that as farmers have high potato production experience the amount of

potato supplied to the market increased through its effect on potato production in the first stage. For this study, it is hypothesized that age has positive effect.

Family Size (familysi): This variable is a continuous explanatory variable and refers to the total number of family in the household. In this study it is assumed that any family member might decide to participate in fruit production and marketing. Since production is the function of labor, availability of labor is assumed to have positive relation with volume of supply. However, family size is expected to have positive impact on volume of sales of fruits, but larger family size requires larger amounts for consumption, reducing volume sales. A study conducted by Wolday (1994) showed that household size had significant positive effect on quantity of teff marketed and negative effect on quantity of maize marketed. In this context family size is expected to have positive or negative impact on volume of sale and choice of market outlets. (sultan, 2016) It is the number of members living household. The variable affects supply of wheat to market negatively and significantly.Lapar et al. (2003), Edmeades (2006) and Berhanu and Moti (2010) found out negative relationship between household size and market participation of households. Therefore, it is hypothesized that it will affect accessing all avocado market outlet choice positively as compared with accessing locale collector market outlets.Fikru et al.(2017) family size determines farm household's market outlet choice decision. As hypothesized the coefficients for this variable is positively and significantly related with collector outlets at 10% significance level.

Education Level of the Household Head (edulevel): This is a dummy variable with a value of one if a household head had attended formal education and zero otherwise. The educational status of the farmer determines the speed with which he/she likely to adopt agricultural technologies. Those who can read and write stand a better chance of understanding things faster. Moreover, better educated farmers tend to be more innovative and are therefore more likely to adopt the marketing systems. Therefore, it is hypothesized to affect positively volume of supply of fruit. Astewel (2010) who found that if paddy producer gets educated, the amount of paddy supplied to the market increases, which suggests that education improves level of sales and that affects the marketable surplus. Abrahm,(2013), in his analysis of vegetables market outlet choice in Habro and Kombolcha districts it is significant and affects retailer and wholesaler market channel choice at 10% and 1% probability level respectively.

Distance from Nearest Market (dismkt): Distance to the nearest market is a continuous variable measured in kilometer from the household residence to the nearest market. The closer the market, the lesser would be the transportation charges, reduced walking time, and reduced other marketing costs, better access to market information and facilities. The results by Sebatta (2013) and Habtamu (2015) found that distance from the nearest market had a positive and significant effect on potato farmer's decision to participate in the market in Uganda and Hadiya Zone of Ethiopia, respectively. Adisu (2016) proved that distance from the nearest market was found to be positive and significant influence on the volume of potato supplied to market at 1% probability level. The closer a household to the nearest urban center, the lesser would be transportation costs, loss due to spoilage and better access to market information and facilities. Berhanu and Moti (2010) found out negative relationship between market participation and distance to the nearest urban market center. Addisu (2016) in this study, distance from nearest market is hypothesized to influence volume supply positively. In addition, those households who are close to market are assumed to have more probability of choosing better market outlets. Sultan, (2016) Distance from the closest market place positively and significantly affected accessing millers/processors market outlet as compared with accessing assembler market outlet. It also affected wholesaler market outlet negatively and significantly.

Farming Experience (expofpro): This is a continuous variable measured in number of years. The expected sign was positive as a household with better experience in fruit farming is assumed to produce more amounts of fruit and, as a result, assumed to supply more amounts of fruit to market. Toyiba et al. (2014) found that experience in papaya production had a positive and significant effect on papaya volume marketed. Addisu (2016), the result showed that vegetables farming experience of households has significant effect at 5% significant level for onion quantity sold with expected positive sign. A household with better farming experience are more likely to change and/or to aware marketing systems and differences in profitability in the different marketing outlets. Berhanu et al. (2013) found a positive relationship of experience in dairy farming and the choice of a more profitable milk marketing outlet. Therefore, it is expected that farm experience affects market outlet choice decisions.

Access to market information (mktinfo): This is a dummy variable taking value of 1 if the producer had access to market information and zero otherwise. It has been hypothesized that it affects the marketable avocado supply of the household positively. The better information farmers have the more likely they supply fruit to the market. The general idea is that maintaining a competitive advantage requires a sound business plan. Again, business decisions are based on dynamic information such as consumer needs and market trends. A study by Muhammed (2011) revealed that if wheat producer gets market information, the amount of wheat supplied to the market increases. Alemayehu (2012) also found that access to market information positively affected amount of ginger supplied to market. The study by Abraham (2013) indicated that access to market information affected marketed supply of potato and tomato positively and significantly. Tewodros (2014), Access to market information positively influences wholesale, retail and consumer markets participation such that, a change in a farmer's status from no access to market information to access increases the probability of wholesale, retail and consumer markets participation than farme get.

Access to credit (acctocre): This is a dummy variable, which assumes a value of one if the farmer has credit access and zero otherwise. Access to credit would enhance the financial capacity of the farmer to purchase the necessary inputs and increases output. Therefore, it is hypothesized that access to credit would have positive influence on volume of sales.Alemnewu (2010) and Muhammed (2011) found that if pepper and teff producer gets credit, the amount of pepper and teff supplied to the market increased. Due to these, it is hypothesized that access to credit will have influence on wholesale market outlet choice decisions.

Quantity of avocado produced(quantity): It is a continuous variable measured in kg. The variable is expected to have positive contribution to the amount of avocado supplied to the market. Farmers who produce more output per tree are expected to supply more fruit (avocado) to the market than those who produce less. Abay (2007) and Adugna (2009) found that the amount of tomato and papaya produced by farming households has augmented marketable supply of the commodities significantly. Ayelch (2011) result shows that quantity of avocado produced was significantly affected avocado quantity supplied at 1% level.

Lagged year Price of avocado (laggedye): This is a continuous variable that measured annual average price of avocado in the reference market in 2017 i.e. the one year last year price of avocado. When avocado price is high in the market in the previous year, farmers are motivated to take their produced to the market. Therefore, this makes the supply to be directly related to the previous year market price. The study by Goetz (1992) on household marketing behavior in Sub-Saharan Africa found a significant positive relationship between grain price and the probability of quantities sold. The study by Tomek and Robinson (1985) argued that product price has direct relations with marketable supply.

Access to extension services (extension): This is a dummy independent variable taking the values 1 if the avocado producer have access to extension services and zero otherwise. The objective of the extension service is introducing farmers to improved agricultural inputs and to better methods of production. In this regard, extension is assumed to have positive contribution to farm level marketable supply of avocado. Ayelech (2011) found that extension access, which affected positively the marketed supply of mango.Birhanu et al (2013) found that access to dairy extension services such as dairy technology information, training, field days, field visits and field tours received by households positively and significantly affected accessing cooperative milk market outlet as compared with accessing individual consumer milk market outlet .Different studies conducted previously revealed that extension agent visits had direct relationship with market outlet choices (Holloway and Ehui, 2002; Rehima, 2006).The number of extension agent visits improves household's intellectual capitals and helps in improving vegetables production and impacts vegetable market outlet choices. So that extension contact is assumed to have direct relation with market outlet choice of vegetable producers. (Sultan, 2016) frequency of extension contact positively and significantly affected accessing wholesales market outlet choices as compared with assembler market outlet choices at 10% probability level

Price of avocado (currentpr): This is a continuous variable that measured annual average price of avocado in the reference market in 2018 i.e. the current selling price of avocado. The expected sign was positive the price of avocado decrease/increase in different market outlet the producer chooses which one is better for me to decide. The wholesale market outlet to give better price than other market outlet the producer immediately decide to sell the product to wholesaler with consideration of giving price and vice versa. According to Birhanu et al (2013) price offered by milk market outlet per liter of milk significantly and negatively affected accessing cooperative milk market outlet as compared with accessing individual consumer milk market outlet. Sultan (2016) Price offered by wheat market outlet per kilogram significantly and negatively affected accessing cooperative wheat market outlet as compared with accessing assembler wheat market outlet. It also affected wholesaler and processor wheat market outlets positively and significantly at 1% probability level respectively.

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter presents the results of the study. Descriptive analysis is employed to describe the socio-demographic characteristics of sampled farm households, traders and consumers. Value chain analysis presents value chain analysis of avocado which includes value chain actors and their roles, value chain governance, challenges and opportunities along value chain, marketing channels, marketing costs and margins, and benefit shares of actors in the value chain. Econometric analysis was employed to identify determinants of avocado market supply and market outlet choice of avocado producers.

4.1. Descriptive Statistics

Table 3: Descriptive Statistics for dummy variables

Variables	Item	Frq	Present
Extension service	Yes	49	40.83
	No	71	59.17
Credit access	Yes	34	28.34
	No	86	71.66
Market information	Yes	17	14.17
	No	103	85.83

Source: Survey result, 2018

Table 3 depicts that out of the total respondents of avocado producing sample households, about 40.8% of the farmers reported that they had access to extension service and 59.17% of the farmers reported that they had no access to extension service in 2017 production season. The extension services providers were office of agriculture experts, DAs and innovative farmers. The extension services provided were about avocado production, input use, seedling raising, harvesting and post-harvest handling. And also finance is the crucial element starting from land preparation up to the marketing of the product. As depicted in Table 3, only 28.34% of sampled producers had access to credit in Mana woreda. The main objectives of the credit were to

purchase fertilizer (20%) and seeds/seedling of fruits (80%) (Appendix table 4). The reason behind refusal of credit was because the majority of farmers cover cost of production of fruits by selling grain produced by rain fall. Although credit was accessible and available for poor farmers to build asset and food secured by purchasing the different packages designed by the regional government, there is lack of attention to access and avail credit for avocado fruit producers. Furthermore the above table describe the accessibility of market information to producer.Closer look at access to market information shows that there is no system in place for systematically collecting, analyzing and disseminating information relevant to the needs of different actors. However, almost all 85.83% of sampled farmers had no access to market information from different sources and only 14.17% had access to market information. The type of information provided were (48.33%) about output price information, (10%) price and buyers information, (10%) market place and price information's, (28.33%) buyers information's and (3.33%) demand information of those (Appendix Table 1). The sampled respondents revealed that the major source of market information were traders, brokers, radio/television, friends/ relatives, kebeles administrations and combinations of those. The sampled respondents revealed that the major source of market information were traders, brokers, radio/television, friends/ relatives, district and kebeles administrations and combinations of those(Appendix Table 2).

Table 4: Descriptive Statistics for continuous variables

Variables	Observation	Mean	SD	Min	Max
Age	120	41.10833	10.00487	22	68
Family size	120	5.133333	1.664929	2	8
Experience	120	8.141667	2.808438	3	15
distance to nearest market	120	9	6.241633	1	22

Table 4 above provides a summary of the descriptive statistics of the age of household head. Age measured in years, provided a clue on working ages of households. The mean age of the sample household heads was 41 years with the minimum and maximum age of 22 and 68 years, respectively. The implication of this mean age was in the area is mostly dominated by working age group this leads to improve the productivity of avocado on Mana woreda. And also the mean family size of the total sample households was 5.134 persons with the minimum and maximum family size of 2 and 8 this might assist them for a better participation of households in the avocado markets.The respondents have an average of 8.141 years of farming experience in avocado production with a standard deviation of 2.8 years.Distance from producer's house to nearest market was also the factor which determines producer's avocado supply to market. As observed from Table , the average distance needed for producer's to travel to nearest market place was took average in km of 9 with range from 1 to 22 km .

4.2. Value Chain Analysis

The value chain activities identified by the respondents are qualitatively analyzed in-depth to establish which factors influence the value chain activities in the organization. The analysis of the value chain is divided into the primary activities, support activities and factors that influence the value chain activities. A tangible avocados volume is moved from its production field to markets and consumed by final beneficiaries. It is essential to know at first what the current situation is and what strategy needs to be adopted in order to overcome the bottlenecks.

4.2.1. Avocado value chain actors and major functions

The main actors involved in the avocado value chain, their roles and inter relationships are discussed below.

Inputs suppliers

Agriculture value chain analysis begins at the input supply level. Inputs such as seeds, fertilizer, pesticides, and farm implements are supplied by cooperatives, BoA, Jimma Agricultural Research Center, traders, and informal farmers to farmer's exchange. Adequacy and quality of fruit seeds are crucial for increased production.

Labor is an important factor input of agricultural production. The labor is employed in avocado production from land preparation to harvest. As depicted in Table 12, about 75% of the respondents used family labor, 14.17% used hired labor for the production of avocado, 6.67% were used cooperative labor and 4.17 were used labor exchange for the production of avocado.

Table 5: Sources of labor for avocado production

Labor source	Frequency	Present
Family labor	90	75
Hired labor	17	14.17
Cooperative labor	8	6.67
Labor exchange	5	4.17
Total	120	100

Source: Survey results, 2018

Producers

Farmers are the primary and most valued actor in the avocado value chain. Producers are smallholder avocado producer. They are major actor involved in production and marketing of surpluses they produce. Producer decide to, what input to use, when to seed and harvest, how much to consume, and how much to sell, considering the available resource. They perform most of the value chain functions right from farm inputs preparation on their farms to post harvest handling and marketing. The major value chain functions that fruits producers perform include land preparation, growing/planting/, fertilization, irrigating, protecting from weed, pest/disease, harvesting and post-harvest handling and marketing. But in this study are focused how much to produce, how much to sell and how much to consume. And also how much kg is damaged out of total production.

Table 6: Amount of quantity produced and quantity to sell in kg.

Variables	Obs	Mean	SD	Min	Max
Quantity produced	120	1068.583	1484.314	100	9050
Quantity supplied to the market	120	733.1667	656.3455	200	4000

Source: Survey results, 2018

As it is depicted in the Table 6, average quantity produced of sampled producer is 1068.58 in kg with ranging from 100 to 9050 kg and the mean quantity supplied to the market is733.17 in kg with ranging from 200 to 4000 kg. The total production of avocado in case area is 128230 kg out of this kg the total surplus of avocado which would follow to market through all channels were estimated to be 90979 kg.

Table 7: Current price and lagged year price of avocado/ kg.

Variables	Obs	Mean	SD	Min	Max
Lagged year price	120	7.311688	1.326056	4	12
Current price	120	7.935065	2.299973	4	12

Source: Survey results, 2018

As it is depicted in the Table 7, the mean of current price of avocado is 7.935 in kg with ranging from 4 to 12 birr/kg and the mean of lagged year price of avocado is 7.3116 in kg with ranging from 4 to 12 birr/kg.

Rural collectors

Rural collectors are independent operators at primary markets who assemble and transport avocado from smallholder farmers, using pack animals and small trucks for sale to larger markets. The local traders play the key role as in the avocado value chain in area; their trading activities include buying and assembling, repacking, sorting, and selling to wholesalers typically transport on donkeys or cart to nearest town. Their major sales outlets are relatively wholesalers. And most of these outlets own or rent storage but usually do not store for more than two or three days. These local traders collect avocado for wholesalers and wholesalers purchase from rural collectors by covering all cost and also additional fee for their services.

Brokers/middle men

Brokers in the woreda have regular and temporary customers from major towns and cities across the country. Brokers facilitate transaction by convincing farmers to sale his avocado and facilitating the process of searching good quality and quantity avocado to wholesalers. The share of profit that goes to brokers varies from farmer to farmer and from trader to trader. The brokers sometimes go beyond facilitation of transaction and tend to set prices and make extra benefits from the process. A few wholesalers go straight to farmers fields without using brokers to purchase the fruit products from the farmers where they negotiate prices. Brokers do not follow proper business conduct and as a result they constrain the marketing system more than they facilitate. In case the producer is not sold through broker, they forced to sell at the lower price because of perishability of the product. The broker travel to the rural areas and contact producers, they inspect the product quality, estimate output, set price and come back to communicating with wholesalers to purchase and transport. The farmers have no idea of the price paid by the wholesalers and only receive what has been bargained with the broker.

Wholesalers

Wholesalers are traders that buy avocado from rural collectors and also directly from farmers, usually those in surplus areas for resale in deficit, to larger market centers and retailers with better financial and information capacity. Wholesalers are the major buyers of avocado as they buy at least a truck load of fruit at a time from farmers. They mostly purchase from farmers and local collectors. There are no wholesalers who have the license to do wholesale in the study area. But all of wholesalers are located outside the study area mainly in Jimma. Wholesalers mostly purchase in bulk from the woreda, transport and sell the produce to the major towns like Jimma and Addis Ababa. Wholesalers buy avocado from producers through brokers who represent them in avocado buying activities. They have better storage, transport and communication access than other traders.

Processors

Processing of fruit in the sense of preserving and value addition is not as such practiced in the study areas. Processing function is undertaken by juices house, cafés, hotels or restaurants in which case fresh sold to consumers. Avocados are commonly consumed in the form of juice.

Retailers

Retailers are key actors in avocado value chain within and outside the study area. These are known for their limited capacity of purchasing and handling products and low financial and information capacity. They are the last link between producers and consumers. During the market visit, it was observed that retailers keep small amount of avocado. Consumers usually buy the product from retailers as they offer according to requirement and purchasing power of the buyers.

Consumers

Consumers are final purchasers of avocado products mostly from retailers for consumption purpose. Avocado consumers are individual households (rural and urban dwellers) hotels and institutions. Consumers think that if the chain becomes shorter and shorter the price of avocado will be reduced.

4.2.2. Value chain governance

The governance structure gives information about the position of the smallholders in the chain and the relations between smallholders and purchasers. The producers" position in price negotiation is not good in the study area. Due to lack of valuable market information and not well organized producers" heavily depend on traders. Hence, they are price takers and hardly negotiate the price due to fear of post-harvest loss, in case the product is not sold. From focus group discussion producers reported that co-ordination among the value chain actors was low and also there were the complexity of information and knowledge sharing among the chain.

The assessment made indicates that the wholesalers assisted by the brokers are the main avocado fruits value chain governors. Moreover, the study also revealed that the governance structure exercised was favorable to wholesalers and retailers and leaves smallholders and consumers in a weak position with other value chain actors. Wholesalers have sufficient information about the

supply of avocado and which direction it flows along the marketing channels and markets in different parts of the country. The wholesalers are well networked with each other's as well as with brokers but informally. These traders exchange information on avocado fruit prices, local supply situation and the prospects of harvest in their area. Then, they agree on the price at which the buyer is willing to take the price so that the seller determines the farmers" price taking into account his profit margins. Except this networking and business relation, there is no formal collateral when the transaction takes place.

In general, the governance structure in the study area was characterized by low coordination among the value chain actors in information exchange and knowledge transfer and low involvement in changing the rules and regulations that was exercised in the study area. Therefore, care should be taken in order to create a co-ordination mechanism among the value chain actors and encouraged all actors in changing the rules and regulations that was exercised in the study areas.

4.2.1. Challenges and opportunities of actors along avocado value chain

One of the merits of value chain analysis is that it helps to clearly identify bottlenecks to the development of the chain right from input supply up until the consumption level in intense way. Accordingly, a number of constraints and opportunities are explained by different actors throughfocus group discussion and questionnaire. From results major constraints which are currently hindering the development of the avocado fruit value chain can be categorized according to the three basic stages: the farm level, the marketing/traders stage and consumer stage.

At the farm-level, key constraints faced by farmers are the shortage of good quality seed, high cost of inputs, limited knowledge on the proper plantation, harvesting and post- harvest handling diseases and pest attacks, lack of storage, and inadequate credit service. This will fear producers to not expand avocado production and marketing those indicate (Appendix table 6).

Farmers suffer from poor post-harvest handling techniques, leading to significant losses, which affect returns to the farmer and traders. Furthermore, farmers do not have good storage facilities available at the farm level, and this forces them to sell their product immediately after harvest.

In the marketing stage, the major problem to hinder the development of avocado value chain such as poor transport facility, price setting problem, product quality problem, presence of unlicensed traders, lack of product standard, low price for the products and perishability of the product, limited function of cooperatives, limited market research and credit service.

In the finally stage constraint faced by the consumer are income shortage,lack of consumers cooperatives and high price of product.

4.3. Analysis of Avocado Market Structure-Conduct and Performance

4.3.1 Market structure

Market structure in food marketing is analyzed based on the number of buyers and sizes of enterprises within the system, the degree of market transparency (market information), and the condition of entry to and exit from trade (Scarborough and Kydd, 1992; Pender et al., 2004).

In this study the market structure of avocado is assessed using market concentration ratio, degree of market transparency, flow of market price information within markets and condition of entry into and exit from trade. For this reason, educational level, trade experience, licensing procedure, lack of working capital and policy barriers are used as a clue to examine the avocado market structure in Mana Woreda. The result is listed as follows:

4.3.1.1 The degree of market concentration

Market concentration refers to the number and relative size distribution of buyers and sellers in the market. For an efficient market, there should be sufficient number of firms (buyers and sellers); firms of appropriate size are needed to fully capture economies of size; there should be no barriers to entry into and exit from the market and should have full market information. Concentration ratio was not calculated for avocado due to low number of the sampled wholesalers.

4.3.1.2 Degree of market transparency

The degree of market transparency refers to the timeliness and reliability of market information that the traders have for their marketing decision. In a transparent market, participants have adequate information about their competitors regarding their source of supply and buying prices for better decisions.

Based on this essence, the assessment on the continuum indicated, only 26 and 47 percent of producers and traders respectively have reported as they have adequate, timely and reliable information in the study area. The research result has implied that, the market of the study area is well characterized by lack of transparency in timeliness and reliability. The result has also ascertained that traders have more privileged in information access than producers. The reality assisted traders take hold of better market information through cellular phones (64.7 percent). The traders' survey result has also indicated that about 75 % of the sample traders got price information through combination of telephone, personal observation and other traders. The rest (25 %) of the traders reported that they could guess market information from the acts of other traders (e.g. interest to buy large volume of avocado at higher prices).

4.3.1.3 Barriers to entry and exit

Managerial know-how, working capital, legal and policy constraints are used to analyze barriers of avocado market entry and exit. Table 16 summarizes barriers to entry and exit of avocado traders expressed in terms of education level attained, experience in fruit trade, main sources of capital, access to credit and licensing of the sampled avocado traders across the sample markets.

I. Managerial know-how

Managerial know how is assessed to measure the ability and knowledge of avocado and mango traders. The continuum is therefore examined by level of traders' formal education and their trade experiences.

a) Level of education

The result of traders' survey in Table 16   indicated that, about 14.29% of the respondents were illiterate, 14.29%of the respondent were read and write; while the remaining 50% and 21.43% of trading household heads have attended primary and secondary education, respectively. Since the

majority of the traders are entitled to primary education which confirmed that traders' educational background seem to be a barrier to entry into avocado trade.

Table 8: Barriers to entry and exit of avocado traders (%)

Barriers	Frequency	Present
I Managerial know-how		
a. Education		
Read and write	2	14.29
Illiterate	2	14.29
Primary	7	50
Secondary	3	21.43
Total	14	100
a. Business experience		
1-5 year	9	64.28
6-10	3	21.42
11-15	2	14.28
Total	14	100
III Lack of working capital		
a. Source of fund		
Owen capital	10	71.43
Borrow from formal source	1	7.14
Relatives and friends	3	21.43
Total	14	100
b. Access to credit		
Did not have access	9	64.28
Easy to get credit	5	35.71
Total		
III license		
not licensed	12	85.71
licensed	2	14.28
Total	14	100

Source: Survey result, 2018

b) Business experience

Business or trade experience refers to the number of years that avocado trader engaged in trading activity where their business experience plays crucial role in decision making activity. The traders' survey results in (Table 8) showed that, most of the traders are not well experienced in avocado trading business for more than 5 years. Out of the surveyed traders about 64.28%, 21.42%, and 14.28% of the traders had an experience of 1-5; 6-10 and 10-15 years of business experiences, respectively. The majority of traders in the sampled markets had 1-5 years of experience. This may explain that there is no barrier to entry in avocado trade with respect to years of experience.

II) Lack of working capital

a) Source of working capital

Working capital refers to the amount of money required by avocado traders to enter into the trading business. From the survey result, it was observed that the majority of avocado traders (71.43%) had their own source of capital for the respective trading activities; while 21.43 percent of the traders have got their working capital from their relatives and friends. But the remaining 7.14 percent of the traders have borrowed their capital formal credit sources (Table 8).

b) Access to credit services

However, traders' survey result revealed that about 64.28% of avocado traders responded that they did not have access to credit where 35.71 percent of the traders are easy to get the service from the available formal credit sources in (Table 8). The survey result showed that most traders didn't get credit access due to collateral and other complicated processes. This as constraining reasons to expand the scale of operations and achieve greater efficiency in credit services. This implied that, lack of capital discourages entry into avocado trading.

III) License of avocado traders

In many business activities licensing is a major barrier. As a rule, a trader who has license in one business is not allowed to perform any other businesses other than the business for which he/she is licensed. However, this was not the case as most of the traders operating in the study area who had no fruit trade license. Based on the survey result, about 85.71 % of the respondents are not licensed in fruit trading while 14.28 % of the traders had licenses (Table 8). The assessment implied that, absence of trading license for   avocado trading activities had not restricted traders to enter and exit in avocado trading businesses.

4.3.2 Market conduct

Market conduct refers to the patterns of behavior of firms. This implies analysis of human behavioral patterns that are not readily identifiable, obtainable, or quantifiable (Pomeroy and Trinidad, 1995). There are no agreed upon procedures for analyzing the elements of market conduct. Rather, some points are put to detect unfair price setting practices and the conditions under which such practices prevail. In this study conduct of avocado market is analyzed in terms of the traders' and price setting, purchasing and selling strategies.

4.3.2.1 Producers' market conduct

The research result pointed out that, supply of avocado occurs mainly from April to October. But February and March are the months when prices of avocado reach at peak; while July up to September are the months when avocado prices drains at rock bottom prices. According to the assessment avocado was highly supplied to market from June to October. Respondents also reported that, there were no significant sales in the months of December to March, but it extends up to May.

4.3.2.2 Traders' market conduct

Place to sell

The survey result indicated that, almost all transactions made on avocado marketing took place with direct contact between sellers and buyers. Large proportion of avocado traders (45%) purchase avocado directly from farmers at farm gate, while 30%, 20% and 5% of the traders purchase avocado from Yebu, village markets and roadside, respectively table 17.

Table 9: Market place to buy avocado

Market place	%
Yebu market	30
Village market	20
Farm get	45
Roadside	5

Source: Survey result, 2018

Table 10: Method of price setting and term of payment

Price seating strategy	Percent (%)
Myself	20
Set by demand and supply	30
Negotiation with farmer	5
Without negotiation	45
Term of payment	
Cash	57.14
After some hours	28.57
On the other days after sale	14.28
Method of attracting supplier	
Giving better price	57.14
By visiting them	14.29
Fair scaling	28.57

Source: Survey result, 2018

Price setting and terms of payment

The assessment indicated (Table 10) among all respondents, 20% of the farmers have reported as price set by self, 30% of the farmer have reported as price setting was by demand and supply force, 45% of the farmers have reported as they don't negotiate on price to sell their producer and the remaining 5% was negotiate on price to sell their produce; indicating this large amount of producers are price takers. But 57.14 percent of the respondents stated the term of payment is conducted through cash in hand system. The selling strategy of the respondent farmers was open to any buyer. Thus, all producers sell their produce to anybody as far as they offer better price.

The data in Table 10 showed that, avocado traders have used different methods to approach their clients. According to the assessment 57.14 and 14.29 percent of traders attracted their suppliers by paying better price and by visiting them, respectively. Congruently, fair scaling are the approaches often used by traders to attract their suppliers with a value of 28.57%.

4.3.3. Performance of Avocado market

4.3.3.1 Marketing Channels

Marketing channel and marketing margins were used in the analysis of supply chain performance. Four parameters are necessary to measure the efficiency of a channel. These are quantity handled, producer's share, total marketing margin, and rate of return. Out of these volumes handled, producer's share and marketing margin were considered for avocado in this study. Consequently effectiveness is defined as the ability of the marketing channels to result to (or offer) proper service outputs or the right services in relation to consumer preferences. In essence therefore, identification of the marketing chain precedes its analysis. Marketing channels are defined as alternative routes of product flows from producers to consumers; (Kohls and Uhl, 1990).This section presents results for the identified marketing channels.

Avocado market channel

Producers sell avocado through different channels. According to this survey finding, six marketing channels were identified for avocado. The channel comparison was made based on volume that passed through each channel. Accordingly, the producer-Wholesaler-consumer market channel carried the largest volume of avocado which is 28 percent of the total volume

followed by Producer-Local collector-Wholesaler-consumer market channel which is about 20 percent of the total marketed (Fig 3).

I. **Producer-Retailer-Consumer channel**: This channel represented 15% of total avocado marketed during the survey period. The channel was found to be the fourth important marketing channel in terms of volume.

II. **Producer-Processor-Consumer channel**: It accounted for 19% of total avocado marketed in the study area during the survey period. The channel was found to be the third most important channel in terms of volume.

III. **Producer-Wholesaler-Consumer market:** Represented 28% of the total avocado marketed during the survey period. It is the first most important channel in the study area in terms of volume.

IV. **Producer-Local collectors-Wholesaler-Consumer market**: The channel accounted for 20% of total avocado marketed during the survey period. The channel was found to be the second most important in terms of volume.

V. **Producer-Local collector-Wholesaler-Processor-Consumer channel**: It accounted for 7% of total avocado marketed during the survey period. The channel was found to be the least important in terms of volume and the longest in terms of intermediaries in avocado marketing channel in the study area.

VI. **Producer-Consumers channel**: This channel represented 11% of the total avocado marketed volume of avocado during the survey period. The channel is the second least important avocado marketing channel in the study area in terms of volume.
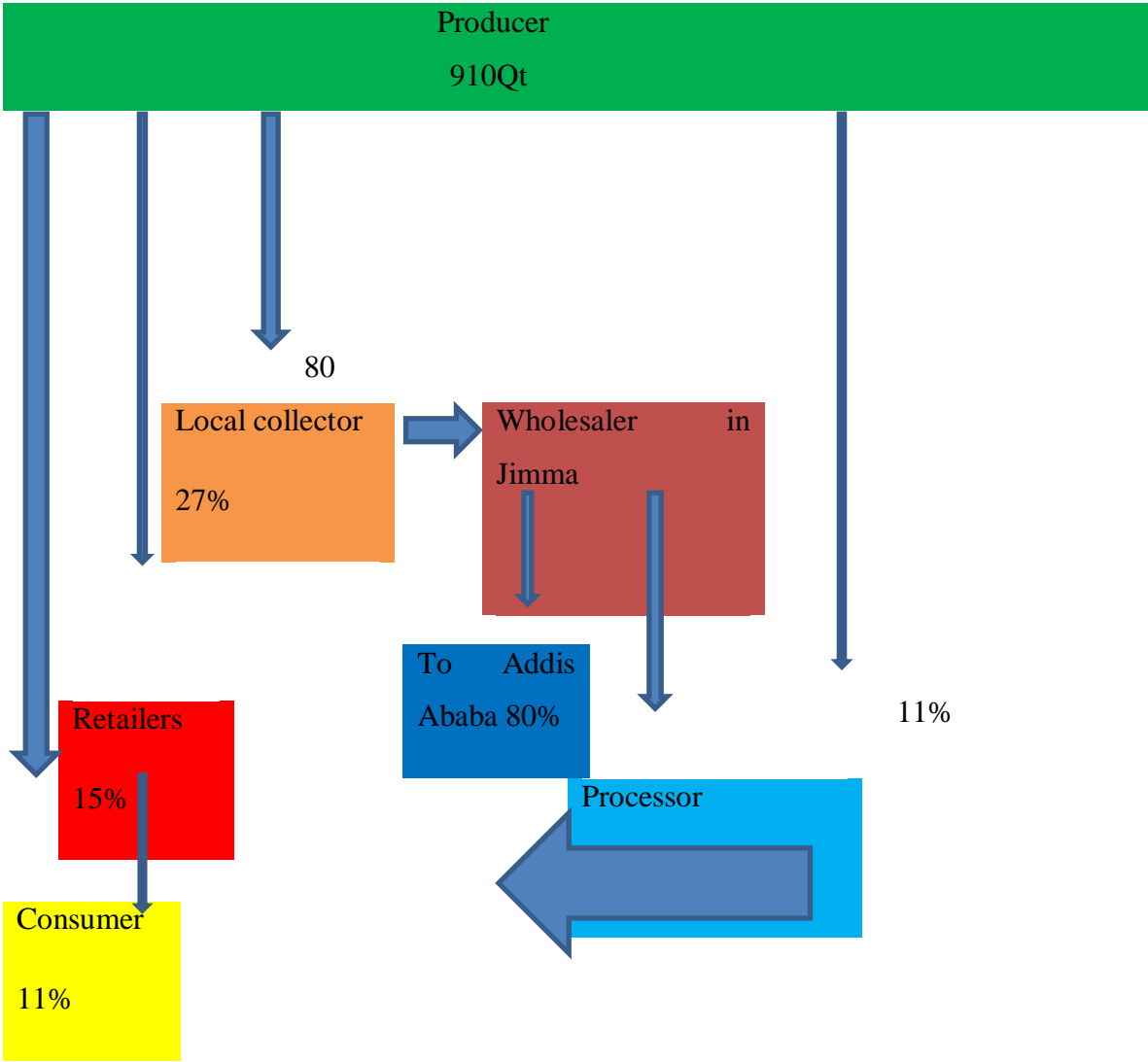
Figure 3. Avocado marketing channels

Source: Survey result, 2018

4.3.3.2 Marketing margin analysis

Margin determination surveys should be conducted parallel to channel surveys based on price (payment) received or selling price to calculate the margin. A systematically recording of prices at different levels of marketing chain during a two to three week period is sufficient to calculate quite accurately the relevant marketing margins (Pomeroy and Trinidad, 1995).

4.3.3.2.1 Avocado marketing cost and margin analysis

Marketing costs are estimated to compute the share of profit captured by key actors in the marketing chain. Table 11 shows the average marketing costs incurred by every actor during transaction. The highest marketing cost was incurred by the wholesalers (152 birr/qt) followed by processor (138 birr/qt). This is because wholesalers transport costs is higher to reach final destination of market and specialized labor for the packing, loading and unloading is relatively expensive in the consumer market. Average production cost of producers was (83.5 birr/qt) when they sold to consumers, locale collector was (109.7birr/qt) and retailer was 82 birr/qt.

Table 11: Marketing cost for different marketing agents (Birr/qt)

MC	Producer	Locale collector	Retailer	Wholesaler	Processor
Sack	12	11	11	11	11
Load/unload	10.5	7	17	9	10
Labor for packing		6.5	8	6.5	7
Transportation cost	35	30		55	40
Storage cost				8	6
Telephone cost		7	2	4	5
Wastage loss	20	10	12	13.5	10
Personal expense				6	8
Brokerage				7	6
Tax	6	8	9	12	10
Other cost		30	23	20	25
Total cost	83.5	109.5	82	152	138

Source: Survey result, 2018

Tables 12: Avocado marketing margin for different channels (Birr/qt).

		I	II	III	IV	V	VI
Producer	Purchase price						
	Production cost	182.5	182.5	182.5	182.5	182.5	182.5
	Marketing cost	83.5	123	145	147	85	70.5
	Selling price	790	790	790	790	790	790
	Market profit	524	484.5	462.5	460.5	522.5	537
	GMM_P (%)	84.05	71.18	69.78	64.22	52.5	100
Locale collector	Purchase price				790	790	
	Production cost						
	Marketing cost				109.5	109.5	
	Selling price				920	935	
	Market profit				20.5	35.5	
	GMM_{LC} (%)				10.56	9.63	
Retailer	Purchase price	790					
	Production cost						
	Marketing cost	82					
	Selling price	940					
	Market profit	68					
	GMM_R (%)	15.95					
Wholesaler	Purchase price			790	920	935	
	Production cost						
	Marketing cost			152	152	152	
	Selling price			1132	1230	1235	
	Market profit			190	158	148	
	GMM_{Wh} (%)			30.21	25.20	19.93	
Processor	Purchase price		790			1235	
	Production cost						
	Marketing cost		138			138	
	Selling price		1110			1505	
	Market profit		182			132	
	GMM_{PR} (%)		28.82			17.94	
TGMM (%)		15.95	28.82	30.21	35.77	47.5	0

Source: Survey result, 2018

Table 12 clearly depicted differences between the total income from avocado trading and the costs incurred in the process of avocado trading which gives the marketing profit of each actor namely producers, rural collectors, retailers, wholesalers and processor. The results showed that to avocado producers market profit was highest when they direct sell consumers in channel VI which is 537 birr/qt, retailer in channel I which is 524 birr/qt, locale collector in channel V which is 522.5 birr/qt and while take lowest market profit when they direct sell to wholesaler and locale

collector which accounts, 462.5 birr/qt and 460.5 birr/qt, respectively. This implies producers are more profitable if they sold to retailer and consumers. From traders wholesalers shared the highest profit 190 birr/qt when they made direct purchase from producers in channel III and they sold to consumer. Processor gained the second highest profit 182birr/qt on channel II, if they bought from producers and they sold to consumers. Avocado retailer made a profit of 68 birr/qt on channel I and while take the lowest market profit was locale collector 20.5 birr/qt in channel IV, if they bought from producer and they sold to wholesaler. This implies that processor and wholesalers were received the highest remuneration from avocado marketed in the study area while retailers and rural collectors took the smallest profits shares from avocado value chain (Table 12).

As indicated in Table 12, total gross marketing margin (TGMM) is highest in channel V and IV which was 47.5% and 35.77%, respectively and lowest in channel I which was 15.95%.Producer's share (GMM$_P$) was highest in channel I which account 84.05% from the total consumers" price and lowest in channel V which is 52.5%. This difference might support the theory that as the number of marketing agents increases the producers share decreases. The reason being, the higher number of middlemen in the commodity market, the more profit they retain for their services whether they add value to the item or not. The results also shows that the maximum gross marketing margin from traders was taken by wholesalers, which accounts 30.21% of the consumers" price in channel III and followed by processor which was 28.82% in channel II. This implies share of market intermediaries in the consumer's price was substantial and there was a need to reduce market intermediaries to the marketing margins and thereby enhance the producers" income. The minimum gross margin is taken by locale-collector which was 9.63% in channel V.

4.4. Econometric Results

In this section, the selected explanatory variables were used to understand the determinants of volume of avocado supplied to market and for estimates determinants of producers" market outlet choices decisions.

4.4.2 Diagnostic tests of the CLRM

Prior to fitting multiple linear regressions, the hypothesized explanatory variables were checked for existence of multicolliniarity, heteroscedasticity problem.

Test of multicolliniarity: All VIF values are less than 10. This indicates absence of serious multicollinearity problem among independent variables (Appendix Table 8). If there is presence of multicolliniarity between independent variables, it is impossible to separate the effect of each parameter estimate in the dependent variables. It is thus, important to test multicolliniarity between explanatory variables**.**

Since there is heteroscedasticity problem in the data set, the parameter estimates of the coefficients of the independent variables cannot be BLUE. Therefore, to overcome the problem, Robust OLS analysis with heteroscedasticity consistent covariance matrix was estimated (Appendix table 9).

4.4.3. Determinants of avocado supplied to market

Analysis of determinants of volume supply of avocado was found to be important to identify factors constraining avocado supply to market. Ten explanatory variables were hypothesized to determine the household level marketable supply of avocado. Among these variables, only six variables namely (quantity produced, age and market access, experience and Lagged year price) were found significant for avocado supplied to the market.

Table 13 .Determinants of avocado supplied to the market

Quanitity ss	Coffecient	Robust Std.Err	T	p>|t|
Ageofpro	-8.569379**	3.864494	-2.22	0.028
familysi	75.78584***	27.38125	2.77	0.006
edulevel	-59.99586	76.97338	-0.78	0.437
expofpro	15.21844	22.36885	0.68	0.497
dismkt	-2.245293	11.37238	-0.20	0.844
acctocre	312.7502***	110.9353	2.82	0.005
mktinfo	210.681**	102.1417	2.06	0.041
laggedye	97.4973***	27.96956	3.49	0.001
quantity	.1902886**	.0772092	2.46	0.015
extensio	34.04139	87.7065	0.39	0.698
cons	-413.9408	318.9812	-1.30	0.196

N=120

Prob > F   = 0.0000***

R-Squared   = 0.6755

Note: Dependent variable- is avocado quantity supplied to the market   ***   Significant at 1 percent   ** Significant at 5 percent

Source: Survey result, 2018

Quantity of avocado produced: It is the total amount of avocado produced in kg in 2017/2018 production season in the study area. It was hypothesized that quantity produced of avocado affects marketable supply positively. Because a farmer that obtains high yield can supply more to the market than a producer who had fewer yields. Accordingly the result indicated that quantity of avocado produced affects marketabel supply positively and significantly at 5% probability level. The positive coefficient for quantity of avocado produced implies that an increase in quantity of avocado produced by one kg resulted in an increase in farm level marketed surplus of avocado by 0.19 kg, keeping other factors constant. The finding was consistance with pervious study by Abay (2007) and Adugna (2009) found that the amount of tomato and papaya produced by farming households has augmented marketable supply of the commodities significantly. Ayelch (2011) result shows that quantity of avocado produced was significantly affected avocado quantity supplied at 1% level.

Family size: It is the number of members living household. The variable affects supply of avocado to market positively and significantly at 1% level. Because production is the function of labor, availability of labor is assumed to have positive relation with volume of supply. This indicates that the more family size helps to supply more avocados in the market. As the member of household is increased by one, volume of avocado supplied to market is increased by 75.78 kg, keeping other factors constant. This result is consistent with previous study conducted by Wolday (1994) showed that household size had significant positive effect on quantity of teff marketed.

Lagged year price-This is a continuous variable that measured annual average price of avocado in the reference market in 2017 i.e. the one year lagged price of avocado. The variable affects supply of avocado to market positively and significantly at 1% level.This indicates that when avocado price is high in the market in the previous year, farmers are motivated to take their produced to the market. Therefore, this makes the supply to be directly related to the previous year market price. According to the econometric result, lagged price was found significant with the expected sign. As lagged price increased by a unit, the avocado supplied to the market increased by 97.49 kg, keeping other factor remain constant. This result is consistent with previous study conducted by Goetz (1992) on household marketing behavior in Sub-Saharan Africa found a significant positive relationship between grain price and the probability of

quantities sold. And also by Tomek and Robinson (1985) argued that product price has direct relations with marketable supply.

Age of the household head: The variable affects supply of avocado to market negatively and significantly at 5% level. According to the econometrics result, age of hh was found significant and negative sign. Because, increasing the age of household head leads to decrease the production of avocado. So, the reduction of production of avocado affect the volume of avocado supplied to the market. As age of farmer increases by one year the volume of avocado supplied to the market decreased by 8.56 kg, keeping other factor remain constant. This finding was inconsistence with the previous study conducted by Tshiunza et al. (2001) used age as the major farmers' characteristics that significantly affected the proportion of cooking banana planted for market. And also studied by Abraham (2013) also proved that aged farmers provide more of their vegetable product to market.

Access to market information: The variable affects supply of avocado to market positively and significantly at 5% level. Because farmers easily get market information, the amount of avocado supplied to the market increases. If the producer esaily get market information the volume of avocado supplied to the market increased by 210.68kg, keeping other factor remain constant. This finding was consistance in the previous study conduceted byMuhammed (2011) revealed that if wheat producer gets market information, the amount of wheat supplied to the market increases. Alemayehu (2012) also found that access to market information positively affected amount of ginger supplied to market. The study by Abraham (2013) indicated that access to market information affected marketed supply of potato and tomato positively and significantly.

Access to credit: The variable affects supply of avocado to market positively and significantly at 1% level. Because access to credit would enhance the financial capacity of the farmer to purchase the necessary inputs and increases output. If producer easily get credit access, the volume of avocado supplied to the market increased by 312.75 kg, keeping other factor remain constant. This shows that the more households acquire credit services, the more they increase sale of avocado production. Because credit facilitate fortune condition to acquire inputs such as improved seeds, own transport and other inputs that leads to produce more avocado to supply the market.

4.4.4 Test Result for Multinomial Regression Model

Test for Multicollienrity

After estimating the model with 8 explanatory variables we have conducted a test to detect if there is problem of multicollinearity in our model. Here we have mean VIF of 1.11 and variance inflation factor less than 10 for each explanatory which indicate that multicollinearity is not a severe problem. This value presented in (Appendix table 10).

Goodness of fit test

Goodness of fit test were conducted to test the null hypothesis which assumes that all of the regression coefficients across both models are simultaneously equal to zero, as clearly shown in (appendix table 11) p-value from the LR test is 0.0000 which is significantly lower than 0.05 would lead us to conclude that at least one of the regression coefficients in the model is not equal to zero this suggests that the model has a strong explanatory power.

Independence of Irrelevant Alternative (IIA) Test for MNL Model

A stringent assumption of multinomial and conditional logit models is that outcome categories for the model have the property of independence of irrelevant alternatives (IIA). Stated simply, this assumption requires that the inclusion or exclusion of categories does not affect the relative risks associated with the repressors in the remaining categories.

As it is discussed earlier, the MNL model requires the fulfillment of the assumption of the Independence of Irrelevant Alternatives (IIA), otherwise the model will be inappropriate. Different literatures suggest different ways to handle the problem of IIA and to test the fulfillment of the assumption. For instance, McFadden (1973) forwarded that models with independence of irrelevant alternative assumption should be used in cases where the alternatives can plausibly be assumed to be distinct and weighted independently in the eyes of each decision option. Moreover, Multinomial logit models works well when the alternatives are dissimilar. Additionally, two most common methods that are used to test Independence of irrelevant alternative (IIA) are Hausman-McFadden (HM) test and Small- Hsiao (SH) test are suggested. In this model five categorical outcome tests of IIA were reported here. Then the study has computed the model using no adaptation as a base category.

The study had used Hausman-McFadden test of independence of irrelevant alternatives. The chi-square results along with the degrees of freedom and probability values are presented in (Appendix table 12). Although none of the tests reject the Ho that IIA holds, the results differ

considerably, depending on the outcome considered. The Hausman-McFadden tests results from the appendix table indicate that we fail to reject the null hypothesis indicating that our assumption for independence of irrelevant alternatives (IIA) is satisfied.

4.4.5 Determinates of avocado market outlet choices

Multinomial logistic regression was used to analyze factors affecting choice of avocado marketing outlets with five alternative categories. If there are a finite number of choices (greater than two), multinomial logit estimation is appropriate to analyze the effect of exogenous variables on choices. (Table 14) presents the results of the Multinomial Logit model.The Log pseudo likelihood = -94.41, showed that likelihood ratio statistics are highly significant (P < 0.000) suggesting that the model had strong explanatory power. The pseudo-R square was 0.4288 indicating the explanatory variable explained about 42.88% of the variable in the choice of market outlets. Before the marginal effects were run, the coefficient estimates were run and presented in (appendix tabel 13) to provide only the direction of the effect of the independent variable on the dependent variables but not the actual magnitude of the change of probabilities. Thus, the marginal effects from the MNL model, which measure the expected change in the probability of a particular choice being made with respect to a unit change in an independent variable, are reported and discussed. The significant value (also known as p-values) show whether a change in the independent variable significantly influences the Logit at a given level (Gujarati, 2007).

Tabel 14: marginal effect from multinomial logit on the choice of marketing outlet.

	Wholesaler		Retailer		Locale collector		Processor	
dy/dx	p>|z|	dy/dx	p>|z|	dy/dx	p>|z|	dy/dx	p>|z|	
familysi	-0.004369	0.858	-0.0909	0.731	0.0409423	0.145	0.0164518	0.480
edulevel	-0.1507384	0.034**	0.0390467	0.553	-0.0294154	0.650	0.0272438	0.575
expofpro	-0.0074092	0.778	0.0070581	0.767	0.0163017	0.448	0.0420714	0.017**
dismkt	-0.0237841	0.106	-0.0070581	0.539	0.0275527	0.040**	0.0331634	0.011**
acctocre	0.9829	0.000***	0.7573044	0.000***	0.5715425	0.001***	0.2439671	0.026**
mktinfo	0.1385877	0.135	-0.0651316	0.385	-0.1887737	0.001***	0.0428618	0.387
currentpr	0.03257795	0.013**	0.0049485	0.750	-0.0021915	0.880	-0.0223655	0.054*
extension	0.0763786	0.288	-0.0243449	0.716	-0.0000778	0.999	-0.0686086	0.206

Model summary

Number of observation=120   Wald chi2(24)=51.63   prob>chi2=0.0000   pseudo R2=0.4288

Log pseudo likelihood=-94.41

The base outcome is consumer market

*, **and *** imply level of significant at 10, 5 and 1% respectively.

Source: Survey result, 2018

Educational level: The dummy educational status of the household is important variable affecting the avocado market channel choice. Hence, literacy decreases the probability to choose the wholesaler channel for avocado marketing. It is significant and affects wholesaler market channel choice at 5% probability level. As an educational status was better than the previous, the probability of participating in the wholesaler market decreased by 15% as comper to than consumer market outlet choice. This may be due to literate households are more aware of market channel and able to get market information for their produce and helps to choose the best market channel that expected to give better price for their produce. The result in this finding is consistent to Abrahm, (2013), in his analysis of vegetables market outlet choice in Habro and Kombolcha districts.

Experience of HHH: The likelihood of choosing processor outlet was also positively and significantly affected by farming experience at 5% levels of significance. This result indicated that more experienced households in avocado production were more likely to deliver avocado to processor outlet than less experienced farmers. The many years engaged in avocado production and marketing gives the farmers desire to adjust their market links; trying alternative marketing outlets to increase sales volume or better prices all this to maximize profits. The relationship also implies that experienced farmers had better knowledge of cost and benefits associated with various avocado marketing outlets; consequently they are likely to increase the quantities supplied through the processor to benefit from economies of scale. The finding was consistence to Berhanu et al. (2013) found a positive relationship of experience in dairy farming and the choice of a more profitable milk marketing outlet.

Distance from home to nearest market: the study finding shows that, households distance from nearest market was significant at 5% level and positively influences locale collector and processor market participation. As the distance of the household from nearast market increased by one kilometer, the probability of participating in the locale-collector and processor market compared to consumer market increased by 2.75% and 3.31% implying that the households was sell more avocado in the locale collector and processor market as compared to the consumer market, respectivelly. This result concurs to the prior expectation, as household's location further from market places they prefer to sell their produce at locale collector.This findig was consistance with the previous studty by Sultan (2016), Distance from the closest market place

positively and significantly affected accessing millers/processors market outlet as compared with accessing assembler market outlet. Riziki et al. (2015) also confirmed that distance to the market is significant determinant of choice of marketing outlet.

Access to market information: Access to market information negatively influences locale collector markets participation and the result was significanyat 1% level, such that, a change in a farmer's status from no access to market information to access decreased the probability of locale collector markets participation than consumer market participation by 18.87%. This implies that access to information will make the farmer participate more in the other market outlet choice than the locale collector market option. The findig was consistance with previouse study by (Lapar et al., 2002; Shepherd, A., 1997), market information enable the farmer to improve their decision making on what to produce and to whom to sell which in turn increases his/her marketed surplus and market participation. And also by Tewodros (2014), Access to market information positively influences wholesale, retail and consumer markets participation such that, a change in a farmer's status from no access to market information to access increases the probability of wholesale, retail and consumer markets participation than farme get.

Current price of the commodity: It is continuous variable, which was, price given for the commodity with different market outlets per hundred kilograms. Hence, it was hypothesized that price given by market outlets can positively and negativelly affect the wholsaler and processor market outlet choice and the result was significant at 5% and 10% level, respectivelly. The marginal effect result shows that the likelihood of accessing processor avocado market outlet decreases by 2.23% for a birr increase per kg, the likelihood of accessing wholesaler outlet increases by 3.25% for a birr increase per kg of avocado as compared with accessing consumer avocado market outlet. This finding was consistance with privaouse study by Birhanu (2013) also found out that price offered by milk market outlet per liter of milk significantly and negatively affected accessing cooperative milk market outlet as compared with accessing individual consumer milk market outlet.And also by Sultan (2016) also found out Price offered by wheat market outlet per kilogram significantly and negatively affected accessing cooperative wheat market outlet as compared with accessing assembler wheat market outlet. It also affected wholesaler and processor wheat market outlets positively and significantly at 1% probability level. From his study only focused on wholesaller market outlet with consistancy.

Access to Credit Services : The dummy access to credit services affect positivelly the probability choice of wholesaler, retailer, locale collector and processor market channel and the result was significant at 1%, 1%, 1%and 5% level, respectivelly . Credit is related with the different market outlet than consumer because avocado requires high capital throughout its production processes; farmers who had more access to credit service produce market-oriented to increases and strengthen the linkage with wholesalers, processor and retailer.This shows that the more households acquire credit services, the more they increase scale of avocado production. Because credit facilitate fortune condition to acquire inputs such as improved seeds, owen transport and other inputs that leads to produce more avocado which attracts wholesaler,retailler, locale collector and processesor.This result is consistent with Alemnewu (2010) and Muhammed (2011) found that if pepper and teff producer gets credit, the amount of pepper and teff supplied to the market increased. Due to these, it is hypothesized that access to credit will have influence on wholesale market outlet choice decisions.

CHAPTER FIVE

5. Summary, Conclusions and Policy implication

This part of the study tried to summarize and conclude the key findings which arose out of the study and pass possible policy implication as remedies to alleviate the existing and observable potential hurdles.

5.1 Summary

This study was conducted in Mana woreda of jimma zone in Oromia region. The main focus of this thesis was analyzing avocado value chain. The specific objectives of the study include identifying avocado value chain actors, their respective roles, challenges and opportunities in the study area; to analyze respective marketing costs and margins across market channels; to identify the determinants of quantity of avocado supplied to the market in the study area; and To identify the determinants of market outlets choice decisions of avocado producers. To address the objectives of the study, both quantitative and qualitative methodologies were used. The data were generated from both primary and secondary sources. The primary data were collected through personal interviews form a total of 154 respondents (120 producers, 14 traders and, 20 consumers) using structured and semi-structured questionnaires. Qualitative data were also collected through focus group discussions.

Descriptive statistics, gross margin and econometric model were used to analyze the data collected using (STATA Software Package). Multipel leneiar regression model was adopted to understand the determinants of avocado supply to market and multinomial logit model (MNL) to analyze determenat of market outlet choice of farmers.

Out of the producer respondents, 94.17% and 5.83% were male and female household heads respectively. The minimum and maximum age of the respondents were 22 and 68 years respectively with mean age of 41.1 years. The average family size in the study area was 5.13. The minimum and maximum family sizein the study area was 2 and 8, respectively.

Provision of adequate services for the communities enhances the communities' socioeconomic development in general and the well-being of individuals in particular. It has important contribution in improving production and productivity and thereby increasing marketable surplus and ultimately for increasing the income of smallholder farmers. The most important services that are expected to promote production and marketing of avocado in the study area include access to credit, access to extension service, and access to market information. Avocado producer farmer's market major sources of information were friends/relatives, radio/telvision, traders,brokers and kebele adimnistration which is 32.5%, 5.83% , 37.5%, 16.67% 8.33%, respectively. The result also showed that 28.34% of the respondents have access to credit. Extension service in agriculture is indispensable and it provides assistance for farmers in improvement of production and productivity, it also enables flow of information and transfer of knowledge and scientific findings to practice. Out of the interviewed farmers, 40.83% have access to extension services delivered by different stakeholders in the study area.

The major actors involved in avocado value chain include input suppliers, producers, rural collectors, wholesalers, retailers, broker, processors and consumers. Most producers sell their products to the traders while some of them sale for consumers. However, it is also found that wholesalers, retailers and collectors directly purchase the avocado from the farmers. The study results indicate that the wholesalers does assisted by the brokers are the main avocado value chain governors. The producers" position in price negotiation and product quality definition is not good in the study area.

The overall avocado value chains are constrained by a number of factors which hinder the development of fruits value chain. At farm level, the major production constraints are shortage of good quality seed, high cost of inputs, lack of availability of adequate pesticides/herbicides, limited knowledge on the proper plantation, harvesting and post- harvest handling activities, diseases and pest attacks, lack of storage, and inadequate credit service. At marketing/trading stage, poor road and transport facility, price setting problem, poor market information, product

quality problem, presence of unlicensed traders, lack of product standard, price fluctuation and perishability of the product as the major problems of fruit marketing.

About sex different avocado market channels have been identified with each channels having different marketing margin. The results showed that avocado producer"s market profit was highest when they sell to consumers in channel VI, retailer in channel I, locale collector in channel Vand while take lowest market profit when they direct sell to wholesaler and locale collector in channel III and IV, respectively. The total gross marketing margin (TGMM) was highest in direct sell to locale collector in channel V and IV, respectively and lowest in direct sell to retailer in channel I.

Out of the 128230 kg of total avocado production in Mana woreda total surplus of avocado which would follow to market through all channels were estimated to be 90979 kg. The result of multiple leniear regression indicated that quantity produced of avocado influences amount of avocado supplied to market positively and significantly. This indicated that the one variables should get attention if we are going to increase marketable supply of avocado in the study area.

Econometric result of the (MLR) model indicated that yield of avocado produced, age of household head, family size of HHH, access to market information, access to credit and lagged year price of avocado are significantly determining the quantity of avocado supplied to the market.

Avocado producers of the study area supply their product to different market outlets. Farmers supply their products to wholesalers, retailer, locale collector, processor and consumer market outlets. To analyse the determinate of producers choice of the five market outlets, multinomial logistic regression model was used. The model results indicated that education level, experience, distance from nearest market,access to market information, current price of the commodity and accese to credit are significantlly determine the producer market outlet choice.

5.2 Conclusion

The value of R square (0.6755) indicates that 67.55% the MLR model dependent variable is explained by the independent variables. On the other the value of pseudo R square (0.4288) indicates that 42.88% the MNL model dependent variable is explained by the independent variables. Therefore, it implies that internal factors are important determinants of value chain anlysis for avocado in case area to the extent on average 67.55% and 42.88% respectively.And also the MLR model result show that

Positive coefficient of variable quantity of avocado produced specifies the positive relationship. However, the relationship between avocado supplied to the market and quantity of avocado produced is statistically significant (+). the positive coefficient indicates that a unit increase in quantity of avocado produced will increase the marketable supply of farmers.

Positive coefficient of variable family size specifies the positive relationship. However, the relationship between quantity of avocado supplied to the market and family size is statistically significant (+). Because production is the function of labor, availability of labor is assumed to have positive relation with volume of avocado supplied to the market.

Positive coefficient of variable lagged year price of avocado specifies the positive relationship. However, the relationship between quantity of avocado supplied to the market and lagged year price is statistically significant (+).This indicates that when avocado price is high in the market in the previous year, farmers are motivated to take their produced to the market.

Negative coefficient of variable age of HHH specifies the negative relationship. However, the relationship between quantity of avocado supplied to the market and age is statistically significant (-). Because, increasing the age of household head leads to decrease the productivity of avocado. So, the reduction of productivity of avocado affect the volume of avocado supplied to the market.

Positive coefficient of variable access to market information specifies the positive relationship. However, the relationship between quantity of avocado supplied to the market and market information is statistically significant (+).Because farmers easily get market information, the amount of avocado supplied to the market increases.

Positive coefficient of variable crdeit access specifies the positive relationship. However, the relationship between quantity of avocado supplied to the market and credit acess is statistically significant (+).Because access to credit would enhance the financial capacity of the farmer to purchase the necessary inputs and increases output.

The MNL model results indicated that the likelihood to choose wholesalers market outlet was significantly influenced by educational level, accesse to credit and current price of the commodity as compared to accessing consumer avocado market outlet. The likelihood of accessing retallier avocado market outlet was significantly influenced by acesse to credit as compared to accessing consumer market outlet. The likelihood of accessing locale collector outlet was significantly influenced by accesse to market information, accesse to crdeit and distnance from nearest market place as compared to accessing consumer market outlet. The likelihood of accessing processor avocado market outlet was significantly influenced by acesse to credit, experience of the HHH,current price of the avocado and distance from nearest market place as compared to accessing consumer market outlet.

Generally, given the large potential for fruit production in the country, their contribution to the total GDP has been extremely low for many reasons. The most cited reasons include lack of market oriented production which is too traditional and poorly supported by scientific recommendations, excessive margin mainly due to inefficient and costly transport, absence of fruit market information, inadequate government interventions and absence of market regulations and legislations and its marketing activity is principally attributed to poor actors skill. As a result, fruit marketing needs due attention in any on-going or future fruit development plan.

5.3 Policy implication

The findings of this study enabled us to make the following policy implication for policy makers, developments actors and researchers who have strong interest in promoting avocado production and marketing for equal benefits among value chain actors.

It is highly recommended to improve the input supply system so that farmers receive the right type of production inputs, quantity and quality needed at the right time. Improving system will protect farmers from purchasing low quality inputs by high inputs cost. The role of research institutes and universities are crucial in identifying high yielding and disease resistant varieties to improve production and productivity of fruits

Improving the business planning skills of smallholders" to produce diversified fruits which can be targeted both for national and international markets is priority issues. Due to the lack of business knowledge and marketing system, farmers are unable to take farming as business. Therefore, there is a need to capacitate farmers by providing continuous training on production and marketing of fruits.

Strengthening the linkage/interaction among value chain actors, there is a need to change the outlook of actors, by developing ground rules that will bind the relationship between producers and traders. In particular, positive attitudes toward partnership, interaction, networking and learning need to be developed among main actors in the value chain. So the chain actors should work in an integrated way to improve production, reduce post-harvest losses, and to strengthen sustainable market linkage in the study areas. In additions to this, organizing (voluntarily) traders and producers and establish trustful and strong trade agreements between the two institutions is crucial to minimize unfair price created by brokers. With a strong relationship between traders and producers, searching for market information and dissemination will be crucial.

Traders are capable of sourcing price information from different sources whereas poor farmers rely on other farmers and government extension staff for the same information. Therefore, there is a great need to make information available to farmers at the right time and place in response to this challenge; it is also good to develop an integrated agricultural marketing information system that will be linked to Woreda information center, and to link them to government's program.

The result of econometric analysis indicates that volume of avocado supplied to market is influenced positively and significantly by quantity of avocado produced, access to market information, access to credit and lagged year price of avocado. Therefore, in order to enhance volume of avocado supplied to market, these variables should get attention and promoted. Therefore, it is important to create credit access and simplify way of provision for farmers because it will help farmers to improve productivity which will increase their income. Increasing surplus production through provision of credit service improve market participation of avocado. Farmers have to linking production with marketing. And also it is good to enlightening farmers to produce based on market signals, consumer preferences and to direct or advice on the proper methods of handling, storing, transporting, and above all improving quality of avocado. Hence, it is recommended to provide efficient credit access,to provide updating market information for producer to improve knowledge and skills with production and marketing system.

The likelihood to choose wholesalers market outlet was significantly and positively influenced by current price of the commodity and access to credit as compared to accessing consumer avocado market outlet. Therefore to improve the price of the product and there is a great need to make credit available to farmers at the right time and place in response to this challenge; it is also good to develop an integrated agricultural office that will be linked to Woreda information center, to link them to government's programto boost surplus production.The likelihood of accessing wholesaler's market outlet is also negatively and significantly influenced by educational level. Improving educational background of producer can improve the delivery of avocado to wholesaler's market outlet because mostly wholesalers are to buy more kg of avocado than other trader.

The likelihood of accessing retallier avocado market outlet was positively and significantly influenced by access to credit as compared to accessing consumer market outlet. Because the more households acquire credit services, the more they increase scale of avocado production. So,the producer more supply to retallier market outlet.

The likelihood of accessing locale collector market outlet was significantly and positively influenced by access to credit and distance to nearest market place as compared to accessing consumer market outlet. To improve availability of credit to enhance the producers capacity to produce at high quality of avocado and to supply in most profitable market outlet. And also to

improving ownership of transportation facilities and road infrastructures can increase accessibility of locale collector market outlet.

The likelihood of accessing processor market outlet was significantly and positively influenced by distance to nearest market place as compared to accessing consumer market outlet.To improve rural infrastructure in developing market infrastructure in the form of establishing produce collection points across rural areas. The likelihood of accessing processor market outlet was significantly and negatively influenced by current price of avocado. Therefore to increase fair market share by building trust between producers and traders by improving price information networks and establish well defined linkages. Increasing production alone is not enough without getting a reasonable selling price and marketing linkage. Offering reasonable price per quintal can inspire avocado farmers to sell avocados through the best market outlets.

5.4. Recommendation for future study

The main intention of the study was to determine the value chain analysis for avocado and also determined the factors that influence the choice of marketing outlets in Mana woreda. However, the study proposes further research on to identify best upgrading practices agreed by different chain actors so that a well-organized regional and national fruit production and marketing can be implemented. Moreover, the current study employed ten elements as independent variables under MLR model and also eight explanatory variables under MNL model. This implies that other variables relating to determents of avocado supplied to the market and determinates of market outlet choice were not considered. Hence, it is suggested that in future, other researchers should factor in other elements of avocado supplied to the market and determinates of market outlet choice.

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APPENDICIES

Appendix 1: Table
Appendix Table 1: Type of information sampled households provided during survey year

Type of information provide	Freq	%
Price information	58	48.33
Market place and price information	12	10.00
	34	28.33
Buyers information	12	10.00
Price and buyers information		3.33
Demand information		
Total	120	100

Source: Survey result, 2018.

Appendix 2: source of MKT information for respondent

Source of information	freq	%
Traders	45	37.5
Brokers	20	16.67
Radio/television	7	5.83
Friends/ relatives	39	32.5
Kebele administration	10	8.33
Total	120	100

Source: Survey result, 2018.

Appendix Table 3: Means of transport used by sampled producers

Means of transport	Freq	%
On donkey	62	51.67
Vehicle	18	15.00
On foot	23	19.17
Cart	17	14.17
Total	120	100

Appendix Table 4: Purpose of credit

	Frequency	Present
Purchasing of fertilizer	24	20
Purchasing of seeds	96	80

Source: Survey result, 2018.

Appendix 5: means of livelihood of the consumer

Means of income	freq	%
Trading	9	45
Employment	3	15
Daily laborer	6	30
Pension	2	10
Total	20	100

Source: Survey result, 2018.

Appendix Table 6: Proportion of farmers indicating   marketing problems

Marketing problem	Freq	%
Low price	14	11.67
Storage	25	20.83
Lack of transportation	39	32.50
Lack of market	26	21.67
perishability	16	13.33
Total	120	100

Source: Survey result, 2018.

Appendix Table 8: Test for multicollinearity of explanatory variables for MLR model

```
. vif

    Variable |      VIF    1/VIF
-------------+----------------------
     expofpro |     1.22   0.818348
     quantity |     1.19   0.840357
     acctocre |     1.17   0.855521
     familysi |     1.13   0.883854
     ageofpro |     1.11   0.898943
      mktinfo |     1.10   0.912937
       dismkt |     1.08   0.925370
     edulevel |     1.07   0.936323
     laggedye |     1.04   0.958671
     extensio |     1.04   0.961388
-------------+----------------------
     Mean VIF |     1.12
```

Source: Survey result, 2018.

Appendix Table 9: MLR results for factors influencing volume of avocado supplied to market

quanitys	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
ageofpro	-8.569379	3.864494	-2.22	0.028	-16.20829	-.9304627
familysi	75.78584	27.38125	2.77	0.006	21.66154	129.9101
edulevel	-59.99586	76.97338	-0.78	0.437	-212.1485	92.15681
expofpro	15.21844	22.36885	0.68	0.497	-28.9979	59.43477
dismkt	-2.245193	11.37238	-0.20	0.844	-24.72489	20.2345
acctocre	312.7502	110.9353	2.82	0.005	93.46523	532.0351
mktinfo	210.681	102.1417	2.06	0.041	8.778217	412.5837
laggedye	97.4973	27.96956	3.49	0.001	42.21009	152.7845
quantity	.1902886	.0772092	2.46	0.015	.0376699	.3429074
extensio	34.04139	87.7065	0.39	0.698	-139.3274	207.4102
_cons	-413.9408	318.9812	-1.30	0.196	-1044.468	216.5868

.

Source: Survey result, 2018.

Appendix Table 10: VIF for MNL model variables

. vif

Variable	VIF	1/VIF
acctocre	1.16	0.860132
expofpro	1.14	0.877048
mktinfo	1.13	0.885057
currenta	1.13	0.887532
familysi	1.12	0.891349
edulevel	1.08	0.927429
extensio	1.06	0.940669
dismkt	1.06	0.947820
Mean VIF	1.11	

Source: Survey result, 2018.

Appendix Table 11: Goodness of fit test for MNL model

. lrtest unconstrained

Likelihood-ratio test	LR chi2(8) =	26.50
(Assumption: . nested in unconstrained)	Prob > chi2 =	0.0009

Source: Survey result, 2018.

Appendix Table 12: Independence of Irrelevant Alternative (IIA) Test for MNL Model

```
. hausman fm nm

                ── Coefficients ──
             (b)          (B)          (b-B)      sqrt(diag(V_b-V_B))
             fm           nm           Difference      S.E.
─────────────┼──────────────────────────────────────────────────────────
  familysi   .3249566     .2453999     .0795567         .
  edulevel  -1.271259    -1.134073    -.1371855         .
    dismkt   -.022781     -.018824     -.003957         .
   mktinfo   .1974119     .1610016     .0364103         .
  currenta   .2558481     .2386219     .0172262         .
  extensio  -.1648168     .3164982    -.4813149         .
─────────────┴──────────────────────────────────────────────────────────

                     b = consistent under Ho and Ha; obtained from mlogit
           B = inconsistent under Ha, efficient under Ho; obtained from mlogit

   Test:  Ho:  difference in coefficients not systematic

              chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                      =         6.99
            Prob>chi2 =       0.3214
            (V_b-V_B is not positive definite)
```

Source: Survey result, 2018.

Appendix Table 13:Results of MNL and marginal effects for choice of avocado market outlets

```
Multinomial logistic regression              Number of obs    =        120
                                             Wald chi2(24)    =      51.63
                                             Prob > chi2      =     0.0000
Log pseudolikelihood = -94.413676            Pseudo R2        =     0.4288
```

whomdose	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
wholesal						
familysi	.1427801	.20716	0.69	0.491	-.2632461	.5488063
edulevel	-1.295419	.6212881	-2.09	0.037	-2.513121	-.0777168
expofpro	.1854555	.232903	0.80	0.426	-.271026	.641937
dismkt	-.026699	.1525081	-0.18	0.861	-.3256094	.2722115
acctocre	16.00472	.5820081	27.50	0.000	14.86401	17.14544
mktinfo	.4716021	.7869917	0.60	0.549	-1.070873	2.014077
currenta	.2416353	.1214362	1.99	0.047	.0036248	.4796459
extensio	.3666386	.6207637	0.59	0.555	-.8500359	1.583313
_cons	-3.792619	2.009174	-1.89	0.059	-7.730527	.1452887
retalier						
familysi	.1299617	.2316594	0.56	0.575	-.3240825	.5840058
edulevel	-.2871285	.5658712	-0.51	0.612	-1.396216	.8219586
expofpro	.2785319	.2252479	1.24	0.216	-.1629459	.7200098
dismkt	.0726686	.1400197	0.52	0.604	-.201765	.3471022
acctocre	15.15876	.5332333	28.43	0.000	14.11364	16.20388
mktinfo	-.6444207	.6728308	-0.96	0.338	-1.963145	.6743033
currenta	.0902388	.1391733	0.65	0.517	-.1825359	.3630136
extensio	-.1879557	.5757185	-0.33	0.744	-1.316343	.9404318
_cons	-2.596603	2.064946	-1.26	0.209	-6.643824	1.450617
consumer	(base outcome)					
local_co						
familysi	.4370178	.2478283	1.76	0.078	-.0487169	.9227524
edulevel	-.5989094	.5688599	-1.05	0.292	-1.713854	.5160355
expofpro	.3661977	.202137	1.81	0.070	-.0299836	.762379
dismkt	.3113967	.143615	2.17	0.030	.0299164	.592877
acctocre	13.98122	.9319213	15.00	0.000	12.15469	15.80775
mktinfo	-1.426022	.5989952	-2.38	0.017	-2.600031	-.252013
currenta	.0201105	.1332834	0.15	0.880	-.2411202	.2813413
extensio	-.1291792	.5644186	-0.23	0.819	-1.235419	.9770609
_cons	-4.28264	2.082014	-2.06	0.040	-8.363313	-.2019679
processo						
familysi	.4122822	.3386595	1.22	0.223	-.2514783	1.076043
edulevel	-.1107888	.7569984	-0.15	0.884	-1.594478	1.372901
expofpro	.7707624	.2694591	2.86	0.004	.2426322	1.298893
dismkt	.554722	.2091713	2.65	0.008	.1447537	.9646902
acctocre	13.6489	1.280181	10.66	0.000	11.1398	16.15801
mktinfo	.0655437	.752337	0.09	0.931	-1.40901	1.540097
currenta	-.23282	.1696154	-1.37	0.170	-.5652601	.0996201
extensio	-.9359456	.7848895	-1.19	0.233	-2.474301	.6024096
_cons	-7.238355	3.025858	-2.39	0.017	-13.16893	-1.307782

```
Expression  : Pr(whomdose==wholesal), predict(outcom(1))
dy/dx w.r.t. : familysi edulevel expofpro dismkt acctocre mktinfo currenta extensio
```

	dy/dx	Delta-method Std. Err.	z	P>|z|	[95% Conf. Interval]	
familysi	-.0043693	.0244244	-0.18	0.858	-.0522402	.0435016
edulevel	-.1507384	.0709358	-2.12	0.034	-.28977	-.0117067
expofpro	-.0074092	.0262865	-0.28	0.778	-.0589297	.0441114
dismkt	-.0237841	.0146997	-1.62	0.106	-.0525949	.0050268
acctocre	.9829	.1712741	5.74	0.000	.647209	1.318591
mktinfo	.1385877	.0926584	1.50	0.135	-.0430195	.3201949
currenta	.0325795	.0130645	2.49	0.013	.0069736	.0581855
extensio	.0763786	.0718486	1.06	0.288	-.0644421	.2171992

```
Expression  : Pr(whomdose==retalier), predict(outcom(2))
dy/dx w.r.t. : familysi edulevel expofpro dismkt acctocre mktinfo currenta extensio
```

	dy/dx	Delta-method Std. Err.	z	P>|z|	[95% Conf. Interval]	
familysi	-.0090988	.0264157	-0.34	0.731	-.0608726	.042675
edulevel	.0390467	.0658757	0.59	0.553	-.0900674	.1681608
expofpro	.0070581	.0238646	0.30	0.767	-.0397157	.0538319
dismkt	-.0075934	.0123533	-0.61	0.539	-.0318055	.0166187
acctocre	.7573044	.1536258	4.93	0.000	.4562033	1.058405
mktinfo	-.0651316	.0749259	-0.87	0.385	-.2119836	.0817204
currenta	.0049485	.0155196	0.32	0.750	-.0254694	.0353663
extensio	-.0243449	.0668687	-0.36	0.716	-.1554051	.1067152

```
Expression  : Pr(whomdose==local_co), predict(outcom(4))
dy/dx w.r.t. : familysi edulevel expofpro dismkt acctocre mktinfo currenta extensio
```

	dy/dx	Delta-method Std. Err.	z	P>|z|	[95% Conf. Interval]	
familysi	.0409423	.0280867	1.46	0.145	-.0141066	.0959911
edulevel	-.0294154	.0648157	-0.45	0.650	-.1564518	.0976209
expofpro	.0163017	.0214909	0.76	0.448	-.0258197	.0584231
dismkt	.0275527	.0134158	2.05	0.040	.0012581	.0538472
acctocre	.5715425	.1705931	3.35	0.001	.2371861	.9058989
mktinfo	-.1887737	.0584785	-3.23	0.001	-.3033895	-.0741579
currenta	-.0021915	.0145755	-0.15	0.880	-.030759	.026376
extensio	-.0000778	.0622528	-0.00	0.999	-.1220911	.1219354

```
Expression  : Pr(whomdose==processo), predict(outcom(5))
dy/dx w.r.t. : familysi edulevel expofpro dismkt acctocre mktinfo currenta extensio
```

	dy/dx	Delta-method Std. Err.	z	P>|z|	[95% Conf. Interval]	
familysi	.0164518	.0232667	0.71	0.480	-.02915	.0620536
edulevel	.0272438	.0486122	0.56	0.575	-.0680343	.1225219
expofpro	.0420714	.0176052	2.39	0.017	.0075657	.076577
dismkt	.0331634	.0129974	2.55	0.011	.0076889	.0586379
acctocre	.2439671	.10958	2.23	0.026	.0291942	.45874
mktinfo	.0428618	.0495049	0.87	0.387	-.054166	.1398895
currenta	-.0223655	.0116036	-1.93	0.054	-.0451081	.0003771
extensio	-.0686086	.0542778	-1.26	0.206	-.1749912	.037774

Source: Survey result, 2018.

Appendix 2: Survey Questionnaires

A.Producers' Interview Schedule

Remark: The personal profile obtained from respondents with regard to the theme will be kept confidential and will not have any consequence on the respondent in any ways. Please give correct answer to the following questions.

Instructions to Enumerators

• 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 farmer's 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.

Objectives of the study

To identify avocado value chain actors, their respective roles, challenges and opportunities in the study area.

To analyze respective marketing costs and margins across market channels

To identify the determinants of quantity of avocado supplied to the market in the study area; and

To identify the determinants of market outlets choice decisions of avocado producers

I. Demographics

1. Woreda_____

2. Sex of respondents   1= Male 2=Female

3 .Age of the respondent?_____

4. Ethnicity of the respondent; 1=Oromo 2=Amhara 3=Yem 4 = Dawuro 5=others

5. Religion :   1=Muslim =2 Orthodox   3=Protestant   4=Wakefata 5= others

6. Marital status: 1=Single 2 =Married   3= Widowed   4= Divorced

7. Educational level : 1, read and write 2, illiterate 3, primary 4,secondary

5, certificate and above

8. Number of household member:_____

9. Are you heading of the Household?   1=Yes   0=No

10. If yes, go to Q 11, If, No what is the relationship to the head of the household?_____

1, wife   2, cousin   3, sister/ brother   4, others_____

11. How old is the head of the household **1**=18-24 **2**=25-31 **3**=32-38 **4**=39-44 **5**=>44

12. Ethnicity of the head 1=Oromo 2=Dawuro 3 =Amhara 4=Yem 5=Wolayita 6=others

13. Religion of the hh head: 1=Muslim   =2 Orthodox 3=Protestant 4=Wakefata 5= others

14. Does the head of the household ever attend school? 1=Yes 0=No

15. If your answer for Q 14 is yes, what is the highest grade completed? _____

16. Do you have a children within school age; 1= Yes 0=No

17. If your answer for Q 16 is yes, number of total children? _____

18. If your answer is Yes for Q16, number/s of children under school age? _____

19. If your answer is yes for Q 16, how many of them are go to school? _____

20. Do your children help you in any works at home? 1= Yes 0=No

21. If your answer 20 is yes what age they are/is? _____

22. Distance of your residence from the nearest market center_____km or _____walking time in (hr/min)

23. How much of avocado trees under production, in 2017_____?

II. Resource ownership and tenure

24. Is supply of labor a problem during production?   1. Yes   2. No

25. What is the labor source for avocado?

    1. Family labor   2. Labor exchange   3.Hired labor   4. Cooperation

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

27. Total amount of hired labor for the production in a year 2017 _____

III Crop production and inputs used

28. How long have you practiced production of avocado? _____Years.

    29. How many times do you produce avocado in 2017 production season? _____

30. Have you ever used agricultural inputs (fertilizer, chemicals, improved seeds etc.) for the production of avocado? (√)   1. [ ] Yes   2. [ ] No

31. If your answer for Q.30 is No, what was the main reason behind? _____

32. Do you always get inputs in the quantities that you need at the right time? (√)

    1. [ ]Yes   2. [ ] No

33. If your answer for Q.32 is No, what are the reasons? (√) (*Multiple responses are possible)
1. [ ] I am not sure of the benefit   2. [ ]   Too expensive   3. [ ] Not available on time

    4. [ ] Cash shortage 5. [ ] Low quality   6. [ ] Far distance

    7. Others (specify) _____

34. Have you encountered problems in accessing these inputs? (√) 1. [ ] Yes 2. [ ] No

35. If your answer for Q.34 is yes, what are the problems? (*Multiple responses are possible)

    1. Unavailability   2. Shortage of supply   3. Costly

    4. Remoteness of input selling   5. Others (specify)_____

36. How did you solve these problems? Your opinion_____

VI Extension contact

37. Did you have extension contact in relation to avocado production in the 2017 production season? (√) 1. [Yes 2. [ ] No

38. If your answer for Q.37 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_____

39. If yes, how often the extension agent contacted you? (√)

1. [ ] Weekly   2.[ ] Once in two week   3.[ ] Monthly   4. [ ] Twice in the year

5. [ ] Once in a year   6. [ ] Any time I ask them

40. What was the extension advice specifically on avocado production? (√) (Multiple responses are possible) 1. [ ] Seed bed preparation   2. [ ] Fertilizer (compost) applications

3. [ ] Harvesting   4. [ ] Transplanting

5. [ ] Marketing of avocado   6. [ ] Post-harvest handling

7. Others (specify) _____

41. Who provides the advisory service? (√) (Multiple responses are possible)

1. [ ] Development agents   2.[ ] NGOs (specify) 3. [ ] Woreda OoARD experts

4. [ ] Research centers (specify)   5. [ ] Neighbors and friend

6. [ ] Others (specify) _____

V. Credit access

42. Did you get credit access in the year 2017? 1=Yes   0=No

43. If yes, have you used credit in 2017 for avocado production purpose?   1= Yes 0 =No

44. If yes, how much did you take for avocado production purpose? ----------Birr

45. For what purpose did you take the credit in relation to avocado production? _

 1. To purchase fertilizer for fruits   3. To rent in land to extend fruit production

 2. To purchase seed/seedlings of fruits   4. To purchase transporting animals

 5. Others (specify) _____

46. From whom did you get credit for fruit production? _

   1. Relative   2. Bank   3.Micro finance institution 4.Traders   5. NGO

   6. Peasant association   7. Friends   8. Others (specify) _____

VI. Marketing Aspect

47. How much kg of avocado produced in 2017_____?

 48. How much avocados fruit supplied to the market _____ kg in 2017

 49. How much the price of avocados fruit to sell _____ in   pr/kg.

 50. Which place to sell this fruit in 2017?

 1. Farm get   2. Local market   3.Town   4. Other_____

 51. By which means of transportation to supply this fruit in the market?

     1. On donkey   2. Vehicle   3.On foot (being carried)   4. Carts

 52. To whom do you sell?

   1. Wholesaler   2.Retailer   3.Consumer   4. Processors   5. Broker

6. Local collector

53. By which means of payment to sell this fruits?

    1. Cash   2. Credit   3.Advance payment   4. Other _____

54. Do you have marketing information in 2017? (√) 1. [ ] Yes 2. [ ] No

55. If your answer for Q.54 is yes, from whom did you get the market information? (√)

    1. Traders   2. Brokers 3.Radio/television   4. Friends/ relatives

    5. Kebele administration

56. What type of information did you get? (√)

1. [ ] Price information   2. [ ] Market place information

3. [ ] Buyers" information 4. [ ] Other (specify) _____

57. At what time interval do you get the information? (√) 1. [ ] Daily 2. [ ] Weekly

    3. [ ] Monthly   4. Other (specify) _____

58. Did you know the market prices before you sold your fruits in 2017?   1=Yes 0=No

59. How do you get market price information of fruits?

    1, through telephone communication   2, by seeing day to day transaction

    3, by assessing different market place   4, others_____

60. Farm gate lagged or last year average selling price of avocado _____birr/kg.

61. Farm get current year average selling price of avocado _____birr/kg.

62. What is the trend of price for the last 5 years?

    1. Increasing   2. Decreasing   3.The same 4. Ups and down

63. If increasing, why?   1, decreasing in purchasing power of money

2, demand of fruit users increase   3, others_____

64. If decreasing, why? 1, lack of quality 2, the level of farmer increase time to time

3, willingness of producer to produce avocado is decline   4, others_____

65. Does your produce have preferred quality by buyers in 2017? 1= Yes   0=No

66. If no, what interventions are needed to attract better price 2017? _____

67. What are the problems of marketing in 2017?

1. Lack of market   2. Low price   3. Storage   4. Lack of transportation

5. Lack of market information   6. Tax   7. Brokers hinder fair sales

8. Perishability   9. Other (specify)_____

68. What determines to sell the products to your customers?

1. Price   2. Fair Scaling   3. Proximity   4. Others _____

69. Do you negotiate on price in 2017?   1= Yes   0= No

70. How did you sale your produce in 2017?

1. Direct to the purchaser   3. Through commission man to the purchaser

2. Through broke   4. Other (specify)_____

71. What was /were problem/s created by brokers in 2017 on fruit trade? _

1. Took to limited client   3. Charged high brokerage fee

2. Cheating on scaling (weighing)   4. Wrong price (market) information

5. Others (specify) -- -----------------------------------

72. Did you face difficulty in finding buyers when you wanted to sell avocado?

      1= yes 0= No

73. If yes, in Q 72 is it due to: _

      1. Inaccessibility of market?   2. Low price offered?   3. Lack of information?

      4. Others (specify) -----------

74. What do you do if you didn't get the expected price for your avocado supply?

1. Took back home   2. Sold at lower price

      3. Took to another market on the same day4. Sold on other market day

75. Is storage of avocado production a problem for you? (√) 1. [ ] Yes 2. [ ] No

76. If your answer for Q.75 is yes, indicate the total volume of the product damaged in kg_____

77. Who sets your selling price for avocado in 2017? _

      1. Yourself   2. Set by demand and supply   3. Buyers

      4. Negotiations   5. Other (specify_____

78. What is the average cost incurred to collect avocado fruit from the tree? _____ Birr/day/all trees.

79. What are the average costs incurred for transporting and handling of avocado to the nearby market _____ birr/qt

      End of the interview Thank you very much for responding to the questions. Name of the Enumerator: _____ Date of Interview: _____

B.Traders' Interview Schedule

Remark: The personal profile obtained from the respondents with regard to the theme will be kept confidential and will not have any consequence on the respondent in any ways. Please give correct answers to the following questions.

Instructions to Enumerators

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

 • Please fill the interview schedule according to the trader's reply (do not put your own feeling).

 • Please ask each question clearly and patiently until the trader gets your points.

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

• Put the answer on the space provided.

Objectives of the study

To identify avocado value chain actors, their respective roles, challenges and opportunities in the study area.

To analyze respective marketing costs and margins across market channels

To identify the determinants of quantity of avocado supplied to the market in the study area; and

To identify the determinants of market outlets choice decisions of avocado producers

I. General information

1. Name of trader_____Sex_____Age _____Years.

2.Educational level   1, read and write   2, illiterate 3, primary 4, secondary 5, certificate and above

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

4. Total family size_____

5. What different languages do you speak? 1. Oromiffa   2. Amharic

3. Others_____

6. Woreda _____Name of Market_____1. Village market 2. Yebu market 3. Jimma market

7. Distance from residence to the market_____Km /walking time in minutes'

8. Main occupation   1. Wholesaler   2.Farmer trader (village collector) 3. Retailer

4. Urban assembler   5. Processor   6. Others (specify)_____

9. Linkage with value chain actors.   1. producer   2. Wholesaler   3.Retailer 4. Consumer

5. Collector   6. Broker   7. Others_____

10. How do you undertake avocado trade activity in 2017?   1. Alone   2. With partner

11. How long have you been in avocado trading? ----------------- Years.

12. Do you participate in avocado trading year round? 1= Yes 0= No

13. If no, at what period of the year do you participate?   1. Year round

2. When purchase price becomes low   3. During high supply

4. Other (specify) -----------------

14. Do you practice trading other than fruits? 1= Yes   0=No

15. Number of market days in a week? _____

16. What was the amount of your initial working capital when you start this fruit trade_____ Birr.

17. What is the amount of your current working capital in 2017?_____Birr.

18. What is your source of working capital? _____ 1. Own 2. Loan 3. Gift 4. Share

5. Others (specify)_____

19. If it was loan, from whom did you borrow?_____1. Relative/family

2. Private money lenders.   3. NGO.   4. Friends.   5. Other traders

6. Micro finance institution.   7. Bank.   8. Others (specify)_____

20. How much was the rate of interest? _____ Birr for formal, --------------birr for informal.

21. What was the reason behind the loan?_____ 1. To extend fruit trading.

2. To purchase fruit transporting vehicles/animals. 3. Others (specify) _____ 22. How was the repayment schedule? _____   1. When you get money

2. Monthly 3. Semi-annually   4.Quarterly   5. Others (specify_____

23. Is there change in accessing finance for avocado trade these days?

1. Improved   2. Deteriorated   3. No change

24. Who will buy avocado fruits from you in 2017?   1. Wholesaler   2. Retailers

3. Household consumers   4. Brokers   5. Others _____

25. From where did you purchase avocado?

1. From village, name_____

2. From market, name of market   (specify)_____

26. For whom do you purchase avocado? 1. For own 2. For others

27. How did you sale your produce?   1. Direct to the purchaser 2.Throug broker

3. Other (specify)_____

28. Who sets the price? 1. Myself 2. Set by demand and supply 3. Buyers 4.Other_____

29. How did you set price? 1. Set at time of advance given 2. Negotiated at delivery

3. At time of delivery   4. Others_____

30. If purchasing price was set at the time of advance given, how did you agree?   1. Orally

  2. Written agreement   3. Other (specify)_____

31. Do you carry out any physical treatment to maintain product quality? 1. Yes   0. No

32. What do you do, if the product is not sold on time? 1. Took back home

   2. Took to another market   3. Sold it at lower price   4. Sold on other market day

33. How do you attract suppliers? 1. Giving better price 2. By visiting them

     3. Fair scaling / weighing   4. Others_____

34. Who purchase fruits for you?   1. Myself   2. Broker   3. Commission agent

  4. Family members   5. Friends   6. Others_____

II. Purchase practice

35. From which market and supplier did you buy avocado?

    1, Yebu market from producer   2, Menseramkt from producer   3, farm get from producer

    4, yebu market from local collectors 5, mensera market from local collectors

36. When did you set the purchasing price? (√)

1. [ ] One day before the market day 2. [ ] One week before the market day

    3. [ ] Early in the morning of the market day 4. [ ] At the time of purchase

    5. Other (specify)_____

37. Did you use brokers to purchase fruits? (√) 1. [ ] Yes 2. [ ] No

38. 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)

39. 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) _____

40. At which season of the year was preferable to purchase avocado in terms of price? Lowest price _____months.

41. Average buying prices for products per /kg in   production season _____birr.

42. How do you measure your purchase? 1. By sack 2. By basket 3. By weighing (kg)

      4. By feresula

43. Is obtaining sufficient volume is a problem in 2017? 1= Yes 0= No

44. From which market (s) do you prefer to buy most of the time in 2017?

            1, yebu market 2, local market   3, farm get

45. Why do you prefer this market? 1. Better quality 2.shortest distance 3.High supply

                  4. Others_____

46. Is your purchasing price higher than your competitors?   1= Yes 0= No

47. If yes, what was the reason?   1. To attract suppliers   2. To buy more quantity

                                3. To kick competitor   4. To get better quality

 48. How many regular suppliers do you have 2017? _____

 49. The price of avocado in 2017 is lower? 1. Yes 0. No

 50. What are the reasons for low price of avocado in 2017?

    1, excess supply   2, poor production 3, trade regulation   4, others

III. Selling practices

51. Average selling prices for avocado per kg in production season _____birr

52. To which market and to whom did you sell avocado in 2017?

    1, yebu market to wholesaler 2, Yebu market to retailers

    3, Yebu market to consumer   4, others

53. How did you attract your buyers?   1. By giving better price relate to others

  2. By visiting those 3. By fair scaling (weighing)   4. Others (specify_____

54. How many regular buyers do you have 2017? _____

55. Do you know the market prices in different markets (on farm, village market, yebu   market, Jimma market) before you sold your fruits in 2017? 1=Yes   0= No

56. What is your source of information?

  1, communication with others   2, assessment of market

   3 sellers   4, others_____

57. How do you qualify the reliability, timeliness and adequacy of the information you got? Regarding the nearby local and Jimma market.   1. It was reliable   2. It was timely

                        3. It was adequate   4. Others_____

58. Are you willing to pay for market information if it is available? 1= Yes   0= No

59. Accessibility to market roads in rainy seasons for vehicles is?

    1. Difficult   2. Easily accessible

60. If difficult, for how long? _____Months

61. Do you have other branch shops/ shades to sell your avocado in 2017?   1= Yes   0= No

62. Are there problems on fruit marketing? 1=yes   0= no

63. If you yes, what are the problems?

    1, credit access   2, price setting 3, storage problem 4, information flow 5, government policy

    6, others_____

64. Are there restrictions imposed on unlicensed fruit traders? 1= Yes 0=No15.

65. What percent of the total produce is sold on local market of   Avocado _____ % in 2017?

66. What percent of the produce will goes to domestic market (Jimma) of Avocado___ %. In 2017?

67. How much average cost incurred per quintal in the trading process of avocado fruits in 2017?_____ in birr.

VI. Marketing Services

 68. Did you pay tax for the avocado trading activity in 2017? 1=Yes   0=No

 69. What was the basis of tax for the avocado trading activity in 2017?

    1. per sack_____ birr   2. Per basket   3. Per kg 4. Per quintal   5. Fixed payment

    6. by budgeting

 70. What is your opinion regarding the marketing fee paid in this market as compared to your transaction?   1. Low   2. High   3.Average   4. You don't know

 71. Is fruit trading in your locality needs a trading license?   1=Yes   0=No

72. If yes, how do you see the procedure to get the license? 1. Complicated   2. Easy

73. Did you store avocado before you sold in 2017? 1= Yes 0= No

74. If yes in Q 73 for how long did you store avocado fruits in the store? Maximum for -------- Hrs/day

75. Amount of avocado fruits lost due to storage ------------------ k.gs/quts.

76. Are you organized in any different organization? 1, yes   0= no

77. If you yes, which one of the following to organized?

   1. Social association (Iqub) 2.Trade association 3. Marketing cooperative

   4. Others_____

    End of the interview Thank you very much for responding to the questions.

            Name of the Enumerator: _____

            Date of Interview: _____

C. Consumers Interview Schedule

I. General information

1. Name of Respondent: _____

2. Zone_____: Woreda_____: Kebele: _____ Village: _____

3. Sex of respondents; 1=Male 2=Female

4. Age of respondents_____

5. Marital status 1=single 2= Married 3= Divorced 4= widowed (widower)

6. Education; 1= Illiterate 2=Primary school (1-8) 3=Secondary school (9-12) 4=Certificate and above

7. Religion; 1=Orthodox 2=Protestant 3=Catholic 4=Muslim 5=Others (specify)__

8. Means of income; 1= Farming 2= Trade 3=Employment 4=others (specify) _____

9. Source of fruits 1=Own produce 2=purchase

10. Linkage with commercial   fruit value chain actors: (√) (Multiple responses are possible).

1. [ ] Collectors   2. [ ] Farmers 3.[ ] Retailers   4. [ ] Wholesalers 5. [ ] Brokers

    6. [ ] Cooperatives   7. Others (specify) _____

11. Do you think fruit   value chain is complex and many intermediaries? 1. [ ] Yes 2. [ ] No

12. Do you think traders of fruits marketing are efficient and competitive? (√) (Multiple responses are possible). 1. [ ]Yes 2. [ ] No

13. If your answer for Q.12 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) _____

II. Purchase of fruits

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

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

3. If the answer to Q. 2 is yes, how many farmers could be your potential sellers with respect to a particular fruit? Approximate for avocado_____.

4. Do you consider any quality requirements to purchase avocado? (√) 1. [ ]Yes 2. [ ] No

5. If yes for Q.4, what quality requirement do you consider for; avocado_____

6. What are the constraints hindering consumption of avocado?

    1. Supply shortage   2. Lack of market information   3. Income shortage

    4. High price of the product   5. Others _____

7. Do you know the benefits of consuming avocado product? (√) 1. [ ] Yes 2. [ ] No

9. Do you think there is problem with consumption of avocado product? (√) 1. [ ] Yes 2. [ ] No

10. What should be done to increase avocado product consumption?

_____

11. Do you think that the price of avocado reduced if the value chain actors" linkage is improved?

    1. [Yes 2. [ ] No.

12. If your answer for Q.11 is No, why? _____

13. If your answer for Q.11 is yes, where intervention should is needed_____

D. Checklist for Focus Group Discussion

Participants: Producers of Avocado in selected kebele;

1. Woreda:_____ Kebele _____

2. Problems related to inputs suppliers (availability/access, quality, cost of inputs)?_____

_____

3. Problems related to avocado production (post-harvest loss, disease, extension service, credit access, market access)?_____

4. How these problems can be solved? _____

5. How do traders influence farmers" participation in Avocado value chain?_____

6. What are the major problems in marketing of Avocado?_____

7. Who is responsible for the above problem? _____

8. What is the quality trend of Avocado improving or deteriorating? Who is responsible for the problem?_____

9. How these problems can be solved?_____

10. Linkage /interaction/ partnership/ coordination between Avocado value actors_____?

11. How all Avocado value chain actors" benefited from this business equally? Your opinion_____