Value Chain Analysis of Maize and Haricot Bean in Central Rift Valley of Ethiopia: The Case of Adami Tulu-Jido Kombolcha and Dugda Districts

M.Sc. Thesis

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Value Chain Analysis of Maize and Haricot Bean in Central Rift Valley of Ethiopia: The Case of Adami Tulu-Jido Kombolcha and Dugda Districts

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By

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APPROVAL SHEET

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As Thesis Research Advisors, we hereby certify that we have read and evaluated this Thesis prepared, under our guidance, by Muluken Asfaw entitled "Value Chain Analysis of Maize and Haricot Bean in Central Rift Valley of Ethiopia: The Case of Adami Tulu Jido Kombolcha and Dugda Districts" We recommend that it be submitted as fulfilling the thesis requirement.

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As member of the Board of Examiners of the M.Sc. Thesis Open Defense Examination, We certify that we have read, evaluated the Thesis prepared by Muluken Asafaw and examined the candidate. We recommended that the Thesis be accepted as fulfilling the Thesis requirement for the Degree of Master of Science in Agriculture (Agricultural Economics).

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DEDICATION

I dedicate this thesis manuscript to my family for their continuous contribution throughout my life.

STATEMENT OF AUTHOR

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BIOGRAPHY

The author was born on March 22, 1987 in Yirgachefe, Sidama zone. He attended his elementary school education at Dipo and Sabian Elementary Schools; and secondary school studied at St. Theresa School and Dire Dawa Comprehensive Secondary School all in Dire Dawa. After a successful completion of preparatory school studies, he joined Haramaya University College of Agriculture and Environmental Science in 2007 and graduated with B.Sc. degree in Agricultural Economics in June 2009. After his graduation, in the year 2010, he was employed by St. Theresa School as a teacher for two and half years and also worked a year on ACORD Dire Dawa project implementing charity association. He joined Haramaya University in July 2011 to pursue his M.Sc. degree in Agricultural Economics program.

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LIST OF ABBREVATIONS

ATJK	Adami Tullu Jido Kombolcha
BDS	Business Development Services
CIMMYT	International Maize and Wheat Improvement Center
CIRAD	Center Internationale en Recherché Agronomique Pourle Development
CRV	Central Rift Valley
CSA	Central Statistics Agency
EARI	Ethiopia Agricultural Research Institute
ETB	Ethiopian Birr
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
INRA	International Institute National de la Recherché Agronomique
OESPO	Oromia Economic Study Project Office
PSE	Pioneer Seed Enterprise
SIMLESA	Sustainable Intensification of Maize and Legumes Cropping System for Food Security in Eastern and Southern Africa
SNNP	Southern Nations, Nationalities and Peoples
TLU	Tropical Livestock Unit
UNCTAD	United Nations Conference on Trade and Development
USAID	United States Agency for International Development
WFP	World Food Program

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ABSTRACT

This study was initiated with the general objective of analyzing maize and haricot beans value chains in the Adami Tulu Jido Kombolcha and Dugda districts of Central Rift Valley of Ethiopia. The main objectives of the study were to map and identify the actors of the value chains, the structure of costs and incentives among them and to identify determinants of farmers' participation decision and marketed volume in the study areas. In this study, both primary and secondary data were used. A total of 200 sample households, 65 maize traders, 28 haricot beans traders, 6 input suppliers and 2 processors were taken. Producers, assemblers, wholesalers, retailers, cooperatives and unions were found to be important actors in the maize value chain. In haricot beans market, in addition to mentioned actors, exporters were the intermediaries found in the market in the study areas. Value chain governance was studied on the basis of control over volume of flow, contractual agreement, quality and level of competition. The highest value added in maize and haricot beans was 192.43 ETB/qt and 358.96 ETB/qt respectively. Producers gained the highest gross profit in maize and haricot beans value chains. The Heckman two-stage econometric estimation procedure was employed to identify factors that determine market participation decision and intensity of participation of maize. In maize market, the selection equation results showed that participation decision was positively and significantly affected by market price, district dummy and source of price information. The outcome equation results revealed that intensity of participation was found to be positively and significantly affected by market price, district dummy, land size, livestock holding, distance to main market, family size, source of price information and literacy level. On the other hand, haricot beans market, since the inverse mills' ratio was insignificant ML was applied. District dummy, land size, non-farm income and number of extension contact were found to significantly affect market participation and intensity of participation; in addition, the participation was positively and significantly affected by sex, source of price information and distance to main market negatively. The outcome equation identified market price, level of education and family size was found to affect positively and significantly; and negatively to livestock holding. Lambda is significant for maize and insignificant for haricot bean market. To upgrade the value chain, minimizing loss at production and marketing stage; planting maize processing factories; minimizing costs of production through establishing seed producing enterprises are the actions to be taken to strengthen the sector development.

1. INTRODUCTION

1.1. Background

The main crop production in Ethiopia include: cereals, pulses, oilseeds, vegetables, root crops, fruit crops, Chat, coffee, hops, sugarcane, and —enset. Of this production, cereals constitute the largest share, about 80 percent of the total crop production. The five major food grains—teff, maize, sorghum, wheat, and barley—make up 96 percent of total cereal production (Von Braun and Tolulope, 2007).

Cereals are the major food crops both in terms of the area they are planted and volume of production obtained. They are produced in larger volume compared with other crops because they are the principal staple crops. Cereals are grown in the country with varying quantity. Out of the total grain crop area, *teff*, maize, sorghum and wheat take up 22.6%, 17%, 15.9% and 11.9% of the grain crop area, respectively (CSA, 2012). Cereals contributed 86.1% of the grain production. Maize, *teff*, wheat and sorghum made up 27.8%, 16%, 13.3 % and 18.1 % of the grain production, in the same order. The same source shows that the private peasant holders grow various crops for own consumption and/ or economic benefits.

Legumes are also among the various crops produced in all regions of the country after cereals. Legumes are grown in different volumes across the country. Legumes grown cover 13.4 % of the grain crop area and 10.6% of the grain production. Faba beans, haricot beans, and chick peas were planted to 3.8 %, 2.7% and 1.8% of the grain crop area. The production obtained from faba beans, haricot beans and chick peas was 3.3 %, 1.8 % and 1.8 % of the grain production, in that order (CSA, 2012).

Grain legumes play important roles on farms, in human diets and for the sustainability of agriculture. Many of the poorest countries in the world derive 10-20% or more of their total dietary protein from grain legumes of which Ethiopians total dietary protein is measured 15%. Grain legumes provide 7.5% of total protein intake in the developing world, three times higher than the 2.5% proportion found in the developed world (Akibode and Maredia, 2011).

According to CSA (2012), in East Shoa of Oromia regional state private households produce grain crops of cereals, pulses and oil seeds dominantly. Because of its large geographical coverage and the scale of production, maize plays a critical role in the food security of the country and particularly the poor. Area coverage production of maize accounts 36% of all cereals produced and from legume group faba beans, chick peas and haricot beans accounts 10%, 23 % and 43% respectively. The level of production of maize accounts 42% of all cereals produced and from legume group faba beans, chick peas and haricot beans accounts 13%, 29% and 36% respectively.

The study areas, Adami Tullu Jido Kombolcha (ATJK) and Dugda are the major cereals and legumes producer districts in the Central Rift Valley (CRV) of Oromia region. These districts are endowed with available land and water resources that offer high potential for irrigation development and have the capacity to grow different annual and perennial crops. Even though the districts are more favorable for cereal and legume crops production in particular, due to several socioeconomic problems, the value chain activity faced challenges. So in this study, maize and haricot bean value chain analysis including input supply, production, marketing and value adding activities were identified and analyzed using data obtained from households and market participants.

1.2. Statements of the Problem

Given the fact that maize is one of the priority crops of the country and the existence of enormous potential for improving yield, a number of constraints that face the agricultural sector should be addressed to increase productivity and improve market performance. The major constraints are lack of storage and marketing facilities in both the surplus producing and the consumption centers; weak producers' organizations and limited participation in maize seed production and distribution and marketing of members' output (USAID, 2010).

The maize value chain in Ethiopia involves input suppliers, producers, traders (local assemblers and wholesalers), retailers and processors, and consumers. The marketing chains are long and involve too many operators who rarely provide marketing services beyond transport and storage. The market supply is also fragmented as a result of the small volume handled by traders and limited number of large scale buyers. Large buyers also face the challenges of procuring uniform and consistent supply of quality maize since there are no formal quality control infrastructures such as instruments for checking level of

moisture content or color or size, resulting in concerns about the presence of aflatoxins (Rashid, et al., 2010).

According to USAID (2010), a set of constraints spanning the value-chain of legume are in production, aggregation and trading, and commercialization exports. Productivity is below potential due to low input usage, especially chemical fertilizers capable of increasing yields in field trials by 10 to 80 percent; limited availability of seed and limited familiarity with the variety of existing pulse types and limited usage of modern agronomic practices.

Legumes product aggregation and trading is complex that reduced product quality through excessive handling and lessened and the link between the producers and the export markets is weak due to the large number of ineffective intermediaries operating in the value chain. The intermediaries have failed to acquire scale and operate in limited geographic areas. The fragmentation of intermediaries between the producer and consumer markets creates a lack of transparency in markets. Credit access for primary cooperatives and unions is accounted only 1% and 10% respectively. In terms of market information, market participants typically have either no or ill-informed information on prevailing grain prices, supplies, stocks and inter-regional grain flows. These show aggregating and trading activity is limited by constrained access to finance for smaller marketing actors is inadequate road networks which creates transportation difficulties (Dawit, 2010). The other problem on legume value chain is that the country is not ensured in consistent demand for its pulse exports.

Many studies have been undertaken in the production, aggregation and marketing, and commercialization of maize and legumes products in different parts of the country. However little has been done on the value chain approach which is strongly advocated as a viable strategy to increase producers' competitive position and better integration to the dynamics of global value chain. The study areas have potential in production of maize and legume, but such study has been conducted little.

To this effect, the value chain analysis for the commodities were conducted to reduce the gap on the subject and to better understand improved strategies to reorient the benefit of value chain actors. The study attempted to address the following questions.

- Who are the actors and what kind of organizational structure do they have in value chains of maize and haricot bean?
- How governance, incentives and cost structures are existed in the value chain?
- What amount of maize and haricot bean is sold and what are its determinants?
- What are constraints and opportunities of maize and haricot bean in the value chain?

1.3. Objectives of the Study

The main objective of the study is to conduct maize and haricot bean value chain analysis in central Rift Valley of Ethiopia with a specific focus on two districts (ATJK and Dugda).

The specific objectives of the study are:

1. To identify and map maize and haricot bean value chains actors and their interactions;
2. To assess the governance, incentives, and cost structures of maize and haricot bean value chain actors;
3. To estimate the marketed surplus of maize and haricot bean and to identify its determinants; and
4. To identify constraints and opportunities of maize and haricot bean value chain.

1.4. Significance of the Study

The study can generate valuable information on value chain analysis of maize and haricot bean that might assist policy makers at various levels to make relevant decisions to intervene in the development of maize and haricot bean production, marketing, processing and designing of appropriate policies and strategies. Governmental and nongovernmental organizations that are intervening through their programs in the development of maize and legumes value chains are expected to benefit from the result of this study. The findings of the study might also be useful to input suppliers, producers, traders, consumers, and marketing agents to make their respective decisions. It may also serve as a reference material for further research on similar topics and other related subjects.

1.5. Scope and Limitations of the Study

The study focuses on mapping major value chain actors; assessing the cost structure of these actors and also constraints and opportunities in the value chain. The study also

concentrates mainly on identifying determinants of market participation and volume marketed surplus by maize and haricot bean producers. The area coverage of households will be restricted only to two districts, ATJK and Dugda, based on the problem faced in value chain of these commodities. The sampled households farm gates will be a conception of commodities and the destination of the chain is at the hands of final consumers found in near cities (Adama and Hawasa) and towns (Shashemene and Batu). Due to time and resources limitations, the study doesn't represent the entire value chain of maize and legumes in the country.

1.6. Organization of the Thesis

The thesis is organized into five chapters. It starts with the introduction, which includes statement of the problem, objectives, significance and limitation of the study. The second chapter reviews literature that deals with past studies and information pertinent to the study. The third chapter explains research methodology including description of the study area, sampling techniques, methods of data collection and tools for data analysis. In the fourth chapter the main findings of the study are discussed. Finally, conclusions and recommendations are provided in chapter five.

2. LITERATURE REVIEW

2.1. Basic Concepts and Definitions

Value Chain: Refers to a sequence of target oriented combinations of production factors that create a marketable product or service from its conception to the final consumption. This includes activities as design, production marketing distribution and support services up to the final consumer. The activities that comprise a value chain can be contained within a single firm or divided among different firms, as well as a single geographical location or spread over wider areas (ILO, 2006).

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

Value chain is a specific type of supply chain – one where the actors actively seek to support each other so they can increase their efficiency and competitiveness. They invest time, effort and money, and build relationships with other actors to reach a common goal of satisfying consumer needs – so they can increase their profits (KIT *et al*., 2006).

Value chain actors: Actors in a value chain may include input suppliers, producers, itinerant collectors (small and mobile traders who visit villages and rural markets), assembly traders (also called primary wholesalers who normally buy from farmers and itinerant collectors and sell to wholesalers), wholesalers (who deal with larger volumes than collectors and assemblers and often perform important storage functions), retailers (who distribute products to consumers), and processors (firms and individuals involved in the transformation of a product) (Kaplinisky and Morris, 2001).

Value chain actors are those involved in supplying inputs, producing, processing, marketing, and consuming agricultural products (Getnet, 2009). They can be those that

directly involve in the value chain (rural and urban farmers, cooperatives, processors, traders, retailers, cafes and consumers) or indirect actors who provide financial or non financial support services, such as credit agencies, business service and government, researchers and extension agents (KIT *et al*., 2006).

Marketing channel:

It 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 (Koler and Armstrong, 2003). 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).

Marketable and marketed surplus:

Marketable surplus is the quantity of the produce left out after meeting the farmers' consumption and utilization requirements for kind payments and other obligations such as gifts, donation, charity, etc. Thus, marketable surplus shows the quantity left out for sale in the market. The marketed surplus shows the quantity actually sold after accounting for losses and retention by the farmers, if any and adding the previous stock left out for sale. Thus, marketed surplus may be equal to marketable surplus, it may be less if the entire marketable surplus is not sold out and the farmers retain some stock and if losses are incurred at the farm or during transit (Thakur *et al.*, 1997*)*.

Marketing cost and margins

Marketing costs: Refers to costs incurred to perform various marketing activities in moving products from producers to consumers. Marketing costs include handling costs (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 (and officials) to reach an agreement, transferring the product, monitoring the agreement to see that its conditions are fulfilled, and enforcing the exchange agreement (Holloway and Ehui, 2002).

Marketing margins: A marketing margin is the percentage of the final weighted average selling price taken by each stage of the marketing chain. The total marketing margin is the difference between what the consumer pays and what the producer/farmer receives for his product. In other words, it is the difference between retail price and farm price (Cramers and Jensen, 1982). A wide margin means usually high prices to consumers and low prices to producers. The total marketing margin may be subdivided into different components: all the costs of marketing services and the profit margins or net returns. 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 services (Wolday, 1994).

2.2. Agricultural Value Chains and Value Chain Analysis

Although the value chain approach in general has a long tradition especially in industrial production and organization, its application in international development and agriculture, has gained popularity only in the last decade.

Value chain analysis is a powerful tool for managers to identify the key activities within the firm which form the value chain for that organization, and have the potential of a sustainable competitive advantage for a company. There in, competitive advantage of an organization lies in its ability to perform crucial activities along the value chain better than its competitors. The value chain framework of Porter (1990) is “an interdependent system or network of activities, connected by linkages”. When the system is managed carefully, the linkages can be a vital source of competitive advantage (Pathania, 2001). The value chain analysis essentially entails the linkage of two areas. Firstly, the value chain links the value of the organizations’ activities with its main functional parts. Then the assessment of the contribution of each part in the overall added value of the business is made (Lynch, 2003).

Value chain approaches have been used to analyze the dynamics of markets and to investigate the interactions and relationships between the chain actors. The agricultural value chain approach is utilized by many development interventions that intend to engage smallholders either individually or collectively into the production of market oriented high

value crops. Concepts and analytical tools for analyzing the functioning of agricultural value chains are, therefore, important to understand the impact of chain development interventions on smallholders and the rural poor. Similar to the agricultural innovation systems perspective, value chain approaches help orient agricultural development thinking more towards a systems perspective (Rich *et al.,* 2008).

There are four major basic concepts in agricultural value chain analysis: value chain, stages of production, vertical coordination and business development services. Since value chains are composed of hierarchy of chain stages, the concept of stages of production is basic in value chain analysis. Closely related to the stages of production is the concept of vertical coordination. A value chain needs business support services to function. Hence, the fourth basic concept is the concept of business development services. Kaplinsky and Morris (2001) have given brief descriptions of these basic concepts below:

Agricultural value chain

An agricultural value chain is usually defined by a particular finished product or closely related products and includes all firms and their activities engaged in input supply, production, transport, processing and marketing (or distribution) of the product or products. According to Kaplinsky and Morris definition, the value chain as 'the full range of activities which are required to bring a product or service from conception, through the intermediary phases of production, delivery to final consumers, and final disposal after use.' An agricultural value chain can, therefore, be considered as an economic unit of analysis of a particular commodity or group of commodities that encompasses a meaningful grouping of economic activities that are linked vertically by market relationships. The emphasis is on the relationships between networks of input suppliers, producers, traders, processors and distributors (UNCTAD, 2000).

The value chain concept entails the addition of value as the product progresses from input suppliers to producers and to consumers. A value chain, therefore, incorporates productive transformation and value addition at each stage of the value chain. At each stage in the value chain, the product changes hands through chain actors, transaction costs are incurred, and generally some form of value is added. Value addition results from diverse

activities including bulking, cleaning, grading and packaging, transporting, storing and processing.

Value chains encompass a set of interdependent organizations, and associated institutions, resources, actors and activities involved in input supply, production, processing, and distribution of a commodity. In other words, a value chain can be viewed as a set of actors and activities, and organizations and the rules governing those activities. Value chains are also the conduits through which finance (revenues, credit, and working capital) move from consumers to producers; technologies are disseminated among producers, traders, processors and transporters; and information on customer demand preferences are transmitted from consumers to producers and processors and other service providers.

Stages of production

In agricultural value chain analysis, a stage of production can be referred to as any operating stage capable of producing a saleable product serving as an input to the next stage in the chain or for final consumption or use. A stage of production in a value chain performs a function that makes significant contribution to the effective operation of the value chain and in the process adds value.

Vertical coordination

The performance of an agricultural value chain depends on how well the actors in the value chain are organized and coordinated, and on how well the chain is supported by business development services (BDS). Verticality, in value chains, implies that conditions at one stage in the value chain are likely to be strongly influenced by conditions in other stages in the vertical chain, in direct and/or indirect ways, and in expected and/or unexpected ways. It should be noted that intra-chain linkages are mostly of a two-way nature. A particular stage in a value chain may affect and be affected by the stage before or after it.

The result of good coordination between the stages of a value chain may be reflected in a good match between buyer preferences and seller supplies. That is, better coordination in a

value chain results in better matching of demand and supply between the chain stages, resulting in efficient and low-cost exchange, quality maintenance, and value addition.

Business development services

Closely related to the concept of value chains is the concept of business development services. These are services that play supporting role to enhance the operation of the different stages of the value chain and the chain as a whole. In order to farmers to engage effectively in markets, they need to develop marketing skills and receive support from service providers who have better understanding of the markets, whether domestic or international. Local business support services are, therefore, essential for the development and efficient performance of value chains. Business development services can be grouped into infrastructural services; production and storage services; marketing and business services; and financial services.

2.3. Purposes of Value Chain Analysis

The value chain approach analyzes the firms in a market chain—from input suppliers to final buyers—and the relationships among them. It analyzes the factors influencing industry performance, including access to and the requirements of end markets; the legal, regulatory and policy environment; coordination between firms in the industry; and the level and quality of support services. Relationships among firms in an industry can facilitate production and marketing efficiencies and enable the flow of information, learning, resources and benefits (SNV, 2007).

Value chain analysis is conducted for a variety of purposes. The primary purpose of value chain analysis is to understand the reasons for inefficiencies in the chain and identify potential leverage points for improving the performance of the chain, using both qualitative and quantitative data. In general, agricultural value chain analysis can be used to understand how an agricultural value chain is organized (structure), operates (conduct) and performs (performance) (Anandajayasekeram and Berhanu, 2009).

Value chain analysis facilitates an improved understanding of competitive challenges, helps in the identification of relationships and coordination mechanisms, and assists in understanding how chain actors deal with powers and who governs or influences the chain. Developing value chains is often about improving access to markets and ensuring a more efficient product flow while ensuring that all actors in that chain benefit. Changing agricultural contexts, rural to urban migration, and resulting changes for rural employment, the need for pro-poor development, as well as a changing international scene (not least the increase in oil prices) all indicate the importance of value-chain analysis (Anandajayasekeram and Berhanu, 2009).

Kaplinsky and Morris (2001) argue that there are three main sets of reasons why value chain analysis is important in this era of rapid globalization. The first reason they raised is that with the growing division of labor and the global dispersion of the production of components, systemic competitiveness has become increasingly important. Second, efficiency in production is only a necessary condition for successfully penetrating global markets. Third, entry into global markets which allows for sustained income growth requires an understanding of dynamic factors within the whole value chain.

The value chain can help to answer questions regarding how the produce reach the final consumer; the structure (economic relationships) between players in the chain; how this structure is likely to change over time; the key threats to the entire value chain; and the key determinants of your share of the profits created by your chain. It helps policy maker to find out where the bottlenecks are. Which part of the chain holds up in the others? Which bottlenecks deserve priority attention of government? Where can the donor agencies help (Hubert, 2005)?

2.4. Dimensions of Value Chain

Value chain analysis can be an important tool with which one examines structural change. Altogether, a value chain comprises five dimensions; these are the technical structure, the actors in a chain, the territorial, the input output and the governance structure (Gereffi, 1994). The analysis of these structures will give answers to a set of questions: How does the production process run? Who participates at which stage? Where do the different stages take place? How are they inter-linked? Who has which benefits, etc. They are

needed to find the relevant points of intervention for a successful integration of poor population sections. The different dimensions of a value chain are explained below.

Technical structure and actors:

The technical production process can generally be separated into five stages: input supply, primary production, processing, marketing and consumption. On every stage, one to several different actors can be found.

Trading activities do not only take place between the stages of processing and consumption but also between production and processing or input supply and production. Nevertheless, it is not mentioned as an own stage of the chain there. It is assumed that between these stages trading activities are mostly undertaken by the participants of the respective stages as a pure transfer of goods within the production process without specific marketing activities (Schipmann, 2006).
Territorial structure:

The territorial structure is understood as the geographic concentration or dispersion of production and marketing and which gives an overview of the location of the single stages of a value chain (Stamm, 2004). This is the spatial boundaries of a value chain. The geography implies that some value chains can be international, while others could be national, regional or local (McCormick and Schmitz, 2001).

Input-output structure:

The input-output structure is a set of products and services linked together in a sequence of value-adding economic activities (McCormick and Schmitz, 2001). It concerns the link of inputs, activities and actors involved in the production, trade and finalization of the commodity for the consumer market and the geographical coverage (Tuvhag, 2008). The input-output structure gives mainly an overview about four aspects: the amount and quality of a good that is needed from one stage of the chain to fulfill the requirements of the following stage, the value that is created on each stage, the profit distribution in a chain and the information flow between the single stages of a chain (Schipmann, 2006).

Governance structure:

Nadvi (2008) described the governance of various institutional involved in value chains. He defined governance as the institutional structure by which rules are set and implemented. Governance is a central concept to value chain analysis and can be defined as non- market coordination of economic activity. Governance ensures that interaction between firms along a value chain exhibit some reflection of organization rather than being simply random. Another important feature of governance is that it involves the ability of one firm in the chain to influence or determine the activities of other firms in the chain. This influence can extend to defining the products to be produced by suppliers. This power is exercised through the lead firms control over key resources needed in the chain, decisions about entry to and exit from the chain and monitoring of suppliers (Rounder, 2004).

Humphrey and Shmitz (2001) argue that the issue of governance in value chain is important for market access, fast track to acquisition of production possibilities, distribution of gains, leverage points for policy initiatives, and channel for technical assistance.

2.5. Framework for Value Chain Analysis

Agricultural value chain analysis systematically maps chain actors and their functions in production, processing, transporting and distribution and sales of a product or products. Through this mapping exercise, structural aspects of the value chain such as characteristics of actors, profit and cost structures, products flow and their destinations, and entry and exit conditions are assessed. As such, value chain analysis is a descriptive construct providing empirical framework for the generation of data. However, value chain analysis also provides an analytical structure to gain insights into the organization, operation and performance of the chain (Kaplinisky and Morris, 2001).

Agricultural value chain analysis is a dynamic approach that examines how markets and industries respond to changes in the domestic and international demand and supply for a commodity, technological change in production and marketing, and developments in organizational models, institutional arrangements or management techniques. The analysis

should look at the value chain as a set of institutions and rules; as a set of activities involved in producing, processing, and distributing commodities; and as a set of actors involved in performing the value adding activities. Value chain analysis focuses on changes over time in the structure, conduct and performance of value chains, particularly in response to changes in market conditions, technologies and policies. (Kaplinsky and Morris, 2001).

Value chain analysis is very effective in tracing product flows, showing the value adding stages, and identifying key actors and their interaction in the chain. It is actor oriented. Generally, Taylor (2005) has outlined the following summary of value chain analysis methodology.

Understanding supply chain structure and selecting a target value stream:

The objective of value chain analysis is to improve supply chain performance with a view to enhance competitiveness. A pre-requisite, therefore, is an understanding of the scope of the processes, which make up the supply chain system. Because most firms are part of complex supply networks, it is common to find that they do not have a clearly defined picture of their supply chain structures. A first task for the value chain analysis team is to develop a supply chain structure map.

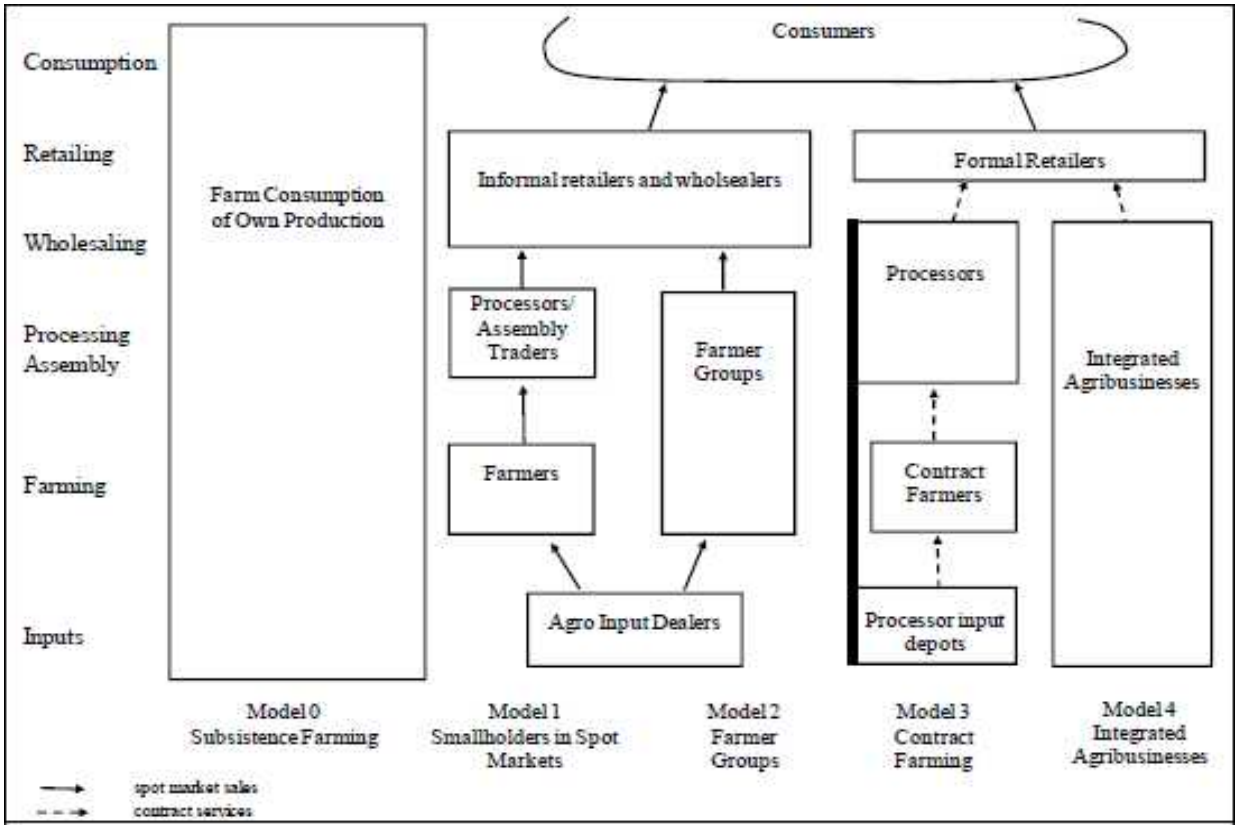
Analysis of the individual facilities along the chain:

In order to collect the data necessary to understand the overall chain, the individual plant and facilities along the chain will be analyzed. Process activities mapping is used to record identify and quantify the value adding or non-value adding steps in the process.

Analysis of issues and opportunities along the whole chain:

Mapping of the complete chain inevitably throws up many issues and improvement opportunities. The value stream mapping model naturally leads to classification of issues into those related to physical flows and those related to information flows. It is suggested, however, that it is useful to consider further dimensions in terms of issues related to the organization, management and control of the chain.

Figure 1 depicts the framework of value chain in developing countries. The arrows reflect a possible order of analysis of value chains: define constraints for the value chain under study – study (redesign) opportunities for this value chain – define upgrading options, taking into consideration value chain constraints (Trienekens, 2011). The main aim of a value chain is to produce value added products or services for a market, by transforming resources and by the use of infrastructures – within the opportunities and constraints of its institutional environment. Therefore, constraints for value chain development are related to market access (local, regional, international) and market orientation, available resources and physical infrastructures (Porter 1990) and institutions (regulative, cognitive and normative; Scott, 1995).



Source: Byerlee (2012) and Haggblade (2012).

Figure 1: Business models for inclusive agricultural value chains

The three components of value chain analysis are network structure, value added and governance structure. A network structure has two dimensions: vertical and horizontal. The vertical dimension reflects the flow of products and services from primary producer up to end-consumer. The horizontal dimension reflects relationships between actors in the same chain link (between farmers, between processors, etc.).

2.6. Review of Empirical Studies

Value Chain Analysis

Wubshet (2010) conducted a study to analyze value chain of fair trade coffee with equal emphasis on the conventional value chain and their respective functions in Bedeno district. According to the study, farmers are actors in both fair trade and conventional (mainstream) value chains of coffee. The other actors in conventional coffee value chain are collectors, suppliers and exporters. For Fair trade coffee value chain actors are primary cooperatives and union. Collectors were engaged in purchasing coffee from remote areas and at town markets. Suppliers buy coffee from producers and collectors and process and transport it to central market, Dire Dawa. At the apex, there are exporters who buy coffee from suppliers through ECX trade system. In the same study, exporters reprocess and meet export standard and export coffee. Primary cooperative perform the work of both collectors and suppliers where collecting and processing function. The collected coffees processed and sell to the union. Union were responsible for reprocess and export to both specialty and conventional market.

Abraham (2013) conducted a study on vegetable value chain analysis in Habro and Woldya districts of East Hararghe zone. He identified roles of actors as vegetable producer farmers, cooperatives, private pesticides/herbicides suppliers, Haramaya University and World Vision as input suppliers. Collectors were engaged in purchasing vegetables from remote areas and sell at town markets to wholesalers. Wholesalers purchase vegetables from farmers and collectors and sell to retailers, exporters and consumers. Retailers purchase vegetables from producers, collectors and wholesalers and sell to consumers. The study also stated support of institutions facilitation tasks like creating awareness, facilitating joint strategy building and action and, the coordination of support.

A study of Thomas et al (2012) was conducted on staple food value chain in which performance of the rice value chain studied in terms of rewards, costs and margins across the value chain segments in South Asia, specific to Bangladesh, China and India, stated cost items in the value chain. The study revealed the largest category of costs in the value chain was farmers' external inputs which accounted 36% and 44% of value-chain costs in Bangladesh and China respectively. Hired farm labor was an expensive cost in Indian rice

value chain. It accounted to 42% of farm costs and 35% in the entire rice value chain. In addition to these cost; operational and transport costs, milling costs and energy costs in the post harvest activities (fuel and electricity) were found to be major cost items in the value chain.

A study has also conducted on market assessment of staple foods value chain analysis in Kenya to provide a framework for the development of a strategic plan to improve the value and the volume of staple foods marketed. In maize value chain analysis key constraints faced the subsector at input, production, processing, marketing and policy level and, on the other hand, its potential market opportunities were identified. Based on a recent study (Mulinge et al., 2009) the cost of fertilizer accounted for 28% of total production cost. According to USAID (2010), inadequate credit facilities and high cost of finance for farmers and traders, high and increasing processing cost, inadequate, untimely and low utilization of market information, and unpredictable maize import and export policies.

Supply Analysis

A study conducted on market chain of *teff* and wheat in Alaba which identified determinants of supply of *teff* and wheat, econometric result showed that quantity produced access to market information, access to extension service and sex of the household head significantly affected the volume of *teff* supplied to the market. Moreover, quantity produced access to credit and price of other (pepper) crop significantly affected volume of wheat supplied to the market (Mohammed, 2010).

A study of Yaynabeba et al (2011) conducted on factors influencing market participation decision and extent of participation of haricot bean farmers in Meskan district of Ethiopia. Among the significant variables which affect market participation decision, value of haricot bean produced, access to market information, farm size, education level, access to credit showed positive effect. The extent of market participation among haricot bean producers was significantly affected by farm size, value of haricot bean produced, access to input supply and access to credit.

Rehima (2006) investigated factors affecting pepper supply in Alaba and Siltie of SNNPS of Ethiopia. According to the results of the study, the regional wholesaler and urban assemblers purchased about 44% and 28% of farmers' production, respectively. Market information is the main problem. The study has identified the main determinants of pepper market participation decision and its effect on the quantity supplied. One of the most important variables influencing the decision to participate in pepper market is pepper production. The other factors that adversely affects market participation is crop yield of the households. Moreover, pepper production and extension services are the significant factors of the quantity of pepper supplied. Non - farming income and number of livestock owned are found to affect the quantity of pepper supplied negatively.

A study was also conducted to estimate factors affecting the market participation decision and volume marketed of papaya in east shoa of Ethiopia. Determinants of participation decision variables were access to credit, family size of the household, current market price, access to market information and non-farm income. However, intensity of participation were affected by land size, age of the household headed, family size of the household, sex of the household headed, and experience in papaya production. The coefficient associated with the inverse mill's ratio was not significant; indicating that no unobserved factors might be affected participation decision and volume marketed (Toyiba, 2013).

3. RESEARCH METHODOLOGY

3.1. Description of the Study Areas

The Central Rift Valley (CRV) in Ethiopia (between 38°00' to 39°30' E and 7°00'to 8°30' N) covers about one million ha and is part of the Great African Rift Valley. The CRV is in the centre of the Ethiopian Rift, 150 km southwest of the capital Addis Ababa, and encompasses three large lakes, i.e. Lake Ziway, Abyata and Langano, and three major rivers, i.e. Bulbula, Meki and Katar. Lake Shala, which borders the CRV, forms together with Lake Abyata the Abyata-Shala Lakes National Park. The CRV is situated in the administrative regions of Oromia and the Southern Nations and Nationality Peoples (SNNPS) region and covers approximately 10,000 km^2 (Francisco, 2008).

Adami-Tulu-Jido-Kombolcha (ATJK) district

ATJK district is located at167 km from the Capital Addis Ababa. There are 38 administrative kebeles. From the total area 45% is cultivated, about 30% is used for grazing and woodlands, 7% is classified as marginal land and other land uses account for about 18% (OESPO, 2003). According to the same source the elevation of the districts ranges from 1500 to about 2300 m asl with mountain Aluto as highest peak of 2335 m-asl. The mean annual temperature is 20^0C at Ziway and Adami Tullu station (OESPO, 2003). May is the hottest month with a mean maximum temperature of 28^0C and the coolest month is December with a mean minimum temperature of 10^0C.

ATJK area is 1403 km^2 with a total population of 141,745 (in 1997) of which more than 70% lives in rural areas. The livelihoods of local farmers mainly depend on mixed farming of crops and livestock. Land use of ATJK is characterized by open wood land, annual crops, livestock grazing and some irrigated agriculture. Livestock, crops and forest products are the main sources of income for the farmers in ATJK. Farm size, number of livestock and draught animals (oxen) are the main factors which determine the wealth status of farmers. Farm holding size ranges from 0.75 to 3 ha with an average size of 1.5 ha. The average family size is 4.6. Maize, haricot bean, *teff*, wheat and sorghum are

mainly grown under rain fed conditions. The greatest proportion of the land is grown with maize and haricot bean (OESPO, 2003).

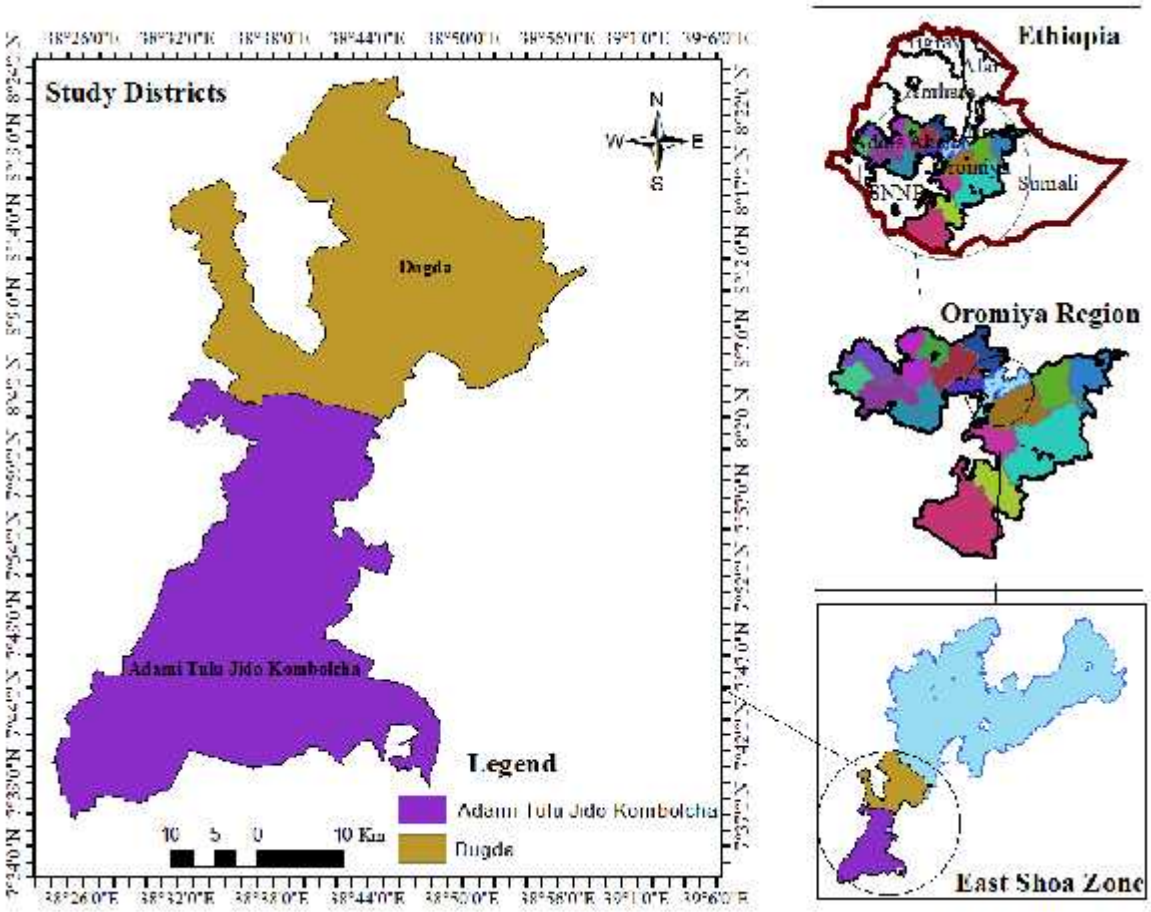


Figure 2: Map of study districts

Dugda district

Dugda district is located at central rift valley in East Shewa zone of Oromia region. The capital city of this district is Meki town, which is located at 134 km from Addis Ababa along the main asphalt road that lead through Mojjo to Hawassa. Neighborhood SNNPS to the west, Zeway Dugda to the East, Bora district to the North and Adami Tullu Jiddo Combolcha district to the south. The district has a total of 36 kebeles. It's total population and households were estimated to be 157,818 and 17,156, respectively (CSA, 2011). Of the total of the district's population of 157,818, about 81,186 were males and 76,632 were

females. Amongst the total 17,156 rural agricultural household, 14,721 and 2,435 were male and female headed household, respectively.

The district has a total area of 95,945 hectare and is situated 8^0 01'to $8^0$25'N Latitude and $38^0$32'to $39^0$04'E Longitude. From this, cultivated land accounts for 52,490 hectare, grass land 13,417 hectare, forest land 3411 hectare, water body 12032, mountain and stone 298 hectare, and others 14297 hectare. Soil type was sandy soil 70%, clay soil 20%, and salty soil 10%. In addition to these, the topography of the district is 96.38% plain, 3.46% mountain. The district's attitudes range from 1600 to 2000 m. a. s. l. The mean annual temperature and rainfall are 22 to 28^0c and 700 to 800mm, respectively.

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

This study will be carried out in two districts (ATJK and Dugda) in CRV. These districts are covered under the Sustainable Intensification of Maize and Legumes Cropping System for Food Security in Eastern and Southern Africa (SIMLESA) program with farm household level maize and legumes production, consumption and marketing data collected in 2011 and 2013 to be used in this study.

3.2. Sampling Techniques

ATJK and Dugda districts, as study areas were selected purposively for two major reasons. First the districts are a predominant grower of maize and legumes in the central rift valley of Ethiopia where the environment is suitable to produce the crops. Secondly, there are potential input supplier cooperatives and unions to distribute improved seeds, fertilizers and chemicals for the producers.

Producers sampling

From the two districts a total of 200 households were surveyed, 100 from each, and the sample has been selected based on a two-stage random sampling technique to obtain necessary data. The first stage involved selecting the major maize and legumes producing *kebeles* from each based on information obtained from districts Agriculture and Rural Development Office. In the second stage, proportional sampling method was employed to draw representative samples from each district on the basis of population size of maize and legumes producing households (Table 1). A simplified formula suggested by Yamen (1967), was used to determine sample size as:

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

where n is the sample size, N is the population size of maize and haricot bean growers in the study areas and e is the level of precision assumed to be 5%.

Table 1: Sample distribution of maize and haricot beans producers

Districts	No. of kebeles	Sampled kebeles	Sample size
ATJK	38	7	100
Dugda	36	7	100
Total	74	14	200

Source: survey result, 2013

Traders sampling

After random selection of output traders (wholesalers, retailers, and assemblers), input suppliers (cooperatives and unions) and processors data were collected using independent semi structured questionnaires designed for this purpose. The number of sample traders was determined based on traders list forwarded by districts trade and industry office of potential market towns.

The sites for the trader surveys were market towns in which a good sample of maize and legume traders existed. On the basis of flow of the commodities, four markets Arada at Shashemane, Batu *gebeya* at Batu, Meki *gebeya* at Meki and Amede at Adama were selected, which are the main maize and legume marketing sites in/around the study areas.

Due to the absence of reliable census information on the population of traders in both areas, the first step in drawing a systematic random sample was conducted in the selected markets. Scheaffer et al. (1996) states that: "A systematic sample is generally spread more uniformly over the entire population and thus may provide more information about the population than an amount of data contained in a simple random sample."

Table 2: Sample size of traders and processors in their respective towns

Traders	Adama	Batu	Meki	Shashemane	Total
Rural assemblers	1	5	2		8
Urban assemblers				3	3
Rural wholesalers			1		1
Urban wholesalers	10	10	3	5	28
Urban retailers	21	6	2	9	38
Processors	2				2
Total	34	21	8	17	80

Source: Survey result, 2013

An attempt was made to select representative sample whenever possible using systematic random sampling by incorporating licensed and un-licensed traders, and to include respondents from each of the following categories: assemblers, wholesalers, processors and retailers.

3.3. Sources and methods of data collection

Primary data were collected by the CIMMYT (International Maize and Wheat Improvement Center) in collaboration with the EIAR (Ethiopia Institute of Agricultural Research). This study was carried out in Dugda and ATJK districts in CRV. These districts are covered under the Sustainable Intensification of Maize and Legumes Cropping System for Food Security in Eastern and Southern Africa (SIMLESA) program with farm

household level maize and legumes production, consumption and marketing data collected in 2011 and 2013 to be used in this study.

In identifying the actors engaged in the maize and legumes value chain, the study covered major maize and legume supply towns like Shashamane, Meki, Batu (Ziway), and Adama. Traders, input suppliers, processors, and exporters in these towns are interviewed to get relevant information that helps to analyze the governance, incentive, and cost structure in the value chains of the two commodities.

Type and the degree of variability of the information collected determine the sample size of a particular study. It is evident that researchers do not agree on sample size that should be used in each segment of the value chain. The decisions involved are partly a function of the information currently known, time and resources available, accessibility to and openness of the marketing participants themselves as well as the estimated size of the trading population (Mendoza, 1995).

In the study areas, among actors, producers are the largest in number in maize and legume value chain. Traders (exporters, wholesalers and retailers and assemblers) have small population size in the value chain. Maize and legumes producers and traders were sampled and interviewed. In addition to the producers and traders, input supplier cooperatives and union were interviewed.

Secondary data were collected from different sources such as government institutions and research institutes available in the region. Besides, different relevant published and unpublished reports, bulletins and websites will be consulted to generate relevant secondary data to the study.

3.4. Methods of Data Analysis

In this study value chain mapping approach, descriptive analysis and econometric method were employed to analyze the data.

Identification of value chain constraints and opportunities

The identification of constraints and opportunities is not distinct from, but rather part of, value chain analysis. Using structured interview guides, value chain constraints and opportunities were identified during interviews with value chain participants that help as intervention point.

Mapping the value chain

Identification of value chain actors is always followed by the mapping of each value chain. The purposes of mapping the value chain is to visualize networks in order to get a better understanding of connections between actors and processes in a value chain, to demonstrate interdependency between actors and processes in the value chain and to create awareness of stakeholders to look beyond their own involvement in the value chain.

Deciding what to map depends on available resources and on the scope and objective of the analysis. A value chain has many dimensions: the actual product flow, the number and type of actors, the accrued value etc. Therefore the following questions can guide what dimensions to map:

- What are the different (core) processing steps in the value chain?
- Who are the actors involved in these processes and what do they actually do?
- What are the flows of product, information and knowledge in the value chain?
- What is the volume of products, the number of actors, and the number of jobs involved?
- Where does the product (or service) originate from and where does it go?
- How does the value change across the chain?
- How does the added value along the chain relate to the transformation/process in that particular point of the chain?
- What types of relationships and linkages exist?
  What types of (business) services are feeding into the chain?

Descriptive analysis

Descriptive method of data analysis refers to the use of percentage, and comparison and standard deviations. It was used in the process of examining and describing marketing cost and marketing margin of maize and legume value chain actors. Statistical tests such as chi-square and t-test were used to test significance of results obtained from the descriptive analysis.

Structure-Conduct-Performance (S-C-P) is an analytical approach or framework used to study how the structure of the market and the behavior of sellers/buyers of different commodities and services affect the performance of markets (Kizito, 2008).

Market structure consists of the relatively stable features of the market that influence the rivalry among the buyers and sellers operating in a market. Some examples of market structure include the number of buyers and sellers of food commodities in the market, the number of sellers of agricultural inputs such as fertilizer and veterinary drugs, barriers to entry into the market and the nature of trading relations (vertical coordination mechanisms) among market participants. Estimating the numbers, size and special distributions of each category of intermediary provides an indication of both the local structure of the market and the range of alternatives faced by participants in the marketing chain in their buying, selling and hiring functions.

Market concentration is defined as the number and size distribution of sellers and buyers in the market. The greater the degree of concentration, the greater is the possibility of non-competitive behavior, such as collusion. The common used measure of market concentration is given by the proportion of total industry sales accounted for the four large enterprises in the industry.

Kohls and Uhl (1985) suggest that, as a rule of thumb, the four enterprises concentration ratios of 50% or more is indicative of strongly oligopolistic industry, of 33% to 50% is weak oligopoly and less than that is un-concentrated industry. The measure of market concentration computed as:

$$Si = \frac{Vi}{\sum Vi} \quad (2)$$

where, S_i is market share of buyer i

V_i is amount of product handled by buyer i

$\sum$ Vi is total amount of product handled

$$C = \sum_{i=1}^{r} Si, \quad i = 1,2,3,4. \tag{3}$$

where, C is concentration ratio

S_i is Percentage share of the i^{th} firm

r is the number of relatively large firms for which the ratio is going to be evaluated.

Market conduct refers to the patterns of behavior that traders and other market participants adopt to affect or adjust to the markets in which they sell or buy. These include price setting behavior, and buying and selling practices (Kizito, 2008). Definition of market conduct implies analysis of human behavioral patterns that are not readily identifiable, obtainable or quantifiable. Thus, in the absence of theoretical framework for market analysis, there is a tendency to treat conduct variables in descriptive manner.

The total cost incurred on marketing by producers, sellers and by the various intermediaries involved in the sale and purchase of the commodity till the commodity reaches the ultimate consumer is calculated as follows (Acharya and Agarwal, 2006).

$$C = C_f + C_{mi} \tag{4}$$

C = Total cost of marketing of the commodity,

C_f = Cost incurred by the producer from the time the product leaves the farm gate, and

C_{mi} = Cost incurred by the i^{th} middleman in the process of buying and selling the product.

A marketing margin is defined as the difference between the price paid by consumers and that obtained by producers or the price of a collection of marketing services that is the outcome of the demand for and the supply of such services.

The cost and price information obtained from the survey was used to evaluate the gross marketing margin. Total Gross Marketing Margin (TGMM) is always related to the final

price paid by the end buyer and is expressed as percentage (Mendoza, 1995). The method of analysis of marketing margin is as follows,

$$TGMM = \frac{P_c - P_p}{P_c} \times 100 \quad (5)$$

Where TGMM is the total gross marketing margin; P_c is end buyer (consumer) price; and P_p is first seller (or producer) price.

The producer's margin is calculated as:

$$GMM_p = \frac{P_c - TGMM}{P_c} \times 100 \quad (6)$$

Where GMM_p is the gross marketing margin (the producer's share in the consumer price)

The net marketing margin (NMM) is the percentage of the final price earned by the intermediaries as their net income after their marketing costs (MC) are deducted.

$$NMM = \frac{TGMM - MC}{P_c} \times 100. \quad (7)$$

Where, NMM = Net marketing margin

Econometric analysis

Even though studies employed different models in determining factors affecting market supply, the commonly used ones are the well known Tobit and Heckman's sample selection models. Tobit model which assumes all producers are potential suppliers of a good and that volume of supply and market participation are influenced by the same variables in the same way (Blaylock and Blisard, 1993).This problem can be overcome using the Heckman's sample selection model where a Probit model for participation or 'selection' equation is estimated and a regression model, which is corrected for selectivity bias, is specified to account for the level of market supply.

In this study, to estimate the marketed surplus of maize and to identify its determinants, the Heckman's two stages model was employed. The model first estimates the participation equation (the probability of participating in maize market) and derives maximum likelihood probit estimates from the coefficient of the participation equation. Using these estimates, a variable known as the inverse Mills ratio (IMR) was calculated.

The IMR is a variable for controlling bias due to sample selection (Heckman, 1979). The second stage involves including the Mills ratio to the maize supply equation and estimating the equation using Ordinary Least Square (OLS) technique to estimate the model. On the other hand, since there was estimate in haricot bean market the Heckman selection model (ML) was used because there is no sample selectivity bias since IMR is insignificant in the two-step model.

If the coefficient of the 'selectivity' term is significant then the hypothesis that an unobserved selection process governs the participation equation is confirmed. Moreover, with the inclusion of extra term, the coefficient in the second step 'selectivity corrected' equation is unbiased. Specification of the Heckman two-equation procedure, which is written in terms of the probability of Maize/haricot bean Market Participation (MMP), and Volume of Maize/haricot bean Marketed (VMM), is:

The participation/the binary probit model is specified as:

$$Y_i = \mathbf{X_1}\boldsymbol{\beta_1} + £_i \qquad (8)$$

$MMP=1$ if $Y_i > 0$ and $MMP=0$ if $Y_1 \leq 0$

Where:

MMP is maize or haricot bean market participation;

Y_i is a dummy variable indicating the probability of sampled household maize or haricot bean market participation;

X_{1i} is a vector of variables determining participation in the probit model;

$_{1i}$ is a vector of unknown parameter to be estimated in the probit regression model; and

$£_i$ is random error term.

The observation equation

Then the parameters can consistently be estimated by OLS over *n* observations reporting values for Z_i by including an estimate of the IMR denoting a_i as an additional regressor

in equation (7). More precisely the observation equation/the supply equation is specified as:

$$Z_i = \mathbf{X\beta} + \mathbf{\mu\lambda} + \text{¦}_i \quad (9)$$

Where:

Z_i is the volume of marketed maize or haricot bean supply in the second step;

X_i are the explanatory variables determining the quantity supply;

$_i$ is unknown parameter that shows estimated in the quantity supply;

«$_i$ is a parameter that shows the impact of participation on the quantity supply; and

¦$_i$ is the error term.

3.5. Definition of Variables and Working Hypothesis

Dependent Variables

Market participation decision: It is a binary variable that the dependant variable Yi and Zi is the participation decision whether to participate or not in maize or haricot bean supply and it assumes a value1 for household heads were suppliers and 0 otherwise.

Quantity supplied: It is a continuous variable which represents dependent variable; the actual supply of maize or haricot bean by farm household heads to the market which is measured in natural logarithm transformed kilogram supplied.

Independent Variables

Hypothesized independent variables were similar in both crops. These are non-farm income, market price, district dummy, sex of the household, land size, livestock holding, number of extension contact, amount of credit, distance to main market, family size, source of price information and level of literacy.

Non- farm income: It is a continuous variable measured in amount of birr the farmer earned other than farming activity. A household with better income from non farming

activity is assumed to have low market participation and volume of maize or haricot bean marketed. Leavy and Poulton (2007) reported that caution is needed if we want to increase involvement of agricultural households' with non-farm employment comparative advantage in market oriented production. Thus for those farmers that do have other work activities besides farming it is expected to correlate negatively with papaya market participation and volume marketed.

Market price: It is a continuous variable measured in percentage. This variable is expected to influence market participation decision and volume of maize and haricot beans marketed positively. When the price of the product is promising, farmers are motivated to take their produce to the market. The study of Goetz (1992) on household marketing behavior in Sub-Saharan Africa found a significant positive relationship between grain price and the probability of quantities sold. The study of Wolelaw (2005), on determinants marketable supply of rice found a significant positive relationship between rice sold and current price.

District Dummy: This variable is a dummy taking the value zero if the district is Dugda and one if the district is Adami Tulu Jido-Kombolcha, which consists of a number of characteristics of the districts. This is related to the difference in access to information, access to market and production potential between the districts. This variable hypothesized to influence participation decision and market supply of maize and haricot bean sales either positively or negatively. To support the study, a study conducted by Abraham (2012) reported difference in access to markets, access to infrastructures and difference in socio-economic characteristics of districts has effect on volume of market supply.

Sex of the household head: This is a dummy variable that takes a value of 1 if the household head is male and 0 otherwise. It could take positive or negative signs. According to Toyiba (2013) market chain analysis of papaya, being male headed household would increase sales volume. A study by Makhura (2001) on the households' participation process in livestock markets indicted that women are more inclined to sell their livestock than men. Therefore, this variable is expected to have a positive relation with maize and haricot bean market participation and volume of sale.

Land size: This is the total land holding, which is a continuous variable. If the producer has large land size he would allocate more land to his cash crop (maize or haricot bean).

Thus, increase in size of land is expected to have direct influence on market participation and marketed surplus. According to Kinde (2007) in his study to analyze factors affecting sesame marketable surplus total land owned has a significant effect to the amount supplied.

Livestock holding: This is a continuous variable defined in terms of tropical livestock unit (TLU), which excludes oxen. It is assumed that household with larger TLU have better economic strength and financial position to purchase sufficient amount of inputs (Kinde, 2007). There exist availability of draft power for crop production and the use of crop residue for livestock production. Therefore, it is hypothesized that livestock holding has a positive relationship with maize and haricot bean market participation and marketed surplus.

Number of extension contact: It is a continuous variable**.** The number of visits made by extension agent in the year measures the variable. Those farmers who have frequent contact with extension workers are more likely to know the advantage of maize or haricot bean production. Therefore, number of contact with extension agent is proposed to have direct relation with market participation and volume of marketed surplus. Studies have shown that visits by extension agent improve participation and volume decision of output marketed (Holloway et al., 2000).

Amount of credit: It is a continuous variable is measured in birr. Those producers who borrowed high amount of money can produce more which increases participation decision as well as supply in to the market in large quantity. Therefore in this study, it is hypothesized that amount of credit affects participation decision and intensity of participation significantly and positively. A study done by Alene *et al.* (2007) found positive and significant relationship between access to credit and maize market participation decision.

Distance to the main market: It is a continuous variable measured in kilometers. The assumption is that the more access the market the higher the participation and volume of maize and haricot beans market and vice verse. Therefore, it is proposed that the variable is negatively related to the market participation and marketable volume. According to

Wolday (1994) on food grain market in the case study of Alaba Siraro, he identified that poor market access has significant and negative effect on quantity of food grain supplied.

Family size: It is a continuous variable, measured in terms of adult equivalent. Families with more household members tend to have more labour. Production in general and marketed surplus in particular is a function of labour. Gezahagn (2010) who found that family size have positive effect on the households' gross income from groundnut production. Thus, family size was expected to have positive impact on market participation but larger family size requires larger amounts for consumption, reducing marketed surplus. A study by Singh and Rai (1998) found marketed surplus of buffalo milk to be negatively affected by family size. Thus, it is hypothesized that family size exerts positive or negative on market participation and volume of marketed.

Source of price information: It was a dummy variable, 1 if source of information is neighbor household heads (chosen by many producers); 0 otherwise. Household heads have many options to gather information on purchasing and selling prices of maize and legume. The major sources of information are neighbor producers, governmental bodies, traders and media. This difference in source of price information was hypothesized to determine market participation and intensity of maize and haricot bean positively or negatively.

Level of literacy: It is a continuous variable and refers to the formal schooling or literacy of a respondent. Those household heads that had formal education determines the readiness to accept new ideas and innovations, and easy to get supply, demand and price information and this enhances farmers' willingness to produce more and increase volume of sales. Therefore, formal education is proposed to positively influence market participation and marketed surplus. Holloway *et al*. (1999) observed that education and visits by an extension agent had significant and positive effects on quantity of milk marketed in the Ethiopian highlands.

Table 3: Description of the dependent and independent variables used in the model

Variables	Measurement	Expected effect
Non-farm income	Continuous (Birr)	-
Market price	Continuous (Birr)	+
District dummy	Dummy (0= Dugda 1= ATJK)	+/-
Sex of the households	Dummy (0= female 1= male)	+/-
Land size	Continuous (number of hectare)	+
Livestock holding	Continuous (Tropical Livestock Unit)	+
Number of extension contact	Continuous (number of extension contact)	+
Amount of credit	Continuous (Birr)	
Distance to the main market	Continuous (distance in kilometer)	-
Family size	Continuous (man equivalent)	+/-
Source of price information	Dummy (1=neighbor producer 0=others)	+/-
Literacy level	Continuous (year of schooling)	+

4. RESULTS AND DISCUSSION

This chapter of the thesis deals with discussion and interpretation of the findings from descriptive and econometric analysis. It has five main sections. The first section deals with descriptive and inferential statistics of the sample households. The second section presents value chain analysis of maize and haricot bean, which includes value chain map, actors and their roles, and value chain governance. The third section focuses on marketing channel and performance analysis of the value chain, which includes marketing channels, marketing costs and margins, and incentives shares of actors in the value chain. The fourth section presents results of econometric analysis, which contains the determinants of market participation and intensity of participation analyzed using Heckman two stages model. The fifth section deals with constraints and opportunities of maize and haricot bean in production and marketing.

4.1. Characteristics of Sample Households

4.1.1. Demographic characteristics of households

Table 4 result of the survey revealed that both male and female household heads were engaged in production of maize and haricot bean. Male heads of household respondents account for the highest percentage, (80%). The chi-square test shows that there was no statistically significant difference between the two groups with regards to sex. Moreover, the survey result indicated that 33.5% of the respondents were illiterate and the rest were literate. This shows significance difference between the two groups was at significance level of 1%.

Table 4: sex and literacy status of sample households in the two districts

Variables	ATJK	Dugda	Total sample	χ^2
Sex (%)				0.16
Male	84	76	80	
Female	16	24	20	
Literacy status (%)				-4.23***
Illiterate	23	44	33.5	
Literate	77	56	66.5	

Note: *** and ** statistically significant at 1% and 5% significance level.
Source: survey result, 2013

Large family size is a distinguishing characteristic in rural communities of many developing countries such as Ethiopia (Mamo, 2009). The case was similar in the study areas, the household heads that were interviewed had a family size ranging from 2 to 16 and the average family size is found to be 6.94 persons. Family of the household heads in the two districts has no significant difference. Age of the household head determines whether the household benefits from the experience of an older person or base its decision making over the younger farmers. The average age of the sampled respondents was 42.11 years which ranged from 20 to 75 years. In the two districts age significance difference was measured to 5%. The survey result showed that sample respondents have had farming experience ranging from 1 to 45 years. The average years of farming experience related to growing of maize and haricot bean were 11.75 and 18.82 years respectively. Farming experience of neither maize nor haricot bean has a significance difference between the districts (Table 5).

Table 5: Age, family size and farming experiences of the sample household heads

Variables	Dugda		ATJK		Total sample		t-test
	Mean	SD	Mean	SD	Mean	SD	
Age of households (year)	40.04	12.26	44.18	12.76	42.11	12.65	-2.3**
Family size (number)	6.58	2.69	7.29	2.95	6.94	2.84	-1.78
Maize farming experience	11.67	11.97	11.83	9.5	11.75	10.78	-0.11
Haricot bean experience	19.64	11.43	17.99	10.99	18.82	11.22	1.05

Note: *** and ** statistically significant at 1% and 5% significance level.
Source: survey result, 2013

4.1.2. Livestock Ownership

Livestock production is an integral component of the farming system and contributes a lot to crops production. As indicated on Table 6 important animals kept by the sample farmers were cattle, shoats, donkey and poultry. Oxen are the main source of farm power for plowing and threshing. Donkeys are also important animal kept mainly to transport farm implements, seeds, production, production byproducts, water, men and women to farm plots, market and home.

The study revealed that the difference in the ownership of livestock in the districts. Farmers who have high number of oxen, sheep and mules are from Dugda while ATJK farmers owned large number of goats and donkeys comparing to its contagious district. Shoats significantly differ among the two districts at significance level of 1%. Pack animals (donkey and mule) and oxen significantly differ at a significance level of 10%.

Table 6: Livestock ownership of sample household heads

Type	Dugda=100		ATJK=100		Total=200		
	N	Mean	N	Mean	N	Mean	t-test
Cow	274	2.74	283	2.83	557	2.79	-0.19
Ox	252	2.52	205	2.05	457	2.29	1.36*
Bull	64	0.64	53	0.53	117	0.59	0.71
Heifer	132	1.32	136	1.36	268	2.68	-0.1
Calf	161	1.61	146	1.46	307	1.54	0.52
Goat	224	2.24	459	4.59	683	3.42	-3.6***
Sheep	266	2.66	69	0.69	335	1.68	2.92***
Donkey	113	1.13	139	1.39	252	1.26	-1.42*
Horse	14	0.14	8	0.08	22	0.11	1
Mule	4	0.04	1	0.01	5	0.03	1.36*
Chicken	532	5.32	549	5.49	1081	5.41	-0.2
Bee hives	31	0.31	21	0.21	52	0.26	0.68

Note: *** and * statistically significant at 1% significance level.
N= number of livestock owned
Source: computed from own survey, 2013

4.1.3. Market participants and non-participants

This section explained socio-economic and demographic characteristics of maize and haricot bean market participants and non participants using t-tests and chi-squares to show means and percentages differences. The age of maize market participants and non-participants was 46.94 and 41.61 respectively. The family size of maize production participants and non-participants was almost similar, that is, 6.95 and 6.96, respectively. The mean years of experience in the production for participants and non-participants were

17.96 and 18.48 years respectively. An average volume of maize sold by market participants was 14.37 quintals per household heads. There was a mean difference of 1637.23 birr generated from non-farm income activities. Nonfarm income of maize was significant at 10% probability level. Demographic characteristics of households were identified on the basis of supplying commodities to the markets. According to data collected, 68.48% of the household heads sell the maize grain in to market. Percentage of male participants and non-participants on sell maize was accounted to 69.7% and 30.30% respectively. 73.28% of literates had better market participation while 42.86% of illiterates participate in maize market. 63.64% of females were also participating in the market. The survey result explained among haricot bean producers, 84.87% of the households supplied to market. 88.24% and 84% of female and male households participate in haricot bean markets respectively. 73.91% and 88.41% of haricot bean market participant were literate. The statistical tests of sex and literacy status indicated there was no statistical difference among participants and non participants for both commodities.

Table 7: Socio-economic characteristics of market participants and non-participants

Variables	Maize			Haricot beans		
	Non-participants	Participants	t-test	Non-participants	Participants	t-test
Age (year)	41.61	46.94	-1.09	40.95	48.71	-1.35*
Family size (number)	6.96	6.95	0.03	7.5	7.37	0.14
Experience (year)	18.48	17.96	0.28	9.57	14.92	-1.87**
Quantity sold (quintal)	0	14.37	-9.33***	0	5.75	-7.58***
Non-farm income (birr)	2974.44	4611.67	-1.33*	946.93	5958.28	-3.26***

Note: *****,** ** and * statistically significant at 1%, 5% and 10% significance level.
Source: Survey result, 2013

On the other hand, the age of haricot bean market participants was greater in eight years than non-participants which are 40.98 in average. According to the survey result, at a range of 2 to 16, an average family size of participants was 7.37 where as the non-participants' was 7.5. The family size of male headed households was greater than female headed households. An average family size of male headed households was 7.2 whereas female headed household have an average family size of 5.7. This difference of family

size can be considered as a source of difference in labor force and consumption level in the family. Growing years of the legume is differentiated 14.92 to market participants and 9.57 to non-participants. Non-farm income of maize was significant at 5% probability level. There was also farming experience at 1% significant difference between haricot bean participants and non participants (Table 8).

Table 8: Demographic characteristics of market participants and non-participants

	Maize			Haricot beans		
Variables	Participants	Non participants	Chi-square	Participants	Non participants	Chi-square
Sex			0.45			0.19
Male	69.70	30.30		84.00	16.00	
Female	63.64	36.36		88.24	11.76	
Educational status			19.19			8.7
Illiterate	42.86	57.14		73.91	26.09	
Literate	73.28	26.72		88.41	11.59	

Note: ******* statistically significant at 1% significance level.

Source: Survey result, 2013

4.1.4. Overview of maize and haricot bean production

4.1.4.1. Inputs used and costs

In the study districts, households used modern inputs (seed, fertilizers and chemicals) for both maize and haricot bean production. In production of maize, ATJK district households seed and DAP consumption is greater than that of Dugda while worse off in consumption of urea and herbicides. Fertilizers used for maize production was significant at 5% probability significance level between the districts. That is ATJK district producers used much fertilizer than that of Dugda. On the other hand, in haricot bean production, ATJK producers used seed twice of Dugda district producers. Its significance difference is at 5% significant probability level. The districts also consumed 123.2 kg/ha and 88.96kg/ha of DAP respectively in the production season 2012/13.

Table 9: Inputs used by the two districts household heads (kg/ha)

Inputs	Maize					Haricot beans				
	ATJK		Dugda			ATJK		Dugda		
	Mean	SD	Mean	SD	t-test	Mean	SD	Mean	SD	t-test
Seed	32.66	6.12	38.36	3.7	-0.79	9.68	40.35	19.07	36.32	-1.73**
DAP	120.5	37.1	242.9	51.3	-1.9**	88.96	25.56	123.2	57.52	-0.55
Urea	90.4	43.6	7.1	5.4	2.24**	0	0	17.2	17.2	-1
Herbicides (l/ha)	0.72	0.16	0.04	0.04	4.1***	0.2	0.2	0	0	1.85**

Note: *** and ** statistically significant at 1% and 5% significance level.

Source: Own computation from survey result, 2013

According to the survey result, Table 10, costs of inputs used by households to produce maize grains and legumes are different regarding its cost items and type of commodity. The main costs of inputs the producers incurred were to fertilizers, seed, chemicals, hired oxen and labour. In maize production a difference in cost of seed used and hired oxen are significant at 5% significance level among the districts. Maize producers incurred 3663 birr/hectare and 108.8 birr/hectare cost of production to DAP and herbicides respectively in ATJK. Dugda district incurred lesser cost of production than of ATJK. In haricot beans production the cost of DAP is the largest in both districts. The Cost of hired oxen for growing haricot bean differs among the two districts at 1% significance level.

Table 10: Costs of inputs used by households in the districts (Br/ha)

Inputs	Maize					Haricot bean				
	Dugda		ATJK			Dugda		ATJK		
	Mean	SD	Mean	SD	t-test	Mean	SD	Mean	SD	t-test
Seed	559.8	456.6	813.6	579.2	-1.56**	115.4	13.26	234.9	59.3	-0.31
DAP	1872.6	443.4	3663	592.7	0.53	1705	438.6	1262	211.7	0.23
Urea	1112.4	61.6	1113.6	24.6	-0.9	-	-	208.5	311.3	-
Herbicides	88.3	58.52	108.8	9.31	-1.03	84.94	61.54	-	-	-
Labor	684.3	194.5	884.4	166.2	-0.58	306.4	332.9	288.5	353.5	0.12
Oxen	398.4	41.01	231.4	53.76	-2.47**	78.33	20.21	173.5	78.4	-3.2***

Note: *** and ** statistically significant at 1% and 5% significance level

Source: Own computation from survey result, 2013

4.1.4.2. Overview of production

Maize producer households' landholding in ATJK is ranges from 0.25 ha to 9.5 ha with an average maize cultivated land of 1.73 ha which greater than that of Dugda which allocated 0.88 ha of land for the production of maize. There was a significant difference in land allocation to maize production among districts at 1% significant level due to smaller land size in Dugda compared to in ATJK district. Landholding of the haricot beans producers' ranges from 0.25ha to 5ha in ATJK district and from 0.25ha to 4.5 ha per household in Dugda district. Average cultivated land owned by these producers is 1.73 ha and 2.36 ha per households in these districts respectively. Land size is large in Dugda compared to in ATJK district but the area allocated to haricot beans production is smaller (0.62 ha) than that of ATJK which is 0.73 ha.

Table 11: Mean land allocation of sample households in hectare

Crops	Dugda		ATJK		Total		t-test
	Mean	SD	Mean	SD	Mean	SD	
Maize	0.88	0.52	1.73	0.94	1.08	0.81	-2.99***
Haricot beans	0.62	0.73	0.73	0.64	0.69	0.67	-0.74

Note: *** statistically significant at 1% significance level.
Source: Own computation from survey result, 2013

In terms of farmland share, dominant crops produced by households are maize, haricot bean and red *teff* with percentages of 82.5%, 47% and 33%, respectively. Most of the households produce combinations of grains and legumes while others produce single type of crop. There was a difference in production of maize, haricot bean, red teff and white teff in the two districts at 1% significance level. This is may be due to agro-ecology and natural resources difference existed between the districts (Table 12).

Table 12: Distribution of crops in the two districts

Variables	ATJK (N=100)		Dugda (N=100)		Total (N=200)		χ^2
	N	%	N	%	N	%	
Maize	94	94	71	71	165	82.5	18.32***
Haricot beans	60	60	32	32	92	46	13.57***
Red teff	16	16	50	50	48	24	26.14***
White teff	3	3	45	45	48	24	48.36***
Barely	22	22	26	26	48	24	0.44
Faba beans	-	-	22	22	22	11	-
Sorghum	11	11	10	10	21	10.5	0.05
Field pea	-	-	8	8	8	4	-

N= number of growers
Note: *** statistically significant at 1% significance level.
Source: Own computation from survey result, 2013

The average maize and legumes productivity in ATJK is higher than Dugda district. In ATJK district, the mean yield of maize and haricot bean was 24.72 and 10.83 qt/ha, respectively. Similarly, in Dugda district, the mean yield of maize and haricot bean was 20.11 and 6.09 qt/ha (Table 13). In both districts the average yield of maize is lower than the national average which is 25.4qt/ha, and average yield of haricot bean is higher than the national average which is 10.58qt/ha for haricot bean (CSA, 2012). There is a significant difference in productivity of haricot bean between the two districts.

Table 13: Yield of maize and haricot bean per hectare

	Dugda		ATJK		Total		t-test
Crops	Mean	SD	Mean	SD	Mean	SD	
Maize	20.11	24.8	24.72	34.7724.8	22.73	30.84	-0.99
Haricot beans	10.836.09	4.91	10.83	6.6	9.18	6.45	-3.9***

Note: *** statistically significant at 1% significance level.
Source: survey result, 2013

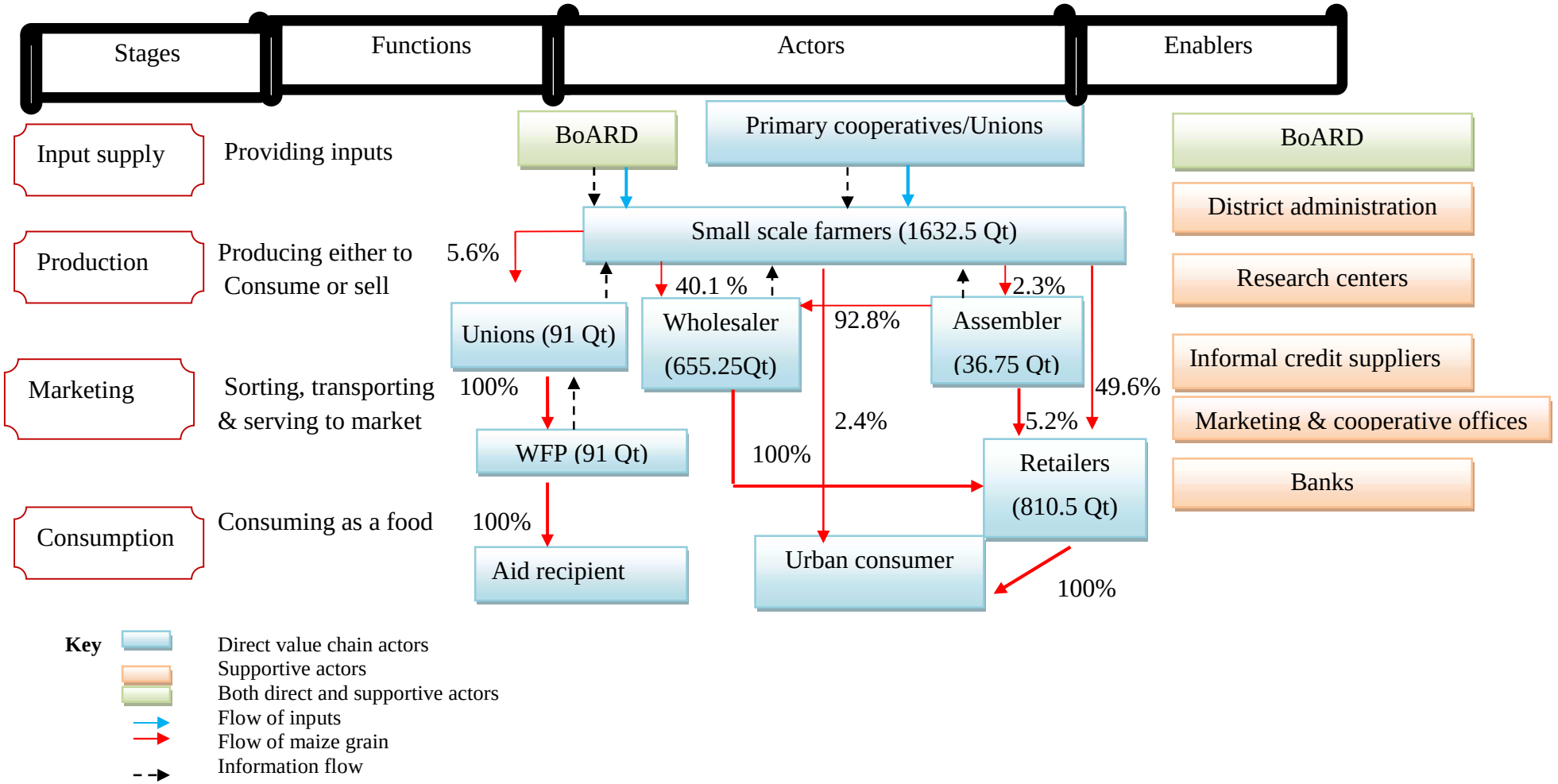
4.2. Value chain Analysis

4.2.1. Value chain map of maize and haricot beans

In order to have a better understanding of the value chain, once the actors are identified, it is also important to analyze what their interactions/linkage looks like. According to Hall *et al* (2007), to understand patterns of interaction between different actors and organizations, it is first important to map linkages in general ways, but then it is also necessary to understand the nature and purpose of these linkages. Hence, value chain mapping was used to understand pattern of interactions between the key actors. It allows seeing the extent of links to be systematically investigated. Below distinction was made for both commodities to show a separate marketing channels, value chain mappings, and cost, margin and profit analysis.

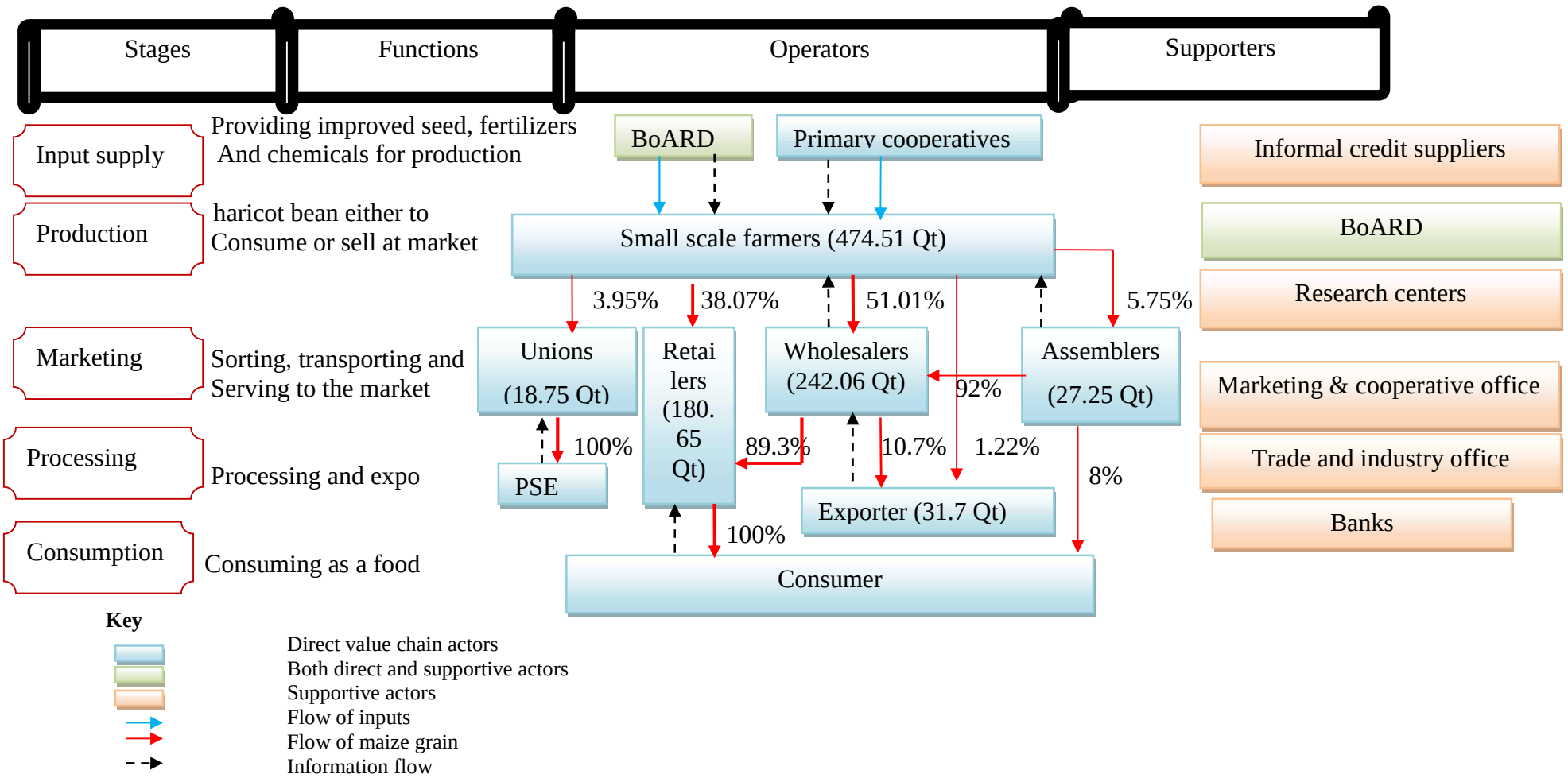
Figure 3 indicated value chain mapping of maize. In this map stages, functions, actors and enablers were given. The major stages of this commodity are input suppliers, production, marketing and consumption. Input supply stage mainly encompasses farmer cooperatives and union to supply seed, fertilizers and herbicides to nearby *kebeles*. In production stage, producers grow maize using agricultural inputs supplied by the cooperatives/unions. Farmers in turn supply the commodity to traders in the market in different quantity. Retailers and wholesalers purchase the largest quantity of maize in the map. Information flows among all actors to improve quality of the product and to determine the level of production. Bureau of Agricultural Research Development mapped as both direct actor (supplying input) and indirectly as enabler. Other enablers in the districts were research centers, district administration, informal credit suppliers, banks, and marketing and cooperatives offices.

Similarly, the haricot bean value chain map showed stages (including processors that are missed in maize value chain), functions, actors and enablers (Figure 4). Inputs like seeds, fertilizers and services delivered by input suppliers to producers in order to update their technologies at hand. All actors were linked each other either through quantity or information flow. The volume of haricot bean flow in each actor was variable according to bargaining and carrying capacity of purchasers for the commodities required. .



Source: own construction based on survey result, 2013

Figure 3: Value chain mapping of maize



Source: own construction based on survey result, 2013

Figure 4: Value chain mapping of haricot beans

4.2.2. Actors, their Role and Linkage

Actors and their Role

This section presents the actors and their role in the maize and haricot bean value chain in the study areas. In the same way as to Ghimiray et.al (2007), actors, their role and linkage is assessed along the different stages of the value chain as; input supply, production, marketing, processing and consumption.

Input Supply Stage

Primary cooperatives are playing an important role in the supply of inputs required for maize and legumes production. Improved seeds, fertilizer, herbicide and pesticide are the main inputs delivered to producers in ATJK and Dugda districts. These inputs are supplied either in cash or in loan base. Bora Dembel union which considered prevailing high demand for maize and legume seeds collects grains from member farmers and sell to private seed enterprises. The major responsibility of cooperatives/unions is to supply factors of production with non-profit base except adding transportation costs incurred. Those input suppliers also pool grain produced from members to deduct producers' transaction costs and strengthen the cooperatives. The main buyers of the grains were NGOs and unions. Written contract was made with WFP to collect maize grain from member farmers to reduce risk associated with price volatility. But the challenge is often not to supply quality commodities according to the organization standards.

Other important services unions/cooperatives provided to maize and legume producers were storage facility, transportation and credit services. These unions joined members of business associations like unions, federations, banks, insurances and ECX. Major identified functions of the membership were to produce marketing and farmers' cooperatives. The advantages of belonging to the associations were getting easier access to market information and helps negotiate with authorities and annual dividend for members.

Production Stage

At this stage of value chain, the role of maize and legume producers and their marketing outlets are identified. The mode of transportation, marketing options and type of market are producers market aspects considered in selling their products. Maize and haricot bean producers transport the commodities to village or town markets either carrying sack or loading on donkeys. They had several marketing options, directly selling to consumers and retailers. They sell directly or through broker to assemblers (more than one-third amount of produced both maize and haricot bean directly flowing outlet) to cooperatives and wholesalers. Farm gate, village market and town markets are type of markets used by household heads. About 1% farmers also sell their haricot bean to exporters at farm gate. Urban retailers and urban wholesalers were the main buyers of maize and haricot bean with percentages of 89.7% and 89.08% (Table 14).

Table 14: Farmers' market outlets for maize and legume

Agents	% of farmers' outlet	
	Maize	Haricot beans
Farmer cooperatives	5.6	3.95
Consumers/other farmers	2.4	0.00
Rural assemblers	2.3	5.75
Urban wholesalers	40.1	51.01
Urban retailers	49.6	38.07
Exporters	0.00	1.22

Source: survey result, 2013

Marketing Stage

This stage consists of traders who buy from farmers, grain trade enterprises and other traders to sell maize and legume in different markets. Major marketing actors, volume of sale in percentage and their roles were identified.

Assemblers: The study identified two types of assemblers: rural and urban. Rural assemblers collected 20.08% of the total supply of producers in the market and sold 63.88%, 35.08%, and 1.04% to urban wholesalers, consumers and retailers respectively. Regarding haricot

bean, rural assemblers and urban assemblers bought 6.45% and 2.95% of surplus of haricot bean producers respectively. The quality of maize rural and urban assemblers were moderate and above average respectively. Haricot beans quality supplied by those actors was above average.

Wholesalers: Producers, urban assemblers and rural assemblers were the maize grain supplier to urban wholesalers. The supplied level of the grain by producers, urban assemblers and rural assemblers was 3.18%, 92.84% and 63.88% respectively. The total quantity of maize carried out by wholesalers was accounted to 17,001 quintals in the market. In haricot bean market, 688 quintals and 300 quintals were supplied by rural assemblers and urban assemblers to urban wholesalers in that order. Urban wholesalers also directly sell 5473 quintals and 300 quintals to many urban retailers and a single processor enterprise respectively. The quality of maize and haricot beans supplied by wholesalers was found above average.

Retailers: Rural assemblers, urban assemblers and producers were the main suppliers of retailers. Rural and urban assemblers supplied 1.04% and 7.16% of their total supply in the market, and bought 11.95% of its total purchase from producers. In haricot bean market, besides to wholesalers supply, retailers directly purchased 95 quintal of the legume. The quality of both commodities supplied by retailers was above average.

Primary farmer cooperatives/unions: Besides supplying inputs to small scale farmers, cooperatives/unions collect maize grain from their members. The collected amount from maize producer cooperatives members was 7663 quintals which is 25.25% of maize supplied in the market. These quintals of maize directly sold to WFP in order to distribute food aid recipients. It is the only channel where cooperatives trade their maize grain. Haricot bean producer members of cooperatives sell the haricot bean to unions and dominantly sold to seed producing enterprise, Pioneer Seed Enterprise, which accounted 45.78% of the total haricot beans supplied in the market. Quality of these maize and haricot beans was found above average to be supplied to respective buyers.

Processors/Exporters: Two legumes processor trading enterprises were surveyed in Adama city. For the sake of this study haricot bean is only considered. One of the enterprise, Soreti international trading, purchase the commodity from ECX to add value further at export

standard and dominantly make available for Djibouti market. The other import and export enterprise, Gonde, clean the haricot bean to export to Europe and Asia market. Often Russia and Netherlands are the Europe terminal markets to win a share of 60% and 10%, and the rest volume to Pakistan. Europeans most demanded for white haricot beans to prepare pre-cooked canned food. On the other hand, the red varieties of the legumes are popular to be consumed by Pakistani. No maize processing enterprises were found in the central rift valley of Ethiopia.

These processing enterprises owned modern processing equipments to fit export standard. Cleaning machines, and packaging and bagging equipments are primarily useful to sort the haricot bean then pack for international market. It sorts and cleans to remove dirt, stones, chaff, broken and spoilt seeds and other foreign materials. Processors sort by mechanical or electronic sorting device after handy laborers work. Cleaning was done by dry methods. Dry cleaning was intended for grain legumes meant for package and storage purpose.

Volume of processed cleaned haricot bean grain is not equal throughout the year. It depends on supply of beans by regular suppliers ECX and local wholesalers. At peak season average volume of processed and sold haricot bean was 30,274.30 quintal to receive an average of 1170.77 birr/quintal and cut to 16,279 quintal with selling price of 1310.31 birr/quintal at slack season. The enterprises purchase the commodity at an average price of 750 birr/quintal and export for 1256.13 birr/quintal after incurring a total cost of 376.05 birr/quintal[1] for processing year of 2012/13.

As indicated on (Table 15) maximum stored quantity of the product is 20,000 quintal which is 40% of full capacity of storage facility. The percent of spoilage in the store is 2%. According to the survey result the enterprise also used separated modern sealed warehouse for haricot bean and chick pea to store on average 12 weeks before export according to contract agreed. The enterprise does not have contractual agreement with farmers to supply raw materials. But the enterprise signs contractual agreement with purchasers when it exports. It delivers on a particular date a particular quality and quantity at the prevailing

[1] Total cost of haricot beans processing by enterprises is given, appendix 3

prices at the time of delivery. Sometimes prices agreed in advance to a particular quality and quantity applied.

Table 15: Storage facilities of processor enterprises

Storage facility	Haricot bean	
	Mean	Standard Deviation
Capacity of store (quintal)	50,000	11313.71
Maximum stored (quintal)	20,000	7071.07
Storage period (weeks)	12	5.65
Spoilage (%)	2	1.41

Source: survey result, 2013

Consumption Stage: The study result indicated producers, rural assemblers and retailers are suppliers of consumers. Consumers bought 0.13% of producers, 2.97% of rural assemblers and 96.9% of the retailers supply. Rural assemblers and retailers were the main sources of haricot beans supply to the consumers. Rural assemblers supplied 8.02% of their purchase directly to consumers; and retailers 100%.

Business Development service providers

Such actors are those who provide supportive services including training and advisory, information, financial and research services. According to Martin et al. (2007), access to information or knowledge, technology and finance determines the state of success of value chain actors.

Trainings: Oromia bureau of agriculture, bureau of cooperatives and NGOs were intervened to give trainings for input supplier farmer cooperatives/unions to practice correct use of inputs (fertilizers, seeds and chemicals), and good business and storage management dominantly in 2012. To encourage the use and sale of inputs the cooperatives/unions offered extension services for agricultural inputs delivered. There was a significance difference in the two districts at 1% significance level.

Extension services: among the total sample farmers in two districts on average 87.5% has taken extension services. Oromia Agricultural Rural Development through its development

agents was the major actor who provides information and advisory service on production and management practices. Sample farmers also indicated that they are getting information mainly on crop rotation, soil and water management, livestock management, and input and output market price from primary cooperatives, district agricultural offices and NGOs. There was a significance difference in extension services between ATJK and Dugda districts at 10% significance level.

Access to market information: the study results revealed that 71.5% of the sample households provided market information. Better service in ATJK which accounted to 78% which is greater than 65% of Dugda. Its significance difference was at 5% significance level. Usually the information is with regard to commodities price in the market and they are retrieved from different sources such as fellow/other farmers in the neighbor traders and visual observations.

Credit access: The survey result showed that 43% and 48% of sample respondents from Adami Tulu-Jido Kombolcha and Dugda districts respectively took credit. In the study areas, micro finance, individual lenders, cooperatives, relatives and credit and saving institution have been identified as main sources of credit[2]. The major purposes of their credit were to buy agricultural inputs like seeds, fertilizers, and herbicides and pesticides, to run nonfarm business, to buy food and other consumption needs. There was no significance difference between the two districts in credit access.

[2] Details of sources and purposes of credit (appendix 4)

Table 16: Access to services by sample respondents in percentages

		ATJK	Dugda	Total	χ^2
Variables	Item	N=100	N=100	N=200	
Training					17.92***
	Yes	53.22	46.17	49.69	
	No	46.78	53.83	50.31	
Extension services					3.7*
	Yes	92	83	87.5	
	No	8	17	12.5	
Market information					4.15**
	Yes	78	65	71.5	
	No	22	35	28.5	
Credit					-0.51
	Yes	43	48	45.5	
	No	57	52	54.5	

Note: ***, ** and * statistically significant at 1%, 5% and 10% significance level.

Source: survey result, 2013

4.2.3. Value chain governance

Governance of maize and haricot beans actors were assessed by volume of commodities flow, price setting strategy, share of margins, level of competition and quality control. Volume of maize and legume carried out varies on the basis of actors purchasing, transaction and storage ability. Price setting strategies are different throughout the actors. The strategies are prevailing market price, negotiated price, seller quoted or contractual. Quality attributes of the maize and legume are also assessed through various methods to control over the market.

In maize value chain out of the total volume of maize flow (30,344 quintals), 56.03% is carried out through wholesalers. Of these volume 17,001 quintals, 84.96% traded to other traders and enterprises through facilitation of ATA, EGTE and ECX. The rest amount of maize, 15.04%, directly sold to retailers. Moreover, wholesalers govern the value chain by giving credit, transportation and storage services to its suppliers, and delayed payment and packaging to the buyers. The major sources of market price information were through personal contact, agents and ECX. Maize is only restricted to domestic market. In haricot bean market the dominant actors identified were exporters who have potential to supply their purchases to international markets in huge mass. From the total volume of haricot bean flow among actors is 11,597 quintals, 52.88% was carried out through wholesalers. From the total volume of flow through wholesalers, 5,473 quintals, 89.24% traded to other traders and

enterprises through facilitation of ECX. The rest amount was sold to processors. Exporters were intervened in global market through cleaned and processed haricot beans in a contractual basis.

As depicted in Table 17, 1.54% of maize traders have contractual agreement with their buyers. Since the regular suppliers and buyers of traders are few in numbers they usually buy and sell without contractual agreement. Even though prevailing market price has a room in setting the market price of maize which is 20% and 16.92% during buying and selling respectively, price setting is much of negotiation between buyer and seller. 80% and 81.54% of the traders undertake price negotiation to buy the maize from their suppliers and to sell to other traders. But producers receive the price set by traders/brokers even for quality products. Traders complain about non-licensed traders, market infrastructure and non-satisfying credit from lending institutes. They complain about farmers for not providing quality product. Farmers also complain back on traders for offering low prices. Traders are also often open for credit sell for customers in the market. Mediation was a primary source of remedy for those who do not repay credit and followed by termination of business relationships with them. Smallholder farmers are not well organized and not governing the value chain, rather they are price takers and hardly negotiate the price of maize produced. Purchasing price strategies of the haricot beans market were by negotiation and accepting the prevailing market price. While in selling the commodity, in addition to negotiation and prevailing market price, seller quoted price and contractual agreement was practiced. Their contractual agreement base undertakes to deliver on a particular date products of a particular quantity at prices agreed in advance. The contractual agreement bear trust among actors by allowing credit sale with long repayment period. But for customers default on credit sales, to recover their business, used either local mediation/arbitration/ processes involving business colleagues and friends.

Table 17: Price setting strategies in maize and haricot bean trade

Price setting strategies	Maize				Haricot bean			
	When purchasing		When selling		When purchasing		When selling	
	N	%	N	%	N	%	N	%
Negotiation price	52	80	53	81.54	19	67.86	20	71.43
Market price	13	20	11	16.92	9	32.14	5	17.86
Contractual price	0	0.00	1	1.54	0	0.00	2	7.14
Seller-quoted price	0	0.00	0	0.00	0	0.00	1	3.57

N= number of traders

Source: survey result, 2013

Number of traders and level of maize and haricot beans buying and selling potential of in markets of the study areas was different. Number of buyers and sellers were also increasing in throughout time. As indicated in Table 18, increasing number of traders was observed in Batu and Meki towns for both commodities. The number of traders was large in Meki town than that of Batu. In Batu town the current maize selling traders increased in two folds relative to last decade. The haricot beans traders showed slightly increment in Batu market and almost similar in Meki throughout the decade. The number of buying and selling traders is similar in these markets.

Table 18: Number of maize and haricot bean traders at town level

Competition year	Selling competition							
	Maize				Haricot bean			
	Batu		Meki		Batu		Meki	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Current year	24	12.12	79	62.3	19	10.93	23	12.12
Before 3 years	21	10.81	59	48.88	17	12.52	27	11.55
Before 10 years	12	8.68	42	23.63	9	5.17	28	17.68
When the respondent started business	16	9.78	41	29.36	14	15.49	25	13.23

Source: Own computation from survey result, 2013

Maize and haricot beans market shows concentrated number of buyers. The analysis of the degree of market concentration was carried in Batu and Meki markets. Concentration was calculated by taking annual volume of purchased maize and haricot beans in 2012/13 from sample traders. The result shows that in both towns, maize and haricot beans traders were concentrated in the hands of few traders. In Ziway and Meki markets, the four largest traders handled 76.3% and 86.16% from the total volume of maize purchased, and 91.75% and 100% from total volume of haricot beans purchased, respectively.Applying the market structure criteria suggested by Kohls and Uhl (1985), the maize and haricot beans market shows that strongly oligopolistic market in Ziway and Meki markets. This suggests that there is market imperfection because a few traders seem to have monopolized the market (Table 19).

Table 19: Concentration ratio for sample markets in percentages

Sample markets	Concentration index	
	Maize (%)	Haricot bean (%)
Batu (Ziway Gebeya)	76.3	91.75
Meki (Meki Gebeya)	86.16	100

Source: survey result, 2013

Major quality attributes looked by maize traders were foreign matters, maturity, moisture, pest damage and age of the maize. Their methods of quality assessment depend on its attributes. All traders check foreign matters and pest damages by visual inspection. Visual inspection was also used by 88.7% of the traders to estimate age of the product. 71.88% of the traders assess moisture content by biting the grain. They were less accessed to use accurate quality measurements like laboratory analysis and moisture meters which assure testing and grading standards to the product. Similarly, haricot bean traders considered different quality attributions to buy from their suppliers. The most common attributes considered are foreign matters and shape of the grain. Grain colour, size and moisture contents were also considered as important attributes of the commodity. Visual inspection is the most assessment method to allow the legume to keep in their stores. 65.3% and 26.9% of bean traders assess the quality of the haricot beans through methods of bite and visual inspection respectively. In contrary, they gave little attention in considering cooking traits, nutritional contents and smell of the haricot bean bought. The types of haricot beans purchased by processors were pure varieties of red and white haricot beans due to increased market demand. Basic attributes considered when buying those raw materials are cleanliness,

size, maturity, colour, season produced, moisture content and weight. Main methods of assessment are sieving for percent of foreign matters; visual inspection to assess size, maturity, colour and age; moisture meter to detect moisture content and weight through laboratory analysis. These assessment methods gave accurate standards of specification, testing and grading to the products (Table 20).

Table 20: Major maize and haricot bean quality attributes and methods of assessment

Quality attributes	Assessment methods																							
	Visual inspection				Smell				Feel				Weight				Bite				Shaking				Experience			
	Maize		Haricot bean		Maize		Haricot bean		Maize		Haricot bean		Maize		Haricot bean		Maize		Haricot bean		Maize		Haricot bean		Maize		Haricot bean	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Moisture	14	21.88	7	26.9	1	1.56	1	3.85	1	1.56			1	1.56	1	3.85	46	71.88	17	65.3	1	1.56			0	0.00		
Maturity	49	81.7			1	1.67			2	3.33			1	1.61			5	8.33			0	0.00			2	3.33		
Product age	55	88.7			0	0.00			1	1.61			1	1.61			1	1.61			0	0.00			4	6.45		
Pest damage	65	100																										
Foreign matters	65	100	28	100																								
Color			26	100																								
Shape			27	100																								
Size			26	100																								

N= number of traders

Source: Own computation from survey result, 2013

4.3. Marketing Channels and Performance Analysis

4.3.1. Marketing channels

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 and Armstrong, 2003). The analysis of marketing channels is intended to provide a systematic knowledge of the flow of the goods and services from their origin (producer) to the final destination (consumer). Since the channels to maize and legumes were different the analysis was done separately for both commodities.

Marketing channels of maize

Nine main alternative channels were identified in maize marketing. The estimated quintal of maize flow in the main markets (Batu, Meki, Adama and shashemane) was 30,344qt in 2013. The main marketing channels identified from the point of production until the product reaches the final consumer through different intermediaries were shown in figure 5.

The main buyers of the grain were urban assemblers and cooperatives which accounted 51.28 and 25.25 percent respectively. On top of this, channel comparison was made based on volume of sale passed through each channel. Accordingly, the channel of farmers to consumer through intermediaries of urban assemblers, wholesalers and retailers carry on the largest (14,444 qt) followed by 7663 qt from farmers to aid recipient through their respective farmers' cooperatives and WFP; and again these two channels were the longest channels identified, in addition the sixth channel of farmers-rural assemblers-urban wholesalers-retailers-consumers carry the third volume of 1593 qt. Thus, the quantity of maize flow in the longest channels accounted to 78.1% of the total volume of flow in the markets. ECX played a facilitation role of the quantity of maize flow in the VIII channel.

Channel I: Farmers →Consumers (39 Qt)
Channel II: Farmers → rural assembler → consumer (875 Qt)
Channel III: Farmers → urban retailer → consumer (3,625 Qt)
Channel IV: Farmers → rural assembler → urban retailer → consumer (26 Qt)

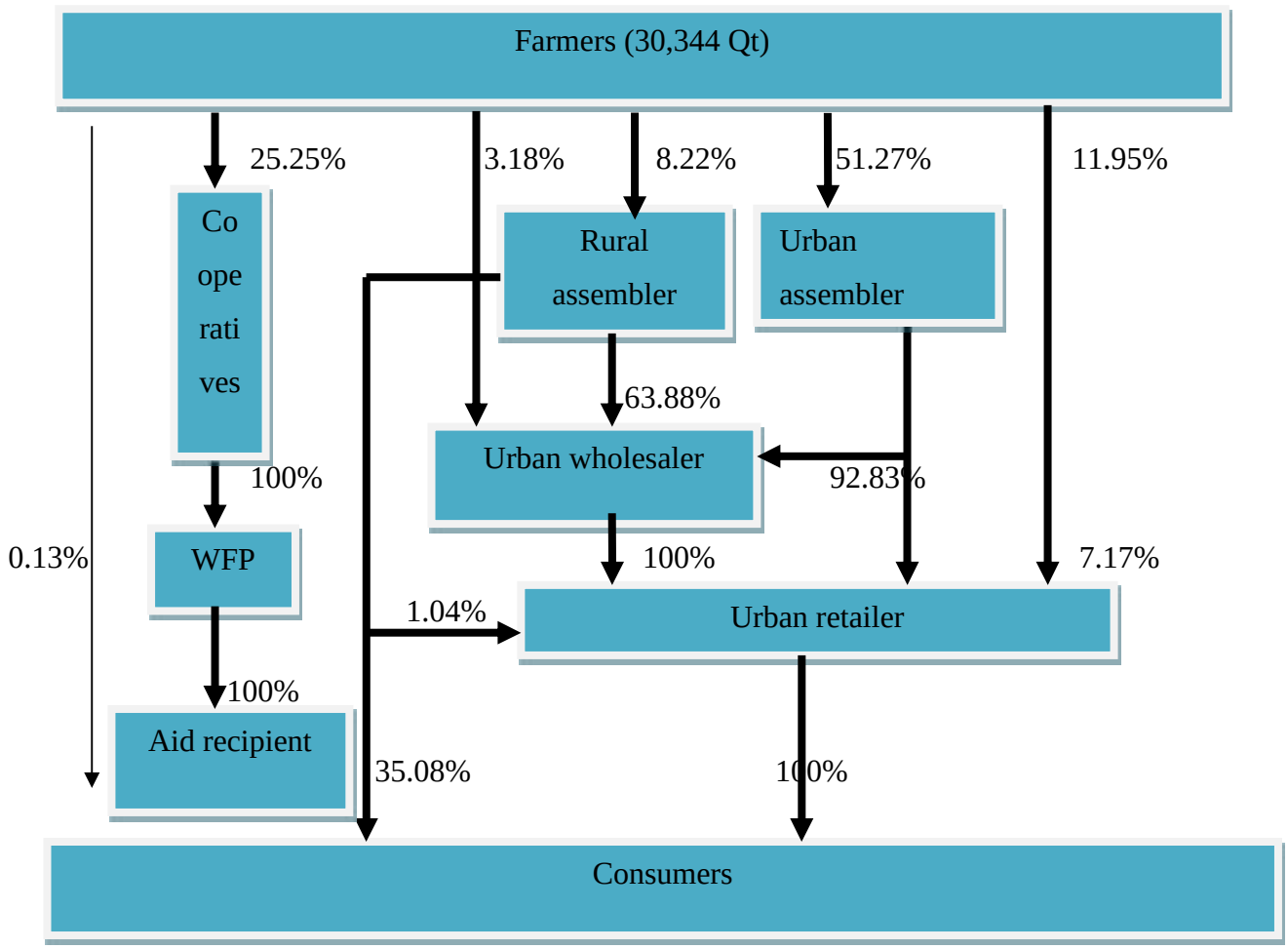
Channel V: Farmers → urban wholesaler → urban retailer → consumer (964 Qt)

Channel VI: Farmers →rural assembler →urban wholesaler →retailer→consumer (1593 Qt)

Channel VII: Farmers → urban assembler → urban retailer → consumer (1115 Qt)

Channel VIII: Farmers→urban assembler→urban wholesaler→retailer→consumer (14,444Qt)

Channel IX: Farmers→Cooperatives→Cooperatives Union→WFP→Aid recipient (7663 Qt)



Source: Own sketch from survey result, 2013

Figure 5: Maize market channel

Marketing channels of haricot bean

Seven main alternative channels were identified for haricot bean market. Market supplied amount of haricot bean was estimated 11,597qts in surveyed towns. . Amount of the haricot beans the consumers bought directly from households is negligible. Rather, farmers' cooperative unions and wholesalers directly bought in larger proportion comparing to

consumers and other intermediaries. From the quantity supplied in the market, farmers' cooperatives lead by carrying 45.78% and wholesalers followed by 44.36% of the total volume of haricot beans. The main marketing channels identified from the point of production until the product reaches the final consumer through different intermediaries were depicted in figure 6. According to volume of haricot bean passed to different channels, the channel of farmers–cooperatives/unions–PSE carries the largest volume of 5,300 qt followed by a channel of wholesalers bought from producers and sold to retailers that carries a volume of 5148qt. ECX facilitates haricot bean trade flow through channel IV, V and VI which accounted 49.5% of quantity flow in the towns. This quantity was purchased by grain traders at ECX market and sold to other traders including processors.

Channel I: Farmers→cooperatives/union→Pioneer seed enterprise (5309qt)

Channel II: Farmers →rural assembler→urban wholesaler→Processor/exporter (660 Qt)

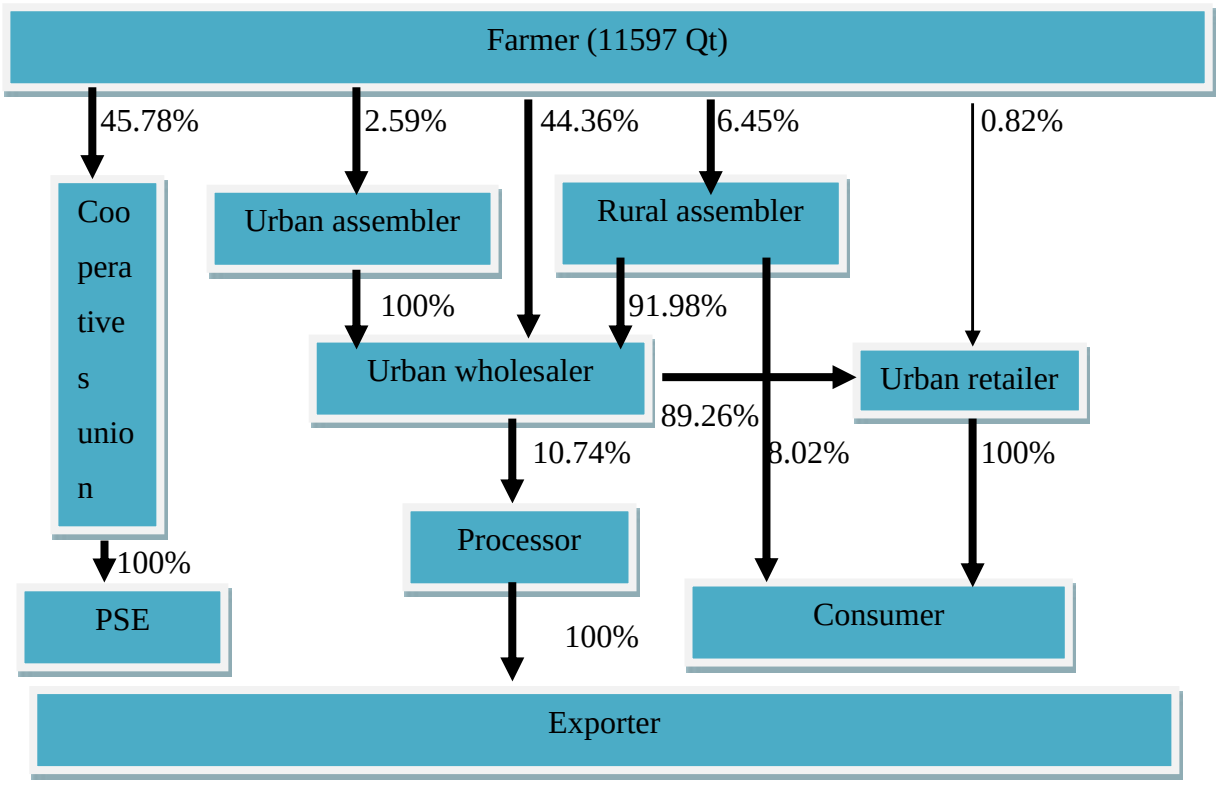
Channel III: Farmers → urban retailer → consumers (95 Qt)

Channel IV: Farmers→ rural assembler→urban wholesaler → retailer→consumer (28Qt)

Channel V: Farmers → urban assembler → urban wholesaler→retailer→consumer (300Qt)

Channel VI: Farmers→ urban wholesaler→ retailer→consumer (5145Qt)

Channel VII: Farmers→ rural assembler → consumer (60 Qt)



Source: Own sketch from survey result, 2013

Figure 6: Haricot bean market channel

4.3.2. Market performance analysis

4.3.2.1. Market performance of maize

Marketing costs and benefit share of actors

Types of marketing costs related to the transaction of maize by rural assemblers, urban assemblers, urban wholesalers, retailers, farmer cooperatives and cooperatives union with their benefit shares were given. Cost of transportation is the highest amount followed by cost of loss due to sieving to avoid foreign matters. Rural assemblers, urban assemblers, urban wholesalers, urban retailers, cooperatives and unions loss 36.31%, 37.6%, 35.12%, 25.85%, 61.54% and 7.57% of the total marketing costs they incurred respectively.

The average cost of production and its selling price of maize was 230.98 and 423.41 ETB per quintal. The result showed that profit margin obtained by producers was ETB 157.93 per quintal (Table 21). Each of the maize value chain actors adds value to the product as the product passes from one actor to another. In a way, the actors add the value of the product through improving product grade by sorting, cleaning, packaging and time utility. Comparing to other value chain actors, profit margin of the producer is 51.59% by adding 36.03% value to the commodity. Other actors buying from the farmers and selling to final consumer through different channels took 48.41% of the total profit margin. This disproportionate share of benefits is the reflection of power relationship among actors. Next to the producers, retailers and urban wholesalers took 19.16% and 11.3% profit margins whereas urban assemblers and rural assemblers are with the lowest profit margins of 2.55% and 3.9% respectively. This is because; even though they incur moderate marketing cost, they sell at cheap relative price to others. The price change from producer’s to consumer price is 35.97%.

Table 21: Maize marketing costs and benefits share of actors

Items (Br/qt)	Producers	Rural assemblers	Urban assemblers	Urban wholesalers	Urban retailers	Cooperatives	Unions	Urban consumers
Purchase prices		413.57	420	428.16	494.45	400	430	575.69
Production cost	230.98							
Marketing costs								
Labor	10.5	3.13	3.5	2.42	2.67			
Brokerage		3	2	3.16	1.3			
Package	12		3	3.87	1.39		12.5	
Storage		2.67	0.91	0.38	4.64		10	
Loss		13	12.6	11.13	5.84	8	4.3	
Transport	10	8.29	5	4.42	1.64		25	
Loading/offloading		3.71	4.5	4.31	3.11	5	5	
Sale tax	2	2	2	2	2			
Total marketing cost	34.5	35.8	33.51	31.69	22.59	13	56.8	
Total cost	265.48	35.8	33.51	31.69	22.59	13	56.8	
Sale prices	423.41	461.3	461.3	494.45	575.69	430	505	
Marketing margins	192.43	47.74	41.31	66.29	81.24	30	75	
Margins (%)	36.03	8.94	7.74	12.41	15.12	5.62	14.05	
Profit margins	157.93	11.94	7.80	34.60	58.65	17	18.20	
Profit (%)	51.59	3.9	2.55	11.3	19.16	5.55	5.95	

Source: own computation, 2013

Margins of maize in different marketing channels

Table 22 explained marketing margin among different actors in different channels. The total gross marketing margin is highest in Channel VI, VIII and II which accounts for 38.41, 36.42 and 35.77 percent of the consumer's price, respectively. The lowest total gross margin (12.2%) was owned in channel III where farmers directly sold to the urban retailers.

Other than producers direct sell to consumers, producers' share (producers' gross marketing margin) is highest (87.8%) in channel III. The lowest in channel VI (61.59%) because of the involvement of rural assemblers, urban wholesalers and urban retailers channel that purchase relatively at a lower price from producers. From rural assemblers involved channels, channel was the highest in gross marketing margin, 35.77%, which was the highest of all traders. Urban retailers were the traders involved in many channels comparing to other traders. But its gross margin ranged from 11.16% to 16.31%. Farmer cooperatives and unions had marketing activity in only one channel (channel IX) with gross marketing margins of 15.81% and 10.55% respectively. Urban wholesalers' gross marketing margin was the highest in channel VI when they purchase from rural assemblers and sell to urban retailers. Urban assemblers' gross marketing margin was 22.21% which was the second largest of all traders.

The net marketing margin computed result showed the highest in channel II (34.27%) where rural assemblers purchase from producers to sell to the consumers and followed by channel VII (20.96%) in which the urban assemblers and retailers are connected to purchase from producers and sell it to consumers. The reason for difference in producers' return across the channels is due to difference in marketing costs and length of the channels. The lowest net marketing margin (6%) was gained by unions as shown in channel VIII.

Table 22: Margins of actors in maize marketing channels in percentages

Margins	I	II	III	IV	V	VI	V II	VIII	IX
TGMM		35.77	12.2	32.63	26.5	38.41	33.37	36.42	26.36
GMM of producers	100	64.23	87.8	67.37	73.5	61.59	66.63	63.58	73.64
GMM of rural assemblers		35.77				10.35		18.49	
GMM of urban assemblers							22.21		
GMM of urban wholesaler					12.52	14.08		12.93	
GMM of urban retailers			12.2	16.31	13.98	13.98	11.16		
GMM of cooperatives									15.81
GMM of unions									10.55
NMM of rural assemblers		34.27				8.85		12.52	
NMM of urban assemblers							20.96		
NMM of urban wholesaler					10.86	12.42		13.62	
NMM of urban retailers			15.44	15.55	13.75	13.75	10.9		
NMM of cooperatives									13.41
NMM of unions								6	

TGMM=Total Marketing Margins, GMM= Gross Marketing Margin and NMM= Net Marketing Margins

Source: own computation, 2013

4.3.2.2. Market performance of haricot bean

Marketing costs and benefit share of actors

Different types of marketing cost related to the transaction of haricot beans by assemblers, wholesalers, retailers, processors, farmers' cooperatives and unions with their benefit shares was given. Cost of transportation is the largest marketing cost of most actors. The processor firms incur 65.6% of marketing cost in processing the haricot beans in order to penetrate international market.

As depicted on table 23 the average cost of production and its selling price of haricot bean was 239.11 and 598.07 ETB per quintal. The result showed that profit margin obtained by producers was ETB 309.21 per quintal. Actors add value on the product through keeping the grain free from live insects, toxic seeds, impurities and moisture contents. Processors also further improve the haricot bean by cleaning from dead insects, insect fragments and insect webbings. Compared to other actors, producers' profit is 32.8% by adding value of 22.53% to the commodity. Unions' share of profit is 28.1% by adding a value of 20.1% followed by processors and urban assemblers with a value addition of 31.76 and 5.86 percents to win 13.88 and 7.67 percents of profit margin. While farmer cooperatives, 1.8%, and urban wholesalers, 2.28%, are actors with the lowest benefit share (margin). This is because their selling prices fetch a little revenue. Actors selling price difference is a feature of haricot bean value addition in which the processor, the largest value added firm, received more than double price of producers. The price change from producer's to consumer price is 31.26% which is lower relative to maize.

Table 23: Haricot bean marketing and benefit share of actors

Items (Br/qt)	Producers	Rural assemblers	Urban assemblers	Urban wholesalers	Urban retailers	Processors	Cooperatives	Unions	Pioneer seed enterprise	Urban
Purchase prices		525	565	658.33	700	750	550	580	900	785
Production cost	239.11	0	0	0	0	0	0	0		
Marketing costs										
Labor	10.5	6.25	6	6	5	12.4	3	5		
Brokerage		10	3	2	1					
Package	12	9	8	6.83	3	5	7	10		
Storage		1.67	1	2.39	14.12			5		
Processing cost						246.78				
Transport	22.25	31.5		15	2	79.80		25		
Load/offloading		7	3	6.83	1		3	5		
Sale tax	2			6.10		32.07		5		
Total marketing costs	49.75	65.42	21	45.15	26.12	376.05	13	55		
Total cost	288.86	65.42	21	45.15	26.12	376.05	13	55		
Sale prices	598.07	658.3	658.3	725	785	1256.1	580	900		
Marketing margin	358.96	133.3	93.33	66.67	85	506.13	30	320		
Margins (%)	22.53	8.37	5.86	4.18	5.34	31.76	1.9	20.1		
Profit margins	309.21	67.91	72.33	21.52	58.88	130.08	17	265		
Profit (%)	32.8	7.21	7.67	2.28	6.25	13.88	1.8	28.1		

Source: own computation. 2013

Marketing margins of haricot bean in different channels

Table 24 indicated marketing margin among different actors in different channels. The total gross marketing margin (TGMM) was the highest in Channel II, I and V which were accounted for 58.2, 38.89 and 27.04 percent of the consumer's price, respectively. The lowest total gross margin (4.59%) was gained in channel III where farmers directly sold to the urban retailers.

Producers share (GMMp) is the highest (95.41%) in channel III and followed by 86.87% in channel VI; and lowest in channel II (41.8%). The reason for the highest and lowest gross margins was urban retailers purchase at expensive and rural assemblers' bargaining power to purchase at lowest price. Processors captured the largest gross marketing margin (40.29%) in channel II to sell the commodity at international market level followed by unions in the channel I to gain gross marketing margin of 35.56%. From rural assemblers' involved two channels, channel VII was the third highest in gross marketing margin in the haricot bean market. The lowest margins were accounted for farmer cooperatives, urban retailers and urban wholesalers in channels I, III and II with margins of 3.33, 4.59 and 6.37 % respectively. Urban assemblers perform marketing activity only in channel V with a gross margin of 9.04%. Urban wholesalers involved in four channels which was the most frequent comparing to other traders. Its gross margin ranged from 6.37% to 18% with an average gross marketing margin of 13.5%.

Net marketing margin was the highest in channel II (31.8%) in which the haricot bean pass through producers-rural assemblers-urban wholesalers-processors-exporter and followed in channel I (30%) as cooperatives purchase from producers to sell it to PSE through unions. Cooperatives, urban wholesalers and urban retailers accounted the lowest net marketing margins of 2.81, 3.57 and 4.13% in the first three consecutive channels respectively.

Table 24: Margins of actors in haricot bean marketing channels in percentages

Margins	I	II	III	IV	V	VI	VII
TGMM	38.89	58.2	4.59	26.79	27.04	13.13	23.36
GMM of producers	61.11	41.8	95.41	73.21	72.96	86.87	76.64
GMM of rural assemblers		11.54					23.36
GMM of urban assemblers					9.04		
GMM of urban wholesalers		6.37		16.5	18	13.13	
GMM of urban retailers			4.59				
GMM of processors		40.29					
GMM of cooperatives	3.33						
GMM of unions	35.56						
NMM of rural assemblers		9.38					18.65
NMM of urban assemblers					7.6		
NMM of urban wholesalers		3.57		12.67	14.17	9.3	
NMM of urban retailers			4.13				
NMM of processors		31.8					
NMM of cooperatives	2.81						
NMM of unions	30						

Source: own computation, 2013

4.4. Econometric Analysis

Maize and haricot bean are produced to supply in to market and household consumption in the study areas. Various variables were assumed to determine the market participation decision and its marketed surplus by sampled households. Under this section the result of the Heckman two stages model are given for maize and Heckman selection model with sample selection for haricot bean due to significant and insignificant nature of lambda respectively. The Heckman two-step selection model was employed in order to control the selectivity bias and endogeneity problem; and obtain consistent and unbiased parameter estimates.

Determinants of maize market participation decision

Table 25 summarized results of the model output of maize and haricot bean participation decisions. In the first stage, households decide whether they would be sold the commodities in to market or not. Based on the Heckman's selection assumption (i.e. the selection equation should contain at least one variable that is not in the outcome equation); sex of the household were taken as exclusion restriction to be included in the participation equations but not in the outcome equations to predict IMR correctly. Out of twelve explanatory variables, three of them were found to determine the participation decision in maize market. These are market price, district dummy and source of price information. The summarized results of the model output of maize and haricot bean participation was given.

Market price: As expected, market price determines participation decision positively and significantly with 1% significance level. The positive and significant relationship between the variables indicates that as market price of maize increases, the probability of market participation also increases. A one birr increment in market price of maize increases the market participation decision by 0.04%.

District Dummy (ATJK=1): There is a positive and significant relationship between the two districts for maize at a significance level of 10% for each. As the district becomes ATJK, the more likely maize market participation was observed. As the producer become ATJK the level of participation increased by 0.4%.

Source of price information: The participation equation result showed that source of price information affects maize market participation positively and significantly. As the source of price information is emanated from neighbor producers response to participate in maize market increased. It was significant at 10% significance level. This may indicates the immediate share of information among producers encouraged them to participate in the market, even though reliability of the information is in question. This source of price information increased the maize market participation by 0.42%.

Table 25: Results of determinants of maize and haricot bean market participation

Variables	Maize		Haricot bean	
	(Heckman-two step)		(Sample selection, ML)	
	Coefficient	Standard error	Coefficient	Standard error
Non –farm income (log)	-0.03	0.03	0.16*	0.09
Market price	0.04***	0.01	0.16	0.14
District dummy	0.40*	0.23	1.25*	0.68
Sex of the household heads	-0.31	0.30	-3.77**	1.84
Land size	0.13	0.12	0.87*	0.49
Livestock holding	0.02	0.02	0.09	0.06
Number of extension contact	-0.01	0.01	0.03***	0.01
Amount of credit (log)	-0.03	0.05	-	-
Distance to main market	-0.01	0.02	-0.15*	0.08
Family size (man equivalent)	-0.12	0.14	-0.34	0.33
Source of price information	0.42*	0.24	1.3**	0.61
Level of literacy	-0.01	0.04	0.04	0.14
LR Chi^2 (1)	-		15.35	
Number of observations	165		92	

The dependent variable (participation decision) is a binary variable that takes the value 1 if the household had participated in maize/haricot bean market, 0 otherwise.
*, ** and *** represents significance at 10%, 5% and 1% probability levels respectively

Source: model output, 2014

Determinants of haricot bean market participation decision

In haricot bean market participation decision, out of eleven explanatory variables, seven variables were statistically significant. District dummy, source of price information, sex of the household, distance to the main market, land size, non-farm income and number of extension contact were found significantly affect the participation decision. An explanatory variable, level of credit, estimated in maize model analysis to determine household heads market participation and intensity of the participation is not included in to haricot bean. This is because the number of household heads credit owned in haricot beans trade was little.

District Dummy (ATJK): There is a positive and significant relationship between the two districts for haricot bean at a significance level of 10%. Same as maize grain, in haricot beans as the district becomes ATJK, market participation increased by 1.25%.

Source of price information: It affects the haricot bean market participation positively with a significance level of 5%. When price information is sourced from neighbor producers' to the haricot bean producers participate in the market increased by 1.33%.

Sex of the household head: This is a dummy variable that hypothesized sex affects the market participation decision and volume of supply of maize and haricot bean either positively or negatively. The result of the selection equation showed that females have a better market participation decision than males. Statistically, sex has a significant and negative effect on haricot bean market participation at 5% significant level. This is because, according to the survey result, the family size of male households is relatively greater than that of female household heads. Hence, large family size expected higher consumption level which suppresses the market participation decision. According to the econometric result output, being female headed household increased the haricot bean market participation by 3.78%.

Distance to main market: As hypothesized, further the distance from households' farm gate the less market participation decision was observed. The result showed a negative and significant relationship between the variables. The variable was significant at 10% significance level. The output result interpreted as the main market located further by one kilometer from farm gate the participation decreased by 0.15%.

Land holding: As expected land holding was positively and significantly related to market participation decision. The larger owned land the more allocation expected to the crops. Thus, in this study, land holding was found positive and significant relationship with participation decision by 10% significance level. As the household heads owned additional hectare of land the haricot bean market decision increased by 0.87%.

Non-farming income: Unexpectedly, non-farm income of the household heads negatively affected the market participation. On average, if a haricot bean producer gets non-farming income causes 0.16% reduction in its participation decision. This may be because households who have better non-farm income will not tend to generate cash from selling of haricot bean rather from their non-farm income.

Number of extension contact: As hypothesized, frequency of contact with extension agents positively influenced the participation with a significant level of 1%. An extension contact of the household increased the market participation decision by 0.02%.

Determinants of maize market supply

Out of eleven hypothesized variables in the outcome equation of the model, eight variables were found to be significant as determinants of the volume of maize marketed. As indicated in Table 26 the variables were market price, district dummy, livestock holding, land size, level of credit, distance to main market, family size and source of price information. The inverse mills' ratio of maize was found significant and positive. The amount of maize and haricot beans supplied in to the market was measured in kilogram. To normalize the large volume of supply natural logarithm was used.

Market price: As expected, this variable has a positive effect on volume of maize market supplied with statistically significant level of 1%. The positive and significant relationship indicates that household increased the supply of maize by 0.01% for a one birr increment of market price. In the study of Wolelaw (2005), on determinants marketable supply of rice, he found a significant positive relationship between rice sold and current market price.

District Dummy (ATJK=1): The variable consists of a number of characteristics of the districts. This is related to the difference in access to information, access to market and producing potential of maize between the districts. There was a positive and significant relationship between the two districts at a significance level of 1%. This implies ATJK supplied more volume of maize comparing to Dugda district.

Land Size: As expected, it was found household heads with large land size allocated more land to maize cultivation. The relationship of land size to volume of supply is positive and significant at 10%. As land holding increased by one hectare the level of maize supplied in to the market increased by 0.04%. According to Kinde (2007) in his study to analyze factors affecting sesame marketable surplus total land owned has a positive and significant effect to the amount supplied.

Livestock holding: As hypothesized livestock holding has a positive and significant relationship with marketed volume of maize. It was significant at 10% significance level. The result shows that a unit increase in livestock unit results in 0.04% increment in the volume of marketed.

Distance to main market: This variable has a positive effect on intensity of maize market participation and found to be statistically significant at 5% significance level. A single kilometer increases in distance from the farm gate shows reduced volume of market supply of maize by 0.05%.The positive relationship indicates that the farther a household head is located from the main market, the more would be to supply in maize market. This is may be households who sell haricot bean in large volume prefer town markets to village markets.

Family size: As expected the family size (adult equivalent) positively and significantly determined the level of maize supply in the market. It was measured in adult equivalent which tells labor contribution in maize production and marketing. The grain was significant at 5% significance level. The result interpreted as for every increment in adult equivalent there was 0.51% increased level of marketed supply.

Source of price information: This variable affected intensity of maize market participation positively and significantly. It is significant at 10% significance level. This indicates that as

household heads get price information from neighbor producers its volume of supply increased by 0.72%. This is may be no cost to have nearby information on price information.

Literacy level: As expected, those literate household heads increased the volume of maize market supplied. The relationship was significant at 1% significance level. It was found that a positive and significant relationship which indicated that as the household improved in one grade level of formal schooling, volume of market supply increased by 0.26%.

Table 26: Maize and haricot bean market supply equation model

Variables	Maize		Haricot beans	
	(Heckman-two step)		(Sample selection, ML)	
	Coefficient	Std. Error	Coefficient	Std. Error
Non –farm income (log)	0.01	0.06	0.13***	0.03
Market price	0.26***	0.01	0.15***	0.02
District dummy	1.32***	0.41	0.53**	0.25
Land size	0.3*	0.18	0.55***	0.1
Livestock holding	0.04*	0.02	-0.32**	0.02
Number of extension contact	0.01	0.01	0.01**	0.01
Amount of credit (log)	0.06	0.09	-	-
Distance to main market	0.05**	0.03	-0.01	0.02
Family size (man equivalent)	0.51**	0.25	0.66***	0.13
Source of price information	6.72*	0.43	-0.08	0.22
Level of literacy	0.26***	0.06	0.11***	0.03
Mills lambda	2.29***		-	
Lambda	-		0.91	
Rho	1.00		1.00	
Sigma	2.29		0.91	
Wald chi^2	367.54		3299.86	
Censored observations	52		14	
Uncensored observations	113		78	
Number of observations	165		92	
Log likelihood	-		-108.9	

*, ** and *** represents significance at 10%, 5% and 1% probability levels

Source: model output, 2014

Mills lambda: According to the model output, the lambda (Inverse Mill's Ratio) or selectivity bias correction factor has positive impact on maize marketed volume with 1% significance level. The result suggests that there are unobserved factors that might affect both probability of maize market participation decision and marketed volume. The positive sign of this inverse mill's ratio shows that there are unobserved factors that affects both participation decision and marketed volume positively.

Rho(ρ) is the correlation between the error terms of the substantive and selection models. Rho has a potential range between -1 and +1 and can give some indication of the likely range of selection bias. A correlation with an absolute value of 1 would occur if the regression coefficients of the selection model and the regression coefficients of the substantive model were estimated by identical processes (i.e., potential selection bias). Conversely, a value of rho closer to zero would suggest that data are missing randomly or the regression coefficients of the selection model and the regression coefficients of the substantive model were estimated by unrelated processes (i.e., less evidence of selection bias) (Cuddeback et al., 2004). In this particular case, a rho value of 1 indicates the existence of selection bias and justifies the use of Heckman two stages model.

Determinants of haricot bean market supply

Non-farm income: unexpectedly, it affected the volume of marketed supply of haricot bean positively and significantly. It was significant at 1% significance level. As the non-farm income increase by one birr the intensity of participation would be increased by 0.13%. This may be because producers who have better non-farm income will support the haricot bean production to generate more cash from sell of it.

Market price: As expected, this variable has a positive effect on volume of haricot beans market supplied and was statistically significant at 1% significance level. The positive and significant relationship indicates that household heads who increased the supply of haricot bean by 0.01% for a one birr increment of market price. The study of Wolelaw (2005), on determinants marketable supply of rice, he found a significant positive relationship between rice sold and current market price.

District Dummy (ATJK=1): There was a positive and significant relationship between the two districts at a significance level of 5%. This indicates ATJK supplied more volume of haricot beans comparing to Dugda district. As the district was found ATJK the market supply of haricot beans increased by 0.53%.

Land size: This variable shows a positive and significant relationship with marketed supply of haricot bean at 1% significance level. As size of owned land increased by one hectare the level of haricot beans supplied in to the market increased by 0.55%.

Livestock holding: Rejecting the hypothesis, this variable influenced the quantity of haricot bean market supply negatively. It was significant at 5% significance level. The result shows that a unit increase in the livestock causes 0.32% decrease in the amount of marketed supply. This is mainly due to the fact that farmers with more TLU tend to specialize in livestock production by reducing production of haricot beans as means of income.

Number of extension contacts: As expected, frequency of contacts with extension workers were positively and significantly affected the haricot bean intensity of market participation. A 5% significance level and positive relationships was observed among the variables. As number of extension contact increased by one, the volume of haricot beans supplied to the market increased by 0.01%. Studies have shown that visits by extension agent improve participation and volume decision of output marketed (Holloway et al., 2000).

Family size: As expected the family size was found to determine level of haricot bean supply positively and significantly. Haricot beans were significant at 1% significance level. The result interpreted as for every increment in man equivalent there was 0.66% improvement in volume of the legume market supply to the market.

Level of literacy: As expected, those household heads with better in level of literacy increased the volume of haricot bean market supply. It was found that a positive and significant relationship with 1% significance level which indicated that as the household improved in one grade level of formal schooling, volume of supply increased by 0.11%.

Lambda: It was found to be positive but insignificant as indicated in Table 26. This showed that there was little sample selection bias or in other words, there were no unobservable

characteristics affecting the household heads market participation decision and extent of their participation. The sign indicates that the error terms in the participation and outcome equations are positively related.

4.5. Challenges and opportunities of maize and haricot bean value chain

Value chain actors were asked to identify their major production and marketing constraints on the survey for further technological, institutional and organizational innovation for upgrading the value chain in the study areas. Thus the major constraints and opportunities are briefly discussed in this subsection.

4.5.1. Production constraints

According to producers report, factors that hindered the production of maize and haricot bean were identified. Major constraints of SIMLESA crops were drought, high cost of fertilizers and improved seeds, and delay in inputs. Table 27 indicted maize and legumes production constraints identified by producers in percentages.

Drought: Natural factors such as drought and flood are often beyond the control of farmers and supportive institutions. According to the survey result 82.5% of the producers indicated drought as a constraint in production. Despite the availability of irrigation water for 13% of respondents water use is not well established. Due to shortage of water to maize yield reduced if water deficit occurs during the critical growth stages from tasseling to grain. Mostly, production of haricot beans is highly constrained by environmental stresses such as: drought, pests, diseases, and low input farming methods that have resulted into declined soil fertility and productivity.

High cost of inputs: For higher yield of maize and haricot bean both physical and non-physical inputs are important. Primarily producers used improved seeds, fertilizers, pesticide/herbicides and labor with equal concern of services like research, extension service and technology dissemination from governmental and nongovernmental institutions. But those inputs are utilized in inappropriate amount by most producers due to its expensiveness and less supply in the market. Among the total sample of respondents 76.5% and 62.5%

replied limited access and supply of inputs as their production problem due to high price of fertilizers and improved seeds respectively.

Late arrival of inputs: Since agricultural products are seasonal all useful inputs need early arrangement to boost the production by applying inputs on the right time. But the survey result revealed that 64% and 52.5% of the producers complain delay supply of improved seeds and delay on fertilizers.

Table 27: Production constraints of maize and legumes

Major constraints	N=200	%
Drought	165	82.5
Price of fertilizers	153	76.5
Timely availability of improved seeds	128	64
Prices of improved seeds	125	62.5
Timely availability of fertilizers	105	52.5
Availability of credit to buy fertilizers	87	43.5
Availability of credit to buy seeds	84	42

N= number of traders

Source: Own computation from survey result, 2013

4.5.2. Production opportunities

Favorable land, climatic condition and high productivity potential are good opportunity of production in the study areas. Maize and haricot bean is considered as the main cash crop and food source for the farmers in many low lands and mid altitude zones of Ethiopia. This opportunity enabled farmers to produce these commodities for commercial purpose. Thus, these situations increased the production volume of maize and legumes in the areas.

Throughout time increased institutional support to production of maize and legumes by government bodies, research centers and nongovernmental organizations is observed. Government via its researchers and district agents' intervention increased correct use of inputs (fertilizers, seeds and chemicals) and organized trainings on business development to improve their role in production and marketing. Non-profitable institutions also play a great role in conducting researches, organizing trainings on business development strategies and

post harvest management. As shown on table 28, according to input supplier cooperatives, 38.46% and 23.08% of the interventions were on business management and correct use of inputs respectively. Trainings were also made on subsidized distribution of seeds and fertilizers.

Table 28: Input interventions and trainings

Types of intervention	N =13	%
Business management	5	38.46
Correct use of fertilizers/seeds/chemicals	3	23.08
Storage management	2	15.38
Subsidized distribution of seed	1	7.69
Subsidized distribution of fertilizers	1	7.69
Post harvest management	1	7.69

N= number of trainings organized

Source: survey result, 2013

4.5.3. Marketing constraints

Table 29 indicates unstable price, weak market information, presence of non-licensed traders and absence of grades and standards were the major market constraints that hinder maize and haricot bean market.

Price volatility: It is a common problem for agricultural products. Thus, maize and haricot beans as agricultural products price instability is the major market constraint. This is because of its nature of seasonal supply with unsatisfied demand in the market. According to the survey result 62.8% of respondents' replied unstable price hindered the business.

Weak market information: In the surveyed maize and haricot bean producing towns, half of respondent, traders are unable to access regular market information. It is a major problem in developing marketing plans and in price discovery. This lack of information is increasing both transaction cost and resistance to risk taking. All value chain actors suggest that a simple price and volume information system would develop their marketing decision making.

Poor coordination amongst traders: According to the survey result 62.8% of the traders pointed out presence of non licensed traders in the market. Most of maize and haricot bean

traders are not part of formal trading organizations. They are informal and often non licensed traders. Consequently very poor business coordination amongst traders has been observed. It was difficult for these informal traders to gather information and access opportunities in new area of the business. Moreover, these traders are seasonal and work with other commodities such as teff, barely and sorghum during the year. If traders were to be given support in terms of business skills development, they would wish such an intervention to apply across commodities. This situation also decreases competitiveness of licensed traders who obliged to pay annual taxes. But in non licensed traders side the tax is used to develop their business. However, they were less accessed to different services like trainings, credit and information.

Absence of grades and standards: 48.7% of the respondents indicated absence of standards of specification, testing and grading constrained maize and legumes market. These traders usually test quality of their purchase in traditional methods. The main assessment methods of quality are feeling, biting, visual inspection, shaking or trust on sellers. Those methods are not proven scientifically to have appropriate measurement of quality of the commodity. Laboratory analysis and moisture meter are not used to standardize the maize and haricot beans to strengthen the business.

In addition to above all, less role of government support to strengthen grain marketing, limited access to credit to purchase required amount of maize and legumes and covering other marketing costs, and non transparent taxation system are identified as constraints of maize and haricot bean which hinder improvement of a special market supply-value chain actors/traders in the business.

Table 29: Major marketing constraints identified in the study areas

Major marketing constraints	N=78	%
Prices are unstable	49	62.8
Presence of non licensed traders	49	62.8
Weak market information	39	50
Absence of grades and standards	38	48.7
Poor quality of grains	38	48.7
Limited access to credit	36	46.2
Non-transparent (complicated) taxation system	32	41
Absence of government support to improve marketing	24	30.8
Multiple taxation	20	25.6
Inadequate market infrastructure	22	28.2

N= number of respondents
Source: Own computation from survey result, 2013

4.5.4. Marketing opportunities

Major maize and haricot beans market opportunities pointed out were presence of potential sellers and buyers, presence of storage facility and improved trends of quality.

Presence of potential traders: The major opportunity for marketing is presence of potential sellers and buyers in markets. Traders pool and transport both crops to different parts of the country as well as abroad market (haricot beans). The presence of high consumer demand for the commodities increased the marketing activities. Proximity of urban wholesalers, large volume carriers of the products, to processing factories was considered as an opportunity to haricot beans market.

Availability of storage facility: The traders use different types of stores to keep their maize and legumes properly with a possible minimized loss and fetch a reasonable price. Mainly used types of stores were sealed warehouse, non-sealed warehouse, stores and shades. Table 30 indicated storage capacity of warehouses, stored amount, storage duration and loss of maize and haricot beans. Average storage capacity of maize warehouses were 656 quintals with lagged year stored amount of 112 quintals. The grain bought stored for 7 weeks before allowed to sell with 0.9% spoil in stores. Haricot beans' average storage capacity of warehouses was 1301 quintals. Lagged year stored amount was 210 quintals and spent 6 weeks with 1.02% spoilage.

Table 30: Storage facilities of traders

Storage facility	Maize		Haricot beans	
	Mean	SD	Mean	SD
Store capacity (quintal)	656	1320.28	1310	1867.44
Maximum quantity stored (qt)	112	174.08	210	306.65
Average storage period (week)	7	6.61	6	5.51
Spoilage (%)	0.9	1.53	1.02	1.95

Source: survey result, 2013

Trends of product quality: Agricultural products quality determines the price, volume of supply and level of value addition. Table 31 indicated trends of maize and haricot beans

quality in the market. According to the result 84.62% and 82.15% respondents considered improved quality for the commodities. Out of which 64.62% and 42.86% respondents considered a slight increment of maize and haricot beans quality respectively. Thus, increasing quality of maize and legumes attract all actors and enablers in the value chains development.

Table 31: Trends of maize and haricot bean quality

Quality	Maize		Haricot beans		X^2 test
	N=65	%	N=28	%	
Increased a lot	13	20	11	39.29	3.8*
Increased slightly	42	64.62	12	42.86	3.26*
No change	5	7.69	4	14.29	0.52
Decreased slightly	4	6.15	0	0	1.8
Decreased a lot	1	1.54	1	3.57	0.38

N= number of respondents

Source: survey result, 2013

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary and Conclusions

The study was undertaken with the objective of maize and haricot bean value chain analysis in Adami Tulu-Jido kombolcha and Dugda districts in central rift valley of Ethiopia. The specific objectives of the study are identifying and mapping the major maize and haricot beans value chain actors, functions and their relations; analyzing its marketing costs, margins and value share of the value chain actors; identifying determinants of market participation and intensity of market participation of maize and haricot beans.

The data were collected from 200 households' using pre-tested structured questionnaire. The sample households were from 14 potential producer kebeles, in the two districts. All the sampled household heads are growers of maize and/or legumes. Of those producers of maize and haricot bean, 113 participate in maize market from 165 producers. In haricot bean market participation the number is 78 from 92 producer household heads. Market participation decision and volume of sales are found to be important elements in the study of the value chain. Therefore, Heckman two stages model was employed to determine factors of the market participation and marketed surplus of maize and haricot beans. The main findings of this thesis are summarized as follows. The analysis was made using descriptive statistics and econometric model using STATA 12 software packages.

The value chain analysis revealed the main actors and their interaction in maize value chain are maize producers, rural and urban assemblers to receive products from farmers; urban wholesalers carry the grain to retailers and ECX for trade facilitation. Retailers are a simple link to consumers to purchase and consume the grain nearby market. Cooperatives also collect the grain from member and non member producers, as an agent, to cooperatives unions to sell to WFP and other traders via ECX market. Middlemen link farmers to the urban grain traders by bargaining at farm gate level. District agricultural offices, research centers, market and industry offices, and formal and informal sources of credit institutions were identified as enablers. On the other hand, haricot beans value chain analysis identified haricot bean growers, assemblers, wholesalers, processors and private seed enterprise as an actor of the value chain. Processors received haricot beans grain either from local wholesalers

or directly from ECX. Private seed enterprise, Pioneer seed enterprise (PSE), was observed to purchase the haricot beans grain to produce seed and bring back in to the market through further value addition. The same as maize enablers (District agricultural offices, research centers, market and industry offices, and formal and informal sources of credit institutions) play a great role in haricot beans production and market development.

The average production cost of maize was 230.98 ETB and sold for 423.41 ETB per quintal. Its market indicates nine channels. Of these channels, the highest share of the total volume of maize goes to the VIII channel where the maize grain flow from producers-rural assemblers-urban wholesalers-other traders at national level via ECX. Regarding margin of maize value chain actors of maize producers had maximum gross margin of 100% and a minimum of 61.59%. This least margin for the producers is due to long channel which consist many actors. Producers' margin and profit is the highest of all actors in maize value chain actors. On the other hand, haricot bean production cost was 239.11 ETB and sold for ETB 598.07 ETB per quintal. Seven market channels were identified. In the shortest channel, channel I, where unions receive from producers to sell private seed enterprise producers got the highest margin of 95.41% and least in the longest channel, channel II, with the margin of 14.8%. From haricot bean value chain actors' processors lead value addition followed by producers. But producers' profit margin is the greatest of all actors.

Traders govern the maize and haricot beans value chain. In maize value chain, wholesalers govern the value chain through carrying large proportion of the marketed volume even outside of the study boundary and paying for quality products by negotiation. On the other hand, in haricot beans value chain, processors has a great role in facilitation, price setting and setting standards quality for the haricot beans bought in domestic market. It also involves takes part in international market to sell processed haricot beans based on contractual agreement at large quantity.

Heckman's two stages model procedure was used to analyze factors affecting market participation decision and volume marketed separately. The model output revealed that market price, district dummy and source of price information were found to exert significant effect on households' maize market participation. However, the supply equation identified market price, district dummy, land size, livestock holding, distance to main market, family size, source of price information and literacy level; and inverse Mill's ratio (LAMBDA) as

important factors affecting sale volume of maize. Heckman selection model was used to analyze determinants of haricot beans market participation, in probit equation, were district dummy, sex of household heads, distance to main market, land size, non-farm income, frequency of extension contact and source of price information. The supply equation revealed that district (ATJK), literacy level, land holding, livestock owned, non-farm income, number of extension contact, family size and market price. These econometric results revealed that district dummy was the most important determinant in both maize and haricot beans market participation. The intensity of market participation of these commodities strongly was affected by market price, literacy level, district dummy and family size (man equivalent).

The major production and marketing constraints were also identified in the study districts. Producers face drought, high cost of production and delay in inputs arrival for purchase. Traders are also constrained by price volatility, weak market information, poor coordination amongst traders, and absence of grades and standards.

5.2. Recommendations

On the basis of the results of this study, the following policy implications are drawn so as to suggest for the future intervention strategies aimed at the promotion of maize and haricot bean production and marketing particular to the study areas.

Recommendations for maize value chain

Maize traders' margins are constrained by loss due to transportation, packaging and cleaning practice. Thus, this loss can be minimized through proper cleaning, packaging and transportation facilities which improve share of each actor in the chain. Another factor that constrained these margins is segregation of intermediaries sharing margins with a little improvement to the commodity in the market. Thus, capacity building to producers can strength their bargaining power over price in the market.

Even though, the study areas are potential for production of maize grain there is no processing enterprise to add value on the commodity. Hence, planting agro-processing firms which consume maize as a raw material to have a form utility can increase demand for the product as well as benefit from increased price of maize in study areas.

District dummy, level of literacy and extension contact were found to be determinants of outcome equation of the model. Since Adami Tulu-Jido Kombolcha has naturally endowed environment for maize production, it has potential than that of Dugda in production of maize which indicates any intervention should considered the mentioned difference. Upgrading literacy level of the producers can increase volume of supply. In addition, strengthening farmer contacts with development agents to share knowledge on methods of handling and cleaning, and improving the quality contribute a lot in boosting the level of haricot beans supply in the market.

Recommendations for haricot bean value chain

The probit model analysis showed that source of price information and frequent extension contact found increasing market participation decision of haricot bean producers. Easily understandable and communicable, allowing producers facilitation in price information should be designed. Distance to main market was found negative and significantly affected participation decision. The negative and significant relationship indicates that household farther from market deprived to sell the product which increases transaction costs of the household. The distant market also hindered the producers benefit from time utility. Hence, special attention should be given to market infrastructure in order to allow incentives to the haricot bean producer accordance with their level and quality of product. Since frequency of extension contact significantly affected the market participation decision and extent of participation strengthening farmer contacts with development agents contribute in boosting the level of haricot beans supply and participation in the market.

The results of outcome equation indicate that haricot beans supply to the market is positively and significantly (at 1% significance level) affected by district dummy, market price, off-farm income and family size. Literacy level of the households revealed as the producers develop their knowledge and skill through formal education they can decide how much to supply in large quantity. Non-farm income is contributing for haricot bean production and marketing in the study areas. Therefore, beside this agricultural activity, creating income generating activities in turn encourages volume of haricot bean supply.

From traders side, attention should be given to improve weak market information access, price volatility, poor coordination among traders and lack of quality grain supply; and

producers challenges, increased costs of production and late input supply can be corrected by establishing and licensing seed producing governmental and nongovernmental enterprises. Responsible governmental bodies and respective stakeholders intervention is a remedy to improve the challenges.

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7. APPENDICES

Appendix Table 1: Conversion factor for adult equivalent

Age group (years)	Adult equivalent	
	Male	Female
<10	0.6	0.6
11-13	0.9	0.8
14-16	1	0.75
17-50	1	0.75
>50	1	0.7

Source: Storck *et al.,* 1991

Appendix Table 2: Conversion factors used to compute TLU

Animal category	Conversion factors
Calf	0.25
Weaned calf	0.34
Heifer	0.75
Cow	1.00
Horse	1.10
Donkey(adult)	0.7
Donkey (young)	0.35
Camel	0.25
Sheep and goat (adult)	0.13
Sheep and goat (young)	0.06
Chicken	0.013

Source: Storck *et al.,* 1991

Appendix Table 3: Sources and purposes of credit used by households in percentage

Variables	ATJK N=(12)	Dugda= N(30)	Total= N=(42)	X^2-test
Credit sources				**1.79**
Lender individuals	25	23.33	23.81	
Cooperatives	8.33	13.33	11.9	
Microfinance	50	43.33	45.24	
Relatives	16.67	10	11.9	
Merry go round	-	6.67	4.76	
Saving and credit associations	-	3.33	2.38	
Purpose of credit				**11.35**
Buying seeds	33.33	3.33	11.90	
Buying fertilizers	16.67	23.33	21.43	
Buying herbicides and pesticides	-	3.33	2.38	
Buy oxen for traction	-	13.33	9.52	
Buy other livestock	-	10	7.14	
Invest in irrigation system	8.33	6.67	7.14	
Non-farm business	16.67	10	11.90	
To pay land rent	-	3.33	2.38	
Buy food	16.67	10	11.90	
Consumption needs	8.33	16.67	14.29	

Source: own computation, 2013

Appendix Table 4: Total costs of processing enterprises in 2012/13 processing year

Items	Total cost of operation (birr/quintal)	% of total cost
Variable costs		
Transport to firm	23	6.12
Loading/offloading	5	1.33
Labor	12.4	3.3
Electricity	1.54	0.41
Quality control testing	2.53	0.67
Fumigation	0.81	0.22
Package and label	5	1.33
Health and veterinary inspection	1.84	0.49
Communication	0.59	0.16
Transit	25.41	6.76
Freight transportation	46.39	12.34
Marketing cost	10	2.66
Fixed costs		
Management	9.51	2.53
Repair and maintenance	108.74	28.92
Income tax	32.2	8.56
Credit costs	58.3	15.5
Depreciation	32.79	8.7
Total	376.05	100

Source: own computation, 2013

Appendix Table 5: Household questionnaire

Sustainable Intensification of Maize-Legume Cropping Systems for Food Security in Eastern and Southern Africa (SIMLESA) Project

PART 0. INTERVIEW BACKGROUND

1. Respondent's name:.....
2. Region.....
3. 3. Zone.....
4 District:…..…….…….....

5. Peasant Association …..…….....

6. Village.....

7. GPS readings of Village: a) Altitude.....; b) Latitude……; c) Longitude……

PART 1. FARMERS IDENTIFICATION AND VILLAGE CHARACTERISTICS

Experience in growing maize (years)…….....

Experience in growing legumes (years) Haricot bean..... Soybean…….....Pigeonpea……
Groundnut…..…Cowpea…… (Other, specify name) .....Years of experience……...

Distance to the village market from residence (km) .....minutes of walking time .....

What means of transport do you use mainly to get to the village market? (**CodesA**)……

Average single trip transport cost (per person) to the village market using this means of transport (ETB/person).....

Family code	Name of household member (start with respondent)	Sex Codes A	Marital status Codes B	Age (years)[A]	Education (years) **Codes C**	Ownfarm labour contribution Codes D
1	**2**	**3**	**4**	**5**	**6**	**10**
	Codes A 0. Female 1. Male	**Codes B** 1. Married living with spouse 2. Married but spouse away 3.Divorced/separated 4.Widow/widower 5. Never married 6.Other, specify	**Codes C** 0. None/Illiterate 1. Adult education or 1 year of education * Give other education in years	**Codes D** 1. 100% 2. 75% 3. 50% 4. 25% 5. 10% 6. Not a worker		

Distance to the nearest main market from residence (km)……minutes of walking time……...…

Average single transport cost (per person) to the main market using a car (ETB/person) .....

Distance to the nearest source of seed dealer from residence (km) .....minutes of walking time .....

Distance to the nearest source of fertilizer dealer from residence (km) .....minutes of walking time ……

Distance to nearest source of herbicides and pesticides dealer from residence (km)…minutes of walking time ....

Distance to the nearest farmer cooperative from residence (km)……minutes of walking time .....

…

Codes A: 1. Walking; 2. Bicycle; 3. Tractor; 4. Car ; 5. Cart, 6. Other, specify……

A/For the under 6 year olds, give age to the nearest 3 decimal places

PART 2: CURRENT HOUSEHOLD COMPOSITION AND CHARACTERISTICS

Section A: Land holding (timad) during the 2012/13 cropping year (last cropping year)

Land category	**Long rain season**	
	Cultivated (annual + permanent crops)	Uncultivated (e.g. grazing, homestead etc)
1	**2**	**3**
1. Own land used (A)		
2. Rented in land (B)		
3. Rented out land (C)		
4. Borrowed in land (D)		
5. Borrowed out land (E)		
6. Total owned land (A+C+E)		
7. Total operated land (A+B+D)		
8. Bought land during long rain season		
9. Sold land during long rain season		

Section B: Main sources and quantity of seed for Maize, Haircot beans, faba bean, and other major legumes grown last cropping year (2012/13)

Season Codes A (start with belg)	Crop	Crop variety	Total amount of seed (kg)	Quantity of seed and sources					
				Source 1		***Source 2***		***Source 3***	
				Codes B	***Amount (kg)***	***Codes B***	***Amount (kg)***	***Codes B***	***Amount (kg)***
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

Codes A	**Codes B**			
1. Belg (residual moisture) 2. Meher	1. Own saved 2. Gift from family/neighbor 3. Farmer to farmer seed exchange 4. On-farm trials	5. Extension demo plots 6. Farmer groups/Coops 7. Local seed producers 8. Local trader	9. Agro-dealers/agrovets 10. Bought from seed company 11. Provided free by NGOs/govt 12. Govt subsidy program	13. Other (specify)

PART 3. CROP PRODUCTION (2012/13 crop calendar)

Section A. Plot characteristics, investment and input use

plot size (timad)	Crop(s) grown	Crops variety	(Sub)plot ownership **Codes C**	Soil fertility **Codes E**	Irrigation (**Codes J)**
1	**2**	**3**	**4**	**5**	**6**

Codes C		**Codes E**	**Codes J**
1. Owned	4. Borrowed in	1. Good	1. Irrigated
2. Rented in	5.Borrowed out	2. Medium	2. Rainfed
3. Rented out	6. Other, specify….	3. Poor	

Section B: Input use

	Fertilizer (If not used, put Zero)				Seed use (if intercropped, separate by comma)					Herbicides	
grown	Amount of DAP , etc (Kg)	Total cost (ETB)	Amount of Urea etc (Kg)	Total cost (ETB)	Main seed source (**Codes A**)	Non-bought seed (own saved, gift, farmers to farmers exchange, etc(**kg/No**.)	Number of seasons own saved recycled	Bought including credit		Litres/kg	Total cost (ETB)
								Amount (kg)	Total cost (ETB)		
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**

Codes A

1. Own saved
2. Gift from family/neighbor
3. Farmer to farmer seed exchange
4. On-farm trials
5. Extension demo plots
6. Farmer groups/Coops
7. Local seed producers
8. Local trader
9. Agro-dealers/agrovets
10. Bought from seed company
11. Provided free by NGOs/govt
12. Govt subsidy program
13. Other (specify)……

Section C: Input use and crop harvested

(Serial number, plot code, sub-plotcode, and crop(s) grown in this Section should be in exactly the same order as in Section A above)

Crop(s) grown	Pesticides		Oxen days/hand hoe		Total labour (family and hired) use in person days Intercrops: record harvesting and threshing/shelling separately (by comma)									Cost of oxen hired (ETB)	Cost of hired labour/shelling, threshing (ETB)	Stress incidence on plot **Codes A**	Total harvested per (sub)plot Intercrops: separate by comma	
					Land preparation & planting		Weed control			Harvesting		Threshing or shelling					Fresh or green (kg)	Dry (kg)
	litres	Total cost (ETB)	Plowing Freq	Total Plowing days	Male	Female	Weeding freq	Male	Female	Male	Female	Male	Female					
5	**6**	**7**	**8**	**9**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
														N/A				

Codes A: 0. No stress; 1. Insect pests; 2. Diseases; 3. Water logging; 4. Drought; 5. Frost; 6. Hailstorm; 7. Animal trampling; 8. Other, specify……

Section D: Marketing of crops

Crop (From Column 1 of Section D)	Form (From Column 3 of Section D)	Market type **Codes A**	Month sold **Codes C**	Quantity sold (kg) (sum should be equal to Column 7 of Section D)	Who sold Codes B	Price (ETB /kg)	Buyer **Codes D**	Period to payment after selling, weeks (if immediate write zero)	Relation to buyer Codes E	Quality Codes F	Sales tax or charges (ETB)	Time taken to sell crop (minutes)	Time taken to get to the market (minutes)	Mode of transport Codes G	Actual transport cost (ETB)
1	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**

Codes A	**Codes B**	**Codes C**		**Codes D**		**Codes E**	**Codes F**	**Codes G**
1. Farmgate	0. Female	1. January	7. July	1. Farmer group	7. Rural wholesaler	1. No relation but not a long time buyer	1. Below average	1. Bicycle
2. Village market	1. Male	2. February	8. August	2. Farmer Union or Coop	8. Urban wholesaler	2. No relation but a long term buyer	2. Fair and Average	2. Hired truck
3. Main/district market	2.both	3. March	9. September	3. Consumer or other farmer	9. Urban grain trader	3. Relative	3. Above average	3. Public transport
		4. April	10. October	4. Rural assembler	10.Exporter,	4. Friend		4. Donkey
		5. May	11. November	5. Broker/middlemen	11. Other, specify…….	5. Money lender		5. Oxen/horse cart
		6. June	12. December	6. Rural grain trader		6. Other, specify……		6. Back/head load
								7. Other, specify….

PART 4: LIVESTOCK PRODUCTION AND MARKETING

Section A: Livestock production activities during 2012/13 cropping year

Livestock type	Number of livestock at end of 2012/13 cropping season (including bought ones)
1	**2**
Cattle	
1. Indigenous milking cows	
2. Cross-bred milking cows	
3.Exotic milking cows	
4. Non milking cows (mature)	
5. Trained oxen for ploughing	
6. Bulls	
7. Heifers	
8. Calves	
Goats	
9. Mature female goats	
10. Mature male goats	
11. Young male goats	
12.Young female goats	
Sheep	
13. Mature female sheep	
14. Mature male sheep	
15. Young female sheep	
16. Young male sheep	
Other livestock	
17. Mature trained donkeys	
18. Young donkeys	
19. Horses	
20. Mules	
21. Mature chicken	
22. Local Bee hives	
23.Modern Bee hives	
24.Pigs, mature	
25.Pigs, young	

PART 5: ACCESS TO FINANCIAL CAPITAL, INFORMATION AND INSTITUTIONS

Section A: Household credit need and sources during 2012/13 cropping year

Reason for loan	Needed credit? **Codes A**	If **Yes** in column 2, then did you get it? **Codes A**	If **Yes in column 3**				
			Source of Credit, **Codes D**	How much did you get **(ETB)**	Did you get the amount you requested **Codes A**	Annual interest rate charged **(%)**	Debt outstanding including interest rate at end of season **(ETB)**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1. Buying seeds							
2. Buying fertilizer							
3. Buy herbicide and pesticides							
4. Buy farm equipment/implements							
5. Invest in transport (bicycle etc)							
6. Buy oxen for traction							
7. Buy other livestock							
8. Invest in irrigation system							
9. Invest in seed drill or minimum tillage system							
10.Non-farm business or trade							
11. To pay land rent							
12. Buy food							
13. Consumption needs (health/education/travel/tax,)							

Codes A
0. No
1. Yes

Codes D
1. Money lender
2. Farmer group/coop
3. Merry go round
4. Microfinance
5. Bank
6. SACCO
7. Relative
8. AFC
9. Other, specify..

Section B: Access to extension services

Issue	Received training or information on […..] during 2012/13? (**Codes A**)	Main information source for 2009/10, Rank 3 (codes B)			Number of contacts during 2012/13 (days/year)		
		Rank 1	Rank 2	Rank 3	Govt extension	Non-profit NGOs	Private Companies
1	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1. New varieties of maize							
2. New varieties of legumes							
3. Field pest and disease control							
4. Soil and water management							
5. Crop rotation							
6. Minimum tillage							
7. Leaving crop residue in the field							
8. Adaptation to climate change							
9. Irrigation							
10. Crop storage pests							
11. Output markets and prices							
12. Input markets and prices							
13. Collective action/farmer organization							
14. Livestock production							
15. Family health							
16. Sanitation							
17. Family planning							
18. Tree planting							

Codes A	Codes B				
0. No	1. Government extension service	4. Seed traders/Agrovets	7. Other private trader	10. School	11. Mobile phone
1. Yes	**2. Farmer Coop or groups**	5. Relative farmers	**8. Private Company**	11. Radio/TV	12. Other, specify……
	3. Neighbour farmers	6. NGOs	**9. Research center**	**12. Newspaper**	

Section C: Market access

Crop	Did you get market information before you decided to sell the crop? **(code A)**	If yes in column 2, where did you get the information? (**Code B**) Rank 3	Ever failed to sell due to lack of buyers or poor price? **Codes A**		No. of buyers who came to buy at farm gate last season (2012/13)			
			Lack of buyers	Poor price	Assemblers or brokers	Wholesalers	Farmer group or coops	Consumers
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1. Maize								
2. H.beans								

Section D: Constraints in access key inputs and crop production

Input and production constraints	**Maize**		**Haircot beans**		**Faba bean**	
	Constraint? **Codes A**	Rank its importance (only those with **Yes** incolumn 2)	Constraint? **Codes A**	Rank its importance (only those with **Yes** incolumn 4)	Constraint? **Codes A**	Rank its importance (only those with **Yes** incolumn 6)
1	**2**	**3**	**4**	**5**	**6**	**7**
Socioeconomic						
1. Timely availability of improved seed						
2. Prices of improved seed						
3. Quality of seed						
4. Availability of credit to buy seed						
5. Timely availability of fertilizer						
6. Price of fertilizer						
7. Availability of credit to buy fertilizer						
8. Access to markets and information						
9. Reasonable grain prices						
Biophysical						
10. Drought						
11. Floods						
12. Pests						
13. Diseases						
14. Soil fertility						

Appendix Table 6: Maize and legume traders quetionnaires

Sustainable Intensification of Maize-Legume Cropping Systems for Food Security in Eastern and Southern Africa (SIMLESA) Project

[To be filled by enumerators with selected traders along the supply chain]

Section 1.0 Background Information

1. **Name of the Enumerator……..……..**
2. Name of the respondent ……..
3. Respondent postal address…….…….
4. Respondent tel. no. (mobile)…….
5. Respondent tel. no. (fixed landline)…….
6. Sex of the respondent (Use codes)…….……*1. Male 0. Female*
7. Age of the respondent (years)……..
8. Respondent's level of formal education (completed years)…….
9. Respondent's main occupation (Use codes)……
   1. Farming 2.Business (this one) 3. Business (other) 4. Salaried employment 5. Other,
10. Respondent position in maize-legume business (Use codes)……..
    1. *Owner manager 2. Hired manager 3. Other, specify……..……..……..……..…*
11. Region/Province…….……
12. District……..
13. Division/Ward……..
14. Town/market/village where business is located .....…….
15. Name of business enterprise……
16. What year (YYYY) did you start this business?_____

Section 2.0 Business/trader type identification

2.1 Fill the table below;

Product	Year started trading YYYY	Business type (rank 3) Codes A		
		1st	2nd	3rd
1.Maize (dry)				
2.Maize(green)				
3.Haricot Beans				
4.Faba bean				

Business type:*Codes A*

1. *Rural open air retailers*

2. *Rural retail shopkeepers*

3. *Rural assemblers*

4. *Rural brokers*

5. *Rural wholesalers*

6. *Urban wholesalers* ***12.*** *Other, specify……..*

7. *Urban exporters*

8. *Urban processors*

9. *Urban supermarkets*

10. *Urban retail shopkeepers*

11. *Urban open air retailers*

Section 3. Business peak seasons and competition

3.1: Peak seasons for the various crop products in the business

Crop	Buying						Selling					
	Peak months (use codes)			No. of weeks in the month			Peak months (use codes)			No. of weeks in the month		
1.Maize (dry)												
2.Haricot beans												

Peak month codes:1. *January;* ***2.*** *February;* ***3.*** *March;* ----------***12.*** *December*

3.2: Number of direct business competitors at different levels over time when buying

Level of competition	Maize				Main legume, specify name……			
	No. at the start of business	No. about 3 years ago	No. in the year 2000	No. currently or now	No. at the start of business	No. about 3 years ago	No. in year 2000	No. currently or now
1.Market								
2. Village								
3. District								
4.Region/Province								
5.National								

3.3: Number of direct business competitors at different levels over time when selling

Level of competition	Maize				Main legume, specify name……			
	No. at the start of business	No. about 3 years ago	No. in the year 2000	No. currently or now	No. at the start of business	No. about 3 years ago	No. in year 2000	No. currently or now
1.This Market								
2. This Village								
3. This District/Woreda								
4.Region/Province								
5.National								

Section 4: Trading Activities

4.1: Quality attributes considered when buying

Attribute	Maize/haricot bean				
	Considered when buying? Use codes **Codes: 1.Yes 0.No**	How important is this attribute in affecting the price of maize? 1. Not at all 2. Minor importance **3.** Very important	**Three main assessment methods used – Use codes Rank 3**		
			1st	**2nd**	**3rd**
1. Grain color					
2. Grain shape					
3. Grain size					
4. Batch homogeneity/uniformity of size,					
5. Foreign matter					
6. Insect/pest damage					
7. Chemical residual					
8. Moisture content					
9. Cooking traits					
10. Nutrition (e.g. protein content)					
11. Weight					
12. Variety					
13. Grain damage/breakage					
14. Smell					
15. Maturity					
16. Age of product					

Main method codes

1. *Moisture meter* ***2.*** *Visual inspection****3.****Feel* ***4.*** *Smell* ***5.****Taste* ***6.****Weight* ***7.*** *Bite* ***8.*** *Shaking*

9. *Lab analysis* ***10.*** *Sieve* ***11.*** *Experience with seller* ***12.*** *Other, specify……..*

4.2:Quantity, quality, and price of maize and legumes bought during the last 12 months (Convert quantities into kg equivalent).

SEASON	Month bought **Codes D**	Crop **Codes A**	Seller **Codes B**	Form **Codes C**	Total Quantity bought **kg**	Price paid **ETB /kg**	Quality of the grain **Codes E**	Distance to buying point KM	mode of transport to warehouse/business premises/ sale point **Codes F**	If hired, transport cost to business premises/warehouse/sale point **ETB/kg**	Seller search costs **ETB /kg**	Commissions /fees to buying agents **ETB/kg**	Cleaning/ grading labour **ETB/kg**	Weight loss after cleaning **ETB /kg**	Storage costs **ETB /kg**	Loading/ offloading charges **ETB/ kg**	Other costs **ETB /kg**
Peak Season																	
Normal/AverageSeason																	
Low Season																	

Codes A	**Codes B**	**Codes C**	**Codes D**	**Codes E**	**Codes F**
1.Maize (dry) 2. Maize (green) 3. Common beans 4. Groundnuts 5. Soya beans 6. Pigeon pea 7. Cowpea 8. Other, specify	1. Farmers 2. Rural open air retailers 3. Rural retail shopkeepers 4. Rural assemblers 5. Rural brokers 6. Rural wholesalers 7. Urban wholesalers 8. Urban exporters 9. Urban processors 10. Urban supermarket s 11. Urban retail shopkeepers 12. Urban open air retailers 13. Other, specify……	1. Unshelled 2. Shelled	1. January 2. February 3. March - - - 12. December	1. Above average 2. Medium 3. Below average	1. Train 2. Truck 3. Bicycle 4. Ox-cart 5. Back/head lots 6. Other, specify

NB: ****Storage costs*** include chemicals used in storage, labour, weight loss in storage due to moisture and or insect damage, refrigeration etc

4.3: Quantity, quality, and price of maize and legumes sold during the last 12 months (Convert quantities into kg equivalent).

SEASON	Month sold **Codes D**	Crop **Codes A**	Buyer **Codes B**	Form **Codes C**	Total Quantity sold **kg**	Price received**ETB/kg**	Quality of the grain **Codes E**	Distance to market/ sale point **KM**	Mode of transport to market/ sale point **Codes F**	If hired, transport cost	Buyer search costs (delivery transport, phone costs, discounts, advertising) **ETB/kg**	Payment to selling agents **ETB/kg**	Processing costs**ETB/kg**	Packaging labeling**ETB/kg**	Customs clearing/ other govt. fees**ETB/kg**	Other costs **ETB/kg**
Peak Season																
Normal/Average Season																
Low Season																

Codes A	**Codes B**	**Codes C**	**Codes D**	**Codes E**	**Codes F**
1.Maize	1. Rural consumers	1. Unshelled	1. January	1. Above average	1. Train
2. Common beans	2. Rural open air retailers	2. Shelled	2. February	2. Medium	2. Truck
3. Groundnuts	3. Rural retail shopkeepers		3. March	3. Below average	3. Bicycle
4. Soybeans	4. Rural assemblers		-		4. Ox-cart
5. Pigeionpea	5. Rural brokers		-		5. Back/head lots
6. Cowpea	6. Rural wholesalers		-		6.Other, specify……
7. Other, specify…	7. Urban consumers		12. December		
	8. Urban wholesalers				
	9. Urban exporters				
	10. Urban processors				
	11. Urban supermarket s				
	12. Urban retail shopkeepers				
	13. Urban open air retailers				
	14. Other, specify……				

NB:*****Storage costs*** include chemicals used in storage, labour, weight loss in storage due to moisture and or insect damage, refrigeration etc.

Section 5: Agricultural input and output market price information

7.1 How many agricultural output markets do you monitor their prices regularly?.....

7.2 How many agricultural input markets do you monitor their prices regularly? .....

7.3 Rank your three main sources of information on the price of the day in your main sales market

1st ……2nd……3rd…….

Codes:1. Extension agents **2.** Press **3.**Internet **4.** Agents/Traders **5.**Gov't information services/departments **6.** Radio/TV **7.** Banks **8.** Personal contacts.**9.**Non-govt/non-profit information providers 10. Commercial marketing agencies 11. Other, specify…….

7.4 Rank the three best or most effective methods in providing information on prices &markets to you 1st……. 2nd……3rd……..**Codes:1.** Radio **2.**TV **3.**Posted bulletin **4.**Press **5.**Internet **6.**Telephone **7.** Conversation **9.** Other, specify……

Section 6: Marketing constraints

(Note to enumerators: Give a chance for the respondents to state the constraints and then if necessary, prompt them using the list below

Constraints	**Constraint? 0. No, 1. Yes (if 0, move to next constraint)**	**Importance rank (only those with Yes in column 2) (Codes A)**
1.Prices are unstable		
2. Poor quality of grains		
3. Absence of grades or standards		
4.Multiple taxes at different levels of government (between regions districts, and provinces/zones)		
5.Non-transparent (complicated) taxation system		
6.Difficulties in obtaining license		
7.Not all traders are licensed		
8.Weak access to market information		
9.Limited access to credit		
10.Weak legal system for contract enforcement		
11.Inadequate market infrastructure		
12.Absence of government support to improve marketing		
13.Weak demand for agricultural products		
14. Other specify ……..		
15.Other, specify……..		

Codes A.

1.Very important 2. Important 3.Neutral 4. Little importance 5.not important at all

Section7: Product quality and price trends

Question no.	**Question**	**Response (Use codes)**	
		Maize	Legumes
7.1	What has been the trend of product quality provided by your supplier? **Code A**: **1. Increasing 2. Same 3. Decreasing**		
7.2	What has been the trend of product purchasing prices? **Code A: Increased a lot 2. Increased slightly 3. Decreased a lot 5. Decreased slightly 6. No change 7. Do not know**		
7.3	What has been the trend of product selling prices? **Code A: Increased a lot 2. Increased slightly 3. Decreased a lot 5. Decreased slightly 6. No change 7. Do not know**		

In your view, what three most important things do you suggest can be done to improve these crop/commodity businesses? Give three major reasons

Maize	
Suggestion 1	
Suggestion 2	
Suggestion 3	
Beans	
Suggestion 1	
Suggestion 2	
Suggestion 3	
Soy beans	
Suggestion 1	
Suggestion 2	
Suggestion 3	

THANK YOU FOR PARTICIPATING IN THE INTERVIEW