VALUE CHAIN ANALYSIS OF SOYBEAN *(Glycine Max [L.] Merr:)* THE CASE OF METEKEL ZONE OF BENSHANGULE GUMUZ NATIONAL REGIONAL STATE, ETHIOPIA

M.Sc. THESIS

By

TSEHAY WUBETU

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JIMMA, ETHIOPIA

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Submitted to the Department of Agricultural Economics and Extension, Jimma University College of Agriculture and Veterinary Medicine, in Partial Fulfilment of the Requirements for the Degree of Master of Science in Agribusiness and Value Chain Management

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May, 2016
JIMMA, ETHIOPIA

Jimma University College of Agriculture and Veterinary Medicine

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DEDICATION

This thesis is dedicated to my aunt Altaye Shimels for her contribution in the success of my life, my husband Nigussie Ayehu for his dedicated partnership and my newly born baby Elroi Nigussie for her affection and love.

STATEMENT OF AUTHOR

I the undersigned, hereby declare that the thesis- Value Chain Analysis of Soybean *(Glycine Max [L.] Merr:)* the Case of Metekel Zone of Benshangule Gumuz National Regional State, Ethiopia is the outcome of my original work and all sources of materials used for this thesis have been duly acknowledged. This thesis has been submitted in partial fulfilment of the requirements for M. Sc. degree at the Jimma University and is deposited at the University Library to be made available to borrowers under rules of the library. I solemnly declare that this thesis is not submitted to any other institution anywhere for the award of any academic degree, diploma, or certificate.

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BIOGRAPHICAL SKETCH

The author was born on 16 December, 1986 in Berkegn town of- Funeteselam zone, Amhara region. She attended her elementary and junior education in Atse zereyakob school in Addis Ababa and highschool and preparatory in Abyot Kirs senior secondary school in Addis Ababa. After successful passing ESLCE, she joined Samara University in 2008 and graduated with B.Sc. in Horticulture in 3rd July, 2010. After graduation she served in Samara University in the faculty of Dry Land Agriculture in the department of Horticulture for almost 3 years. She joined Jimma University in March 2013 to pursue her M.Sc. degree in Agribusiness and Value Chain Management.

ACKNOWLEDGMENT

At the outset I would like to praise the everlasting Father and the Prince of love and peace the Almighty God who always let the bulk of unfinished work to be completed at a moment.

I am grateful to my respected major advisor Bezabih Emana (PhD), for his unreserved advice, guidance, and constructive criticism starting from the very commencement up to thesis completion. Without his encouragement, insight and professional expertise, the completion of this work would not have been possible. My thanks also go to my co-advisor Tinsae Demsie (MSc.) for his advice, valuable comments and for his fast response for all my requests starting from the proposal preparation up to the completion of the research.

In addition would like to express my sincere appreciation and gratitude to the pawe research institution for the kindness and helpful support during my stay there. I would like also to thank the pawe and Dangur District Office of Agriculture and Rural Development for the support and consults they did during the preliminary survey and survey time. I also wish to express my heartfelt thanks to the many farmers and traders who responded to my numerous questions with patience.

My special thanks and heartfelt gratitude extends to my husband Mr. Nigussie Ayehu for his patience, support, encouragement and travel with me during the survey. I am also grateful for my best friends Misale Kuru, Fitsum Desta, Bemretu Boka, Mulusew Tadesse, Bizualem Asefa and Tigist Kinfu with all her families for their affection, unreserved encouragement, inspiration and support. I also thank all people who assisted me in one way or another during my study period.

Wishing all Holy blessings from Jesus Christ and be considered in His eternal Government.

ACRONYMS/ABBREVIATIONS

ADLI	Agricultural Development Led Industrialization
BoARD	Bureau of Agriculture and Rural Development
CSA	Central Statistical Agency
DA	Development Agent
ENI	Ethiopian Nutrition Institute
FHH	Female Headed Household
GMM	Gross Marketing Margin
GMMi	Gross Marketing Margin at i^{th} link
GPMi	Gross Profit Margin at i^{th} link
GTP	Growth and Transformation Plan
HH	Household
MHH	Male Headed Household
MLRM	Multiple Linear Regression Model
MoFED	Ministry of Finance and Economic Development
NMM	Net Marketing Margin
OEi	Operating Expense at i^{th} link
OLS	Ordinary Least Square
OoARD	Office of Agriculture and Rural Development
OoTI	Office of Trade and Industry
RMA	Rapid Market Appraisal
TGMM	Total Gross Marketing Margin
TGPM	Total Gross Profit Margin
VIF	Variance Inflation Factor

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ABSTRACT

In Metekel zone of Benshangule Gumuz national regional state, soybean is a major cash crop which is mainly produced by smallholder farmers. The study was undertaken with the objective of mapping value chain actors, describing value addition, estimating share of actors' margin and identifying determinants of market supply of soybean by smallholder farmers. Simple random sampling techniques were employed to select a total of 147 farmers from six kebeles. Data were also collected from input suppliers, collectors, local retailers, local wholesalers, national wholesalers, national retailers, processors; exporters and enablers/supporters/ who were also selected using different sampling techniques. Data were collected from both secondary and primary sources. Descriptive and econometric methods of data analyses were used to analysis data using STATA 11. The profitability analysis indicates that soybean production was profitable. The average amount of soybean supplied to the market by producers was 28.84 quintal with a minimum amount of 3.96 quintal and maximum amount of 61 quintals. The major problems identified are low access to improved inputs, collateral problem to get credit, poor storage facilities, low price of produce, and low negotiation (bargaining) power of producers. The result of LRM market supply model revealed that current price, quantity produced, soybean farming experience, the land size allocated for soybean production, training, active family size (labour force), source of oxen and market information significantly affected market supply of soybean. To increase the marketed supply of soybean , enabling the producers to process the product, improving access to inputs to increase productivity of soybean, experience sharing of soybean farming, expanding land allocated for soybean production, facilitation of conditions for farmers to have their own oxen, continuous training and extension service in soybean production and provision of adequate market information are needed.

***Key words**: Ethiopia, market supply, soybean, value chain*

1. INTRODUCTION

1.1. Background of the Study

Agriculture is the main stay of Ethiopian economy contributing about 43% of the GDP, 80% of employment and 90% of the export (MoFED, 2011). Since 1994/95, the Ethiopian government adopted Agricultural Development Led Industrialization (ADLI) development strategy. The strategy argues that growth starts from agriculture and initiates the growth of other sectors especially the industry sector through backward and forward linkages (MoFED, 2006). Furthermore, Ethiopia launched and commenced implementing its Growth and Transformation Plan (GTP) in 2009/10. GTP envisages the ADLI strategy to continue with the bid to transform Ethiopian economy from agriculture domination and using agriculture itself as a stepping board (MoFED, 2010). Therefore, it is becoming increasingly crucial for policy makers to focus immediate attention on agro-industries. Such industries, established along efficient value chains, can increase significantly the rate and scope of industrial growth (UNIDO, 2009).

Having all these importance, agriculture continues to face a number of problems and challenges. The major challenges are adverse climatic conditions, lack of appropriate land use system resulting in soil and other natural resources degradation, limited use of improved agricultural technologies, the predominance of subsistence agriculture and lack and/or absence of business oriented agricultural production system, limited or no access to market facilities resulting in low participation of the smallholder farmers in value chain or value addition of their produces (Emana, 2010).

Historians believe that soybean is one of the oldest crops raised by man. It was first grown in East Asia about 5000 years ago (BIDCO, 2005). This was approximately 5000 years after agriculture evolved. Soybean has been a staple crop in the diet of East Asians (especially China) for over 4000 years. It has a high commercial value and contains all the amino acids required by the human body except methionine, usually found in cereals such as maize (Osho, 1995). Soybean (*Glycine max* [L.] Merr.) is one of the important food legumes that is used for different purposes including human food and animal feed. It is grown in many parts of the world and is primary source of vegetable oil and protein for use in food, feed and industrial application. It can substitute meat and to some extent also milk in that it is capable of reducing protein malnutrition (Franklin, 1988). Of all grain legumes, soybean has the

highest concentration of protein. While most other grain legumes contain about 20% protein by volume, soybean contains about 40% protein (Greenberg and Hartung, 1998). It is important to note that beef and fish contain about 18% protein. The same authors stated that soybean products are cholesterol free and high in calcium, phosphorus and fiber. Soybean provides more protein and low levels of saturated fat BIDCO (2005), than most other vegetable grains. As a major crop, the prominence of soybean in the western world was first experienced during the 1960s. Today, there are over 1000 varieties of soybean ranging in size from as small as a pea to as large as a grape.

Soybean is a stable food of great nutritional value. It is an important global crop, providing oil and protein. The bulk of the crop is solvent-extracted for vegetable oil and deflated soya meal. A small proportion of the crop is consumed directly by humans. Soybean flour made from Soya meal can be mixed with wheat flour. Moreover, it is also used in to the making of candies and ice cream (DSA, 2008). The mature seeds can also be processed to give Soya milk, curds and cheese. Soybean has a number of health related advantages as well. It is regarded as equal in protein to animal foods. It has been found to be excellent for a number of different conditions such as high blood pressure, diabetes related diseases and many others. It is very useful in improving the menu of malnourished children and revitalizing heart and breast cancer patients and has no cholesterol (DSA, 2008).

Soybeans offer a variety of potential benefits to the production systems, diets, and incomes of smallholder producers. In addition to being a potentially profitable cash crop, the high protein content (about 40%) in soya means it could also contribute to improved nutritional status of rural households (Dixit et al., 2011).

Direct use of soybean products as human food is a more efficient way of utilizing the highly nutritional soya protein as compared to feeding animals and then eating the animal products. Soybean continues to receive lots of media attention about the potential for its effect on health. One example is the concern about the hormonal effects of soya infant formulas, and another is the proposed beneficial effect for bone health, for the reduction of menopausal symptoms and in cancer (British Nutrition Foundation, 2002). On the same line, soybean has received increasing attention in recent years from health care providers, biomedical researchers and the lay public alike because of its potential role in the prevention of a number of chronic diseases like cancer, coronary heart disease and osteoporosis (Monje *et al*., 2006).

Khalil (2006), also described that in developing countries, there is an urgent need of nutritious foods to meet the nutritional requirements of ever increasing populations.

Even if the nutritious benefit of soybean is undeniable, compared to the USA, South/Latin America and Asia, Africa is a very small producer of soybean. During the last decade or so, Africa accounted for 0.4 – 1% of total world production of soybean. The main producers within the continent include Nigeria, South Africa, Uganda, and Zimbabwe. Nigeria, which contributed nearly 50% of Africa's output, accounted for a mere 0.3% of the world soybean output in 2003 (FAOSTAT, 2008).

Indigenous food processing industries using locally produced soybeans are highly expected to satisfy the vast growing interest of soybean based food stuffs. In Ethiopia, particularly in the capital city, Addis Ababa, Faffa food Share Company, East African flour factory, and Health care food manufacturing private limited company are using local and imported soybeans enormously in the preparation of enriched food products for children and adults. This indicates that the local demand is increasing steadily.

Soybeans were first grown in Ethiopia in 1950 and throughout the 1970s Ethiopia produced 6,000 tonnes of soybeans a year, making it one of the top four African soybean producing countries (William, 2007). About 19 African countries are recorded in the world soybean production statistics compiled by FAO. These countries and the proportion of African soybean production that each accounts for are: Nigeria (48.9%), Uganda (16.8%), South Africa (14.9%), Zimbabwe (8.4%), Ethiopia (2.7%), Rwanda (2.0%), Egypt (1.7%), and DRC (1.4%).Others are: Cameroon (0.8%), Benin (0.7%), Cote d'Ivoire (0.3%), Liberia (0.3%), Burkina Faso (0.3%), Zambia (0.2%), Gabon (0.2%), Tanzania (0.2%), Morocco (0.1%), (FAOSTAT, 2008).

However, most part of Ethiopia has a very conducive agro-climactic condition for soybean production though most of the areas are covered by maize and other cereal crops. The Benshangul Gumuz Regional State (BGRS) which is situated in the Blue Nile River Basin had 12,206 and 12,000 ha of land allocated for soybean production in the year 2013 and 2014 respectively. According to the regional bureau of agriculture, in 2013 from the total land allocated for soybean 41% and 35% were allocated by Metekel and Asossa zone while Kamash and Maokomo zones produced 24% of the total production in region. With regard to productivity Kamashi and Metekel zones recorded the average productivity of 18.7 and 19 quintal per hectare respectively which is almost the same.

Despite the significance of soy bean to address food and nutrition insecurity problems prevailing in the country, little emphasis has been given to production, supply and export of this important commodity. In spite of the potential for production and growing demand for oil seed (which includes soybean), in the world market, the supply is constrained by different factors in the country. These constraints are mainly observed at four different supply chain levels (farmers, traders, processors and exporters). Opportunities for oilseed export are not fully exploited yet because of inefficient marketing, improper cleaning and sometimes poor contract discipline (Wijnands *et al*., 2007).

According to CSA (2006/07), there are 49,642 private peasant holdings that cultivate about 6,352.5 hectares of land and produced 58,489.5 quintals of soybean in Ethiopia. Use of soybean in Ethiopia was limited to baby foods production. Moreover, given the wide range of health benefits of soy bean stated earlier, flour mill factories are likely to blend their products with soy flour if it is available domestically at affordable price. This will increase the nutritional value of the milled flour thereby increasing the demand in the market. According to CSA (2006), based on the foregoing analysis, the annual potential demand for soy flour is estimated to be about 7,703 ton, where 2,483 ton (32%) emanates from the baby food producing plants while the remaining 5220 ton (68%) is the demand of flour milling plants. In general, the above presentation divulges that there is substantial potential demand and less supply for the product in Ethiopia.

So as to exploit the opportunity of the current growing demand for soybean and soybean products, development programs and approaches which bring all soybean actors together is fundamental to improve quality and strengthen linkages. Therefore, this study aimed at analysis of soybean value chain including both production and marketing aspects.

1.2. Statement of the Problem

The analysis of aggregation and trading examines the flow of pulses from their origin (producer) to their final destination. Several studies Hailu et al. (1994); Gezahegn and Dawit, (2006); Bekele and Hialemariam, (2007); Dawit et al., (2010) have characterized the pulse marketing channels in Ethiopia, and have concluded that, with the exception of haricot beans, the marketing system of pulses is highly underdeveloped, and more or less similar to that of cereals

Many smallholders in the Ethiopian oilseeds chain depend on middlemen, due to the small quantities involved. This complicates tracking out the origin of the product and meeting the requirements of highly developed consumer markets. This requires professionally managed supply chains with tracking and tracing systems (Wijnands *et al*., 2007), (UNECA, 2009).

Despite the significant potential and the clear benefits of soybean production for smallholders, soya production remains limited. In part, this may be linked to the pervasive belief among farmers that soya markets are unreliable. However, interviews (during diagnostic study) with downstream market actors suggest that there is, in fact, significant unmet market demand for soya.

The seeming disconnect between farmers' perceptions of unreliable markets despite significant market demand is the underlying paradox of the smallholder soya value chain.

Although soybean is economically an important export commodity and its market in Ethiopia is operating freely, as far as we know there is no much study conducted on soybean value chain to identify the key constraints and potentials on the system in the zone. By assessing the extent of market chain and value chain across different actors, then it is possible to determine the performance and supply of soybeans in the study areas. The Ethiopian agricultural output markets are characterized by inadequate transport network, limited number of traders, inadequate capital facilities, high handling costs, inadequate market information system, weak bargaining power of farmers and underdeveloped industrial sectors (Jema, 2008). Farmers in Ethiopia are more focused on the production part without having adequate market information about their products.

Agricultural marketing has become highly complex and difficult involving very large and long marketing channels, a large number of middlemen, many types of physical, social, economic and facilitating marketing functions and services. The majority of farmers are marginal, small, scattered, illiterate and unorganized. They do not have sufficient time, knowledge and skills for the scientific marketing of their produce. In the absence of well-developed markets, marketing facilities, and marketing efficiency, farmers are at disadvantage by selling their increased marketable surplus to traders in the market as they get low prices (Thakur *et al*., 1997).

According to the diagnostic study conducted for this research, there are different problems that could affect the volume of soybean supply to the market in Ethiopia in general and in

Pawe and Dangur districts of Metekel zone in particular. Some of those factors affect the production and the amount supplied of soybean are: low price of soybean, low bargaining power of producers, limited credit availability; because of the collateral limitations of the farmers, low strength of unions and cooperatives, share of the producer is much less, there is no value adding activities to the product by the trader at all, low level of training and unbalanced share of actors are the major gaps for the production and supply of soybean in the study area. The extent to which these variables affect the soybeans supply to the market is not studied in the area.

Problems in the soybeans value chain hinder the potential gains that could have been attained from the existing opportunities.

In this regard, soybean value chain analysis is an interesting process that has not been investigated much in the study areas. Both buyers and sellers in the study areas usually do not play collective roles towards one another and there are limitations on soybean supplying and processing activities in the study area. Plus to this supporting services have a priceless importance in the production and marketing of any agricultural commodities. However, the farmers and traders do not use much the services that have to be served by the support services.

All the aforementioned production, productivity and marketing situations are the highlights of several soybean farmers in the country, which needs the specific focus of researchers to conduct soybean value chain analysis in these specific areas as it incorporates factors influencing production, volume of soybean supplied to the market and producers shares of end consumers' prices in it.

Furthermore, the study on factors affecting soybean market supply and the benefit share of different actors in the value chain as far as my knowledge is concerned; there is little study in the study areas on the selected commodity. So, this study investigates the value chain analysis of soybean produced in Metekel Zones. Therefore, this study will help to find the weakest link of the chain and to narrow the wide research gap that has been observed currently on soybean value chain analysis in the study area.

1.3. Research Questions

The study tries to answer the following questions:

1. What does the existing soybean value chain look like?
2. What does the performance and share of actors' look like?
3. What are the factors determining soybean supply to market?

1.4. Objectives of the Study

The general objective of the study was to analyze the value chains of soybean. The specific objectives of the study were:

1. To identify the soybean value chain;
2. To examine the actors' performance along the soybean value chain;
3. To analyze the determinants of soybean supply to the market;

1.5. Significance of the Study

The study analyzed the entire soybean value chain from input supplier to the consumer of the study area. It also provides a holistic picture of existing challenges and opportunities in the soybean value chain. Moreover, this study provides information on the determinants of soybean supply to the market, actors' performance and benefit share, and identifies opportunities and constraints of soybean value chain in the study areas. Therefore, it could shed light on required efforts to enhance utilization of soybean at larger scale to bring about economic development in the area. The information generated could also help a number of organizations including: research and development organizations, traders, producers, policy makers, extension service providers, government and non-governmental organizations to assess their activities and redesign their mode of operations and ultimately influence the design and implementation of policies and strategies. It could also help different actors to identify and analyze new ways of stimulating innovation.

1.6. Limitations of the study

The study faced different limitations. But the first and most one was since there was no recorded and transparent data for every trader during the study, it was very difficult to find the exact price they used to buy and sell the product and quantity they bought and sold. The

companies I used to interview were not volunteers to tell the exact price they bought the product because they said that price is one mechanism to compete with their competitors. So for this specific study finding the exact price of traders' was the biggest challenge faced by the researcher.

1.7. Organization of the thesis

The study is divided into five main sections. Following the introduction, chapter two presents review of literature. In chapter three, the research methodology is presented. In chapter 4, result discussion and analysis of empirical findings is presented. In the last section, conclusions and recommendations are given.

2. LITERATURE REVIEW

In this part of the thesis, theoretical reviews like the basic concepts of value chain, concepts guiding agricultural value chain, benefit of value chain in agricultural sector, markets and marketing, market channel, marketing performance, developing value chain towards the benefit of producers, status of soybean production in Ethiopia and empirical reviews would be discussed.

2.1. Concepts in Agricultural Value Chain

A value chain encompasses the full range of activities and services required to bring a producer or service from its production to its end use (Kaplinsky, 2000). Value chain includes process actors like input suppliers, producers, processors, traders and consumers. At one end are the producers – the farmer who grow the crop and raise the animal. At the other end are consumers, who eat, drink and wear the final products. In the middle are hundreds and thousands of individuals and firms, each performing one small step in the chain: transporting, processing, storing, selling, buying, packaging, checking, monitoring, making decision,, etc. It also includes a range of services needed in the value chain including technical support (extension),business enabling and financial services, innovation and communication, information brokering, etc. the value chain actors and service providers interact in different ways starting from local to national and international levels (Bezabih, 2011).

The multitude of functions that are performed to produce goods and make them available for the consumer is also expressed in the concept of market chain. The market chain refers to the system that consists of actors and organizations, relations, functions, and products, cash and value flows that make possible the transfer of goods or services from the producer to the final consumer (Bezabih and Mengistu, 2011).

2.2. Definitions and Concepts of Value Chain

Industry chains are classified as either ‘supply’ or ‘value’ chains (Abraham, 2013).

2.2.1. Supply chain

Supply chain is the physical flow of goods that are required for raw materials to be transformed into finished products. Supply chain management is about making the chain as efficient as possible through better flow scheduling and resource use, improving quality

control throughout the chain, reducing the risk associated with food safety and contamination, and decreasing the agricultural industry's response to changes in consumer demand for food attributes (Dunne, 2001).

2.2.2. Value chain

A value chain is the full range of activities required to bring a product from conception, through the different phases of production and transformation. A value chain is made up of a series of actors (or stakeholders) from input suppliers, producers and processors, to exporters and buyers engaged in the activities required to bring agricultural product from its conception to its end use (Kaplinsky and Morris, 2001). Bammann (2007), identified three important levels of value chain.

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 chain management is about creating the added value at each link in the chain and a sustainable competitive advantage for the businesses in the chain. How value is actually created is a major concern for most businesses. Porter (1985), indicates that value can be created by differentiation along every step of the value chain, through activities resulting in products and services that lower buyers' costs or increase buyers' performance. In much of the food production and distribution value chain, the value creation process has focused on commodities with relatively generic characteristics, creating relatively small profit margins.

Value chains provide the framework for designing and implementing many developments programs and projects. Given a multitude of different arenas of application, geographical locations, commodity types, target groups and desired outcomes, a variety of closely related conceptualizations of value chains has emerged (Stamm and von Drachenfels, 2011).

It is a group of companies working together to satisfy market demands. It involves a chain of activities that are associated with adding value to a product through the production and distribution processes of each activity (Schmitz, 2005). An organization's competitive advantage is based on their product's value chain. The goal of the company is to deliver

maximum value to the end user for the least possible total cost to the company, thereby maximizing profit (Porter, 1985).

The value chain concept entails the addition of value as the product progresses from input suppliers to producers and consumers. A value chain, therefore, incorporates productive transformation and value addition at each stage of the value chain. At each stage in the value chain, the product changes hands through chain actors, transaction costs are incurred, and generally, some form of value is added. Value addition results from diverse activities including: cleaning, grading, and packaging, transporting, storing and processing (Anandajayasekeram and Berhanu, 2009).

Value chain actors: The chain of actors who directly deal with the products, i.e. produce, process, trade and own them. These value chain actors operate within an institutional environment, which can either facilitate or hinder its performance (Gereffi, 1995).

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

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

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

2.2.3. Vertical coordination

Vertical coordination describes how different types of enterprises interact with their input suppliers (one or more functional level below them in the value chain map) and with the firms that purchase their output (one or more functional levels above them in the value chain map). The nature of these interactions defines the governance structure, which influences the distribution of benefits and, in turn, reflects the distribution of power and control within the value chain (Steven et al., 2012).

2.2.4. Horizontal coordination

Horizontal coordination among like firms can often confer competitive advantages as well.

Farmer associations and marketing cooperatives emerge for precisely this reason, in order to help large numbers of small value chain actors increase their bargaining power, reduce their transaction costs, attain the scale necessary to attract high prices and assemble the minimum lot sizes necessary to meet the requirements of large-scale intermediaries from whom they purchase or to whom they sell (Steven et al., 2012).

2.2.5. Competitiveness

Value-chain analysis originally emerged as a tool for increasing competitiveness by pinpointing where and how participants could introduce efficiencies, reduce costs and maximize value. The implementation of competitive strategies, initially popularized by (Porter, 1985), aimed to promote behaviours that make value chains more competitive. Indeed, value-chain analysis provides useful information on structure linkages, actors, and dynamics. It helps to identify where, how, why, and by whom value is added and created along the chain, as well as how changes could result in improved performance (Hawkes and Ruel, 2011). These improvements or "upgrades" in the competitiveness of value chains can occur in different ways, through process upgrading, product upgrading or functional upgrading (Kaplinsly and Morris, 2000; Knorringa and Pegler, 2006). Process upgrading involves improving the efficiency of internal processes.

2.4. Major Concepts Guiding Agricultural Value Chain Analysis

There are four major key concepts guiding agricultural value chain analysis (Anandajayasekeram and Berhanu, 2009; Kaplinsky and Morris, 2000). These are effective demand, production, value chain governance, and upgrading.

2.4.1. Production

In agricultural value chain analysis, a stage of production can be referred to as any operating stage capable of producing a saleable product serving as an input to the next stage in the chain or for final consumption or use. Typical value chain linkages include input supply, production, assembly, transport, storage, processing, wholesaling, retailing, and utilization, with exportation included as a major stage for products destined for international markets. A stage of production in a value chain performs a function that makes significant contribution to the effective operation of the value chain and in the process adds value (Anandajayasekeram and Berhanu, 2009).

Producing the required amount effectively is a necessary condition for responsible and sustainable relationships among chain actors. Thus, one of the aims of agricultural value chain analysis is to increase the quantity of agricultural production. Understanding the mechanisms of the agricultural production greatly help to design appropriate policy that bring more gain to farmers and the whole society at large. For a long time, sector analyses have been used to measure the different economic aspects of production. However, sector analyses have not been without weaknesses. In particular, sector analysis tends to be static and suffers from the weakness of its own bounded parameters. Such analysis struggles to deal with dynamic linkages between productive activities that go beyond that particular sector (Kaplinsky and Morris, 2000). By going beyond the traditional narrow focus on production, value chain analysis scrutinize interactions and synergies among actors. Thus, it overcomes several important limitations of traditional sector assessments.

2.4.2. Value chain Governance

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

According to Raikes *et al.* (2000), trust-based coordination is central for goods and services, whose characteristics change frequently, making a standardized quality determination for the purposes of industrial coordination difficult. This applies to the manufacturing industry as well as agri-food chains. It is possible to identify in one industry several coordination forms used by different firms where the choices rely on the trust existent between the firms.

Governance within value chains reflects the distribution of power and information among various actors. Alternative types of vertical coordination emerge depending on the distribution of market power (the ability to set prices, quality standards and minimum delivery quantities), political power and information (on standards and alternate market prices) (Gereffi et al., 2005). As a result, adjustments in vertical coordination mechanisms generally require investments in literacy, information and organization that modify the

underlying power structure within the value chain. At the same time, these public investments increase prospects for successful horizontal coordination among value chain members, for example, in farmer organizations.

2.4.4. Value chain upgrading

Product upgrading involves the introduction of new, improved or more profitable goods and services. Functional upgrading involves increasing profitability by changing the mix of activities undertaken. In many instances, these forms of upgrading require investment in equipment, know-how or human capacity, potential barriers that risk excluding the poor.
Upgrading refers to the acquisition of technological capabilities and market linkages that enable firms to improve their competitiveness and move into higher-value activities (Kaplinsky and Morris, 2000).

2.5. Benefit of Value Chain in Agricultural Sector

It is an innovation that enhances or improves an existing product, or introduces new products or new product uses. This allows the farmer to create new markets, or differentiate a product from others and thus gain an advantage over competitors. In so doing, the farmer can ask a higher premium (price) or gain increased market share or access. Adding value does not necessarily involve altering a product; it can be the adoption of new production or handling methods that increase a farmer's capacity and reliability in meeting market demand. Value-added can be almost anything that enhances the dimensions of a business. The key is that the value-adding activity must increase or stabilize profit margins, and the output must appeal to the consumer (AAFC, 2004).

Value chain is useful as a poverty-reduction tool if it leads to increase on and off farm rural employment and income. Increased agricultural productivity alone is not a sufficient route out of poverty within a context of globalization and increasing natural resource degradation. A focus on post-harvest activities, differentiated value added products and increasing links with access to markets for goods produced by low-income producers would appear to be the strategy open to smallholders (Lundy *et al*., 2002).

Traditionally, little attention has been paid to the value chains by which agricultural products reach final consumers and to the intrinsic potential of such chains to generate value added and employment opportunities. While high-income countries add nearly US$185 of value by processing one tone of agricultural products, developing countries add approximately US$40.

Furthermore, while 98 percent of agricultural production in high-income countries undergoes industrial processing, barely 38 percent is processed in developing countries. These indicate that well developed agro-value chains can utilize the full potential of the agricultural sector (UNIDO, 2009).

In spite of the fact that markets are crucial in the process of agricultural commercialization, transaction costs and other causes of market imperfections could limit the participation of farm households in different markets (Sadoulet and de Janvry, 1995 as cited in (Moti, 2007). This implies that markets could be physically available but not accessible to some of the farm households. Value chain analysis is essential to explain the connection between all the actors in a particular chain of production and distribution and it shows who adds value and where, along the chain. It helps to identify pressure points and make improvements in weaker links where returns are low (Schmitz, 2005).

2.6. Developing Value Chain Systems towards the Benefits of the Poor

In recent years, the pro-poor growth approach has become one of the key concerns of developmental organizations. The focus of the approach lies in the promotion of economic potentials of the poor and disadvantaged groups of people (OECD. 2006). The main aim is to enable them to react and take advantage of new opportunities arising as a result of economic growth, and thereby overcome poverty *(*Berg *et al.,* 2006). The promotion of value chains in agribusiness aims to improve the competitiveness of agriculture in national and international markets and to generate greater value added within the country or region. The key criterion in this context is broad impact, i.e. growth that benefits the rural poor to the greatest possible extent or, at least, does not worsen their position relative to other demographic groups. Pro-poor growth is one of the most commonly quoted objectives of value chain promotion. In recent years, the need to connect producers to markets has led to an understanding that it is necessary to verify and analyze markets before engaging in upgrading activities with value chain operators. Thus, the value chain approach starts from an understanding of the consumer demand and works its way back through distribution channels to the different stages of production, processing and marketing (GTZ, 2006).

The value chain approach seeks to identify long-term solutions to reduce the vulnerability of developing countries to fluctuating world market prices or trade shocks. It does not just focus on adding value to existing traditional commodity exports (in other words, diversifying the

same product), but also on promoting alternative products. Another characteristic of the approach is that it does not solely concentrate on functional dimensions such as supplying appropriate inputs, or applying good agricultural processing, handling and distribution practices. It emphasizes the importance of institutional arrangements, or rather governance issues, along the value chains that link and coordinate producers, processors and distributors of a certain product. Moreover, this aspect covers authority and power relationships that determine how financial, material and human resources are allocated and flow within the chain *(*Gereffi *et al.*, 1994). Dynamic value chain systems respond to market shifts by developing and transferring knowledge to intermediaries and producers, so that they can adapt and maintain a competitive market position over time. Vibrant value chain systems grow and continuously incorporate new businesses, generating ever-increasing jobs, income, and assets. In this manner, value chain systems can have the potential to significantly reduce poverty for large numbers of poor people (Alexandra and Mary, 2006).

2.7. Development of Market-Driven Soybean Value Chain

The value chain approach considers both the added value of a product and an insight into the actors' roles and relations. The value chain approach analyses a product's development process from input supply through production and processing level, transport, trade and marketing, to consumption. Despite the fact that, earlier work on agriculture concentrated mainly on improving the supply side of the respective value chains e.g. production conditions and output, recent studies have also paid attention to the demand side (Diao, 2007). Here the value chain analysis concentrates on both ends of the chain corresponding with the two sides of a market.

The development of the domestic markets of a commodity is strongly determined by factors on the supply side; example soils, aridity, agricultural knowledge, competition, weather, and market infrastructure as well as on the demand side example increase in population, urbanization, and income-elasticity. Natural occurrences such as aridity, the composition of soils, and the weather are mainly responsible for creating opportunities and constraints on the supply side of the market. Production of soybean in rain fed is highly affected by seasonality (high and low supply on the markets), which is mainly influenced by the climate and weather conditions. Those farmers who have access to irrigation can operate more independently of the seasons (Koenig *et al*., 2008). Furthermore, the importance of market co-ordination and market participation have been highlighted and described as one of the most important

constraints responsible for the poor performance of commodity (Dorward *et al*., 2005). According to estimations by Kelley and Byerlee (2004), some 60% of the African rural population lives in areas of good agricultural potential, but with poor market access. Only 22% live in areas of good agricultural potential and good market access and 18% suffer from poor market access and poor agricultural potential.

Agricultural potential and market access alone cannot make farmers profitable. Availability of market infrastructure (storage, transport, etc) is important for farmers to avoid flooding of markets and enables them to increase their profit by selling in times of low supply. Due to seasonality, market prices fluctuate depending on the quantity and the quality of the products on the markets. Especially on the wholesale and retail markets prices also fluctuate even during one day. Often the limited availability of storage is the reason that traders and retailers try to sell all their produce by the end of one day, even if they achieve only a low price. In times of high supply, traders benefit more; in times of low supply farmers can sell everything they harvest for good prices (Koenig *et al*., 2008).

2.8. Characterization of Pulses Subsector

2.8.1. World soybean industry trends

Among the major oilseed crops in the world, soybean is the largest source of edible oils.

The major U.S.A. oilseed crops are soybeans, cottonseed, sunflower-seed, canola, rapeseed, and peanuts. Soybeans are the dominant oilseeds in the United States America, accounting for about 90% of U.S. oilseed production (USDA, 2008).

Soybean growers in leading producing countries (especially Brazil, Argentina, and the U.S.A) have been using biotechnological innovations to boost soybean production. As a result, most of the soybean that is currently grown has undergone biotech modification (Jagwe and Nyapendi, 2004). Based on the 2003 production records, about 81% of the soybean produced in the United States of America has been modified using biotechnology while Argentina and Brazil have genetically modified 99% and 34% of their respective soybeans (Jagwe and Nyapendi, 2004) citing (American Soybean Association, 2004). The use of biotechnology modified planting materials confers the advantages of higher crop yields and greater tolerance to soybean diseases and pests (Jagwe and Nyapendi, 2004). High crop yield increases the profits that farmers make from soybean production and marketing enterprises.

2.8.2. Overview of Ethiopia's pulses production

Twelve pulse species are grown in the country. Of these, faba bean (Vicia *faba* L.), field pea (*Pisum sativum* L.), chickpea (*Cicer arietinum* L.), lentil (*Lens cultinaris* Medik.), grass pea (*Lathyrus sativus* L.), fenu greek (*Trigonella foenum-graecum* L.) and lupine (*Lupinus albus L.*) are categorized as highland pulses and grown in the cooler highlands. Conversely, haricot bean (*Phaseolus vulgaris* L.), soybean (*Glycine max* L.), cowpea (*Vigna unguiculata* L.), pigeon pea (Cajanus cajan L.) and mung beans are predominantly grown in the warmer and low land parts of the country. Among the individual varieties, faba beans (broadly known as horse beans) accounts for the greatest portion of production at 36 percent, followed by haricot beans (17 percent) and chickpeas (16 percent). Other pulses (e.g., lentils, peas, lupines, and mung beans) account for the remaining 32 percent (CSA, 2008/09).

2.8.3. Status of soybean production in Ethiopia

In Ethiopia, pulses rank second as food crops after cereals, occupying 17.7% of the total cultivated area, and contribute 12% of the total crop production (CSA, 2002). Soybean is one of the most important pulse crops of the country with an annual production of 7,205 tons in 2009 (FAOSTAT, 2011). Subsistence farmers in different parts of the country, who have been engaged in soybean production, are benefiting from the multiple uses of the crop (Abebe, 2012).

Soybeans were first grown in Ethiopia in 1950 and throughout the 1970s Ethiopia produced 6,000 tonnes of soybeans a year, making it one of the top four African soybean producing countries (William, 2007). About 19 African countries are recorded in the world soybean production statistics compiled by FAO. Ethiopia has made a good early start in production of soybean as compared to other African countries indicated in FAO records which recognizes Ethiopia with global soybean statistics since 1962.

In 1981 about 2,000 hectares of land were under production by the State Farms Development Authority; this produced only 10% of the soybeans required by the Ethiopian Nutrition Institute (ENI) which is the pioneer in production of a soy-fortified weaning food (William, 2007). Hence the industry has historically been based on human culinary applications. Soya production is diversified into other soybean market end use opportunities, in particular animal feed preparation, and oil crushing and export commodities.

Time series historic data on Ethiopia's soybean production data suggests that production, area and yield have remained almost stagnant for many decades. In 2012 Ethiopia was ranked 41st from the world in terms of total production and contributing 0.03% for the global soybean production.

The Ethiopian soybean industry starts to become relatively small, complex and opportunity 'on global commodity markets and weather conditions which have a major influence the domestic market. There have been a number of literature reviews over recent years and these documents have generally all agreed that there is a significant potential for the industry to expand if marketing aspect is improved (Chilot,2010); (Wijnands, 2009). These assumptions have been based on the identified value of soybeans as a rotation crop in total farm productivity systems and from domestic and export market opportunities, in particular, the growing interest in soy foods. Nevertheless, the market is governed majorly by few private traders which set the price depending on the export market and humanitarian organizations (Like World Bank, World Food Program etc). These organizations demand for enriched food nutrient to support malnourished children in disaster prone areas. The demand and the land cover for the soybean has increased substantially over the past years. This is mostly for processing into confined animal feed and human nutrition by enriched food processers companies such as FAFA, Agri seft etc.

The major soybean growing areas in Ethiopia are Southern Nations Nationalities and Peoples Regional state (Abela and Hawassa); Oromia Region (Arsi Negelie, Ziway, Bako, Jimma, Deddesa and Angergutin), and Benshangul Gumuz Region (Assosa and Metekel Zone) (Soybean Production Manual, 2011 unpublished). In 2012 the national production of soybean in Ethiopia was estimated at 11261 hectares; with a total productivity of 1582 tons per hectare (CSA, 2012).

2.8.4. Recent growth of the pulse sub-sector

Ethiopia is now one of the top ten producers of total pulses in the world, the second-largest producer of faba beans after China, and the fifth or sixth largest producer of chickpeas (FAOStat, 2008). Within Ethiopia, pulses are the third-largest crop export behind coffee and oil seed, and represent a USD 90 million export industry. Although production continued to increase through 2009, export volumes dropped by 42 percent in 2008/09 (from 233 tons to 136 tons) (CSA, 2009). Farmers sold on domestic markets (as the export price was not high

enough to justify transport and cleaning costs), further depressing the farm-gate price, or stored their pulse supply, anticipating an upswing in the global price. This price volatility exacerbated challenges throughout the value chain, causing sourcing problems for exporters and traders and limiting ability for the off-take market to function. This impact also had lagging effects on pulse production.

2.8.5. Destination countries for Ethiopian soy bean Export

Australia Bahrain, Djibouti, India, Indonesia, Italy Kuwait, Netherlands, Philippines, Saudi Arabia, Singapore, Sudan, USA and Vietnam are countries Ethiopian soy bean exports are destined during the last ten years. Sudan, Indonesia, Djibouti, Netherlands and Vietnam are the highest volume recipient countries for Ethiopian soy bean export with the percentage share of 42%, 21%, 12%, 9% and 4% respectively. The total volume of export destined to Sudan during the period 2004-2011 is 5,138 ton and the total volume exported to the second large recipient country Indonesia has been 2,611 ton Export of Soy bean in Ethiopia has been started in 2004 and there was no record of export of any soy bean or soy bean products before 2004. Ethiopia is exporting only soy bean grain and no other processed products of soy bean are started to be exported. The emphasis had given domestically to value addition activities on soy bean to produce various products such as edible oil, sauce and other non-edible products have been very limited. The last ten years trend in the volume of exported grain of soy bean has been increasing (Mekonen and Kaleb, 2014).

2.8.6. Contributions of pulses to smallholders' livelihood

Pulses contribute to smallholder livelihoods in multiple ways. Firstly, pulses can play a significant role in improving smallholders' food security, as an affordable source of protein. Secondly, pulses can have an income benefit for smallholders, both in terms of diversification and because they yield a higher gross margin than cereals. In addition to improving food and nutritional well-being, pulses can also improve soil health. Pulses have nitrogen fixing properties that can reduce fertilizer usage for cereals in the next season by up to 60 percent (if the recommended fertilizer dosage is otherwise adhered to. Thirdly, an indirect benefit of pulse production is the crop residues, which are widely used as animal feed thereby supporting livestock – an often important means of livelihood for smallholders. Given that cereal production causes higher soil nutrient depletion, rotating between pulses and cereal will not only contribute towards maintaining soil health but can also reduce the country's

fertilizer usage. Finally, as the third largest crop export product in terms of total value (USD 90 million), pulses have a positive impact on the trade balance, and contribute to the country's foreign exchange reserves. However, only 140,000 tons out of 1.6 million are exported (CSA, 2008/09).

2.9. Market and Marketing

Market can be defined as an area in which one or more sellers of given products/services and their close substitutes exchange with and compete for the patronage of a group of buyers. Originally, the term market stood for the place where buyers and sellers are gathered to exchange their goods, such as village square. A market is a point, or a place or sphere within which price making force operates and in which exchanges of title tend to be accompanied by the actual movement of the goods affected (Backman and Davidson, 1962). The concept of exchange and relationships lead to the concept of market. It is the set of the actual and potential buyers of a product (Kotler and Armstong, 2003). Conceptually, a market can be visualized as a process in which ownership of goods is transferred from sellers to buyers who may be final consumers or intermediaries.

2.9.1. Marketing channel

Formally, a marketing channel is a business structure of interdependent organizations that reach from the point of product or origin to the consumer with the purpose of moving products to their final consumption or destination (Kotler and Armstong, 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).

2.9.2. Marketing costs

Marketing costs refers to those costs, which are incurred to perform various marketing activities in the shipment of goods from producers to consumers. Marketing costs include: handling cost (packing and unpacking, loading and unloading putting inshore and taken out again), transport cost, product loss, storage costs, processing cost, capital cost (interest on loan), market fees, commission and unofficial payments (Heltberg *et al*., 2001).

2.9.3. Marketing margin

A marketing margin is the percentage of the final weighted averages 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).

2.10. Market Supply

Agricultural products differ from manufactured goods in terms of supply and demand. Agricultural products supply is peculiar because of the very seasonal biological nature while their demand is relatively stable throughout the year.

Supply is boldly underlined in economic theory that human being is always under process of choice from a number of alternatives. The basis for the decisions could be issues ranging from in house to the exogenous uncontrollable factors. A case in point here is market supply where scholars put each owns point of determining variables.

The study of market supply helps filling the gap for success of commercialization. The analysis can identify factors that determine market supply. Knowing the determinants mean knowing where to focus to boost production. The point is to improve marketable surplus based on the capacity of potential market. However, how much can be increased is a question of supply determinants and demand. A vivid review of the basic principles and applications, therefore, help reveal all these.

Market supply refers to the amount actually taken to the markets irrespective of the need for home consumption and other requirements where as the market surplus is the residual with the producer after meeting the requirement of seed, payment in kind and consumption by peasant at source (Wolday, 1994).

Marketable surplus is the quantity of produce left out after meeting the farmer's consumption and utilization requirements for kind payments and other obligations such as gifts, donation, charity, etc. This marketable surplus shows the quantity available 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 (Thakur et al., 1997).

Taking the specific conditions of India Harris (1982), defined market supply (volume sold) in agrarian economy to constitute the basic wage good for those in the economy not controlling grain (even if they were used for its production). In the process of commercialization of which the marketed surplus is an indicator, not only sets up physical flows of commodities, it is instrumental in monetizing the economy she added.

The surplus product supply stands for what the household brings to the market, but this does not necessarily imply an excess over his "subsistence requirement". It includes parts of the product needed for consumption by the farm household when the farmer is forced to sell to pay rents, buy inputs, cancel debts, buy non-farm staples, to meet socio-cultural obligations, and to cover other immediate expenses. As a result, marketed surplus represents actual surplus and the quantity sold in the form of forced selling (ANRS-BOARD, 2003).

Neway (2006), cited two options for commercialization. The most common form in which commercialization could occur in peasant agriculture is through production of marketable surplus of staple food more than what is needed for own consumption. Another form of commercialization involves production of cash crops in addition to staples or even exclusively.

At the farm household level, commercialization is measured simply by the value of sales as proportion of the total value of agricultural output. At the lower end, there would always be some amount of output that even a subsistence farmer would sell in the market to buy basic essential goods and services. For this reason, the ratio of marketed output up to a certain minimum level cannot be taken as a measure of commercialization. Neway (2006), proposed the proportion to be 20 percent of marketable surplus in the Ethiopia as a cut of rate for commercialization.

Marketed surplus is defined as the proportion of output that is marketed (Harris, 1982). 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 the transit (Thakur et al., 1997). In the case of crops that are wholly or almost wholly marketed, the output and marketed surplus will be the same (Reddy et al., 1995).

2.11. Review of Empirical Studies

In this section empirical review of documents and studies relevant for this study is made. A number of empirical studies have been conducted by different people and institutions on the supply of agricultural products both outside and inside Ethiopia. But the studies are mainly conducted around major cereals, vegetables, fruit and coffee crops and due to this fact that studies conducted in the area of oils crops, particularly on soya bean is very limited. As a result of this, the review mainly included the studies conducted on cereals, coffee, vegetables and fruit with very few related oils crops.

2.11.1. Value chain approach

There are a number of studies that have employed the value chain approach to agricultural commodities. But as mentioned above, the studies are mainly conducted on cereals, vegetables, fruit and coffee crops and due to this fact that studies conducted in the area of oils crops, particularly on soya bean is very limited.

A study on green beans by Lusby (2007), has revealed that lack of crop husbandry skills and limited extension services has constrained the productivity of the sector. Simultaneously, Cormick and Schmitz (2001), have indicated that even though firms in a system are formally independent of one another, an increasing network through personal relations and repeated transactions has assisted to inspect and alleviate the chain's core problems by developing their capacity and reducing the cost of the actors.

Fitter and Kaplinsky (2001) used a value chain analysis to examine inter-country distributional outcomes of the global coffee sector by mapping input-output relations and identifying power asymmetries along the coffee value chain. Their study showed that returns to product differentiation taking place in the face of globalization do not accrue to the coffee producers. They also found that power in the coffee value chain was asymmetrical. At the importing end of the chain, importers, roasters and retailers compete with each other for a share of value chain rents but combine to ensure that few of the rents return to the farmer or the producer country.

Value chain study conducted on mango by Dendena *et al. (*2009) indicated that the subsector faces some challenges. Among others: highly disorganized and fragmented industry with weak value chain linkages, long and inefficient supply chains, inadequate information flows

and lack of appropriate production are explained as the major problems. The study recommended institutional innovation to reduce the above challenges.

Dereje (2007) used value chain approach to study the competitiveness of Ethiopian coffee in the international market. The study indicates that Ethiopian farmers have low level of education, large family size with small farmland and get only 3% of the retail price in the German market. Thus, policy intervention was suggested to improve farmers' performance.

Horticulture value chain study conducted in Eastern parts of Ethiopia identified different problems on the chain (Emana, 2008). The major constraints of marketing identified by the same study include lack of markets to absorb the production, low price for the products, large number of middlemen in the marketing system, lack of marketing institutions safeguarding farmers' interest and rights over their marketable produces (e.g. cooperatives), lack of coordination among producers to increase their bargaining power, poor product handling and packaging, imperfect pricing system and lack of transparency in market information communications.

2.11.2. Determinants of market supply

There are a number of empirical studies on factors affecting the market supply of agricultural commodities. For example, Bosena (2008), identified the major factors that affect the marketable supply of cotton of farm households at Metema district. She examined the relationship of marketable supply and the determinant factors using Ordinary Least Squares (OLS). Factors identified to affect the household level of sesame marketable supply include yield of sesame, number of oxen, number of foreign languages spoken by the head of the household, modern inputs used, sesame area and time of selling influenced positively the marketable supply as expected.

Wolday (1994), identified major factors that affect teff, maize and wheat at Alaba Siraro District. He studied the relationship of farm level marketable supply of the cereals using cross-sectional data. To capture the influence of the independent variables on the marketable supply of food grain, he adopted multiple regression analysis with both dummy and continuous variables as independent variables. He found out that the size of output, access to market and family size had affected marketable supply of food grain.

Geremew (2012), examined factors affecting sesame market supply in Diga district based on the Hausman test and the post estimation tests of Durbin-Wu-Hausman endogeneity test. According to his study, the quantity of sesame marketed is likely endogenous variable to the model, which may result in inefficient estimation result. Basically such problems arise if some factors explaining the variation in the dependent variable (in this case, total income generated from sesame sale) could also affect of the potential repressors (e.g. quantity of sesame marketed).

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

Another study by Wolelaw (2005), find out the major factors that affect the marketable supply of rice at Fogera district using multiple linear regression models. And it is investigated the relationship between the determinant factors of supply and the marketable supply of rice and her study revealed that the current price, lagged price, amount of rice production at farm level and consumption at household level had influenced marketable supply of rice at the district.

Wolelaw (2005), Kindie (2007) and Kinde (2007), indicated that the major factors that affect marketable supply of sesame in Metema district by using cross-sectional data with dummy and continuous explanatory variables. In his study he implemented multiple linear regression model to identify the relationship between the marketable supply of sesame and the hypothesized explanatory variables, hence his study acknowledged that amount of sesame productivity, use of modern inputs, number of language spoken by the household head, number of oxen owned, sesame area and time of selling of sesame influenced marketable supply of sesame positively.

Abay (2007), applied Heckman two-stage model to analyze the determinants of vegetable market supply. According to Wolday (1994), marketable supply of agricultural product could be affected by different factors including the size of land holding, the output level, family size, market access, price, inputs, formal education, oxen number, accesses to extension and credit services, distance to market, time of selling, access to labor and age. In sum, empirical evidences indicate that marketable supply approach has become an important framework to

analyze economic agents in agricultural sector. In this study an attempt will be made to identify factors affecting the marketable supply of soybean.

Abraham (2013), applied multiple regression model to indicate that marketable supply of tomato was significantly affected by access to market information and quantity of tomato produced; marketable supply of potato was significantly affected by access to extension service, access to market information, vegetable farming experience and quantity of potato produced; and marketable supply of cabbage was significantly affected by non/off farm income, Woreda dummy, distance to the nearest market and quantity of cabbage produced. The result of endogenous regression result shows that quantity of potato production significantly affected by access to extension service, access to market information, vegetable farming experience, sex of the household head, age of the household head and quantity of fertilizer application. Therefore, according to the author, these variables require special attention if marketable supply is to be increased.

From these studies, one can conclude that most of the factors that affect the supply of each commodity differ from other commodities. Hence, difference in the marketing system of these commodities, type of commodities (food or industrial commodity), and location of the study area can result in differences in factors affecting marketable supply of the commodities. Hence, it is important to analyze factors affecting marketable supply of soybean. Recent studies are commonly using regression models to estimate the supply function as we have seen in above reviews. Likewise for this particular study, Linear multiple Regression model has been proposed to analyze and estimate supply of soybean in the study area.

2.12. Conceptual Framework

The review of related literature presented above clearly indicated that agricultural productivity improvement at farm household level and market supply are influenced by diverse and complex factors. The proposed study employed different econometric models and approach in analyzing the factors that affect soybean output in Metekel zone of Benshangul Gumuz, Ethiopia. The conceptual framework that is used in conducting the study entails soybean output & related input, farm household characteristics, socio-economic factors, etc. The conceptual framework in Figure 1 illustrates how these factors are interrelated and influence soybean farmers' decisions to employee optimum input thereby produce efficiently so as to supply more. Hence with very few exceptions of the details, the conceptual frame

work below was used to analyze the data with regard to assessing the supply determinants of soybean farm households in Metekel zone.

Based on the theoretical and empirical review, observations of soybean supply factors of the study area, the following conceptual framework depicts the most important variables expected to influence soybean producers to supply soybean to market in the study area which is Metekel zone.

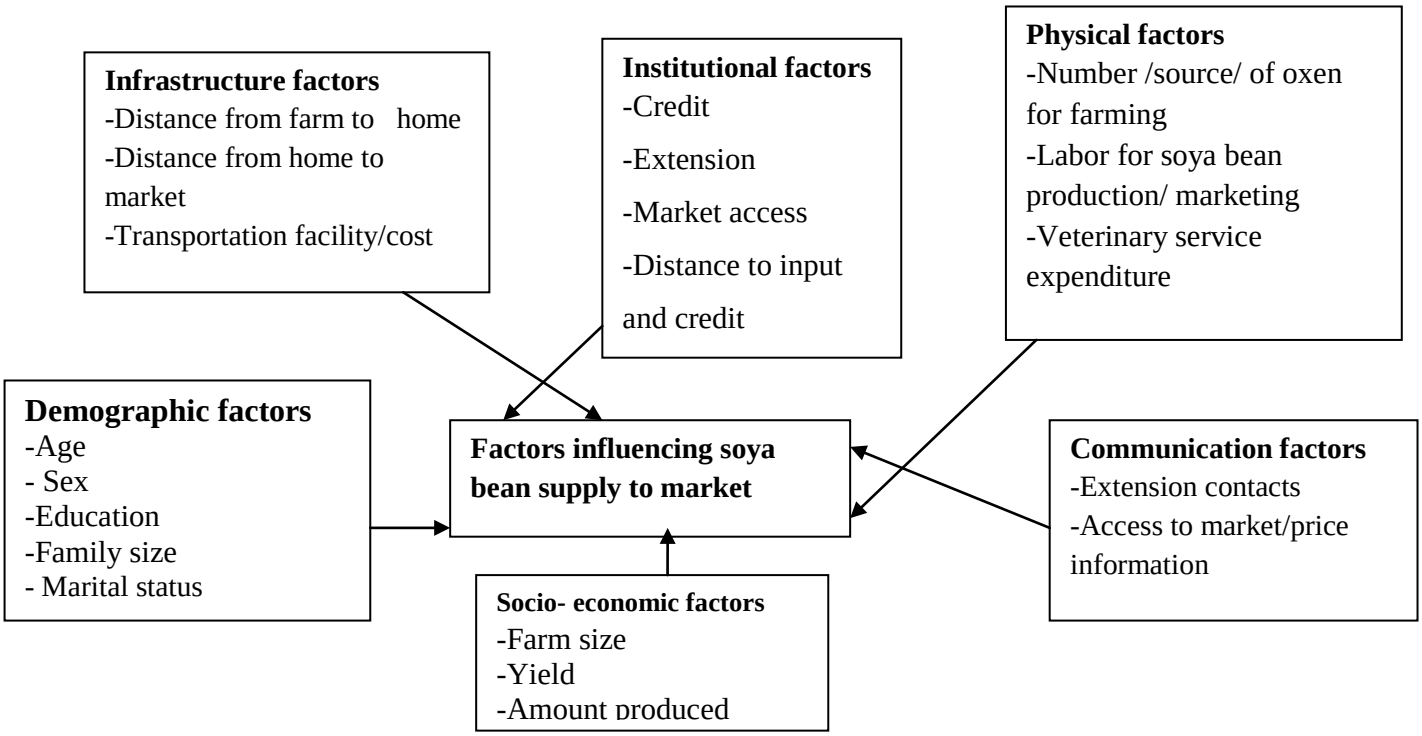

Figure 1: Conceptual frame work of the study.

Source own computation 2015/16

3. METHODOLOGY

3.1. Description of the Study Area

The study was conducted in Metekel zone located in the Benshangul Gumuz National Regional State, North West Ethiopia, covering an area of 3,387,817 hectares. About 80% of the area is characterized by having sub-humid and humid tropical climate. The topography of the zone presents undulating hills slightly sloping down to low land Plateaus having varying altitudes from 600 to 2800 m.a.s.l. Meteorological data of Pawe Agricultural Research Center indicate that the zone receives an annual rainfall ranging from 900 to 1450 mm with annual minimum and maximum temperature of 20 and 35°C respectively. The dominant vegetation cover of the study area is characterized by different types of woodland which include broad-leaved deciduous woodland, Acacia woodland, riparian woodland along the major rivers, Boswellia woodland and bamboo thicket (UNDP/ECA, 1998). According to MoA cited in Engda (2000), the surrounding of Metekel Zone has a wide climatic range within hot to warm moist lowlands and hot to warm sub humid lowlands agro-ecological zones.

The survey was conducted 2014/15 in two major soybean growing Districts of Metekel zone (Pawe and Dangur). The site is located North West Ethiopia in Benshangul Gumez regional state as shown in the Figure 1. The Altitude of Pawe district is 1100 masl and an altitude of Dangur District is 1150 m.a.s.l. In both districts annual Rainfall is 1586.315 ml and the average minimum and maximum temperature is 16.9 and 32.5 °C respectively.
The district Pawe has a total of 12,267 households while Dangur has 13,663 total households.

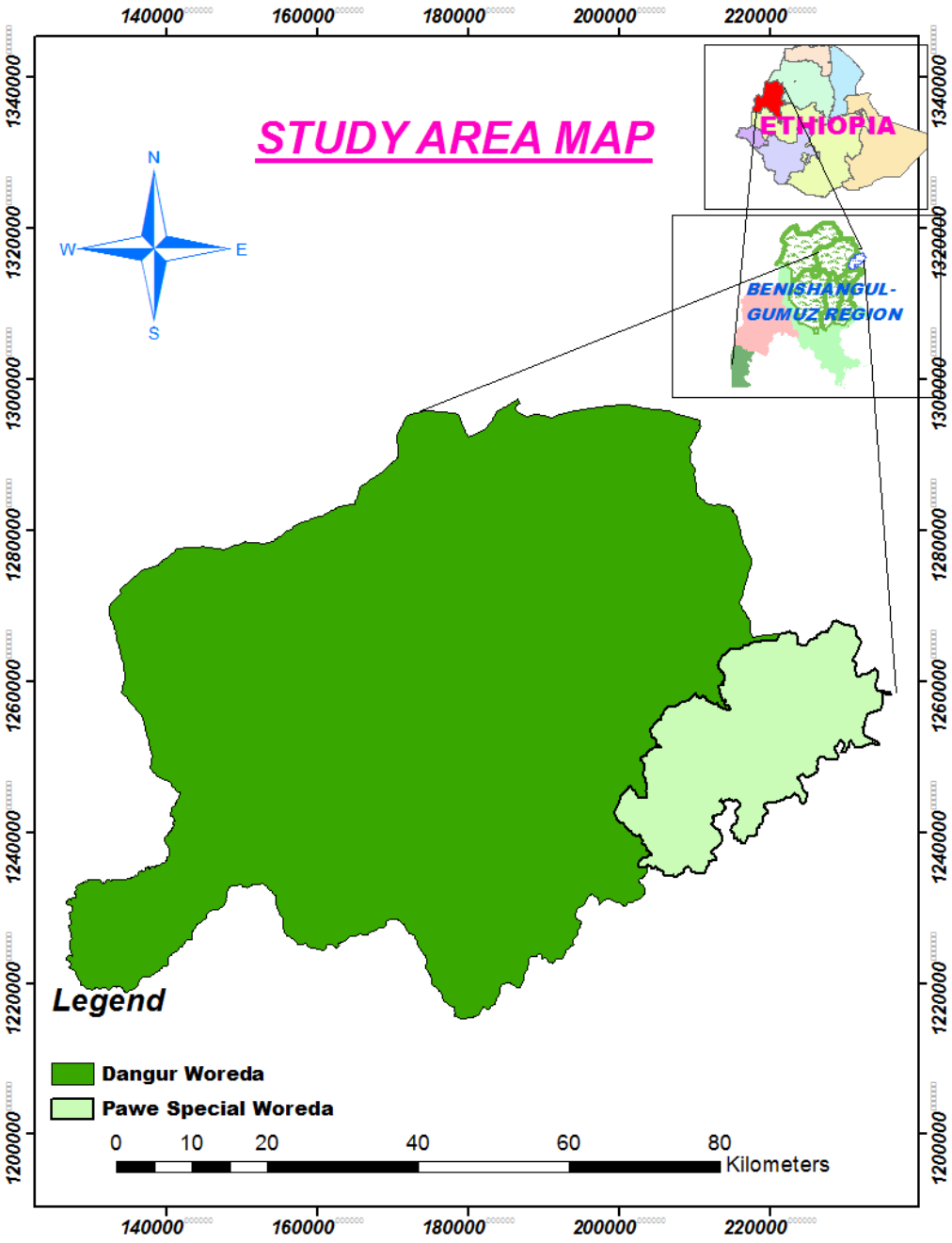

Figure 2: Map of Pawe and Dangur Districts of Metekel zone

3.2. Types, Sources and Methods of Data Collection

For this, study both qualitative and quantitative data were collected. The qualitative data include socio demographic formation like farmers' livelihood, sex, extension service, educational status of the household head access to market information, credit facility, etc. The quantitative data include volume of soybeans supplied to the market, age of the household head, soybean production, prices of soybean, distance to district market, distance to all

weather roads, family size, land size, and so on. The study used these and other data to estimate the determinants of soybean supplied to the market. For the purpose of value chain analysis information on volume of soybean and soybean products mobilized (sold/bought), cost and price, actors linkage, value adding activities, were collected and used.

The data for this study was collected from both primary and secondary sources. Regarding the source of data for value chain mapping and analysis, the primary actors (farmers, traders, retailers, processors, cooperatives/unions) and other service/providers and influencers (microfinance, office of agriculture and rural development (OoARD), coop/union, trade and market development office and Pawe agricultural research centre were used as primary sources. The secondary source was collected from Central Statistical Authority (CSA), Bureau of Agriculture and Rural Development (BoARD), and other sources.

For the primary data both formal and informal survey were used. The informal survey used Rapid Market Appraisal (RMA) technique using checklists. Primary data was collected through questionnaire; check lists, direct observation of the study area, and focus group discussion. The formal survey was undertaken through formal interviews with randomly selected farmers, traders and consumers using a pre-tested semi-structured questionnaire for each group. The secondary data was collected through thorough review of both published and unpublished records/documents from aforementioned sources (refer to the questioner in the Appendix B).

3.3. Sampling Procedure and Sample Size

In order to select a representative sample soybean producer this study implemented, a three stage sampling procedure. In the first stage, with the consultation of district agricultural experts and development agents, out of six districts and one special district, Dangur and Pawe districts were selected purposively because of their potential in soybean production. Dangur has 25 Kebeles and Pawe has 20 kebeles. In the second stage from these kebeles a total of six Kebeles were selected randomly. Three kebeles were selected randomly from each district as a representative sample. In the third stage, using the list of farmers from the sampled kebeles 147 sample smallholder producers were selected randomly based on proportional to the population size of the selected kebeles.

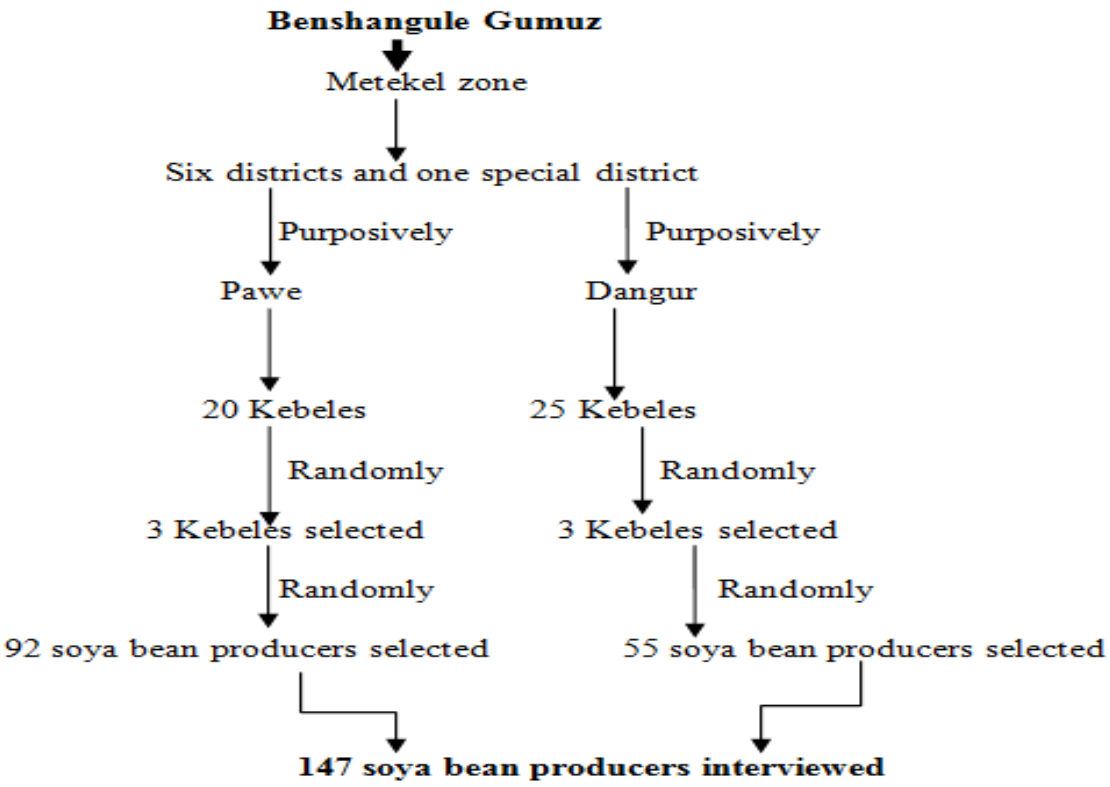

Figure 3: Sampling frame work of the study area

N.B: Here the sample size difference shown between the two districts is because of the population size difference between the districts and from the population the districts have, the proportionate sample size has been taken.

3.3.1. Sample size determination for producers

For populations that are large Cochran (1963:75), developed the Equation 1 to yield a representative sample for proportions.

$$n = \frac{z^2 pq}{e^2}$$ ---------- Equation 1

Which is valid where **n** is the sample size, $\mathbf{Z^2}$ is the abscissa of the normal curve that cuts off an area **e** at the tails (1 – e equals the desired confidence level, e.g., 95%) 1, **e** is the desired level of precision, **p** is the estimated proportion of the soybean producers in the population, and **q** is 1-p. The value for Z is found in statistical tables which contain the area under the normal curve.

So by computing the values for z = 95%, p = 10%, q = 90% and e = 5%

$$n = \frac{1.96^2 * 0.1 * 0.9}{0.05^2} = 138$$

But for the finite number of population known (in this case 4246 soybean growing farmers, (997 from Mender 30, 1096 from Mender 23/45 and 606 from Mender 4 KAs of district Pawe, and 651 from Beles 2, 316 from Mambuk & Kitli and 316 from Azarti & Kitli KAs of district Dangur) finite population correction for proportions is needed. If the population is small then the sample size can be reduced slightly. This is because a given sample size provides proportionately more information for a small population than for a large population. The sample size (n_o) in equation 1 can be adjusted using the following Equation 2 (Cochran, 1963).

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}} \quad \text{..... Equation 2}$$

$$n = \frac{138}{1 + \frac{(138 - 1)}{4246}} = 134$$

Where n_o is sample size calculated in equation (1) assuming infinite number of population, n is the adjusted sample size for population known and N is the population size. Therefore, out of **4,246** total soybean producing farmers, **147** sample soybean producers were selected including 10% of contingency. Then, this 147 sample respondents were distributed to kebeles proportionately according to their population size.

Sample size distribution of HH head or soybean producers is n= 147

Table 1: Sample size distribution of the HH head

Districts	Selected KAs	total soybean producers	Proportions	Sample
Pawe	Mender 30	997	0.235	34
	Mender 23/45	1096	0.258	37
	Felegeselam (Mender4)	606	0.143	21
Dangur	Beles 2	651	0.154	23
	Mambuk & Kitli	316	0.074	12
	Azarti & Kitli	580	0.136	20
Total		4246	1	**147**

3.3.2. Sample size determination for actors other than producer

For this study information from input suppliers, traders, processors, consumer and other supportive actors were needed mainly for the purpose of mapping the soybean value chain and assessing the performance of actors'. The **sampling technique** or procedure that was

used for this study was random selection from those who have link with each other and who mobilizes the commodity soybean. Based on the chain of 147 sample farmers, sample of input suppliers, traders, processors and others were selected and interviewed through checklist. Besides one important key representative person from each service provider's and influencer's offices were taken and interviewed with the help of checklist.

Researchers do not agree on sample size determination and procedure that should be used in each segment of the marketing chain (Mendoza, 1995). The decisions will involve partly a function of information currently known, time and resources available, accessibility to and openness of the marketing participants as well as the estimated size of the trading population. Therefore sample size determination formula may not be necessary because it will be forced to follow the chain of actors trading with each other.

In this study, information from private farms, suppliers and/or processors, cooperatives/union, exporters, domestic wholesalers, and consumers were also needed mainly for the purpose of mapping the soybean value chain, and calculating value share. Sampling may not work for value chain analysis because it is must to be forced to follow the chain of actors trading with each other. For example considering a farmer, it is must to consider in the analysis the suppliers/processor to which the farmer is selling. Accordingly, following the chain of the 147 sampled farmers, the following sample sizes were taken from actors other than farmers using its respective sampling technique.

Collectors from Metekel zone: Following the chain of farmers, from among 92 collectors in the two districts, only 56 collectors (37 from Pawe and 19 from Dangur district) were linked with the 147 sample farmers with marketing and other activities. Thus, 18 sample collectors (12 from Pawi district and 6 form Dangur district) were taken from the six sample kebeles of the two districts proportionately and randomly. Some of the collectors are residing in the district towns and some of them in the kebeles.

Table 2: Sample size distribution of the retailers

Districts	Selected KAs	Total collectors	Proportions	Sample
Pawe	Mender 30	12	0.214	4
	Mender 23/45	16	0.286	5
	Felegeselam (Mender4)	9	0.161	3
Dangur	Beles 2	9	0.161	3
	Mambuk & Kitli	4	0.071	1
	Azarti & Kitli	6	0.107	2
Total		56	1	18

Wholesaler from Metekel zone (W_1): Following the chain of collectors and/or farmers, from among 25 wholesalers in the two districts, only 20 wholesalers (13 from Pawe and 7 from Dangur district) were linked with the 56 linked collectors and/or with 147 farmers with marketing and other activities. Thus, 15 sample wholesalers (9 from Pawe district and 6 form Dangur district) were taken from two districts proportionately and randomly.

Table 3: Sample size distribution of the traders

Traders	Pawe district			Dangur district				Total
	Mender 30	Mender 23/45	Felegeselam (mender 4)	Beles 2	Mambuk & Kitli	Azarti & Kitli	Addis Ababa	
Collectors	4	5	3	3	1	2		18
Wholesaler	9			6			3	18
Retailers	4	3	2	3	1	2	7	22
Processors							2	2
Exporters							2	2

Wholesalers in Addis Ababa (W2): Following the chain of wholesalers in Metekel zone (W1), 3 wholesalers from Addis Ababa (W2) were sampled randomly from the total of 15 linked wholesalers.

Exporters: There were around 5 private limited exporters who were linked with the sampled Wholesalers in Addis Ababa (W2) and/or wholesalers in Metekel zone (W1); and two of them were selected for interview.

Retailers in Addis Ababa (R2): Following the chain of wholesalers in Addis Ababa (W2), 5 retailers from Addis Ababa (R2) were sampled randomly.

Processor/wholesaler in Addis Ababa (W3): Following the chain of wholesalers in Addis Ababa (W2) and/or wholesalers in Metekel zone (W1), two processors namely Fafa food Share Company and Health care food manufacturing from Addis Ababa were sampled randomly.

Retailers in Addis Ababa (R3): Following the chain of the two sampled processors/wholesalers in Addis Ababa seven retailers like ET fruits, hotels and different supermarkets were taken randomly.

Consumers: it is apparent that there are many consumers who have been consuming soybean products in Addis Ababa. Thus, for the sake of getting price information, 10 consumers were interviewed.

3.4. Methods of Data Analysis

To address the objectives of the study, both descriptive statistics and econometric analysis were employed.

3.4.1. Descriptive statistics analysis

The descriptive statistics such as mean, percentages, standard deviation and frequency of occurrence were used to analyze socio-economic characteristics of respondents.
For this study, value chain analysis and performance of actors' along the soybean value chain was done using descriptive statistics analysis.

3.4.2. Value chain analysis

Abraham (2013), stated that as products move successively through the various stages, transaction takes place between multiple chain actors, money and information are exchanged and value was progressively added. The analysis of soybean value chains highlights the need for enterprise development, enhancement of product quality, and quantitative measurement of value addition along the chain, promotion of coordinated linkages among producers and improvement of the competitive position of individual enterprises in the marketplace (Kaplinsky and Morris, 2001). The following three steps of value chain analysis were applied to this study:

1. Mapping the value chain to understand the characteristics of the chain actors and the relationships among them, including the study of all actors in the chain, of the flow of soybean through the chain, of employment features, and of the destination and volumes of domestic and foreign sales. This information can be obtained by conducting surveys and interviews as well as by collecting secondary data from various sources.

2. Identifying the distribution of actors' benefits in the chain. This involves analyzing the margins and profits within the chain and therefore determined who benefits from participating in the chain and who would need support to improve performance and gains. In the prevailed context of market liberalization, this step is particularly important, since the poor and small holder farmers involved in value chain promotion were the most vulnerable.

3. Emphasizing the governance role. Within the concept of value chain, governance defines the structure of relationships and coordination mechanisms that exist among chain actors. By focusing on governance, the analysis identified actors that may require support to improve capabilities in the value chain, increase value added in the sector and correct distributional distortions. Thus, governance constituted a key factor in defining how the upgrading objectives could be achieved.

Following the above procedure, the main aspects of soybean value chain analysis was done by applying some quantitative and qualitative analysis. First, an initial map was drawn which depicts the structure and flow of the chain in logical clusters. This exercise was carried out in qualitative and quantitative terms through graphs presenting the various actors of the chain, their linkages and all operations of the chain from pre-production (supply of inputs) to consumption. After having developed the general conceptual map of the value chain, the next step was analyzing the chain's economic performance and benefit share of actors.

Analysis of performance of actors along the soybean value chain

To find out the benefit share of each actor the following concept was applied. In analyzing margins, first the Total Gross Marketing Margin (TGMM) was calculated. This is the difference between producer's (farmer's) price and consumer's price (price paid by final consumer) i.e.

$$\text{TGMM} = \text{Consumer}'\text{sprice} - \text{Farmer}'\text{sprice} \ldots\ldots\ldots \text{Equation 3}$$

Then, marketing margin at a given stage 'i' (GMMi) will be computed as:

$$\text{GMMi} = \frac{SPi - PPi}{TGMM} \times 100 \ldots\ldots\ldots\ldots\ldots\ldots \text{ Equation 4}$$

Where, SPi is selling price at i^{th} link and PPi is purchase price at i^{th} link

Total gross profit margin also computed as:

$$\text{TGPM} = \text{TGMM} - \text{TOE} \ldots\ldots\ldots\ldots\ldots\ldots \text{ Equation 5}$$

Where, TGPM is total gross profit margin, TGMM is total gross marketing margin and TOE is total operating expense.

Similar concept of profit margin that deducts operating expense from marketing margin was done by (Dawit, 2010) and (Marshal, 2011).

Then profit margin at stage "i" is given as:

$$\text{GPMi} = \frac{GMMi - OEi}{TGPMi} \times 100 \ldots\ldots\ldots\ldots\ldots\ldots \text{ Equation 6}$$

Where,

GPMi =Gross profit margin at i^{th} link

GMMi =Gross marketing margin at i^{th} link

OEi =Operating expense at i^{th} link

TGPM=Total gross profit margin

3.4.4. Econometric analysis

For this study, volume of soybean supplied to the market is considered as dependent variable in the econometric analysis.

3.4.4.1. Market supply model

A higher market supply can help farmers to participate in a high value markets by increasing their level of income. Therefore, investigating the nature of market supply is a major component of agro-value chains. In this study, multiple linear regression models (MLRM) was used to analyze factors affecting farm level soybean supply to the market in the study areas because all soybean producers are assumed to participate in the market.

$$Y = \beta X' + u_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{ Equation 7}$$

Where **Y** = quantity of soybean supplied to market

X'=a vector of explanatory variables

(i.e. Age, sex, education, price of soybean, membership in the cooperative, land size, quantity of soybean produced, livestock, market information, credit, extension service, distance to the nearest market, experience, family size, training).

β ' =a vector of estimated coefficient of the explanatory variables

$\mathbf{U_i}$ = disturbance term

Hypothesis and Definition of Variables

In the case of study identifying factors influencing the marketing of soybean, the main task is to analyze which factors influence the supply of soybean. Therefore, potential variables which are hypothesized to influence farmers marketing of their soybean are explained below.

Quantity supplied (QTSUPP)

It is a continuous variable that represents the total quantity of soybean supplied by individual households in the study year. Amount supplied to the market of soybean were hypothesized to be measured in quintals and influenced by a combined effect of various factors.

The independent variables

The explanatory variables which were expected to influence the dependent variables were the following:

Age of Household Head (AGE): It is age of the HH head which is continuous variable and measured in years from the time of birth. The expected influence of age is assumed to be positive; it is a proxy measure of farming experience of household. Aged households are believed to be wise and acquire skills in soybean production hence produce much and supply more. In addition to the amount they supply aged HH are assumed to be wise and use resource more efficiently to get the given level of output. So for this study age is hypothesized that it has a positive effect on on amount soybean supplied.

Sex of the Household Head (SEX): A dummy variable taking 0 if female and 1 if male for variable to be considered. Tshiunza et al. (2001), determined that male farmers tended to produce cooking banana for market and, therefore, participated in banana market more than female farmers participate. For this study, it is assumed to have a positive effect on the volume of soybean production and supply to the market. Since the female producers have to do the triple task, male producers are assumed to give a better attention for the production and market supply of the product soybean.

Education level of the household (EDLHH): It is a dummy variable measured in terms of whether the household has a formal education or not which takes a value 1 if a household have formal education and 0 otherwise. Education broadens farmers' intelligence and enables them to perform the farming activities intelligently, accurately and efficiently. Moreover, better educated farmers tend to be more innovative and are therefore more likely to adopt the marketing systems. Formal education enhances the information acquisition and adjustment abilities of the farmer, thereby improving the quality of decision making (Fakoya *et al*., 2007). Therefore, this variable is hypothesized to influence volume of soybean sales positively. Astewel (2010), found that if

paddy producer gets educated, the amount of paddy supplied to the market increases, which suggests that education improves level of sales that affects the marketable surplus.

Price of soybean (PRICE): It is a continuous variable and is measured in Birr per kilogram. This variable is expected to influence marketable supply positively. When the price of the product is promising, farmers are motivated to take their produce to the market. This makes the supply to be directly related to the current market price.

Membership in a cooperative (COPM): It is a dummy variable taking a value 1 if a farmer is a member or employee in a cooperative and 0 otherwise. Having a membership in a cooperative increases the attachment of a farmer to a cooperative than those who are not member and help to realize the benefits of a cooperative.

Land size (LAND): This refers to the total area of land that a farm household owned. It is a continuous variable measured in hectars. In agriculture, land is one of the major factors of production. The availability of land enables the owner to earn more agricultural output which in turn increases the marketable supply (Desta, 2004). Therefore, land holding and marketable supply are expected to have direct relationship.

Quantity of soybean produced (QTSBP): It is continuous variable measured in quintals. This variable is expected to have a positive contribution to soybean producers' market supply. A marginal increase in soybean production has obvious and significant effect in motivating market supply. Therefore, this variable is hypothesized to have a positive effect on marketable surplus. Abay (2007); Adugna (2009) and Ayelech (2011), found that the amount of tomato, papaya, avocado and mango produced by farming households has augmented marketable supply of the commodities significantly. The variable was expected to have positive contribution to the amount of soybean supplied to the market. Farmers who produce more output per hectare are associated to supply more soybeans to the market than those who produce less.

Source of Livestock (Oxen) (SOX): This is a dummy variable which takes the value of 1 if the respondent have accessed his/her own farming oxen or 0 if the respondent have no their own oxen but use the farming by rented oxen. In areas where farming by animal is practiced, the availability of animals especially oxen have a great influence on the production of soybean which in turn have a positive relationship with the volume supply of soybean to the market.

Therefore, for this study own oxen availability was hypothesized to influences volume of soybean sales positively.

Access to Market Information (ACCMIF): This is a variable expected to influence market supply positively. The variable is considered dummy where it takes a value of 1 if a farmer has market information on price and demand information and 0 if not. Farmers marketing decisions are based on market price information, and poorly integrated markets may convey inaccurate price information, leading to inefficient product movement. Therefore, it was hypothesized that market information positively related to market supply of soybean. Again, business decisions are based on dynamic information such as consumer needs and market trends (CIAT, 2004).
Therefore those who have access to dynamic information will produce more soybeans for market.

Access to credit (ACC): This is a dummy variable taking the value 1 if the household takes loan and 0 otherwise, which indicates credit taken for soybean production. Access to credit would enhance the financial capacity of the farmer to purchase the inputs, thereby increasing soybean production and market share size. Therefore, it was hypothesized that access to credit would have positive influence on level of production and sales. Because if they could get credit, they would have the access to use more inputs to produce more. Alemnewu (2010), and Muhammed (2011), found out that if pepper and teff producer gets credit, the amount of pepper and teff supplied to the market increased.

Adequate access to extension service (EXC): A dummy variable taking a value of 1 if soybean producer household has adequate access to extension service and 0 otherwise and representing extension services as a source of information on technology. It was expected that extension service widens the household's knowledge with regard to the use of improved technologies and has positive impact on soybean sale volume. Therefore, this variable was hypothesized to influence volume of soybean sales positively. Ayelech (2011), found that if fruit producer gets extension, the amount of fruits supplied to the market increases. It is hypothesized to increase the production efficiency of soybean.

Distance to the Nearest Market (DMKT): It is a continuous variable measured in kms. It refers to the distance of the farmer residence from the market places, where cooperatives and traders are buying soybean from farmers. Wolday (1994); on food grain market in the case study of

Alaba indicated negative relationship between distance from the household residence to grain market and volume of marketed food grain. Therefore, it was hypothesized that this variable is negatively related to marketable surplus of soybean.

Soybean Farming Experience (EXPSBF): It is the total number of years a farmer stays in production of soybean. A household with better experience in soybean farming is expected to produce more amounts of soybean and, as a result, he/she is expected to supply more amounts of soybean to market. Farmers with longer farming experience were expected to be more knowledgeable and skilful (Ayelech, 2011).Therefore, this variable was hypothesized to positively influence soybean market supply.

Family Size (Family): Family size of a respondent is a continuous variable measured in terms of number of family members in the household. Soybean production in general and market supply of soybean products in particular is a function of labour. Accordingly, families with more household members tend to have more labor which in turn increase soybean production and then increase soybean market supply. On the other hand, family size also decreases market supply because high proportion of the product would be used for consumption. But for this study family size was expected to influence positively the volume of soybean supply to the market. Gezahagn (2010), who found that family size have positive effect on the households' gross income from groundnut production.

Training (**TRN**): A dummy variable, which would take a value of 1 if the farmer, was trained outside of his/her locality and 0 otherwise; it is assumed training will increase the production efficiency.

Table 4: Description of dependent and independent variables used in the MLRM

No.	Description	Types	Effect
1	Quantity of soybean supplied	Continuous	+ve
2	Current price of soybean	Continuous	+ve
3	Quantity soybean produced	Continuous	+ve
4	Distance of the respondent from the nearest market	Continuous	-ve
5	Farming experience of the respondent	Continuous	+ve
6	Active family size of the respondent	Continuous	+ve
7	Total land allocated for soybean production	Continuous	+ve
8	Educational level of the respondent	Dummy	+ve
9	Adequate extension access of the respondent	Dummy	+ve
10	Sex of the respondent	Dummy	
11	Cooperative membership of the respondent	Dummy	+ve
12	Source of oxen the respondent uses	Dummy	
13	Access to market information	Dummy	+ve
14	Access to credit	Dummy	+ve
15	Age of the respondent	Continuous	+ve/ -ve
16	Total land size of the respondent	Continuous	+ve

4. RESULTS AND DISCUSSIONS

This chapter presents the major findings of the study. It has five main sections. The first section deals with descriptive of the sample households. The second section presents result of value chain analysis of soybean which includes value chain map, actors and their roles, and value chain governance. The third section presents actors' performance analysis of the value chain which includes marketing costs and margins, and benefit shares of actors in the value chain. The fourth section presents results of econometric analysis which contains the determinants of market supply of soybean by using MLR model.

4.1. Description of Soybean Producers

4.1.1. Demographic characteristics of sample households

This section presents demographic and socioeconomic characteristics of the sample respondents. Of the total sample respondents of 147 farmers included in the survey, 87.1% were male-headed households and only 12.9% were female-headed households. With regards to educational status of the study area, from 147 respondents 60.5% and 39.5% of the respondents were illiterate and literate, respectively. Farming was the main occupation and source of livelihood for all sample farmers (100%) in the study area. The survey data revealed that the major source of income for the sampled farmers is on-farm activities (from both crop and livestock production). Only **10.9%** of the respondents reported that, they have access to non-farm activities in the study area and generates some additional income. However, all of these farmers (who have access to non-farm income) reported that, it is not their main source of income, their main source of income is farming. Majority of sampled farmers (**89.1%**) reported that crop production is the major and only source of their income.

According to the study, 17% of the respondents have been a member of cooperatives and the rest 83% of the respondents have never been a member of cooperatives. This is because the cooperatives and the unions were established to facilitate the transaction of soybean production but it has never been as strong as needed by the producers and actors among the chain. For the question why the cooperatives are such in a weak position, the cooperative officer in the study area stated that there is shortage of money and awareness limitation. Since they had money

shortage, they made an agreement to be paid 50 birr per quintal by different traders. And the total price was made first to the cooperatives. By the time it has been bought and stored to be sending it for the traders, price of soybean was fluctuated. That means the current market price has been decreased then the traders wanted to buy the product by the current market price, and an argument has been made and ended with mistrusted. So according to the officer's statement they become weaken to create the strong link with producers and traders and ended with little members of cooperatives.

Table 5: Demographic and socioeconomic characteristics of samples of categorical variables

Variable		MHH(N=128)	FHH(N=19)	Total(N=147)
Marital status (%)	Married	91.41	68.42	88.44
	Unmarried	3.13	5.26	3.40
	Divorce	2.34	15.79	4.08
	Widowed	3.12	10.53	4.08
Cooperative (Yes)	%	16.41	21.05	17
Occupation (Yes)	%	10.12	15.79	10.89

Average age was 37.5 and 35.9 years for male headed and female headed households, respectively. The average total household size of the respondents was 6.2 and 6.4 persons in both male headed and female headed households, respectively. From these total family sizes of the respondents, the average active household members of the total sample respondents were 4 persons in both male headed and female headed households. The average years of farming experience related to soybean production was 4.9 and 4.6 years for male headed and female headed households, respectively.

Table 6: Demographic and socioeconomic characteristics of samples of continuous variables

Variables	**MHH (N=128)**	**FHH (N=19)**	**t-test**
Age	37.5	35.9	0.43
Active family size	4.1	4	0.88
Total household size	6.2	6.4	-0.36
Experience	4.9	4.6	0.7

4.1.2. Production overview

The average amount of soybean produced was 33.31 and 33.29 quintals and has been sold with 678.84 and 666.84 birr per quintal in both male headed and female headed households respectively. The average amount soybean produced was 33.3 quintals per household head for both male and female household head. From the total amount soybean produced, the average amount soybean sold was 25.65 and 24.58 quintals per head for male and female house hold head respectively. From the total amount soybean produced, people in the study area allocate a small proportion of it for consumption. This is due to lack of awareness about the nutritional value of the product and lack of knowledge how to prepare and consume the product in different forms. The average amount of soybean allocated for consumption was almost 1.2 quintals per head for both male and female households.

Table 7: Mean for production and marketing of soybean by producers

Variables	MHH (N=128)	FHH (N=19)	t-test
Distance	7.03	10.89	-2.1
Current price	678.84	666.84	1.35
Quantity produced	33.31	33.29	0.61
Quantity SB sold	25.65	24.58	0.37
Quantity SB consumed	1.25	1.18	0.51

The average landholding of the sample respondents was 4.4 ha per household for both male headed households and female headed households. From these total land size 2.25 and 2.5 hectares of land was covered by soybean averagely by male headed and female headed households respectively. In terms of land allocation both male headed households and female headed households use similar allocation for soybean production as it can be seen from the results below. Depending on the climatic condition of the area, producers allocate their expensive land for any type of crop that will benefit them. Total land cultivated by both male household headed and female house head headed has been exceeded from that of total land owned by the household because they use land rent system. This indicates that both households have the ability to produce much than that of their land. The average size of land allocated for major crops produced under the study area are shown in table 8.

Table 8: Land holding and allocation to major crops produced (ha/HH)

	MHH		FHH		
Variables	N	Mean area (ha)	N	Mean area (ha)	t-test
Total land size	128	4.41	19	4.37	0.06
Soybean	128	2.59	19	2.5	0.35
Sesame	70	2.6	11	1.36	1.462
Groundnut	84	1.31	18	1.1	1.674
Maize	77	0.93	11	0.72	1.268

4.1.2.1. Soybean productivity

The average soybean yield is estimated to be **13.75** qt/ha in the study areas. The yield doesn't show much variation among the districts because those farmers who produce in Pawe district frequently access extension services and support in training and advisory from Pawe research center. They are also beneficiaries from the research institute in accessing bio fertilizer and improved soybean seed variety. While farmers who are producing in Dangur, even if they don't get enough support from the research institution and extension services as much as those who produce in Pawe, they do have a land which is much fertile and doesn't exhausted as Pawe's does.

4.1.3. Means of livelihood

The respondents depend on different means of income generation strategies where sesame and groundnut production were major sources of their livelihood other than soybean for the majority of the producers in the both districts. For this reason, about 48.9% and 58.2% of the respondents earned their living from groundnut and sesame production as a major source in Pawe and Dangur districts, respectively. Both male headed and female headed producers maintain their livelihood in sesame, soybean, groundnut and maize production respectively. The respondents also generate their means of livelihood from livestock production and some of them from activities other than farming. Both male and female headed households have similar focus on the selection of income generating means which means it doesn't show much variation among male and female headed households on the production of sesame, soybean, groundnut and maize. But their means of livelihood has shown a significant variation on livestock production and off farm income generating activities. As the result shows male headed households generate their income from

livestock production 1459.06 birr in average but female headed households can make only 560.42 birr in average. This could be due to male headed households do spent their time in production of high value animals like oxen, goats and hives while females do spent their time in producing animals like poultry. In another way of income generating system as the result shows on off farm activities male headed households earn 9215.56 birr in average while female headed households earn 3250.64 birr in average. This shows a significant variation between male headed households and female headed households. This variation is due to the difference on which male and female household's responsibilities which is as it is well known in developing countries like Ethiopia, female do both the productivity and reproductively which includes getting birth and rearing child activities while male do focus on productivity. Income generating from both livestock production and off farm activity shows significant variation at one percent level of significance.

Table 9: Means of income of the producers by source (Birr/HH)

Livelihood means	MHH(N=128)	FHH(N=19)	Total(N=147)	t-value
Soybean	14590.02	14595.26	14590.69	-0.003
Ground nut	10176.56	11997.37	10411.9	-0.91
Sesame	16964.69	8326.32	15848.16	1.35
Maize	494.53	126.32	446.94	0.93
Livestock	1459.06	560.42	964.78	2.39***
Off-farm income	9215.56	3250.64	5732.60	2.63***
Total HH income	**27639.31**	**23482**	**15555.47**	

*** shows significant level at1%

In addition during the survey, coffee production, dairy and other enterprises were a means of income generating for both male and female headed household's livelihood even if it is in small proportion. The respondents' especially in pawe district also suggested that if there were irrigation access, vegetable farming would be much important for them. They have the knowledge about the importance and production system of vegetable and how income generating it was if there was an irrigation facility. Most of them suggested that they need irrigation facility to produce twice and three times per year.

They said that they are different rivers which can be used for irrigation but they need the government to interfere and help them in diverting the water to irrigation and usable form by constructing weir.

4.2. Result of Value Chain Analysis (VCA)

4.2.1. Mapping of soybean value chain in Metekel zone

Value chain mapping means drawing a visual representation of the chain, which involves various linkages among the soybean input suppliers, producers, traders, processors and consumers and the support service providers such as logistical service providers, transporters, and the enabling environment. According to McCormick and Schmitz (2002), value chain mapping enables to visualize the flow of the product from conception to end consumer through various actors. It also helps to identify the different actors involved in the soybean value chain, and to understand their roles and linkages. The value chain map depicts the flow of soybean in the market, activities carried out at each stage of the value chain, the structure of actors and the support involved in the value adding process. Consequently, the current value chain map of soybean in Pawe and Dangur districts is depicted in figure 3.

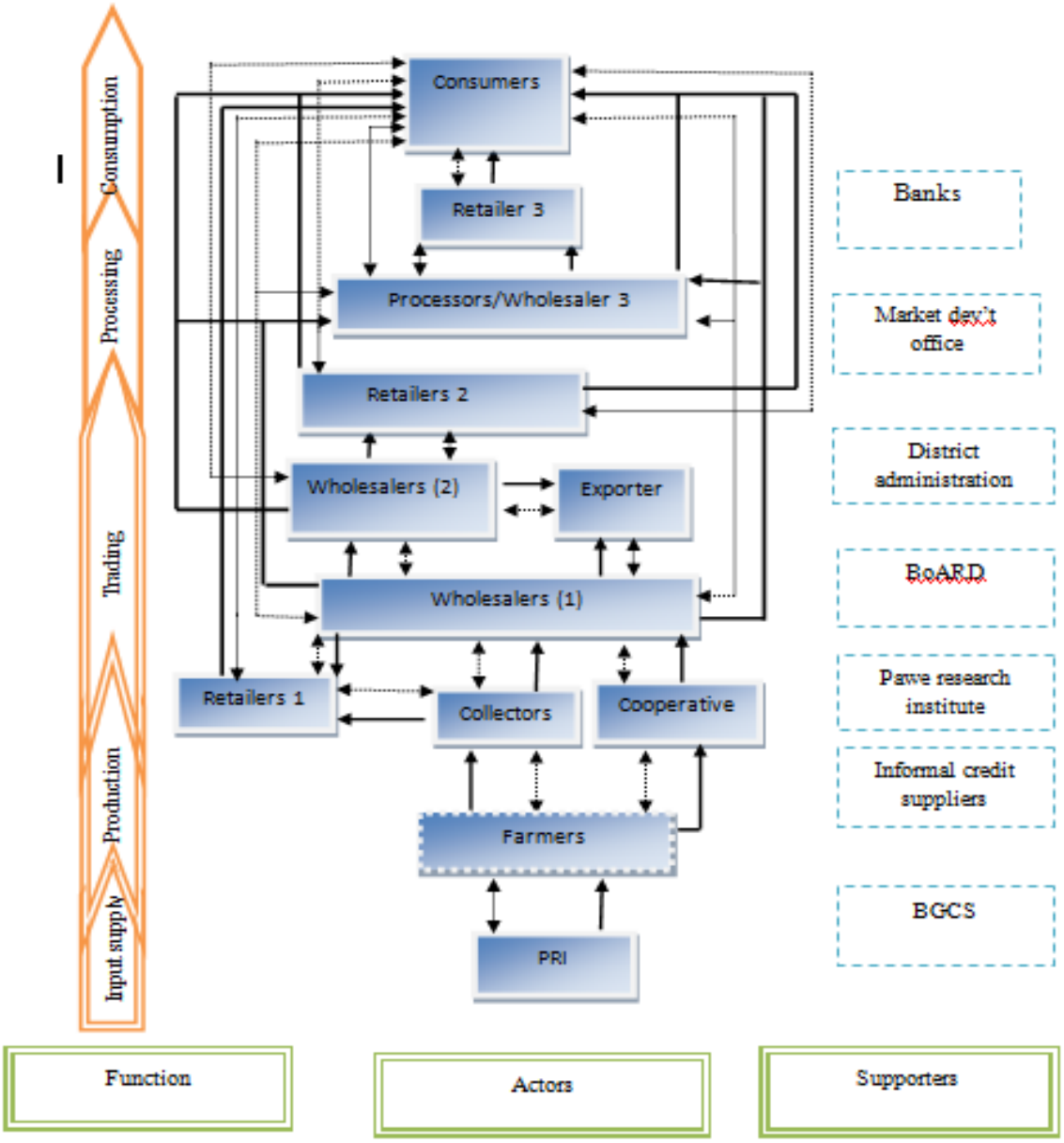

Figure 4: Value chain map of soybean

Source: Own sketch based on survey result, 2014/15

4.2.2. Actors and their functions in soybean value chain

The value chain map highlighted the involvement of diverse actors who are participated directly or indirectly in the value chain. According to KIT *et al. (*2006), the direct actors are those involved in commercial activities in the chain (input suppliers, producers, traders, consumers) and indirect actors are those that provide financial or non-financial support services, such as credit agencies, business service providers, government, NGOs, cooperatives, researchers and extension agents.

The primary actors in soybean value chain in both districts include soybean seed and other input suppliers, farmers, traders and consumers. Each of these actors adds value in the process of changing product title. Some functions or roles are performed by more than one actor, and some actors perform more than one role.

4.2.2.1. Soybean production

A. **Producers**

Soybean growers are the major actors who perform most of the value chain functions right from farm inputs preparation on their farms or procurement of the inputs from other sources to post harvest handling and marketing. The major value chain functions that soybean growers perform include ploughing, sowing, fertilization, weeding, pest/disease controlling, harvesting and post-harvest handling.

The diverse agro-climatic conditions can make growing soybean crops highly cost-effective and competitive, and provide vast opportunities in study areas. Unfortunately, these opportunities have not been exploited by the farmers due to the lower price they receive for their produce in the markets. Soybean production in these two districts are based on rain fed system. Sole cropping is the most popularly practiced production system in both districts.

Post- harvest handling, which includes different activities like sorting, packing, storing, transportation, loading and unloading, is done by the farmers themselves or traders or brokers. But most of the farmers apply these activities by themselves and take it to market to sell at better price offered by different traders.

B. Input suppliers

At this stage of the value chain, there are many actors who are involved directly or indirectly in agricultural input supply in the study area. Currently office of agriculture and rural development (OoARD) and Pawe research institute are the main source of input supply. Soybean growing farmers also participated in this stage especially in Pawe district making manure and composts in order to decrease the costs incurred for fertilizer. All actors are responsible to supply agricultural inputs like improved seed varieties, fertilizers, herbicides, pesticides and farm implements which are essential inputs at the production stage. Regarding fertilizers, majority of the farmers used only organic fertilizer (manure and compost) while some farmers used both inorganic and organic fertilizers depending on the land size allocated to soybean and the soil fertility status as perceived by the farmers. But most of the farmers especially those who are in Dangur district didn't use much of fertilizers especially inorganic fertilizer and this is due to the land they have is still fertile enough unlike than that of Pawe which has been exhausted and in need of much fertilizers whether it is organic or inorganic.

C. Support service providers

Such actors are those who provide supportive services including training and extension, 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. OoARD, micro finance Pawe research center are main supporting actors who play a central role in the provision of such services.

D. Training and Extension Services

Pawe research center, DAs and OoARD were the main sources of soybean training in both districts. The survey result revealed that from those who had participated in soybean training that were organized in the last two years in Pawe and Dangur districts, 88.9% were male headed households and 11.1% were female headed household of sample respondents. The result shows that most of the trainings were given on fertilizer application and the other trainings such as compost preparation, crop management, harvesting, post-harvest handling and marketing are given in composition. Regarding extension service, among the total sample farmers only 48.3% of the respondents have taken extension /advisory services on the soybean value chain. OoARD

through its DA backed by the Woreda specialists is the major actor who provides information and advisory service on soybean production and management practices. In the appendix table 5, access to services has played an important role in supplying soybean to the market. The table of producers' characteristic by the level of market supplied revealed that from those who had access to market information 100% had supplied above the mean. The same holds true for the variable adequacy of extension service. All of those who said that they have got adequate extension service i.e. around 90% of the respondent had supplied above the mean. But those who hadn't access to get adequate extension service because of different factors, it could be distance factor or shortage of time, had supplied below the mean.

The traders' survey resulted that there is no trainings or some other services except financial service that has been given for them with special objectives. The traders has been complaining about the government and other organizations for not concerning and providing /facilitating/ such kind of trainings or seminars on the way how they are doing their trading activities and solutions on the problems they face.

Table: Proportion of HHs having access to services (%)

Variable	MHH (N=128)	FHH (N=19)	Total (N=147)	X2/t-value
Training (yes)	88.9	11.1	100	0.3224
Advisory (yes)	88.7	11.3	100	0.3353
Market information	87.94	12.1	100	2.3149
Credit	89.58	10.42	100	0.3985

E. Financial services

In the study area, Benshangule Gumuz Credit and Saving Institution (BGCSI), Benshangule Gumuz microfinance and individual lenders have been identified as a potential source for credit both in kind or on a cash basis for producers. The survey result showed that only 32.65% sample respondents took credit from different formal and non formal institutions. From those who had taken credit, most of them had access to credit from Benshangule Gumuz credit and saving institutions found in their districts. The rest 67.35% of the respondents had never took credit from any formal or informal institutions. Most of the respondents' reasons for not participating in credit were high interest rate and lack of collateral. Financial service is the only service the

traders' can get. Sources of credit for traders are also the same as producers except some big traders get credit from private banks like Abay bank. Most of the producers and traders complain on Commercial Bank of Ethiopia for not lending them money even if they had fulfilled the necessary criteria. The manager of the Commercial Bank of Ethiopia in the area stated different reasons for not lending money for producers and traders but the main point raised was that they are supporting millennium development goals by providing support for the grand renaissance dam, road infrastructure and condominium house buildings.

The large scale producers and traders are also complaining microfinance institution for its loan size limitation. Even if the large scale producers and traders fulfil the criteria required to get credit from microfinance institutions like Benshangule Gumuz credit and saving institutions, the microfinance has its loan limitation. During the survey the manager of district microfinance told me that their maximum amount of lending in the district level is 30,000 and 50,000 ETB for producers and traders respectively. The manager also stated that if the amount more than the limited is needed, it can be find from the zone level. Those who had taken credit had supplied above the mean. As the data shows, from those who had taken credit there is no one who had supplied below the mean and this shows how important the credit is to supply more to the market.

F. Transport service

In the study area, different forms of transportation services are available. Means of transportation varies among farmers but predominately producers use back animals, cart and vehicles. Male headed households paid a mean total of 1127birr per head. But female headed households paid a total mean of 701 birr per head. This is because female households decrease the cost of transportation by using themselves to transport the product. Unlike male headed households, female households do transport the product as much as they can.

G. Actors other than producers

Soybean traders and processors have less/ invisible function in the production of soybean. Their function to the production of soybean is indirect. Some of the traders and research institutes do lend improved seed to the producers. The traders involve in a way how producers can get fertilizers and herbicides or fungicides when it is needed. The function of actors other than

farmers or producers, is much or less in facilitating the production by providing and supporting the producers by different mechanisms. They sometimes lend money to the producers which have to be paid for the labours used in production and harvesting. So the actors other than producers in the soybean value chain, in one way or other way they act as service providers since they facilitate the production. They play an important role in adding value and transacting the product after harvest.

4.2.2.2. Soybean marketing

A. Marketing by producers

Soybean producers sell different amount of soybean in the market depending on different demographic and socioeconomic characteristics of the household. In average soybean producers market supply was 28.84qt. Here, producers were divided into two according to their level of market supply by using the average market supply as reference. The study shows that majority of the soybean producers' market supply were below the average supply of the sample households' i.e. 52.4% of the households supply below the average.

To supply more soybean to the market, one has to produce more. As the table 5 in the appendix indicates the amount soybean produced has a significant effect on the amount supplied to the market. Those who had produce around the mean of 46.36 qt had supplied above the mean and those who had produced around the mean 24.8 qt had supplied below the mean.

As it is well known most of the Ethiopian farmers use animal power for farming system. For this farming system in most of the areas an ox is needed much. The same is true in Metekel zone. Indeed there are some other animals used for this farming application, ox takes the lion share of the farming power. So as table 5 in the appendix shows, those who had their own oxen had supplied above the mean than that of who had been farming by ox renting. When we see farming experience, those who had more years in farming of soybean which has a mean around 7.6 year had supplied above the mean than that of who had less soybean farming experience which has a mean around 2.5year. The results in active family labor also show positive/significant effect on the amount soybean supplied to the market. Those who had more active family labour has supplied above the mean that of who had less active family labour (please refer the appendix table 5).

As table 5 in the appendix illustrates most of the variables show significant effect in supplying the soybean to the market. When most of the variables tested independently to the mean supplied they show significant variation. When we see current price of soybean all of the suppliers supplied above mean when the price is higher i.e. 705.89 birr and the rest supplied below mean since the price is less than they were expecting i.e. 651.3 birr. The same holds true on the variable total land allocated for soybean production. Those who supplied above the mean had allocated more hectares of land in which the mean is around 3.47 ha and those who supplied below the mean had allocated a land which is about 1.8 ha.

Distance to the nearest market also plays an important role in soybean supplied to the market. According to table 5 in the appendix those who had a shortest distance i.e. around 3.59 km had supplied above the mean than that of who had a longer distance i.e. around 11.1 km.

B. Marketing by traders

There are different actors who move the product from one point to the next by adding different values to the specific product. The different values added by each actor may be one or more of the following values. It could be place utility, form utility or time utility. And the different actors who could move the product by adding such values in the soybean value chain may include the following:

Brokers/Middle Men

Brokers play important roles in soybean marketing in the study area and in Addis Ababa where the role is much visible in Addis Ababa where there are many processors and exporters of the product soybean operate. As the study found out, at national level, they have an important role in linking farmers and wholesalers to market and other stakeholders of the commodity chain while the ability of market access by farmers is limited and market demand requires an improvement in quantity as well as diversity of products type. The brokers sometimes go beyond facilitation of transaction and tend to control and fix prices, create price symmetry and make extra benefits from the process in addition to convincing the producers to sell their soybean at the prices set by wholesalers.

Collectors

These are traders who collect soybean from farmers in village markets and from farms for the purpose of reselling it to wholesalers and retailers. They use their financial resources and their local knowledge to bulk soybean from the surrounding area. Even if they play important role in negotiation with farmers, most of the farmers had an agreement to sell to some other traders in which they had borrowed money during production season of soybean. The collectors are one part of the primary actors in which their functions include; buying, assembling, transporting and selling to wholesale markets.

Wholesalers

Wholesalers are mainly involved in buying soybean from collectors and producers in larger volume than any other actors and supplying them to retailers, exporters and consumers. Survey result indicates that wholesale markets are the main assembly centers for soybean in their respective surrounding areas. They have better storage, transport and communication access than other traders. Almost all wholesalers have a warehouse in a market either self owned or rental basis. In this study there are three types of wholesalers: wholesalers' one, wholesalers two and wholesalers three. Both wholesalers one and wholesalers two are differentiated only by their location. But the types of the product both wholesalers handle are the same which is raw soybean. Wholesalers one (WS1) are located in the study area. In the study area, more than 90% of the respondents sell their products to Wholesalers one found in the nearest urban center. This is due to the farmers borrow money during production from Wholesalers one by promising to bring or sell the product to that Wholesaler who lend the money. So even if the farmer has the probability to get a better price in the near future market, it is a farmer's obligation to sell the product to the Wholesaler by the current market price. Wholesaler two (WS2) is mainly located around Mesalemia in Addis Abeba. Wholesalers three (WS3) are wholesalers who buy and sell processed soybean products to consumers.

Retailers

Retailers are also important primary actors in the soybean value chain in the study area. For this specific study retailers are grouped into three and this classification was made based on the retailers' location and the type of the products they used to retail. Based on their location there

are retailers found in the study area, and in Addis Ababa which is coded as retailer one and retailer two. Based on the product they used to retail, there is one sub section coded as retailer three. Retailer one (R1) which are retailers found in the study area and their duty is to buy the product from farmers, collectors and wholesaler one and store it to their temporary storage. Then by sorting and packing they sell raw soybean to nearby consumers by negotiation.

Retailer two (R2) are retailers who are located in Addis Ababa and retailing row soybean by buying from wholesalers in Addis Ababa and sell the product to consumers. Retailer three (R3) is retailer who retail processed soybean products to consumers by buying from processors or wholesalers who has processed products. The three different retailers add their own value on the product and increase their share of margin.

Exporters

During the survey, only few exporters were found. These were different private soybean exporters found in Addis Ababa. Some of these private soybean producers are Sitti agri products, Hajuta trading, Humadd trading, Endeovour general trading and Tariku Tegegn edible oils mills. These exporters buy soybean from wholesalers mainly from Messalemia, but sometimes they negotiate with local wholesalers through brokers, and add values like pest control and cleaning and export it. Most of the product has been exported to India, Pakistan and Europe. The above mentioned private exporters require raw soybean in bulk to meet their export need. For example, Hajuta trading exported 2,400 quintal during the survey year of 2014/15.

Processors

There are different soybean processing companies in Ethiopia especially around Addis Ababa. Some of these processing factories or companies in Ethiopia include; Faffa food share company, Seka business group, Hilina enriched food processing center and Health care food manufacturing. These companies are intensively working in processing soybean in different solid and liquid forms and make it available in easily consumable forms. They buy the raw soybean from wholesalers mainly from Messalemia and after processing they sell the different forms of it to hotels, supermarkets, ET Fruits wholesalers and consumers. The above mentioned companies require raw soybean in bulk to meet their demand.

For example, Health care food manufacturing used 55,597 quintals of raw soybean to produce 54,750 m^3 soya oil during the survey year (2014/15).

Consumers

Consumers are those who purchase the products for consumption. Ethiopia is well known in soybean production but the product has been consumed a little. But now days by knowing its importance, soybean has been consumed by different forms like Nifero, Kolo etc. and in processed form like soya blended flour, soya milk, soya oil and tasty soya, etc. Consumers get different forms of it from processors, wholesalers, retailers, supermarkets and hotels. About three types of soybean consumers were identified: households, restaurants and institutions. The private consumers are employees, and urban and rural dwellers who purchase and consume. The processed form especially soya oil demand is currently very high. For example Health care food manufacturing sold 480,000 litters soya oil for ET fruits only by the survey year of 2014/15.

C. Value chain governance

The dominant value chain actors play regulatory role in the flow of the product. They determine the flow of commodities and level of price. In effect they govern the value chain and most other chain actors subscribe to the rules set in the marketing process. The study result indicates that the exporters and wholesalers assisted by the brokers are the key value chain governors. They have sufficient information about the supply of soybean and which direction it flows along the marketing channels and markets in different parts of the country. They also set prices. The wholesalers in different markets are well networked. These traders exchange information on soybean prices, local supply situation and the prospects of harvest in their area. Then, they agree on the price at which the buyer is willing to take the price so that the seller determines the farmers' price taking into account his profit margins. Except this networking and business relation, there is no formal collateral when the transaction takes place.

The smallholder farmers are not organized and are not governing the value chain. Hence, they are price takers and hardly negotiate the price due to lack of storage and needing of money to pay what they have borrowed during production. In most cases, the business relations between the various operational actors are of free market exchange and uncoordinated. Due to lack of a proper market information system and minimal bargaining power, farmers are forced to sell their

product at the price offered by traders. Traders in both districts usually refer to wholesalers in Addis Abeba to fix price. There is no vertical linkage between value chain actors but there is horizontal linkage between traders. In some cases, there are conflicts among the traders regarding payment and failure to keep their commitment. Overall, the governance of the soybean value chain is buyer driven with minimum trust between various actors. Traders are always complaining that the farmers are not providing quality product while farmers are blaming the traders for offering low prices. The value chain governance is similar in both districts. The major source of market information is the neighbours who sold soybean during the previous market days. Recently the use of cell phone in the rural areas is increasing.

4.3. Marketing Channels and Actors' Share Analysis

4.3.1. Marketing channels

Marketing channels refer to the routes taken by from producers to consumers. 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). Soybean passes through various channels until it reaches the final consumers. Around **ten** channels are identified in the soybean value chain. The shortest channel occurs when producers directly sell the product to consumers. This occurs when farmers bring small quantity of the product to market and when the farm is close to urban centers. The most common type of soybean market is channel 4 and 8 for this specific study. The channel in Addis Ababa is not continuation of the channel in the study area, because in the study area the raw product is traded but in Addis Ababa the processed one is preferable by consumers.

Channel 1: Producer ⟶ Consumer

Channel 2: Producer ⟶ Wholesaler1 ⟶ Retailer1 ⟶ Consumer

Channel 3: Producer ⟶ Retailer ⟶ Consumer

Channel 4: producer → Collector → wholsale1 → wholsaler2 → consumer

Channel 5: Producer → Collector → Wholesaler2 → Retailer2 → Consumer

Channel 6: Producer → Collector → Wholsaler1 → Wholsaler2 → Processor/Wholesaler 3 → consumer

Channel 7: Producer → Collector → Wholsaler1 → Wholsaler2 → Processor → /Wholsaler3/ Consumer

Channel 8: Producer → Collector → Wholsaler1 → Processor → Wholsaler3 → Retailer3 → Consumer

Channel 9: Producer → Collector → Wholesalers 1 → Wholesaler 2 → Exporter

Channel 10: Producer → Collector → Wholesalers 1 → retailer1 → consumer

4.3.2. Marketing costs and benefit shares of actors in soybean value chain

Table 11 and 12 indicates different types of marketing cost related to the transaction of soybean by collectors, wholesalers and retailers; and the benefit share of each marketing actors.

Table 10: Marketing costs and benefit shares of actors in soybean value chain for channel 4

Item (birr/qt)	Producer	Collector	Wholesaler1	Wholesalers2	Retailers 2	Hori. sum
Purchase cost	-	720	850	920	1475	3965
Prod^{n} cost	242	-	-	-	-	242
Market cost						
Material cost	10	10	10	10	10	50
Transport cost	15	20	5	30	5	75
Tele. Cost	-	3	2	2	-	7
Load/unload	-	5	5	5	5	20
Tax		2	2	2	2	8
Cleaning				20		20
Total marketing cost	25	40	24	49	22	160
Total cost	267	760	874	969	1497	4367
Average waited sales price	720	850	920	1475	1575	5540
Gross margin (value added)	478	130	70	555	100	1333
market Share margin %	35.86	9.75	5.25	41.64	7.5	100
Profit margin (net margin)	453	90	46	506	78	1173
Share profit %	38.62	7.67	3.92	43.14	6.65	100

Table 11: Marketing costs and benefit shares of actors in soybean value chain for channel 8

Item (birr/qt)	Producer	Collector	Wholesal1	Processor	Wholesal3	Retailer3	Hori. Sum
Purchase cost	-	720	850	920	1700	1900	6090
Prod^{n} cost	242	-	-		-		242
Market cost							
Material cost	10	10	10	15	10	8	63
Transport cost	15	5	5	10	20	5	60
Tele. Cost	-	2	2	3	2	-	9
Load/unload	-	5	5	4	5	-	19
Tax		2	2	2	2	2	10
Cleaning				20			20
Broker	-		-	4	-	-	4
Total marketing cost	25	24	24	58	39	17	187
Total cost	267	744	874	978	1739	1917	6519
Average waited selling price	720	850	920	1500	1900	2000	7890
Gross margin (value added)	478	130	70	580	200	100	1558
market Share margin %	30.68	8.34	4.5	37.23	12.84	6.42	100
Profit margin (net margin)	453	106	46	522	161	83	1371
Share profit %	33.04	7.73	3.35	38.07	11.76	6.05	100

Each of the soybean value chain actors adds value to the product as the product passes from one actor to another. In a way, the actors change the form of the product through improving the grade by sorting, cleaning or create space and time utility. Compared to farmers, traders' operating expense is much less but their profit margin is more than that of farmers. That means by simply buying from the farmers and selling to consumers, traders took above 77% of the total profit margin. While farmers, doing all the work of producing soybean and bearing the associated risks, took only 33% of the profit margin. This disproportionate share of benefits is the reflection of power relationship among actors. Soybean producers are responsible for risks and other situations, the risks which include drought, flood or rodents and some other pests. So by this kind of situations the loss is accounted on producers. They are risk takers. During marketing stage the price makers are the traders who has not clue about the production cost of the product. But the producers who produce the product and has every specific cost incurred for the process of that product are price takers. By the time of survey the producers were asked whether soybean

production is profitable or not, but their answer was that if a farmer would know (calculate) the entire costs of the production process he/she would never produce for the rest of their time.

4.3.3. Marketing margins of soybean in different channels

As it is shown in table 12, marketing margins of soybean in the ten channels for each group of market players are given. GMMp, GMMc, GMMr1, GMMw1, GMMw2, GMMr2, GMMprc, GMMw3, GMMr3 and GMMMexp are gross marketing margins of producers, collectors, rural retailers, rural wholesalers, urban wholesalers, urban retailers, processors, processed product wholesalers, processed product retailers and exporters, respectively.

The total gross marketing margin (TGMM) is the highest in channel IX, VIII, VI, V, VII and IV which takes the percent of 64%, 58.75%, 58.75%, 57.42%, 56 and 54.28% of the total consumers' price respectively. Processors, urban wholesalers and rural wholesalers have got the highest gross marketing margin in channel VII, VI and III, respectively whereas wholesalers have got the lowest marketing margin in channel IX. Without considering channel I (producers sell directly to consumer) producer's share (GMMp) is highest (91.7%) from the total consumers' price in channel II and lowest in channel IX, VIII and VI (36%, 41.25%, and 42.25%) because of the involvement of processors and processed product retailers in this channel that purchase relatively at a lower price from producers in their locality. The table which includes all possible market channels for soybean in the study area is presented in the appendix table 6 but the table which has the major marketing channels are presented below.

Table 12: Marketing margins of actors for two major marketing channel of soybean

Market Channel	Market margin								
	TGMM	GMMp	GMMc	GMMw1	GMMw2	GMMr2	GMMprc	GMMw3	GMMr3
IV	54.28	45.72	8.25	4.44	35.24	6.35	-	-	
IX	64	36	6.5	3.5	-	-	29	20	5

As the table 6 in the appendix shows, the net marketing margin (NMM) of producers are somewhat high in almost all channels, this is because the producers implicit cost couldn't be calculated since they themselves don't know. And it has been difficult for the study to calculate their real net marketing margin. But the above results show that by simply calculating the visible costs incurred and remembered by the producers. In the traders case NMMw2 are somewhat high in channels V, IV and III. Processors' highest NMM channels are VII and VIII.

4.4. Factors Affecting Quantity of Soybean Supplied to the Market

In the study area soybean is produced mainly for market and it is the main cash crop for producers in Metekel zone. The survey result revealed that all farmers supply the product to the market after meeting their household requirement even if their household requirement is very little.

In the model, 13 explanatory variables (6 continuous and 7 dummy) were included in the model estimation using OLS. The variables used and hypotheses were summarized in Table 4.

Multiple linear regression models were employed to identify the factors. For the parameter estimates to be efficient, unbiased and consistent assumptions of Classical Linear Regression (CLR) model should hold true. Hence, multicollinearity, endogeniety and heteroscedasticity detection tests were performed using appropriate test statistics. The degree of multicollinearity among the explanatory variables has been tested using VIF for continuous variables and CC for dummy variables. The results for mean of VIF were 1.33. The result of the contingency coefficient was also less than 0.75. Therefore, Since VIF is less than 10 and CC is less than 0.75 serious multicollinearity problems would not be suspected. For heteroscedasticity Breusch-Pagan /Cook-Weisberg test (hettest) was employed and the result showed that there is no heteroscedasticity problem. Endogeniety test results also shows that there is no endogeniety problem for soybean supply to the market. For details see (Appendix Table 1-4).

The result of the econometric analysis indicates that among the 13 hypothesized variables, eight variables (current price, quantity produced or yield, soybean farming experience total land size allocated for soybean production, training, active family size (labour force), source of oxen and market information) significantly affect the household marketed supply as indicated in Table 14.

Table 13: Determinants of soybean market supply (MLRM result)

Variables	Coefficient	Std. Err.	t	P>t
Current price	.080	.012	6.66	0.000
Quantity produced	.213	.052	4.08	0.000
Distance from the nearest market	.035	.039	0.87	0.385
Experience soybean farming	1.089	.166	6.57	0.000
Land covered by soybean	2.134	.364	5.86	0.000
Sex	.156	.255	0.61	0.543
Adequate extension access	2.137	.357	5.99	0.000
Education level	5.89	5.29	1.11	0.268
Active family size	.652	.237	2.75	0.007
Cooperative membership	.163	.226	0.72	0.474
Source of oxen	2.499	.502	4.98	0.000
Credit	.553	.412	1.34	0.182
Adequate access to market information	2.45	.825	2.97	0.004
_cons	-48.026	7.509	-6.40	0.000

Market price: Price was expected to affect the marketed supply of soybean positively. The variable was measured in birr per quintal. It affects the amount supplied to market positively as it was expected. Wolelaw (2005), identified the major factors that affect the supply of rice at Fogera *Woreda*. His study revealed that the current price had affected marketable supply of rice positively. As the current selling price of soybean increases by one birr the amount of soybean supplied to the market will increase by .080quintals. The variable was significant at 1% significance level. By its nature soybean can stay longer if it is kept in dry and rodent free stores. So the producers bring it to market when the current price rises and store it if the current selling price goes down until it rise up again.

Total size of land allocated for soybean production: Total land a respondent owned for soybean production, is a continuous variable measured in hectare influence participation decision. The availability of land enables the owner to earn more agricultural output which in turn increases the marketable supply (Desta, 2004).The sign was as expected. This variable affect the amount supplied significantly. As the producer owns more land the more he/she will allocate for soybean production. As the more land is allocated for soybean production; more soybean will be supplied to the market. As more land is allocated for soybean production soybean supply to market will increase by 2.134 qt. Kinde (2007), found out that total land owned has a significant effect to the amount supplied. Alemnew (2010), found out that total land owned has a significant effect to the amount supplied. The variable was significant at 1% significance level.

Quantity produced: The result is in line with hypothesis indicating that households who had produced more amounts of soybean had also supplied more amounts of it to market at 1% of significant. On average, if production increases by one unit, it results in an increase in farm level market supply by 0.213 quintals. This result is in line with Abay (2007); Adugna (2009), and Ayelech (2011), who indicated an increase in tomato, papaya and avocado production by farming households has increased marketable supply. Rehima (2007), also identified that the major factors that affect marketable supply of pepper at Alaba and Siltie of SNNPRS using cross-sectional data and found that quantity of pepper produced significantly affect the amount supplied.

Experience in soybean farming: This variable was significant to volume supplied to market. The sign was as expected. As farmer's experience in soybean production increases the amount supplied to market increases. As the soybean farming experience of the farmer increased by one year the amount of soybean supplied to the market increased by 1.089quintals. The variable was significant at 1% significance level. Alemenew (2010), also identified that the major factors affecting the quantity of red pepper supplied to the market at Bure woreda using OLS and found that the experience in red pepper production has significantly affect the amount supplied.

Adequate Extension access: Extension access affects positively the marketed supply at 1% of significant level. On average, if soybean farmers get extension access, the amount of soybean supplied to the market increases by 2.137 quintals. This result goes in line with findings of Adugna (2009), the aim of the extension service is introducing farmers with new and improved

agricultural inputs for better methods of increasing production and productivity in turn increase marketable supply. Alemnew (2010), also indicated that in his work on the factors affecting the quantity of red pepper supplied to the market and found out that access to extension has significant effect. This indicates that access to extension service avails information regarding technology which improves production that affects the marketed supply.

Source of oxen: In areas where farming by oxen is practiced, the availability of oxen has a great influence on the production of soybean which in turn have a positive relationship with the volume of soybean supplied to the market. The result shows that as the farmer uses their own ox to farm instead of renting it, the amount of soybean supplied to the market increased by 2.499 quintals. This is because if the farmer used rented oxen, then he/she has to pay the amount they agree on usually the product soybean in quintals. This means if the amount soybean is paid to the person who rent oxen, then it decreases the amount that the producer would has to supply to the market. The variable was significant at 1% significance level. Bosena (2008), also find out that having own source of oxen has a significant effect for cotton marketing in Metema Woreda. Oxen are one of the inputs in soybean production and the number of oxen owned by household was found to be a significant factor that affected farm level soybean marketable supply in the study area. So, it is important to help the farmers to have their own oxen.

Market information: Market information has shown positive effect on soybean quantity supplied with significance level at 1%. On average, if soybean producer can get adequate and reliable market information, the amount of soybean supplied to the market will increase by 2.45 quintal. This is similar with the finding Adugna (2009), who illustrate if papaya and tomato producer gets information, the amount of papaya and tomato supplied to the market increases.

Active family size (labour force): Soybean production in general and market supply of soybean products in particular is a function of labour. Accordingly, families with more household members tend to have more labor which in turn increase soybean production and then increase soybean market supply. On the other hand, family size also decreases market supply because high proportion of the product would be used for consumption. But for the case of soybean since it is not a staple food to be consumed at home in a mass amount, as all the active family size increases by 1 the amount soybean supplied to the market increases by 0.653 quintal. So the result shows that active family labour is significant at 1% significance level. This result goes in

line with Gezahagn (2010), who found that family size have significant effect on the households' gross income from groundnut production.

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary and Conclusions

This study aimed at analyzing value chain of soybean in Metekel zone of Benshangul Gumuz region. The specific objectives of the study include identifying soybean value chain, examining the actors' performance along the soybean value chain and analyzing the determinants of soybean supply to the market in the study area.

The data were generated from both primary and secondary sources. The primary data were collected from individual interview using structured questionnaire, checklist and focus group discussion. The primary data for this study were collected from 147 randomly selected households and 33 traders from Pawe and Dangur districts, 15 traders from Addis Ababa markets, 2 exporters, 2 processors and 10 consumers from Addis Abeba city were interviewed. The analysis was made using descriptive statistics and econometric model using SPSS and STATA software. All the sampled households were soybean producers. Market supply of soybean was found to be important element in the study of soybean value chain. Therefore, in identifying determinants that affect the market supply of soybean, a multiple regression model was used. The findings of this study are summarized as follows.

Of the 147-interviewed soybean producing households, 87.1% were male headed and the rest 12.9% were female headed households. The average ages of the sampled respondents were 42 years. The average active family size was 4 in both male and female headed households.

Soybean value chain analysis of the study areas revealed that the main value chain actors were input suppliers, soybean producers, wholesalers, retailers, collectors, processors, exporters and consumers, OoARD and Pawe research institute were the main actors involved in the production input supply and service providing activities . Collectors were engaged in purchasing the product from remote areas and sell at town markets to wholesalers and retailers. Wholesalers purchase soybean from farmers and collectors and sell to retailers, national wholesalers, processors,

exporters and consumers in one way. And in the other way (sometimes) wholesalers purchase the product from farmers & collectors and sell it to the national wholesalers which are in Addis Ababa city. Retailers purchase soybean from producers, collectors and wholesalers and sell to consumers. There are also governmental and nongovernmental supportive actors who support soybean value chain directly or indirectly. Value chain supporters or enablers provide facilitation tasks like creating awareness, facilitating joint strategy building and action and, the coordination of support. The main supporters of the soybean value chain in the study areas are office of agricultural and rural development (OoARD), Woreda administrations, Benshangul Gumuz saving and credit institution, Pawe research institute, informal credit suppliers and banks.

Constraints hindering the development of soybean value chain are found in all the stages of the chain. The constraints faced with almost all stage include; low price of soybean, price fluctuation of the product from time to time, low bargaining power of producers, limited credit availability; because of the collateral limitations of the farmers, low strength of unions and cooperatives, there is insignificant value adding activities to the product both by the producers and traders at all because of low level of training, lack of storage, lack of transport and unbalanced share of actors are the major gaps for the production and supply of soybean in the study area.

Soybean produced in this area passes through several intermediaries, *i.e.* collectors, wholesalers, and retailers, with little value being added before reaching the end-users. But much of the value is added when the product passes through processors. The intermediate buyers obtain the soybean from the farmers at a lower price and they sell to the consumers at a higher price. The average price that sample respondents received for a quintal of soybean was reported to be 635 Br/qt whereas the price that consumers paid was 1600 and 2200 Br/qt if it is unprocessed and processed respectively. The research result also indicated the absence of organized institution and system group marketing, inactive cooperative`s and unions and shortage of processing activities have made traders in a better position to dominate the roost in pricing.

The result of the multiple linear regression model indicates that current price, quantity produced, soybean farming experience total land size allocated for soybean production, training, active family size (labour force), source of oxen and market information were significantly affected market supply of soybean. Therefore, these variables require special attention if market supply has to be increased.

Conclusion

Generally processing soybean into oils, cake flour and other products is a way of adding value. There is need to develop a sustainable strategy involving the government, NGOs and farmers in order to increase the production base. GOs and NGOs can capacitate the farmer by training them on various value additions. The financial sector can fund the production of soybean products whilst the government can provide subsidized inputs to the small holder farmer. This multisectoral approach will definitely yield the required result of increasing income for the smallholder farmer. The government can also incorporate technology in the curriculum of institutions of higher learning.

The private sector can also contract the smallholder farmer by equipping them with the inputs and machines and thus later buy the products for example the oil can be brought by national foods. There is need to reduce over reliance in the importation of key production inputs such as seed and fertilizer. Imported inputs have meant that the domestic farmer inputs costs has risen and remained higher. There is need to reduce the cost of inputs in soybean production and boost local production and encourage more smallholder farmers.

The question that now arises and needs to be addressed in order for the productive farmers to become profitable is do they have the a business mindset, access to finance, infrastructural support and access to transport and market? One of the most practical solutions to this dilemma is the division of responsibilities between the private sector and NGOs. NGOs can add value through capacity building activities such as farmer group strengthening and business training activities. One aspect of value chain implementation might be enhancing access to mechanization or other means of enhancing the resources smallholders have to manage their land. All these efforts however need to be gender sensitive women also need to be fully involved at all levels.

The farmer needs adequate financing on the farm and processing operations. The farmer needs a special bank to address their particular needs of through specialized concessionary interest rates

to promote the expansion of production. In addition they are needed to upgrade irrigation and consistent input supply to improve soybean.

5.2. Recommendations

The major problems identified in soybean value chain analysis were related to both soybean production and marketing. Thus, appropriate interventions are required to alleviate these problems. To solve the production and marketing problems and increase production and market supply of soybean, and value chain upgrading, the following recommendations are forwarded:

1. **Enabling the producers to process the product**

The result has revealed that current price has a significant effect on the market supply of soybean. Since the raw soybean has been sold by a cheap price (the price set by the traders) which has discourage the producers to produce and supply much, this study recommend that there must be a way initiation and training the producers to add value to the product or upgrading or differentiating the product which would be a best way to get a better price (which might be set by the producers). The government or NGOs need to involve in training the producers how to add value or how to process it in order to attain a better price. For the product to be upgraded by the producer, the government or NGOs need to support them by providing the materials needed for processing and creating market linkage for the processed products. So if the government and NGOs interfere in the processing and producers made themselves aware of it, the producer can supply as much as he/she had in his store without any hesitation of price fluctuation issues.

2. **Improve access to inputs to increase productivity of soybean**

The results of the study indicate that increase in production has a significant effect to the amount supplied. So to produce more one has to use appropriate inputs in a required amount and time. It is important to provide modern inputs like improved seed and fertilizer at the right time and the required amount at reasonable price to increase production. the average yield attained by the survey year was **13.7 qt**/ha, this was attained by using manure(which is bulky and time consuming) as fertilizer and mixing some amount of improved seed (which is expensive when compared with the local seed) with the local seed. So if they could get these inputs as much as they needed the productivity would increase, this increases the market supply of the product by the producers.

3. Improving experience sharing of soybean farming

Farming experience has shown a significant role on the amount of soybean market supply. So it is important to increase the access and habit of experience sharing among the soybean producers. Since the experience of one farmer differs from another farmer, one can has a common and best understanding of soybean farming by bringing the farmers together to share their experience.

4. Facilitation of conditions for farmers to have their own oxen

Oxen are one of the inputs in soybean production and the number of oxen owned by household was found to be a significant factor that affects farm level soybean marketed supply in the study area. Farming using their own oxen increases the economic source of the producers. First there is no rent expense of oxen, in addition to this, by fattening the oxen after production season they could sell it by better price than they used to buy the oxen. So it is recommended that rather than taking the option of renting farming oxen, it is better to spend the money they had to buy their own oxen. In another way ownership of ox could be related to wealth status and if a producer is wealthy, he/ she could buy inputs needed for the production of the product. It is important to help the farmers to have their own oxen.

5. Continuous training and extension service in soybean production

The increase in soybean production technique has a significant effect to increase production then by market supply. Hence, continuous training and extension access that would change the production skill of producers is very important to change the attitude of farmers. Hence, concerned stakeholders need to provide continuous training in production and marketing of soybean in the study area.

6. Provision of adequate market information

Market information services have to be established or strengthened to provide farmers and traders consistently and timely. Market information services must be widens and broadens in order to rich producers all over the country.

This study would also like to recommend that it is very crucial to link commercially oriented small and large scale farmers to value chains. This means, industries engaged in processing of oil crops to produce edible oil need to be supported or encouraged to start processing soy bean. This

needs to be linked with a group of soy bean producing farmers. Farmers need to be linked with soy bean processing factories as a result market is secured for farmers to become interested to engage in soy bean production. Promote soy production and processing among small holders, engaged in subsistence farming, for food security purposes.

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7. APPENDICES

Appendix A. Tables

Appendix table 1: Result of VIF for continuous explanatory variables in MLR model

Variable	VIF	1/VIF
Qunsbpr	1.59	0.630854
Expsbf	1.37	0.729521
Cprisb	1.31	0.760556
Tlncosb	1.28	0.783567
ActFS	1.27	0.790461
DMkt	1.17	0.856219
Mean VIF	1.33	

Appendix table 2: Result Contingency coefficients for the discrete variables in MLR model

	Exc	Sex	Edulevel	Coopmem	Soroxen	MInfo	Credit
Exc	1.0000						
Sex	-0.0468	1.0000					
Edulevel	0.0403	0.0943	1.0000				
Coopmem	-0.0261	0.0415	0.1402	1.0000			
Soroxen	-0.3132	0.1143	0.0498	-0.1071	1.0000		
MInfo	-0.1786	0.1255	0.0621	-0.0934	0.4704	1.0000	
Credit	0.3040	-0.0521	0.0049	-0.0449	-0.2518	-0.1436	1.0000

Appendix table 3: Heteroscedasticity test

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity (hettest)
Ho: Constant variance
Variables: fitted values of Quantity soybean sold
chi2(1) = 1.99
Prob > chi2 = 0.158

Appendix table 4: model specification test

Ovtest
Ramsey RESET test using powers of the fitted values of Quantity soybean sold
Ho: model has no omitted variables
F(3, 128) = 0.75
Prob > F = 0.5216

Appendix table 5: statistical test of variables by the level of market supply

Variables		Market supply			Pearson χ^2/ t
		Above mean (N=70)	Below mean (N=77)	Total (N=147)	
District (Pawe, %)		62.86	62.34	62.59	0.0042
Price (birr, mean)		705.89 (6.92)	651.3 (32.13)	677.3 (36.17)	13.92***
Total land cultivated for soybean (ha, mean)		3.47 (0.08)	1.77 (0.06)	2.58 (0.09)	16.82***
Education level	(Illiterate, %)	57.14	53.25	55.1	0.72
	(Elementary (1-8), %)	31.43	35.06	33.33	
	(High school (9-12), %)	7.14	9.09	8.16	
	(Higher education (above 12), %)	4.29	2.6	3.4	
Cooperative membership (yes, %)		17.14	16.88	17.01	0.0018
Distance to the nearest market center (km)		3.59 (0.12)	11.1 (1.03)	7.53 (7.53)	-6.94***
Credit (yes, %)		68.57	0	32.65	78.4***
Adequacy of extension service (yes, %)		90	0	42.86	121.1***
Quantity of soybean produced (qt, mean)		46.36 (0.94)	24.77 (0.92)	35.05 (1.12)	16.31***
Source of farming oxen (own, %)		100	77.92	88.44	17.47***
Access to market information (yes, %)		100	92.2	95.9	5.69***
Age (year)		44 (0.71)	31.2 (0.58)	37.32 (0.69)	14.15***
Farming experience (year)		7.56 (0.32)	2.45 (0.11)	4.88 (0.26)	15***
Active family labour (Number)		5.24 (0.124)	2.96 (0.087)	4.04 (0.12)	15.2***
Non/off-farm income (birr, mean)		37257	11451.9	23740.1	7.48***

*** Shows significant at 1% significance level and figures in the parenthesis indicate standard deviations

Appendix table 6: Marketing margins of actors in different marketing channel of soybean

Market margin	I	II	III	IV	V	VI	VII	VIII	IX	X
TGMM	0	8.3	51.1	54.28	57.42	58.75	56	58.75	64	51.82
GMMp	100	91.7	48.9	45.72	42.58	41.25	44	41.25	36	48.18
GMMc	-	-		8.25	-	-	-	-	6.5	-
GMMr1	-	8.3	2.2	-	5.81	11.87	12.67	11.87		13.87
GMMw1	-		17.03	4.44	-	4.38	4.67	4.38	3.5	5.1
GMMw2	-		31.85	35.24	41.93	33.13	5.33	5		5.85
GMMr2	-			6.35	9.68	9.37	-	-	-	-
GMMprc	-						33.33	25	29	-
GMMw3	-							12.5	20	-
GMMr3	-								5	-
GMMex	-									27
NMMp	96.15	88.19	47.04	44.81	40.97	39.69	42.3	39.69	31.75	46.35
NMMc	-		-	1.11	-	-	-	-	-	-
NMMr1		5.69	0.81	-	4.58	10.69	11.4	10.69	8.55	12.48
NMMw1	-		15.26	16	-	2.87	3.1	2.87	2.3	3.36
NMMw2	-		28.2	28.2	38.77	30.1	2.1	1.94	1.55	2.26
NMMr2	-				8.26	6.31	-	-	-	-
NMMprc							29.47	21.37	17.1	-
NMMw3								10.1	8.05	-
NMMr3									19.25	-
NMMexp										23.43

NMMp, NMMc, NMMr1, NMMw1, NMMw2, NMMr2, NMMprc, NMMw3, NMMr3 and NMMMexp are net marketing margins of producers, collectors, rural retailers, rural wholesalers, urban wholesalers, urban retailers, processors, processed product wholesalers, processed product retailers and exporters, respectively.

Appendix B. Interview schedules

Jimma University

College of Agriculture and Veterinary Medicine

Department Agricultural Economics and Extension

Agribusiness and Value Chain Management (ABVM) Master's Program

Research work (2014/15)

Value Chain Analysis of Soybean in Metekel zone of Benshangul Gumuz, Ethiopia
Household Survey Questionnaire

Introductory Statement: *As per the requirement of the research project I prepared this questionnaire to undertake study entitled* ***Value Chain Analysis of Soybean in Metekel zone of Benshangul Gumuz, Ethiopia.*** *Thus, for the objective of this research your participation is inevitable and kindly invited for giving information. I expect maximum effort and patience from the local respondents and enumerators with sincerity.*

I. PRODUCERS INTERVIEW SCHEDULES

1. Socio-Demographic Characteristics

1. Name _____ mob. No……
2. District : _____ Kebele: _____ Village (gote): _____ agro ecology_____
3. Gender: 1. Male 2. Female
4. Age […….]
5. Educational status 1. Illiterate 2. Informal 3. If formal, (specify grade……..)
6. Marital status (√): 1. [ ] Married 2. [ ] Unmarried 3. [ ] Divorced 4. [ ] Widowed
7. Ethnicity status 1. Shinasha 2. Agew 3. Kembata 4. Oromo 5. Amhara 6. Tigre 8. Other...….
8. If you have leadership position in your area, mention your leadership status/s…….

9. Health status 1. Healthy 2. Ill

10. If you are a member of any cooperative mention it ……..

11. If you are a member, is your cooperative certified? 1. Yes 2. No

12. Family size by age category

Age Category (Yr)	Male	Female	Total
<14			
14-64			
> 64			
Total			

2. Land and other Household Resource Holdings

13. Is shortage of land a problem for soybean production? 1. Yes 2. No

14. How many hectare of land do you have your own in 2014/15? …….

15. How many hectare of land did you rent-in and shared-in in 2014/2015? ……..……

16. How many hectare of land did you rent-out in 2014/2015? ……..……..……...…...…

17. From the total, what amount of land did you cultivate in 2014/2015? ……

18. From the total, what amount of land was fallowed/ uncultivated in 2014/2015? ……

19. From the total, what amount of land was used as pasture land in 2014/2015? ----------

20. From the total, what amount of land was covered with soybean only in 2014/2015?

21. For which kind of farming activity you allocate major portion of the land? 1. For soybean production 2. For sesame 3. For groundnut 4. Maize 5. Other (specify…….)

22. Do you have occupation other than farming? 1. Yes 2. No

3. **Production and Harvesting of Soybean**

23. Experience in soybean farming ……years.

24. How many hectare of land was covered with soybean in 2014/2015? ……

25. How many total quintal of soybean did you harvest in 2014/2015? …….....

26. From the total harvested, how many total quintal of soybean did you allocate for consumption purpose in 2014/2015? …….....

4. Agronomic input used and their costs in 2014/2015

Agronomic inputs	Amount (in kg/ litter/number)	Cost (birr per unit)	Total cost (in birr	Source Code_ B	How obtained (Code_C)	**Code_B** 1. Illegal market 2. Legal market 3. Agriculture office 4. ARDO
Example	1000 seedlings	0.75	0.75*1000=750	2	4	
Improved						

seeds						5. Cooperative/union 6. NGO (Specify) 7. Trader/processor 8. Research institutions 9. University(specify) 10. Fellow farmer 11. Other, specify
Local seed						
Fertilizer						
Manure/compost						
Herbicides						
Pesticides						
Fungicides						
Code_C 1. Exchange in kind 2. Purchase by cash 3. On credit 4. Gift 5. Other specify						

27. Did you always get inputs at the right time and place? 1. Yes 2. No

28. Did you always get inputs in amount and quality that you need? 1. Yes 2. No

5 . Labour requirement

Activity	Number of labor used	Daily payment (in birr)	Total number of days worked	Total cost (in birr)	Source of laborer 1. Family 2. Hired
Production					
Harvesting					
Processing					
Marketing					

29. Was human labour a major problem/shortage for you in soybean producing activities? 1. Yes 2. No

6. Credit Access

30. Did you get either formal 2014/2015? 1. Yes 2. No

31. Did you get informal credit in 2014/2015? 1. Yes 2. No

32. If no, why? 1. Not available 2. Restricted criteria 3. High interest 4. I didn't need 5. Other ……

33. If yes, what is the total amount of credit you received both in cash and in the form of other material?

..... and.....

7. Information/knowledge flow

Training

34. Have you accessed adequate training in soybean production and marketing? 1. Yes 2. No

35. If yes how long totally is it in days? …….....

Advisory service

36. Did you get advisory service on soybean production and marketing before? (√) 1. [ ] Yes 2. [ ] No

37. If your answer for **Q.36** is No, why? (Multiple response is possible) 1. No service provider nearby 2. Possessed the required information 3. Availability of contact farmers 4. Do not have time to get the service 5. [ ] Others (specify)

38. If Yes, for how long (days) have you got advisory service in the last two years? _____

Marketing

39. Please mention the name (s) of the marketing centers/areas you sold your soybean in 2014/15?

.....

40. Please mention the name of the urban center(s) which you can get marketing information so far?

.....

41. If you sold soybean , when did you start and finish selling soybean in 2014/2015?

…..... and.……

42. How many total quintal of soybean was left-over from 2014/2015? ……..……..… If any, why left over? ……

43. From the total harvested and left-over (if any) soybean, how many total quintal of soybean sold in 2014/2015? ……..

44. To whom did you sell most of your soybean? ……..…… Why.....

45. Did you really face difficulty in finding nearby buyer when you wanted to sell soybean in 2014/2015? 1. Yes 2. No

Marketing of soybean (2014/2015)				
For whom did you sell?	Names of actor/company whom you sold to	Amount sold (Quintal)	Average price per Quintal	TR received (P*Q)
Farm gate collector				
Cooperative				
Processor				
Rural wholesaler				
Urban Wholesaler				
Exporters				
Brokers				
Retailers				
Consumers				
Other (specify)				

46. Means of transportation used; (multiple response is possible) 1. Vehicles 2. Manpower 3. Back of animals 4. Others (specify) ___

47. If you used vehicles, was it easily accessible? 1. Yes 2. No

48. If you did not used vehicles, why? _____

8. Distance of residence

49. Is distance problem for you to supply soybean? 1. Yes 2. No

50. Distance of your home from the mostly used market center in km? ……..……..….....

51. Distance of your home to the nearest development center in km? ……

52. Distance from your residence to all weather road in km? ……..…….……...……...

53. Distance from your residence to the nearest urban center in km? ……...…..….

9. Soybean Value Chain

54. How is your performance and efficiency in the soybean value chain system so far?

1. Highly profitable 2. Profitable 3. Less profitable

55. What are the major value addition works you did before selling your soybean (2014/2015)?

Value adding activities (CODE_A)	CODE_A*	
	1. Harvesting	**6.** Loading /Unloading
	2. Cleaning/sorting	**7.** Storing
	3. Grading	**8.** Selling
	4. Packing	**9.** Other
	5. Transport	……

56. From the above (**Code A***) which are the value adding activities you didn't perform before 2014/15 or 2014/2015?

.....

57. If you involve on major value adding activities of soybean , what are the major factors which motivated you to practice value adding activities?.....

.....

58. Which of the following you practiced? 1. Applying organic compost to increase production 2. Build new soybean storage bins/container to improve storage 3. Adoption of new technologies or management methods 4. Adoption of new soybean seed varieties 5. Plant new soybean seed variety that has more desirable characteristics 6. Producing better quality soybean 7. Other (specify)…….

59. In which of the following value chain enterprises did you involve too? 1. Maize enterprise 2. Vegetables/fruits enterprise 3. Dairy enterprise 4. Honey enterprise 5. Cattle/meat enterprise 6. Chat enterprise 7. Coffee 8. Other (specify)…….

60. Did you involve in a kind of vertical integration where you assume more than one or two value adding activities by your own? 1. Yes 2. No

61. Do you have any horizontal business integration with other smallholder farmers operating in the same functional segment of the value chain? 1. Yes 2. No

62. If yes for what purpose? 1. For joint purchase of inputs 2. For joint use of farming equipment and facilities 3. For joint sales activities 4. To obtain scale advantages through inter-firm coordination 5. For sharing information 6. For joint credit request purpose 7. For increasing bargaining/negotiation power 8. For designing initiatives that emphasize upgrading the value chain 9. For reducing costs through achieving scale in transactions or operations 10. For obtaining access to quality extension services 11. For the joint use of warehouse 12. Other (specify)……

63. In which of the following are you a member? 1. Soybean cooperative 2. Contract farming under a trader/or /processor 3. Contractual agreement with fair trade 4. Out grower scheme around a lead farm or nucleus farm 5. Warehouse receipt finance 6. Other (if any)……

64. Vertical linkage with commercial value chain actors: (Multiple response is possible)

1. Retailers 2. Whole sellers 3. Consumers 4. Brokers 5. Collectors 6. Others (specify) _____

65. Did you have a kind of horizontal linkage with other farmers? 1. Yes 2. No

66. Is storage of soybeans a problem for you? 1. Yes 2. No

Product differentiation – competition

67. From where do you get knowledge about how to improve your products and services (to make them more competitive)? 1. Research and development Institutions 2. Extension services 3. Private basic development service providers 4. Own research & development 5. have no research and development at all 6. Other sources …….

68. What is your mechanism to compete and win your competitors so far? 1. By decreasing price 2. By increasing the quality of the product 3. By producing differentiated soybean products 4. By reducing production cost 5. By decreasing the marketing and transaction cost 6. By hoarding now and selling later 7. Other……..……

Contractual agreement and accompanying services

69. What kind of services did you get from your buyer and/or your input supplier? 1. Loans 2. Training 3. Maintenance services 4. Equipment 5. Marketing support 6. Other……

70. What kind of in advance contract agreement you made to sell soybean in 2014/2015 (if any)? 1. A kind of pre-paid debt 2. Out-growers scheme/arrangement 3. Cooperative membership agreement 4. Foreign Niche market 5. Other…….…….

71. How many quintal of soybean did you sell in 2014/2015 based on the already in advance contract agreement? .....

72. Do your soybean products have preferred qualities by buyers? 1. Yes 2. No

73. If your answer for **Q.73** is No, what interventions are needed to improve quantity and quality of soybean crops production to attract better prices? _____

74. Do you consider quality requirement of your customers in your production process? 1. Yes 2. No

75. If your answer for **Q.75** is Yes, what quality requirement do you consider?

76. What was your source of information about quality requirement of your customers?

Price information

77. Did you know the market prices before you sold your soybeans? (√) 1. Yes 2. No

78. Did you know the nearby market price before you sold? 1. Yes 2 No

79. What do you do if you did not get the expected price for your soybeans supply? 1. Took back home 2. Sold at lower price 3. Took to another market on the same day 4. Sold on other market day

80. Did you face difficulty in finding buyers when you wanted to sell soybean? 1. Yes 2. No

81. How is the attractiveness of the price of soybean in 2014/2015? 1. Very attractive 2. Moderate 3. Low

82. If you sold for both cooperatives and other traders, which one was better?

1. The cooperative price 2. The traders price 3. Both are the same

83. How is the price of the soybean you sold to your buyers (traders) fixed?

1. by market price 2. Fixed by you (farmer) 3. Fixed by your buyers (traders/processors)

84. Which price of the following is relatively most attractive in 2014/2015? 1. Price of soybean 2. Price of maize 3. Price of vegetables/fruit 4. Price of dairy products 5. Price of honey 6. Price of sesame 7. Price of groundnut 8. Price of coffee 9. Other (specify)…….……

10. Analysis of costs and margins of soybean

85. Is the cost of soybean production affordable? 1. Yes 2. No

86. Do you consider that cost of soybean processing (if any) is affordable? 1. Yes 2. No

87. Was the marketing and other transaction cost for soybean is very high (costly)? 1. Yes 2. No

88. Was the transportation cost for soybean is very high (costly)? 1. Yes 2. No

89. Estimate the total amount of cost incurred per quintal soybean

Average Selling price (Birr/qt.)	Total cost per Quintal of soybean for:												
	Harvesting	Sorting/grading	Packing material	Loading/ unloading	Storage	Broker	Transport	Damage & weight Loss	Tax	Administrative	Insurance	Others	Total

90. What are the soybean marketing constraints (rank it)?

Lack of market	Low price offerd	Lack of storage	Lack of transport	Lack of market information	Poor linkage with actors	Low quality of product	Low demand	High market distance	Other (specify)

11. Crop (other than Soybean) and Livestock Enterprises

Crop enterprise

Crop enterprise in (2014/2015) Types of crop grown	Size of land cultivated (Hectare)	Quantity of production(qt)	Quantity sold (qt)	Current price (Birr/qt)	Total sold value(Br)
E.g. ***	12	8	3	500	3 X500 = 1500
Soybean					
Groundnut					
Sesame					
Maize					
Sorghum					
Chat					
Coffee					
Vegetable					
Fruit					
TOTAL					

Livestock enterprise in (2014/2015)

Livestock type	Number	Purpose of keeping them (code N)	CODE –N	Income from livestock sale	Income from sale of livestock products
Ox/Steer			1. For draft (cultivation/transport) 2. sales (live animal) 3. For sale milk/butter 4. for consumption		
Cow/Heifer					
Calve					
Sheep/goat					
Donkey					
Horse					
Mule					
Hen/ chicken					
Productive Hive*					

TOTAL			5. For manure 6. Other (Specify) …..		

12. Farm and non-farm income

91. What is the total income (birr) you earned from the total soybean production in 2014/15?
……..……..……
92. What is the total income you earned from other crops production than soybean (cereal crops, chat, vegetables, fruits, crop residue etc) in 2014/2015?
……..……
93. What amount of income you earned from the livestock production in 2014/2015? …….

13. Non/off-farm income only in 2014/15

94. What is the total non/off farm income you earned in 2014/2015? ……..……..

14. Capital/wealth

95. What is the total cash saving you have now? ……..….
96. What is the total estimated capital (both in cash and kind) you have now? ……
97. How many total debts (in birr or kind) did you borrow to pay back in 2014/2015? .....

Messages/Research Gaps:

What are your special messages/recommendations you want to transfer to the concerned body concerning soybean in general?

…….…… ……. ……
……
…….

Thank you for your kind cooperation!

II. TRADERS INTERVIEW SCHEDULE

1. General Information

1. Name of trader: Age Sex_____
2. Address: Region Zone Woreda: _____ Town: _____
3. Type of trade: 1. Retailer 2. Wholesaler 4. Collectors 5. Others
4. Marital status 1. Single 2. Married 3. Divorced 4. widowed
5. Family size: Male _____ Female _____ Total _____
6. Educational level of the respondent 1. Attained formal education 2. No formal education
7. Position of respondent in the business: 1. Owner- manager 2. Spouse of owner 3. Employed manager 4. Daughter of the owner 5. Son of the owner 6. Relative to the owner 7. Other (specify)
8. How long have you been operating the business? _____ years
9. Did you trade alone or in partnership? 1. Alone 2. Partnership 3. Other (specify) _____
10. If partnership, how many are you in the joint venture? _____ persons.
11. Total number of peoples employed in your business:

Employee	Male	Female	Total
Family member			
Non family member			
Total			

12. What is your main business? /Put in order of importance and business proportions/

Activities	Business rank
Wholesaling	
Retailing	
Assembling	
Brokerage	
Processing	
Exporter	
Others (specify)	

13. Do you participate in soybean trading year round? 1. Yes 2. No
14. If your answer to **Q.13** is No, at what period of the year do you participate? 1. When purchase price becomes low 2. During high supply 3. Other(specify)

15. Do you practice trading other than soybeans? 1. Yes 2. No
16. If your answer to **Q.15** is Yes, what? _____
17. Number of market days in a week? _____
18. What was the amount of your initial working capital when you start this soybeans trade business? _____ Birr.
19. What is the amount of your current working capital? _____ Birr.
20. What is your source of working capital? 1. Own 2. Loan 3. Gift 4. Share 5. Others (specify)
21. If it was loan, from whom did you borrow? 1. Relative/family 2. Private money lenders. 3. NGO (specify) _____ 4. Friend 5. Other traders 6. Micro finance institution 7. Bank 8. Others (specify)
22. How much was the rate of interest? _____ Birr for formal, _____ Birr for informal.
23. What was the reason behind the loan? 1. To extend soybeans trading. 2. To purchase soybeans transporting vehicles/animals. 3. Others _____
24. How was the repayment schedule? 1. Monthly 2. Quarterly 3. Semi-annually 4. When you get money 5. Others (specify)
25. Is there change in accessing finance for soybeans trade these days? 1. Improved 2. Deteriorated 3. No change
26. What mode of transportation did you use? Give in percentage
    1. Man power 2. Animal transport 3. Vehicle 4. Cart 5. Others (specify) _____
27. Do you carry out any physical treatment to maintain product quality? 1. Yes 2. No
28. If your answer to **Q.27** is Yes, mention;_____
29. Linkage with commercial value chain actors: (Multiple response is possible) 1. Farmers 2. Retailers 3. Whole sellers 4. Consumers 5. Local collectors 6. Brokers 7. Others(specify)_____

2. **Purchase practice**

30. From which market and supplier did you buy soybeans? (*Multiple market area is possible, ** Multiple answers are possible and write the codes in correspondence to the market area and other answers should be written in accordance)

Crop type	Market (location name)	From	1. producers 2. retailers 3.wholesalers 4. collectors 5.coopratives 6. brokers	Quantity purchased in qt	Average price per quintal	%age of purchased soybean	Payment 1.cash 2.credit 3.advance payment
Soyb							

ean			7.unknowens 8.others (specify)				

31. From which market do you prefer to buy most of the time? _____
32. Why do you prefer this market? 1. Better quality 2. High supply 3. Shortest distance 4. Others (specify)
33. Are all your purchasing centers accessible to vehicles? 1. Yes 2. No.
34. If your answer to **Q.33** is No, what proportions are accessible? _____ % .
35. Who sets the purchase price? 1. Myself 2. Set by demand and supply 3. Sellers 4. Other (specify)
36. Who purchase soybeans for you? 1. Myself 2. Broker 3. Commission agent 4. Family members 5. Friends 6. Others (specify)
37. How do you attract suppliers? 1. Giving better price 2. By visiting those 3. Fair scaling /weighing 4. Extending credit 5. Using brokers 6. Advertising using influential peoples 7. Other (specify)
38. Do you consider quality requirement of your customers in purchasing activities? 1. Yes 2. No
39. If your answer to **Q.38** is Yes, what quality requirement do you consider for? _____ _____.
40. What was your source of information about quality requirement of your customers? _____.
41. Is your purchasing price higher than your competitors? 1. Yes 2. No
42. If your answer to **Q.41** is Yes, what was the reason? (Multiple answer is possible); 1. To attract suppliers 2. To buy more quantity 3. To kick competitors 4. To get better quality 5. Others (specify)
43. How many regular suppliers do you have? Producers _____, Collectors _____ , Processors _____, Wholesalers _____, Retailers _____, others _____
44. Have you ever stopped purchasing due to lack of fund? 1. Yes 2. No
45. If your answer to **Q.44** is Yes, for how long? _____.
46. Is obtaining sufficient volume a problem? 1. Yes 2. No
47. Have you ever stopped purchasing due to lack of supply? 1. Yes 2. No
48. If your answer to **Q.47** is Yes, for how long? _____.

3. Selling Practices

49. To which market and to whom did you sell soybeans. (*Multiple market area is possible, ** Multiple answers are possible and write the codes in correspondence to the market area and other answers should be written accordingly)

Crop type	Market location	To	1.processor 2.retailer 3.wholesalers 4.exporters 5.coopratives 6.consumers 7.hotels & organizations 8.brokers 9.unknowns 10.others (specify)	Quantity sold (qt)	Average price/kg	%age share of buyers	Payment 1.cash 2.credit 3.advance payment
Soybean							

50. How did you sale your produce? 1. Direct to the purchaser 2. Through broker 3. Other (specify)
51. When did you get the money after sale? 1. As soon as you sold 2. After some hours 3. On the other day after sale 4. Other _____
52. What do you do, if the product is not sold on time? 1. Took back home 2. Took to another market 3. Sold it at lower price 4. Sold on other market day
53. When did you sell? (Give point 1 forvery frequent strategy 2 for second frequent strategy and so on……..)

Selling strategy	Ranking
Store and sell when price rises	
Sell as soon the purchase	
Sell in pieces as buyers comes	
Sale before purchase	
Others (specify)	

54. How did you attract your buyers? 1. By giving better price relative to others 2. By visiting them 3. By using brokers 4. By fair scaling 5. Advertising 6. Others (specify) _____
55. How many regular buyers do you have? Wholesalers_____, Consumers_____, Processors _____, Assembler _____, Retailers _____, exporters ____ , others ____

56. What is your packaging material? 1. Sisal sack 2. Plastic sack 3. Others _____
57. Do you know the market prices in different markets (on farm, village market and other areas) before you sold your soybeans? 1. Yes 2. No
58. What is your source of information? _____
59. What percent of the total produce is sold on local/Woreda market? _____ %
60. What percent of the produce is sold to domestic market? _____ %
61. What percent of the produce was exported? _____ %
62. Who sets selling price? 1. Myself 2. Set by demand and supply 3. Buyers 4. Other (specify)
63. Are there charges (taxes) imposed by government or community officials at the market? 1. Yes 2. No
64. If your answer to **Q.63** is yes, what are they and what is the basis of payment?

Tax type	Amount (Birr)	Base of payment	Rate of payment (Birr)
		Per qt	
		Simply on daily bases	
		Per track base	
		Based on purchased value of products	
		Based on sales value of products	
		Others (specify)	

65. Do the payments you pay have ever hindered you from supplying soybean? 1. Yes 2. No
66. Do you want to expand soybeans trading? 1. Yes 2. No
67. If your answer to **Q.66** is Yes, why? _____
68. If your answer to **Q.66 is** No, why? _____
69. Indicate your average cost incurred per quintal in the trading process of soybeans.

Cost components	Cost incurred in Birr/qt
	Soybean
Purchase price	
Labor for packing	
Loading/unloading	
Transportation fee	
Sorting	
Storage cost	
Loss in transport & storage	
Processing cost	

Telephone cost	
Watching & warding	
Other personal expenses	
License and taxes	
Other cost (specify)	
Total cost	
Selling price	
Revenue	

70. Are there problems on soybeans marketing? 1. Yes 2. No
71. If your answer to **Q.70** is Yes, what are the problems?

Problems	1. Yes	2. No
Credit		
Price setting		
Supply shortage		
Storage problem		
Lack of demand		
Information flow		
Quality problem		
Government policy		
Telephone cost		
Lack of government support to improve soybeans marketing		
Others (specify)		

72. What do you think are the causes of the problems? _____

_____

_____.

4. Marketing Services

73. Is soybean trading in your locality needs a trading license? 1. Yes 2. No
74. If your answer to **Q.73** is Yes, how do you see the procedure to get the license? 1. Complicated 2. Easy
75. Did you have soybeans trade license? 1. Yes 2.] No
76. If you do not have specific soybean trading license what is your joint trading license? 1. Grain 2. General 3. Consumers supply license 4. Other
77. How much did you pay for soybean trade license for the beginning? _____Birr
78. How much is the yearly renewal payment? _____Birr
79. Are you organized in any organization? If yes, why?

Capital/wealth

80. What is the total cash saving you have from soybean trading? ……
81. What is the total cash saving you have now? ……..….
82. What is the total estimated capital (both in cash and kind) you have now? ……
83. How many total debts (in birr or kind) did you borrow to pay back in 2005/2014/15? .....

Messages/Research Gaps:

What are your special messages/recommendations you want to transfer to the concerned body concerning soybean in general? ……..…… …… ……

Thank you for your kind cooperation!

III. CONSUMERS INTERVIEW SCHEDULE

Research work (2014/15)

Value chain analysis of soybean in Metekel zone of Benshangule Gumuz, Ethiopia

INTRODUCTORY STATEMENT

As per the requirement of the research project I prepared this questionnaire to undertake study under the title of ***value chain analysis of soybean in Metekel zone of Benshangule Gumuz, Ethiopia.*** *Thus, for the objective of this research your participation is inevitable and kindly invited for giving information. I expect maximum effort and patience from the local respondents and enumerators with sincerity.*

1. Name of Respondent: _____
2. Zone: Woreda: _____ Kebele: _____ Village: _____
3. Age of the respondent: [_____] years
4. Sex of the respondent: 1. Male 2. Female
5. Education level of the respondent: 1. No formal education 2. Have formal education
6. Marital status: 1. Married 2. Unmarried 3. Divorce 4. Widowed
7. Distance to nearest town: [_____] km
8. What is your major means of income generation? 1. Farming 2. Trade 3. Employment 4. Others _____
9. Is soybean consumed in your family? 1. Yes 2. No
10. Experience in soybean products consumption? _____ years
11. Where do you get to consume? 1. Purchase 2. Produce
12. If you don't consume soybean products, why? _____ _____ _____.

Demand for the soybean products

13. What type of soybean products purchased for consumption?

Soybean products	Quantity purchased/ month	Low price paid (Birr/kg)	High price paid (Birr/kg)	From whom do you buy
Soybean				
Soya oil				
Testy soya				
soya blended flours				
Soya flour				

14. Do you consider any quality requirements to purchase soybeans? 1. Yes 2. No
15. If yes, what quality requirement do you consider for? _____ _____

16. What are the constraints hindering consumption of soybeans? Rank horizontally (1= most severe, 2= second severe and etc)

Crop type	Lack of awareness	Supply shortage	Income shortage	Lack of market info.
Soybean				

17. Do you know the benefits of consuming soybeans product? 1. Yes 2. No
18. Do you think there is problem with consumption of soybeans product? 1. Yes 2. No
19. What should be done to increase soybeans product consumption? _____
    _____

Messages/Research Gaps:

What are your special messages/recommendations you want to transfer to the concerned body concerning soybean in general? ……..…… …… ……
……

END!
Thank you for your kind cooperation!

IV. CHECKLIST FOR KEY INFORMANTS INTERVIEW

Research work (2014/15)

Value chain analysis of soybean in Metekel zone of Benshangule Gumuz, Ethiopia

I. INTRODUCTORY STATEMENT

As per the requirement of the research project I prepared this questionnaire to undertake study under the title of ***value chain analysis of soybean in Metekel zone of Benshangule Gumuz, Ethiopia.*** *Thus, for the objective of this research your participation is inevitable and kindly invited for giving information. I expect maximum effort and patience from the local respondents and enumerators with sincerity.*

1. District ……..……...… kebele (PA) ……..……...…….…… Name of key informant ……
2. Name of the Key person…… Tele/mobile No…….
3. Emal: ……..
4. When started to function? What is the objective of this office related with soybean business? What are the major services your office or other via your office provided to smallholder farmers and or other soybean actors so far? What are the relations your office has with smallholder farmers and other actors in the soybean value chain system?
5. Whom have you provided credit mostly (your credit customer)? What amount of credit or other financial services you provided for smallholder famers, traders, collectors, etc...(Other than smallholder farmers) particularly in 2014/15 year? Detail information including the name, date …etc!
6. What are the major criterions to be fulfilled first to receive credit? Do you think smallholder farmers are able to satisfy it? If not, what is the problem for them and how you accommodate this problem? What about the traders and other large scale farms?
7. What do you think of the financial problem for smallholder farmers in your area? How are you cooperating with them to solve this problem? How soybean production, harvesting, and processing stages are affected by financial problem? Which stage of soybean business is your target area for the intervention? Have you seen the intervention impact of financial service on the smallholder farmers? Do you think there has been positive impact?
8. What are the stakeholders working with your office? How is the linkage of your office from other stakeholder (NGO, Banks and other financial institutions) to help smallholder farmers or any other actors against financial problems?
9. What are your major internal strengths, which increased/strengthen and your performance in the soybean value chain system? What about your weaknesses? What are also the opportunities and threats for your objectives related with soybean value chain? What interventions do you think is needed to strengthen the linkage between banks with the soybean business sector?

Messages/Research gaps: What are your special messages / recommendations related with financial problem of farmers/traders and the service you provided them you want to transfer to the concerned governmental office?

Thank you for your kind cooperation!