Haricot Bean Value Chain Analysis in Boset Woreda, Oromia National Regional State, Ethiopia

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Abstract

This study aimed at analyzing haricot bean value chain in Boset woreda, Oromia National Regional State, Ethiopia with the objectives of analyzing haricot bean value chain in the study area. The data were collected from both primary and secondary sources. The primary data were collected from 196 producers,14 local collectors, 6 wholesalers, 7 retailers, 3 primary cooperatives, Lume Adama farmers' Cooperative Union and 3 exporters through using random sampling method. Besides, 4 focus group discussions with 32 producers and key informant interview with 4 organizations were conducted. Descriptive statistics and econometric model were used to analyze the data. To analyze factors affecting supply of haricot bean to the market, multiple linear regression models was used. The value chain analysis revealed that haricot bean value chain actors in the Woreda were input suppliers, producers, primary cooperatives, local collectors, wholesalers, retailers, union, exporters and consumers. Value chain supporters are from Governmental offices, NGOs and private service providers. It was also found out that haricot bean flows through several channels with little value being added. The value chain is governed by exporters and wholesalers who have capital and better information than the other value chain actors. The profit share which account 32.41% to exporters;18.66% to primary cooperatives and Lume Adama Union, 17.98% to retailers, 14.38% to wholesalers, 4.75% to collectors and while producers receive 11.82% profit margin. The result of the multiple linear regression model indicated that land allocated for haricot bean, utilization of NPS fertilizer and livestock ownership have positive and significant influence on supply of haricot bean to the market while distance from nearest market and lagged market price have negative influence. Therefore, strategies aiming at improving farm land management, utilization of fertilizers, livestock ownership, improving road access, price support policy are recommended to upgrade the haricot bean value chain.

Keywords: Value chain Actors, Supporters, Haricot Bean, Multiple Linear Regression.

1. INTRODUCTION

Pulse crops are important components of crop production in developing countries and a vital crop for achieving food, nutritional and income source of smallholders (Mbene, 2005; FAO, 2009; Foresight, 2011). On average pulse contribute about 3% of total calories consumed in developing countries, ranging from 4% in Sub Saharan Africa to less than 1% in Central Asia (Sitou and Mywish, 2011). Pulses are the second most planted crop in terms of hectare, with over 85 million hectares and 77.6 million tons were produced globallyfrom2012 to 2014 (Suffyan K, *et al.*, 2016). India is the world's biggest producer of pulse by 26%. Other producing countries include Canada, Myanmar, China, Brazil, Australia, Africa and rest of world took 8%, 6%, 6%, 4%, 4%, 22% and 24 respectively.

In particular haricot bean is the most important food legume for consumption which makes the source of protein and carbohydrate in human diets in the world (Siri*et al*., 2014). The world haricot bean production is estimated to be around 21.7 million tons, from 27.4 million hectare in Latin America, Asia and Sub Saharan Africa.Out of these the total volume exported was 3,648,000 tons, from this data the Sub Saharan African countries accounted 1.8% share of the total export (Nedumaran*et al*., 2015).

Ethiopia is known as the homeland of several crop plants. It is ranked 13th among pulse producing countries in the world (FAO, 2015). Pulses play crucial economic, and food and nutrition security roles, in Ethiopia. According to CSA 2016 report the country planted on 1.47 million hectare and produced 2,620,530 tons in 2016. 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).

Haricot bean (*Phaseolus vulgaris L.*) has been an export pulse crop for more than 50 years and probably been grown as food crop for a much longer period in the low and midland altitude areas of the country(Ferris and Kaganzi, 2008). The crop is widely grown in areas between 1400-2000 m.a.s.l altitudes. The main production areas include East Hararghe, West Wellega, East Shewa, WestArsi, 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 is 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, Awash Melka and Mexican 142 varieties. The pure red and pure white colored beans are the most common commercial varieties (Ferris *et al*., 2007).

Haricot bean 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 2016 report also shows that the production share of haricot bean has consistentlybeen an average 18 percent of all the pulses for the last three years. Ethiopian haricot bean production has increased by more than threefold from 138 to 4780 thousand tones between 2005 and 2016 (CSA, 2016). Its export accounts for about 41 percent of pulse exports increasing from 51 thousand tons to 170 thousand tons in the same period (ERCA, 2016). According to Gezahegn*et al*. (2006), haricot beans cover the dominant part of the Ethiopia's pulses export, contributing about USD 93,383,166 to the export industry in 2016 (ERCA, 2016).

Boset*woreda* has conduciveagro ecology for production of haricot bean. In 2016, a total of 50,965 quintals was produced from 8712 ha of cultivated land (WoANR, 2016).Out of this during the survey period 14,875 quintals was supplied to market (WoTMD, 2016). In the area, haricot bean is both a staple and cash crop used as a main source of income and food for smallholder farmers.

Therefore, this study aimed toidentify the value chain actors and functions, cost and benefit margins and factors that affect haricot bean supply to the market using appropriate statistical approaches.

1.2 Statement of the Problem

Agricultural marketing is the main driving force for economic development and has a guiding and stimulating impact on the production and distribution of agricultural produce. Moreover, agricultural marketing will play a coordinating role, steering supply and demand with respect to place, time and form utilities (Malik *et al*., 1993; Reddy *et al*., 1995; Tassew*et al*., 2010). However, the marketing of haricot bean at the local level was largely carried out by smallholder farmers and traders that face many socio economic challenges along the marketing channel (USAID, 2012; Yaynabeba and Tewodros, 2013; FAO, 2015).

However, farmers faced a multitude of challenges in both the production and marketing of haricot bean. Cash or liquidity constraints often force farmers to sell off their product immediately after harvest when prices are low. Government has exerted efforts under the proclamation No.550/2007 for exportable crop by establishing primary market at the village level and transacted at the Ethiopian Commodity Exchange (ECX) market. Even if the system is under implementation, the market aspect is articulated with limited access to market infrastructure, price volatility, lack of storage facilities and weak coordination among stakeholders are the major constraints of the commodity (Tewodros, 2013).

A review of the literature in the agro-industry value chain in Ethiopia indicates that the main challenges in the sector faces include limited market outlets, limited efforts in market linkage activities, poor extension service, lack of credit and poor market information among actors (Dereje, 2007; Kaleb, 2008; Dendena*et al*., 2009 and Gashahun 2015). Correspondingly, Mamo (2009) argued that small scale, dispersed and unorganized producers are less likely to exploit market opportunities as they cannot attain the necessary economies of scale and lack bargaining power in negotiating prices. Inclusion of smallholder farmers in value chains would help to counteract these challenges. Many smallholders in Ethiopian grain value chain depend on intermediaries due to small quantities they supply. This not only complicates tracing out of the product, it also makes meeting the requirement of highly developed consumer market difficult (Wijnands*et al*., 2007). Moreover, information on value chain analysis and margin distribution among actors in the study area is insufficient. Thus, a comprehensive research is needed to envisage the direction of input-output flows along the chain (Tsegaye*et al*., 2009).

While a considerable literature exists in the topic, the bulk of studies concentrate on agronomic factors (Gidago*et al*., 2011; Abebayehu, 2011;Hassen *et al*., 2015), factors affecting adoption of the crop (Ayalew, 2011; Rahmeto, 2007), market opportunity for haricot bean (Ferris and Kaganzi, 2008), factors influencing market participation decision and extent (Yaynabeba and Tewodros, 2013 and Agete, 2014)and white haricot bean value chain (Gashahun, 2015).Even though these studies appraised haricot bean production potential and its economic contribution to the country,on factors affecting producers' haricot bean supply is understudied. Hence, this study aims to fill in this research gap by comprehensively investigating the role of households and farm characteristics, wealth, institutional factors, market conditions and agricultural technologies in determining the volume of haricot bean supply to the market. Identifying the factors responsible for haricot bean supply differences from 1 to 80 quintals among producers' would help to target interventions to alleviate constraints and challenges for haricot bean market participation and market supply (WoTMD, 2016). In the absence of well-developed marketing system and facilities farmers are at disadvantage by selling their product to traders as they receive less benefit (Rubyogo*et al*., 2011 and Beza*et al*., 2014). Improving the market participation and marketed supply production is an important pathway to improve their wellbeing.

Despite the nutritional and economic importance of haricot bean in Boset*woreda,* various outcomes such as low productivity, erratic rainfall, post-harvest loss and price fluctuations contribute for the value chain inefficiency and also influenced the supply of the product to the market (WoANR, 2016). However, the evidence base regarding value chain actors, functions, profit margin distribution, and factors that affect producers to supply haricot bean to the market is scanty. Nevertheless, the determinants of haricot bean supply to

the market are given less attention in the study area. Thus, a detailed investigation is required to identify problems prevailed in the haricot bean value chain.

Therefore, by considering the existing knowledge gap this research was intended to address the limitations of the existing few studies by comprehensively investigating the role and interaction of various haricot bean value chain actors, benefit share along channels and identify factors that affect supply of haricot bean to the market. With this thrust, the study aimed to contribute to the growing literature in value chain analysis and market supply.

1.3 Research Questions
This study had addressed the following questions:
1. Who are the actors in haricot bean value chain? What are their functions?
2. Who are service providers in the study area?
3. What is the share of benefit of the haricot bean value chain actors?
4. What are the factors affecting the volume of haricot bean supply to the market in the study area?

1.4. Objectives of the Study
The general objective of this study is to analyze haricot bean value chain in Boset*woreda*.   The specific objectives of the study are;
1. To identify haricot bean value chain actors and their functions;
2. To identify the linkage of value chain actors;
3. To examine actors' performance along the value chain in the study area and
4. To analyze factors affecting haricot bean supply to the market

2. METHODOLOGY
2.1. Description of Boset Woreda
Boset is one of the woreda of East Shewa,Oromia Region of Ethiopia, in which the study was conducted. It is located about 125 km South east of Addis Ababa have an estimated area of 1,378.4 square km; is bordered on the south by Arsi Zone, on the west by the Awash River which separates it from Adama, on the north by the Amhara Region and on the east by the Fentale woreda. The Woreda has a total of 36 Kebles, of which 33 are rural based peasant administration areas. The 2007 national census reported a total population for this woreda of 142,112, of whom 73,925 were men and 68,187 were women; 115,598 or 81.34% of its population were living in rural areas.

The *woreda* has altitude ranging from 1085 to 2342 meters above sea level The land in this woreda shows that 30.6% is arable or cultivable, 7% pasture, 51.2% bushes, 0.1% forest, 1.4% houses and the remaining 9.7% is considered degraded or otherwise unusable (WoANR, 2016).

From the total 43,457 hectare, crops produced in the Woreda include 30% maize, 18% haricot bean, 3% wheat, 31% teff, 8% sorghum, 3% barely, 2% chickpeas 1% Lentils, 1% Faba beans, 1% Field pea and 2% vegetables and sugar cane and livestock population 681,518   are the most important means of livelihood (WoANR, 2016).
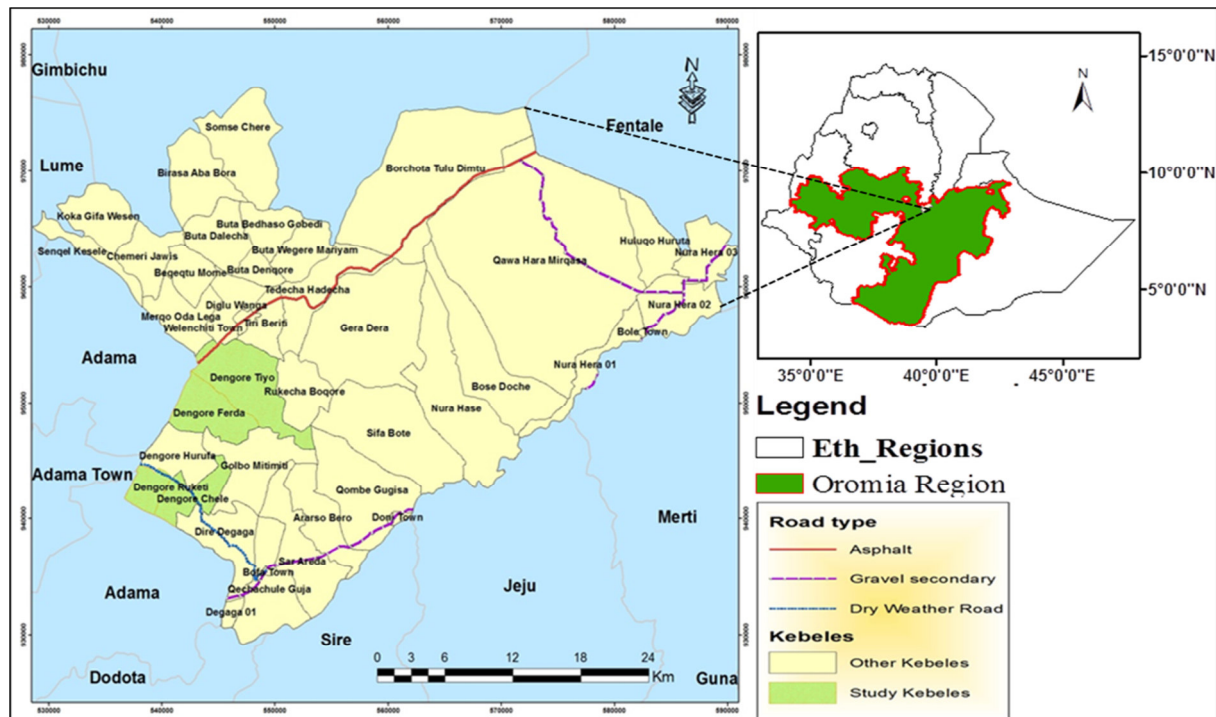
Figure 1. Geographical location map of Boset woreda
Source: Oromia Planning and Economic Development Commission, 2017

2.2. Types and Source of Data
In order to address the objective of the study quantitative and qualitative types of data were used. Structured and semi-structured questionnaires were prepared to collect data. The sources of data used were primary and secondary data.

2.3. Sample size and Sampling Procedure
2.3.1. Sample Size of Producers
For this study, in order to select a representative haricot bean producing kebeles and sample households, a stratified random sampling technique was implemented. The 4 sample kebeles namely Furda, Tiyo, Chele and Ruketi were selected randomly in proportion. From each stratum, based on the household list, sample producers was selected randomly using probability proportion to size (PPS).

The sample size was determined by Yamane (1967) sampling formula indicated below.

$$n = \frac{N}{1+N(e)^2}$$ ……………………………………………………………Equation (1)

Where n = is the sample size,
 N = is the total number of Household who produce haricot bean 4652 in the four kebeles, and
e = is the level of precision at 7%.

$$n = \frac{4652}{1+4652(0.07)^2} = 196$$

Using the formula given in Equation.1, a total of 196 of haricot bean were selected according to the proportion from four kebeles.

2.4. Methods of Data Collection
Enumerators who are working as a Development Agent and have data collection experience were recruited for data collection.

2.5. Methods of Data Analysis
Both descriptive statistics and econometric analysis were used to analyze the data collected from haricot bean producers and traders.
2.5.1. Descriptive Statistics
These methods of data analysis refer to the use of percentages, means, standard deviations and maps in the process of examining and describing value chain functions, chain actors, supportive services, enabling

environment and household characteristics.

2.5.2. Value Chain Analysis

This study employed the value chain analysis approaches to achieve its objectives. Value chain analysis is a process that requires four interconnected steps: data collection and research, value chain mapping, analysis of opportunities and constraints, and recommendations for future actions.

Marketing Margin

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

$$TGMM = \frac{End~buyer~Price - First~seller~price}{End~buyer~price} \times 100 \dots\dots\dots\dots\dots\dots\dots\dots\dots (3)$$

Then marketing margin at a given stage 'i' will be computed as;

$$GMM_i = \frac{SP_i - PP_i}{TGMM} \times 100 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (4)$$

Where SP_i is selling price at i^{th} link and PP_i is purchase price at i^{th} link.

The net marketing margin (NMM) is the percentage over the final price earned by the intermediary as his net income once his marketing costs are deducted. The equation tells that a higher marketing margin diminishes the producer's share and vice-versa. It also provides an indication of welfare distribution among producers and marketing agents.

$$NMM = \frac{Gross~Margin - Marketing~cost}{End~buyer~price} \times 100 \dots\dots\dots\dots\dots\dots\dots\dots\dots (5)$$

2.5.3. Econometric Analysis

In this study, a multiple linear regression model was used to analyze factors affecting supply of haricot bean to the market in Boset *woreda*, because all the sample producers actively participant in the market. Following Greene (2002), the multiple linear regression models is specified as:-

$$Y_i = \beta X + \epsilon \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (6)$$

Where Y_i, is the quantity of haricot bean supplied to the market in quintals, X is the vector of explanatory variables, and ϵ is the disturbance term that captures all unobserved factors that will affect haricot bean market supply. The parameter of interest is β that measures the effect of the explanatory variables on the quantity of haricot bean supply.

2.6. Hypothesis and Definition of Variables

The explanatory variables were hypothesized to influence marketed supply of haricot bean in the study area were explained in the following manner.

2.6.1. Dependent Variable

Quantity supplied to market: It is a continuous variable which represents dependent variable. It is the actual amount of haricot bean supplied to the market by producers in the year 2016, measured in quintal (100kg).

2.6.2. Independent Variables

The main hypothesized variables expected to influence market supply of haricot bean were explained as follows.

Table 1. Definitions, measurement of explanatory variables and expected effects

S.N	Variables	Category	Value	Expected Effect
1	Gender	Dummy	1= Male 0= Female	+
2	Age of sample producers	Continuous	Number of Years	+/-
3	Education of sample producers	Continuous	Number of years in school	+
4	Family Size	Continuous	Number of family member	_
5	Land under haricot bean	Continuous	Hectare	+
6	Number of livestock holding	Continuous	TLU	+
7	Income from off farm	Continuous	Ethiopian Birr	-
8	Number of hours the oxen plough haricot bean	Continuous	Hours	+
9	Lagged Market Price	Continuous	Birr/Quintal	+/-
10	Frequency of Agricultural Extension contact	Continuous	Number of contact/year	+
11	Access to Credit	Dummy	1= If accessed , 0 =if not	+
12	Access to price information	Dummy	1= If Accessed 0 = If not	+
13	Labor availability (Labor)	Continuous	Man equivalent	+
14	Distance from Nearest Market	Continuous	Number of Kilometers	-
15	Utilization of improved seed	Dummy	1= if utilized , 0 = if not	+
16	Utilization of fertilizer	Dummy	1= if utilized , 0 = if not	+

3. RESULTS AND DISCUSSION

3.1 Results of Descriptive Analysis

3.1.1. Demographic of the Sample Producers

The survey covered a total sample size of 196 producers, of which 25% were female-headed while the remaining 75 % were male headed. The majority of the samples producers were married (75%) while 18.4% and 6.6% were widows   and divorced, respectively (Table 3).

Table 2. Proportion of sample producer by gender and marital status

Variables	Frequency (Total N=196)	Percent
Gender of the Producers		
Female	49	25
Male	147	75
Marital status		
Married	147	75
Widowed	36	18.4
Divorced	13	6.6

Source: Own computation from survey result, 2017.

The age of the sample producers ranges from 25 and 80 years, with an average of 45.5 year. The average family size of the sample producers was 6 persons per household, which is similar to national average family size of Ethiopia. As indicated in table 4, there are 3 man equivalents per households, which show the mean labor available for work.

Table 3. Descriptive statics of age and family size of the sample producers

Variables	Min	Max	Mean	Std. dev
Age of producers	25	80	45.53	9.19
Family size	1	16	6	2.23
Labor (man equivalent)	1	7	3	0.97

Source: Own computation from survey result, 2017.

3.1.2. Socioeconomic Characteristics of Sample Producers

Socio economic characteristics of sample producers were education, land holding and allocation to different crops, livestock holding and income from off farm accessed by the sample producers are summarized under table 5 and 6 below.

Educational status of sample producers

Table 4. Educational status of the sample producers

Variables	Frequency (Total N=196)	Percent
No education	114	58.2
1st cycle	55	28.1
2nd cycle	24	12.2
High school	3	1.5

Source: Own computation from survey result, 2017

Land holding of sampled producers

Table 5. Land holding, allocation to crops and ownership of livestock by sample producers

Resource	Minimum	Maximum	Mean	St. dev
Land holding & allocation				
Total land holding (ha)	0.5	8	2.08	1.28
Land allocated for haricot bean (ha)	0.25	4	0.65	0.52
TLU	0.13	37.38	5.75	4.28
Income from off farm (ETB)	0	115,800	6645.64	12,610.6

Source: Own computation from survey result, 2017

As it is indicated in the table the mean land allocated by sample producers for haricot bean production in 2016 was 0.65 hectare which takes a share of 31% of the total land owned by the sample farmers.

Agriculture is the main source of livelihood for all sample producers. Crop production and livestock rearing are the major income sources. In addition to these, 49% of the sample producers (out of these 27 of them are female) are engaged in off-farm activities earning an average of 6,645 birr from selling processed local drinks and foods, cart service, mining of sand soil , wage work in Chinese construction and sugar cane factory.

3.1.3. Access to Service from Institutions

Institutional support services are critical points for the effectiveness of haricot bean value chain summarized in table 7.

Table 6. Access to service provision by sample producers

Variables	Frequency (Total N=196)	Percent
Price information	169	86.2
Source of information		
Radio	140	71
Television	40	20
Friends/Neighbors	165	84
Traders	190	97
Development Agents	43	22
Primary cooperatives	73	37
Frequency of Agricultural Extension contact		
2 times per year	57	29.1
3-4 times per year	74	37.7
>4 time per year	65	33.2
Membership to primary Cooperatives	152	77.6
Access to credit service	19	9.7

Source: Own computation from survey result, 2017

3.1.4. Demographic Characteristics of Sample Traders

The demographic characteristics of traders, in this study refer to age, gender and education status of sampled traders. According to the survey result, about 88.9% of the traders were male while the rests of 11.1% were female traders. The educational status of sampled trader's shows that 81.5 % were educated.

The survey result shows that the mean age of traders is 39.1 years. The minimum and maximum age is 27 and 52 years, respectively. The average age of collectors is 38.6 years, while the wholesalers and retailers are 44.2 and 35.9 years, respectively.

Volume of haricot bean purchased by traders

Traders are transacted haricot bean stationed at different level based on their financial and storage capacity. The volume of purchased haricot bean by exporters was 408,610 quintals in 2016 as summarized in table 10 below.

Table7. Volume of haricot bean purchased by all traders and cooperatives

Traders	Volume (Quintals)
Collectors	6461
Primary Cooperatives	3124
Wholesalers	13400
Retailers	382
Lume Adama Union	8178
Exporters	408,610

Source: Own computation from survey result, 2017

3.2. Haricot Bean Value Chain Analysis

3.2.1 Actors of Haricot Bean Value Chain and their Functions in Boset Woreda

Input suppliers: According to the survey result primary cooperatives/Lume Adama farmers' Cooperative Union, organized seed multiplier farmers, and traders are the main suppliers of seed, fertilizer (NPS) and pesticides in the study area.

Producers: Haricot bean producers are the main actors who perform most of the value chain functions starting from land preparation, purchase of inputs, planting of seed, cultivating of plants, harvesting, threshing and marketing.

The survey result showed that 94.9% of sampled respondents own oxen while 5.1% of the respondents don't have their own oxen. They cultivate land by exchanging their labor for oxen power.

According to the survey result shown in table 14, the sample producers planted haricot beans on 127 ha of land and produced 1,806 qt in the year 2016. This implies that the yield of haricot bean was 14.22 quintal per hectare which has difference in application of fertilizer with improved seed and local seed have difference in yield which accounts 2.24 quintals. This figure is less by 2.24 quintal than the yield reported by CSA (2016). However, the yield is higher than what was reported 5.4 quintal by Gashahun (2015).

The average haricot bean produced is 9.21 quintal per sample producers. Haricot bean production is not only for home consumption but also as cash crop to meet the requirements of the small holder farmers in the study area. The result shows that on average 7.68 quintal of haricot bean was supplied to the market and 0.89 quintal was used for home consumption and 0.64 quintal reserved for seed.

Farmers Primary Cooperatives: in the woreda there are a total of 33 primary cooperative out of which 4 primary cooperatives (Bofa, Chele, Furda and Golbo) are involved in the marketing of haricot bean. It was

understood from the key informant's interview that primary cooperatives purchased 652 quintals and sold it to Union in 2016. After they collected the product, the coops directly supplied to Lume Adam Farmers' Cooperative Union.

Collectors: They are engaged in purchasing of haricot bean from producers at kebele level. According to the survey, there were 14 collectors involved in buying of haricot bean and they handle the 38% share in directly purchasing haricot bean from producers. Most of them are operating as an agent for wholesalers and exporters due to insufficient working capital and lack of license.

Wholesalers: These are suppliers of bulk of haricot bean to exporters, are mainly involved in buying from rural collectors and occasionally they buy directly from farmers at kebele and Olanchiti town. From key informant's interview held with Woreda Trade and Market Development Office, it was known that there are 16 wholesalers having license to purchase haricot bean. However, in the year 2016, only 6 wholesalers were functioning well due to limited financial capabilities and shortage of warehouse. They transport to Adama for cleaning and sorting and then truck to ECX warehouse to sell for exporters through brokers. They also sell to retailers and consumers at their retailing stock at Olanchit town.

Retailers: - These retailers buy haricot bean in two ways. Majorly they purchase it from producers at local market and they sell it to consumers at Olanchiti town. Secondly they purchase haricot bean from Adama and Olanchiti wholesaler's then resell to consumers.

Lume Adama Farmers' Cooperative Union:-LumeAdama which is located at Mojo town is engaged in input supply, seed multiplication, output marketing, cleaning and packing of seeds and products using sieve machine, wheat flour processing , loan facilitation and training delivery to primary cooperatives. The Union had experience of directly exporting haricot bean but currently it sell to exporters at ECX market. The key informant interview result shows that LumeAdama Union purchased haricot bean directly from the primary cooperatives by adding 2-5% at premium price from the local market.

Exporters: They are traders who buy and export different products to different abroad countries. According to the survey result, there is one Exporter named Nur-Hussien engaged in purchasing haricot beans directly from farmers, collectors and wholesalers in Boset Woreda. The two exporters contacted were ACOS Ethiopia Plc and Albar Trading Plc participating in haricot bean marketing, operating at Adama city. The study result shows that the main importing countries of haricot bean are European countries such as Portugal, Netherlands, Turkey, Greece, Italy, Belgium , Asian and others countries.

4.2.4. Haricot bean Value Chain Map

Haricot bean value chain map in Boset *woreda* shows the functions performed and actors involved along the value chain. Besides, it demonstrates service providers and the flow of haricot bean product and information. As it is shown in Figure 3 the flow starts from the bottom stream to upper stream.
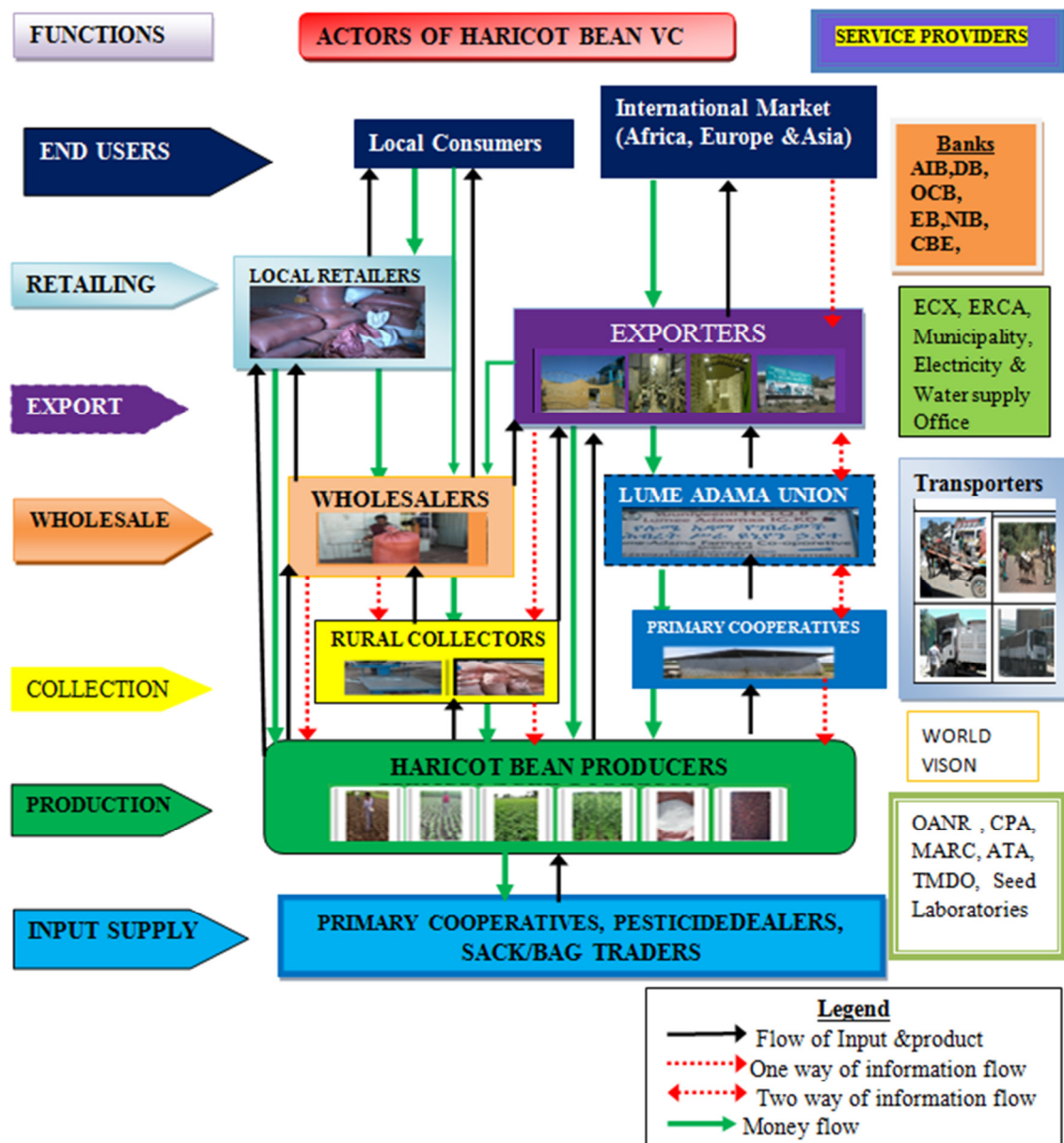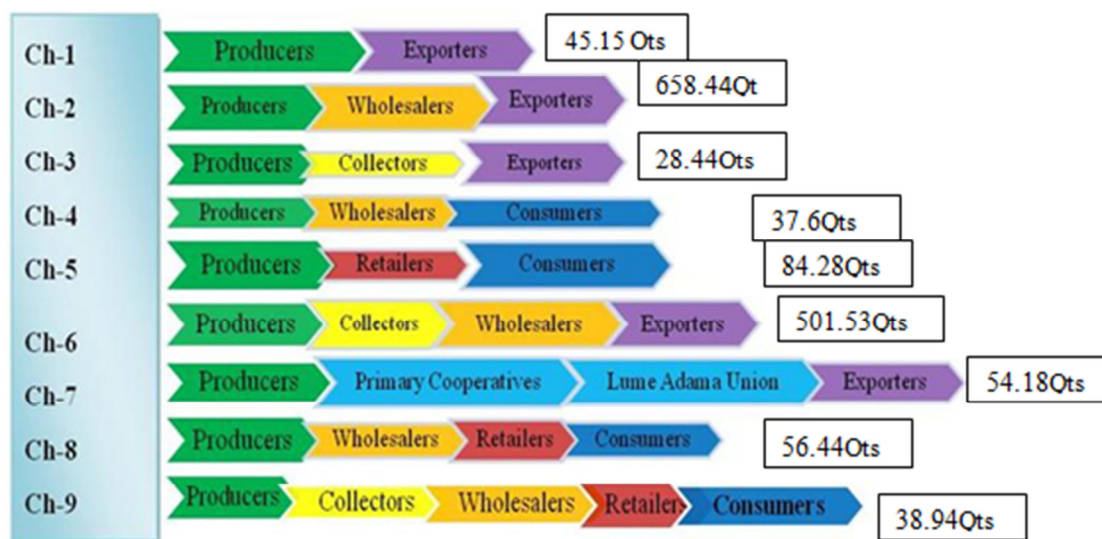
Figure 3. Haricot bean value map

Source: Own sketch from result survey, 2017

4.2.7. Market Channel and Performance Analysis

Haricot Bean Market Channels

According to the survey result, nine main outlet channels were identified in terms of quantity of haricot bean flow in the study area.

Figure 2. Haricot bean market channels

Source: Own sketch from survey result, 2017

Marketing costs and benefit shares of haricot bean value chain actors

The performance of haricot bean market was calculated taking into consideration the costs, income and margins of producers, collectors, wholesalers, retailers, primary cooperatives, Union and exporters along each channel. Table 15 compares producers, traders share profit margin for the value chain actors. Profit share margin which accounts 32.41%,18.66% , 17.98%, 14.38%, and 4.75%, goes to exporters, primary cooperatives and LumeAdama Union, retailers, wholesalers, collectors and while producers doing all the activities and challenged production risks earn about 11.82% share of profit margin as tabulated below.

Table 8. Haricot bean marketing cost and benefits of actors (birr/quintal)

	Items	Producers	Collectors	Primary Cooperatives	Whole Salers	Retailers	Union	Exporters	Sum
1	Purchase price		718	771	766	863	832	951	4901
2	Production Cost	579							579
3	Total Marketing cost	28	36	41	58	29	106	126	424
4	Total Cost	607	753	812	824	892	938	1077	5904
5	Sale price	743	808	832	991	1100	1135	1452	7060
6	Market Margin	164	91	60	224	237	303	501	1580
	% Share of market margin	**10.4%**	**5.73%**	**3.81%**	**14.19%**	**15%**	**19.16%**	**31.7%**	**100%**
7	Profit margin	136	55	19	166	208	197	375	1156
	% Share of profit	**11.82%**	**4.75%**	**1.66%**	**14.38%**	**17.98%**	**17%**	**32.41%**	**100%**

Source: Own computation and survey result, 2017

4.2.7.2.2. Marketing margin of haricot bean along different channels

The Total gross marketing margin (TGMM) which is the total consumer price left for different actors is highest in channel 3 and 6 at 50.6% followed by channel 2 which accounted 50%.

From the identified haricot bean traders, exporters have got the highest gross marketing margin 78.5%, 73.7% of consumer price in channel 1and 3 and followed by retailers69.7% in channel 5 and wholesalers have got the 64.6% in channel 4 respectively. .

The net marketing margin is higher in channel 1 which accounts77.8% as exporters directly purchase from producers and followed by channel 3 which accounts for 75.6% of consumer price. Whereas following exporters, retailers and wholesalers have got 71.9% and 63.9% in channel 5 and 4 respectively. However, producer's highest net marketing margin was 36% in channel 4.

4.4. Econometric Analysis

This sections analyzes the determinants of haricot been supply to the market using a multiple linear regression (MLR) method.

4.4.1. Factors Affecting Supply of Haricot Bean to the Market

Among the 16 explanatory variables hypothesized to determine the household's haricot bean supply to market, 5

were found to be significant.

Table 9. Factors affecting supply of haricot bean to the market

Variables	Coef.	Robust Std. Err.
Gender	-0.945	0.645
Age	-0.035	0.051
Education of sample producers	0.033	0.195
Family size	0.218	0.158
Distance from the nearest market	-0.148**	0.062
Land allocated to haricot bean	6.326***	1.774
Income from off farm	0.252	0.207
Utilization of improved seed	0.976	1.046
Utilization of fertilizer(NPS)	4.191***	1.062
Lagged market price	-1.527***	0.509
Access to market information	-0.384	0.869
Access to credit	0.764	1.216
Frequency of Agricultural extension contact	0.131	0.147
Number of hours oxen used to plough filled	0.041	0.027
Labor availability	0.715	0.577
Number of livestock holding (TLU)	0.147*	0.081
Constant	1.734	1.869

N= 196, R-squared = 0.7456, Adj R-squared= 0.7229, F= 15.61, VIF= 1.77

*, ** and *** are statistically significant at 10%, 5% and 1%, respectively. Std. Err is robust

Source: Own computation and survey result, 2017

Distance from the nearest market: It affects haricot bean supply negatively and significantly at less than 5% significance level. Consistent with theory and empirical evidence, the result shows that as the distance from the nearest market increases by 1 kilometer, the quantity of haricot bean supplied decreases by 0.15 quintals. This might be due to increase in associated transportation costs that will increase with distance to markets. Distance from markets is also associated with increase in transaction costs that could affect households' crop supply to markets.

Farm Land allocated: As expected, farm land allocated for haricot bean is found to have a positive and significant effect on the amount of haricot bean supplied to markets. The result shows that positively and significantly at 1% significance level. A 1 hectare increase in the size of the farm land allocated for haricot bean would give rise to about 6.3 quintals increase in the quantity supplied to market. The possible explanation for the positive association is that the production of haricot bean will increase with increase in the amount of land allocated to haricot bean. This will, in turn, increase the amount to be supplied to the market.

Utilization of NPS: As it was hypothesized, utilization of fertilizer had a positive and significant effect on quantity of haricot bean supplied at 1% significance level**.** Exploring the effect of NPS fertilizer use on haricot bean market supply shows that the amount of haricot bean sale increases with the use of fertilizer. Use of fertilizer increases the volume of haricot bean supply by 4.1 quintals. This underscores the crucial role of productivity enhancing technologies such as fertilizer in increasing market supply.

Lagged Market Price: the price of haricot bean is an incentive to supply to the market, so it was hypothesized as the lagged market price as a determinant variable. As hypothesized, the lagged market price of haricot bean has a negative and significant effect on the volume of haricot bean supplied at 1% significance level. The result shows that aone birr increase in sale price of haricot bean in previous year is associated with a decrease in the volume of haricot bean supplied by1.53 quintals. This is due to the fact that at the time when the price reaches to peak, producers have not haricot bean at stock so itless the volume of haricot bean supply to the market.

Finally, the number of livestock owned by the household is found to influence the quantity of haricot bean supply to market positively and significantly at less than 10% significance level. A 1 unit increases in the number of livestock lead to 0.15 quintals increase in the amount of marketed haricot bean. These is the fact that those household having livestock will contribute to the production and market supply of haricot bean through utilization of oxen power, manure and transportation service.

4. CONCLUSION AND RECOMMENDATIONS
4.1. Conclusion

This study was conducted with the aim of analyzing haricot bean value chain in Boset*woreda* of Oromia National Regional State. Haricot bean is one of the potential cash crops which have a significant contribution to the livelihood of farmers in the study area. The key objectives of the study were identifying haricot bean value chain actors, their functions and relationship among them, examining actor's performance along the chain and

analyzing factors affecting haricot bean supply to the market in the study area. Data for the study came from a household survey of 196 farm households randomly selected and 32 respondents from 4 focus group discussions from 4 kebeles. Data were also collected through individual interview of 14 collectors, 6 wholesalers, 7 retailers, 3 primary cooperatives, 1 farmer's cooperative union and 3 exporters. As such, data were gathered through key informant interview from haricot bean value chain supporters. The analysis was made using descriptive statistics and econometric model with the aid of SPSS 20 and STATA 12 software. Multiple linear regression models were applied to analyze factors that affect producer's supply of haricot bean to the market in the study area.

Results from the value chain analysis indicate that the main actors in the haricot bean value chain in Boset *woreda* are input suppliers (Primary cooperatives and pesticide dealers), haricot bean producers, collectors, wholesalers, retailer, primary cooperatives (Furda, Chele and Tiyo), Lume AdamaFarmers' Cooperative Union and Exporters (Nurhussien, Albar trading and ACOS Ethiopia). Supporters are Agricultural and Natural Resource Office, Cooperative Promotion Agency, Trade and Marketing Development Office, Melkasa Agricultural Research Center, Ambo and Asalla seed Laboratories, Agricultural Transformation Agency, World Vision, Oromia Credit and Saving Share Company, Banks , transport (animal cart and vehicle) service providers and storage /suck trading shops.

Analysis of the share of benefits has 352 birr difference when haricot bean sold to local and exported. Benefits along the haricot bean value chain indicates that about 69.52% of the profit share go to traders, 18.66% of the profit margin go to cooperatives and Union while producers obtain about 11.82% of the profit share.

In Boset *woreda*, haricot bean reaches to the end users through nine market channels. From these channels, producers directly sell haricot bean through five marketing channels such as, local retailers, collectors, wholesalers, primary cooperatives and exporter. Producers prefer to sell to cooperative than any other traders but due to financial constraints of cooperatives, the largest proportion of haricot bean which account 50%, 37.8%, 5.6% and 3% supplied to wholesalers, collectors, retailers, exporters respectively while only 3.6% was sold to cooperatives in 2016. The study result shows that out of the total produced haricot bean, 83% (1505 quintals) were supplied to the market out of these 85.57% volume of haricot bean exported and 14.43% sold to local consumers through different channel to reach the end market.

Estimates of the multiple linear regression models indicate that the level of haricot bean supply to the market is determined by the distance from the nearest market, farm land allocation, utilization of NPS fertilizer, lagged market price and number of livestock. Accordingly, distance from the nearest market and lagged market price were found to influence the quantity of haricot bean supplied to market negatively. The rest of explanatory variables had shown positive and significant relationship.

4.2. Recommendations

Core interventions and enabling actions can holistically strengthen the haricot bean value chain to be effective and consistent transactions that supply domestic and international markets. The recommendations or policy implications to be drawn from this study are based on the constraints identified and significant variables from the analysis of present study. These recommendations are complementary to and intended to accelerate the impact of current development strategies. The first recommendations articulated on the value chain of haricot bean and the second is on based on the result of multiple linear regressions.

Implementing Irrigation and facilitating crop Insurance: considering the economic importance and food consumption of haricot bean to minimize risk related with erratic rainfall the government should have to focus on utilization of irrigation scheme and facilitating crop insurance to specific to haricot bean producers.

Enhance linkages among value chain stakeholders: Stronger linkages between exporters and smallholders will lead to a more efficient value chain where demand signals are clearly communicated to the producers, and where inputs are available to ensure proper production of the necessary export haricot beans. Actions to enable consistent supply between producers and exporters may include: provision of input packages; development of new varieties appropriate for export; leverage of cooperatives to provide consistent input supply.

Enhance Pre and post-harvest management practices: reduce pre and post-harvest losses due to poor access to farm machineries facilities should be resolved by respective institutions. Agricultural extension service provision and strengthening capacity of primary cooperative in terms of credit provision and training on marketing aspects could be a crucial point to sustain the value chain of the product in the study area.

The results of multiple regression analysis indicated that access to inputs is a key step in bridging the yield gap between current and potential production. Acknowledging the efforts done in fertilizer utilization improvements on NPS and bio- fertilizers supply on timely to farmers, along with knowledge on how to apply it effectively to improve the production of haricot bean based on soil type of the area is crucial.

Improving market access could be a pathway for increasing haricot bean market participation (as sellers) of farmers. Therefore, improving road access to rural kebeles will encourage farmers to supply haricot bean to the market where they need to sale because it make easy for transportation availability.

Previous haricot bean market price has impact on the quantity of haricot bean supplied to the market.

Therefore, government bodies should be considered effect of lagged price and have to facilitate contractual agreement between producers and traders could also be relevant to increase farmers' incentive to increase their volume of market supply.

Although this is an empirical question, increasing land allocated to haricot bean (provide that this does not significantly affect the economic returns from other crops or the overall household utility) with enhanced soil fertility will help to increase both the production and supply of haricot bean. On top of this, increased use of productivity enhancing technologies such as improved seed and chemical fertilizer will boast farmer's supply of haricot bean to the market.

Given the positive role of livestock in haricot bean supply, investing on livestock feed, water supply, adaptable breeds and veterinary service should be given a due attention by the concerned body to increase their contributions on the quantity of haricot bean marketed.

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