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Soya Bean Value Chain Analysis in Chewaka District, Buno Bedele Zone of Oromia

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Abstract
Soybean is among the important pulse crops grown in different parts of Ethiopia as stable food and income generation source. Market continue to be seen as the means for ensuring that smallholder farmers of agricultural products are effectively integrated into the mainstream of national economies. The study was conducted in Chewaka district of Buno Bedele zone. Both primary and secondary data were used for this study. A three stage of sampling technique was employed to select appropriate sample household heads. Descriptive statistics and costs and margins analysis methods along the value chains were employed for the study. The core functions in soya bean value chain of the study area include: input supply, production, marketing, processing and consumption. Under this core functions, actors are broadly classified into three, namely inputs suppliers, direct market actors and chain supporters. The study result indicated that there is fair producers' share of final price among all major marketing channels and market actors obtained fair selling price of net margin in five major marketing channels, but traders obtained low net marketing margin. Major constraints that influence the development of soya bean value chain in the study area were identified and prioritized. Access market information, linkage, farmers-cooperatives contractual and others issues need attention.
Keywords: Soya bean, marketing margin and value chain

1. Introduction

Soya bean is among the important pulse crops grown in different parts of Ethiopia as stable food and income generation source. The country has immense potentials for soya bean production and popularized in different parts of the country with multiple food and economic advantages for small-scale farmers. It is used as food for home consumption, raw materials for local factories and feed (both hulm and husk) for animal dairy or fattening farms (Abebe, 2017; Sisay, 2017). The crop has relatively high protein content (about 40%) with a good balance of the essential amino acids, unsaturated and non-cholesterol fatty acid (approximately 20%) and contains vitamins such as thiamine, niacin, riboflavin, choline, vitamins E and K, which are necessary for normal body growth and development (Tinsley, 2009; Adelodun, 2011).

Many efforts have been done in improved soya bean varieties development and/or adaptation with different agronomic and other management options since 1950 in Ethiopian agricultural production systems (Addisu *et al.*, 2016). Bako agricultural research center also made great effort to generate, promote and disseminated this technology in potential production areas of western Oromia for more than ten years. Chewaka district is among the areas where this technology was introduced and disseminated to improve food security and income of smallholder farmers. In the district smallholder farmers who are currently producing the soya bean are preparing different recipes with different types of cereal and vegetable crops use as parts of their stable foods. In this area soya bean is widely produced by the majority of farmers and playing a crucial and diverse role in the diets of community, cash generation and enhancing soil fertility.

Markets continue to be seen as the means for ensuring that smallholder farmers of agricultural products are effectively integrated into the mainstream of national economies, especially in developing countries and its provide the opportunity for farm production to contribute in poverty reduction through the cash income realized from sales of farm produce. In turn, markets drive production as farmers struggle to meet the demands of consumers and end-users in terms of quantity and quality (Tewodros, 2014). Locking markets for smallholder farmers is therefore considered a crucial developmental necessity. Research and case studies conducted in various parts of the country point to the importance of the market access to smallholders (Chilot *et al*., 2010).

Therefore, assessment of better processing and food preparation, market and value chain development in the study area is the major ones. Cognizant to the importance of value chain approach to stimulate both supply and demand side Equation, attention was given to study the marketing practice and value chain of soya bean with the following objectives: (1) to identify different marketing channels and actors in soya bean value chain (2) to determine the extent of value addition in terms of marketing cost and margins in successive stages of soya bean movement and (3) to assess major constrains and opportunities in soya bean value chain in the study area

2. Research Methodology

2.1. Area Description

Chewaka district is found in Buno Bedele zone of western Oromia. It is located about 390 kilometers distance

from Finfinne the capital city of Ethiopia to the west direction. The District is found between Debana and Dhidhesa drivers' catchment. The elevation of the district is about 900-1400m asl and it has 28 rural and 2 urban kebeles. Chewaka district has 13,063 households head on 57,300 hectares of land. The major crops grown in the study area are maize, sorghum, rice, soya bean and sesame crop for home consumption and income generation source.

2.2. Sources and Data Collection Methods

Both primary and secondary data were collected for this study from sample households, traders, Chewaka district offices and other sources. Primary data like land allocation with productivity, inputs used for soya bean, price of soya bean inputs and outputs, market outlets, constraints and opportunities were collected from sample households and traders. The secondary data which are relevant to this research topic were used as additional information to strengthen the primary information for rational conclusion. These data were collected from both published and unpublished documents like Journals, Local administration offices, Research Centers, and Central Statistic Agency. For this data collection, different methods and instruments were employed. Focus Group Discussion (FGD) for both sample households and traders were conducted and based on FGD result, interview of soya bean producers and traders were conducted using semi-structured schedule. Field enumerators were involved in data collection with the close supervision of the researcher.

2.3. Sampling Technique

A three stage of sampling technique was employed to select appropriate sample households. Chewaka district was selected purposively because of soya bean technologies were widely popularized and extent of production. In the second stage, three kebeles were selected randomly from soya bean produced kebeles. Finally, about 121 sample households were selected randomly based on probability proportional to size. About 10 traders, 3 primary cooperatives and one union were selected from sample frame of trade and industry office of the district.

2.4. Data Analysis Method

To address the objectives of the study, descriptive statistics and market performance along the value chains of data analysis were employed. Descriptive statistics such as mean, standard deviation, and percentages were used to have a clear picture of the characteristics of sample units.

The term marketing margin is the percentage of final weighted average selling price taken by each stage of the marketing margin. Total gross marketing margin is the difference between producer and consumer prices of an equivalent quantity and quality of commodity (Tomek and Robinson, 1990; Sexton *et al*., Jema, 2008). In other word it is the difference between retail price and farm price (Cramer and Jensen, 1982). However, it may also describe price of differences between other points in marketing chains. Marketing margins of soya bean producers and traders were estimated using the following formulas.

$$\text{TGMM} = \frac{\text{Consume Price} - \text{Farm gate Price}}{\text{Consumer Price}} \text{x}100$$

$$\text{GMM}_{\text{p}} = \frac{\text{Consume Price} - \text{Gross Marketing Margin}}{\text{Consume Price}} \text{x}100$$

$$\text{NMM} = 100\% - \text{TGMM or NMM} = \text{TGMM} - \text{TMC}$$

Where: TGMM is total gross marketing margin; GMM_P is producers gross marketing margin, TMC is total marketing costs and NMM is the net marketing margin.

3. Results and Discussion

3.1. Household Characteristics of Soya bean Producers

The average age of sample households was about 39.02 years with standard deviation of 11.34 and the average family size of sample households was 6.33 persons per household with standard deviation of 2.15. The average educational level expressed in years of schooling of the sample households was about 3.03. With regards of sex and marital status out of the total sample households about 95% and 97.5% were male headed and married, respectively (Table 1).

Table 1. Sample household characteristics of soya bean producers

Household Description (N=121)		Mean	Std. Deviation
Age of Household		39.02	11.34
Education level of respondents		3.03	2.65
Total family size		6.33	2.15
Participated in agriculture		2.50	1.00
Household head		Frequency	Percent
Sex	Male	115	95
	Female	6	5
Marital status	Married	118	97.50
	Single	1	0.80
	Widowed	2	1.70

3.2. Land Holding for Major Grown Crops with their Productivity

In the study area like maize, soya bean, sorghum and rice are the major grown crops by sample households. On average 0.51 and 0.56 hectares of cultivated land were allocated for soya bean during 2014/15 and 2015/16 cropping season, respectively. The productivity of this crop was 1.86 and 1.95 tons during 2014/15 and 2015/16 cropping season, respectively (Table 2). This implies that soya bean is the more important crop grown by farmers in the study area. Land allocated for maize, sorghum and rice were summarized with their productivity during 2014/15 and 2015/16 cropping season.

Table 2. Land allocated for major crops with their productivity by sample households

Major crops Grown	2014/15				2015/16			
	Land allocated (ha)		Productivity (ton)		Land allocated (ha)		Productivity (ton)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Maize	0.28	0.23	3.81	1.47	0.36	0.51	3.83	1.56
Soya bean	0.51	0.23	1.79	0.72	0.55	0.26	1.86	0.83
Sorghum	0.40	0.25	2.58	1.51	0.34	0.24	2.52	1.18
Rice	0.16	0.18	3.04	1.53	0.18	0.19	3.00	1.39

3.3. Trends of Soya bean for Past Five Years

In the study area, farmers produce soya bean for dual (home consumption and income source) purpose. According to the study findings both supply and demand sides were increased for the past five years (Table 3). Majority of the respondents confirm that both supply and demand are increasing from time to time. The demand for soya bean bulk products at national level is very high. Different lead-firms like Guts Agro-industry, Alema Koudjis Feed Factory, FAFa Food Share Company and others were widely used soya bean grain product for the production of blended soya-maize flour, and poultry feeds. Therefore, different NGOs and private companies were popularized soya bean technologies for producers. This indicates that the demand of soybean grain bulk at the national level is very high while the linkage among local producers and the final grain buyers is very weak**.**

Table 3. Trends of soya bean supply and demand of 2011/12-2015/16 production years

Trends	Supply		Demand	
	Frequency	Percent	Frequency	Percent
Increase	100	82.6	104	86
Decrease	10	8.3	4	3.3
The same	11	9.1	13	10.7

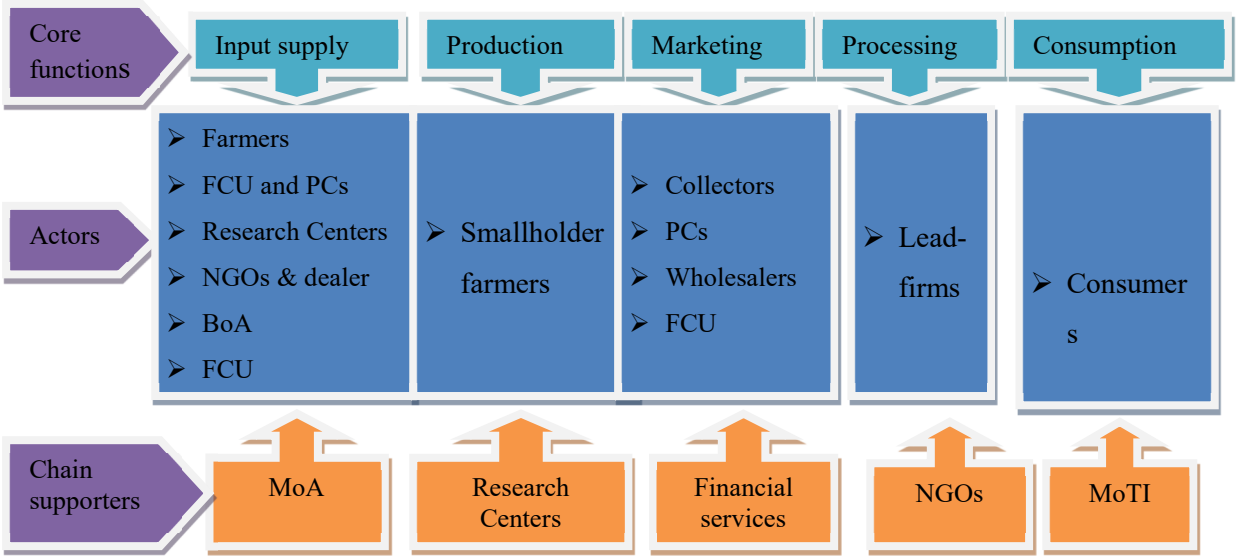
3.4. Soya bean Value Chain Analysis

Core Functions and Major Actors

The core functions in soya bean value chain of the study area include: input supply, production, marketing, processing and consumption. Under these core functions, actors are broadly classified into three, namely inputs suppliers, direct market actors and chain supporters (Figure 1). Major actors who involved in input supply functions were farmers, private dealers, NGOs, agricultural research centers, cooperative union, primary cooperatives, woreda office of agriculture. They are mainly delivered inputs like fertilizers, inoculants, seed and others (such as credit, insecticide, etc). The direct market actors were those involved in soya bean trade who order the flow of soya bean in time and space. These include producers, local collectors, primary cooperatives, cooperative union, wholesalers, lead-firms and consumers.

The chain supporters are involved in technical advice, service provision and policy formulation and implementation of chain. Technical advices like extension services and marketing information along soya bean chain provided by DAs, BoA, Research Center and NGOs. According to survey report about 69%, 19% and 4%

obtained information by government experts, research center and NGOs, respectively (Appendix 1). The market information share and buyers were only traders and cooperatives in the study area. Accordingly, about 92% and 8% buyers were traders and cooperative, respectively (Appendix 2). Financial is another most important chain support specially, in soya bean production and marketing functions.



Where: PCs is primary cooperatives, FCU is farmers cooperative union, LFs is lead-firms, SM is supermarket and WS is wholesalers

Figure 1. Core functions and actors of soya bean value chain

Marketing Channels

Marketing channel is an organized network of different agencies and institutions which in combination perform all the activities required to link producers with consumers to accomplish the marketing tasks. Only a small portion of goods and services is consumed at the point of production and only a small fraction of any output is purchased by the ultimate consumers directly from the final producers (Jaleta, 2011). Marketing of soya bean in the study area starts from production areas moving on to the end users. Based on the direction of flow and volume of soya bean transacted, five marketing channels were identified (Figure 2).

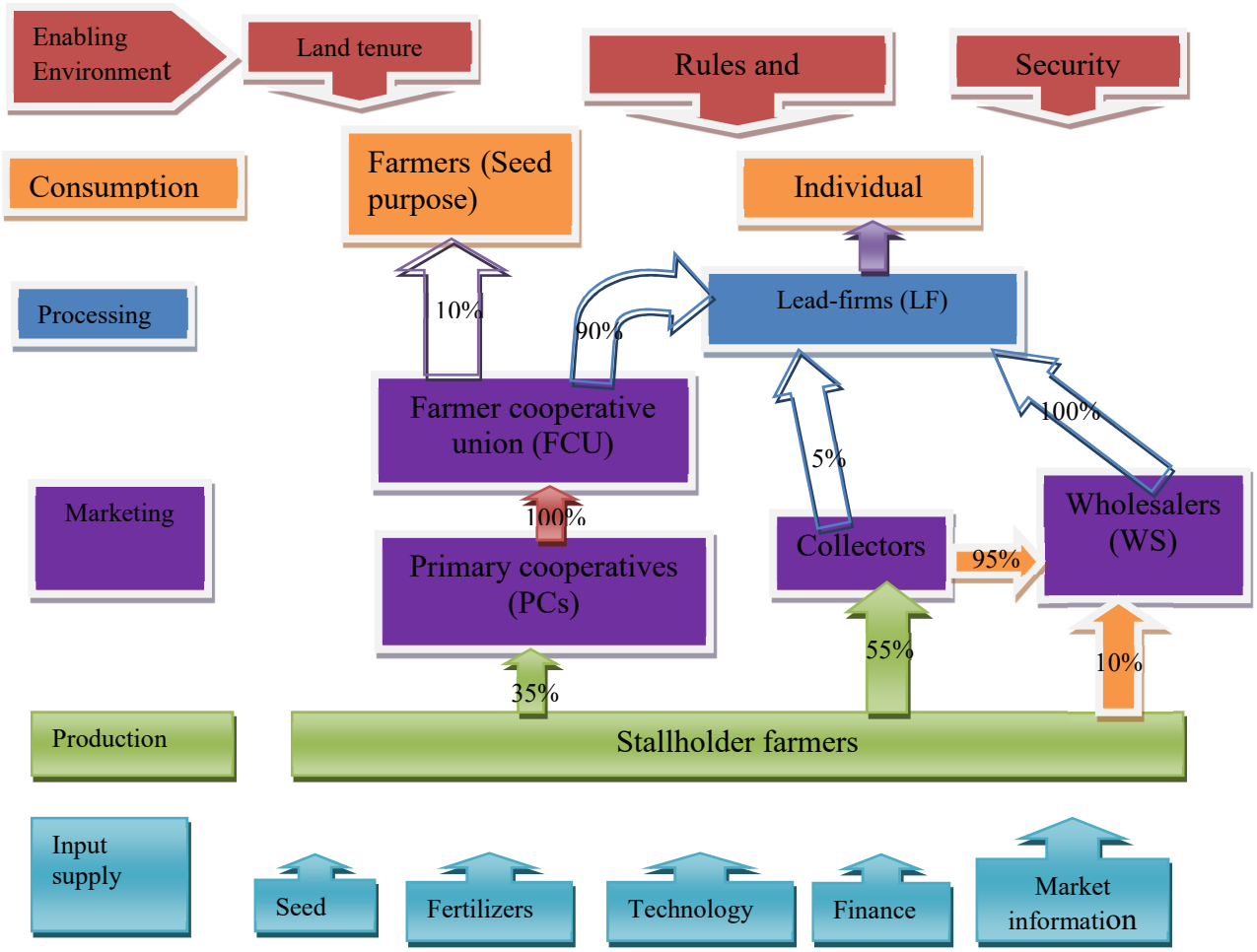


Figure 2. Soya bean value chain map in the study area

According to household and traders survey about 4,500qts of soya bean were transacted by sample traders end buyers. The percentage of soya bean transacted by each channel was summarized by figure 3.

The identified channels were:

Channel 1: Producer → PCs → FCU → Farmers

Channel 2: Producer → PCs → FCU → LFs → Consumers

Channel 3: Producer → Collectors → LFs → Consumers (124qts)

Channel 4: Producer → WS → LFs → Consumers

Channel 5: Producer → WS → LFs → Consumers

Channel 1 starts from producers and ends with farmers for the purpose of seed. In this channel about 157qts (3.5%) volume of soya bean was supplied. Channel 2 and 4 were dominants as the accounted about 1,418qts (31.5%) and 2,351qts (52.2%) volume of the soya bean were supplied to lead-firms, respectively. Channel 5 supply about 450qts (10%) volume of soya bean and channel 3 only about 124qts (2.8%) volume of the total soya bean was supplied to lead-firms (Figure 3).

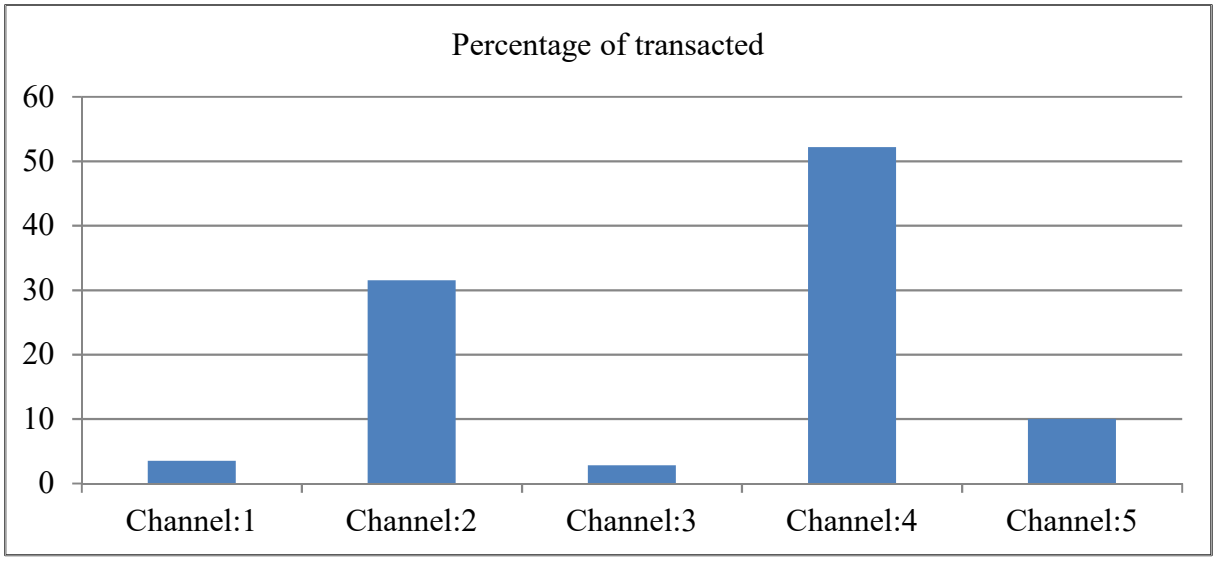


Figure 3. Soya bean marketing channels and percentage of soya bean transacted

Costs and Margin Analysis

In order to indicate the distribution of marketing costs and margins, the major marketing channels were identified based on the direction of flow and volume of production supplied to market.

The flow of benefits among actors in the value chain was another aspect of the value chain. In this study market channel I is the one that lead soya bean to farmers for the purpose of seed. This channel involves producers, primary cooperatives, farmers' cooperatives union and farmers. Soya bean producers obtain about 81% of the final price of the processed soya bean sold farmers cooperative union. Both Union and PCs gets only about 3% of their selling price as a net margin.

Table 4. Soya bean marketing costs and margins of major channels

Marketing Descriptions	Channel-I			Channel-II			Channel-III		Channel-IV			Channel-V	
	Producers	PCs	FCU	Producers	PCs	FCU	Producers	Collator	Producers	Collectors	WS	Producers	WS
Selling price	710.50	780	880	700	760	850	715	850	705.65	765.45	855	720	855
Total marketing cost		50	78		50	78		45		41	63		103
Marketing margin		69.5	100		60	90		135		59.8	89.55		135
Net margin		19.50	22		10	12		90		18.8	26.55		32
Producers' share of final price			81			82		84			83		84
Percentage of selling price													
Marketing cost		6	9		7	9		5		5	7		12
Gross margin		9	11		8	11		16		8	11		16
Net margin		3	3		1	2		11		3	4		4

Market channel II is the channel that supply soya bean to lead-firms. This channel involves producers, primary cooperatives, farmers' cooperative union, lead-firms and consumers. Soya bean producers obtain about 82% of the final price of the processed soya bean sold union. Primary cooperatives and union also gets about 1% and 2% of their selling price as a net margin, respectively.

Market channel III is less leading that supply soya bean to lead-firms. This channel involves only producers, collectors, lead-firms and consumers. Soya bean producers obtain about 84% of the final price of the processed soya bean sold wholesalers. A collector also gets about 11% of their selling price as a net margin.

Market channel IV is the dominant that supply soya bean to lead-firms. This channel involves producers, collectors, wholesalers, lead-firms and consumers. Soya bean producers obtain about 83% of the final price of the processed soya bean sold wholesalers. Wholesalers and collectors also gets about 4% and 3% of their selling price

as a net margin, respectively.

Market channel V is also supply soya bean to the lead-firms. This channel involves producers, wholesalers, lead-firms and consumers. Soya bean producers obtain about 84% of the final price of the processed soya bean sold farmers cooperative union. Wholesalers also get only about 4% of their selling price as a net margin (Table 4). In this study, for all channels producer's share of final price is high as compared to chickpea which is 54.2% (Tewodros, 2014). This implies that there is fair producers' share of final price among the major marketing channels and traders were obtained fair selling price of net margin in five major marketing channels.

3.5. Major Constraints and Opportunities in Soya bean Value Chain

3.5.1. Major Constraints

There are different constraints that influence the development of soya bean value chain in the study area. Some of the major constraints that influence the value chain actors are described as follows.

Input supply constraints: According to the respondents, the availability of soya bean rust resistance variety and inoculants are the major important constraints. There are no local market supply inoculants to the farmers in the study area.

Table 5. Pair wise ranking of major constraints of soya bean value chain during survey period

Input supply constraints	Score	Rank
Shortage of inoculants	1	1
Shortage of capital	0	3
Lack of rust resistance variety	2	1
Production constraints		
Disease (yellow rust)	5	1
Weed problem	4	2
Low price	1	5
Low productivity	2	3
Shortage of information (price, inoculants and rust)	2	3
Poor soil fertility	1	5
Marketing constraints		
Low supply	2	2
Poor infrastructure (poor market linkage and road)	3	1
Shortage of credit	1	3
Low capital	0	4
Processing constraints		
Low supply	1	2
Poor quality	2	1
Poor market linkage	0	3

Production constraints: The major production constraints reported by respondents were disease (yellow rust), weed control problem, low price of grain, low productivity, Shortage of information and poor soil fertility. In the study area recently, soya bean yellow rust and weed control problem are the bottle neck to boost soya bean production and productivity.

Marketing constraints: Regarding marketing (traders and lead-firms) were low supply, poor infrastructure (poor market linkage and road), shortage of credit and low capital are reported as major constraints by respondents. Poor infrastructure, shortage of credit and low supply were the series problems in soya bean marketing in the study area.

Processing constraints: It was reported that poor quality and low supply were the major constraints in processing soya bean. Due to weak of vertical linkage there is information gap between lead-firms and producers on grain quality amount supply in a year. Even though there is supply increase in the past five years; it's not full fill demand interest (with both quality and quantity of lead-firms).

3.5.2. Major Opportunities

Hunde Chewaka union and different NGOs work on soya bean: Due to increasing trend of demand hunde chewaka union and other NGOs like 2SCALE, AGRA, N2-Africa work on inputs supply and collect the grain through primary cooperatives. In the study area there is few local collectors and no input suppliers. Currently hunde chewaka union installed their capacity supporting by different NGOs to competitiveness input supply to farmers and grain supply to lead-firms.

There are strong community seed producers in the study area: In the study area there is formal community seed producers to produce and supply seeds to others farmers. Therefore, smallholder producers can access improved and certified seed easily with minimum resources to other producers.

Government commitment to support legume production: Chewaka district is one of the maize and sorghum mono-cropping dominants areas. In this area to break this mono-cropping system soya bean and common bean production is the only solution to break these maize and sorghum mono-cropping system. Therefore, different

research centers, universities, NGOs and others interested in order to provide necessary support for soya bean production.

Many local soya factories established in the country: There is a huge demand for soya bean bulk products in the country. For instance, Gut-Agro Industry needs more than 5000 metric tons per annum of legume including soybean grain product for the production of blended soya-maize flour (Wolde-meskel, 2017) and the government of Ethiopia has made an agreement to produce corn-soybean blend (CDB) to produce up to 39000 metric tons with eight different local manufacturers (Francom and Counselor, 2016). This indicates that the demand of soybean grain bulk at the national level is very high while the linkage among local producers and the final grain buyers is very weak.

4. Conclusion and Recommendations

Conclusion

Soybean is among the important pulse crops grown in different parts of Ethiopia as stable food and income generation source, particularly in the study area. Many efforts have been done in improved soybean varieties development and/or adaptation with different agronomic and other management options. Besides, locking market for smallholder farmers is therefore considered a crucial developmental necessity.

The study was conducted in Chewaka district which found in Buno Bedele zone west direction of the country. Both primary and secondary data were collected and used for this study from sample households, traders and Chewaka district offices and other sources using different survey instruments and data collection methods. A three stage of sampling technique was employed to select appropriate sample household heads. Descriptive statistics and costs and margins analysis methods along the value chains were employed for this study.

In this study five core functions with major value chain actors were identified. Actors in this study were broadly classified into input suppliers, direct market actors and chain supporters. The actors who delivered inputs were farmers, private dealers, NGOs, cooperatives and woreda BoA. The direct market actors were involved in soya bean flow which includes producers, collectors' cooperatives, wholesalers and consumers. The chain supporters are involved in technical advice, service provision and policy formulation and implementation of chain.

About five major soya bean marketing channels in the study area were identified and analyzed. The total amount of soya bean that was transacted through these marketing channels was 4,500qts to end users. The study result indicated that there is fair producers' share of final price among five major marketing channels and market actors obtained fair selling price of net margin in five major marketing channels. In five major channels traders were obtained low net marketing margin.

Major constraints that influence the development of soya bean value chain in the study area were identified and prioritized. Accordingly, lack of rust resistance variety and availability of inoculants are the major constraints in input supply. The major production constraints were disease, weed control problem, low productivity, low price and poor soil fertility where as low supply, shortage of credit poor infrastructure and low capital reported as major constraints traders. Besides, low supply and poor quality of grain also reported as major lead-firms constraints. To enhance production and productivity of soya bean different opportunities were identified and summarized.

Recommendations

- Access to market information and credit enables farmers to participate in market options which secure them in higher price for their soya bean products are crucial. This network undoubtedly provide useful information on price, quality, quantity needed by lead-firms and accessibility of credit by local traders. This means producers remain price takers not price makers.

- A set of enabling constraints will deepen the impact of soya bean production along value chain actors very loose of production. This may require expanding the existing extension systems on agronomic practices, high yielder with disease resistance varieties, and appropriate chemical for weed control and grain quality parameters to increase productivity of soya bean need attention.

- Many efforts should be needed to sustainably make strengthening market linkage among the producers and the final grain buyers. This may require formalizing the quality grain needed by lead-firms and providing information to producers on how price related to quality of grain.

- Better farmers-cooperatives/unions are instrumental in cultivating trust and establishing the missing link between the farming and business firms. This may need appropriate institutional and legal frameworks to stimulate the development of more out-growers.

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Appendices

Appendix 1. Extension Services for Soya bean value chain by sample households

Extension Services		**Frequency**	**Percentage**
Service obtained	Yes	102	84
	No	19	16
Source of services	Government (DAs and SMS)	69	67
	NGOs	4	4
	Research Center	19	19
	All	10	10

Appendix 2. Market information on soya bean value chain

Market Information		**Mean**	**Std. Deviation**
Distance of market from home (minute)		26.32	31.73
		Frequency	**Percent**
Source of buyers	Traders	111	92
	Cooperatives	10	8
Price decision	Traders	110	90.9
	Producers	11	9.1