



**ADDIS ABABA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS SCHOOL OF
COMMERCE**

**AN ANALYSIS OF HARICOT BEAN VALUE CHAIN: THE CASE OF
BORICHA DISTRICT, SIDAMA ZONE, SNNPR, ETHIOPIA**

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BY

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DEDICATION

*I dedicate this thesis manuscript to my mother **W/ro. SARA DEYAMO** who had played major role in nursing and educating me, without father alone and who eager to see my successes, but passed away few years ago before seeing my successes.*

DECLARATION

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CERTIFICATION

This is to certify that the work embodied in the accompanying thesis entitled “An Analysis of Haricot Bean Value Chain: the case of Boricha District, Sidama Zone, SNNPR, ETHIOPIA” has been carried out entirely by the candidate under my direct supervision and guidance and that the candidate has fulfilled the requirements of the regulations laid down for the partial fulfillment of the requirement of the Degree of Masters of Arts in Logistics and Supply Chain Management examination of the Addis Ababa University College of Business and Economics School of Commerce.

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ACRONYMS

AAU	Addis Ababa University
CIAT	Centro Internacional de Agricultural Tropical
CSA	Central Statistical Agency
EIAR	Ethiopian Institute for Agricultural Research
ERCA	Ethiopian Revenue and Customs Authority
FAO	Food and Agriculture Organization
IFPRI	International Food Policy Research Institute
MOFED	Ministry of Finance and Economic Development
RD	Research and Development
SARI	South Agricultural Research Institute
SNNPR	Southern Nations, Nationalities and People's Region
UNIDO	United Nations Industrial Development Organization

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ABSTRACT

In Borich district, haricot bean are important food and cash crops that play a crucial role in the district. The overall objective of this research was to analysis of haricot bean value chain: profiling, antecedents and consequences of household farm activities in Boricha district, with the specific objectives of to map the value chain of haricot bean in the study area and to assess the relationship between antecedents of value chain activities of household farmers with the supply volume for market. The data were generated by individual interview by using questionnaires and checklists. This was supplemented by secondary data collected from different published and unpublished sources. Multistage sampling technique was applied. Sample of 180 haricot bean producers, Haricot bean traders also (15 local collectors or assemblers, 17 wholesalers, 10 retailers and 4 exporters) were sampled and interviewed along the chain. Descriptive statistics, value chain analysis and multiple regression analysis were employed. The main findings indicated that like variables age, family size, education, land size, haricot bean farming experience, access to extension service, and membership to any cooperative, off-farm income and marketing costs of haricot bean) were found to be significantly affecting the supply of haricot bean to market at household. Of these explanatory variables, Age , education , Land size, membership to any cooperative, off-farm income and marketing costs were the strongest factors that determine haricot bean supply to market ($p<0.001$). To improve the output of haricot bean production and marketing; actors should apply value chain approaches. But bringing about a meaningful change in the production and utilization of haricot bean in the study areas requires a combined effort of all relevant stakeholders.

Key words: Haricot Bean Value Chain Map, Household Farm Activities, Supply

CHAPTER ONE

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). Ethiopia launched and commenced implementing earnestly its first and second Growth and Transformation Plan (GTP) in 2009/10 and 2014/15 respectively. 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).

Pulses play crucial economic, and food and nutrition security roles in Ethiopia. Recently, the production and supply of pulses increased due to increased demand in both local and international markets, thus enhancing smallholders' income (Chilot *et al.*, 2010). Ethiopia is ranked 13th among pulse producing countries in the world (FAO, 2015). The country produced about 1.3 million tons in 2014 (CSA, 2015). Pulses also contribute significantly to Ethiopia's balance of payments. They are the third-largest export crop after coffee and sesame, contributing USD 90 million to export earnings in 2007/08 (Shahidur *et al.*, 2010). Ethiopia is the third largest producer of common beans in Eastern and Southern Africa (COMESA) and the leading exporter in Africa. The country exported 40 percent of its common beans out of the total production in 2010 (FAOSTAT, 2013). Common beans are increasingly becoming an important food security commodity particularly among the smallholders (Bindera, 2009). Furthermore, Ethiopia has a geographic comparative advantage over other competitive countries. It takes nine weeks for sea shipments of beans from China to reach EU markets, whereas it only takes three weeks from Ethiopia (Ferris *et al.*, 2008). According to ERCA 2015 report, haricot bean exports increased in total value from 19 million USD in 2005 to 134 million USD in 2014, quantity is increased from 43 thousand MT in 2005 to 171 thousand MT in 2014, exhibiting a growth of more than threefold.

Haricot bean is an important pulse crop in Ethiopia and in the world. The crop ranks first globally while it stands second next to faba bean in the country. The crop is widely grown in areas between 1400-2000 m.a.s.l. As cited by Ephrem (2016), the main production areas include the East Hararghe, West Wellega, East shewa, West Arsi, Sidama, Wolayita, Wollo and East Gojam (EIAR, 2014). The crop is grown either as a sole crop and/or intercropped with either cereal or perennial crops (Rahmeto, 2007). There are a wide range of haricot bean types grown in Ethiopia, including the mottled, red, white and black varieties. The leading white bean varieties are the Awash 1, Awashmelka and Mexican 142 varieties. The pure red and pure white colored beans are the most common commercial varieties (Ferris et al., 2007). Haricot bean is ranked as the second largest pulse crop in the country in terms of production with a share of 17 percent, next to Faba beans (Negash, 2007). CSA 2014/15 report also shows that the production share of haricot bean has consistently been 19 percent of all the pulses for the last two years. Ethiopian haricot bean production has increased by more than twofold from 138 to 513 thousand tones between 2005 and 2014 (CSA, 2015).

Pulse crops particularly the haricot bean is the major source of hard currency for Ethiopia, which is sounded by challenges of different kinds. Its contribution to the increasing of the household income and asset creation turns out to be the major rationale behind for conducting this study. The pulses sector in Ethiopia has a big potential for growth. The demand for pulses in the world market is constantly growing. The production of haricot beans in Ethiopia has increased ten times when comparing figures from 1995 to 2009. Pulses are Ethiopia's third-largest exportable commodities after coffee and oilseeds (IFPRI 2010).

According to statistical data from Food and Agriculture Organization of the United Nations (FAO) and Government of Ethiopia (GoE), bean production ranges from 100–200 thousand tones, per year, with yields highly dependent upon rainfall. Average national production is approximately 150 thousand tones, per annum. The level of production in 2005 was approximately 175 thousand tones with a domestic market value of USD 30 million. Approximately 35–40 thousand tones, of beans were sold through the international export markets via Djibouti and it is estimated that 10 thousand tones were sold through the Kenyan border at Moyale. This suggests that 125 thousand tones or 70% of the bean harvest was consumed locally (Ferris & Kaganzi, 2008)

The major haricot bean producing regions include Oromia, Amhara and SNNPR. Their share to the national haricot bean production is 51% for Oromia, 24 % for Amhara and 21% for

SNNPR. Haricot bean is the most important pulse crop in the SNNPR. It is grown both as sole crop and in association with other crops. Though it is produced in most parts of the southern region, the leading zones of production are Sidama, Wolayita and Gamo Gofa (IFPRI, 2010). Haricot bean yield in the short season was approximately 200–300 kg per ‘timad’ which is equivalent to 800–1200 kg/ha, with yield increasing to 600–800 kg/timad (2400– 3200 kg/ha) in the longer rains season. Only farmers with more assets and larger farm sizes of 2–3 ha regularly use new seed and fertilizer. This group also hires labor and has access to animal traction for production (Ferris & Kaganzi, 2008). Haricot bean is grouped under the lowland pulses category. It is best adapted in areas with a warm temperature. Areas having mean air temperature between 18 and 24⁰C are best suited for its production. Haricot bean can be successfully grown in non-acidic and well drained soils. Ideally, the soil pH should be between 6.0 and 7.5. The pH should not be below 5.0 or above 8.0. In Ethiopia, it can be grown in areas with elevations between 1400 and 2000 meters above sea level receiving an annual rainfall of 350 to 1100 mm. It requires about 300 to 400 mm of water during its growth period.

1.2. Statement of the problem

Agriculture sector continues to face a set of constraints that restrict further and accelerated growth. Agricultural Markets are underdeveloped at national and regional level. In addition to this, public and private sector partners lack capacities to implement linkages (Shahidur et al., 2010). Ethiopia is the third largest producer of common beans and the leading exporter in Africa. Factors that hinder the competitiveness of agricultural commodities in general which leads to decrease in quality and marketing margin are related to poor production and poor post-harvest value addition skill of farmers, poor market information flow in the value chain, low marketable surplus and poor quality products that do not meet market preferences (Bekele and Hailemariam, 2007). Haricot beans cover the dominant part of the Ethiopia’s pulses export contributing about USD 134 million to the economy of country (ERCA, 2015). However, the share of pulses in general in the export market has been limited by external demand for quality. Due to high demand in the international and domestic markets, Ethiopian haricot bean production has increased more than two fold from 138 to 513 thousand tones between 2005 and 2014 (CSA, 2015). Haricot bean exports account for about 41 percent of pulse production and exports 51 tones to 171 tons from 2005 to 2014. However, the value chain remains underdeveloped and producers earn a low share of benefits (FAO, 2015). The

factors that are affecting supply of Haricot bean to the market were not well studied. Hence, determining factors influencing the quantity of households marketed i.e. factors influencing the quantity marketed to traders in the local market were studied under this paper.

Haricot bean varieties are known to vary in their seed characteristics in addition to their great diversity in growth habit and morphology. However, the issues which related to haricot bean marketing and sales (supply) were not more explored along its value chain from caption to consumption. At present the most effective means of adding value to crops such as beans that are produced by smallholder farmers is through product aggregation based on collective marketing. At present, there are no premiums for graded produce as the largest trading houses, undertake sorting at the processing factories rather than establish price premiums for farmers and/or traders to undertake the value adding activities of cleaning and sorting of beans. Collective action requires that farmers understand and invest in collective action and whilst many farmers are being organized through an Ethiopian Government led co-operative movement, this process will require considerable support, if it is to achieve the desired results. Leading private sector agencies and farmers are not access to contract buying arrangements to supply identified markets

Boricha district is among the areas with ample potential for production of haricot bean in the southern rift valley of Ethiopia and the significant supplier among 19 districts of Sidama zone. Haricot bean is the main cash crop in the study area. Despite of its importance for cash generating crop in district, haricot bean yield is constrained by different factors like low competitiveness, inability to offer premium price for quality in the local, market outlets and limited efforts in market linkage activities. Farmers produce haricot bean in intercropping with maize, coffee, and chat and mono-cropping primarily as an alternative food source and for market sale. But recently they have been facing marketing and sales problems or there are challenges that are negatively influencing produce supply to market. One of the major problems of haricot bean value chain in study area is marketing and sales related issues or supply problem. Aforementioned factors recently have been negatively influencing smallholders' competitiveness and benefit share from the total value added along haricot bean value chain. However, little research was performed concerning the haricot bean value chain from conception to end domestic market. Therefore, this study purposively carried out to assess factors affecting haricot bean value chain development from study district to national level in Ethiopia.

1.3. Research questions

This study seeks to answer for the following questions:

1. What is the profile (map) of haricot bean value chain?
2. What are determinants that are significantly affecting the quantity haricot bean supply to market?

1.4. Objectives of the study

1.4.1. General objective

The general objective of the study is to analysis of haricot bean value chain: profiling, antecedents and consequences of household farm activities in Boricha district, Sidama Zone, Southern Nations Nationalities and Peoples Regional State (SNNPRS), Ethiopia

1.4.2. Specific objectives

The specific objectives of this study are:

1. To map the value chain of haricot bean in the study area
2. To assess the relationship between antecedents of value chain activities of household farmers with the supply volume for market

1.5. Scope of the Study

The study mainly assesses socio-economic constraints facing haricot bean value chain from study area to domestic market. The study was conducted in Boricha district which is found in the SNNPR. More specifically, the study focused on mapping value chain of haricot bean of the study area and assesses the relationship between antecedents of value chain activities of household farmers with the supply volume for market. Value chain analysis and econometric methods were applied to generate results from data.

1.6. Limitations of the Study

One major limitation of this study was the unavailability of secondary database on haricot bean production and marketing activities. Hence, this report mainly relies on the primary information generated from survey questionnaires. Owing to time and financial resources constraints, detail information outside the regions and export activities were not included i.e. this study does not yet deliberate the extra-regional haricot bean trade channels in details.

1.7. Significance of the Study

This study aims to analysis of haricot bean value chain: profiling, antecedents and consequences of household farm activities. It provides holistic picture of existing challenges that hinder competitiveness opportunities of haricot bean in Ethiopia in general and study area in particular. It will help pro poor to increase the income generating opportunities from haricot bean agribusiness activities. Specifically, the study could drop light on required efforts to enhance the production and utilization of haricot bean at larger scale to bring about economic development in the study areas. The information generated could also help a number of organizations including research and development organizations, producers, traders, policy makers, extension service providers, government and non-governmental organizations to assess their activities and redesign their mode of operations. The study also contribute methods for other researchers how to conduct analysis of agricultural value chain activities.

1.8. Definition of Terms and Concepts

Value Chain: Value chains encompass the full range of activities and services required to bring products or services from its conception to sale in its final market whether local, national, international or global. Value chain includes producers, inputs suppliers, operation, processors, retailers and buyer. The value chain mainly focuses on the market collaborating strategy, where it emphasized the linkages between production, marketing etc. activities of the products and services in an effective and efficient manner.

What is value chain analysis (VCA) is a useful analytical tool that helps understand overall trends of organization and identify change agents and leverage points for policy and technical interventions. VCA means of estimating how competitive a selected commodity or product is likely to be in a target market. It describes the activities within and around an organization, and relates them to the analysis of the competitive strength of the organization and evaluates the value each particular activity adds to the organizations products or services and the base for value chain improvement, development or the setup of complete new value chains.

CHAPTER TWO

2. LITERATURE REVIEW

This chapter clarifies the theories and concepts underlying the problem studied. Besides that, major related empirical studies output is presented. The theoretical review section deals a review of agriculture value chain in general and haricot bean value chain in particular. At the end reviews synthesize the reasons why the problem exists and justification for addressing it.

2.1. Theoretical Review

2.1.1. Basic concepts and principles of value chain

Value chains encompass the full range of activities and services required to bring a products or services from its conception to sale in its final market whether local, national, international or global. Value chain includes producers, inputs suppliers, operation, processors, retailers and buyers. They are supported by a range of technical, business and financial services providers. A value chain encompasses the entire network of actors involved in input supply, production, processing, marketing and consumption. Value chain actors operate within institutional environment which can either facilitate or hinder its performance (Gereffi 1995). Regulations, policies, trade agreements, social norms and customs and public goods like infrastructure, research, extension, price information systems and business development services key elements to the institutional environment affecting the value chain performance. Value chains analysis provide the framework for designing and implementing many development programs and projects. Kaplinsky and Morris (2001) define the value chain as full range of activities and services required to bring a product or service from its conception to consumption. Value chain analysis also 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). Four links in a simple value chain of different activities were exposed below:

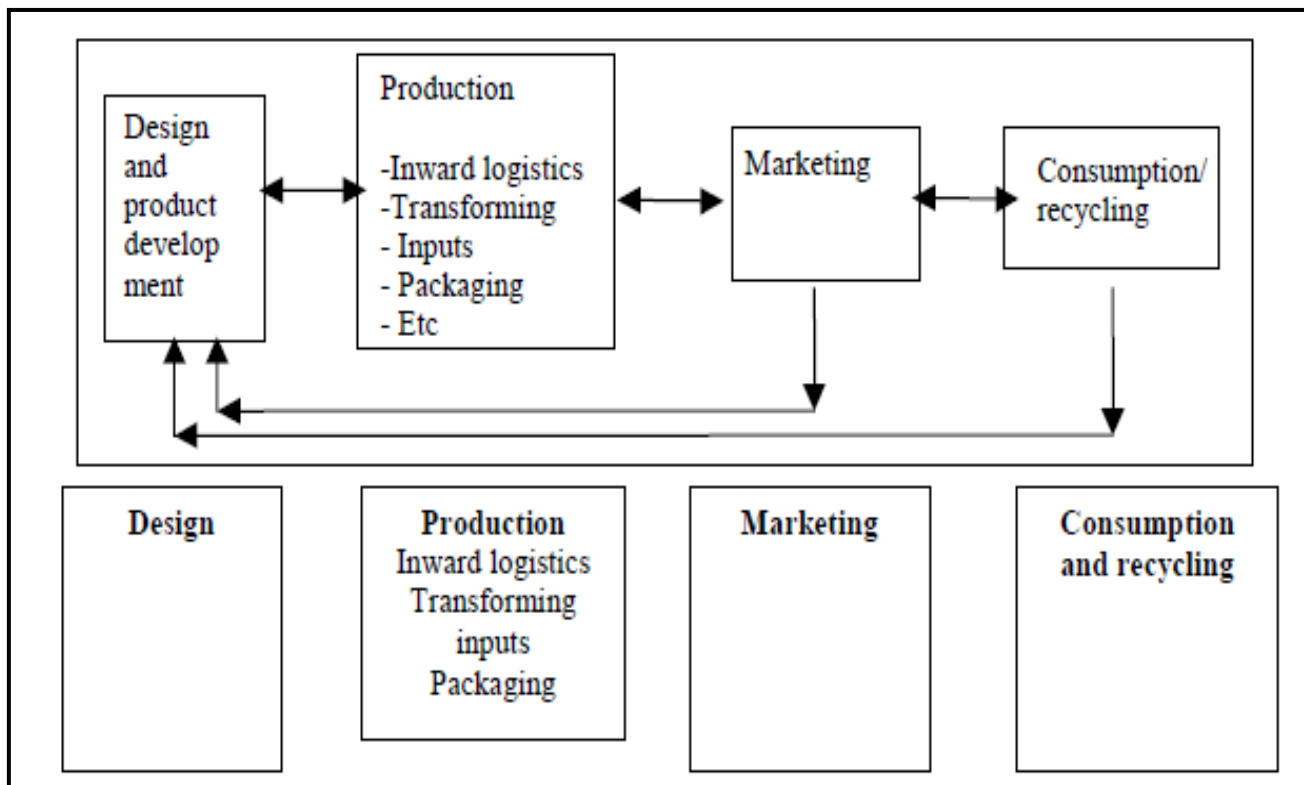


Figure 1: Four links in a simple value chain of different activities

Source: Kaplinsky and Morris (2000).

Value chains encompass a network of competing vertical supply channels that link input suppliers, farmers, processors, distributors and final consumers. Production technology, product quality, perishability, price, input and skill requirements and investment costs often vary substantially across supply channels. As a result, financial, physical and human capital often poses entry barriers that limit access by the poor (Haggblade *et al.*, 2012). Within a given vertical supply channel, enterprises select their competitive niche by deciding which market segments to target, how much to specialize (that is, how many consecutive functions they perform) and what type of technology to adopt in order to meet required quantity and quality requirements. Specialization emerges in some supply channels, often in response to technology change that permits quality improvements and scale economies in production. A number of agricultural products producers form vertical integration when an individual enterprise conducts a sequence of value chain functions.

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. Three major options for managing commercial transactions within a given supply channel revolve around vertical integration, spot markets or contract production. Vertically integrated firms perform multiple production, processing and marketing functions. Spot markets, however, mediate many agribusiness transactions. Where large numbers of buyers compete for product, farmers and value-added processors can receive high prices. But in the presence of thin markets and few traders, farmers and processors face difficulties negotiating a good price (Haggblade *et al.*, 2012). Contract production and subcontracting offers a third system for managing commercial relationships with input suppliers and output marketers. Typically, contract production requires agreed-upon grades, standards, quantity stipulations and delivery conditions. In the presence of frequent asymmetries in economic power and information, small producers require some form of collective action to negotiate fair standards, contracts, enforcement mechanisms.

In many instances, firms competing in different supply channels involve different types of technology. Horizontal coordination like firms can often confer competitive advantages as well. Farmer associations and marketing cooperatives emerge precisely for 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.

Governance within value chains reflects the distribution of power and information among various actors. An 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). The five global value chain governance types (markets, modular value chains, relational value chains, captive value chains and hierarchy) along with the values of the three variables that determine them (namely complexity, capabilities and codification).

Value chain analysis 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

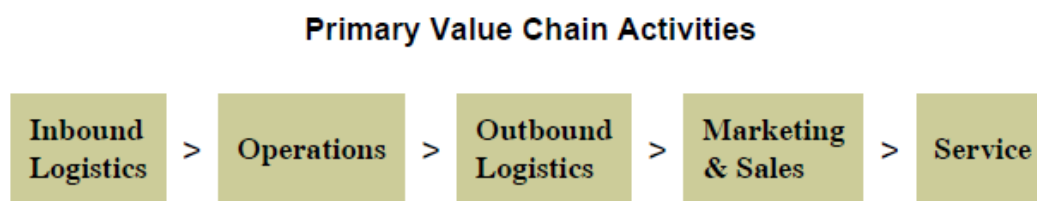
promote behaviors that make value chains more competitive. These improvements or “upgrades” in the competitiveness of value chains can occur in different ways, through process upgrading, product upgrading or functional upgrading (Kaplinsky and Morris, 2000; Knorringa and Pegler, 2006). Process upgrading involves improving the efficiency of internal processes. 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.

Product upgrading: introducing new products or improving old products faster than competitors from neighboring sectors. This involves that improving product development processes both within individual members of the value chain and in the relationship between different them. Functional upgrading: increasing value added by changing the mix of activities conducted within the firm or the sector (eg. taking responsibility or outsourcing, logistics and quality functions) or moving the locus of activities to different links in the value chain (eg. from intercropping with different crops to sole cropping based on interior design). Chain upgrading: moving to a new value chain altogether (eg. Taiwanese firms moved from the manufacture of transistor radios to calculators, to TVs, to computer monitors, to laptops and now to WAP phones.

While most early work on value chains centered on improving competitiveness of different supply channels, many recent efforts have instead focused on increasing opportunities for the poor (Altenburg, 2007). The purely commercial incentives that motivate large agribusiness investments to generate value-chain structures and distributional outcomes those are not inherently pro-poor. In response to these rapid changes in agribusiness supply chains, new efforts have emerged to make value chains a more inclusive and pro-poor (Vorley 2001; Vellema 2010). Pro-poor value chain development approaches refer to interventions that aim to overcome challenges and seize opportunities that can benefit the rural poor (Stamm and von Drachenfels, 2011). The emergence of pro-poor value-chain approaches raises new challenges on how to make value chains more inclusive for poor smallholder farmers, women and youth, without hampering their competitiveness. “It calls for a balanced approach, which takes both competitiveness and equity issues into account” (Altenburg, 2007). Desired outcomes of a pro-poor value chain approach typically include higher income earnings for poor and vulnerable groups as well as higher participation of women and youth.

2.1.2. Identifying Value Activities

Identifying value activities requires the isolation of activities that are technologically and strategically distinct. Value activities and accounting classifications are rarely the same. To analyze the specific activities through which firms can create a competitive advantage, it is useful to model the firm as a chain of value-creating activities. Michael Porter identified a set of interrelated generic activities common to a wide range of firms. The resulting model is known as the value chain and is depicted below.



The goal of these activities is to create value that exceeds the cost of providing the product or service, thus generating a profit margin. (1) Inbound logistics include the receiving, warehousing, and inventory control of input materials. (2) Operations are the value-creating activities that transform the inputs into the final product. (3) Outbound logistics are the activities required to get the finished product to the customer, including warehousing, order fulfillment, etc. (4) Marketing & Sales are those activities associated with getting buyers to purchase the product, including channel selection, advertising, pricing, etc. (5) Service activities are those that maintain and enhance the product's value including customer support, repair services, etc. Any or all of these primary activities may be vital in developing a competitive advantage. For example, logistics activities are critical for a provider of distribution services, and service activities may be the key focus for a firm offering on-site maintenance contracts for office equipment. Each generic activity includes specific activities that vary by industry. The primary value chain activities described above are facilitated by support activities. Porter identified four generic categories of support activities, the details of which are industry-specific. (1) Procurement - the function of purchasing the raw materials and other inputs used in the value-creating activities. (2) Technology Development - includes research and development, process automation, and other technology development used to support the value-chain activities. (3) Human Resource Management - the activities associated with recruiting, development, and compensation of employees. (4) Firm Infrastructure - includes activities such as finance, legal, quality management, etc. Support

activities often are viewed as "overhead", but some firms successfully have used them to develop a competitive advantage, for example, to develop a cost advantage through innovative management of information systems.



Figure 2: Porter's generic value chain

Value chain analysis has been influenced by both internal and external forces which help to study each and every aspect of the industry or sectors. The internal forces are production, marketing etc. and external forces such as technological, ecological, economic, new industry trends and regulatory development. The information technology has also play very important role to update the manufacturing process of the industry. The global value chain framework focused on the nature and content of the inter-firm linkage, and power that regulates value chain synchronization primarily between buyers and firm few tiers of supply (Gary Gereffi, John Humphrey 2005). Value chain is a robust methodology for exploring various aspects of the economy-environment interface and a useful complement to material flow or life cycle analysis with a potentially very widespread applicability. The value chain analysis also provides a framework for coherent and integrated response by industry as well as policy makers, through its focus on linkage within the different stages and actors in a chain (D. Kristina and E. Paul, 2005). The significance of value management from client's point of view, for an organization is a very important indication through which, they easily manufacturing the products according to the customers' needs. The value chain start from the production systems of the raw material and it will move along the linkages with other enterprise engaged in trading, assembling, processing etc. Porter argued that the source of the

competitive advantage cannot be detected by looking at the firm as a whole. Rather the firm should be disaggregated in a series of activities and competitive advantage found in one (or more) of such activities. Porter distinguished between primary activities which have directly contribution to add value to production of the goods (service) and support activities, which instead have indirect effects on the final value of the products. To attain the main objective the study mapping the value chain and analyzing the existing performance in terms of price, cost and profits from the source to the downstream of the value chain was done.

2.1.3. Production of Haricot Beans in Ethiopia

Haricot beans are grown throughout Ethiopia and are increasingly becoming important commodities in the cropping system of small holder producers for food and income. With regard to the economic importance of haricot bean, it is used as a source of foreign currency, as a food crop, as a means of employment, and as a source of cash. Haricot bean production takes place to a varying degree in all regions of the low and mid altitude agro ecologies of the country. However, almost all haricot bean production (more than 99 percent) of the country comes from five major haricot bean production regions: Oromia, Southern Nations Nationalities and Peoples Regional State (SNNPRS), Amahara, Benishangul Gumuz, and Tigray.

Yet production of haricot bean is not without problems in Ethiopia. Improved agronomic practices which are recommended by researchers after testing on the research field and on farmers' field are used to increase crop yield Ethiopian farmers, in general, use lower seed rate than research recommendations which result in lower grain yields (Ali et al., 2003). The seed yield of bean is the result of many plant growth processes which ultimately influence the yield components such as pods/plant, seeds/pod, and unit weight of seed. The highest seed yields were obtained when all the above got maximized (Tessbo et al., 2004). The spatial distribution of plants in a crop community is an important determinant of yield (Egli, 1988) and many experiments have been conducted to determine the spacing between rows and between plants that maximizes yield. Two general concepts are frequently used to explain the relationship between row, spacing, plant density, and yield. First, maximum yield could be obtained only if the plant community produced enough leaf area to provide maximum light interception during reproductive growth (Tessbo et al., 2004). Secondly, equidistant spacing between plants affected interplant competition (Pendleton and Hartwing, 1973). Hence, it will be very important to adjust the spatial distribution of the recommended population in order to

have maximum yield (Alemitu, 2011). To avoid nutrient competition sufficient spacing between plants and rows is vital to get maximum yield in a given plot of land. Appropriate spacing enables the farmer to keep appropriate plant population in his field. Hence, a farmer can avoid over and less population in a given plot of land which has negative effect on yield (Alemitu, 2011). Intercropping of legumes with cereals has been popular in the tropics (Tsubo et al., 2004) and rain-fed areas of the world (Dhima et al., 2007). Intercropping is advantageous for soil conservation; weed control, lodging resistance and yield increment and legume root parasite infection control (Fenandez-Aparicio et al., 2007). Intercropping is also an ecological method to manage insect pest, disease and weeds via natural competitive principle that allow for more efficient resource utilization (Tsubo et al., 2004). As cited by (Alemitu, 2011), Chemed and Yuen (2002) reported that in maize\bean intercropping disease incidence in bean was reduced by 36% and severity by 20% in intercropped than sole cropped bean. The main objective of intercropping has been to maximize use of resources such as space, light, water and nutrients (Willey, 1990). In cereal\legume intercropping, cereal crops form relatively higher canopy structure than legume crops, and the roots of cereal crops grow to a greater depth than legume crops. This indicates that the component crops probably have different spatial and temporal use of environmental resources such as radiation, water and nutrients (Willey, 1990). Different seeding ratios or planting patterns for cereal-legume intercropping have been practiced by many researchers (Tsubo et al., 2003). A number of indices such as land equivalent ratio and economic advantage have been proposed to describe competition within and economic advantages of intercropping systems (Dhima et al., 2007).

Plant density and relative proportion of the component crops are important in determining yield and productivity efficiency of cereal\legume intercropping. The growth and yield of legume is reduced markedly when intercropped with high density of cereal component. To optimize plant density, the seeding rate of each crop in the mixture should be adjusted below its full rate (Sullivan, 2003). As cited by (Alemitu, 2011), Chemed (1997) reported that in bean\maize intercropping, the relative yield advantage increased to a maximum of 18% and increased total productivity. Similarly, Tolera et al. (2005) showed that intercrops produced 32 to 98% more yield per unit area of land than the component sole crops. The results showed that LER is better when cereals are intercropped with legume than when they are sole cropped (Tolera et al., 2005). Application of fertilizer in a recommended amount is essential for high yield and quality of grains (Morgado, 2003). The use of fertilizer is considered to be

one of the most important factors to increase crop yield per unit area basis, however, the response to the type of fertilizer and rate of application vary widely with location, climate and soil type (Marshner, 2002). Nitrogen deficiency occurs almost everywhere unless Nitrogen is applied as a fertilizer or manure (Desta, 1988). It has been reported that there was increased yield responses of pulse for nitrogen fertilizer (Morgado, 2003). Phosphorus is the second limiting element after nitrogen for plant growth (Tolera et al., 2005). Phosphorus deficiency is also the major constraints to the growth of legumes in many soils (Desta, 1988). Beans respond to the application of phosphorus and production increase proportionally with increase of phosphorus fertilizer (Tolera *et al.*, 2005). Many research on legume indicated that phosphorus availability in the soil is a great limitation for bean production in tropics ((Morgado, 2003). Application of fertilizer on haricot bean production could vary depending on area of production and soil fertility. As cited by (Alemitu, 2011), according to the regional Agricultural bureau extension program manual (2006), Setegne and leggesse (2003), the recommended fertilizer rate, is 100 kg DAP ha⁻¹ and 50 kg ha⁻¹ UREA.

Weeds are major constraints in pulse production in Ethiopia, particularly in the low lands, where competition between crops and weeds is high due to the prevalent problem of moisture stress (Ali et.al, 2003). Proper weed controls crucial to ensure optimum crop performance but in pulse either the operation is not done at all or employed too late to provide any benefit to the crop. (Tenaw et.al.,1997).Crop loss assessment trials shows that uncontrolled weeds growth could result in over 36% yield reduction in haricot bean and more than 50% in soybean (Beyenesh,1988).in haricot bean production 2-3 times weeding is necessary for getting good yield. The first weeding is done after two weeks of the plant emergence and the second is 21-25 days after emergence (Setegne and leggesse (2003). Insect pest constitute a major constraints to sustainable production of haricot bean .The key pests in food legume crops in Ethiopia are aphids and bean stem maggot (Walle, 2002). The bean stem maggot and bean bruchids are the most important pest of haricot bean in the field and in storage respectively (Ferede .N, 1994). Control measure for pests are, intercropping and dressing the seed with 25gm premirol methyl for 10kg seed of haricot bean (Alemitu, 2011). Fungal and bacterial diseases are among the main production constraints in the major bean growing areas of the country (Fininsa and Yuen, 2002). The effect of diseases may be restricted to certain production systems, locations and cropping seasons (Habtu and Abiy, 1995). Among the listed disease of beans in Ethiopia, common bacterial blight, rust, anthracnose and angular leaf spot are economically important (Fininsa and Yuen, 2002). Using disease resistance

varieties, clean seed and intercropping are some of the control measures for haricot bean diseases (SARI, 1997, SARI, 2002). Timely harvest is important to reduce mold, bird and insect damage and also to decrease losses due to shattering and wet weather (Ali et.al, 2003). Crops may be harvested when they are physiologically mature. Haricot bean is harvested when the foliage of the crop is turned to yellow and before starting shattering (Setegne and Leggese, 2003).

2.1.4. Market participation of haricot bean farmers

Haricot bean has been an important export commodity for the Ethiopian economy for the last 40 years. It is the smallholder farmers in the low and mid-attitude zones of the country who use haricot bean, not only as source of income but also as source of food. Common beans are the most important food legumes for direct consumption in Ethiopia. Farmers grow common beans, which are consumed as dry bean, and snap beans (the green pods are consumed as a vegetable) (Agete, 2014). The demand of Common beans produced in Ethiopia is increasing in the world because about two-thirds of the world's population relies on a largely vegetarian diet. Furthermore, production and export of common beans are increasing due to new markets created in the developed world, by the increasing number of vegetarian consumers (Ferris and Kaganzi, 2008; Wortmann, 2006; Rubatzky and Yamaguchi, 1997). The crop is used as source of foreign currency, food crop, means of employment, source of cash, and plays great role in the farming system (CSA, 2005). As cited by Alemitu (2011) according to EPPA (2004) in the year 2000, 2001 and 2002 Ethiopia exported 23994.4, 32932.7 and 42127.0 tones and earning 8.2, 9.98 and 13.2 million USD respectively. The same study revealed that the main destination markets were Pakistan, Germany, Yemen, UK, South Africa, India and Mexico having 12.5, 7.8, 6.9, 5.79, 4, 4, 4 % share respectively. As stated by (Legese et.al, 2006), the country's exports of haricot beans have increased over the last few years, from 58,126 MTs in 2005 to 78,271 MTs in 2007 and Ethiopia gets 63 million dollar from haricot bean market in 2005. According to (Ferris and Robbins, 2004) White beans from the northern Rift Valley were sold into export markets to supply European canning factories and red beans were exported from the southern Rift Valley areas to supply drought affected areas in northern Kenya. The major storage and trading sites in the southern Rift Valley area are concentrated in the towns of Sodo, Awassa and Shashemene while the major collection centers for white beans being in Nazareth, prior to exportation through Djibouti (Ferris and Kaganzi, 2008). There are good prospects that this market will grow as consumers in

industrialized countries seek evermore competitive suppliers (Ferris and Kaganzi, 2008). For the major processing companies, Ethiopia is a relatively new source of supply and recent investments by a number of international companies from Italy, UK and Turkey indicate that market prospects are good (CIAT, 2008).

Integration of smallholders into markets is essential for sustainable development of the agricultural sector in agriculture-based economies World Bank (2008). Smallholder market participation depends on various factors including farm productivity, access to input supply and services, access to output markets Berhanu et al. (2009), transaction costs Key et al. (2000) and Alene et al. (2008), and Market participation defined as either purchasing or selling crop or livestock on the market Bellemare and Barrett (2006). Rios et al. (2009), defined market participation in terms of sales as a fraction of total output, for the sum of all agricultural crop production in the household which includes annuals and perennials, locally-processed and industrial crops, fruits and agro-forestry. The sales index would be zero for a household that sells nothing, and could be greater than a unit for households that add value to their crop production via further processing and/or storage Rios et al. (2009). The commonly used approach in the literature to estimate market participation decision is two stages. In the first stage, households that produce a particular commodity decide whether to be net buyers, net sellers, or autarkic in the market for that commodity. In the second stage, net buyers and net sellers determine the extent of market participation Key et al. (2000) and Holloway et al. (2005) and Bellemare and Barrett (2006). Reardon and Timmer (2005), argued that market participation is both a cause and a consequence of economic development. Markets offer households the opportunity to specialize according to comparative advantage and thereby enjoy welfare gains from trade.

In the earlier periods, international organizations have seen the market participation as a solution to increase the welfare of smallholders in developing countries and move them out from the poverty trap FAO (2006) and World Bank (2007). Infrastructures provision, improved technological, and capacity building have been put in place to help farmers to sell their products and increase household incomes. Equally, for more than twenty years, the transition from low productivity and semi-subsistence agriculture to high productivity and commercialized agriculture has played a central role in development and agricultural economics (Shewaye, 2015). According to Barrett (2008), there are two main arguments on why market participation of farm households is so important to economic growth and poverty

reduction in rural areas. One is it allows farmers to focus on the production of those goods in which they are skilled (i.e. they have a comparative advantage) and to trade the surplus for other goods and services they desire but for which they do not hold comparative advantage in production. On the other hand, it allows larger scale production, decrease of fixed production cost, and use of technology which all together leads to more rapid total factor productivity growth. Transaction costs are one of the barriers to smallholder resource poor farmers to participate in market. Fixed and variable transaction costs impact on market participation whereas amount sold or bought, only depend on variable transaction costs Holloway et al. (2000) and Okoye et al. (2010). If transaction costs are large, they need to be measured and explained. It is argued by DeJanvry and Sadoulet (2005) that, attempting to observe them directly will always underestimate their importance, quite likely by large amounts. However, that they can be derived from observed behavior. Transaction costs reflect the character of the market, but are mainly embedded in household characteristics and their economic environment Holloway et al. (2000); Makhura et al. (2001) and Okoye et al. (2010).

2.2. Empirical Review

2.2.1. Pulses value chain in Ethiopia

Through productivity and market improvements, the critical role of pulses in smallholder livelihood and food security can be expanded. The current productivity of pulses falls significantly below the demonstrated potential. For example, current average chickpea yields are 1.2 metric tons per hectare. Estimates suggest that productivity gains from improvements in planting techniques could double overall pulse production to two million tons over a period of five years. This gain in productivity would not only increase smallholder income by 40 to 70 percent per hectare, but would also ensure greater food security through meeting domestic pulse demand. But the demonstrated potential in Ethiopia is 2.9 tons per hectare if accompanied by the appropriate inputs (IFPRI, 2010)

The study also reported that challenges in the value chain; however, a set of constraints span the pulses value-chain in production, aggregation and trading, and demand sinks/export. High-level findings are presented as productivity is below potential due to: low input usage, especially chemical fertilizers capable of increasing yields in field trials by 10 to 80 percent; limited availability of seed and limited familiarity with the variety of existing pulse types, and; limited usage of modern agronomic practices. Aggregation and trading: the link between

the producers and the export markets is weak, due to the large number of ineffective intermediaries operating in the value chain. The intermediaries have failed to acquire scale and operate in limited geographic areas. The fragmentation of intermediaries between the producer and consumer markets creates a lack of transparency in markets. Export: while there has been substantial growth in recent years, the current export market is underdeveloped. The less developed fragmented exporters operating at smaller scale in the market results in inconsistent export flows and thus, inconsistent demand for exports. The major causes of limited export development are (i) inadequate market intelligence (ii) inability to leverage scale efficiencies due to smaller size and (iii) non-conducive the business environment due to missing credit and insurance; and (iv) inconsistent policy interventions (IFPRI, 2010)

2.2.2. Factors affecting production and marketing of haricot bean

Wogayehu and Tewodros (2015) were studied on factors affecting production and market supply of haricot bean in Southern Ethiopia and revealed that the result of the log linear regression shows it is possible to increase production of haricot bean by increasing the supply of seed, fertilizer, non-farm activities and labor. These variables significantly influence production positively. From the estimates of supply function, selling price and production amount positively and significantly affect marketable supply, but consumption significantly influences market supply negatively. Hence by increasing production and selling price, market supply can be improved. The policy implications of the present findings are to have increased and diversified non-farm activities, with increased input delivery which would have great contribution in increasing haricot bean production and market supply in the area.

Even though haricot bean has important opportunity in the economy, the value chain of this crop is highly constrained by many problems which encompasses of inadequacy of improved haricot bean seed multiplication and distribution, lack of awareness about the need to produce preferred quality of haricot bean to world market and inadequacy of access to information by value chain actors. Additionally, lack of appropriate marketing infrastructure in the haricot bean producing areas as well as in the main terminal market are also bottlenecks. On the other hand, based on the value chain analysis of haricot bean study conducted by Bethlehem (2013), Shaun et al. (2010), Abebe et al. (2010) and Rubyogo et al. (2011) appraised the fact that white haricot bean producing small-scale farmers are often constrained by inadequate supply of improved seeds, fertilizer, agrochemicals, market outlets, limited efforts in market linkage activities and credit institutions. In addition to these factors, The major problems of

the value chain are limited improved seed supply, poor extension service resulted in quality deterioration, price volatility, prevalence of haricot bean diseases and rainfall scarcity, basically affecting productivity and quality of haricot bean ultimately leading to low competitiveness and inability to offer premium price for quality in the local and ECX market for export. Moreover, haricot bean producers are at very subsistence level of farming due to small land size allocation to haricot beans (average land allocation less than 0.46 hectare), poor usage of chemical fertilizer for haricot bean production, limited access to credit, poor market information which leads to poor market linkages are factors constraining haricot bean sector. If these problems are fixed in the value chain, haricot beans will become a highly attractive local and export commodity in the study area.

In low income countries the agricultural sector is essential to growth, poverty reduction, and food security. Pulse crops are important components of crop production in Ethiopia's smallholders' agriculture, providing an economic advantage to small farm holders as an alternative source of protein and other nutrients, cash income, that seeks to address food security. Kabata et al., (2017) were studied on an understanding of determinants and constraints to production and usage of pulse crops based on data collected in 2013 from 256 households in Oromia region of Ethiopia and reported that determinants of production and consumption were identified using logistic regression. The results show that Haricot bean was produced, but not widely consumed. Lentil was widely consumed but not produced. Production of haricot bean was hampered by problems related to weed control, disease, pests, yield and soil quality, a seasonal market, and a shortage of farmland. Consumption of haricot bean was low due to perceived gastrointestinal distress after eating and the culture of it being a taboo food. Logistic regression showed household head, educational status and age, land size and household size statistically significantly ($p\text{-value} < 0.05$) affected household pulse (haricot bean and lentil) consumption frequency. Agronomic, market, culture and household characteristics related determinants and constraints were identified. Also a mismatch of production and consumption was observed in the study.

Former studies on other agricultural produce marketing and sales also revealed a lot of socio-economic actors that influencing recent agricultural produce marketing. Ayelech (2011) identified factors affecting the marketable surplus of fruits by using OLS regressions and 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. The market chain analysis of honey production was studied by Assefa (2009) in Atsbi by using econometric OLS model and reported three important variables such as quantity of honey produce, price of honey and education level of the household head were found to be significantly affecting the household marketable supply of honey at household level. The sets of forces that can drive changes in agricultural value chains are shifts in market demand and shifts in technology or other factors affecting supply (Haggblade et al., 2012). The main determinants of market supply are product price, provision of consumer goods, production cost, market supply costs and political factors which include the level of government intervention. Among this the more important variable which influences the behavior of the market supply of producers is price. If price increases, producers will gain high revenue and would be motivated to increase the market supply (Wolday, 1994; cited in Muhammed, 2011). More generally, the most widespread factors which are affecting economic opportunities of actors in agricultural value chains are end markets, business enabling environment, vertical and horizontal linkages, supporting markets-including finance and other sector and non-sector specific services, firm-level upgrading, power dynamics among firms, access to learning and innovation and distribution of benefits.

2.3. Conceptual Framework of the Study

In order to provide an answer to the problem statement, structure for the study is required. This structure was ruled for covering relevant stakeholders and variables. Production-to-consumption approach was applied. Michael Porter's value chain model was followed in this particular study. Michael Porter was the first person who introduced the term "value chain" in his book competitive advantage: creating and sustaining superior performance (Porter 1985). Michael Porter defines "value chain" as a representation of a firm's value-adding activities, based on its pricing strategy and cost structure. The ability of any firm to understand its own capabilities and the needs of the customer is crucial for competitive strategy to be successful. The first steps in conducting the value chain analysis are to break down the key activities which involve in the frame work. The next steps are to assess the potential for adding value through the means of cost advantage or differentiation. Finally, it is very important for the analyst to determine the strategies that focus on those activities that would enable the company to attain sustainable competitive advantages. The profitability of a firm depends on how effectively it manages the various activities in value chain; price that the customer is willing to pay for the company products and services exceeds the relative cost of the value chain activities. The value chain mainly focuses on the market collaborating strategy, where

it emphasized the linkages between production, marketing etc. activities of the products and services in an effective and efficient manner. Vertical alignment is also an important aspect where companies connect one end of the primary activities up to the last end of the supportive activities, at each stage of the products which to increases value.

Porter's value chain model is too broad and beyond capacity of this particular study. Therefore, to address the objectives, this study was focused on the following framework due to owning time and financial constraints. The specific conceptual model was established below (figure 3).

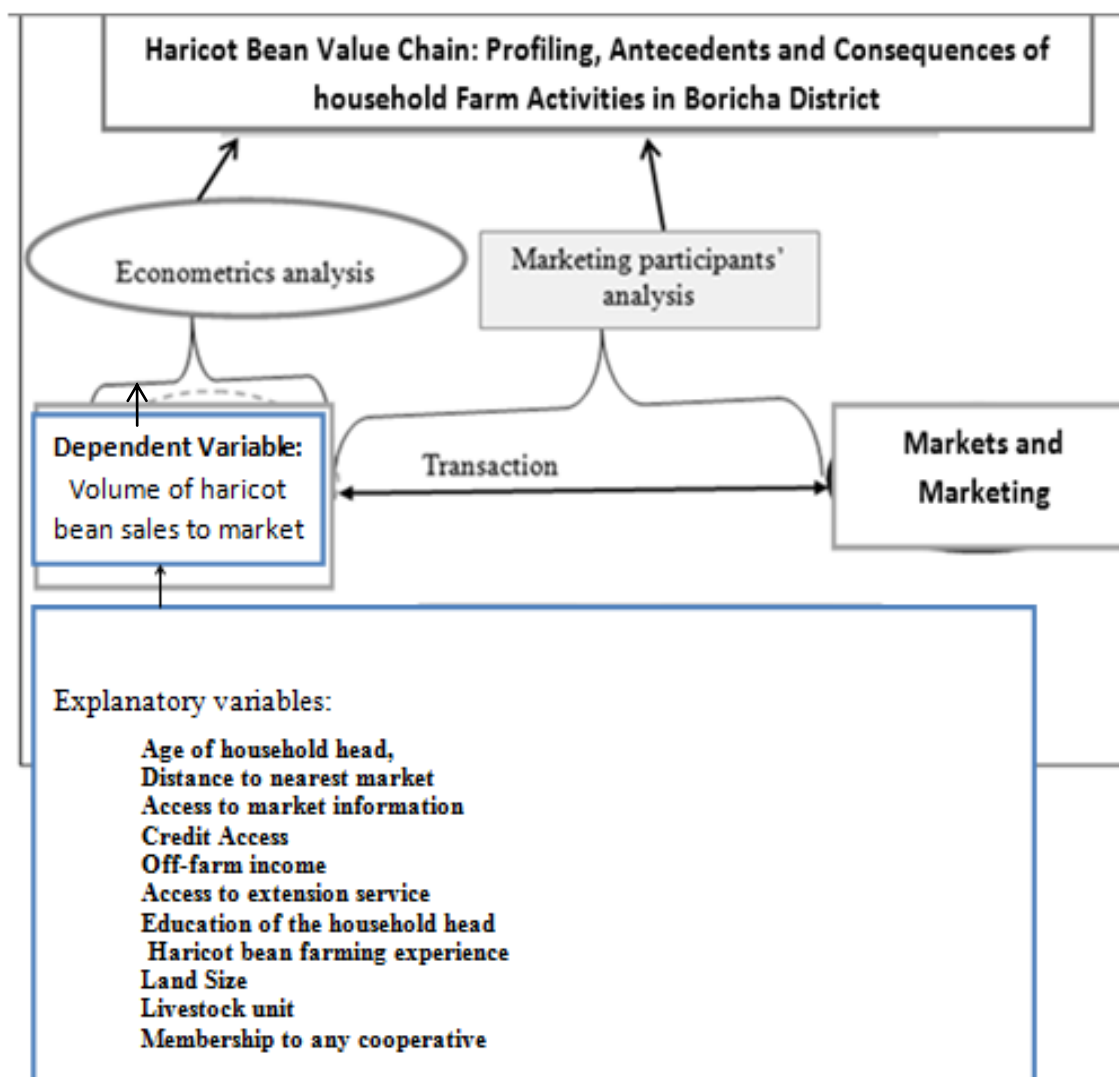


Figure 3: Conceptual model of this study

Source: Own sketch

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Description of the Study Area

Sidama zone is part of Southern Nations, Nationalities and Peoples Regional State (SNNPRS) of Ethiopia. It is one of the highly populated areas in Ethiopia. Sidama is currently divided into 19 districts and characterized by three agro-ecological zones: the dry midlands/lowlands (20%), the midlands (48%) and the highlands (32%). The livelihood strategy in Sidama Zone is mixed agriculture (crop and livestock production) system. Major crops grown include: enset, coffee, maize, wheat, teff, barley, haricot bean and khat. There are two cropping seasons in Sidama Zone: belg and meher. Belg rains are mainly used for land preparation and planting of long cycle crops such as maize and sorghum and seed bed preparation for meher crops. The meher rains are used for planting of cereal crops like barley, teff, wheat and vegetable crops. Besides, meher rains are also responsible for the growth and development of perennial crops such as enset, coffee and khat.

Boricha district: is located in Sidama, 306 kilometers south of Addis Ababa. Its geographical location extends from 6°46'N and 38°04'E to 7°01'N and 38°24'E. Administratively the *District* is divided into 39 rural and 3 urban *Kebeles*. According to the 2007 census the total population of the *District* is 250,260 consisting of 125,524 males and 124,736 females. From these 10,402 are urban inhabitants and 239,858 rural. The *District* has an estimated land area of 603.45 square kilo meters. Altitude varies between 1700 and 2000m above sea level and the area is characterized by low land agro-ecological zones. Rain fall ranges between 647-1242 mm and temperature varies between 28-33c⁰. Rainfall is bimodal occurring in two growing seasons, namely the *belg* growing season (extending from March to May) and the *kiremt* growing season (extending from June to August). “*Belg*” season is a period of land preparation and planting of crops like maize, enset and potato. During “*kiremt*” season crops such as *Enset*, potato and sweet potato are grown. Haricot bean and maize are the main potential crops in the area. In general mixed agriculture (crop and livestock production) is practiced in the study area.

3.2. Research Approach

Both qualitative and quantitative methods approach was used to meet the overall objective of the study and to answer research questions and to explain the objectives of the study. According to Loose (1993), a quantitative (deductive) research entails the development of a conceptual and theoretical structure prior to its testing through empirical observation. Deductive or quantitative research conventionally commences by analyzing the literature to identify a single selected problem/knowledge gap leading to the isolation of the major research question(s) in which the existing knowledge may be inadequate (could be identified gaps between existing theories or evidence, contradictions to be explored, or new contexts for applying previous findings. The qualitative method was used to describe the value chain actors who enter into haricot bean production and marketing activities to maximize benefit from the resources available and to expand marketing operations in order to increase their wealth.

3.3. Research Design

In order to address the objectives of the study, both primary and secondary data was used. Both primary and secondary sources data were collected for this study while considering the research objectives. Primary data was collected using informal and formal surveys, and from key informants. The formal survey was undertaken through formal interviews with randomly selected farmers, traders and cooperatives using a pre-tested semi-structured questionnaire for each group. Key informant interview and group discussions were also carried out with extension service providers such as, concerned agricultural office experts, development agents and model farmers. Secondary data which is supposed to support the primary data was collected from all concerned bodies including report of Regional, zonal and district agricultural and natural resource development sectors, journals, related books, and internet browsing. In addition to this, secondary data were collected from published and unpublished sources such as Central Statistical Authority (CSA), Bureau of Agriculture and Natural Resource Development (BoANRD), Bureau of Trade and Industry (BoTI), libraries, and other sources.

3.4 Reliability and validity Analysis

In order to reduce the possibility of getting the wrong answer, attention was paid on the reliability and validity of the questionnaire. Different steps were taken to ensure the validity and reliability of the study: Independent questionnaires were designed for both producers and traders. Enumerators who have college degree working in the district rural area as development agents were recruited and trained on the techniques of data collection. After they were made aware of the objective of the study and content of the questionnaires, a pre-test was conducted under the supervision of the researcher. Some adjustments were made to the questionnaire and the final data used in the research were collected under continuous supervision to ensure an appropriate data collection.

The reliability of the scale was established by conducting reliability analysis where the items internal consistency was measured using Cronbach's alpha (α) coefficient, the coefficient of which ranges between 0 and 1 (Cronbach, 1951). George and Mallery (2003) stated that if the Cronbach's alpha coefficient is closer to 1.0 the reliability of the items in the scale is greater and thereby Alpha value threshold is at 0.7. Table 3.4.1., Reveals that volumes of haricot bean sales had the greatest reliability ($\alpha = 0.79$). Therefore it indicates that the variables studied were all reliable as they were within the 0.7 threshold.

Table 3.4.1:- Reliability Statistics

Variable	Cronbach's Alpha	N of Items
Volumes of Haricot bean Sales	0.79	18

Source: Survey result, 2017

3.5. Population Sampling Design

Sample frame is a list of all those within a population who can be sampled, and may include individuals, households or institutions. Accordingly, the sampling frame of this specific study consist a district from Sidama zone, three haricot bean potential kebeles, producers and traders. Multistage sampling technique was implemented in selecting sample from haricot bean producers' kebeles and households. In the first stage, holding discussion with development agents (DA), out of 39 kebeles 20 haricot bean potential kebeles were

identified. In the second stage, 3 sample kebeles namely “Harino Badelicha, Sadamo Chala and Sadamo Dikicha kebeles were selected randomly. In the third stage, out of 2644 total target population, 180 haricot bean producers were selected using a random sampling technique. Accordingly, sample size is distributed based on proportional to the population size of the selected kebeles (Table 1). Haricot bean traders and cooperatives also were sampled and interviewed along the chain from Boricha village markets, Hawassa and Addis Ababa. Additional data was also collected from haricot bean value chain support providers and influencers along the chain.

To obtain haricot bean representative sample size, simplified formula provided by the Khotari (2004), sample size determination formula used in order to decide the size of sample population:

$$n = \frac{Z^2 * N * p * q}{e^2 (N - 1) + Z^2 * p * q}$$

Therefore, by using the formula using $Z = 1.96$ to 95%, $p = 0.5$, $q = 1 - p$ and $e^2 = 0.07$ values and the sample size calculated $n = 180$ (156 male and 24 female) which is the necessary sample size of the study.

Where: N = total households; n = size of the sample; Z = standard variation at a given confidence level; P = proportion of successes; q = proportion of failures; e^2 = acceptable error

Table 1., Sample size and sample distribution by Kebeles

Sample Kebeles	Sample Household Producers	Selected Size of Sample
Harino Badalicha	1088	74
Sadamo Chala	1200	82
Sadamo Dikicha	356	24
Total	2644	180

The total population of traders and cooperatives are very small along haricot bean value chain; hence the representative samples were taken purposively from different stage. Moreover, haricot bean traders such as 15 local collectors or assemblers, 17 wholesalers, 10 retailers, 3 primary cooperatives from Boricha district, 4 exporters from Addis Ababa, one

cooperative union and one farmers' cooperative federation from Hawassa were interviewed along the chain.

3.6. Methods of Data Analysis

Descriptive statistics and econometric analysis was used to generate information for each specific objective of this study. The raw data was systematically organized and recorded in Statistical Package for Social Sciences (SPSS) and imported and analysed by STATA version 14. This due Statistical Package for Social Sciences (SPSS) is more portable for data feeding whereas, STATA is simpler to analysis recorded data. To address objectives of the study, descriptive statistics like minimum and maximum value, Percentages, means, standard deviations, t-test, χ^2 -test, F-test figure and graph was used to describe socio-economic characteristics and demographic data of sample households

3.6.1. Value chain Mapping

Value chain analysis is a process that requires four interconnected actions: data collection and desk research, value chain mapping, analysis of opportunities and constraints, and vetting of findings with stakeholders and setting strategies for future actions. These four actions are not necessarily sequential and can be carried out simultaneously. This study followed production-to- sales systems approach to better understand the analysis of haricot bean value chain: profiling, antecedents and consequences of household farm activities. But, this study limed to two types of value chain analysis such as mapping the value chain and identifying marketing margins of main chain actors. Steps followed in mapping of haricot bean value chain of the study district are:(1) mapping the core processes in the value chain, (2) identifying and mapping the main actors' involved in these processes, (3) mapping flows of products, information and knowledge, (4) mapping the volume of products, numbers of actors and jobs, (5) mapping the geographical flow of the product or service, (6) mapping the value at different levels of the value chain, (7) mapping relationships and linkages between value chain actors, (8) mapping business services that feed into the haricot bean value chain.

The concept of marketing margin was applied for examination of relative haricot bean value chain actors' benefit share. To calculate actor's share along marketing chain from study area to end domestic market, quantity of specific volume was measured. For this particular study 1 quintal of haricot bean produce was taken to calculate marketing margins. This line with Mendoza (1995) who reported that comparing the total gross marketing margin (TGMM) is

always related to the final price or the price paid by the end consumer and then expressed as a percentage. Mendoza (1995) again advises marketing researchers to emphasize on gross marketing margins in reporting their findings. In similar way, in this study, gross marketing margin was considered instead of NMM at stage. The TGMM obtained by using the following formula:

$$\text{TGMM} = \frac{\text{End price} - \text{producer gate price}}{\text{End market price}} \times 100 \dots\dots\dots \text{equations (1)}$$

Where TGMM is total gross marketing margin;

$$\text{GMMp} = 1 - \text{TGMM} \dots\dots\dots \text{equations (2)}$$

Where GMMp is producers' share which is the proportion of the price paid by consumer that belongs to the producer

$$\text{Value added} = \text{Value of sales} - \text{Cost of intermediate goods (material costs, marketing costs)} \dots\dots (3)$$

3.6.2. Multiple Regression Analysis

In this study, multiple linear regression model was used to identify factors affecting farm level volume of haricot bean supply to the market because, all haricot bean producers were participated in the market and they supplied different quantity. Analysis of factors affecting the relationship between antecedents of value chain activities of household farmers with the supply volume for market was found to be important to identify factors constraining haricot bean supply for market. This model is also selected for its simplicity and practical applicability and based on the relationships of independent variable and explanatory variables. The specification of model is presented below

The econometric model of this study was specified as: $Y_i = F(X_{ij})$:

Where Y_i = Volume of haricot bean sales to market

X_{ij} = Explanatory variables as defined below:

X_1 = Age of household head

X_2 = Distance to nearest market

X_3 = Access to market information

X_4 = Credit Access

X_5 = Off-farm income

X_6 = Access to extension service

X_7 = Education of the household head

X_8	=	Haricot bean farming experience
X_9	=	Land Size
X_{10}	=	Livestock unit
X_{11}	=	Membership to any cooperative
X_{12}	=	Family Size
X_{13}	=	Marketing costs of haricot bean

Econometric model specification of supply function in matrix notation is the following:

$$Y = X'\beta + u_i \dots \dots \dots (4)$$

Where: Y = is Volume of haricot bean Sales to market,

X' = Vectors of explanatory variables,

β is a vector of parameters to be estimated,

u_i = disturbance terms

Specification of errors: It was indispensable to test multicollinearity problem among continuous variables and check associations among discrete variables, which seriously affects the parameter estimates. According to Gujarati (2003), multicollinearity refers to a circumstance where it becomes difficult to identify the separate effect of independent variables on the dependent variable because of existing strong affiliation among them. The two measures that are often recommended to test the existence of multicollinearity are Variance Inflation Factor (VIF) and Contingency Coefficients (CC). Thus, Variance Inflation Factor (VIF) is used to check multicollinearity among continuous variables. As a rule of thumb, if the VIF is greater than 10 (this will happen if R^2 is greater than 0.90), the variable is said to be highly collinear (Gujarati, 2003). A measure of multicollinearity associated with the variance inflation factors is computed as:

$$VIF = \frac{1}{1 - R_i^2} \dots \dots \dots (5)$$

Where: R_i^2 is the multiple correlation coefficients between explanatory variables, the larger the value of R_i^2 is, the higher the value of VIF_i causing higher collinearity in the variable. Contingency coefficient is used to check multicollinearity or association between discrete variables. The value ranges between 0 and 1, with 0 indicating no association between the variables and value close to 1 indicating a high degree of association between variables. A popular measure of multicollinearity associated with the CC is defined as:

$$CC = \sqrt{\frac{X^2}{N + X^2}} \dots\dots\dots (6)$$

Where, CC is contingency coefficient, X^2 is chi-square test and N is total sample size. If the value of CC is greater than 0.75, the variables are said to collinear

Test for heteroscedasticity had undertaken for this study. Heteroscedasticity refers to the case in which the variance of the error term is not constant i.e. heteroscedasticity occurs when the variance of the error term change with changes in explanatory variables. In existence of heteroscedasticity (i) the least squares (OLS) estimators are still unbiased but inefficient (ii) the estimates of the variances are also biased and as a result the tests of significance will become invalid. If we persist in using the usual testing procedures despite the presence of heteroscedasticity, whatever conclusions we draw or inferences we make, may be very misleading. There are a number of test statistics for the detecting heteroscedasticity; According to Gujarati (2003) there is no ground to say that one test statistics of heteroscedasticity is better than the others, but White's Heteroscedasticity testing was applied in this thesis.

3.7. Variables of the Study and Their Measurements

Volume of haricot bean Sales (Y_i): It is continuous dependent variable used in the multiple linear regression model equation. It was measured in quintal (100kg) and represents the actual supply by haricot bean farm household to the market in the survey year.

It is not possible to include a complete list of all possible variables that could affect the household level of agricultural products supply for markets in general and haricot bean supply for market in particular. But, the potential variables which were supposed to influence the quantity of haricot bean supply for market in study district was included. Therefore, the 13 explanatory variables expected to influence the dependent variable are the following:

Age of Household Head: Aged households are believed to be wise in resource use, on the other hand young household heads have long investment horizon and it is expected to have either positive or negative effect on volume of haricot bean sales. Adugna (2009), who found that age of the household head have negative effect on the elasticity of onion supply to the market, which shows that older households are tradition bounded and expected to be reluctant to take up new technologies. Hence it will negatively affect haricot bean production and

supply. Chalwe (2001), studied that age of household head has been synonymous with farming experience.

Distance to Nearest Market-the closer the market, the lesser would be the transportation charges, reduced walking time, and reduced other marketing costs, better access to market information and facilities. In this study distance to nearest market is expected to affect volume of haricot bean sales negatively. Similar issue was studied by Ayelech (2011) on fruit market in Goma Woreda identified that poor market access has significant and negative effect on quantity of avocado and mango supplied. Also those households who are close to market were assumed to have more probability to choose better market outlet. In this study, distance from market is expected to influence the decision of farmers to choose the wholesalers market outlet.

Access to Market Information is a variable expected to influence market supply positively. 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 is expected that market information is positively related to market supply of haricot bean. 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 haricot beans for market. Muhammed (2011) who found that if wheat producer gets market information, the amount of wheat supplied to the market increases. It is also expected that market information is related to decision of marketing channel and price of the product.

Credit Access indicates credit taken for haricot bean production. Access to credit would enhance the financial capacity of the farmer to purchase the inputs, thereby increasing haricot bean production and market share size. Therefore, it is expected that access to credit would have positive influence on level of production and sales. Alemnew (2010) and Muhammed (2011) who found that if pepper and teff producer gets credit, the amount of pepper and teff supplied to the market increases. Therefore, it is expected that access to credit would have positive or negative influence on level of production and amount of haricot bean supplied to market.

Off-farm income is expected to determine the productivity of haricot bean positively. This is because, those farmers earn high off farm income could have the capacity to purchase

agricultural inputs that would improve productivity of haricot bean. Off-farm income was found to be positively related to sesame output (Kinde, 2005).

Access to Extension Service is representing extension services as a source of information on technology. It is expected that extension service widens the household's knowledge with regard to the use of improved technologies and has positive impact on haricot bean sale volume. Therefore, this variable is expected to influence volume of haricot bean sales positively. Ayelech (2011) found that if fruit producer gets extension, the amount of fruits supplied to the market increases. Access to extension is also assumed to have direct relation with market outlet choice of haricot bean producers.

Education of the Household Head: 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 expected to influence volume of haricot bean 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. Therefore, this variable is expected to influence yield and volume of haricot bean sales.

Haricot bean Farming Experience: It is the total number of years a farmer stays in production of haricot beans. A household with better experience in haricot bean farming is expected to produce more amounts of haricot bean and, as a result, he is expected to supply more amounts of haricot bean to market. Farmers with longer farming experience are expected to be more knowledgeable and skillful (Ayelech, 2011). Therefore, this variable is expected to positively influence haricot bean marketable surplus.

Land Size: This refers to the total area of land that a farm household owned in hectares. 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.

Livestock: Farmers who have a number of livestock are anticipated to specialize in livestock production so that they allocate large share of their land for pasture. Study by Rehima (2006) on pepper marketing showed that TLU showed a negative sign on quantity of pepper sales. On the other hand, it is assumed that household with larger TLU have better economic strength and financial position to purchase sufficient amount of input (Kinde, 2007). But for this study TLU is expected to influence volume of haricot bean sales negatively.

Family Size: Family size of a respondent is a continuous variable measured in terms of number of family members in the household. As haricot bean production is labor intensive activity, haricot bean production in general and market supply of haricot bean products in particular is a function of labor. Accordingly, families with more household members tend to have more labor which in turn increase haricot bean production and then increase haricot bean 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 is expected to influence positively the volume of haricot bean supply to the market. Gezahagn (2010) who found that family size have positive effect on the households' gross income from groundnut production.

Membership to any Cooperative: Thus cooperatives improve understanding of members about market and strengthen the relationship among the members. Therefore, it is expected to be associated with market outlet choice decision of haricot bean producers.

Marketing costs of haricot bean: Specifically transport costs incurred by actors to move haricot bean produce from one place to next markets or end markets. This variable is expected to have negative influence on the market outlet choice of haricot bean producers. The availability of transportation facilities helps reduce long market distance constraint, offering greater depth in marketing choices (Jagwe, 2007).

Table 2: Description of the dependent and independent variables used in the model

Variables used in the model (code)	Description of variables	Variable category	Value (measurements)
Y_i	Volume of haricot bean sales for market	Continuous	Quintal
X_1	Age of household head	Continuous	Number of years
X_2	Distance to nearest market	Continuous	Kilometers
X_3	Access to market information	Dummy	0= no, 1= yes
X_4	Credit access	Dummy	1 = if the household takes loan and 0 = otherwise
X_5	Off-farm income	Continuous	ETB
X_6	Access to extension service	Dummy	1 = if haricot bean producer household has access to extension service and 0 = otherwise
X_7	Education of the household head	Continuous	year of schooling
X_8	Haricot bean farming experience	Continuous	Number of years
X_9	Land Size	Continuous	Hectare
X_{10}	Livestock unit	Continuous	Measured in tropical livestock unit
X_{11}	Membership to any cooperative	Dummy	1 if the household have membership to any cooperatives engaged in any business, 0 = otherwise
X_{12}	Family Size	Continuous	Number of family
X_{13}	Marketing costs of haricot bean	Continuous	ETB

CHAPTER FOUR

4. RESULTS AND DISCUSSION

In this chapter, the major findings of the study were presented. It has four main sections and other related sub-sections. The main four sections those are included in the chapter demographic and socio-economic characteristics of sample respondents, factors affecting inbound logistics and outbound logistics of haricot bean value chain activities and determinants of quantity of haricot bean supply to market.

4.1. Socio-economic and Demographic Characteristics of Sample Respondents

Table 3 presents the characteristics of the haricot bean producer sample respondents with regard to their age, family size, education level, haricot bean farming experiences, total land HH owned HH income sources. The average age of the sample households was 43 years. The survey result showed that most of haricot bean producers are found under productive age. The mean family size of HH in study district was 5 persons. The average education level of HH was 4 (numbers of schooling (grades)). But education level is a vital factor for skill development and enhancing marketing decisions in business in general and haricot bean business in particular. Formal education of HH that determines the readiness to accept new ideas and innovations, and easy to get supply, demand and price information and this enhances farmers' willingness to produce more and increase volume of sales. The average haricot bean farming experience was 11 years. The numbers of male haricot bean producers was larger than female haricot bean producers in study district. Of the total haricot bean producer sample respondents, 86.2% were male-headed households and only 13.8% were female-headed in study districts. The motivation behind this was most of rural households are male headed and they have access to and control over resources. For more than 32.8% of haricot bean producers were not obtained extension services for haricot bean production in study area (table 2).

Table 3: Socio-economic profiles of sampled producers (N=180)

Variables		Mean	SD
Age (Year)		47	7
Family size (No.)		5	0.15
Education level (Grade)		4.4	1..24
Haricot bean farming experience (Year)		11.57	2.31
Total land owned (ha.)		1.13	0.05
Livestock in tropical Livestock Unit		2.024	0.114
Off-farming income in birr		5255.60	525.10
On-farming income in birr		12968.44	698.60
Sex of HH		Percentage (%)	
	Male	86.2	
	Female	13.8	

Source: Own survey results, 2017

The main demographic and socioeconomic distinctiveness of sample traders were presented in table 4. The average age values of traders are implying involvement in haricot bean trading is mainly the work of youth than the older class. The haricot bean marketing activities such as assembling, loading and unloading need more physical strength. This could be qualified to the fact that the youth is physically powerful and participating haricot bean trading at this stage. The mean education level of trader was relatively higher than the mean education level of producer. Haricot bean traders who had formal education level perhaps show readiness to accept new ideas and innovations, easy to get supply, demand and price information and this enhances trader willingness to operate business more and increase their benefits.

Table 4: Socio-economic profiles of sampled traders (Average)

Variables	Haricot bean traders			
	Collectors (N= 15)	Wholesalers (N=17)	Retailers (N=10)	Exporters (N= 4)
Age	29	32	28	43
Family size	4	3	4	8
Education level	3	8	8	17
Haricot bean trading experience	7	5	5	15

Source: Own survey results, 2017

4.2. Profile of Haricot Bean Value Chain

4.2.1. Mapping of haricot bean value chain

In study area, the haricot bean value chain starts from input supply. Haricot bean value chain analysis in this study describes the full range of activities that bring haricot bean from producers to final users. Figure 4 maps show the haricot bean value chain actors and their successive activities/functions of study district. Value chain map of haricot bean shown below (figure 4)

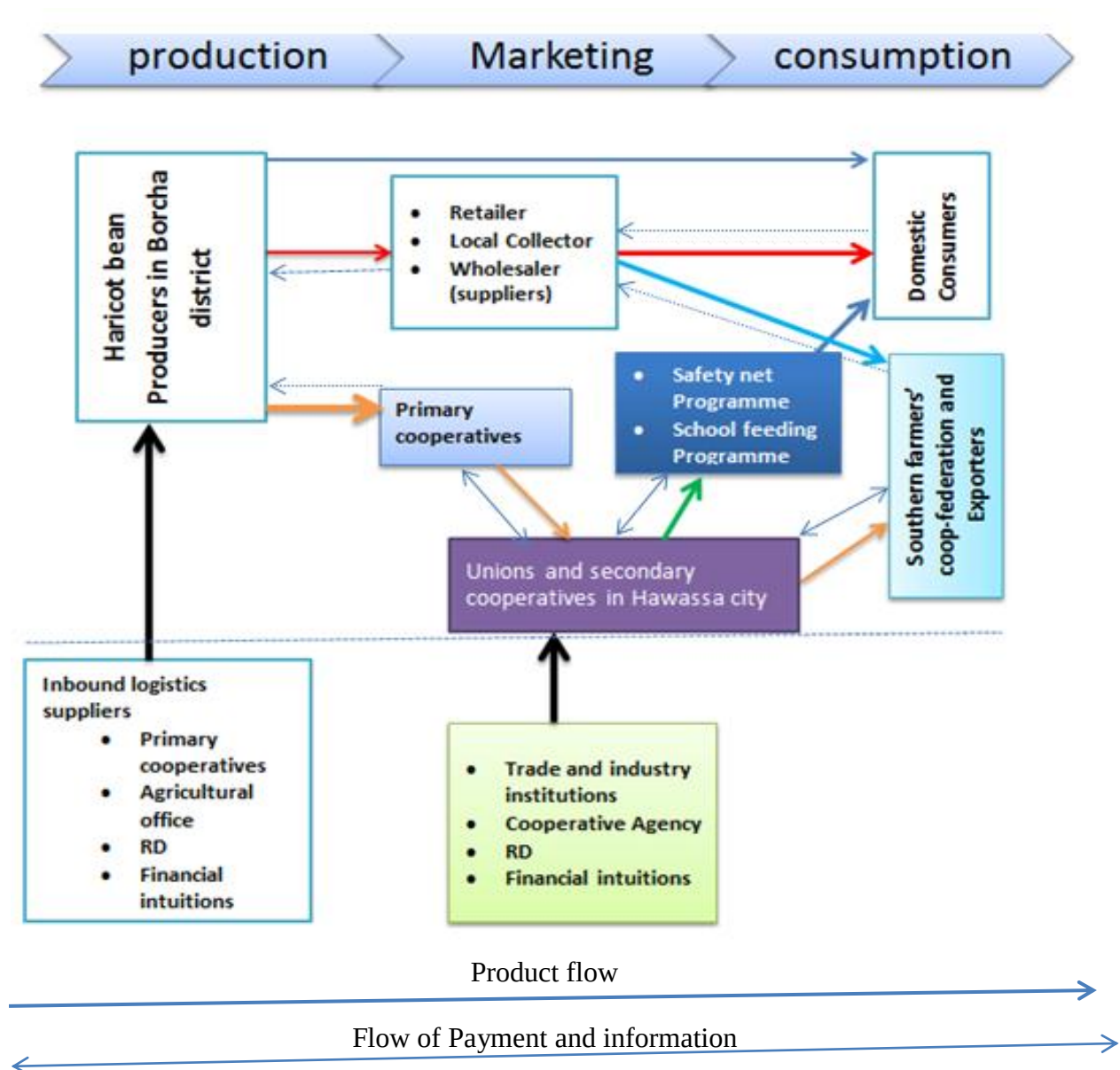


Figure 4: Value chain map of haricot bean

Source: Own draft from survey result, 2017

The main haricot bean chain actors in study areas are input suppliers, producers, local collectors, wholesalers (suppliers), retailers, primary coops, unions, farmers' federation and exporters. Haricot bean producers are the major actors who perform most of the value chain functions. The major functions of haricot bean include production, harvesting and marketing. Transactions were conducted at farm gates to roadsides, or local markets. Prices were fixed by negotiation between producers and buyers. From total volume of 1211.50 quintal haricot bean produced by respondents in survey year, 1059 quintal was sold and the remained was consumed. According to sampled respondents, extension services were critical factor to haricot bean production. Lack of or out reached extension service for haricot bean was significantly affects both the amount of produce and volume of sales in study district.

Value chain activities are to create value that exceeds the cost of providing the product or service. Thus according to sample respondents, in generating a profit factors affecting haricot bean value chain activities in study area were access to inputs to produce haricot bean, lack of access to credit, lack of extension service, scarcity of land, lack of quality seeds, low managerial skill, lack of market information, climate change, lack of market, lack of support activities, distance from access roads and low selling price. According to Porter all the primary value chain activities are facilitated by support activities. However, low managerial skills or farming experiences, lack of access to credit, lack of access to extension service, distance from access roads and lack of support activities are major challenges of haricot bean value chain activities.

4.2.2. Marketing margin: value addition along the chain (TGMM)

Marketing margins are the difference between prices at two market levels. The term market margin is most commonly used to refer to the difference between producer prices of an equivalent quantity and quality of a commodity. However, it may also describe price differences between other points in the marketing chain. The concept of marketing margin was applied for examination of relative haricot bean value chain actors' benefit share. To calculate actor's share along marketing chain from study area to Addis Ababa, variables such as price and volume of sales were measured. For this particular study 1 quintal of haricot bean produce was taken to calculate marketing margins. But, producers' share which is the proportion of the price paid by consumer that belongs to the producer and calculated by one minus TGMM, which was 31.39% i.e. haricot bean farmers share 31.39% out of the total value added (2389.36) along haricot bean value chain.

Table 5: Average haricot bean price along the main marketing chain

Actors	Sample respondents (N=180)			
	Buying price (selling price of producer) per quintal in ETB	Selling price per quintal in ETB	Margin	Share of benefits (%)
Collectors	750	950	200	8.37
Retailers	950	1200	250	10.46
Wholesalers/Suppliers	815	900	85	3.56
Primary Coops	740	850	110	4.60
Unions	850	1060	210	8.79
Farmers Federations	1060	1380	320	13.39
Exporters	900	1364.36	464.36	19.43
Total value added (GMM)			1639.36	68.61

Source: Own survey results, 2017

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

4.3. Antecedents of Value Chain Activities of Household Farmers with the Supply Volume for Market

Before running the OLS regression model, all the hypothesized explanatory variables were checked for the existence of multicollinearity and heteroscedasticity problem. The study used variance inflation factor to investigate the degree of multicollinearity among continuous explanatory variables and contingency coefficient among discrete (dummy) variables. A

statistical package known as STATA was employed to compute the VIF and CC values. Multiple linear regression models were employed to identify the factors. For the parameter estimates to be efficient, assumptions of Classical Linear Regression (CLR) model should hold true. Hence, multicollinearity and heteroscedasticity detection test were performed using appropriate test statistics.

If multicollinearity is less than perfect, the regression coefficients, although determinate, possess large standard error which means the coefficients cannot be estimated with great precision or accuracy. Test for multicollinearity show that, all VIF values are less than 10. This indicates absence of serious multicollinearity problem among independent continuous variables (Annex 1). Contingency coefficient (CC) results were indicated absence of serious multicollinearity problem among the independent dummy variables (Annex 1).

One of the assumptions of Classical Linear Regression Model (CLRM) is that the disturbance terms (error terms), in the regression equation have a common (constant) variance, that is known as the homoscedasticity assumption. If however, the error terms do not have a constant variance we say they are heteroscedasticity. Thus, heteroscedasticity occurs when the variance of the error term change with changes in explanatory variables. Heteroscedasticity by itself does not cause OLS estimators to be biased or inconsistent since neither bias nor consistency are determined by the covariance matrix of the error term. If Heteroscedasticity problems are exist, the least squares (OLS) estimators are still unbiased but inefficient and the estimates of the variances are also biased and as a result the tests of significance will become invalid. Accordingly, for this specific study, after OLS estimation the existence of heteroscedasticity was detected by White's Test. because the $\text{Prob} > \chi^2 = 0.1284$ or (p-value equals to 0.1284) i.e. the large p-value that not rejects the null of homoscedasticity that means there is no heteroscedasticity problems in the explanatory variables.

The overall goodness of fit of the regression model is measured by the coefficient of determination (adjusted R^2). It tells what proportion of the variation in the dependent variable is explained by the explanatory variable. Adjusted R^2 tends to give an overly optimistic picture of the fit of the regression, particularly when the number of explanatory variables is not very small compared with the number of observations (Gujarati, 2003). Over 85% of the household were correctly predicted out of the 180 households heads or the variability of the residual values around the regression line relative to the overall variability is small, the

predictions from the regression equation are good i.e. dependent variables , 85% explained by explanatory variables (Annex 2).

Haricot bean has been producing mainly for market and home consumption in study area. According to the study findings, all the sample households supplied haricot bean to market during the survey period. Analysis of factors affecting farm level marketable supply of haricot bean was found to be important to identify factors constraining quantity of supply to market since haricot bean supply is the core challenge to haricot bean value chain activities in study areas. To analysis the factors that influence haricot bean supply, 13 explanatory variables were included. The 13 independent variables (Age, family size, livestock, education, land size, haricot bean farming experience, distance from nearest market, credit access, access to market information, access to extension service, membership to any cooperative, off-farm income and marketing costs of haricot bean) were included in model analysis as determinants of haricot bean supply to market. The results were given below.

Table: Determinants of haricot bean supply to market

Independent variables	Coefficient	SE	t-ratio	P> t
Age in year	-0.110***	0.0298	-3.68	0.000
Family size in number	0.230**	0.1038	2.20	0.029
Livestock in tropical Livestock Unit	0.031	0.125	-0.24	0.807
Education in number of schooling	0.161**	0.072	2.27	0.024
Land size farmer owned in ha	4.420***	0.395	3.59	0.000
Haricot bean farming experience in year	0.134*	0.076	1.77	0.079
Distance from nearest market in km	-0.088	0.137	-0.64	0.522
Credit access (dummy variable)	0.384	0.495	0.78	0.43
Access to market information ((dummy variable)	0.348	0.608	-0.57	0.568
Access to extension service (dummy variable)	0.913*	0.544	1.68	0.095
Membership to any cooperative (dummy variable)	2.044***	0.475	4.31	0.000
Off-farm income in ETB	0.0002***	0.001	6.65	0.000

Marketing costs of haricot bean in EBT	-0.003***	0.001	-5.48	0.000
Constant (_cons)	2.791**	1.152	2.42	0.017

***, ** and * shows the values statistically significant at 1%, 5% and 10% respectively. SE indicates Standard Error

Source: Own survey results, 2017

The thirteen explanatory variables were imagined to determine the household level market supply of haricot bean. Among the 13 explanatory variables, only 9 variables (age, family size, education; land size, haricot bean farming experience, access to extension service, Membership to any cooperative, off-farm income and marketing costs of haricot bean) were found to be significantly affecting the household marketable supply of haricot bean at household level and this results were discussed as follows.

Age of Household Head: This variable was significant at 1%, significance levels and has a negative coefficient implying that aged households are believed to be wise in resource use, on the other hand young household heads have long investment horizon and this variable has negative effect on volume of haricot bean sales. The regression coefficient of the variable tells us that with the influence of other variables held constant, as age increases by 1 year, haricot bean supply to market decrease by 0.11 quintal. This is in agreement with Adugna (2009), who found that age of the household head have negative effect on the elasticity of onion supply to the market, which shows that older households are tradition bounded and expected to be reluctant to take up new technologies. Hence it will negatively affect haricot bean production and supply.

Family size: It affects haricot bean market supply positively and significantly at less than 5% significance level. Haricot bean production is labor intensive activity, agricultural production in general and market supply of haricot bean products in particular is a function of labor. Availability of labor likely influenced the availability of working force in the house hold. Accordingly, increase with one more household labor which in turn increases haricot bean market supply by 0.230 quintal. On the other hand, Gezahagn (2010) who found that family size have positive effect on the households' gross income from groundnut production. Family size in this particular study has significant effect on the quantity of haricot bean supplied. It indicates that if the family size uses additional labor input it results in the increase of the quantity marketed. This could be because big family sizes likely have large labor and increases the quantity of haricot bean needed for the marketable surplus.

Education of the Household Head: This variable was significant at 5%, significance levels. In explaining the relationship between amount of market supply and education, it was often expected that educated farmers are better able to process information and search for appropriate technologies and methods to alleviate their farming and supply constraints. The survey results showed that education was statistically significant and explained the supply quantity of haricot bean. The regression coefficient of the variable tells us that with the influence of other variables held constant, increase of education in one school, results in increase of haricot bean supply to market by 0.161 quintal. 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.

As expected, total production significantly influenced the supply of haricot bean to market. The coefficient of quantity of production was positive, showing that for a unit increment in level of production, the farmers directly increase market supply. This is in agreement with Fakoya *et al.*, (2007), formal education enhances the information acquisition and adjustment abilities of the farmer, thereby improving the quality of decision making and operations. Moreover, education has a positive effect on different agricultural produce sale quantity per household per year. Most former studies were indicated statistically significance at p-value less than 10% significance level. The positive and significant relationship indicates that education improves the haricot bean value chain activities of household ability to acquire new idea production related and market information, which in turn improves productivity and thereby increase marketable supply of haricot bean.

Land size farmer owned: This refers to the total area of land that a farm household owned in hectares and affects quantity of haricot bean supply to market. Land size was significant at 1% significance level. The positive coefficient for land allocated to haricot bean production implies that an increase in land allocated to haricot bean production increases marketable supply of bean. Keeping other factors constant, increase in haricot bean production area by 1 hectare resulted in an increase in farm level marketable supply of haricot bean by 4.420 quintal. Total land owned by the households was assumed to be positively assisted in changing level of production. As expected the variable land, measured in terms of hectare, was significantly positive. The size of the farm is a factor that is often argued as important in affecting production decisions. This is in line with Bosena (2008) who indicated that the area

of land allocated for cotton production in Metema district significantly and positively affected farm level marketable supply of cotton. 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). Besides haricot bean production, producers used more land for maize crop production. Higher land allocation that resulted in higher production coupled with higher haricot bean supply to the market.

Haricot bean farming experience: It affects haricot bean market supply positively and significantly at less than 10% significance level. The result suggests that as farmers have high haricot bean production experience the amount of supply to the market increased as expected. Thus, the result implied that, as farmer's experience increased by a year, haricot bean supply to market increased by 0.134 quintal. This result is also consistent with other results which show significant effect of experience on avocado production (Ayelech, 2011).

Access to extension service: This variable significantly affects haricot bean supply to market. An extension service widens the household's knowledge with regard to the use of improved technologies and found as positive impact on haricot bean sale volume (0.913 units) at 10% significance level. Access to extension service was positively and significantly associated with haricot bean sale volume and the result shows that on average, if haricot bean producer gets extension service the amount of haricot bean supplied to the market increased. The possible reason for the positive sign may be due to the positive effect of extension on haricot bean production and productivity. Therefore, extension service given to the farmers increase haricot bean quantity produced and this in turn increase haricot bean supplied to the market

Off-farm income: It affects haricot bean market supply positively and significantly at less than 1% significance level. As the income of a farmer obtained from nonfarm activities increased, it was expected to see an increase in output level. This is because, those farmers earn high off farm income could have the capacity to purchase agricultural inputs that would improve productivity of haricot bean. Kinde (2005), in his study of sesame market chain analysis in north Gondar zone of Metema district, off farm income was found to be positively related to productivity. Moreover, off-farm income influences volume of haricot bean supply significantly and positively and this is because most of non/off farm activities that are farmers participating was in cash trading. Farmers participating in trading were business oriented farmers and they produce haricot bean completely for market and farmers participated in

trading have better supply than others. The result showed that if haricot bean producers have non/off farm income, haricot bean supply increased when compared with farmers who do not have non/off farm income.

Membership to any cooperative: This variable was significant at 1%, significance levels and implying that membership of household to any cooperative has positive effect on volume of haricot bean sales. The regression coefficient of the variable tells us that with the influence of other variables held constant, as household have membership to any cooperative, haricot bean supply to market increase by 2.044 quintal. Thus cooperatives improve understanding of members about market and strengthen the relationship among the members. As expected, membership to any cooperative improves the market outlet choice decision of haricot bean producers. This results also in agreement with related study on honey supply. Membership to any cooperative influence positively and significantly the volume of honey marketed at 1% level of significance. As compared with those households who are not member of cooperative, for those household who are members of cooperative, the volume of honey marketed increased by 58.4%.

Being a member of producer group motivates farmers to supply more by giving technical advice, input and up to date information provision to members (Adeoti *et al.*, 2014). Study by Shewaye (2015) also confirmed that being membership of cooperative could have better access to market information, inputs, technical advice and access to credit facilities which lead towards increments of output that in turn increase volume of supply to market. Cooperatives motivate producers to supply more by giving technical advice, input and up to date information to members that leads towards increments of output that in turn increase volume of haricot bean supply and improve bargaining power of producers in time of selling their produce. Hence, strengthening of the existing cooperatives that participate in haricot bean marketing by building financial capacity and creating linkage with processors, and motivating non-members to become members of cooperatives is suggested.

Marketing costs of haricot bean: The coefficient of marketing costs of haricot bean was negative and influenced market supply significantly. Farmers decreased their market supply as marketing costs rose and increase the volume of supply when the marketing costs reduced. Specifically vehicles, carts and transport animals availability support products move to market. The availability of transportation facilities helps reduce long market distance constraint, offering greater depth in marketing choices (Jagwe, 2007). Furthermore, after

production farmers are constrained by transport cost and households with own transport would sell more because ownership of means of transport would reduce transportation cost that constrains them. Marketing costs are the embodiment of barriers to access to market participation by resource poor smallholders. It refers to those costs, which are incurred to perform various marketing activities in the transportation of goods from producer to consumers. Marketing costs includes handling cost (labour, loading and unloading, costs of damage, transportation and etc.) to reach an agreement, transferring the product, monitoring the agreement to see that its conditions are fulfilled, and enforcing the exchange agreement (Holloway et al., 2002).

CHAPTER FIVE

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

Boricha district mainly produce haricot bean and maize among others. It is one of the highly populated areas in Sidama zone. The general objective of the study was to analysis haricot bean value chain: profiling, antecedents and consequences of household farm activities. The study shows that socio-economic profile of haricot bean producers varies across households. The main haricot bean chain actors in study areas are input suppliers, producers, local collectors, wholesalers (suppliers), retailers, primary coops, unions, farmers' federation and exporters). The result also showed that the average volume of haricot bean produced by 180 producers in last production season (2017) was 1211.50 quintal. Among this value 1059 quintal was sold through different marketing channels that were identified during the survey period with an average price of Birr 950 per quintal and the remained was consumed. However, according to haricot bean producers, lack of extension services, low farming experiences, lack of access to credit, distance from access roads and lack of support activities were major challenges of haricot bean value chain activities. The results of the marketing margin analysis (TGMM) indicated that producers' benefit share was 31.39 % out of the total value added (2389.36) along haricot bean value chain in domestic market which is the proportion of the price paid by consumer that belongs to the producer. The study pointed out that all marketing participants of the commodity operated at profit. This indicated that all the marketing agents were advantageous through the channel.

Estimation of determinants of haricot bean for market with the help of OLS regression analysis was employed with thirteen hypothesized variables. The result of OLS regression model analysis pointed out that out of 13 explanatory variables such as age, family size, livestock, education, land size, farming experience, distance from nearest market, credit access, access to market information, access to extension service, membership to any cooperative, Off-farm income and marketing costs; only 9 variables like age, family size, education, land size, haricot bean farming experience, access to extension service, and membership to any cooperative, off-farm income and marketing costs of haricot bean were found to be significantly affecting the supply of haricot bean to market at household. Of these variables, age, land size, membership to any cooperative, off-farm income and marketing

costs of haricot bean were strongest explanatory factors that have been influencing haricot bean supply to market.

5.2. Recommendations

To gain the large economic benefit from the recent huge haricot bean products demand in domestic and international markets, domestic supply of haricot bean should be increased through enhancing the extent of production from small scale to large scale or upgrading production functions. The horizontal and vertical linkages of haricot bean value chain actors and its internal and external value chain governance should be developed in producing areas. The extension services should be provided for smallholder haricot bean farmers and infrastructure should be constructed to transport product from production areas to reach out markets. To bring about meaningful changes in the production and marketing of haricot bean value chain activities in the study areas, it requires a concert effort of all relevant stakeholders. Different non-government supportive organizations should be invited to participate in capacity building and technical training activities.

Number of capacity building and improved technological inputs delivering activities should take place in the production stage. To improve the output of haricot bean and increase their own incomes of household; the farmers in the study district should increase production and market supply. They should switch from too traditional and inefficient ways of production and traditional way of marketing to a value chain approach by increasing participation in technical training, and mastering new technologies, intensifying management, applying different production possibilities and employing improved harvesting techniques. The relationships among the functional areas like management, marketing, finance, production, Research and development, and management information systems are very important for haricot bean businesses to be a highly interactive process that requires effective coordination among them. A key to organizational success is effective coordination and understanding among managers from all functional business areas. Knowledge of these relationships is critical for effectively establishing objectives and strategies of haricot bean value chain activities.

5.3. Future Research

I suggest that the researchers should additionally explore on haricot bean production process and post-harvest management, haricot bean value chain financing and contract farming, haricot bean value chain governance to solve pressing production and marketing problems, and popularize their findings with appropriate governmental departments and production and marketing units.

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A. Annex

Annex1:

Multicollinearity test with VIF and Contingency coefficient

estat vif

Variable	VIF	1/VIF
Experience	2.88	0.347734
Age	2.53	0.395002
mnfo	2.13	0.469679
extension	1.88	0.531005
land	1.82	0.550507
credit	1.77	0.564550
mcost	1.51	0.663729
Edu	1.50	0.666497
off	1.36	0.736023
distancem	1.34	0.748630
Family	1.27	0.787055
livestock	1.06	0.944942
Mean VIF	1.75	

Appendix I: Conversion factors used to estimate Tropical Livestock Units (TLU)

Livestock	Conversion factor
Cow	1
Calf	0.25
Heifer	0.75
Bull	0.6
Ox	1
Goat	0.13
Sheep	0.13
Donkey	0.7
Poultry	0.013
Mules	0.7
Horse	1.1

Source: Storck, *et al.*, 1991

Annex 2.

Multiple regression model results

```
. reg haricotsale Age Family Edu land Experience off livestock distancem credit mnfo extension mcost
```

Source	SS	df	MS	Number of obs	=	180
				F(12, 167)	=	25.31
Model	2071.82256	12	172.65188	Prob > F	=	0.0000
Residual	1139.22744	167	6.82172117	R-squared	=	0.8950
				Adj R-squared	=	0.8542
Total	3211.05	179	17.9388268	Root MSE	=	2.6118

haricotsale	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Age	-.1118916	.0312753	-3.58	0.000	-.1736374	-.0501457
Family	.2587522	.1088464	2.38	0.019	.0438599	.4736445
Edu	.199036	.0756333	2.63	0.009	.0497155	.3483566
land	1.845026	.4013262	4.60	0.000	1.0527	2.637353
Experience	.1605743	.0793434	2.02	0.045	.0039289	.3172197
off	.0002003	.0000323	6.20	0.000	.0001365	.0002641
livestock	-.031579	.1308857	-0.24	0.810	-.2899829	.226825
distancem	-.0697416	.1443342	-0.48	0.630	-.3546963	.2152131
credit	.5198226	.5193458	1.00	0.318	-.5055067	1.545152
mnfo	-.4477984	.6381883	-0.70	0.484	-1.707755	.8121581
extension	1.129123	.5691349	1.98	0.049	.0054964	2.252749
mcost	.0027811	.0004811	5.78	0.000	.0018313	.0037308
_cons	2.171725	1.201898	1.81	0.073	-.2011474	4.544597

B. Annex

Survey Questionnaire

The purpose of this questionnaire is to gather pertinent data that will be used for an input for the assessment of factors affecting value chain activities of haricot bean research at Borchha Woreda. The information you are going to provide will be kept secret and will only be used for the research purpose. Hence, the respondent is kindly requested to provide us his/her genuine responses to the sets of questions included here within the questionnaire. I would like to firmly assure the respondent on the confidentiality of the responses. Thank you in advance for your cooperation!

Direction

1. For questions with listed choices please follow the multiple options
2. For open-ended questions, you are requested to tell your genuine and free opinion

I. Household Survey Questionnaire

Socio-economic characteristics of Household (HH)

1. Age of the HH _____ in years
2. Sex of the HH. _____ (use options: Male = M or Female = F)
3. Educational status of (HH) _____ in number of schooling
4. Marital status of the HH _____ (use options: 0 = Single 1 = Married 2 = Divorced 3 = Widowed 4 = separated 5 = Polygamy)
5. Total number of the current household members (family size). Male _____ in number, Female _____ in number and Total _____ in number
6. Do you have land access for agricultural use? _____ (use option: 1= Yes 0= No)
7. If yes to Q1, what are the total land size _____ in hectare
8. How long since you have started the haricot bean production and marketing? _____ years

9. Source of livelihood

- List major sources of livelihood

10. Total income of HH sources in 2009 E.C :

- Off farming _____ in birr
- On-farming _____ in birr
- Others source of income (if any) _____ in birr

11. Livestock assets status

No.	Type of livestock	Total number that you have	Livestock unit
1	cows		
3	Calf/Calves		
4	Oxen		
6	Bulls		
7	Heifer		
8	Sheep		
9	Goat/s		
10	Donkey/s		
11	Horse/s		
12	Mule/s		
13	Hen/chicken		
15	Total		

12. Type of harvested crop and marketing

No.	Type of harvested crop	Amount of harvested	Amount Consumed	Amount sold out	Amount of annual sales income earned
		In quintal/ kg	In quintal/ kg	In quintal/ kg	In Birr
1	Teff				
2	Wheat				
3	Sorghum				
4	Bean				
5	Pea				
6	Barely				
7	Maize				
8	Haricot bean				
9	Vegetables				
10	Fruit				
11	Coffee				
12	Apiculture				
13	Enset				

13. Volume of haricot bean produced in last production season:-----in quintal

14. Volume of haricot bean sales:-----in quintal

15. Distance to nearest market ----- in km.

16. Selling price per quintal_____ or selling price per kg

17. Do you have access to credit (Mark) 1[] if the household takes loan 0 [] otherwise

18. Do you access to market information: Assign 1 [] if a farmer got information and 0 [] if not.
19. Do you have access to extension service: (mark) 1 [] if haricot bean producer household has access to extension service, 0 [] if not
20. Do you have membership to any cooperative: (Mark) 1 [] if the household is membership of any cooperatives engaged in any business, 0 [] otherwise
21. Have you own market transport facilities mark: 1 [] if households owned transportation facilities, 0 [] otherwise
22. Postharvest value addition: (mark); 1 [] if a household practice value adding activities, 0 [] otherwise

Factors affecting production of haricot bean value chain in the study area

1. Do you access to inputs to produce haricot bean (mark) 1 Yes [], 0 [] No
2. What are inputs that you use to produce haricot bean?

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3. Estimate the selling in EBT

Your possible customers	Buying price/kg	Selling price/kg
Collectors		
Retailers		
Wholesalers		
Cooperatives		
Hotels and organization		
Processor		
Consumers		
Collectors		
Exporter		

4. Factors affecting haricot bean production

No.	Factors affecting haricot bean production	Yes	No
1	Lack of access to credit		
2	Lack extension service		
3	Lack of land		
4	Lack of quality seeds		
5	Short of labor availability		
6	Managerial skill (experience)		
7	Lack of market information		
8	Climate change		
9	Lack of market		
10	Lack of support activities		
11	Distance from access roads		
12	Low selling price		

5. Estimate production costs of haricot bean _____ in EBT

6. Estimate marketing costs of haricot bean _____ in EBT

II. Traders Interview Schedule

- Name of trader: _____ Age _____ Sex _____
- Address: Region _____ Zone _____ Woreda _____ Town _____
- Type of trade: (✓) 1. [] Retailer 2. [] Wholesalers 4. [] Collectors 5. [] Others

- Marital status (✓) 1. [] Single 2. [] Married 3. [] Divorced 4. [] widowed
- Family size: Male _____ Female _____ Total _____
- Educational level of the respondent _____
- How long have you been operating the business? _____ years
- Did you trade alone or in partnership? (✓); 1. [] Alone 2. [] Partnership
- From which supplier do you prefer to buy most of the time?
- Estimate the buying and selling in EBT

Your possible customers	Buying price/kg	Selling price/kg
Collectors		
Retailers		
Wholesalers		
Cooperatives		
Hotels and organization		
Processor		
Consumers		
Collectors		
Exporter		

11. Why do you prefer to buy most of the time from above supplier? _____
12. Factors affecting outbound logistics and marketing of haricot bean value chain activities

No.	Factors affecting haricot bean marketing	Yes	No
1	Lack of market		
2	Low price of product		
3	Lack of storage		
4	Lack of transport		
5	Lack of market information		
6	Poor linkage with value chain actors)		
7	Low quality of product		
8	Low consumer demand		
9	Distance from access roads		
10	Access to credit		
11	Lack common distribution centers		
12	Lack of warehouse		
13	Low supply		

III. Checklist for Focus Group Discussion

Focus group discussion questions with actors regarding factors affecting value chain activities of haricot bean in Boricha District, Ethiopia” for MA Research project

1. Who are the major marketing actors that are involved in the movement of the product from producer to the market? What are the problems associated with them?
2. What are the main activities carried out in the value chain of haricot bean by each actor?
3. Is there land shortage for haricot bean production? How do you transport the produce?
4. Which types of haricot bean variety is common in the district? Why? What about it's availability?

5. What is the average amount of haricot bean that can be produced from one ha of land?
6. What types of business services are feeding into the chain?
7. What are the main strengths and weaknesses of the chain?
8. What are the major factors that affect value chain activities of haricot bean and the amount that is supplied to the market?
9. What are the major constraints that affect producers, urban collectors, rural assemblers, and wholesalers to operate in the haricot bean marketing?
10. What type of relationship exists between value chain actors of haricot bean?

IV. Checklist for Key Informants Interview

1. Name of the organization: _____
2. Role of the interviewee in the organization:
3. Location and contact information: Region/Zone/Woreda/ Kebele/ P.O.Box/telephone
4. Type of the organization: public/private/NGO/CBO.
5. Organizational mission, vision and objectives
6. What is the role of your organization in haricot bean value chain activities in the study area?
7. What are the challenges and opportunities you faced in undertaking those roles assigned to your organization?
8. How are linkages /interaction/ partnership/ coordination between actors?