ANALYSIS OF VEGETABLE MARKET CHAIN IN DUGDA WOREDA, EAST SHOA ZONE, OROMIA REGION, ETHIOPIA

By

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This is to certify that the thesis prepared by Dawit Setegn entitled: "Analysis of Vegetable Market Chain in Dugda Woreda, East Shoa Zone, Oromia Region, Ethiopia", and submitted in partial fulfillment of the requirement for the Degree of Master of Arts in Regional and Local Development Studies, complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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List of Acronyms

AC	Average Cost
ATA	Agricultural Transformation Agency
CIAT	Centro International de Agricultural Tropical
CR	Concentration Ratio
CSA	Central Statistical Agency
DA	Development Agent
EARO	Ethiopian Agricultural Research Organization
EC	Ethiopian Calendar
EHDA	Ethiopian Horticultural Development Agency
ERCA	Ethiopian Revenue and Custom Authority
EU	European Union
FAO	Food and Agricultural Organization
FDRE	Federal Democratic Republic of Ethiopia
FGD	Focus Group Discussion
GDP	Gross Domestic Product
GMM	Gross Marketing Margin
GMM_B	Gross Marketing Margin of Brokers
GMM_{CW}	Gross Marketing Margin of Central Wholesalers;
GMM_{FT}	Gross Marketing Margin of Farmer Traders;
GMM_P	Gross Marketing Margin of Producers
GMM_R	Gross Marketing Margin of Retailers;
GMM_{WWS}	Gross Marketing Margin of Woreda Wholesalers;
GTP	Growth and Transformation Plan
HHH	Household Head
IDE	International Development Enterprise
ILRI	International Livestock Research Institute
KII	Key Informant Interview
KM	Kilometer
LIVES	Livestock and Irrigation Value Chains for Ethiopian Smallholders
MFI	Microfinance Institution
MoA	Ministry of Agriculture
NGO	Nongovernment Organization
OBCT	Oromia Bureau of Culture and Tourism
OCSSCO	Oromia Credit and Saving Share Company
OLS	Ordinary Least Square
ORS	Oromia Regional State
PA	Peasant Association
SCP	Structure Conduct and Performance
SD	Standard Deviation
SME	Small and Micro Enterprise
SMS	Subject Matter Specialist
SNNPRS	Southern Nations, Nationalities and Peoples Regional State
SPSS	Software Package for Social Science
TGMM	Total Gross Marketing Margin
TP	Total Product
USD	United States Dollar
VAT	Value Added Tax
WAO	Woreda Agriculture Office
WIDA	Woreda Irrigation Development Authority
WTO	Woreda Trade Office
WWO	Woreda Water Office

Abstract

This study is aimed at assessing vegetable market chain in Dugda Woreda, Oromia Region of Ethiopia focusing on tomato and onion products. Irrigated vegetable production is increasing with population growth and changes in consumption habits in Ethiopia creating business opportunity for many actors along the market chain, despite number of production and marketing constraints. Analysis of marketing performance of vegetable plays an important role in an ongoing or future market development plan. This study aimed at analyzing the market chain of vegetable for Dugda Woreda with the specific objectives of: identifying the key vegetable marketing actors and channels; examining market structure of major actors; assessing the market performance for key vegetable marketing actors and channels by quantifying costs and profit margins; and identifying key production and marketing constraints and opportunities faced by smallholders. The data was generated by household survey using a pre-tested structured questionnaire, key informant interview, focus group discussions, semi structured questionnaires and checklists. This was supplemented by secondary data collected from different published and unpublished sources. The data analyzed using SPSS version 20 and summarized into descriptive formats such as frequencies, percentages, means and standard deviation. Besides, Structure, Conduct and Performance (SCP) model employed to evaluate the structure and performance of vegetable market.

The study finding shows that vegetable market chain actors are broadly classified into three: input suppliers; direct market actors (producers, brokers, farmer traders, wholesalers, retailers and consumers); and enablers (extension service providers & credit providers). Vegetable producers sell their products to different market intermediaries and final consumers. About five vegetable marketing channels were identified. The total amount of vegetable that was transacted through these marketing channels in 2014/15 was 32,010 quintals. Channel II was found to be the dominant marketing channel in terms of volume of vegetable supply, where about 23,752 quintals of vegetable (74.2% of the total vegetable) was supplied to the market. Channel III was the second dominant market supplier, where about 6,786 quintals of vegetable (21.2%) supplied through this channel. The study result also shows that the total gross marketing margin was 30% with producer participation margin of 70%. The market intermediaries incurred different marketing costs such as packing, sorting, transportation, loading and unloading. Central wholesalers obtain relatively highest profit in channel II and III, which amounted to Birr 204,827 and 58,675, respectively. The study result signifies that the first four largest volumes of vegetable purchased by traders (CR_4) constitute 50% of market share, which indicates the market structure for vegetable is strongly oligopolistic. OLS regression results also revealed that there are economies of scale for wholesalers at Meki market, which clearly indicates the presence of barrier to entry/exit for wholesalers in the market. Opportunities identified for vegetable production include: existence of groundwater, convenient agro-ecology and ideally appropriate for agro-processing industries. On the other hand, challenges recognized for vegetable market chain includes: oligopolistic market structure, absence of storage facilities, soil salinity, overutilization of inputs (fertilizers), increasing cost of inputs, lack of improved seeds and chemicals (insecticides and fungicides), price fluctuation, and high market involvement of brokers. Policy implications drawn from the study findings necessitate legalizing and supporting actors in the local vegetable markets, creating access to accurate and regular market information and technical support to producers on crop diversification.

Keywords: *Vegetable, market chain, market margin, Ordinary Least Square, challenges.*

Chapter One

Introduction

1.1 Background of the Study

Ethiopia is a country with a great variety of agro ecological zones that are favorable for horticultural crop production for home consumption and sale, both local and export. Smallholder peasants produce the majority of vegetable. The areas of production and its role to the country's total GDP, still not estimated, are very low. Area covered under vegetable stands at 1.43% of the area under all crops at national level. Moreover, it shows that vegetable production constitutes about 2.95% of the total crop production (Central Statistical Agency, 2013).

The status of vegetable production has been increasing for the last four years of the Growth and Transformation Plan (GTP-I), i.e. from 2010/11 – 2013/14. The GTP-I performance report for the four years for the agricultural sector indicates that vegetable production achieved 42% of the plan and grown by 60.9% (125.3 thousand tons in 2013/14) as compared to the base year 2009/10 (49 thousand tons). Besides, the quintal per hectare yield for vegetable and fruit has increased for two successive years (2010/11 and 2011/12) from the base year 2009/10 and then declined in 2012/13 and 2013/14. Export earnings (value) of vegetable and fruit has increased from 31.7 million dollar (base year of GTP) to 45.7 million dollar in the year 2013/14 (Ministry of Agriculture, 2014).

Vegetable production is becoming an increasingly important activity in the agricultural sector of the country following the development of irrigation and increased emphases given by the government to small scale commercial farmers. A report indicated that the major share of an estimated 1.4 million tons of vegetable and fruits is consumed locally and only 4.5% of the total is exported (Jema, 2008). Ethiopian vegetable and fruits are mainly destined to the regional markets especially neighboring countries like Djibouti and Somalia. About 90% of Ethiopian vegetable and fruit is exported to Djibouti and Somalia even though the value generated from this is too small (Ethiopian Horticultural Development Agency, 2012).

There is a steady improvement in the demand for vegetable both for local and overseas markets. Volume of vegetable export in Ethiopia has improved from 25,300 tons in 2002/03 to 177,623 tons in 2012/13. The value of vegetable and fruit exports increased with an average of 18% during this period and foreign exchange from less than USD 10 to 230.5 million (Ethiopian Revenue and Custom Authority, 2012/13).

Development needs of vegetable in general are inadequately addressed in Ethiopia. At present, efforts have been stepped up to improve and support the sector. The current Growth and Transformation Plan of Ethiopia (GTP) prioritizes intensive production and commercialization of horticulture. Hence, GTP initiates the need to accelerate the development of vegetable and fruits production and clearly mentioned the transformation of the sub-sector from subsistence to commercial and market-oriented agriculture (MoA, 2010).

The expansion of irrigation agriculture in different parts of the country has enabled smallholders to produce vegetable even in dry season. Through irrigation, farmer's per capita production as well as area under vegetable coverage has been increasing (MoA, 2014). These conditions enable smallholders to have better surplus for market. Like most of agricultural products, vegetable production exhibits seasonality in supply. This creates excess supply of vegetable to markets within limited time frames which leads to decline of prices. Furthermore, due to absence of sufficient local markets and efficient marketing system, farmers are obliged to sell their outputs at lower prices (Agricultural Transformation Agency, 2014).

Mendoza (1991) explains the concept of marketing as physical and economic process whereby the goods are transferred from the producer to consumer. Thus, the marketing chain is the path that the goods follow from their source of original production to their ultimate destination for final use. Many marketing channels may exist as there are separate sources and destinations for each item. Furthermore, the author suggests that a specific investigation must be under taken on each case where the objective in every instance is to trace the movement (purchase and sale) of the product from the source of supply to its point of final use.

As far as the status of vegetable production is concerned, Ethiopia has a variety of vegetable crops grown in different agro ecological zones by smallholder farmers, mainly as a source of income as well as for food. According to CSA (2012) the area under these crops (vegetable and root crops) was estimated to be 359,950.13 hectares with a total production of 24,267,581.58 tons in the year 2011/12. Root and tuber crops are by far the dominant product group. Potatoes (32%) stand out as important products, followed by taro/Godere[1](19%), garlic (12%), and onions (nearly 12%). Potatoes are mostly found in the Amhara Regional State (51%) and Oromia (33%). Among small-scale producers of vegetable, Ethiopian cabbage (Kale) takes the higher rate, almost 50%, followed by red pepper with a share of 31% and green pepper 10%.

[1] Godere is a local name for taro.

Smallholder vegetable farms are based on low input – low output production systems. The use of improved seeds and planting material of high yielding varieties and other inputs such as fertilizer and plant protection materials is not common in the smallholder sector. Technical training and extension services on improved crop husbandry techniques are not available. As a result average productivity levels are low in the small scale farming sector (EHDA, 2011). Besides, the productivity of crops is very low as compared to the potential yield obtained in the research centers and on farmers' field technology verification studies. For instance, the productivity of onion and tomato was about 90 and 70 quintals per hectare by smallholders compared to the potential yield of 400 and 350 quintals per hectare in research centers (Dawit *et al,* 2004).

Tomatoes- The cultivated tomato (*Lycopersiconesculuntum* Mill) is the most important and widely grown vegetable in the world. The importance of tomato is increasing these days in Ethiopia. It is widely accepted and commonly used in a variety of dishes as raw, cooked or processed products more than any other vegetable (Lemma, 2002). Same author also show that there is no recorded data on the definite time regarding the introduction of cultivated tomato to Ethiopia. However, cherry type has been growing for long around big cities and in small gardens. The bulk of fresh market tomatoes are produced by small-scale farmers. Farmers are interested in tomato production more than any other vegetable for its multiple harvests, which result in high profit per unit area. Tomatoes vary in visible fruit characteristics important for fresh market and processing values. These include shape, size, color, flesh thickness, number of locules, blossom end shape and fruit quality. The fruits may be globe shaped (Marglobe), oval or flattened (Marmande), and pear shaped (Roma VF), which differ in acceptability in the local and foreign market, quality, and storability.

Onion- Onion, the principal Alliums, ranks second in value after tomatoes on list of cultivated vegetable crops worldwide (Robinowith & Currah, 2002). They also reminded that all plant parts of alliums may be consumed by humans (except perhaps the seeds), and many wild species are exploited by local inhabitants. Careful handling and the choice of suitable storage method for the cultivar type in question are vital to ensure that the product retains its quality until it reaches the consumer. Cosmetic quality is of increasing importance in competitive markets. According to CSA (2003) onion is produced for both consumption and market. Out of a yearly production, 48.2% of onion and 66.7% of tomato utilized for sale.

1.2 Statement of the Problem

Vegetable production has a significant role in reducing poverty through creating new opportunities for poor farmers, improving the nutrition status of the people and employment generation. According to Lumpkin *et al* (2005) cultivation of vegetable allows productive employment as the labor/land ratio is high. Depending on the crop, production of horticulture crops require at least twice the labor, and up to five times the labor days per hectare as compared to cereal crops (ibid). As a result, increasing horticultural productions contribute to commercialization of the rural economy and create many off-farm jobs.

According to Bezabih and Hadera (2007), a production of horticultural product is seasonal and price is inversely related to supply. During the peak supply period, prices decline and vice versa. The situation is worsened by the perishability of the products and poor storage facilities. Thus, 25% of the product is spoiled along the marketing channel.

As far as vegetable production in Dugda Woreda is concerned, seasonality is the major constraint, where surplus at harvest is the main characteristics of the product. According to Mohammed (2011), the major crops (onion and tomato), that farmers grow for market and are the crops for which market volatility is high. The perishability nature of the product on one hand and lack of organized marketing system on the other often resulted in low producers' price during peak harvest season and vice versa. Smallholders supplying vegetable throughout the year in Dugda Woreda, but they could not generate as much benefit from production (ATA, 2014). This might be due to improper understanding of the market situation by smallholder producers and lack of previous study on key market chain actors within the Woreda.

Getachew *et al* (2014) reveals that wholesalers (supplying the bulk to consumers) 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 vegetable are sold to individual consumers through unions via consumer cooperatives (thereby reducing the numbers of middlemen across the market chain). Abraham (2013) found that out of vegetable passing through several intermediaries, little value being added before reaching the end users. Furthermore, the market chain is governed by wholesalers and exporters who have capital advantage over the other chain actors. Hence, farmers are forced to obtain a lower share of profit margin.

Market distortions are common activities of middlemen in price setting. Some vegetable are not creating time value due to their perishability. This enables actors particularly middlemen to cut price, which further reduce producers bargaining power to sell their vegetable at a price convenient for them. Under such circumstances, a study that focused on the analysis of vegetable market chain actors and channels can play substantial role towards the improvement of the existing market situation. In addition, a study on the market information, producer organizations, and structure of the market are important to alleviate the market distortion within the Woreda.

Even though vegetable is economically and socially important, key vegetable marketing actors and channel and their characteristics have not yet been studied and analyzed for the target study area, where great potential of vegetable production exists. Therefore, this study has the purpose of identifying key vegetable marketing actors and channels; investigating market structure of major actors; assessing market performance by quantifying costs and profit margins for key actors in the vegetable market chain. Furthermore, the study assesses opportunities and constraints that smallholder farmers face in the process of production and sell of vegetable. This narrows the information gap on the issue under discussion and contributes to better understand the marketing system for the benefit of smallholder farmers and other development actors involved in the marketing process. It encourages and can be used as an input for other researchers to further investigate the issue under study.

1.3 Objectives of the Study

The overall objective of the proposed study is to analyze the marketing chain of vegetable in Dugda Woreda.

The specific objectives of the proposed study are:

1. To identify key vegetable marketing actors and channels;
2. To examine market structure of major actors;
3. To assess market performance for key vegetable marketing actors and channels by quantifying costs and profit margins and
4. To identify key production and marketing constraints and opportunities faced by smallholders.

1.4 Research Questions

1. What are the key vegetable marketing actors and channels in the study area?
2. What is the structure of market for major actors in the study area?
3. What are the most important actors in the market and who gets the major share of profit margins?
4. What are the major constraints and opportunities for vegetable production and marketing?

1.5 Significance of the Study

This study covers the production of vegetable, and analyzes the performance of market through evaluation of marketing activities along different marketing channels of crop and assessment of opportunities and challenges, which could be a major contribution to formulate appropriate policies and measures. This information could also help to make appropriate decisions by the farmers, consumers, traders, investors, and others who need the information for their own purposes. The study will also inspire researchers to embark upon further studies.

1.6 Scope of the Study

Attempting to analyze the entire market system in the whole country is an impossible action given the limited resources, both finance and time. Thus, the research primarily focuses on the production of vegetable in Dugda Woreda of East Shoa Zone. The type of crops was restricted to onion and tomato for their dominant area coverage of crops in the study area and differences in the perishability. Moreover, these crops pass through a number of marketing channels. Various market levels, role of actors in the channel, market direction, price determination and bargaining characteristics of producers, costs and profit margins and problem and constraints faced in the whole marketing process was investigated.

1.7 Ethical Considerations

An official letter was written from Center for Regional and Local Development Studies, Addis Ababa University and Ministry of Agriculture to respective woreda officers for the facilitation of the study. Oral and written informed consent was secured from study participant before data collection. The study purpose was explained to the study subjects and participation was on voluntary basis. Study participants were clearly informed that they can withdraw from the study at any time if they needed to do so. The right of each respondent to refuse or answer for few or all questions was respected. Names of study participants were not mentioned in the study report to ensure confidentiality.

1.8 Limitation of the Study

During data collection, some actors particularly brokers and wholesalers were not cooperative for interview for fear of legal and other personal concerns. Some of central wholesalers in Addis Ababa provided inaccurate information because they were scared of extra tax from local custom authority. Moreover, few smallholder producers were reluctant to provide interview without a benefit or payment. On the other hand, as onion and tomato constitute more than 95% of vegetable production in the study area, the scope of the study excluded other vegetable production, and thereby the corresponding market chain.

1.9 Organization of the Study

This research contains five chapters. The introductory chapter of the thesis mainly discusses about the background, gaps and the contribution of the study. Chapter two reviews detailed literature on relevant topics on the study of production and marketing of vegetable. Subsequently, methodologies including description of the study Woreda, the research design, population and sampling, data collection, and data analysis techniques are presented in Chapter three. Chapter four explains results and discussion including data presentation which describes the empirical results, findings and discussions of the research by evaluating data collected. Chapter five summarizes the main findings of the study and draws conclusion and appropriate recommendations.

Chapter Two

Literature Review

This section presents basic concepts and definitions of marketing and relevant theories of marketing. Furthermore, it tries to explore the findings of pertinent empirical studies that have been studied previously in the country.

2.1 Theories and Basic Concepts

2.1.1 Market and Marketing Concepts

Different marketing scholars define about market in different ways but encompass nearly similar meaning. A market is a place, a point or sphere within which price-making force operates and exchanges of title tend to be accompanied by the actual movement of the goods affected (Backman & Davidson, 1962). Formerly the term *market* stood for the place where buyers and sellers get together to exchange their goods, like in village square. The concept of exchange and relationships lead to the concept of market. It is the set of the actual and potential buyers of a product (Kotler & Armstrong, 2003). However, conceptually a market can be envisaged as a process in which ownership of goods is transferred from sellers to buyers who may be final consumers or intermediaries. Therefore, markets involve sellers, sales locations, buyers, and transactions (ibid).

Market is a particular group of people, an institution, and a mechanism for facilitating exchange (Johan *et al,* 1988). It also relates the concept of market to the degree of communication among buyers and sellers and the degree of substitutability among goods. Moreover, Bain and Howells (1988) explained market as simple arrangements to facilitate exchange of one thing for another. The most observable features of a market are its pricing and exchange processes and it is more than a physical place. In today's information and communication technologies no need to meet physically for a market to operate.

Still another scholar, Saccomandi (1998), defined market as the exchange, circulation and distribution of commodities between people and places. By agricultural market, Saccomandi (1998) further added to the economic 'place' in which agricultural producers sell the products obtained in their firms with the degree of space, form, and time-related utility required by the buyers.

Kotler's (2003) definition of marketing is widely known as "the 21st century definition of marketing" which runs as follows a social and managerial process by which individuals and groups obtain what they need and want through creating and exchanging products and values with others. Richardson (1986) underscores the fact that little can be achieved by debating on the definition of marketing and

he provides a fairly broad and widely accepted definition of marketing. Thus, marketing includes all activities from the farm gate to final consumer.

According to Lele and Jain (1997) marketing is a philosophy of business, which states that customer want satisfactions, is the economic and social justification for a firms' existence. As a result, all firms' activities must be devoted to finding out what the customers want, and then satisfying those wants while still making a profit over the long run. Marketing in its simplest form is defined as the process of satisfying human needs by bringing products to people in the proper form, time and place (Branson & Norvel, 1983).

The definition of marketing as a process by which individuals and groups obtain what they need and want by creating and exchanging products with values involves work. Marketing is about the flow of goods and services from their point of production to consumption and for marketing of agricultural products begin at the farm when the farmer plans his production to meet specific demand and market prospects (Abbott & Makeham, 1981; Kohls & Uhl, 1985). Marketing means different things to different people. To the house wife it means shopping food; to the farmer it means the sale of his produce; to the fertilizer distributor it means the selling to the farmer (Abbot & Makeham, 1981).

2.1.2 Marketing System

Branson and Norvel (1983) define the marketing system in terms of what is otherwise known as marketing channel. In broad terms, marketing system may be defined as the totality of product channels, market participants and business activities involved in the physical and economic transfer of goods and services from producers to final consumers. Marketing system operates through a set of intermediaries performing useful commercial functions in chain formations all the way from the producer to the final consumers (Islam *et al*, 2001).

There are different marketing systems that could be employed for different commodities under different circumstances. Nabil identifies (cited in Yeshitila, 2012) three ways of marketing for vegetable as well as other cereal crops.

i. **The quota system**: An obligatory delivery system was imposed on certain commodities of greater demand such as rice, wheat or export and industrial crops such as cotton, sesame and onion. Producers were obliged to deliver predetermined quantities of these crops to the state of predetermined prices. This system was common in the command and central planning economic system in Ethiopia.
ii. **The contracting system**: This type of marketing is applied to the agricultural crops and livestock depending on country specific contexts. A written contract is concluded between the producer (the

vendor) and the procurer (who may be an individual or a company); whereby the first party is committed to deliver the second party an agreed quantity of the crop in question at an appointed place and time. This system is recommended in Ethiopia where production is primarily small scale and the marketing infrastructure is not well developed.

iii. **Free marketing**: Many crops, such as vegetable and fruits are marketed freely. The surplus productions of crops are not subjected to quota system rather marketed freely.

2.1.3 Marketing Efficiency

The marketing efficiency is measured in terms of price integration of markets. According to Wolday (1994), Ethiopian grain markets are relatively integrated after the reform. Moreover, the study of Asfaw (1998) indicates that the grain markets in Ethiopia are integrated spatially. On the other hand, although the grain markets have become more integrated, there were high spatial price differentials indicating the inefficiency of the entire grain marketing system (Gebremeskel *et al*, 1998).

Market efficiency is essential in market induced development and key to generating utility and economic growth. In Pareto optimum sense market efficiency can be expressed as the consumer surplus plus producer surplus minus marketing cost (Maria & Oppen, 2004). As volume of marketed crop increases, there are improvements in the system and facilities that in turn improve the market quality of commodities. Because of their perishability that exposes them for easily contamination; vegetable market needs improved facilities and better handling.

According to Jema (2008), an increase in marketed crops calls for larger and improved market facilities. The study further noted that marketing efficiency is measured by comparing the observed output against the feasible (frontier) output. The scarcity of resources is the major factor that makes the improvement in efficiency so important to an economic agent or to a society. In general, marketing efficiency is evaluated based on the gross margin received by the traders. The marketing margin refers to the difference between buying price and selling price. Hence, the more efficient the marketing system is, the smaller the margin. The following are two main issues that should be considered during evaluation of market efficiency. They are technical efficiency and pricing efficiency.

i. **Technical efficiency**: It is concerned with the manner in which physical marketing functions are performed to achieve maximum output per unit of input. Technological changes can be evaluated to determine whether they reduce marketing costs per unit of output. For example, new methods of packing and processing may reduce waste and prevent deterioration in quality (Abbot and Makeham, 1981).

ii. **Price efficiency**: Pricing efficiency is concerned with the accuracy, precision, and speed with which prices reflect consumers' demand and are passed back through the market channels to producers. Pricing efficiency is, thus, affected by rigidity of marketing costs and the nature and degree of competition in the industry. Activities that may improve pricing efficiency are improvement of market news and information, and competition (Cramer & Jensen, 1982). The objective of pricing efficiency is to improve the operation of buying, selling, and pricing aspect of the marketing process, so that it remains responsive to consumer's preference (Kohls & Uhl, 1985).

2.1.4 Marketing Actors

i. **Producer:** It is the first link in vegetable market chain; the producer harvests products and supplies to the second agent. From the moment he/she decides what to produce, how much to grow and when to grow and sale.

ii. **Consumer:** It is the last link in the vegetable market chain, the participants and their respective functions often overlap. The most widespread combinations are the following: producers to wholesalers that collect commodity and supply it to retailers, wholesalers to retailers (wholesalers that also sell directly to consumers) and wholesalers to exporters.

iii. **Rural assembler:** Sometimes also known as farmer trader, he/she is the first link between producer and other middlemen.

iv. **Middlemen/ broker:** A broker is an individual or party that arranges transactions between a buyer and seller for a commission when the deal is executed. A broker also acts as a seller or as a buyer, becomes a principal party to the deal.

v. **Wholesaler:** They concentrate on the various intermediate sized loads and put the product into large uniform units. These activities all contribute to price formation.

vi. **Retailers:** Middlemen that include super market and other large-scale retailer who divides large shipments of produce and sell it to consumers in small units. The basic function they provide is bulk breaking.

2.1.5 Marketing Channel

The term channel is derived from the Latin word *canalis*, which means canal. A marketing channel can be viewed as a large canal or pipeline through which products, their ownership, communication, financing and payment, and accompanying risk flow to the consumer (Backman & Davidson, 1962). A marketing channel is a business structure of interdependent organizations that reach from the point of product origin to the consumer with the purpose of moving products to their final consumption destination (Kotler & Armstrong, 2003). The analysis of marketing channels is intended to provide a systematic knowledge of the flow of goods and services from their origin (producer) to their final

destination (consumer). This knowledge is acquired by studying the participants in the process, i.e. those who perform physical marketing functions in order to obtain economic benefits (Getachew, 2002).

Abbot (1958) also defines marketing channel as the sequence of intermediaries through which goods pass from producer to consumer. This channel may be short or long depending on kind and quality of the product marketed, available marketing services, and prevailing social and physical environment (Islam *et al*, 2001). In passing, it should be noted that many marketing channels might exist, as there are separate sources and/or destinations for each item.

2.1.6 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). According to (CIAT, 2004), 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. 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).

To find out how many traders are operating in the marketing system, and at what point a commodity changes hand, it is helpful to sketch its flow through the marketing chain. The competitiveness of a market and the structure of the marketing chain are obviously related. If at some point in the chain only a single buyer or seller exists, then non-competitive behavior is likely. Alternatively, the presence of many active buyers and sellers all along the chain carries a strong presumption of competitive behavior and efficient market performance. Estimating volumes and percentages of commodity transformations, at each link in the chain provides an overview of the marketing systems (Timmer *et al*, 1983).

Kotler (2003) defines market chain as a longer channel stretching from raw materials to final products that are carried to final buyers. He shortly puts as value-delivery network. According to Hobbs *et al* (2000), the term market 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.

In general, the reviewed literature explained that market chain analysis 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 or declining), approximate total demand in the channel, market constraints and opportunities for the products. Hence, for a clear application and understanding, market chain definitions in this study are framed to mean as follows. Market chain is taken to encompass everything from input supply dawn to consumption, which is comprehensive.

2.2 Approaches to the Study of Agricultural Marketing

According to Johan *et al* (1988), different circumstances involved in the supply and demand of agricultural products, and the unique product characteristics, require a different approach for analyzing agricultural marketing problems. The most commonly used are functional, institutional and commodity approaches.

2.2.1 Functional Approach

Functional approach studies marketing in terms of the various activities that are performed in getting farm product from the producer to the consumer. These activities are called functions (Cramers & Jensen, 1982). According to Kohls and Uhl (1985), functional approach is to break up the whole marketing process into specialized activities performed in accomplishing the marketing process. The approach helps to evaluate marketing costs for similar marketing middlemen, different commodities and costs and benefits of marketing functions (Kohls & Uhl, 1985; Andargachew, 1990). The widely accepted functions includes; 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.

2.2.2 Institutional Approach

Institutional approach mainly focuses 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). An institutional approach for the marketing of agricultural product should be instrumental in solving the three basic marketing problems, namely consumers' demand for agricultural products, the price system that reflects these demands back to producers and the methods or practices used in exchanging title and getting the physical product from producers to consumers in the form they require, at the time and place desired (Johan *et al*, 1988).

2.2.3 Commodity Approach

In a commodity approach, a specific commodity or groups of commodities are taken and the functions and institutions involved in the marketing process are analyzed. This approach focuses on what is being done to the product after it transfers from its original production place to the consumer (Kohls & Uhl, 1985).

Among the above listed approaches, this study applied the commodity approach as a guideline because it helps to pinpoint the specific marketing problems of each commodity as well as improvement measures. The 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.

2.3 Framework for Evaluation of Marketing System

The development of reliable and steady market system has been an important element in commercialization and specialization in the agricultural sector. In order to study the functioning of markets many researchers have applied the Structure-Conduct-Performance (SCP) paradigm. The SCP approach was developed in the United States as a tool to analyze the market organization of the industrial sector and it was later applied to assess the agricultural system and this framework was to evaluate the performance of industries in the USA (Meijer, 1994). Subsequently, it was applied in the functioning of markets in agricultural sector, and served as a tool to evaluate the performance of the commercial system (Girma, 2002).

The fundamental view of this approach is that, given certain basic conditions, the structure of an industry or market determines conduct of buyers and sellers which influence its performance. The basic conditions refer to characteristics which are exogenous to the market, for example infrastructure, legal and policy environment and available technology. Efficiency factors can be evaluated by examining marketing enterprises for structure, conduct and performance (Abbott & Makeham, 1981). SCP model is 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 & Kydd, 1992). This analytical method is based on the theory that market structure and conduct determine the performance of a marketing system.

2.3.1 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 (Branson & Norvell, 1983; Cramer & Jensen, 1982; Abbott & Makeham, 1981). 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).

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/exit, economies of scale, and assumptions about rival firms' behavior, was relevant in determining the degree of concentration, relationship between concentration and behavior and performance (Schere, 1980).

The study of Wolday (1994) on the food grain market indicates that from the total volume purchased, four of the first four big traders (CR_4) had 35% market share. Gebremeskel, *et al* (1998) reveals that in 25 markets in Ethiopia, the first four big grain traders (CR_4) had a market share of 32.58%. In both cases the result indicated a weak oligopoly.

2.3.2 Conduct of the Market

The structure and conduct of market participants have a direct implication for the nature of production and price relationships between different marketing levels and the direction of causality.

Market conduct refers to the practices or strategies of traders in maximizing their profits. Among these practices are the use of regular partners, long-term relations with clients, and suppliers, the use of intermediaries, and trade within personalized networks (Wolday, 1994). Market conduct deals with the behavior of firms that price-searchers are expected to act differently than those in a price-taker

type of industry (Cramers & Jensen, 1982). Price searchers can determine their selling prices or quantity of output they sell. In addition, they could use their market power to weaken or eliminate competitors by reducing price (Rehima, 2007).

The specified structural features of homogeneous product and free entry and exit require a form of conduct such that each firm must operate as if in isolation. The market behavior of firms determines whether or not they compete and whether they are acting innovatively to improve market efficiency. Informal association between even a small numbers of firms (collusion) can cause price distortions and seemingly independent firms can have joint ownership (subsidiaries) (Staal, 1995).

Meijer (1994) reveals that, conduct is pattern of behavior which enterprises follow in adopting or adjusting to the market in which they sell or buy, in other words it refers to the strategies of the actors operating in the market.

2.3.3 Performance of the Market

Performance of the market is reflection of the impact of structure and conduct on product price, costs and the volume and quality of output (Cramers & Jensen, 1982). If the market structure in an industry resembles monopoly rather than pure competition, then one expects poor market performance.

Abbott and Makeham (1981) reveal further as 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, are strongly influenced by the structure of the relevant markets (Scarborough & 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).

2.3.3.1 Marketing Costs

Marketing costs 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 & Ehui, 2002).

2.3.3.2 Marketing Margin

It is a commonly used measure of the performance of a marketing system (Abbott & 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 & Jensen, 1982; Wasiam & 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 up on the marketing costs as well as on the selling and buying prices (Mendoza, 1995).

The marketing margin in an imperfect market is likely to be higher than that in a competitive market because of the expected abnormal profit. But marketing margins can also be high, even in competitive market due to high real market cost (Wolday, 1994).

There are three methods generally used in estimating marketing margin, which consist of:

i. Detailed analyses of the accounts of trading firms at each stage of the marketing channel (time lag method);
ii. Computations of share of the consumer's price obtained by producers and traders at each stage of the marketing chain; and
iii. Concurrent method: comparison of prices at different levels of marketing over the same period of time (Mendoza, 1995; Scarborough & Kydd, 1992).

2.4 Characteristics of Vegetable Marketing

Being produced both by commercial and smallholder farmers vegetable marketing is influenced by a number of factors that can be attributed to production, product, and market characteristics. Kohl and Uhl (1985) identify these attributes as:

2.4.1 Perishability

Vegetable are highly perishable, they start to lose their quality right after harvest and continued throughout the process until it is consumed. For this purpose elaborated and extensive marketing channels, facilities and equipments are vital.

Perishability behavior of vegetable exposed the commodity not to be held for long periods and fresh produce from one area is often sent to distant markets without a firm buyer or price. Prices may be negotiated while the commodities are en route, and they are frequently diverted from their original destination of a better price can be found. Sellers might have little market power in determining a price. As a result, a great deal of trust and informal agreements are involved in marketing fresh vegetable. There could not always be time to write everything down and negotiate the fine details of a trade. The urgent, informal marketing processes often leads to disputes between buyers and sellers of fresh vegetable and fruits. Producers are normally price takers and are frequently exposed for cheating by any intermediary.

2.4.2 Price /Quantity Risks

Due to perishable nature and biological nature of production process there is a difficulty of scheduling the supply of vegetable to market demand. The crops are subjected to high price and quantity risks with changing consumer demands and production conditions. Unusual production or harvesting weather or a major crop disease can influence badly the marketing system. While food-marketing system demands stable price and supply, a number of marketing arrangements like contract farming provide stability.

2.4.3 Seasonality

Vegetable have seasonal production that directly influencing their marketing. Normally they have limited period of harvest and more or less a year round demand. In fact, in some cases the cultural and religious set up of the society also renders demand to be seasonal. This seasonality also worsened by lack of facilities to store.

2.4.4 Product Bulkiness

Since water is the major components of the product, it makes them bulky and low value per unit that is expensive to transport in fresh form every time. This, therefore, exposed farmers to lose large amount of product in the farm unsold.

These listed characteristics of the product require a special complex system of supportive inputs. It demands a regular marketing preparation process like washing, cooling, proper management from the time of harvest until the produce is put on display. It is frequently believed a vegetable not only remain attractive to the consumer it must also have a shelf life of few days after having purchased by the consumer (Nonnecke, 1989).

Improving vegetable marketing in developing countries is vital for a number of reasons: rapid increase in demand from growing domestic urban populations, opportunities to earn foreign exchange by exporting high value-off-season produce; the income raising opportunities it offers to small farmers and the contribution to employment made by its labor intensive production, handling and sales requirement are some to mention (Abay, 2007).

Horticulture production is profitable. Farmers involved in horticulture production usually earn much higher farm income as compared to cereal producers. Cultivation of fruits and vegetable allows for productive employment where the labor/land ratio is high, since horticultural production is usually labor intensive. Increasing horticulture production contributes commercialization of the rural economy and creates many off-farm jobs. However, expanding the scale of horticulture production is often hindered by lack of market access, market information, and many biological factors (Weinberger & Lumpkin, 2005).

Ideally, measures commonly recommended for the improvement of vegetable marketing are better packaging, handling, and transport; sorting by quality; extending the market season and leveling out gluts and market delivery planning and storage; developing new markets; installation of refrigerated transport and processing equipment: and establishing marketing enterprises.

In general from the reviewed literatures the main problems encountered in vegetable production in Ethiopia are like lack of improved varieties, seasonal price fluctuations, harsh production seasonality, prevalence of pest and diseases, poor pre-and post-harvest handling, poor qualities of product and lack of storage are some of them.

2.5 Review of Empirical Studies

2.5.1 Agricultural Product Marketing

Many scholars conducted research on marketing of agricultural commodities using market concentration ratios, marketing costs and margins and profit analysis. The result indicates that margin and profit received by marketing actors and level of market efficiency varied with respect to location and size of marketing channel. Scott (1995) uses marketing margin analysis on potato marketing in Bangladesh and found out that producer's price and margin were 1.27 and 67% respectively. Ayelech (2011) employs marketing margin analysis on fruits marketing chains in *Goma woreda* in Oromia region Ethiopia and revealed that processors (juice house) received the highest (88.73%) marketing margin and producers received the least (11.27%) marketing margins in avocado and mango trade business. Solomon (2004) using marketing cost and margin analyzed performance of cattle marketing system in *Borena* and found that butchers at Addis Ababa (*Kera*) market received relatively a larger share from total gross marketing margin (69.5%, 63.4% and 61.6%) for cattle supplied from *Yabelo, Negelle* and *Dubluk* markets, respectively. Concerning producers' portion, he found that the highest percentage was found for cattle supplied from *Dubluk* market (21.9%), followed by *Negelle* and *Yabelo* with gross margins of 20.6% and 18.6%, respectively.

2.6 Conceptual Framework

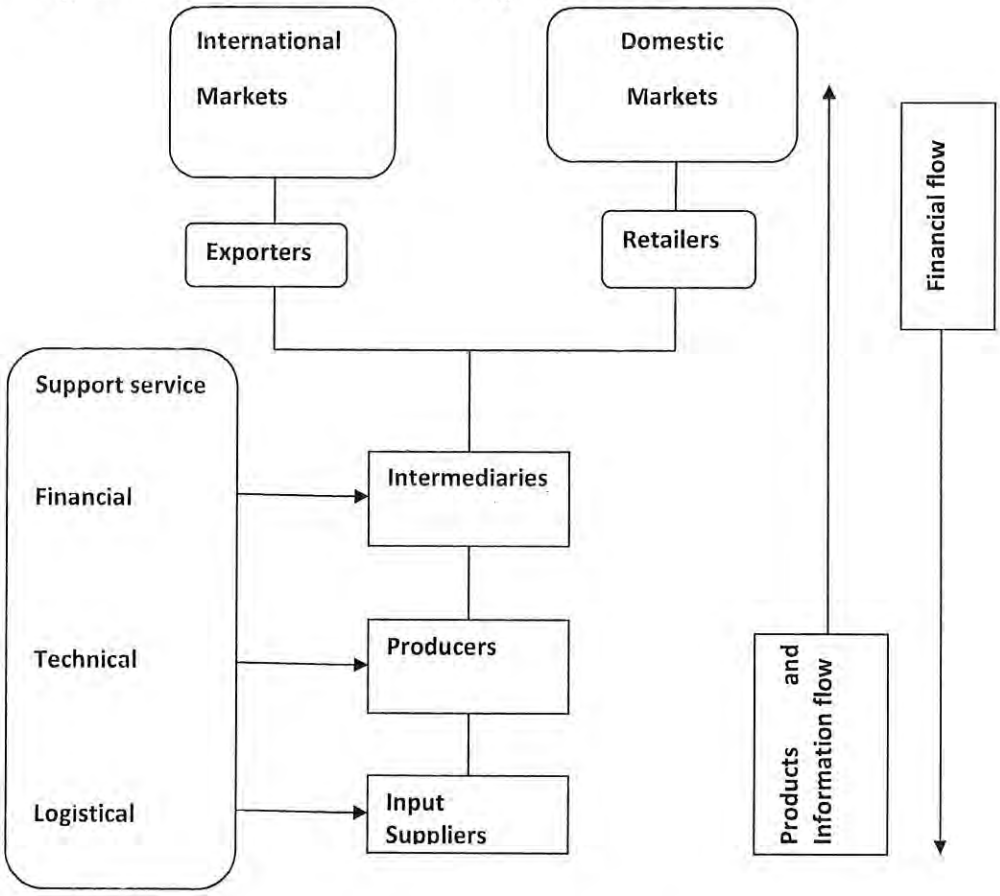
The identification of actors and channels related to marketing and participation of vegetable producers in the market chain is presented in a conceptual framework. Based on theoretical concepts and empirical studies in vegetable sectors, a framework is prepared in figure 1. As shown in the figure, the production and market chain of vegetable is a vertical alliance of enterprises collaborating to varying degrees along the range of activities required to bring a product from the initial input supply stage, through the various phases of production, to its final market destination. For this reason, vegetable market chain means that a vegetable product moves from smallholder producers that grow and harvest vegetable to the market through intermediaries including producer organizations, intermediaries (brokers, wholesalers, exporters, transporters, and retailers) and up to the final consumers. For efficiency of vegetable transaction actors require financial, technical and logistical support services. Besides, products and information flow from producers to intermediaries where as flow of finance from intermediaries towards producers.

Market chain covers the activities from the stage of vegetable harvesting until it reaches the point of consumption. This involves various actors either in local, regional, national or international level. The major driving factors in the domestic market for vegetable is the profit margin obtained; value added

practices and security of income, while at the international markets more emphasis is on the quality of the produce. Smallholder producers have to comply with these standards to access the international markets. Nevertheless, income security and the profit margin are also the driving factors in the international markets. Poor quality and lower scale of production has been the factors hindering the smallholder farmers to reach the international markets easily while intensification and improved production level, upgrading activities in the processing may help the farmers to have direct contact with the domestic and international markets. Moreover, it also helps them to get a higher profit margin thereby improving their livelihood conditions.

Accordingly, this study confines to marketing chain aspects of Dugda Woreda and the largest domestic market destinations in Addis Ababa. This is for the reason that large volume of vegetable products from the study area channeled to Addis Ababa (central market) where potential consumers existed.

Figure 1: Conceptual Framework on Vegetable Market Chain



Source: Adopted from World Bank (2010) with modification

Chapter Three

Methodology

The methodology aims at outlining all methods, materials and procedures used in the study. Firstly, it presents the general description of the study area. Secondly, it details the types and sources of data, sampling procedures and method of data analysis.

3.1 Description of the Study Area

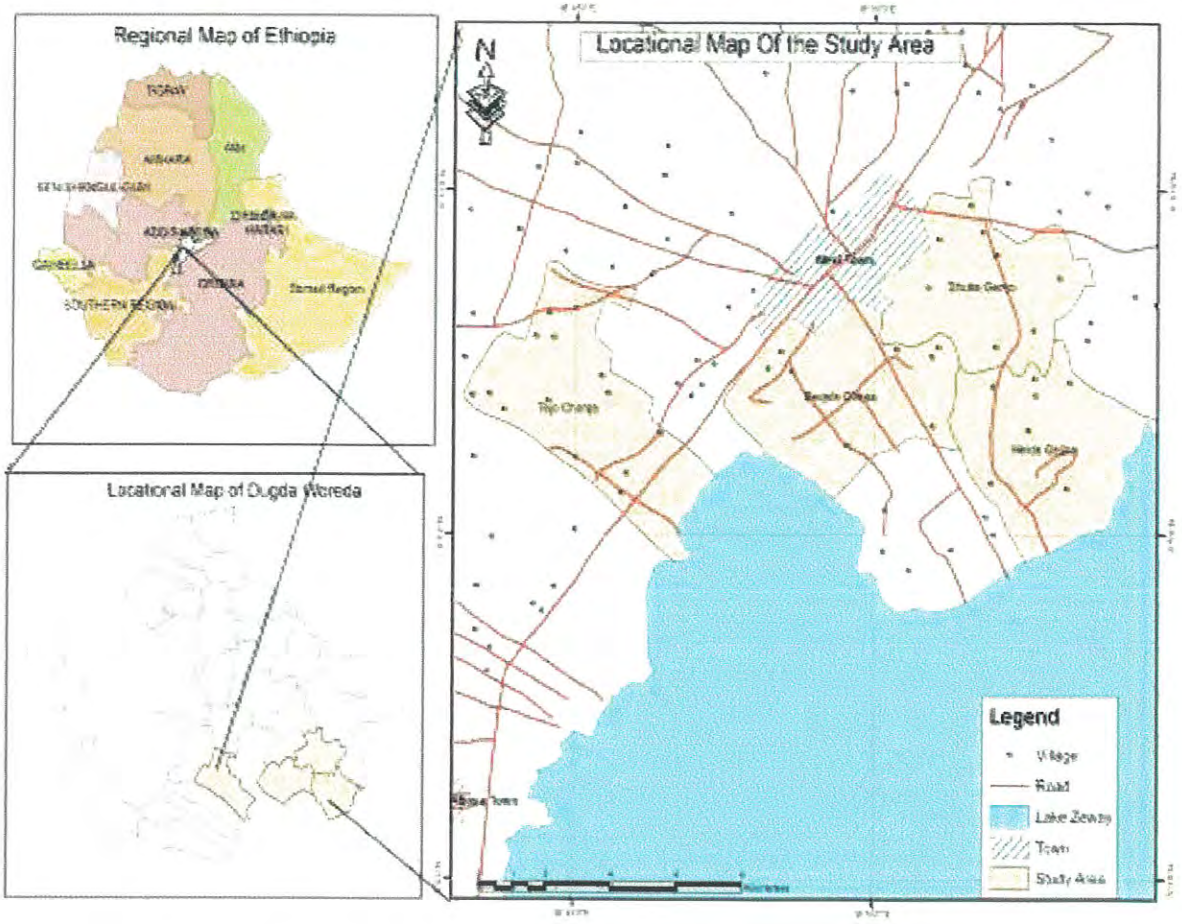
This section captures the physical and natural features of Dugda Woreda. It also elaborates the topographic and natural features land use and ecological features.

3.1.1 Location, Population and Physical Features

East Shoa zone has thirteen Woredas with a population of less than a million and Dugda Woreda is one of and predominantly well known for its vegetable production (CSA, 2015). The Woreda is selected purposively for the reason that all key marketing actors are involved in channeling of vegetable products mainly to eastern and central markets of the country.

Dugda Woreda is located in East Shewa Zone of Oromia Regional State. Geographically the Woreda is located between $8^0$01'N to $8^0$10'North latitude and $38^0$31'E to $38^0$57'E longitude. The total area of the Woreda is 959.45 km^2. The Woreda has 36 rural Kebele Administrations and four urban kebeles. Meki, the main capital of the Woreda, is located 134 km to the South East of Addis Ababa on the main asphalt road to Ziway town. Meki town has three urban Kebeles, namely; 01, 02 and 03. The boundaries of the Woreda are Bora Woreda in the North and North West, Arsi zone in the East, Adami Tulu Jido Kombolcha Woreda in the South and Gurage zone of SNNPRS in the West (WAO, 2014).

Figure 2: Map of Study Area



Source: Agricultural Investment Agency, 2015

According to the National Housing and Population Census, population projection of the year 2015, the population of the woreda was 185, 534 of whom 95,095 (51.3%) are men and 90,439 (48.7%) are women. Moreover, 53,314 (29%) of its population are urban dweller and the remaining 71% of its population are rural inhabitants (CSA, 2015).

The 2007 National Housing and Population Census indicated that there were 27,613 migrant people living in the Woreda that came from different parts of the country. Of the total migrants, 51% were male and 49% female. About 62% of the migrants live in rural areas while 38% live in urban areas engaged in different activities (CSA, 2007).

The altitude of the Woreda varies from 1600 meters to 2020 meters above sea level. The highest part of the Woreda lies towards the West along the border of Gurage zone. Mount Bora is the highest peak of the Woreda which is about 2020 meters above sea level. The physical feature of the Woreda is 97.14% flat land while the remaining 2.86% is mountainous. The agro-ecology of the Woreda is 55% Kolla (Wet Desert) and 45% Weyna Dega (Moderate Highland Dry) (WAO, 2014).

The two major types of soil in the Woreda are Sandy Loam (59%) and Clay Loam (41%). These soil types have light texture making them vulnerable to both wind and soil erosions. In addition, these soil types are saline and alkaline contents, though the degree of salinity is very low (ibid).

3.1.2 Climate and Water Resources

3.1.2.1 Rainfall Pattern and Temperature

Agriculture in Dugda Woreda is mainly rain fed. The major rainy months are June to August. Farmers cultivate their land during this season using rain. However, there are irregularities of rainfall in the Woreda. The average annual rainfall in the Woreda was 671.8mm in the past twenty years. The minimum rainfall recorded were 282.7mm in 1990, 418.3mm in 1991 and 458.6mm in year 2009. As a result, there were food shortages during these years in the Woreda due to low crop production. Between years 1994-1996 as well as years 1998-2001 and years 2003-2008 the rainfall pattern improved, though with some irregularities such as late set-ins and early set-offs particularly during flowering period. The maximum rainfall recorded was 915.4 mm in 2003 (International Development Enterprise, 2011).

In the past two decades the average maximum temperature of the Woreda was 24.8^0C and the average minimum temperature was 11.4^0C. On average, this trend in temperature could be taken as suitable for crop production, animal husbandry and human habitation (ibid).

3.1.2.2 Water Resources

i. Rivers

There are the two major rivers in the Woreda, specifically Meki and Kata. Meki River starts from the highlands of Gurage zone crosses the Woreda and ends in Lake Ziway. Similarly, Kata River begins from Abura, the highlands of Arsi zone, crosses Burka Dembel and Derara kebeles of the Woreda and ends in Lake Ziway (Oromia Bureau of Culture and Tourism, 2011).

ii. Lake

The Woreda has one of county's major rift valley Lakes i.e. Lake Ziway. Lake Ziway covers an area of 434 km^2; it is the largest of the middle Rift Valley cluster of lakes as well as the shallowest lake with a minimum and maximum depth of 2.5 and 8 meters, respectively. The catchment area of the lake is 7,025 km^2 and is fed by a number of rivers of which the major ones are Meki and Kata Rivers. The outflow of the lake is carried by the Bulbula River and ends in Lake Abayata. The shores of the lakes are marshy, shaded by sycamores and reeds that provide a feeding ground for aquatic birds. Some of the water birds, which frequent found at the lake, include cormorants, darts, herons, great white pelicans and marabou strocks and others. There are an estimated number of more than 20,000 birds seasonally visiting the area (OBCT, 2011).

The lake has plenty of hippos in it, and has a healthy population of birds. With large numbers of Tilapia nilotica, a fish that can weigh up to 1.5 kg, the fishing industry does well here and the fish are served fresh in many of the restaurants in nearby towns. The fish also attract a large number of water-associated birds, which can be seen in the reed-lined fringes of the lake (ibid).

Even though lake Ziway has a sizable amount of fish, unregulated fishing practices by the surrounding communities, often using sub-standard equipments has led to increased depletion of these fish resources. In addition to fishery, the lake also serves as main source of water supply for Ziway Town. Moreover, the lake also serves agricultural production, where there are many irrigation plots using water pumps for vegetable, fruit and flower production (ibid).

The lake has five Islands, including Gelila and Debire Tsion (Tullu Gudo) Islands which have 16^{th} century built Orthodox Churches. The historical monastery of Debre-Tsion Mariam and Zaye ethnic group are among the popular tourist attractions of these islands. Tullu Guddo is accessible by boat both from eastern and western shores. Lake Ziway suffers from siltation and diminishing water size mainly caused by soil erosion in upstream areas, particularly by run downs of Meki and Kata rivers. As a result the size of water is threatened to diminish over time that calls for watershed management interventions (ibid). These could have affected the smallholders in production of vegetable for using the lake through canal.

iii. Groundwater Resources

The Woreda has also ground water resources. The average depth of ground water is 15 meters for shallow wells and 43 meters for deep wells. The existing functional water supply schemes are 76 shallow wells, 3500 hand dug wells, 45 deep wells and 4 water distribution points. The safe water supply coverage of the rural areas of the Woreda was 70% in fiscal year 2003 E.C (WWO, 2011).

3.2 Types and Sources of Data

Creswell, J. (2009) noted that a mixed method of research design is useful when either the quantitative or qualitative approach by itself is inadequate. This method can provide to understand the research problems though extra time needed to collect and analyze both quantitative and qualitative data. Quantitative data, often involves random sampling, so that each individual has an equal probability of being selected, and sample can be generalized to the larger population of the target area. For a qualitative data collection, purposeful sampling is used so that individuals are selected since they have experienced the central phenomena (ibid). It is important to recognize both quantitative and qualitative techniques that play useful and complementary role in improving the breadth and depth understanding of the study in a given area.

Accordingly, both primary and secondary data was used to deal with the objectives of the study. The primary data was collected using household survey. For primary data collection a combination of qualitative and quantitative methods was used. The quantitative data was collected using household survey. For household questionnaire survey a total sample size of 190 respondents comprising of 136 farmers, 4 farmer traders (assemblers), 8 woreda wholesalers, 10 woreda brokers, 10 woreda retailers, 6 central wholesalers and 6 central brokers and 10 central retailers took part. For qualitative data a single Focus Group Discussion (FGD) per kebele with producers at sampled PAs were conducted. On Average 8 persons participated in the FGD.

For primary data collection the study used two kinds of sources; (1) Survey questionnaire for vegetable producers and actors from Meki town and Addis; (2) Focus group discussion with farmers. The survey questionnaires were designed to explore vegetable production, marketing, product follow and distribution, marketing costs and margins. To complement the structured survey focus group discussion was conducted with relevant vegetable market chain actors. Moreover, personal observation and KII were also conducted to triangulate with the structured survey questionnaire.

Secondary data was gathered from different sources such as; government institutions, Woreda Irrigation and Development Authority, Woreda Agricultural Office, survey reports, annual reports, bulletins and websites. Published and unpublished documents were also comprehensively reviewed to secure relevant secondary information.

3.3 Sampling Methods

Preliminary information about the study area was obtained from Woreda Irrigation and Development Authority (WIDA) to generate important information for questionnaire preparation for the household survey and to select sample PAs. Attempts were made to select representative samples in the selection of randomly sampled PAs, vegetable producers (tomato and onion) and traders. The surveyed vegetable producing PAs were Shubi-gamo, Welda-kelina, Bekele-girisa and Tepo-choroke.

3.3.1 Producers Survey

In this study a multi stage sampling procedure was followed in order to collect data from representative samples that would help reflect the situation of vegetable market chain of specific commodities (tomato and onion). Accordingly, from 36 PAs in the Woreda only 18 PAs practiced irrigated agriculture to produce vegetable. First, by employing purposive sampling method Dugda Woreda is selected. In the second stage, four PAs were selected randomly from 18 PAs. Then, 140 vegetable producers were selected from identified four PAs using Systematic Random Sampling from which 136 valid cases were obtained. Then by employing Probability Proportional to Size (PPS) number of smallholder farmers to be taken from each PAs is determined from producers' stratum until the required sample size was achieved (Table 1). Primary data were largely collected from households and key informants using questionnaire and interview guides, respectively. The data were collected on March 25 – April 08, 2015.

The determination of sample size was resolved by means of Slovin's sampling formula as cited on Ayelech (2011) with 95 percent confidence level.

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

Where,

n= sample size for the research use

N= total number of HHHs in tomato and onion producing PAs

e = level of precision (error level) at 95% confidence level (0.05)

Therefore:

$$n = \frac{430}{1+430\,(0.05)^2} = 207$$

As per the above formula the sample size (n) computed was 207 sample households. However, Cochran (1963:75): cited in Glenn (1992) described when the target population is large in the study area finite population correction for proportions was applied to reduce sample size slightly. This is because a given sample size provides proportionately more information for a small population than for a large population.

Hence, target population in the study area and the sample size (n_0) can be adjusted using the following formula.

$$n = \frac{n_0}{1+\left(\frac{n_0 - 1}{N}\right)} \quad \ldots\ldots (2)$$

Where, n = is the sample size

N = target population size

n_0 = adjusted sample size computed using previous equation

$$n = \frac{207}{1+\frac{207-1}{430}} = 140$$

Therefore, this study captured a total of 140 randomly selected households, from which 136 valid cases were obtained out of the total of 430 vegetable producing households (onion and tomato) with in the study Woreda to get statistically representative and sound results. Then, the calculated sample size was distributed proportionally to randomly selected PAs.

Table 1: Sample distribution of smallholder producers

S/No	Name of sample kebeles	Population	Sample
1	Shubi-gamo	140	46
2	Welda-kelina	120	39
3	Bekele-girisa	114	37
4	Tepo-choroke	56	18
Total		430	140

Source: Computed from WIDA and PAs, 2015

3.3.2 Traders Survey

The place for trader surveys was market towns in which a good sample of tomato and onion traders existed. On the basis of flow of tomato and onion, two markets namely Meki town and Addis Ababa, Piassa Atikilt Tera were selected purposively.

Vegetable traders such as brokers, farmer traders (assemblers), woreda and central wholesalers, and woreda and central retailers were sampled at town of Meki and Addis Ababa Piassa Atikilt Tera respectively by employing snow ball sampling techniques. Because of the limited number of wholesale traders in the woreda the sample exhaustively contained almost all vegetable wholesalers from Meki town. In total 136 vegetable producers; 4 farmer traders (assemblers); 8 woreda wholesalers; 6 central wholesalers; 10 woreda brokers; 6 central brokers;10 woreda retailers and 10 central retailers from Meki town and Addis Ababa, Atkilt Tera market were interviewed making a total number of 190 respondents for the study.

3.4 Methods of Data Collection

Primary data were collected using seven enumerators who have college diploma and above was recruited and trained for data collection purpose. The selected enumerators have been working in the Woreda Irrigation and Development Authority Office and as development agents in those selected PAs. Before data collection, the questionnaire was pre-tested on six farmers and two traders to evaluate the appropriateness of the design, clarity and interpretation of the questions, relevance of the questions and time taken for an interview. Hence, appropriate modifications and corrections were made on the questionnaire. Data was collected under continuous supervision of the researcher.

The filled-in interview schedule was thoroughly checked for completeness and exactness. Similarly, an informal survey was employed to study the marketing systems of vegetable for the purpose of triangulation and to obtain additional supporting information for the study.

Purposive sampling was employed to collect data from knowledgeable people like elders, youth, and women farmers and responsible persons of different institutions on the subject covering from PAs in Dugda Woreda to the central market at Addis Ababa. The discussions were thus held to access community level information through grounded theory which entailed collection of relevant data until attainments of theoretical saturation (Haggablade & Gamser, 1994; Heisman, 1995). Thus, FGD was held in groups based on pre-determined discussion guides and key informants are interviewed from different organizations and institutions. Duly, the data generated at various levels was supported by field observations and triangulated with other data.

3.5 Method of Data Analysis

Primary data was entered in the SPSS spreadsheet and cleaned for irregularities. The cleaned data was summarized into descriptive format in terms of frequencies, percentages and central tendencies. Moreover, the software was employed to analyze the least square regression (OLS) for determination of economies of scale for marketing intermediaries (actors). Based on the primary data, average prices at different market levels were estimated, after which average price margins for different market intermediaries were computed.

3.5.1 Descriptive Analysis

The study used ratios, percentages, means and standard deviation in the process of examining and describing marketing functions, facilities, services, role of intermediaries, market and traders characteristics. Furthermore, Ordinary Least Square (OLS) regression was conducted in order to determine the existence of economies of scale for identified key actors at Woreda market.

3.5.2 Structure, Conduct and Performance (S-C-P) Model

The model was employed to examine the fundamental relationships between market structure, conduct and performance, and is usually referred to as the Structure, Conduct, and Performance (S-C-P) model. Wolday (1994), Rehima (2007) and Ayelech (2011) also used this model to evaluate food grain, pepper and fruit market respectively. Therefore, the study used S-C-P model to evaluate structure and performance of vegetable (tomato and onion) market in the study area.

3.5.2.1 Market Concentration Measure

Concentration ratio is a way of measuring the concentration of market share held by particular suppliers in a market. It is the percentage of total market sales accounted for by a given number of leading firms. Hence a four-firm concentration ratio is the total market share of the four firms with the largest market shares. The greater degree of concentration is the greater the possibility of non-competitive behavior existing in the market. For an efficient market, there should be sufficient number of firms (buyers and sellers).

$$C = \sum_{i=1}^{r} S_i \qquad r = 1, 2, 3..., r \qquad \text{..... (3)}$$

Where, C- is concentration ratio, S_i- is market share of the i^{th} firm and

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

Kohl and Uhl (1985) suggest that as rule-of-thumb, a four largest enterprise concentration ratio of 50% or more is an indication of 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). Oligopoly is a market structure in which there are a few large firms and entry is difficult but not impossible. Oligopolies can produce identical products or differentiated products. Oligopoly is different from other market structures because firms are interdependent: any action taken by one firm usually provokes a reaction by other firms. Accordingly, concentration ratio was computed for this study and based on result the structure of market determined.

3.5.2.2 Barriers to Entry

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 centre 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, education, capital access, barriers to entry/exit 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 the number of consumers and producer, in particular times and places (Scarborough & Kydd, 1992).

3.5.2.2.1 Economics of Scale

The barrier to entry that is often critical importance in developing countries is scale economies (Pomeroy and Trinidad, 1994). The study examined if there was a barrier to entry by interviewing market actors. The existence of economic scale is a condition permitting relatively large firms to market their product at considerably lower average costs than smaller firms (Pomeroy and Trinidad, 1994). In this study we examine the presence of scale economies by examining the average cost function associated with the firm's marketing activities. For this we need to collect data on total product handled, marketing cost such as transportation,

storage, loading, cleaning and packaging costs, etc. Difference in economics of scale is done using least square regression (OLS) of the form:

$$AC_i = \alpha + \beta Q + \varepsilon \quad \ldots\ldots (4)$$

Where, AC is average marketing cost per kilogram and Q is the total product handled by the firm i and ε is the error term. If AC_i is related negatively to total product Q, it implies that there is economics of scale (Pomeroy and Trinidad, 1994).

3.5.2.3 Estimation of Marketing Costs and Marketing Margin

Different types of marketing costs (including transport, wastage loss, storage, and loading/unloading) relating to transaction of vegetable for producers and each traders (farmer traders, woreda wholesalers, woreda retailers, central wholesalers and central retailers) were collected per kilogram basis.

The term marketing margin commonly refers to the difference between producer and consumer prices of an equivalent quantity and quality of a commodity (Tomek & Robinson, 1990). It is a price charged for providing a mix of marketing services such as assembling, transportation, handling, packing, sorting, storage etc. plus profit. For this study the definition was used for estimating of marketing margin in the study area.

Computing the total gross marketing margin (TGMM) is always related to the final price paid by the end buyer (consumer) and is expressed as percentage (Mendoza, 1995). Marketing margins for the various vegetable traders were estimated using the following formulas.

$$TGMM = \frac{\text{Retailing price} - \text{Farm gate price}}{\text{Retailing (Consumer) price}} \times 100 \quad \ldots\ldots (5)$$

$$GMM_B = \frac{\text{Broker price} - \text{Farm gate price}}{\text{Retailing (Consumer) price}} \times 100 \quad \ldots\ldots (6)$$

$$GMM_{FT} = \frac{\text{Farmer trader price} - \text{Brokers price}}{\text{Retailing (Consumer) price}} \times 100 \quad \ldots\ldots (7)$$

$$GMM_{WWS} = \frac{\text{Woreda wholesalers price} - \text{Farmer trader price}}{\text{Retailing (Consumer) price}} \times 100 \quad \ldots\ldots (8)$$

$$GMM_{CW} = \frac{\text{Central wholesalers price} - \text{Woreda wholesalers price}}{\text{Retailing (Consumer price)}} \times 100 \quad \ldots\ldots (9)$$

$$GMM_R = \frac{\text{Retailing price} - \text{Wholesalers price}}{\text{Retailing (Consumer) price}} \times 100 \quad \ldots\ldots (10)$$

$$GMM_P = 100\% - TGMM \quad \ldots\ldots (11)$$

Where;

TGMM is the total gross marketing margin;

GMM_B is the percentage of total gross marketing margin received by brokers;

GMM_{FT} is the percentage of total gross marketing margin received by farmer traders;

GMM_{WWS} is the percentage of total gross marketing margin received by woreda wholesalers;

GMM_{CW} is the percentage of total gross marketing margin received by central wholesalers;

GMM_R is the percentage of total gross marketing margin received by retailers and

GMM_P is the producer gross marketing margin.

Mendoza (1991) reveals that changes in marketing margins (price elasticity in supply and demand for the product) do not affect producers and consumers in the same way. As demand becomes more elastic and the supply more inelastic, the increase in the margin will be weighted more heavily against producers and their selling price will be affected more. But, as demand becomes more inelastic and supply more elastic, increases in the total marketing margin will have greater impact on consumers (ibid). Thus, the price changes are not necessarily equally distributed between marketing participants. Accordingly, in this study margin for key actor was computed to determine the marketing margin of different intermediaries.

Chapter Four

Results and Discussion

4.1 Socio-Demographic Characteristics of Smallholder Farmers

This section presents demographic characteristics of smallholder farmers, types of market and production of vegetable in Dugda Woreda.

4.1.1 Demographic Characteristics of Sample Households

This sub-section explains the profile of sampled respondents with regard to their age, sex, family size, and experience, level of education, dependency ratio, access to extension services, access to roads and access to markets. There were only eight female headed households from the 140 sampled producers, which is higher than what Bezabih and Hadera (2007) report; only two female households have participated from the total of 141 respondents.

4.1.1.1 Age of the Households

The survey on this demographic factor, measured in years, provided a clue on working ages of households. The average age of the sample households was 34 years (Table 2).The sampled households have a range of 50 years where largest proportions of the household head lie within a productive age with a median of 33 years (Annex8). The survey result further indicated 43.4% of the producers are youth, which is in the middle of 18 and 30 years of age.

Table 2: Socio-demographic characteristics of farming households (in average and SD)

Indicators	Peasant Association									
	Bekele-girisa (N=37)		Shubi-gamo (N=45)		Welda-kelina (N=36)		Tepo-choroke (N=18)		Total (N=136)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Family size of the Household	4	3	5	3	4	2	6	4	5	3
Household head's age	32	10	35	11	34	7	39	10	34	10
Experience in vegetable growing (in years)	6	4	7	7	5	3	7	3	6	5

SD = Standard deviation

Source: Survey result, 2015

4.1.1.2 Family Size and Experience

A family size ranging between 1 and 18 is witnessed in the farming households. The available data indicates that average family size in each household is 5 and this might assist them for a better participation of households in the vegetable markets (Table 2). This is supported by Bezabih and Hadera (2007) witness that different sources of labor are employed in horticultural production of eastern Ethiopia where family labor takes the largest share for labor allotments. Similarly, Wolday (1994) who indicate that household size have significant positive effect on quantity of marketed teff.

The respondents have an average of 6 years of experience in vegetable (onion and tomato) production with a standard deviation of 5 years (Table 2).

4.1.1.3 Education

About 1.47% and 8.82% of the sampled household heads were illiterate and can read and write, respectively. However, 62.5% and 24.26% joined primary and secondary school respectively whereas 3% attended college and above.

Table 3: Educational status of the household head

Indicator	Peasant Association				Total	Percent
	Bekele-girisa	Shubi-gamo	Welda-kelina	Tepo-choroke		
Illiterate	1	-	1	-	2	1.47
Read and write	-	3	7	2	12	8.82
Complete primary school	21	29	20	15	85	62.5
10 complete	13	9	7	-	29	21.32
12 complete	-	2	1	1	4	2.94
College and above	2	2	-	-	4	2.95
Total	37	45	36	18	136	100

Source: Survey result, 2015

4.1.1.4 Dependency Ratio

Dependency ratio is an age population ratio of those typically not in the labor force (the dependent part) and those typically in the labor force (the productive part) and used to measure the pressure on productive population. Accordingly, an average dependency ratio of 0.83 was found in Dugda Woreda. The result indicated that, out of 100 working persons 83 are economically inactive in the study area and more are unable to support income generation process.

Table 4: Age category and dependency ratio

Age category	Frequency	Valid percent	Dependency ratio
1-14	287	44.2	83.3%
15-64	354	54.5	
>64	8	1.2	
Total	649	100.0	

Source: Survey result, 2015

4.1.1.5 Access to Extension Services

Extension service in Dugda Woreda is fully provided by Woreda agricultural line departments. There are three Development Agents (DAs) assigned for each PA in the Woreda. Three DAs institutionally assigned to work in crop production, animal science and natural resources per each PA. However, the extension service is less imparted on vegetable production to impact on production task. The assessment on extension services further highlighted that, learning and knowledge imparting has need to be strengthened further in order to support households to participate in the market chain.

Table 5: Extension contact (in percent)

Extension contact in the year 2007 E.C		Extension contact description	Percent of the household
Household response	Percent	Weekly	36.5
No	30.1	Once in two week	12.5
Yes	69.9	Monthly	28.1
Total	100.0	Twice in the year	5.2
		Once in a year	3.1
		Any time I ask them	14.6
		Total	100.0

Source: Survey result, 2015

According to the assessment, the extension visit in vegetable production in the year 2007 E.C, 69.9% of the respondents have attained extension services and 30.1% of the respondents reported that they had totally no extension visit (Table 5).

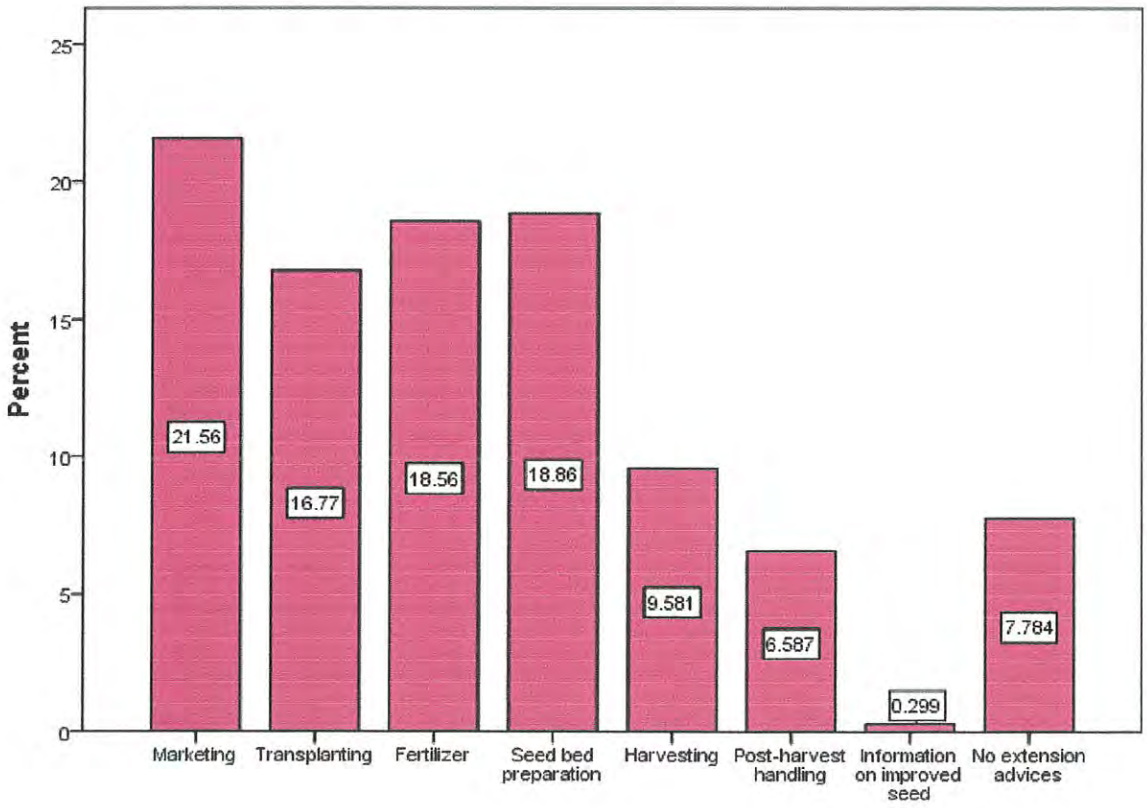
As per KII the frequency of extension visit and services provided for vegetable is less as compared to cereals production. Thus, from all respondents about 3.1% of them are visited once in a year, while 12.5%, 14.6%, 28.1% and 36.5% of the respondents are entitled to get extension access once in two weeks, any time asked them, monthly and on weekly basis, respectively.

This is in line with Davis *et al* (2007) that state absence of extension service has led to poor linkage to support horticulture industry. Carlson *et al* (2005) and Sonko *et al* (2005) who explained the current extension approach was in favor of cereals but not horticultures. Thus, it may negatively affect vegetable production-marketing task. Belay (2003) also indicates agricultural extension service has failed to bring major impact on productivity of horticultures due to weak link between stakes and associate workloads of extension agents.

As it is indicated on Figure 3 the advice of extension expert on vegetable production primarily focus on marketing of vegetable (21.56%) and less given on delivering of information on improved seed (0.30%) and post-harvest handling techniques (6.59%). Thus, advice on marketing of vegetable is in a better condition. This might be due to establishment and implementation of Woreda Irrigation Development Authority that have

mandate to develop irrigated agriculture mainly vegetable in the study area. Besides, the survey result reveals that comparatively majority of women households obtain advice on seed bed preparation from extension expert for vegetable production.

Figure 3: Advice of extension expert on vegetable production



Source: Survey result, 2015

4.1.1.6 Access to Roads

Dugda Woreda has 72 km all-weather roads (17 km asphalt and 55 km gravel) and 50 km dry weather roads (IDE, 2011). Roads primarily serve the Woreda population as an input and output market outlets as well as arteries to access social services such as health and education. The main means of transport on all-weather roads are trucks, buses and mini buses, while off the main road i.e. in the inner rural areas, pack animals (horse, mule and donkey) and on foot constitute the major means of transport (Annex 1).

Availability and adequacy of road is important prerequisite to link producers with potential markets and in reducing transaction costs. For smallholder producers, on average the distance from all-weather roads is about 10.45 Km and one way time taken to access all weather roads is about 34 minutes using different modes of transport. The time taken from input distribution center, Woreda market and major wholesalers in Km is 31, 51 and 41 minutes, respectively. The time taken is not proportional to the distance in Km from infrastructural facilities mainly due to the mode of transport used by the households. Thus, different modes of transport can yield differences in travel time (Annex, 2).

4.1.1.7 Access to Markets

Access to markets is a distance measured in kilometers to reach the nearest market. The study reveals that infrastructure in Dugda Woreda is satisfactory and it is comparatively close to nearby vegetable markets (Annex 2 and 3); which in turn may assist farmers to lessen their transport cost and enhances their market surplus and margins.

The majority of smallholder farmers primarily prefer to sell their vegetable products at Woreda market, which account 54.5%. Due to conducive infrastructure facilities (road) some farmers prefer to sell a large proportion of vegetable particularly onion and tomato at farm gate or spot (38.6 %) followed by selling at nearby local market (6.8 %). Farmers often prefer to sell on the spot (at farm gate) due to perishability of vegetable and lack of capacity to sell at bigger markets far from their residence. In addition, accessibility of roads makes easier for middlemen to enter trucks to production site. It is usually highlighted that closer markets do promote farmers to plant high value vegetables in view of the fact that they are not forced to transport their produce to distant markets where they incurs extra cost and might sell it at loss. Thus, the place of sell could diminish transport cost and enhance their market surplus considerably.

Table 6: Place of sell by smallholder farmers

Indicators	Frequency	Valid Percent
Local market	9	6.8
Woreda market	72	54.5
Farm land (spot)	51	38.6
Total	132	100.0

Source: Survey result, 2015

4.1.2 Types of Market

This subsection explains the different types of market in the Woreda i.e. rural open market, main woreda market, and cooperatives and unions markets.

4.1.2.1 Rural Open Markets

There are three rural open markets that serve the Woreda community; these are Woyo Gebriel, Ela Shanan and Dugda markets. All of these markets serve the trading of agricultural outputs as well as industrial consumption goods like soap, clothing, kerosene, etc. The market days are on Saturday and Tuesday and commodities marketed are like sales and purchases of grains, vegetable, poultry, coffee, dairy products and industrial consumables.

4.1.2.2 Main Woreda Market

There is one main Woreda market in Dugda, located in 03 kebele of Meki town. The market day is on Thursday, locally known as "*Gaba Kamisa*". On this market day household sale and purchase vegetable, cattle, sheep, goat, grains and poultry, dairy products, and industrial consumables (such as salt, edible oil, soap and gasoil), clothing footwear and farm tools.

4.1.2.3 Cooperatives and Union's Markets

There are 22 multipurpose cooperatives in the Woreda that provide marketing service to farmers. The cooperatives purchase farmers produce and supply it to Meki-Batu Union. The Union purchase from members and sale to different organizations such as Oromia Farmers' Federation, consumer cooperatives, universities, wholesalers and other buyers. The Cooperatives are also the major providers of agricultural inputs particularly, fertilizer, improved seed and pesticides to farmers. Meki-Batu Union and Bora Dembel are supply sources of agricultural input to primary cooperatives.

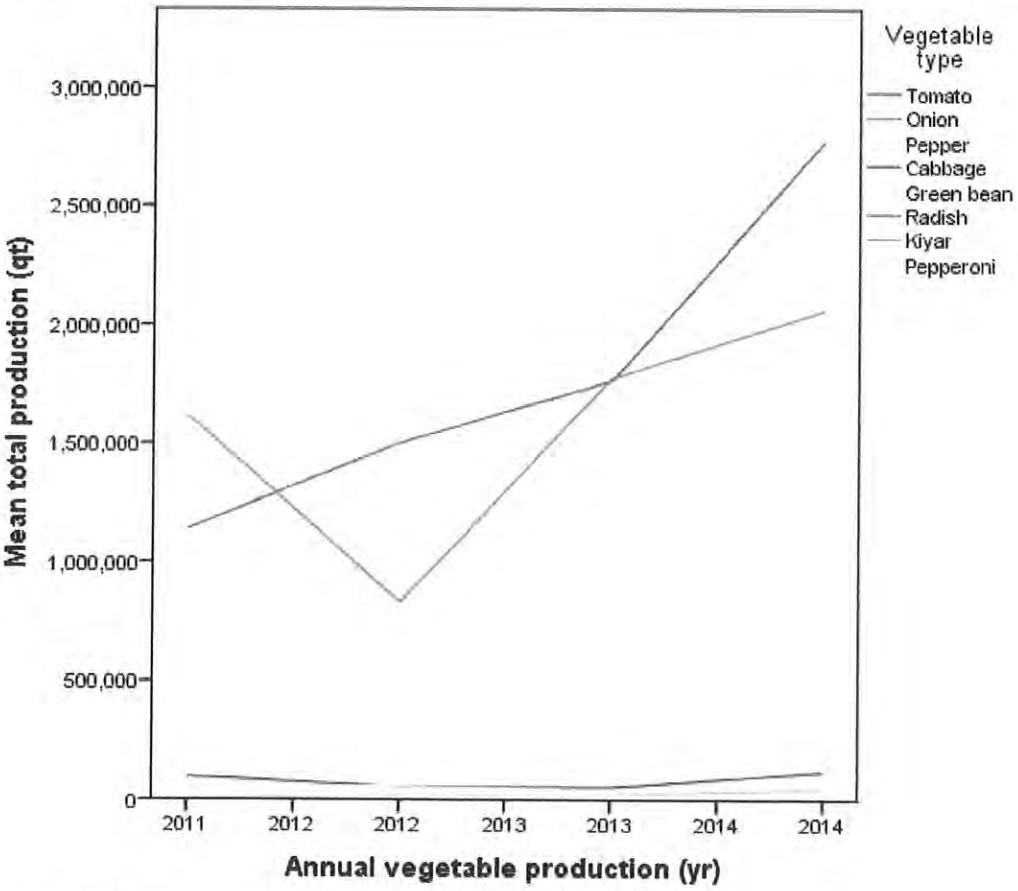
4.1.3 Production Overview

In Dugda Woreda some households produce combinations of vegetable types and others produce one type of vegetable. Majority of households produce tomato that account 50.8% followed by onion 44.4% which together covers 95.2% of total vegetable production in the Woreda from 2011-2014 (Annex 4). There are considerable differences across vegetable outputs in terms of mean annual production in Dugda Woreda. This might be due to the difference in yield, value of crops in the market, agro ecology and natural resources. Tomato and onion are the main vegetable commodities primarily produced for central, southern and eastern markets. Cabbage and Green bean account third and fourth dominant vegetable produced by households in the study areas.

4.1.3.1 Major Vegetable Grown in Dugda

Onion, tomato, head cabbage, Ethiopian cabbage and green pepper are the most commonly produced vegetable in the Woreda. Tomato and onion are dominant and collectively constitute more than 95% of vegetable produced in the Woreda. Dugda Woreda is highly productive in production of onion, tomato, head cabbage and other crops. According to the Woreda Irrigation Development Office, average productivity of vegetable is highly variable depending on factors such as soil type, agronomic practice, and use of improved seed and outbreak of diseases like *Tuta Absoluta* (tomato leaf minor) a very damaging insect which devastated tomato in 2013.

Figure 4: Status of vegetable production from 2011-14 in Dugda Woreda



Source: Computed from WIDA

As clearly depicted on the above graph onion and tomato produced by far higher than other vegetable types.

4.2 Vegetable Supply and Demand in Dugda Woreda

This section presents the supply and demand of vegetable at Meki and Atikilt Tera vegetable markets respectively.

4.2.1 Meki Market

Dugda Woreda is suitable for vegetable production due to its favorable agro-ecology and availability of irrigation water. Out of 36 kebeles of the Woreda 18 have access to irrigation and produce vegetable twice per year. In 2013/14 production season total production of vegetable is estimated to be 5,067,820 quintals on 13,166 hectares of land. As per annual GTP report of the Woreda private pump irrigation constitutes the largest share of irrigation production, which accounts to about 91.6% of total irrigated area in 2013/14 production season from 86% in 2012/13 season. In terms of production 52% in 2011/12 and 88% in 2012/13 comes from private pump irrigation. Main sources of irrigation water are three; Lake Zeway, underground water and river.

There is modern irrigation scheme constructed in 1986 on Lake Zeway that can cultivate 1,142 hectares of land. There are 2,104 households who have access to the scheme. These households are organized under 97 water user associations. There are also 12 private irrigation schemes which cover 249 hectares (Woreda Irrigation Development Authority, 2014). Besides, since underground water is available, most farmers use motor pumps irrigation system to cultivate their farm. Currently, about 13,324 hectares of land is cultivated by vegetable using private pump irrigation system and modern irrigation scheme (WIDA, 2014).

Table 7: Annual productions of major vegetable in Dugda Woreda with irrigation

Types of vegetable	2012/13			2013/14		
	Production	Area (ha)	% of production share	Production	Area (ha)	% of production share
Tomato	1766320	4329	48.11	2778474	4996	54.83
Onion	1778070	5356	48.43	2064355	6178	40.73
Cabbage	55772	351	1.52	120312	1054	2.37
Green bean	45665	413	1.24	57855	579	1.14
Green pepper	25475	218	0.69	46824	359	0.92
Total	3671302	10667	100	5067820	13166	100

Source: Computed from WIDA

There are two common vegetable production seasons in Dugda Woreda. The first season runs from July to December and the second runs from January to June. The peak harvesting months are December and January for the first round and May and June for the second round production period. Tomato is usually collected four or five rounds and can be harvested for longer times on same plots of land.

4.2.1.1 Destination of Vegetable from Meki Market

Tomato produced in Dugda Woreda is supplied to Addis Ababa, Shashemene and different towns in SNNPR. The demand of tomato in Dugda Woreda shows constant trend due its advantage in quality and price competitiveness. As a result, wholesale traders from Addis Ababa prefer to buy tomato from this area throughout the year.

Similarly onion is produced twice per year including the rainy season though production decreases at summer time. Total production of the Woreda is about 1.7 million quintals in 2012/13 production season. From October to December there is surplus of onion in the Woreda. On contrary, from April to September production decreases and, hence, price increases starting from August. This is because production of onion is diminishing during rainy season due to increase in cost of production.

4.2.2 Atikilt Tera Vegetable Market

Atikilt Tera is the largest open market for vegetable and fruits in Addis Ababa where most of the city gets its supply. The market is located in Arada sub-city and has been operating for the last 50 years. Fruits and vegetable as well as fish that enters in to the city goes to this big open market and the place is crowded by thousands of people starting from early in the morning (6:00 am). Delivery is made with trucks (Isuzus) carrying vegetable from vegetable producing areas such as Meki and other potential areas. The wholesale transaction is done early in the morning and; then up to midday retailers and urban consumer conduct their business and in the afternoon the place will relatively be quiet.

Part of Atikilt Tera vegetable market has been demolished recently in order to clear ways for ongoing railway project and as a result a number of traders and shop owners are relocated to Gerji and Kera areas. These situations created an opportunity for traders to organize themselves into Traders' associations and small and micro enterprise (SME) with a plan to redevelop the area and construct modern (standard) vegetable and fruit market center. Even in some cases farmers' cooperatives have purchased shares from these associations and become founding members of the association. These kinds of initiatives are a good entry point in the attempt to improve vegetable marketing system and increase the share of smallholder's benefits.

Vegetable are supplied on daily basis from different corner of the country throughout the year and then distributed to different parts of Addis Ababa and its surrounding areas. Survey held with wholesalers, indicates that although vegetable enter in Atikilt Tera market from almost every direction of the country, wholesalers mainly gets their supply from Meki, Shashemene, Assela and Bishoftu (Debre Zeit) areas. Moreover, it has been well-known that to stay in the business wholesalers have to obtain enough information supply (the place where vegetable are produced in all seasons) or has to have a good relationship with broker's network.

Survey held with wholesaler shows that wholesalers are the main suppliers of vegetable for Atikilt Tera market. These traders get their supply mainly from smallholders, partly from cooperatives and commercial farms. Majority of vegetable that reach Atikilt Tera pass through brokers' network that are found in production areas like Meki. Wholesalers highly depend on brokers' network to get supplies from different areas.

Data gathered from Addis Ababa Trade and Industry Bureau shows that there are about 3,629 registered traders in Addis Ababa out of which 407 are located in Arada Sub city. In Woreda 1 (commonly known as Atikilt Tera) and in its surrounding areas, there are about 215 registered traders (licensed for wholesale and retail trading) that are engaged in trading of fresh vegetable and fruits with a registered average capital of 148,000 Birr.

Vegetable supply at Atikilt Tera is characterized by seasonal variation. Since most of vegetable come from smallholders and the majority of smallholder practice rain-fed agriculture, supply of vegetable varies according to availability of rain. In association with this, supply of vegetable decline in dry seasons. On the other hand, economic and non-economic factors determine demand for vegetable. For example, during holyday season with the exception of onion demand for other vegetable is low but during fasting demand for vegetable becomes higher.

Furthermore, the responsiveness of demand to price is not the same for all vegetable. For example, observation inform us that demand for vegetable like onion seems to be price inelastic, as it is needed in daily food preparation almost by all households.

4.3 Transportation, Infrastructure and Product Packaging

Due to their perishability, vegetable start to lose quality right after harvest and continued throughout the process until consumed. For this purpose elaborated and extensive transportation system, marketing facilities and equipment are vital.

4.3.1 Means of Transportation and Its Effect on Quality

Observation and key informant interview with wholesalers indicated that medium trucks (Isuzu) which are not designed to transport such type of perishable products are used to transport vegetable products. As discussed earlier, vegetable traders get their supply from different part of the country. According to traders and brokers, most of the time produces arrive to end markets within 24 hours after harvest. But during slack seasons it might take longer periods i.e. between 3 - 4 days to deliver a consignment as collection will take longer days. To shorten delivery time, brokers combine and send orders of different traders in one shipment. The primary effects of transportation are loss of freshness for majority of vegetable, loss of firmness particularly for tomato and physical damage due to packaging materials.

Brokers play leading role in arranging the trucks by contacting with individual car owners or with other brokers who operate in fleet management. The sum paid for hiring a vehicle varies based on the distance travelled. On the other hand, smallholder producers highly depend on animal carts and human labor for transporting vegetable to market areas. According to farmers, in the study area no big damages or losses encounter in association with utilization of such transportation mechanism (Annex 1).

4.3.2 Marketing Facilities

The assessed markets have no any other special features. Almost all vegetable markets are located in open market areas. The only exception is Atikilt Tera market. In this market only vegetable and fruits are transacted throughout the week. But the Woreda market centers are found and operate in open markets. In these markets vegetable are supplied to market only on market days. That means only once or twice per week.

In most of Woreda market, informal wholesale and retail vendors inside the market places and small shops carry out supply of fresh produce for consumers. Wholesalers are the main suppliers of vegetable to the markets. Based on the discussion with respective government officials, total number of individuals engaged in

vegetable transaction is unknown in majority of markets, particularly in regional and local markets. As there are no recording and controlling system for vegetable supplied to different markets most of vegetable traders work without registration. For instance, data obtained from Woreda Trade Office indicates that in Meki market there are only 4 VAT registered wholesalers while the total number of wholesale traders of vegetable (onion and tomato) operating in the market is estimated to be 8 for onion and tomato.

Majority of the open markets are managed by local city administrations and serve as major transaction venues for different agricultural and industrial outputs. As per observation and interview with officials, everybody who has a capacity to buy have open access for the markets through middlemen (brokers). Producers or wholesalers do not make any payments (official fees) during loading/unloading or sales of vegetable in supply markets. Similarly brokers and transporters are not requested to make payments for shipments (outgoing produces) from vegetable producing areas.

4.3.3 Storage Facilities

To maintain freshness of vegetable and ensure longer shelf life storage facilities with cold room systems have important roles. With this aspect there is no single market center that has cold room systems out of the assessed markets. Most wholesale traders found in these markets do not have appropriate storage facilities. Traders in Atikilt Tera do rent storage facilities on daily basis or for limited periods. In local market centers (Meki market) there are no appropriate storage facilities for fresh produces. Majority of traders operating in these markets have only sales or distributions shades. Most of the time, wholesalers distribute vegetable using their established relationship with retailers. There are occasions where vegetable are directly distributed to retailers from the vehicles.

4.3.4 Spot Sales

Consumers buy vegetable from different retailers operating in the markets. These retailers have their own sales spot (*Medeb*) in the markets. The partitions are made of corrugated sheet, sacks and plastic materials to provide shades and demarcation. They retail vegetable throughout the week in these spots. In Atikilt Tera there are few shops that serve as vegetable retail spot owned (rented) by retailers. These shops have corrugated iron roofs and walls made of bricks. In Meki town there are a number of sales shops along the main asphalt road

that serve for retailing onion and tomato. Most of these shop owners are directly engaged in vegetable marketing and their main targets are individuals that travel along the road.

4.3.5 Product Standards and Packaging

Discussion with KII reveals that vegetable products are sorted and graded during collection. One of the key roles of brokers in vegetable transaction is to make sure of cleaning, sorting and grading is done before the shipment is delivered to traders. Daily prices are also set based on these grading systems. It has been noted that since consumers pay better price for quality produce, traders are willing to pay higher prices for quality products. Most of these grading standards are subjective. The most common indicators for vegetable quality include visually attractiveness, size, color, variety, and being free of spot. According to the traders and brokers, price variation is common in vegetable market due to product classifications and grading practices.

Packaging materials play important role in reducing loss and damage of produces during transportation and storage. Product delivering and packaging systems are similar in all the assessed markets. For instance, tomato is transported using wooden boxes that have a carrying capacity of around 50 - 55 kg. The box even serves as unit of measurement for setting price in supply markets irrespective of its actual content. On the other hand, polypropylene sacks are the most widely used packing materials for transporting vegetable. Onion, potato, carrot and green pepper are loaded on trucks using this packing material. But, sometimes items like head cabbage, onion and potato are loaded on trucks as bulk loads without any packing materials.

4.3.6 Product Loss and Damage

Due to perishability of some vegetable, product loss and damages is common. Besides, absence of appropriate transporting vehicles and storage facilities also aggravate the problem. Most commonly product damage (loss happen) during loading/unloading, transportation and storing process.

In the assessed market higher percentage of loss is reported for tomato. Tomato is highly susceptible for damage during loading/unloading and transportation as the outer pile easily gets damaged during loading/unloading and storage. On the other hand, absence of packing materials increases loss associated with head cabbage. It also loses weight and freshness when stored for long period. Generally some of vegetable lose freshness and get spoiled due to absence of proper storage facilities in the markets.

4.4 Market Chain Actors and Their Role in Vegetable Market Chain

Actors are those involved in producing, processing, trading or consuming a particular agricultural product. They include direct actors which are commercially involved in the chain (producers, traders, retailers, consumers) and indirect actors which provide financial or nonfinancial support services, such as banks and credit agencies, business service providers, government, researchers and extension agents. The major market chain actors are input suppliers, credit providers, producers, farmer traders, wholesalers, brokers, retailers and consumers. The major actors identified in the vegetable market chain are wholesalers and their brokers. Smallholder farmers do not have any power or say on price determination (price takers). Below is a detail discussion of each actor separately.

4.4.1 Input Suppliers

These are cooperative and private input dealers (agro dealers) that sell tomato, onion and cabbage seeds and fertilizers. Meki-Batu Union and private input dealers like Agro Veg. agricultural input supplier, Senbo pesticides, Adama, Rediet and Gemo are the main input suppliers in the Woreda. These private dealers sell inputs including seed and fertilizer. Farmers prepare own seedling which is about 90.2% and the remaining supplied from private nursery. Farmers have also an access for seedlings from Awash Melkasa and Koka areas. Private input dealer have high contribution in supply of insecticide/fungicides in the Woreda which account 97.7%. According to KII majority of private dealers at Meki town do not have license in seed and fertilizer trading and not managed by professionals like agronomists.

Table 8: Sources of input for vegetable producers in Dugda Woreda

Input sources for vegetable producers		**Percent**
Source of seedling	Own	90.2
	Private nursery	9.8
Source of fertilizer	Open market	9.1
	Cooperative association/union	90.9
Source of insecticide/fungicide	Open market	97.7
	Union/cooperative	1.5
	Union	0.8

Source: Survey result, 2015

4.4.2 Extension Service Providers

Woreda Irrigation Development Authority and Woreda Agricultural Office are the main bodies that provide technical support on production of vegetable. The others are NGOs and international organizations like ILRI/LIVES, EU, and FAO are also involved in institutional support for vegetable producers. Major project

funded by EU and implemented by consortium of NGOs like Self Help Africa, Oxfam America and Farm Africa is currently under implementation with Meki-Batu Fruits and Vegetable Growers Union.

4.4.3 Credit Providers

Vegetable production is a costly activity in the area. To cultivate onion and tomato on a quarter of a hectare, farmers have to invest 11,000 Birr or up to 22,000 Birr, respectively (ATA, 2014). Therefore, most farmers rent out their land to other commercial farmers due to lack of capital. In order to solve this there are attempts to provide farmers with credit that help them to cultivate land for their own.

The main credit institutions operating in the area are Oromia Credit and Saving Share Company (OCSSCO), Busa Gonfa, Meklit, Africa Mender and Metemamen. However, most of these credit institutions are not providing credit for vegetable growers due to high risk attached to vegetable production. For example, credit is provided based on group based loan/group liability. The loan primarily dispersed for purchase of fertilizer, seed, irrigated agriculture and herding and 19.30 million Birr credit dispersed to clients by OCSSCO in June 2014 for 28 PAs in the woreda.

The credit institution considers vegetable production as a risky business due to diseases and price fall during harvest. However, Busa Gonfa Micro Finance institution is currently providing credit for vegetable producers in rural PAs. The institution dispersed 108,439 Birr for 22 farmers that cultivate vegetable in 2014. But, the institution has limited capacity and reaches only 5 PAs. It offers a minimum of 4000 and maximum of 8000 Birr for farmers based on their loan repayment history. This is very low compared to the high cost needed to cultivate vegetable.

4.4.4 Producers

There are about 6082 households (producers) of vegetable in the Woreda. Their estimated annual production is 1.7 million quintals of tomato, 1.7 million quintals of onion and 120312 quintals of cabbage. Though majority of the farmers are members of cooperatives they rarely sell their products to cooperatives and institutional buyers.

With all their variability, producers are producing onion and tomato for market and thus they are the major player of the market. They participate in the truck load sell of vegetable to wholesalers, traders, cooperatives and unions at farm gate. They also sell to different types of retailers (with varying volume of sell) both at farm gate, local market and at central market if they have good link to traders. Despite the fact that farmers are

sources of all marketed vegetable and probably the dominant in terms of number of market participants, they are disadvantaged group among the market players since they are price takers. Smallholder producers benefited when selling to the union (which is not common), or to the retailers in very small quantity or Addis Ababa market (which is very rare) as producers mostly sell vegetable through brokers.

4.4.5 Farmer Traders

Farmer traders perform both vegetable production and selling by collecting from other farmers. They live at Meki town and carry out both production and trading simultaneously. They sell vegetable for central (Adama and Addis Ababa) and southern (Shashemene and Hawasa) markets. Their number is small. They purchase and sell vegetable without involvement of brokers.

4.4.6 Brokers

Brokers in the Woreda have regular and temporary customers from major towns and cities across the country. Their supply to the towns varies seasonally. As per KII more than 100 brokers of vegetable found in the Woredas and all of them are illegal brokers (do not have broker licenses).

There are different levels of brokers in the Woreda. The main brokers who deal directly with traders in other places are based in Meki town while their assistants receive orders and deal with farmers. The share of profit that goes to brokers varies from farmer to farmer and from trader to trader. It is common for all brokers to get commission ranging 800-1000 Birr for one car (50-60 quintals) for onion. Similarly one track carries 84 boxes of tomato (46 quintals) for which brokers get up to 1500 Birr. The rate of commission vary because of the quality and quantity of vegetable supplied. To get higher commission and most importantly retain their customers, brokers usually overload the car, fill the sacks and boxes intensively and sort-out less quality products.

4.4.7 Sorters

These are people that are hired by traders or brokers to grade vegetable at farm gate. They separate less quality and infected products after harvest so that the traders get quality products. They are paid about 7-8 Birr per box or about 500 Birr per car. On top of this they get informal payments in the form of bribe from farmers to sort it less seriously. But farmers know that the sorters are more loyal to traders and brokers. If they do not give any bribe the sorters will deliberately drop out good/moderate quality products.

4.4.8 Transporters

The main transporters are track and Isuzu car owners in different towns. Their number is unknown but there are adequate transporters. Traders sometimes use their own car to transport to their sale outlet. The total cost of transporting 50-60 quintal of onion is about 2000 Birr over a distance of 125 Km. For example to transport 50-60 quintal of vegetable to Addis Ababa they charge 2000 Birr, 1500-2000 to Shashamane and 3000 to Hosana. Accordingly, per quintal transport cost is about 33 Birr to Addis Ababa and 50 Birr for Hosana. However, transporters usually overload the car beyond its capacity (they call it *Fiddamo*), which reduces per quintal cost. They usually travel during night time to reach the next morning market. In addition, there are transport brokers that link product brokers with transporters. They are paid 10% commission by owners of car. They are directly contacted by product brokers.

4.4.9 Wholesalers

Wholesalers are the major buyers of vegetable as they buy at least a truck load of vegetable at a time from farmers. Easy access to road and mobile phone has helped the wholesalers to know where to find product throughout the country and decide the price at which he/she has to buy to get maximum profit. Wholesalers buy vegetable from producers through brokers who represent them in vegetable buying activities. Thus, traders, particularly those from Addis Ababa and Adama just call the brokers they know to send them full truck of vegetable and they send the cash either through bank or with truck driver.

4.4.10 Retailers

Retailers are market actors which have direct contact with consumers. There are three major types of retailers in vegetable markets: open market retailers, supermarkets and shops, and roadside retailers. Open market retailers are buying vegetable either from wholesale traders or farmers. Meki town retailers buy both from producers and wholesale traders. While in major cities they buy from wholesalers. Road side vegetable retailers are also important vegetable retailers operating on the road from Meki to Addis Ababa. The major advantage of these retailers is to enable vegetable farmers in selling their products without the intervention of brokers. The supermarket and shops are mainly in the major cities and commonly buy vegetable from wholesalers.

4.4.11 Consumers

Consumers are found everywhere though the numbers vary. The major ones are found in major towns in the country like Addis Ababa, Hawasa, Hosana, Moyale, Jijiga, Dire Dawa, Mekele and Bahirdar. Consumers are final purchasers of vegetable products mostly from retailers for consumption purpose.

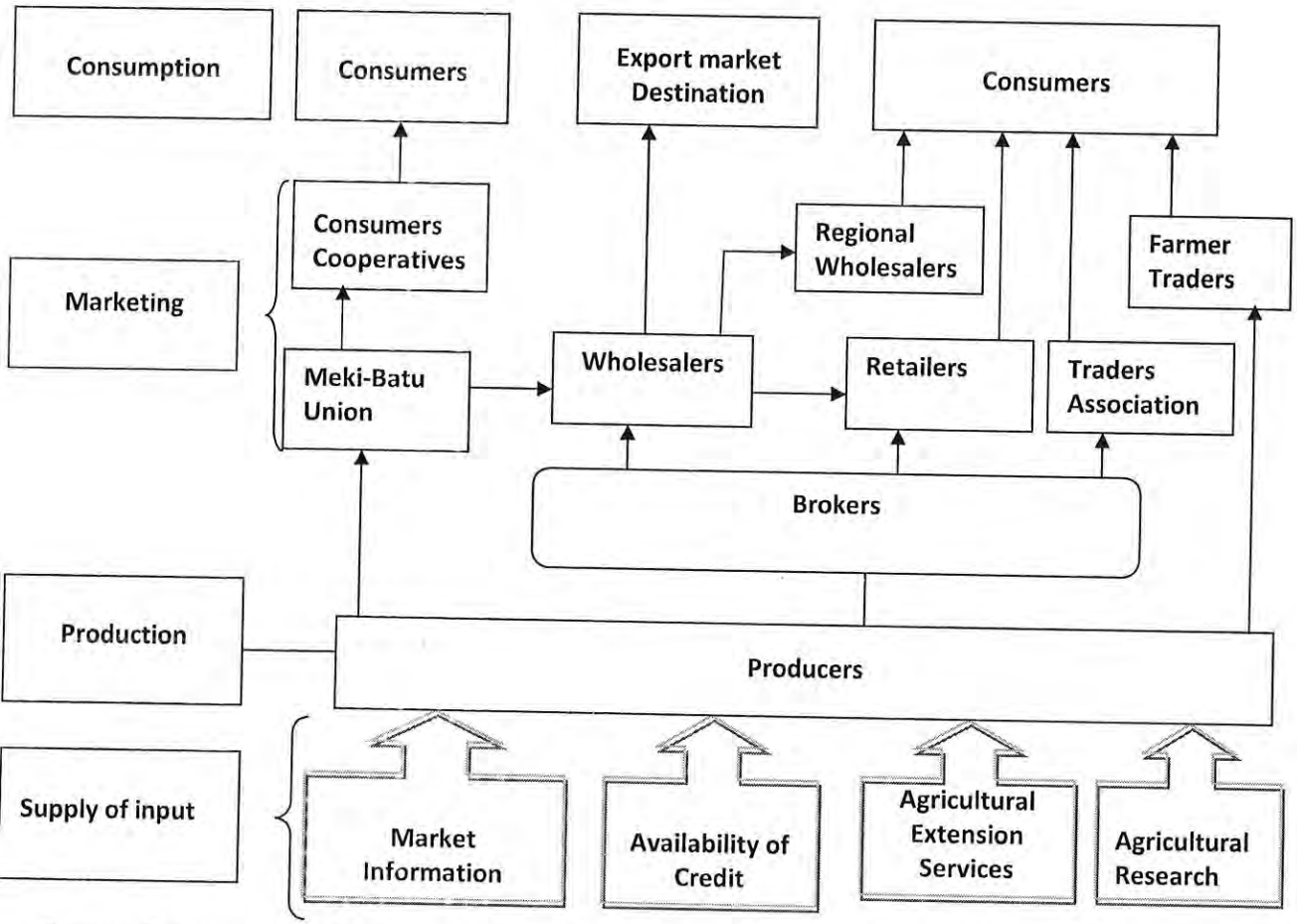
4.5 Market Chain Map of Vegetable in Dugda Woreda

There are a number of ways through which vegetable reaches the final consumers and it is not feasible to take into account all channels for analysis because it makes the analysis very complicated. It is also difficult if not impossible to track the entire actors in the market chain and gather accurate data on the volume of sale and their transaction costs. Instead the analysis is focused on the major marketing channels through which significant portions of vegetable reach the final consumer. The study identifies the five major marketing channels for vegetable market.

The five major vegetable marketing channels identified in this study include: i) producers sold to consumers passing through brokers and wholesalers via retailers, ii) producers sold to consumers through unions via consumers cooperatives, iii) producers sold to consumers directly by retailers in production areas, iv) producers sold to consumers through traders and their cooperatives, v) producers sold in foreign markets through traders of Adama and Jijiga.

Being highly perishable, fresh vegetable require greater attention during harvesting, packaging and transporting from the point of production to the final market. The marketing cost of vegetable mainly involves cost of post-harvest activities incurred before reaching the consumer. This includes cost of harvesting and packaging (material and labor costs), handling (sorting, cleaning, grading, loading, and unloading), and transportation and tax costs. Generally, these components constitute a large share in the total margin between the final retail price and the cost of production.

Figure 5: Market chain of vegetable crops in Dugda Woreda



Source: Survey results, 2015

Channel I: Producers via brokers sold to wholesalers passing through retailers for consumers

This is the largest channel through which consumers receive vegetable produced in the study area. Wholesalers buy tomato and onion at the farm gate through brokers and sell it to retailers in Addis Ababa, Adama, Dire Dawa, Shashemene, Jijiga, Hawasa, Moyale and other towns. As per KII, Addis Ababa market is the largest one in consuming of vegetable produced in Dugda Woreda. Central wholesalers from Addis Ababa sell vegetable products to wholesalers coming from the northern and western parts of the country.

Channel II: Producers sold to unions through consumers cooperatives for consumers

This channel is a new product outlet for vegetable producers in Dugda Woreda. The consumer cooperatives in Addis Ababa have started buying directly from Meki-Batu union. The objective of these cooperatives is to provide consumers with better quality products at reasonable prices. This transaction creates an advantage for both producers and consumers. Consumers will benefit since their cooperatives are not going for unreasonable profit and would not pile up prices with speculations. At the same time, producers will get better price as there is no cheating by brokers. The channel in which Meki-Batu union is supplying vegetable to consumers in Addis Ababa through the recently established consumers' associations is also considered as part of this channel.

Channel III: Producers sold to consumers through retailers in production areas

Retailers are buying vegetable from vegetable producers in the study area and they trade product left after farm gate bulk sells to wholesale traders. Retailers in the production area (with the exception of road side retailers) buy with or without the involvement of brokers depending on the volume of the product. Moreover, roadside marketing is now becoming more common in the production area and consumers passing by the production areas buy vegetable from these road side retailers. Some of roadside retailers are selling vegetable from their own farm.

Channel IV: Producers sold to consumers through farmer traders, traders and their cooperatives

Traders' cooperative like Adama Fere competes for supply bids at the universities and other institutions such as hospitals and police training centers and supply vegetable on contract basis. Meki-Batu Vegetable Marketing Cooperatives Union has also supplied onion to Haromaya University, Arba Minch University and others on contract basis. The problem here is the seasonal nature of vegetable production and fluctuations in its price. As vegetable price varies every day, producers always prefer for better prices i.e. sale to any buyer that pay them higher prices. On the contrary, buyers (especially large buyers) need fixed prices as it will be difficult for them to plan their budgets properly. Hence, daily price fluctuations are one of the challenges for smooth operation of cooperative unions with farmers (i.e. sometimes failing to meet some contract terms). The traders' cooperative can enter into supply contract with fixed price since they can procure a product from anywhere they get at lower prices.

Channel V: Producers sold in foreign markets using Meki-Batu Union and traders of Adama and Jijiga

Djibouti market and Somaliland is in the hands of only few traders and the assembly place moved from Dire Dawa to Adama. They give order to traders who bring them a minimum truck load of 55-60 quintals, assemble and transport it to Djibouti using bigger trucks and distribute to retailers. Depending on the season there is also export through Jijiga to Somaliland but this is very low. Meki-Batu union has obtained requests from Djibouti but could not sign contract due to problems related to price variations stated in channel IV. In general, the channel to export markets used as an alternatives to access potential consumers based abroad particularly during surplus vegetable production.

4.6 Marketing Channels of Vegetable

Vegetable is an important cash crop and it passes through the hands of many intermediaries. Based on the direction of flow and volume of vegetable transacted, five marketing channels were identified. The channel starts from the producers (farmers) and ends in the terminal market passing through a number of marketing actors along the chain. According to producers survey, which involves 136 respondents in Dugda Woreda about 32,010 quintals of vegetable was marketed. In order to quantify the volume of vegetable handled by each marketing actor along the marketing chain, the total purchased amount was obtained from the producer and trader surveys.

The study identified five vegetable marketing channels. The amount of vegetable transacted in these market channels was different and out of the five, two market channels were found to be dominant in terms of vegetable volume of transaction. Marketing channel I starts from producers, retailers and ends with final consumer. In this market channel about 736 quintals of vegetable (2.3%) was supplied. Channel II involves producers, brokers, wholesalers, retailers and consumers. It was found to be the dominant one in terms of volume of vegetable supply. In this market channel about 23,752 quintals of vegetable (74.2%) of the total vegetable was supplied. Marketing channel III was the second dominant one, about 6786 quintals of vegetable (21.2%) supplied in this channel. The participants of this market channel include producers, Woreda wholesalers, central wholesalers, retailers and consumers. Channel IV and V supply 0.8% and 1.5% of vegetable, respectively. The participants of these channels contain producers, farmer traders (assemblers), wholesalers, retailers and consumers and producers, union, consumer cooperatives and consumers, respectively. Marketing channel IV was the least dominant one as they accounted for the supply of 0.8% of total vegetable supplied through this channel.

The identified channels were:

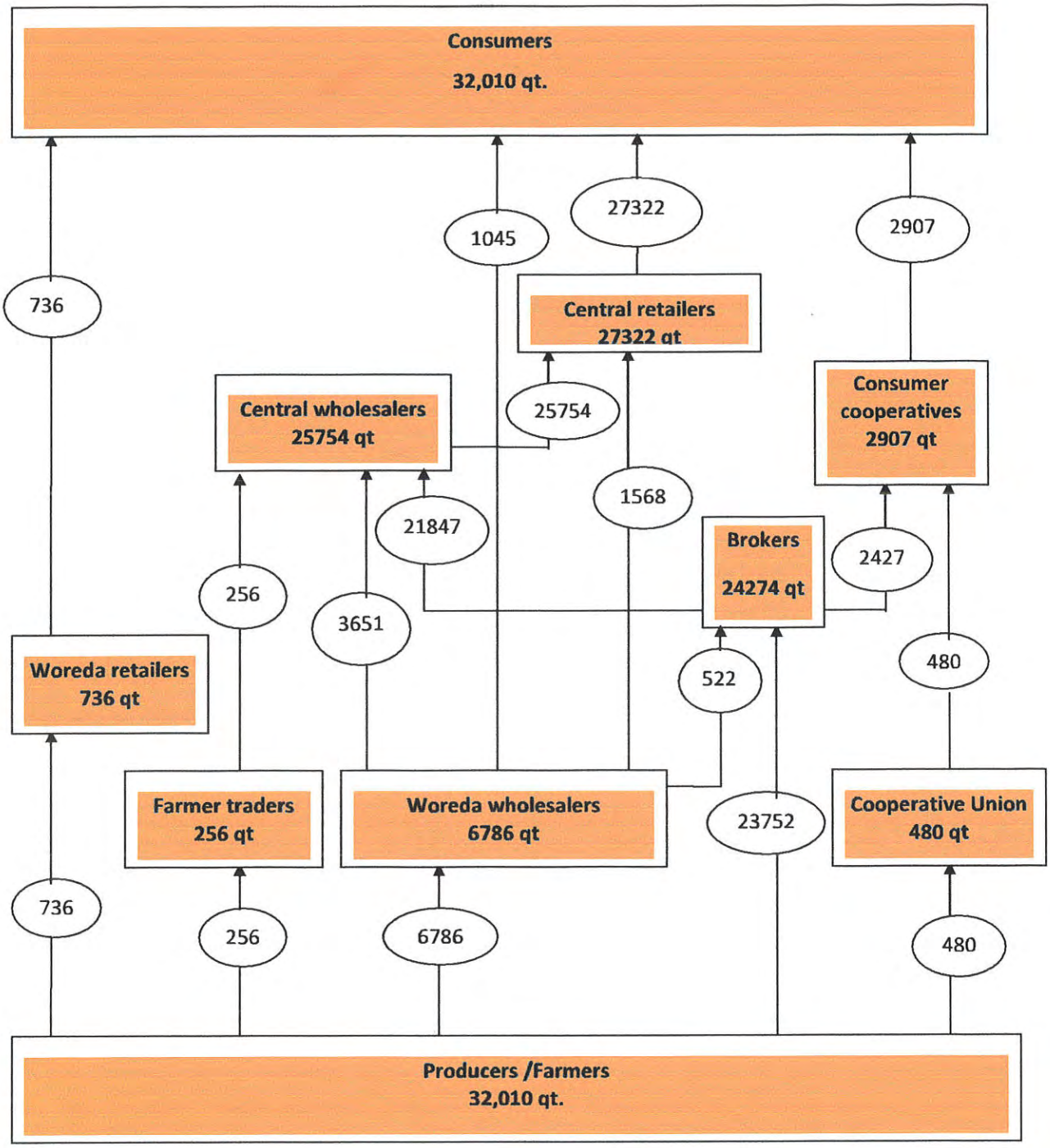
Box-1 Vegetable Marketing Channels of Dugda Woreda

Channel I: Producer ⟶ Woreda retailer ⟶ Consumer (736 qt)
Channel II: Producer ⟶ Broker ⟶ Central wholesaler ⟶ Retailer ⟶ Consumer (23,752 qt)
Channel III: Producer ⟶ Woreda wholesaler ⟶ Central wholesaler ⟶ Retailer ⟶ Consumer (6,786 qt)
Channel IV: Producer ⟶ Farmer trader ⟶ Central wholesaler ⟶ Retailer ⟶ Consumer (256 qt)
Channel V: Producer ⟶ Union ⟶ Consumer cooperative ⟶ Consumer (480 qt)

Source: Survey result, 2015

The subsequent schematic framework for key vegetable trading actors indicated on figure 6 represents volume of vegetable passing several market channels in Dugda Woreda. Producers primarily produce vegetable for the purpose of marketing and the framework clearly indicates the volume of vegetable sold by smallholders passing through several channels. Hence, vegetable produced pass through different marketing channels to reach the final consumer. From the figure the initial quantity produced and sold by smallholder exactly the same with final quantity consumed at different market places. The channel indicates the complexity of the chain that commodity passes through before it reaches the final destination.

Figure 6: Vegetable marketing channels in Dugda Woreda



Source: Survey result, 2015

4.7 Structure and Performance of Vegetable Marketing

4.7.1 Market Structure

Market structure in food marketing is analyzed based on the degree of market transparency (market information), the number of buyers and sizes of enterprises within the system, and the condition of entry to and exit from trade (Scarborough & Kydd, 1992; Pender *et al,* 2004). Koch (1980) reveals four salient aspect of market structure include the degree of seller concentration, the degree of buyer concentration, the degree of product differentiation and the condition of entry/exit. Accordingly, market structure of vegetable is assessed based on market concentration ratio, condition of entry into and exit from trade and flow of market price information within markets are used as a clue to examine vegetable market structure.

4.7.1.1 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 and need to have full market information. Accordingly, concentration ratio was calculated for vegetable market by taking 40 valid sampled cases from wholesalers, retailers, brokers, farmer traders and cooperative unions from Meki and Atikilt Tera markets.

The survey result indicated that the first four largest volume of vegetable purchased by trader's concentration ratio (CR_4) constitute 50% of market share which is higher than what Wolday (1994) and Gebremeskel *et al* (1998) report; concentration ratio of 35% and 32.58% for food grain market and Ethiopian grain markets, respectively. Thus, the market concentration ratio indicates the market structure is a strongly oligopolistic for vegetable marketing (See Annex 7).

4.7.1.2 Barriers to Entry and Exit

One of the barriers to entry that are often of critical importance in developing countries given relative factor endowments is economies of scale (Pomeroy and Trinidad, 1994).

4.7.1.2.1 Entry Barrier for Wholesalers

OLS simple linear regression analysis was conducted in order to know whether there is economies of scale for intermediaries' involved in vegetable marketing. It was done for wholesalers and retailers at Woreda level. It is conducted by computing AC as a predicted and TP (average quantity handled) as a predictor or explanatory variable. The regression result shows average cost and total volume of vegetable handled by wholesalers in the study areas is inversely correlated.

Table 9: OLS Regression between average cost and total product of wholesalers

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	8.905	1.183		7.525	.000
TP	-0.00009	.000	-.628	-1.977	.095

a. Dependent Variable: AC

Source: Survey result, 2015

The coefficient of quantity handled by Woreda wholesalers is negative which specifies an existence of economies of scale and a negative correlation between average cost and total product. It implies as average total vegetable supplied to the market increases the average cost of wholesalers decreases and vice versa. When total product handled to the market increases wholesalers have an advantage and smaller similar firms have less capital and unable to compete with the larger ones. Thus, there is an entry barrier for smaller wholesalers.

The existence of economy of scale for Woreda wholesalers also implies large firms market their products at considerably lower average costs than smaller firms. For every one unit increase in total product (Q); average cost (AC) of wholesalers diminishes by -0.00009 Birr. Entry barrier is characteristics of oligopoly market.

4.7.1.2.2 Entry Barrier for Retailers

Table 10: OLS Regression between average cost and total product of retailers

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	6.869	1.452		4.730	.000
TP	.007	.013	.140	.584	.567

a. Dependent Variable: ACwr

Source: Survey result, 2015

OLS regression result for retailers at Woreda is positive for β coefficients. Thus when total quantity purchased increases by one unit then average cost also increase by 0.007 which increase total marketing cost for retailers. Therefore, there is no entry barrier as well as economies of scale and thus the market is competitive for retailers.

4.7.2 Marketing Performance

4.7.2.1 Marketing Margin

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 price at different levels of marketing chain during a two to three week period was sufficient to calculate quite accurately the relevant marketing margins (Pomeroy & Trinidad, 1994).

A marketing margin measures the share of final selling price that is captured by a particular actor in the marketing chain and results of the marketing margins analysis showed a total gross marketing margin of 30% (complete distribution channel) with a producer participation margin of 70%. Thus, producers have highest marketing margin than intermediaries though not necessarily indicate pure profit that goes to each actors in the margin. The gross marketing margin for vegetable producers is rather on the high side as compared to the study on hot pepper by Amare and Dawit (2013), which is about 29%.

Table 11: Vegetable marketing margin for key actors

Market chain actors	Selling price (Birr/kg)	Gross marketing margins
Average farm gate price	7	
Average brokers price	7.10	
Average farmer trader price	7.30	
Average Woreda wholesalers price	7.80	
Average central wholesalers price	8.40	
Average retailing price	10	
TGMM		30%
GMM_b		1%
GMM_{ft}		2%
GMM_{ww}		5%
GMM_{cw}		6%
GMM_r		16%
GMM_p		70%

Source: Survey result, 2015

TGMM is 30% which designates the portion of price paid by final consumers that belongs to actors/middlemen i.e. brokers, farmer traders, wholesalers and retailers.

GMM_b indicates total gross marketing margin received by brokers which is 1%.

GMM_{ft} shows total gross marketing margin received by farmer traders which is 2%.

GMMcw indicates total gross marketing margin received by central wholesalers which is 6%.

GMMr indicates total gross marketing margin received by retailers which is 16%

GMMp is the portion of price paid by end consumer that belongs to farmer as a producer which is 70% (100% - 30%).

Therefore the purchase price by a marketing actor can be determined with the information on the selling price given by the actors that comes first in the marketing chain (Table 11). Gross marketing margin of farmers is 70% which is as high compared to Tewodros (2014) finding which is 54.2% for chickpea producers.

As it was indicated by KII and FGDs with farmers show that due to the perishability of vegetable (tomato and onion) and absence of storage facilities; farmer are price takers and price inelastic to supply vegetable in the study area. However, consumers are sensitive for price change and they are elastic for change in price in the market. These conditions mostly benefit traders than farmers. This is in line with Mendoza (1991) who stated that as demand becomes more elastic and supply more inelastic the increase in the margin weighted more against farmers and their selling price will be affected more.

4.7.2.2 Marketing Costs

Marketing costs are estimated to compute the share of profit captured by key actors in the marketing chain. Data was calculated on Birr/Kg basis and then converted to total marketing cost. The main costs for middlemen's were transport, cleaning, sorting and grading, service fee, storage, offloading and other expenses.

Table 12 indicates different types of marketing cost related to the transaction of vegetable by farmer traders, woreda wholesalers, woreda retailers, and central wholesalers and central retailers. The marketing cost of actors in the channel indicated transport cost is the highest followed by offloading cost.

Table 12: Marketing cost for different marketing actors (Birr)

Marketing cost	Actors					
	Farmer trader	**Woreda wholesaler**	**Woreda retailer**	**Central wholesaler**	**Central retailer**	**Mean**
Wastage loss	797.5	1150	1215	210	605	795.5
Cleaning, sorting and grading	1600	1300		2000	600	1100
Transport	13500	5600	255	9500	830	5937
Service fee[2]			-	1000		200
Storage		2800	5		450	651
Offloading	7000	4520	60			2316
Other expense		3600	34	4000	467	1620.2
Total cost	**22897.5**	**18970**	**1569**	**16710**	**2952**	-

Source: Survey result, 2015

4.7.2.3 Marketing Profit

Gross profit of traders is summarized in Table 13. Profit of woreda retailers are Birr 2939 in channel I. This profit was made by direct purchase from farmers through total elimination of other intermediaries (woreda brokers, woreda wholesalers and farmer traders), and directly sale to consumers. The profit obtained by central wholesalers was highest in channel II which is Birr 204,827. Farmer traders are benefited in channel IV because of direct purchase from farmers.

[2] Service fee is commission paid to brokers

Table 13: Gross profit for different actors (Birr)

Actors	Indicators	Vegetable marketing channels			
		I	II	III	IV
Farmer traders	Purchase price				218250
	Marketing cost				22897.5
	Selling price				268350
	Gross profit				27,203
Woreda retailer	Purchase price	12700			
	Marketing cost	1569			
	Selling price	17,208			
	Gross profit	2,939			
Woreda wholesalers	Purchase price			637500	
	Marketing cost			18970	
	Selling price			811500	
	Gross profit			155,030	
Central wholesalers	Purchase price		122,198	436,587	268350
	Marketing cost		16710	16710	16710
	Selling price		343735	343735	343735
	Gross profit		204,827	-109,562	58,675
Central retailers	Purchase price		20260	20260	20260
	Marketing cost		2952	2952	2952
	Selling price		24905	24905	24905
	Gross profit		1,693	1,693	1,693

Source: Survey result, 2015

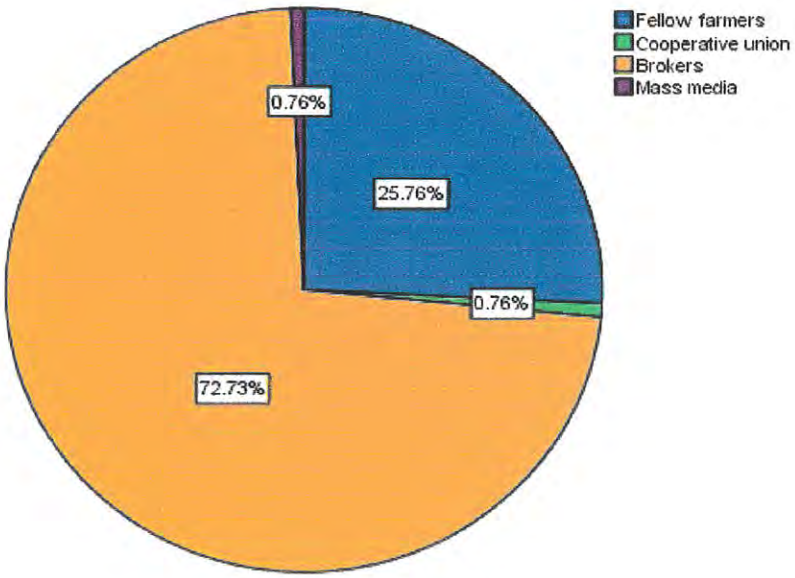
Profit is high for central wholesalers in channel II and this is because of direct purchase from farmers at farm land. However, in channel III central wholesalers incur a loss. This might be due to price fluctuation in the market and wastage loss. All marketing channels are profitable except channel III of wholesalers. In general, subsequent to Channel II of central wholesalers, channel III of Woreda wholesalers, and channel IV of central wholesalers is comparatively the top three profitable (efficient) channels for sale of vegetable in the study area.

4.8 Market Information and Its Use in Decision Making at Meki Market

Farmers obtain market information from brokers who have ultimate power in setting price (72.73%). First, farmers visit brokers in Meki town and tell the product they have. Farmers who have mobile phone also get information from brokers and other farmers in the town (25.76%). Usually in the morning brokers meet and discuss to set price independently by communicating to traders in major towns. Brokers consider price difference across towns and prefer to supply to the town with higher prices. Usually farmers make marketing decision out of pressure from maturity of their production and its perishability. Since products are perishable vegetable producers have limited bargaining power.

Farmers acquired very less marketing information from cooperative union and mass media in the study areas as indicated on figure 7 below.

Figure 7: Market information source for smallholder farmers



Source: Survey result, 2015

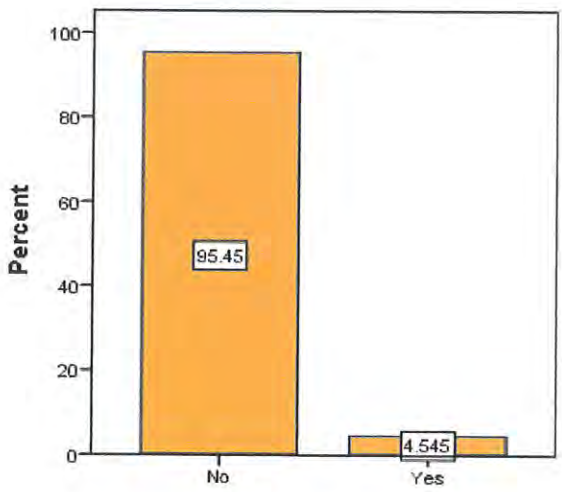
Broker use different techniques to lower producer's price; first by negotiating below price given by traders. For instance, let us assume that a wholesaler in Atikilt Tera agrees with a broker in Meki for supply of 50 quintals of tomato at 8 Birr per kg. Then the broker order his assistants to negotiate with farmers at lower price (e.g. 7.50 Birr per kg) to get the balance 0.50 Birr per kg. Similarly, the assistant brokers go to farmers' field and try to negotiate below 7.50 Birr per kg. Brokers in the supply chain try to get as lower price as possible

using their information about demand and supply conditions in end markets. If brokers understood that they could not manage to get lower price they have the alternative to resort for traders in other cities. By doing so they easily push down the price to the level where it is not profitable to farmers.

Secondly, brokers use model farmers and large producers to influence other farmers to sell at lower prices. They secretly give better prices for model and high producing farmers and agree to tell other farmers by reducing selling prices. As farmers trust model farmers they agree to accept lower price offers.

Thirdly, brokers abuse farmers by manipulating the weighting scale and measurements. For example, it was common to deduct 10kg from gross weight because of the weight of box itself (burden). But recently brokers designed a lighter box that weigh 5kg and still deduct 10kg as before. They simply get 5kg per box (400kg per car). The other way is the infamous "*Gifalign* and *Defalign*" game. As per FGD with farmers reveals that; *Gifalign* means "push for me" in which the broker asks the farmer to push the weighting scale beyond exact number. *Defalign* represents the farmer must give freely one box for every fixed quantity (10 box) bought by the broker. These are not mandatory, but if a farmer refuses to do so the broker will not buy from him another time.

Figure 8: Farmers linkage with buyer firms



Source: Survey result, 2015

As it is clearly depicted in figure 8 above more than 95% of farmers do not have a linkage with buyer firms. In other words, they do not be acquainted with their actual buyers during selling their vegetable. This might be

due to high involvement of brokers/middlemen in vegetable market. This was well supported by FGDs with farmers in which they could not have an access to deal with wholesalers or any other trader. Box 1 below discusses how brokers are profitable in vegetable marketing in the study area.

Box 2: Brokers Role and their Profitability

Case Study-1:

A 35 years old KI from Meki town, who has been an informal broker for the last 10 years, joined the business with a capital of 7000 Birr, currently operating on vegetable from Meki town to Southern and Central markets, discussed his experience as follows. He mainly brokers vegetable from Meki town to Southern (Shashemene, Hawasa and Hosana) and central (Adama and Addis Ababa) markets. He mentioned that the business is profitable as he is making money without incurring much cost where his capital eventually grows enormously. Currently, he has truck to transport vegetable from the spot/farm land to different market places. He is estimating his fixed and operating capital more than one and half a million. He believes that although there are many brokers in Meki market, still they are making lot of money as they don't have that much operating expense. However, there are also challenges in vegetable marketing, where he mentioned the existence of many brokers in the market; price fluctuation and changing behaviour of farmers among the challenges encountered so far with regard to vegetable marketing. He also believes that all actors have to work legally to trade vegetable in the area. Finally, he suggested that the local government, private sector and NGOs have to handle and regulate market distortion in the study area.

Source: Survey result, 2015

4.9 Opportunities and Challenges in Vegetable Market Chain

A number of challenges, opportunities and entry points for further technological, institutional and organizational innovation for upgrading the market chain in the study area were identified by the different market chain actors. In this subsection, the major challenges and opportunities of vegetable market chain are briefly discussed.

4.9.1 Production Opportunities

Dugda Woreda has a huge potential for horticultural development. The Woreda is particularly endowed with Lake Ziway, groundwater resources and rivers and that, if properly harnessed, have a great potential for irrigated agriculture and tourism.

4.9.1.1 Groundwater

Secondary data obtained from woreda indicates that there has been a substantial groundwater potential. Water is often available at less than a meter near Lake Ziway and the depth of groundwater is increasing as one

travels away from the lake. There are many small scale irrigation schemes around the lake using either water from the lake or groundwater for high value vegetable (such as onion, tomato, green beans, potato and cabbage), fruits and haricot bean production. Groundwater is hence a potential for small scale irrigation in the Woreda.

4.9.1.2 Agro-ecology

The agro-ecology of the Woreda is suitable for agricultural production, particularly vegetable such as onion, tomato, and green beans. As per KII multiplication and supplying improved seeds of vegetable such as onion, tomato, green beans and cabbage have market potentials in the Woreda.

Moreover, other opportunity identified was harmonization of different government institutions with unions (WIDA, WOA & Meki-Batu Cooperative Offices), conducive natural resources (soil, air), create employment opportunity, and availability of financial institutions like (banks, MFIs) help to enhance the production and productivity of vegetable in the Woreda.

4.9.2 Production Challenge

There are various development challenges in the Woreda influencing vegetable production. The major challenges that affect production and productivity of vegetable as respondents identified includes: overutilization of chemicals on plots of land, winding, heavy rainfall, absence of storage facilities and poor post-harvest techniques. Furthermore, irregularities of rainfall and moisture stress, use of groundwater and Lake Ziway for irrigation without proper management pose a threat to the soil (soil salinity), inaccessibility of households to electric power supply in rural areas and a relatively limited educational and health infrastructure as compared to the growing need of the population are among the key challenges that impede production of vegetable in the study area.

Other key constraints for vegetable producers in the study area identified through FGD were lack of market information and unfair price setting for farmers, low quantities and untimely supply of improved seeds, ever increasing prices of agricultural inputs (fertilizers and improved seeds), land degradation due to erosion, deforestation and lack of proper soil conservation measures.

4.9.3 Marketing Opportunities

According to the KII Dugda Woreda have three primary alternatives to market vegetable (market outlets); central market (Addis Ababa & Adama), southern market (Hawasa & Shashemene) and international market (Djibouti & Somaliland) are the primary destinations of vegetable in Dugda Woreda. Furthermore, the location of the Woreda has opened opportunities to access eastern market like Dire Dawa and Harar.

Other marketing opportunities identified were like availability of vegetable demand throughout the year, growing number of buyers (demand), high experience in vegetable production and marketing among smallholders and growing price of vegetable. The survey result shows that 94.9% of producers believe that there was a positive change in the last five years related to marketing. As a result they planned to expand vegetable sale due to benefit from marketing opportunities (Annex 5). Furthermore, other marketing opportunities identified in the study area were existence of Meki-Batu Union, good information flow among producers and farmers due to the use of mobile phone, commercialization of smallholder producers and profitability of business if carefully planned & produced. Secondary data obtained from woreda and KII indicated that agro-processing industries, trade, and services are among the marketing opportunities for scaling up of vegetable trade in the study area.

4.9.3.1 Agro-Processing Industries

Data from KII indicated that there are no agro-processing industries, which often have strong forward and backward linkages with vegetable production though the Woreda has a potential for agro-processing factories particularly vegetable.

4.9.3.2 Trade

The study findings show that Dugda Woreda has a potential for agricultural trade. It is primarily known for its vegetable with huge growth potential to supply the nearby large markets, including the capital Addis Ababa, Shashemene and Hawasa. On the demand side, improved agricultural inputs such as vegetable seeds, building materials and essential industrial consumer goods have huge demand in the Woreda.

4.9.3.3 Service Sector

The Woreda has basic infrastructure such as roads, electric power supply and telephone networks. This makes it conducive for and with huge potentials for investment in hotels, lodges and restaurants services.

4.9.4 Marketing Challenge

Price volatility of vegetable is common in Dugda Wereda, and thus, producers are uncertain about the price in every single day. Frequent price changes might have risk of loss for producers of vegetable. Accordingly, farmers are not comfortable to sell vegetable for brokers, but they rather consider them as cheaters. Hence, farmers prefer to meet wholesaler or other buyers to negotiate and sell their vegetable products. The KII respondents further highlighted that there are many brokers who always deal with farmers, negotiate and set a price of purchase based on market prices ordered by a wholesaler from Meki town or Addis Ababa.

The key challenges identified from the assessment includes; existence of oligopolistic market structure, price fluctuation, lack of credit availability, scarcity of fertilizers, high involvement and role of middlemen (brokers), less availability of inputs (insecticide and pesticide), lack of knowhow on marketing condition, high cost of seed (onion & tomato) [which increase production costs of smallholders] and supply of homogeneous products to the market. To explain homogenous products further, for instance, if onion price is expensive in the first season, then farmers are encouraged more to produce onion by the upcoming season, which create a glut in the market and eventually lead producers not to break even.

The existence of many middlemen (brokers) in the market leads to a practice of artificial price setting in the market. It is a technique used by brokers in setting shadow prices where such price most of the time could not stay for longer periods. This condition often ends up with harmful consequences to smallholder producers, mainly by lowering of selling price. Such Price is also used as a mechanism for breaking contractual agreements between unions and producers of vegetable. Another constraint is absence of safe and sound potential market, which discourages producers (unsure about market) that make them to produce below their production capacity.

4.9.5 Challenges Related to Rules, Regulations and Policy

4.9.5.1 Lack of Standard in Measurement Units

Wooden boxes are used in weighing onion or tomato (it weighs 10 kg). Currently, they are made up of light wooden materials weighing only 5kg, which creates room for cheating the farmers. Producers are misled by the weight of these new boxes as 10kg when weighing vegetable losing about 15 boxes of tomato per truck load. This is mainly due to absence of standardized materials for measurements and lack of inspection on weighing balances. Respondents confirmed that limited attempts were undertaken to avoid this problem by relevant government authorities.

4.9.5.2 Absence of Market Rules and Regulations

Vegetable marketing in Dugda Woreda is more of an informal trade with many actors. Some market actors such as brokers are doing all types of businesses in the market chains without any license. The worst challenge here is that few traders are licensed and are paying taxes while competing with non-tax payers in the same market. As per KII the illegal actors that are currently operating informally in the market should have been attracted to the formal market with some sort of incentive, which is none at this moment. Those who have license and formally joined the market system are paying tax while others are doing business informally without paying taxes. This seems penalizing those who conform to the market rules and regulations.

The operation of brokers in the production areas with a manner that distorts the orderly conduct of the market (particularly against farmers who are the majority and price takers in the market) and lack of any intervention from concerned bodies, show the absence of effecting pertinent rules and regulations. Farmers who complained to local administrations were told to agree with brokers without any attempt to identify the problems. The respondents highlighted that it need to enforce law and order in the market so as to create conducive marketing environment in which all actors enjoy equal level playing field with some form of affirmative action/support for the producers in the market.

4.9.5.3 Absence of Active Input Regulatory System

The seed production process is currently controlled by regional bureau of agriculture. But they are not inspecting and certifying locally produced vegetable seeds. Moreover, the quality of imported seed is also substandard as farmers complain about its poor germination. The same holds true for chemicals, where farmers do have complaints on the effectiveness of some of the chemicals. It is argued that the regulatory body focuses much on the food security crops like wheat, maize, teff, etc while leaving aside others. But, vegetable farmers are affected by importing low quality products and the less emphasis given to production of quality vegetable seeds locally. Farmers are also suffering from poor quality irrigation pumps that become non-operational within few days/weeks after they are purchased. This is mainly because of lack of appropriate regulatory system for irrigation pumps and equipments. This requires to set a certain minimum quality standard on the imported pumps and equipments with affordable price.

4.10 Capacity of Support Service Providers

There are capacity gaps in the trade and marketing offices of the local government as it has limited staff with marketing skills for supporting cooperatives. Extension agents (DAs) and subject matter specialists (SMS) have also limited knowledge in advising farmers on irrigated agriculture, vegetable production and marketing.

4.10.1 Short Duration of Project Interventions

Several NGOs are supporting the development of vegetable market chain in the study area. These NGOs use different projects to initiate different development interventions including establishment and capacitating cooperatives in production and marketing of vegetable. Such interventions need time to closely follow up and take corrective actions and there by ensure sustainability. However, the life span of projects is too short and thus phase-out without properly implementing their intended activities. They do not get time to test the feasibility of business models they have introduced for scaling up of best practices.

Chapter Five

Conclusions and Recommendations

5.1 Conclusions

In this study market chain of vegetable were analyzed. Vegetable market chain was discussed and attempts were made to identify key vegetable marketing actors and channels; examining market structure for major actors; and assessing of the market performance for key vegetable marketing actors and channels by quantifying costs and profit margins. Besides, production and marketing constraints and opportunities of vegetable were also discussed.

The major market chain actors identified are input suppliers, credit providers, producers, farmer traders, wholesalers, brokers, retailers and consumers. The major actors identified in the vegetable market chain are wholesalers and their brokers.

Vegetable is an important cash crop and it passes through the hands of many intermediaries. Based on the direction of flow and volume of vegetable transacted, five marketing channels were identified. The channel starts from the producers (farmers) and ends in the terminal market passing through a number of marketing actors along the chain. Accordingly, about 32,010 quintals of vegetable was marketed among the identified channels.

The identified vegetable marketing channels includes: Producers-Woreda retailer-Consumer, Producer-Broker-Central wholesaler-Retailer-Consumer, Producer-Woreda wholesaler-Central wholesaler-Retailer-Consumer, Producer-Farmer trader-Central wholesaler-Retailer-Consumer and Producer-Union-Consumer cooperative-Consumer are the main channels for vegetable marketing. The first channel was the shortest one and vital for producers and consumers to get vegetable at reasonable prices; while the second and third marketing channels were the most dominant in terms of total volume marketed for vegetable.

Profit is somewhat high for central wholesalers in channel II and this is because of direct purchase from farmers at farm land. However, in channel III central wholesalers incur a loss probably due to price fluctuation in the market and wastage loss. Subsequent to Channel II of central wholesalers, channel III of Woreda wholesalers, and channel IV of central wholesalers is comparatively the top three profitable (efficient)

channels for sale of vegetable in the study area. Profit of woreda retailers is Birr 2939 in channel I. This profit was made by direct purchase from farmers through total elimination of other middlemen (woreda brokers, woreda wholesalers and farmer traders), and directly sale to consumers. The profit obtained by central wholesalers was highest in channel II which is Birr 204,827.

Market concentration refers to the number and relative size distribution of buyers and sellers in the market. Thus, concentration ratio was calculated for vegetable market by taking 40 valid sampled cases from wholesalers, retailers, brokers, farmer traders and cooperative unions from Meki and Atikilt Tera markets. The result indicated that the first four largest volume of vegetable purchased by traders (CR_4) constitute 50% of market share which indicates existence of strongly oligopolistic market structure for vegetable marketing.

OLS simple linear regression analysis conducted specifies an existence of economies of scale and a negative correlation between average cost and total product for woreda wholesalers which implies as average total vegetable supplied to the market increases the average cost of wholesalers decreases and vice versa. When total product handled to the market increases wholesalers have an advantage and smaller similar firms have less capital and unable to compete with the larger ones. Thus, there is an entry barrier for smaller wholesalers. The existence of economy of scale for Woreda wholesalers also implies large firms market their products at considerably lower average costs than smaller firms. For every one unit increase in total product (Q); average cost (AC) of wholesalers diminishes by -0.00009 Birr.

Given the large potential for vegetable production in the country, their contribution to the total GDP has been extremely low for many reasons. The most cited reasons include lack of diversified and market oriented production, absence of vegetable market information, inadequate government interventions and absence of market regulations and legislations. Consequently, vegetable marketing needs due attention in an on-going or future vegetable development plan.

The production opportunities identified includes existence of groundwater resources, suitable agro-ecology and presence of financial institutions (banks and MFIs). On the other hand, challenges that affect production and productivity of vegetable as respondents identified include: improper utilization of chemicals on plots of land (overutilization), winding, heavy rainfall, absence of storage facilities and poor post-harvest techniques are the major ones. Furthermore, irregularities of rainfall and moisture stress, use of groundwater and Lake

Ziway water for irrigation without proper management posing a threat to the soil, and inaccessibility of households to electric power supply in rural areas impede production of vegetable in the study area.

The marketing constraints identified include: volatility of prices, presence of oligopolistic market structure, occurrence of deadly disease, high involvement and role of middlemen (brokers and wholesalers), absence of market rules and regulations and lack of standard in measurement units are major factors hindered marketing task of vegetable.

Drawbacks deterring the development of vegetable are found in all stages of the chain. At the farm-level; high costs of seed and seedlings have forced farmers to abandon vegetable production. Storage facilities and absence of collective bargaining power has also forced individual farmers to accept unfavorable deals of intermediaries such as brokers and wholesalers.

Existence of marketing malpractices reported in the study like absence of standardized weighing mechanism, quoting of lower prices and lack of accurate market information about the condition of market are common. Moreover, deficiency in capital and credit availability is also reported as major problems that constrained farmers to sell their produce at existing market price set by intermediaries. Lack of organized institution and efficient marketing system made traders in a better position to dominate the pricing.

5.2 Recommendations

- **Legalizing and supporting local vegetable markets**

Provision of tax holidays and tax cuts for licensed traders as an incentive to encourage legal trade and brokerage services is required (this could also broaden the state's tax base). Government should also find the means to control illegal actors (unlicensed traders and brokers).

Initiate standardized weighing mechanism to overcome the problem of cheating by middlemen. Plastic box of known weight should be used instead of wooden boxes with variable weight (use of wooden box should be forbidden). Using plastic boxes helps traders who buy vegetable from these areas to calculate their profit margins in advance from the normal transaction than being motivated for using wrong weight which support orderly marketing functions.

The Woreda Trade Offices should be staffed and given clear guidance in monitoring the accuracy of weighing scales and measuring boxes in vegetable markets so as to ensure enforcement of law and order in the market. The office should also be capacitated in a way that it could create/promote fair market for producers and all actors.

The government should develop criteria to make brokering an authorized and licensed business so that local authorities provide licenses to those who meet the criteria with restriction that they do only brokering. The licensed brokers should also be given training on brokering activities including legal issues.

- **Changing the role of brokers in the market**

Currently, though brokers played unresponsively for facilitation and marketing of vegetable, their contribution for development of marketing of vegetable is still undeniable, and it would have been much more helpful if they were legalized. The Woreda Trade Office and other concerned partners need to work in closer partnership and regulate brokers to play a constructive role for efficient transaction of vegetable. Hence, WTO, WIDA, WAO and other stakeholders have to capacitate brokers in collaboration through delivering continuous capacity building, trainings and supports. Besides, licensing of all actors including wholesalers involved in vegetable market before they are operating in the business is essential.

- **Changing oligopolistic market structure**

Due to the strongly oligopolistic market structure of vegetable, intermediaries face difficulties to enter or exit freely in the market. Thus, to address oligopolistic tendency, it requires change of the existing imperfect market structure so as to be competitive, through engaging all actors to freely participate in the process of vegetable marketing. To this effect, local administration has to play a key role in participating potential actors (e.g. brokers and woreda wholesalers) to trade vegetable on free market bases by creating convenient environment for all.

- **Providing a regular and accurate market information**

Lack of regular and accurate marketing information is one of the major constraints in agricultural commodity marketing in Ethiopia. The problem becomes more serious for horticultural crops in a situation where storage, processing and transport facilities are underdeveloped. Farmers obtain price information mostly from their relatives and the market itself (mainly brokers) by their own assessment. Therefore, to avoid asymmetry of price information and minimize transaction costs, it is very important to have weekly or monthly price broadcast through any available media in order to reach producers, traders and consumers.

- **Capacitating unions to supply inputs**

To ensure delivery of fertilizers for irrigated production and pesticides of the required quality at the right time producers organizations in the area (like Meki-Batu unions) should be strengthened (they have to offer their services during off season with early planning so as to address the problem).

- **Establishing vegetable processing plants**

Production of vegetable is a risky business (because of its perishability) at times of over production causing prices to fall even below its harvesting or input costs. Promoting small scale processing plants that can add value to these products is one of the means to minimize risks.

- **Support producers on crop diversification (vegetable cropping calendar)**

With a purpose of promoting crop diversification and minimize marketing risk, there is a need to have a national and regional vegetable cropping calendar. The information has to be shared throughout the country (woreda) so that development workers advise farmers what, how and for whom to produce and distribute vegetable in the market.

- **Future Research**

Based on the results and conclusions obtained in this study, further research can be drawn. On the other hand, vegetable production at the study area during dry season requires irrigation using groundwater and Lake Ziway. However, the use of lake water without proper care for irrigation purpose may put the sustainability of the lake under pressure. Unsustainable water use could also limit the shift of land and labor use from subsistence to cash crop production. Future research along this line is important and urgent as commercial flower farms recently started to boom around Lake Ziway as well as utilization of the lake for irrigation.

Farm gate (on the spot) price negotiations may fail due to asymmetric information flow from central market to trading actors. However, it would have been fairly beneficial for both parties if market price information is equally accessed at all levels. It is only occasional that negotiations fail deliberately by sellers while holding higher price tag to get information on the possible maximum judgment of the buyers. This method has a benefit in revealing information but it could also cost producers if the next negotiation ends at a lower price than what the previous buyer offered. Given the fluctuating daily vegetable prices at the central vegetable market and the perishable nature of some vegetable, it is essential to analyze the cost-benefit of using negotiation failure as information revealing strategy and the loss in product quality by sticking to high tag prices.

It is also found out that most farmers prefer selling their vegetable to wholesalers because of failure to trust in brokers. Unfortunately, most of the farmers are hardly able to access wholesalers directly and trade with them. Hence, brokers easily intervene at the guise of facilitating transaction of vegetable. Therefore, analyzing factors (determinants) affecting channel choice decision of smallholders in vegetable marketing appears a topic for further research.

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7. Appendices

Annex 1: Frequency distribution of major infrastructural facilities

Mode of transport		Peasant association			
		Bekele-girisa	Shubi-gamo	Welda-kelina	Tepo-choroke
		Count	Count	Count	Count
Agricultural input distribution center	On foot	13	12	21	9
	Animal power	8	18	4	1
	Vehicle	8	13	6	2
	Vehicle and foot	1	2	5	5
	Vehicle and animal power	6	0	0	1
MFI	On foot	5	7	0	2
	Animal power	3	15	5	1
	Vehicle	6	13	4	9
	Vehicle and foot	3	7	4	5
	Animal power and foot	3	1	0	1
Development agent's office	On foot	26	28	25	16
	Animal power	2	2	3	0
	Vehicle	6	12	6	1
	Vehicle and foot	0	2	2	1
	Foot and animal power	2	1	0	0
All weather road	On foot	24	14	20	13
	Animal power	3	14	7	0
	Vehicle	6	13	6	3
	Vehicle and foot	2	1	3	1
	Animal power and foot	1	2	0	0
	Vehicle and animal power	0	1	0	0
Seasonal road	On foot	12	28	31	11
	Animal power	0	6	2	1
	Vehicle	0	9	1	0
	Vehicle and foot	1	1	0	0
Local (PA) market	On foot	0	0	0	2
	Animal power	0	0	1	0
	Vehicle	0	0	0	1
	Vehicle and foot	0	0	0	0

Mode of transport		Peasant association			
		Bekele-girisa	Shubi-gamo	Welda-kelina	Tepo-choroke
		Count	Count	Count	Count
Local woreda market	On foot	8	7	3	2
	Animal power	4	16	12	1
	Vehicle	8	14	8	9
	Vehicle and foot	5	7	13	5
	Animal power and foot	11	1	0	1
Large urban market	On foot	0	0	0	0
	Animal power	0	0	1	0
	Vehicle	32	33	15	10
	Vehicle and foot	0	0	0	0
	Animal power and foot	0	1	0	0
Major wholesalers	On foot	7	7	0	1
	Animal power	5	16	6	1
	Vehicle	9	14	5	9
	Vehicle and foot	5	7	5	6
	Animal power and foot	10	1	0	1
Middlemen	On foot	7	7	3	2
	Animal power	9	16	12	0
	Vehicle	9	13	8	10
	Vehicle and foot	5	7	13	6
	Animal power and foot	6	0	0	0
	Raw Total	36	43	36	18

Source: Survey result, 2015

Annex 2: One way time taken and distance from infrastructural facilities in (minutes and Km)

	Peasant Administration									
	Bekele-girisa		Shubi-gamo		Welda-kelina		Tepo-choroke		Column Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
One way time taken to agricultural input distribution center in minutes	24	14	29	17	42	18	27	24	31	19
Distance from agricultural inputs in Km	2.63	1.35	3.09	1.98	4.91	13.12	4.58	3.54	3.66	7.04
One way time taken to MFI in minutes	27	13	39	25	83	41	30	23	41	30
Distance from MFI in Km	3	1	4	2	10	3	8	1	5	3
One way time taken to DA's office in minutes	15	15	23	14	35	14	20	10	24	16
Distance from development agent's office in Km	1.83	2.07	2.48	3.55	4.03	13.06	1.84	1.70	2.65	7.19
One way time taken to all weather road in minutes	16	11	31	20	40	36	69	205	34	78
Distance from all weather road in Km	1.77	1.45	3.50	2.57	6.85	16.69	51.41	208.80	10.45	77.20
One way time taken to seasonal road in minutes	10	10	10	10	12	7	17	18	11	10
Distance from seasonal road in Km	.612	.533	1.777	6.768	.706	.900	1.729	2.287	1.277	4.546
One way to local (PA) market in minutes	.	.	.	.	120	.	45	26	64	43
Distance from local market in Km	.	.	.	.	8	.	6	4	6	3
One way to local Woreda market in minutes	30	15	39	24	97	39	31	23	51	39
Distance from local Woreda market in Km	2.99	1.31	4.48	2.25	8.88	1.79	11.89	18.30	6.29	7.49
One way to large urban market in minutes	194	18	170	29	186	36	125	82	176	42
Distance from large urban market in Km	135	2	131	20	115	47	88	68	125	35
One way distance to major wholesalers in minutes	29	15	41	29	77	43	35	23	41	31
Distance from major wholesalers in Km	2.96	1.24	7.15	18.86	531.76	2153.35	8.08	1.00	84.28	831.93
One way distance to middle men in minutes	29	14	41	36	96	39	35	23	52	41
Distance from middle men in Km	2.95	1.24	4.31	2.22	8.71	2.22	8.17	1.10	5.70	3.07

Source: Survey result, 2015

Annex 3: Access to infrastructural services

Indicators	Peasant administration									
	Bekele-girisa		Shubi-gamo		Welda-kelina		Tepo-choroke		Column Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Distance from woreda market in (Km)	2.99	1.31	4.48	2.25	8.88	1.79	11.89	18.30	6.29	7.49
Distance from all weather road in (Km)	1.77	1.45	3.50	2.57	6.85	16.69	51.41	208.80	10.45	77.20
Distance from DA's office in Km	1.83	2.07	2.48	3.55	4.03	13.06	1.84	1.70	2.65	7.19
Distance from MFI in Km	3	1	4	2	10	3	8	1	5	3

Source: Survey result, 2015

Annex 4: Dugda Woreda Vegetable production from 2011-2014

Vegetable type	Total production (qt)	
	Sum	Column Sum %
Tomato	7190452	50.8%
Onion	6292043	44.4%
Pepper	103700	0.7%
Cabbage	331858	2.3%
Green bean	218769	1.5%
Radish	6716	0.0%
Kiyar	11810	0.1%
Pepperoni	3603	0.0%
Total	14158951	100.0%

Source: Survey result, 2015

Annex 5: Table Access to Inputs and Services

Types of input and services delivered		Responses N	Percent of Cases
Access to inputs problems[a]	Shortage of access to inputs in the current irrigation season (2007 E.C)	103	75.70
	Did the HH have adequate extension support in last irrigation season?	77	56.60
	Did the HH receive training in production techniques of the particular commodity (tomato/onion)?	45	33.10
	Did the HH participate in farmers' field day for the particular commodity (tomato/onion)?	26	19.10
	Do you sell on the spot?	131	96.30
	As a seller, do you face many buyers in the market?	131	96.30
	Do you think that your product is the same as others supply?	120	88.20
	Do all actors abide by rules and regulations of technical specification of the product?	8	5.90
	Organization (WIDA) monitors the supplier's performance in meeting the required technical specification?	19	14.00
	Does the organization (WIDA) monitor the supplier's performance in meeting the required technical specification?	29	21.30
	Are both seller and buyer committed to solving problems related to price setting and product quality through negotiation than threatening?	25	18.40
	As producer, do you have difficulties to market your commodities?	123	90.40
	Do you believe that the information that you receive is adequate?	34	25.00
	Do you coordinate each other in purchasing inputs with other farmers?	52	38.20
	Are you involved in contract farming through producer organization (PO) /cooperative association?	14	10.30
	Are you a member of producer organization (PO)/ cooperative association in your kebele/woreda?	51	37.50
	Were there any positive changes in the last five years related to marketing?	129	94.90

a. Dichotomy group tabulated at value 1 and it represents yes respondents.

Source: Survey result, 2015

Annex 6: FGD and key informants in the study areas

S.No	Farmers Group Discussion per PAs	Number of Interviewee
1	Bekele-girisa	9
2	Tepo-choroke	8
3	Welda-kelina	8
4	Shubi-gamo	9
	Total	34
S.No	**Key Informants**	
1	Woreda Irrigation and Development Authority	2
2	Meki-Batu Union	2
3	Input suppliers at Meki town	2
4	Farmer	1
	Total	7

Source: Survey result, 2015

Annex 7: Total volume bought by marketing actors

No	Total volume purchase by Actors Involved					
	Wholesalers	**Woreda Retailrs**	**Central Retailers**	**Central brokers**	**Farmer trader**	**Meki-Batu Union**
1	25000*	100	200		15000	20000*
2	25000*	200	300	9000	5000	
3	60000*	300	150	4000	7500	
4	15000	110	155	5500	10500	
5	10000	100	575	5500		
6	8000	310				
7	11000	170	420			
8	5000	120	500			
9	1000	300				
10	3000	100	200			
11	6000					
12	2800					
13	3000					
Total	**174800**	**1810**	**2500**	**24000**	**38000**	**20000**

* The four largest traders selected to estimate concentration ratio

Source: Survey result, 2015

Annex 8: Age of the household head

Statistics

N	Valid	136
	Missing	0
Mean		34.15
Median		32.50
Mode		28
Std. Deviation		9.794
Range		50
Minimum		18
Maximum		68

Source: Survey result, 2015

Annex 9 Producers' Survey Questionnaire

Introduction

This survey questionnaire is designed to collect data for the purpose of undertaking research for the partial fulfillment of the requirement of MA thesis in Regional and Local Development Studies at Addis Ababa University. Moreover, the survey is conducted as part of LIVES project's diagnostic research in order to understand the market chain of vegetable. The aim in this regard is primarily research for supporting development. All the information to be collected from respondents will be kept confidential, where study finding will be reported only in summarized form. The researcher is indebted to the kind cooperation of respondents and their sincerity of replies to the questionnaire.

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 farmers reply (do not put your own feeling).*
- *Please ask each question clearly and patiently until the farmer gets your points.*
- *Please do not use technical terms and do not forget local units*
- *During the process write answers on the space provided*
- *Check that all questions are asked and the interview schedule format is properly completed.*

Date of interview (dd/mm/yr): _____/_____/_____
Name of the enumerator: _____Name of supervisor: _____

Use this general codes[3]:
-888 = Not applicable
-999= Missing value

[3] *"Not applicable" is utilized whenever the question is not relevant or not applicable for the respondent, "Missing value" refers to a situation where a respondent unable or not-willing to answer the question.*

I. Geographic and administrative information

Firstly we would like to ask you some general questions about your PA.

Country: Ethiopia

01. Region: Oromia

02. Zone: East Shoa

03. Woreda: Dugda

04. PA/Kebelle _____

05. Village/gote/ gare/kushet _____

06. Agro ecology 1= highland, 2= moderete highland, 3= lowland, 4= other (specify) _____

07. Household Head's Name: _____

08. Household's sex: _____

09. Household ID: _____

10. Household head's age: _____

11. Respondent Name: _____

12. Respondent's age: _____

13. Respondent's sex: 1= Male 2 = Female

14. Commodity domain of the PA: 1=onion, 2= tomato 3=other (specify)_____

2. Indicate the distance to infrastructure and services from residence (walking time and distance in km)

Type of Infrastructure & Services	One way (in minutes)	Distance in km	Mode of Transport*	Remark
Agricultural input distribution centre				
Microfinance institution				
Development agent's office				
All weather road				
Seasonal road				
Local (PA) Market				
Local woreda market				
Large Urban Market				
Distance to major wholesalers				
Distance to middle men				

***Mode of Transport:** 1= On Foot, 2= Animal power, 3= Vehicle, 4= Vehicle and foot, 5= other (specify)

3. Household Characteristics: Please list all household members (refer codes in the next page).

HH member Code	Name	Sex[1]	Age	Marital status[2]	Relation[3]	Religion[4]	Education status[8]	Occupation[6] (P= primary, S=secondary)		Skill[7]	Ethnicity[8]	Presence[9]	Reasons for absence[10]
								P	S				
001													
002													
003													
004													
005													
006													
007													
008													
009													
010													

CODES FOR HOUSEHOLD CHARACTERISTICS:

[1] Sex:	[2] Marital status	[3] Relationship to head of household (HH)	[4] Religion	[5] Educational status
1=Male	1= single	1=Household head(HH)	1= Orthodox	1=Illiterate
2=Female	2=married	2=Spouse	2= Islam	2=Church/mosque education
	3=divorced	3=Son	3=Catholic	3=Adult literacy program
	4=widowed	4=Daughter	4=Protestant	4=Elementary school complete
	5=separated	5=Brother or sister	5=Other	5=Junior complete
	6=other (specify)	6=Mother/Father		6= 10 complete
		7=In-laws		7= 12 complete
		8=Relatives		8= College graduate
		9= Hired helper		9= Other (specify)
		10=Other (specify)		

[6]Occupation (P= Primary, S= Secondary)	[7]Special skill	[8]Ethnicity	[9]Presence number of months during 2007 E.C. (0-12 months)	[10]Reason for current absence
1=Farming	0= No special skill	1=Amhara		1=Visiting family
2=Civil Servant	1=Mason	2=Oromo		2=Away for school
3=Housewife	2=Trader/merchant	3=Other(specify)		3= Away for work
4=Daily laborer	3=Handicraft			4=Looking for work
5=PA/village official	4=Carpenter			5=Health treatment
6=Dependent	5=Traditional healer			6=Other (specify)
7=Herder	6=Other (specify)			
8=Student				
9=Trader				
10=Other(specify)				

II. Access to Services and Production

1. How long have you practiced production of vegetable products? _____years.
2. Did you have extension contact expert in relation to vegetable (onion and tomato) production in the year 2007 E.C irrigation season?
   1= Yes, 0= No
3. If your answer for Q.2 is yes, how often the extension agent contacted you specifically for vegetable production?

   1= weekly 3=monthly 5=once in a year
   2= once in two week 4=twice in the year 6= any time I ask them

4. What was the advice of extension expert specifically on vegetable production?

   1= marketing of vegetable 4=seed bed preparation
   2=transplanting 5=harvesting
   3=fertilizer (compost) applications 6=post-harvest handling
   7= others (specify)_____

5. If the extension expert advice was on marketing of vegetable, what were the specific issues addressed?

   1= what to produce 4=how to maintain quality of the product
   2=when to produce 5=information on price differences by variety or quality
   3=how to selling 6=other (specify) _____

6. Have you faced constraints related to vegetable production?

   1= Yes, 0= No

7. If yes, what are the constraints of production for vegetable? Please tick (√) one of the choices ranging from 1 to 5.

No.	Constraints of production	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
1	Insects					
2	Diseases					
3	Weeds					
4	Seedling Shortage					
5	Fertilizer Shortage					
6	Wild animals					
7	Theft					
8	Lack of market information					
9	Other (specify)					

8. Type of information/ services you need in vegetable production? Please tick (√) one of the choices ranging from 1 to 5.

No.	Extension service is required on	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
1	Seedling/ planting material preparation					
2	Weed control method					
3	Disease management					
4	Field management after plantation					
5	Post-harvest treatments and storage					
6	Marketing (information where and when to sell)					

III. Marketing of an irrigated product

1. Did you sell vegetable in the current year/ last year? 1= Yes, 0= No
2. If your answer for Q.1 is No, why you did not sell? _____.
3. If the answer to Q.1 is yes, please answer the questions below. (Please focus only on the selected irrigated vegetable and based on the commodity domain).

Plot	4. Area (in Timad, Kert)	5. Irrigated 0= no, 1=yes	6*. Crop type	7. Seed quantity (in kg)	8. Seedlings (in seed bed)	9.Seed/seedlings type: 1= local, 2=improved	10. Price of seed/seedlings (in birr/kg or number or seed bed)	11*. Source of seed	12*. Source of seedlings	13. Labor used in land preparation including plowing (units)	14. Labor for watering cultivation (units)	15. Labor used for harvesting (units)	16. Average price for labor man days (LMD)	17. Oxen days for plowing/ cultivation (timad/chimdi)	18. Oxen day price/day	19. Land value (if rented) or use local rent	20. Amount of Fertilizer (DAP, UREA, etc.) used (in KG)		21. Price of fertilizer (in Birr)		22*. Source of fertilizer	23.Organic fertilizer used in kg (Manure, Compost, etc)	24. Price of organic fertilizer (birr/kg)
																	D	U	D	U			
1=																							
2=																							

6*: Crop type codes - 1=onion, 2= tomato

11*: Source of seed code - 1=own, 2= from market, 3= AISCO, 4= cooperative association/ union, 5= other (specify)_____

12*: Source of seedlings code - 1=own, 2= private nursery, 3= government nursery, 4= cooperative nursery, 5= other (specify)_____

22*: Source of fertilizer code: 1= AISCO, 2= open market, 3=neighbor, 4= cooperative association /union 5= other (specify)_____

Plot	25. Amount of fungicide used (in Kg)	26. Price of fungicide (in Birr)	27. Amount of insecticide used (in ltr)	28. Price of insecticide (in Birr)	29*. Source of insecticide/ fungicide	30. Other expenses (in Birr)	31. Total output quantity (Kg)	32. Quantity sold (in Kg)	33. Sell price/kg	34*. Sold to whom	35. Date of sale (in month)	36*. Place of sale	37. Distance to the market (in km)	38*. Mode of transport	39. Transport cost (in Birr)	40. Freight cost (in Birr)	41. Market information cost /telephone/ (in Birr)	42*. Information source	43. Linkage with buyer firms 1= Yes, 0= No	44. Technical assistance by the buyer firm 1= yes, 0= no	45. Seed/seedling supply by the buyer firm 1= Yes, 0= No	46*. Other inputs supplied by the buyer firm	47. Other services acquired 1= loan, 2= other	48. Service fee (if outside the purchase price)
1=																								
2=																								

29*: Source of insecticide/ fungicide code: 1= AISCO, 2= open market, 3= union/cooperative, 4= other (specify)

34*: Actors: 1. Collectors, 2. Consumers, 3. Wholesaler, 4. Retailer, 5. Union/Cooperatives, 6. Processors, 7. Brokers, 8. Others (specify)

36*: Place of sale: 1= local market, 2= woreda market, 3= zonal (major) market, 4= regional market, 5= other (specify)

38*: Mode of transport: 1 = on foot, 2 = animal power, 3 = vehicle, 4. foot and vehicle 5= other (specify)

42*: Market information source code: 1= Agricultural Marketing Information Agency (AMIA), 2= fellow farmers, 3= producer organization (PO) / cooperative association, 4= broker/farmer trader, 5= mass media 6= other (specify)

46*: Inputs supplied by the buying firm 1= fertilizer, 2= fungicide /insecticide, 3= No input service 4= other (specify)

49. Did the household face shortage of access to inputs in the current irrigation season (current year)?
    1= Yes, 0= No.
50. If yes to Q. 49, indicate which inputs were lacking in the market?
    1= seed 2=seedlings, 3= fertilizers, 4= fungicide / insecticide, 5= other (specify),
51. Did the household have adequate extension support last irrigation season? 1= Yes, 0= No.
52. Did the household receive training in production techniques of the particular commodity [tomato/onion]? 1= Yes, 0= No.
53. Did the household participate in farmers' field day for the particular commodity [tomato/onion]? 1= Yes, 0= No.
54. Do you sell on the spot? 1= Yes, 0 = No.
55. As a seller, do you face many buyers in the market? 1= Yes, 0= No.
56. If yes to Q. 55, how much percent of your product purchased by a particular buyer? Approximate for onion_____% & for tomato_____%.
57. Do you think that your product is the same as what others supply? 1= Yes, 0=No.
58. Who sets the market price from the following? 1. Collectors, 2.Consumers, 3.Wholesaler, 4.Retailers, 5.Cooperatives, 6.Processors, 7.Brokers, 8. Don't know, 9.Others (specify)_____
    _____
59. Who defines the quality or technical specification of the products? 1. Collectors, 2.Consumers, 3.Wholesalers, 4.Retailers, 5.Cooperatives, 6.Processors, 7.Brokers, 8.Others (specify)_____
60. Are there rules and regulations between producers and buyers related to respecting supply dates and settling the receipts on time? 1= Yes, 0= No
61. Are there rules and regulations related to technical specification of the product?
    1= Yes, 0= No
62. Do all actors abide by rules and regulations of technical specification of the product?
    1= Yes, 0= No
63. If no to Q. 62, which actors violate mostly the rules and regulations just mentioned [refer to Q. 58&59 on list of actors)? 1. Collectors, 2. Consumers, 3. Wholesaler, 4. Retailer, 5. Cooperatives, 6. Processors, 7. Brokers, 8. Others (specify)_____
64. Is there an organization/Woreda Irrigation Development Authority (WIDA) that sets product quality standards (specifications) and regulates its safety? 1= Yes, 0= No
65. Does the organization (WIDA) monitor the supplier's performance in meeting the required technical specifications?
    1= Yes, 0= No
66. If yes to Q. 65 what is the name of the organization? _____. How often is the "regular" monitoring? _____per month /_____ per year.
67. Are both seller and buyer committed to solving problems related to price setting and product quality through negotiation rather than threatening? 1= Yes, 0= No.
68. As a producer, do you have difficulties to market your commodities? 1= Yes, 0=No.

69. If yes to Q. 68, what are the main problems related to marketing?

1=lack of market	6=poor linkage with wholesalers
2=low Price of product	7=low quality of product
3=lack of storage	8=low consumer demand
4=lack of transport	9=important role of brokers
5=lack of market information	10=others (specify) _____

70. What type of information do you receive regularly?
    1= market price, 2= volume supplied, 3=value addition possibilities, 4= market prices by quality differences, 5= other (specify)_____
71. Do you believe that the information that you receive is adequate? 1= Yes, 0= No.
72. If no to Q. 71, what do you recommend to be included in the market information supply?

_____

_____

_____

73. Do you coordinate each other in purchasing inputs with other farmers?
    1=Yes, 0= No.
74. Are you involved in contract farming through producer organization (PO) / cooperative association? 1= Yes, 0= No
75. Are you a member of producer organization (PO)/ cooperative association in your Kebele/Woreda? 1= Yes, 0= No
76. If yes to Q. 75, what are the key functions of POs / cooperative association? 1= facilitate contract farming including bargaining, 2= become part of the supply chain (collecting, sorting, grading, processing,), 3= innovation and knowledge transfer (like improved seed/seedling supply, modern harvesting and post harvesting techniques), 4= transport and storage facilities, 5= collecting market information; 6= credit service; 7= establishing a quality assurance system; 8= lobby the national government, 9= other (specify)_____
    _____
77. Were there any changes in the last five years related to marketing? 1= Yes, 0= No.
78. If yes to Q. 77, what were these changes?

_____

_____

79. Who introduced those changes among the following? 1= government promoted organs, 2=collective action, 3=NGOs, 4= individual initiatives, 5. Union/cooperatives 6= others (specify) _____
80. How is the trend of income obtained from vegetable production & marketing so far?
    1=Increasing 2=Decreasing 3= Same 4=Difficult to tell

Annex 10 Traders' Survey Questionnaire

Introduction

This survey questionnaire is designed to collect data for the purpose of undertaking research for the partial fulfillment of the requirement of MA thesis in Regional and Local Development Studies at Addis Ababa University. Moreover, the survey is conducted as part of LIVES project's diagnostic research in order to understand the market chain of vegetable. The aim in this regard is primarily research for supporting development. All the information to be collected from respondents will be kept confidential, where study finding will be reported only in summarized form. The researcher is indebted to the kind cooperation of respondents and their sincerity of replies to the questionnaire.

Instructions to Enumerators

- *Make brief introduction before starting any question, introduce yourself to the traders, greet them in local ways and make clear the objective of the study.*
- *Please fill the interview schedule according to the traders 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*
- *During the process write answers on the space provided*
- *Check that all questions are asked and the interview schedule format is properly completed.*

Date of interview (dd/mm/yr): _____/ _____/ _____
Name of the enumerator: _____Name of supervisor: _____

Use this general codes[4]:
-888 = Not applicable
-999= Missing value

[4] *"Not applicable" is utilized whenever the question is not relevant or not applicable for the respondent, "Missing value" refers to a situation where a respondent unable or not-willing to answer the question.*

Woreda Broker/intermediary

We would like to ask about how brokers purchase a particular irrigated crop (vegetable) from farmers or farmer-traders and transfer to the next channel.

81. Type of the product 1=onion 2=tomato	82. Education level (no. of years)	83*. Sex of the broker	84. Total capital	85. Operating capital	86*. Source of capital	87*. Source of credit	88. Do you have a warehouse 1= Yes, 0= No	89. Warehouse capacity (in qntls)	90*. Bought from whom	91. Date of purchase (month)	92*. Place of purchase	93. Purchase price / kg	94. Storage cost (Birr/KG)	95. Off-loading cost	96. Wastage loss (in KG)	97. Cleaning, sorting, grading cost	98.Processing cost (in Birr/ KG)	99. Packaging cost (in Birr/ KG)	100.Transport cost (in Birr/ KG)	101. Other expense	102. Sell price (in Birr/ KG)	103*. Sold to whom	104. Date of sell (month)	105*. Place of sell	106*. Services acquired from organizations	107*. Services given by organizations	108. Service fee/cost

83*: Sex: 1= female, 2= male;

86*: Source of capital: 1= own, 2= credit from formal institutions, 3= credit from friends, parent or neighbors, 4= other (specify)

87*: Credit source: 1= bank, 2= microfinance institution, 3= family/friends, 4= supplier, 5= other (specify)

90*:103*. Actors: 1= consumer, 2= farmer 3=broker (intermediary), 4= wholesaler, 5= retailer, 6= service cooperatives, 7= processor, 8= consume, 9=other (specify)

92*: 105*. Place of purchase/sale: 1= local market, 2= woreda market, 3= zonal (major) market, 4= regional market, 5=central market 6= farm land (spot) 7= other (specify)

106*: Services acquired: 1= market information, 2= Credit services, 3= storage, 4= transport, 5= packaging, 6=processing, 7= other, specify.

149*. Service given by: 1= AMIA, 2= private firm, 3=union/cooperative, 4= rented vehicle, 5= regular transporter, 6= own processing, 7= processing enterprise, 8= other (specify)

109. As a seller, do you have a particular buyer? 1= Yes, 0= No.

110. If yes to Q. 109, how much percent of your product has been purchased by the firm?

Approximate for onion_____%; & for tomato_____%.

111. Are there sellers in the market who supply similar products as you do?

1= Yes, 0= No.

How many sellers are there in the market? Approximate for onion_____ & for tomato_____.

112. As a buyer, do you have difficulty in obtaining sufficient supplies?

1= Yes, 0= No.

113. As a buyer do you have difficulty in obtaining timely supplies? 1= Yes, 0= No.

114. As a buyer do you have difficulty in obtaining quality supplies? 1= Yes, 0= No

115. Can similar actors (like your firm) freely enter the market? 1= Yes, 0= No.

116. If No to Q. 115 what is the constraining factor for firm to enter the market freely? _____

_____

117. Are there barriers to entry of actors engaged in vegetable marketing? 1= Yes, 0= No.

118. If yes to Q. 117, what are the specific entry barriers?

1=legal barriers 4= social barriers 7=other (specify) _____

2=political barriers 5=lack of experience _____

3= financial barriers 6=discrimination

119. Is there a strong trust and cooperation evident among brokers/intermediaries?

1= Yes, 0= No.

120. Is there a strong trust and cooperation between farmer and brokers/intermediaries?

1= Yes, 0= No

121. If No for Q.120, what are the apparent choke points or bottlenecks in the channel?

_____

122. Do brokers/intermediaries have rules and regulations to follow in buying or selling vegetable? 1= Yes, 0= No.

123. How is the marketing operation of brokers/intermediaries regulated?

1. From outside, 2.self-regulated

3. No regulation, 4. Other (specify) _____

124. Did you have contract producers? 1= Yes, 0= No

125. If yes to Q. 124, do producers required to meet a specified product quality or standard?

1= Yes, 0= No

126. What services did you provide to your contract farmers?

1.market information 3.storage 5.Packaging

2.credit services 4.transport 6. other (specify)_____

127. How often do producers fail to deliver the agreed supply?

1= always, 2= often, 3= rarely, 4=none

Woreda wholesaler

We would like to ask you about how woreda wholesaler purchases irrigated crops (a particular vegetable) from farmers or local assemblers and transfers to the next channel.

128. Type of product 1=onion 2=tomato	129. Education level (no. of years)	130*.Sex of the wholesaler	131. Total capital	132. Operating capital	133*. Source of capital	134*. Source of credit	135. Do you have a warehouse 1= Yes, 0= No	136. Warehouse capacity (in quintals)	137*. Bought from whom	138. Bought qty (kg) or qntls	139. Date of purchase (month)	140*. Place of purchase	141. Purchase price / kg	142. Storage cost (Birr/KG)	143. Off-loading cost	144. Wastage loss (in KG)	145. Cleaning, sorting, grading cost	146. Processing cost (in Birr/ KG)	147. Packaging cost (in Birr/ KG)	148. Transport cost (in Birr/ KG) or Birr/qntls	149. Other expense	150. Sell price (in Birr/ KG)	151*. Sold to whom	152. Date of sell(month)	153*. Place of sell	154*. Services acquired from organizations	155*. Services given by organizations	156. Service fee/cost

130*: Sex: 1= female, 2= male

133*: Source of capital: 1= own, 2= credit from formal institutions, 3= credit from friends, parent or neighbors, 4= other (specify)

134*: Credit source: 1= bank, 2= microfinance institution, 3= family/friends, 4= supplier, 5= other (specify)_____

137*: 151*. Actors: 1= consumer, 2= farmer 3=broker (intermediary), 4= Wholesaler, 5= Retailer, 6= service cooperatives, 7= processor, 8=consumer, 9=other (specify)

140*: 153*. Place of Purchase/sale: 1= local market, 2= woreda market, 3= zonal (major) market, 4= regional market, 5=central market 6=farm land (spot) 7= other (specify)_____

154*: Services acquired: 1= market information, 2= Credit services, 3= storage, 4= transport, 5= packaging, 6=processing, 7= other, specify.

155*: Service given by: 1= AMIA, 2= private firm, 3= union/cooperative, 4= rented vehicle, 5= regular transporter, 6= own processing, 7=processing enterprise, 8= other (specify)

157. As a seller, do you have a particular buyer? 1= Yes, 0= No.

158. If yes to Q. 195, how much percent of your product does the firm purchases? Approximate for onion____% & for tomato_____%.

159. Do you have sufficient buyers in the market? 1= Yes, 0= No.
Approximate number of buyers in the market for onion_____ & for tomato_____

160. Do you face challenge from several sellers in the market? 1= Yes, 0= No.
Approximate number of sellers in the market for onion_____& for tomato_____

161. As a buyer, do you have difficulty of obtaining sufficient supplies? 1= Yes, 0= No.

162. As a buyer, do you have difficulty of obtaining timely supplies? 1=Yes 0=No

163. As a buyer, do you have difficulty of obtaining quality supplies? 1=Yes 0=No

164. Can similar actors freely enter the market? 1= Yes, 0= No.

165. If no to Q164, what are the barriers to entry of actors in vegetable marketing?

1= legal barriers 4= social barriers 7=other (specify) _____
2=political barriers 5=lack of experience _____
3=financial barriers 6=discrimination

166. Is there a strong trust and cooperation evident among woreda wholesalers? 1= Yes, 0= No.

167. Is there a strong trust and cooperation between farmer and woreda wholesalers?
1= Yes, 0= No

168. If no to Q. 167 what are the apparent choke points or bottlenecks in this channel? _____.

169. Do woreda wholesalers have rules and regulations they have to follow in buying or selling vegetable? 1= Yes, 0= No.

170. How is the marketing operation of woreda wholesalers regulated?
1= from outside, 2=self-regulated 3=no regulation.
4=other (specify) _____

171. Did you have contract producers? 1= Yes, 0= No

172. If yes to Q. 171, what are the specified product qualities or standard required to meet?_____
_____

173. What services you provide to your contract farmers?

1=market information 3=storage 5=packaging
2=credit services 4=transport 6=other (specify)_____

174. How often do producers fail to deliver the agreed supply?
1= always, 2= often, 3= rarely, 4=none

Wereda retailer

We would like to ask you about how woreda retailers purchase irrigated crops (a particular vegetable) from farmers or woreda wholesalers and transfer to the next channel.

175. Type of product 1.onion 2. tomato	176. Education level (no. of years)	177*. Sex of the retailer	178. Total capital	179. Operating capital	180*. Source of capital	181*. Source of credit	182. Do you have a warehouse 1= Yes, 0= No	183. Warehouse capacity (in quintals)	184*. Bought from whom	185. Bought quantity (in KG) or qntls	186. Purchase price / kg	187. Date of purchase (month)	188*. Place of purchase	189. Storage cost (Birr/KG)	190. Off-loading cost	191. Wastage loss (in KG)	192. Cleaning, sorting, & grading cost	193. Processing cost (in Birr/ KG)	194. Packaging cost (in Birr/ KG)	195. Transport cost (in Birr/ KG) or Birr/qntls	196. Other expense	197. Sell price (in Birr/ KG)	198*. Sold to whom	199. Date of sell (month)	200*.Place of sell	201*. Services acquired from organizations	202*. Services given by organizations	203. Service fee/cost

177*: Sex: 1= female, 2= male

180*: Source of capital: 1= own, 2= Credit from formal institutions, 3= credit from friends, parent or neighbors, 4= other (specify)

181*: Credit source: 1= Bank, 2= microfinance institution, 3= family/friends, 4= supplier, 5= other (specify)

184*: 198*. Actors: 1= consumer, 2= farmer 3=broker (intermediary), 4=wholesaler, 5=retailer, 6= service cooperatives, 7=processor, 8= consumers cooperatives, 9=other (specify)_____

188*: 200*. Place of purchase/sale: 1= local market, 2= woreda market, 3= zonal (major) market, 4= regional market, 5=central market 6=farm land (spot) 7= other (specify)

201*: Services acquired: 1= market information, 2= Credit services, 3= storage, 4= transport, 5= packaging, 6=processing, 7= other, specify.

202*: Service given by: 1= AMIA, 2= Private firm, 3= Union/cooperative, 4= Rented vehicle, 5= regular transporter, 6= own processing, 7= processing enterprise, 8= other (specify)

204. As a seller, do you have a particular consumer? 1= Yes, 0= No.

205. If yes to Q.204, how much percent of your product is purchased by the particular consumer?

For Onion_____%, & for tomato_____%

206. Do you have sufficient buyers in the market? 1= Yes, 0= No

207. Do you face challenge from many sellers in the market? 1= Yes, 0= No

Approximate number of sellers in the market: for Onion_____ & for tomato_____.

208. As a buyer, do you have difficulty of obtaining sufficient supplies? 1= Yes, 0= No.

209. As a buyer, do you have difficulty of obtaining timely supplies? 1= Yes, 0= No.

210. As a buyer, do you have difficulty of obtaining quality supplies? 1= Yes, 0= No.

211. Can similar actors (retailers) freely enter the market? 1= Yes, 0= No.

212. Are there barriers to entry of actors engaged in vegetable marketing? 1= Yes, 0= No.

213. If yes to Q. 212, what are the specific entry bottlenecks?

1= lack credit availability 4= shortage of inputs 7=other (specify) _____
2=poor infrastructure 5=poor market linkage _____
3=limited competition 6=limited technical support

214. Is there strong trust and cooperation evident among retails? 1= Yes, 0= No.

215. Is there a strong trust and cooperation between woreda retailers and wholesalers?

1= Yes, 0= No

216. What are the apparent bottlenecks or challenges in the vegetable marketing channel for retailers?

_____

_____

217. Do retailers have rules and regulations to follow in buying or selling vegetable?

1= Yes, 0= No.

218. Is the marketing operation of retailers regulated from outside, or self-regulated?

1=from outside 2=self regulated 3=no regulation 4=other (specify)_____

Rural assembler/ farmer trader

We would like to ask you about how rural assembler/ farmer trader purchases irrigated crops (selected vegetable) from farmers and transfers it to the next channel.

219. Type of the product 1. Onion 2. Tomato	220. Education level (no. of years)	221.* Sex of assembler/farmer trader	222. Total capital	223. Operating capital	224*. Source of capital	225*. Source of credit	226.Do you have a warehouse 1= Yes, 0= No	227. Warehouse capacity (in qntls)	228. Bought quantity (in KG) in the current season	229*. Bought from whom	230. Date of purchase (month)	231*. Place of purchase	232. Purchase price / kg	233. Wastage loss (in %)	234. Storage cost (birr/KG)	235. Off-loading cost (in Birr)	236. Bulking cost (in Birr)	237. Cleaning cost (in Birr)	238. Sorting & grading (certification) cost (in Birr)	239. Processing cost (in Birr / KG)	240. Packaging cost (in Birr/ KG)	241. Transport cost (in Birr/ KG)	242. Sell price (in Birr/ KG)	243*. Sold to whom	244. Date of sell (month)	245*. Place of sale	246*. Services acquired	247*. Services given by	248. Service fee/cost

221*: Sex: 1=female, 2= male

224*: Source of capital: 1= own, 2= credit from formal institutions, 3= credit from friends, parent or neighbors, 4= other (specify)

225*: Credit source: 1= own, 2= bank, 3= microfinance institution, 4= family/friends, 5= buyer, 6= other (specify)

229*: 243*- Actors: 1= producer, 2= farmer trader/broker (intermediary), 3= wholesaler, 4=retailer, 5= service cooperatives, 6 = processor, 7= consumer, 8= other (specify);

231*: 245*Place of purchase/sale: 1= local market, 2= woreda market, 3= zonal market, 4=regional market, 5= other (specify);

246*: Services acquired: 1= market information, 2= credit services, 3= storage, 4= transport, 5= packaging, 6=processing, 7= other, specify.

247*: Service given by: 1= AMIA, 2= Private firm, 3= Union/cooperative association, 4= regular transporter, 5= processing enterprise, 7= other (specify)

249. As a buyer, do you have a particular seller? 1= Yes, 0= No
250. If the answer to Q. 249 is no, how many farmers could be your potential sellers with respect to a particular vegetable? Approximate for onion_____, & for tomato_____.
251. As a seller, do you have a particular buyer or firm? 1= Yes, 0= No.
252. If yes to Q. 251 how much percent of your product does the firm take? Approximate for onion_____%, & for tomato_____%.
253. Are there sellers in the market who supply similar products as you do? 1= Yes, 0= No.
254. If yes to Q. 253, how many sellers are there in the market (approximately)? _____.
255. As a buyer, do you have difficulty of obtaining sufficient supplies? 1= Yes, 0= No.
256. As a buyer, do you have difficulty of obtaining timely supplies? 1= Yes, 0= No.
257. As a buyer, do you have difficulty of obtaining quality supplies? 1= Yes, 0= No.
258. Can similar actors (like your firm) freely enter the market? 1= Yes, 0= No.
259. If no to Q. 258 what is the constraining factor for firm to enter the market freely?_____
_____
260. Are there barriers to entry of actors engaged in vegetable marketing? 1= Yes, 0= No.
261. If yes to Q. 260, what are the specific entry barriers?
1=legal barriers 4= Social barriers 7= other (specify) _____
2=Political barriers 5=lack of experience _____
3=Financial barriers 6=discrimination
262. Is there a strong trust and cooperation between farmers and assemblers or farmer-traders? 1= Yes, 0= No
263. Do assemblers/farmer-traders have rules and regulations to follow in buying and selling vegetable? 1= Yes, 0= No.
264. How is the marketing operation of assemblers/farmer-traders regulated?
1= from outside 2=self-regulated 3=no regulation 4=other (specify)_____
265. Are there factors in the environment that support growth of channels of vegetable marketing? 1= Yes, 0= No.
266. If yes to Q. 265, what are those supporting factors?
1= easier credit availability 4=availability of inputs 7=other (specify) _____
2=access to infrastructure 5=market linkage _____
3=fair competition among traders 6=technical advice
267. If no to Q.265, what are the factors that hinder growth of channels of vegetable marketing?
1=lack credit availability 4=shortage of inputs 7= other (specify) _____
2=poor infrastructure 5=poor market linkage _____
3=limited competition 6=limited technical support

Central Broker

We would like to ask about how the central broker purchases irrigated crops (a particular vegetable) directly from farmers or/and regional wholesalers and transfers to the next channel.

268. Type of the product 1. Onion 2.tomato	269.Education level (no. of years)	270*. Sex of the regional/central broker	271. Total capital	272. Operating capital	273*. Source of capital	274*. Source of credit	275. Do you have a warehouse 1= Yes, 0= No	276. Warehouse capacity (in qntls)	277*. Bought from whom	278. Bought quantity (in KG)	279. Date of purchase (month)	280*.Place of purchase	281. Purchase price / kg	282. Storage cost (Birr/KG)	283.Wastage loss (in KG)	284.Cleaning, sorting, grading cost	285. Processing cost (in Birr/ KG)	286. Packaging cost (in Birr/ KG)	287. Transport cost (in Birr/ KG)	288. Other expense	289. Sell price (in Birr/ KG)	290*. Sold to whom	291. Date of sell(month)	292*. Place of sale	293*. Services acquired	294*. Services given by	295. Service fee/cost

270*: Sex: 1=male 2=female

273*: Source of capital: 1= own, 2= credit from formal institutions, 3= credit from friends, parent or neighbors, 4=other (specify)

274*: Credit source: 1= Bank, 2= microfinance institution, 3= family/friends, 4= supplier, 5= other (specify)

277*: 290*. Actors: 1=consumer, 2=farmer 3=broker (intermediary), 4=wholesaler, 5=retailer, 6=service cooperatives, 7=processor, 8=consume, 9=other (specify)

280*: 292*. Place of purchase/sale: 1= local market, 2= woreda market, 3= zonal (major) market, 4= regional market, 5=central market 6=farm land (spot) 7= other (specify)

293*: Services acquired: 1=market information, 2=credit services, 3=storage, 4=transport, 5=packaging, 6=processing, 7=other, specify.

294*: Service given by: 1=AMIA, 2=private firm, 3=union/cooperative, 4=rented vehicle, 5= regular transporter, 6= own processing, 7=processing enterprise, 8= other (specify)

296. As a seller, do you have a particular buyer? 1= Yes, 0= No.

297. If yes to Q. 296, how much percent of your product is purchased by the particular buyer?

For onion_____% & for tomato_____%

298. Do you face challenges from many brokers in the market? 1= Yes, 0= No

299. Do you have sufficient customer in the market? 1= Yes, 0= No

Approximate number of customers in the market: for onion_____& for tomato_____.

300. As a broker, do you have difficulty in obtaining sufficient suppliers? 1= Yes, 0= No.

301. As a broker, do you have difficulty in obtaining timely suppliers? 1= Yes, 0= No.

302. As a broker, do you have difficulty in obtaining quality suppliers? 1= Yes, 0= No.

303. Can similar brokers freely enter the market? 1= Yes, 0= No.

304. If no to Q. 303, what are the barriers to entry of brokers engaged in vegetable marketing?

1=legal barriers
2=political barriers
3=financial barriers
4=social barriers
5=lack of experience
6=discrimination
7=other (specify) _____

305. If yes to Q. 303, what are the supportive factors to freely join the market?

1=easier credit availability
2=access to infrastructure
3=fair competition among traders
4=market linkage
5=technical advice
6=other (specify)_____

306. Is there a strong trust and cooperation evident among central brokers? 1= Yes, 0= No.

307. Is there a challenge in trust and cooperation between central wholesalers and brokers?

1= Yes, 0= No

308. What are the apparent bottlenecks or challenges of brokers in the vegetable marketing channel?_____

_____

309. Do central brokers have rules and regulations to follow as a broker in the marketing of vegetable? 1= Yes, 0= No.

310. If yes to Q. 309, how is the operation of central brokers regulated?

1= from outside, 2= self-regulated,
3=no regulation, 4=other (specify) _____

Central wholesaler

We ask about how regional wholesaler purchases irrigated crops (a particular vegetable) from farmers or broker or woreda wholesalers and transfers to the next channel.

311. Type of the product 1.onion 2.tomato	312.Education level (no. of years)	313*. Sex of the central wholesaler	314. Total capital	315. Operating capital	316*. Source of capital	317*. Source of credit	318. Do you have a warehouse 1= Yes, 0= No	319. Warehouse capacity(in quntls)	320*. Bought from whom	321. Bought quantity (in KG)	322. Date of purchase (month)	323*. Place of purchase	324. Purchase price / kg	325. Storage cost (Birr/KG)	326. Wastage loss (in KG)	327. Cleaning, sorting, grading cost	328. Processing cost (in Birr/ KG)	329. Packaging cost (in Birr/ KG)	330. Transport cost (in Birr/ KG)	331. Other expense	332. Sell price (in Birr/ KG)	333*. Sold to whom	334. Date of sell(month)	335*. Place of sale	336*. Services acquired	337*. Services given by	338. Service fee/cost

313*: Sex: 1=male, 2=female

316*: Source of capital: 1= own, 2= credit from formal institutions, 3= credit from friends, parent or neighbors, 4= other (specify)

317*: Credit source: 1= Bank, 2= microfinance institution, 3= family/friends, 4= supplier, 5= other (specify)

320*: 333*. Actors: 1=consumer, 2=farmer 3=broker (intermediary), 4=wholesaler, 5=retailer, 6=service cooperatives, 7= processor, 8=consumer, 9=other (specify)

323*: 335*. Place of purchase/sale: 1= local market, 2= woreda market, 3= zonal (major) market, 4= regional market, 5=central market 6=farm land (spot) 7=other (specify)

336*: Services acquired: 1= market information, 2= Credit services, 3= storage, 4= transport, 5= packaging, 6=processing, 7= other, specify.

337*: Service given by: 1= AMIA, 2= Private firm, 3= Union/cooperative, 4= Rented vehicle, 5= regular transporter, 6= own processing, 7=processing enterprise, 8= other (specify)

339. As a wholesaler, do you have a particular buyer? 1= Yes, 0= No.

340. If yes to Q. 339, how much percent of your product is purchased by your particular buyer? Approximate for onion_____% & for tomato_____%.

341. Do you have sufficient buyers in the market? 1= Yes, 0= No

Approximate the number of buyers in the market for onion_____& for tomato_____.

342. Do you face challenges from many wholesalers in the market? 1= Yes, 0= No

Approximate number of wholesalers in the market for onion: _____& for tomato_____.

343. As a buyer, do you have difficulty in obtaining sufficient supplies? 1= Yes, 0= No.

344. As a buyer, do you have difficulty in obtaining timely supplies? 1= Yes, 0= No.

345. As a buyer, do you have difficulty in obtaining quality supplies? 1= Yes, 0= No.

346. Can similar actors (like your firm) freely enter the market? 1= Yes, 0= No.

347. Can similar wholesalers freely enter the market? 1= Yes, 0= No.

348. If no to Q. 347, what are the barriers / bottlenecks to entry of wholesalers engaged in vegetable marketing?

1=legal barriers
2=political barriers
3=financial barriers
4=social barriers
5=lack of experience
6=discrimination
7=other (specify) _____

349. Is there a strong trust and cooperation evident among wholesalers? 1= Yes, 0= No.

350. Is there a problem of trust and cooperation between wholesalers and brokers or farmers?

1= Yes, 0= No

351. If yes to Q. 350, what are the apparent bottlenecks or challenges in this channel?_____

_____.

352. Do wholesalers have rules and regulations to follow in buying and selling vegetable?

1=Yes, 0=No.

353. How is the operation of regional wholesalers regulated?

1=from outside, 2=self-regulated, 3=not regulated,

4=other (specify)_____

354. Did you have contract producers? 1= Yes, 0= No

355. If yes to Q. 354, do producers required to meet a specified product quality or standard? 1=Yes, 0=No

356. What services do you provide to your contract farmers?

1=market information 3=storage 5=packaging

2=Credit services 4=transport 6=Other (specify)_____

357. How often do producers fail to deliver the agreed supply?

1= always, 2= often, 3= rarely, 4=none

Central Retailer

We would like to ask about how regional retailer purchases of irrigated crops (a particular vegetable) directly from farmers and regional wholesalers or woreda wholesalers and transfers to the next channel.

358. Type of the product 1.onion 2. tomato	359. Education level (no. of years)	360*. Sex of central retailer	361. Total capital	362. Operating capital	363*. Source of capital	364*. Source of credit	365. Do you have a warehouse 1= Yes, 0= No	366. Warehouse capacity (in qntls)	367*. Bought from whom	368. Bought quantity (in KG)	369. Purchase price / kg	370. Date of purchase (month)	371*. Place of purchase	372. Storage cost (Birr/KG)	373. Wastage loss (in KG)	374. Cleaning, sorting, grading cost	375. Processing cost (in Birr/ KG)	376. Packaging cost (in Birr/ KG)	377. Transport cost (in Birr/ KG)	378. Other expense	379. Sell price (in Birr/ KG)	380*. Sold to whom	381. Date of sell (month)	382*. Place of sell	383*. Services acquired	384*.Services given by	385. Service fee/cost

360*: Sex: 1=male, 2= female

363*: Source of capital: 1=own, 2=Credit from formal institutions, 3= credit from friends, parent or neighbors, 4= other (specify)

364*: Credit source: 1=bank, 2=microfinance institution, 3= family/friends, 4= supplier, 5= other (specify)

367*: 380*. Actors: 1=consumer, 2=farmer 3=broker (intermediary), 4=wholesaler, 5=retailer, 6=service cooperatives, 7=processor, 8=consumer cooperatives, 9=other (specify)

371*: 382*. Place of purchase/sell: 1=local market, 2=woreda market, 3=zonal (major) market, 4=regional market, 5=central market 6=farm land (spot) 7= other (specify)

383*: Services acquired: 1=market information, 2=credit services, 3=storage, 4=transport, 5=packaging, 6=processing, 7=other (specify)

384*: Service given by: 1= AMIA, 2= Private firm, 3= Union/cooperative, 4= Rented vehicle, 5= regular transporter, 6= own processing, 7=processing enterprise, 8= other (specify)

386. As a seller or central retailer, do you have a particular buyer? 1= Yes, 0= No.

387. If yes to Q. 386, how much percent of your product purchased by your particular buyer?

Approximate for onion_____% & for tomato_____%.

388. Do you have many buyers in the market? 1= Yes, 0= No

Approximate number of buyers in the market: for onion_____& for tomato_____.

389. Do you face challenges from many sellers in the market? 1= Yes, 0= No

Approximate number of sellers in the market: for onion_____& for tomato_____.

390. As a buyer, do you have difficulty in obtaining sufficient supplies?

1=Yes, 0=No.

391. As a buyer, do you have difficulty in obtaining timely supplies? 1= Yes, 0= No.

392. As a buyer, do you have difficulty in obtaining quality supplies? 1= Yes, 0= No.

393. Can similar retailers (like you) freely enter the market? 1= Yes, 0= No.

394. If no to Q. 393, what are the barriers / bottlenecks to entry of retailers engaged in vegetable marketing?

1=legal barriers
2=political barriers
3=financial barriers
4=social barriers
5=lack of experience
6=discrimination
7=other (specify) _____

395. Is there strong trust and cooperation evident among retailers? 1= Yes, 0= No.

396. Is there a strong trust and cooperation between wholesalers and retailers? 1= Yes, 0= No

397. What are the apparent choke points or bottlenecks in this channel?_____

_____.

398. Do retailers have rules and regulations to follow in buying or selling vegetable?

1= Yes, 0= No.

399. How is the operation of regional retailers regulated?

1=from outside, 2=self-regulated, 3=not regulated

4=other (specify) _____.

Annex 11 Key Informants' Interview Guiding Questions (Checklist)

Woreda_____
Kebele_____
Date_____
Name of interviewee_____
Title of the interviewee_____

1. What is the panorama of vegetable market?
2. What are the key actors involved in vegetable marketing?
3. Which actors do play crucial role in vegetable marketing?
4. What are the role of women in production and marketing of vegetable?
5. What is the role of FTCs on vegetable production? How?
6. What are the challenges and opportunities faced by smallholders in vegetable production?
7. What outputs are achieved so far on dissemination of vegetable technologies?
8. What are the possible solutions to correct these problems?
9. What are the constraints and opportunities affecting vegetable marketing?
10. What do you suggest to tackle the challenges?
11. Which are the months of the year that prices are lowest and highest for vegetable marketing?
12. What are the condition of infrastructure like/accessibility of roads, availability of water, storage facilities etc/?

Annex 12 Checklist for Farmers' Group Discussion

1. Group members should:

- *Respect others and their views*
- *Strive to be honest and transparent*
- *Recognize and acknowledge social reactions*

2. The Moderator should

- *Act as catalyst between individuals of the group*
- *Strive to enhance capacity of rural people in analysis of problems and opportunities*
- *Find ways of integrating dominant and quiet people and makes sure that all group members are able to express their opinions*
- *Make sure that the group keeps to the topic but flexible in handling additional information*
- *Take care of time management*
- Listen carefully to any group member and does not much

Woreda_____

Kebele_____

Total number of participants_____

Date_____

1. What are the main actors participated in marketing/trading of vegetable?
2. What are the linkages /interactions/ partnerships between actors?
3. What are the gender roles in production and marketing of vegetable?
4. What are the strengths of production and marketing of vegetable?
5. What are the opportunities on production & marketing of vegetable?
6. What are the constraints of production and marketing of vegetable?
7. What are the threats on production & marketing of vegetable?
8. What is your possible solution to rectify the production and marketing related problems?
9. Discuss out the main challenges faced by each actors (assemblers, brokers, wholesalers, retailer and cooperatives) separately?
10. How do farmers perceive/look themselves as starter of the chain processes?