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AN ANALYSIS OF FACTORS INFLUENCING PARTICIPATION OF SMALLHOLDER FARMERS IN RED BEAN MARKETING IN HALABA SPECIAL DISTRICT, ETHIOPIA

BY

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DECLARATION

This thesis is my original work and has not been presented in any university for the award of a degree.

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DEDICATION

This Work is dedicated to my wife Yaynabeba, for encouragement, support, and prayers that eased the completion of this thesis. More so, my father Jerena Kabeto, and my Mother Achame Benta for the work ethics they instilled and Exodus International Ministry of Nairobi, Kenya for their continuous prayers that has helped me this far.

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LIST OF ABBREVIATIONS AND ACRONYMS

ACOS	Agricultural Commodity Supply
CII	Chemonics International Inc
Co-SAERSAR	Commission for Sustainable Agriculture and Environmental Rehabilitation in Southern Administrative Region (Ethiopia)
CSA	Central Statistical Authority
DA	Development Agent
ECX	Ethiopian Commodity Exchange Authority
EGTE	Ethiopian Grain Trade Enterprise
ERCA	Ethiopian Revenue and Custom Authority
ETB	Ethiopian Birr (18.5 ETB= 1US$)
EU	European Union
FAOSTAT	Food and Agriculture Organization Statistics
FGD	Focus Group Discussion
FTC	Farmers' Training Center
NGO	Non Governmental Organizations
HSD	Halaba Special District
HSDMD	HSD Marketing Department
ILRI	International Livestock Research Institute
IPMS	Improving Productivity and Market Success of Ethiopia Farmers
JICA	Japan International Cooperation Agency
KA	*Kebeles* Administration
M.A.S.L	Meter Above Sea Level
MARD	Ministry of Agriculture and Rural Development
MT	Metric Tons
OLS	Ordinary Least Squares
SNNPR	Southern Nations, Nationalities and People's Region
SSA	Sub-Saharan Africa
TLU	Tropical Livestock Unit
USA	United States of America
USD	United States Dollars

ABSTRACT

Market participation in rural households is a vital strategy in assuring better income and a key factor to lifting rural households from poverty. Red bean is an important crop in Ethiopia, especially Halaba Special District (HSD), but farmers are not participating in the market adequately. The overall objective of the study was to assess the factors determining the participation of smallholder farmers in the red bean market chain in HSD. The specific objectives of the study were characterizing the marketing chain of red bean in HSD, identifying constraints of red bean farmers, traders and cooperatives, examining the factors influencing market participation decision and extent of participation in the district. A multi-stage sampling procedure was employed to draw a random sample of 150 red bean producers, and stratified sampling was employed to get 33 red bean traders. A two-stage Heckman model was used to investigate factors affecting market participation decision for red bean and extent of market participation decision. The study found that about 79, 0.8, 0.7, and 19.5 percent of the produce was purchased by urban collectors, rural assemblers, primary cooperatives, and wholesalers respectively. Traders graded the produce after purchase and sold to the next actors. Wholesalers and a few assemblers used intermediaries to purchase red beans while urban collectors bought directly from the farmers and conveyed to the next actors. It was reported that brokers were a major obstacle to red bean marketing in the district because they confuse farmers with wrong price information and compete benefits expected to be earned by the farmers. Red bean farmers received higher returns when they sold their outputs directly to wholesalers. In the district, major red bean farmers' production and marketing constraints were brokers, price fluctuations, access to improved seed and access to credit. On the other hand red bean traders marketing bottlenecks were low quality, informal traders and shortage of finance. The market participation decision was significantly influenced by price, ownership of transportation means, number of extension visits per year, amount of red bean produced, awareness about quality standards; market information, family size, access to credit, and gender. These suggest that there is an urgent need for concerned organization to take part and improve the income and hence the livelihood of red bean farmers. The extent of market participation was significantly influenced by price, ownership of means of transport, amount of red bean produced and family size. Awareness about quality standards influenced market participation decision positively, indicating that farmers should be trained on red bean quality standards. Comprehensive extension work is

urgently needed to assist red bean farmers in post harvest handling, and linking them with markets. Based on the findings, the study recommended creating good market networks, reliable market information, strong extension intervention, and training farmers on methods of producing high quality red bean. Attention should be given to brokers' activities and access to improved seeds, and the government should enhance credit supply.

CHAPTER 1

INTRODUCTION

1.1 Background

Market participation in rural households is an important strategy for poverty alleviation and food security (Mathenge et al., 2010). It refers to the markets actors' decision on whether to be involved or not in the flow of products from producers to end users (Yaynabeba, 2013). Majority of smallholder farmers in rural areas are trapped in a vicious circle of poverty characterized, *inter alia*, by low economic returns due to low market participation. Poverty reduction and improving the livelihood of the rural smallholders has strong relationships with their market participation (Mathenge et al., 2010). Increased market participation by the poor has been found to be vital as a means of breaking from the traditional semi-subsistence farming and a key factor to lifting rural households from poverty. However, smallholders do not often participate much in food crops markets due to subsistence production and also higher costs associated with searching for markets (World Bank, 2008; Jayne et al., 2005).

In Ethiopia, pulses are important food crops that play a crucial role in the country's economy. Besides improving smallholders' food security, pulses are an affordable source of protein and make up approximately 15 percent of the average Ethiopian diet (Shahidur et al., 2010). In addition, pulses offer natural soil maintenance benefits through nitrogen fixation, which improves the cereals yield, consequently resulting in savings for smallholder farmers because of less fertilizer use and increasing soil fertility. Pulses account for 13 percent of cultivated land and approximately 10 percent of value addition (*ibid*). The most common pulses in Ethiopia include common bean (*Phaseolus vulgaris* L.), horse bean, pea, lentil, and chickpea (Bindera, 2009).

Common beans are important for direct consumption because they grow all over the world and are consumed as dry and snap beans. The world major common beans producers are India, Brazil, Myanmar, and China. 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). For instance, consumption has increased from 98,065 tons to 242,100 tons between 2004 and 2009. In addition, it is important in the county's balance of payments (CII, 2010).

There is a wide range of common beans grown in Ethiopia such as mottled, red, white, and black varieties (Ferris and Kaganzi, 2008). Among the four types of common beans, the commercial varieties are pure red and pure white. These two varieties are becoming the most commonly grown types with increasing market demand. Red bean are produced for both sale and home consumptions. The white beans are exported to the European Union (EU) and United States of America (USA). Red bean are exported to Asia, Africa, and some EU countries (ERCA, 2008). In the last few years, domestic and international demands for red and white beans have increased. For instance, in 2005 and 2009 the country got US$ 63 and 90 million respectively from common beans export market (Shahidur et al., 2010). Despite the huge international demand for red and white bean from Ethiopia, the country is unable to meet the demand whereas there is huge un-marketed production in the country (CSA, 2011; Ferris and Kaganzi, 2008).

In Ethiopia, the quantity of red bean exported to different parts of the world is relatively lower than that of white beans. For instance, in 2008 the total amount of white and red bean exported was 78,271 and 8,911 metric tons (MT) respectively. Ethiopian red bean has high demand in Africa, Arabia, Asia, and some EU countries, and are exported to the different part of the world (Bindera, 2009). The increasing demand for quality red bean on the world export market is a great opportunity for Ethiopia to boost its export earnings if smallholder farmers' market participation is increased and the farmers linked to markets. However, smallholders have not yet taken full advantage of the opportunities on local and export market. Besides the increasing demand, the country has a suitable climate, low production costs, availability of arable land and, access to the port of Djibouti, making it possible to export large quantities all over the world (Bisschop and Dijk, 2007). Furthermore, Ethiopia has both time and cost advantages over the major exporting countries. For instance, it takes nine weeks for beans sea shipment from China to EU markets whereas it only takes three weeks from Ethiopia to same markets (Legese et al., 2006).

Red bean grow in almost all regions of Ethiopia, and are mostly produced by smallholder farmers. The major red bean production region of the country is Southern Nation Nationality

People Region (SNNPR), as compared with other regions of the country (Bindera, 2009; IPMS, 2005). The crop is a principal food and cash crop particularly in SNNPR (Bisschop and Dijk, 2007). In SNNPR, Halaba Special District (HSD) is one of the largest red bean producers. Figure 1.1 below presents the trend of red bean production in HSD over the past half decade. In recent years, red bean production and land allocation have been increasing. The average land area covered by red bean was 19,262 hectares between 2008 and 2011 and in the district; area coverage was not more than 10,000 hectares before 2008 (HSDMD, 2012). The average red bean production increased from 28,000 MT in 2008 to 40,000 MT in 2011 (HSDMD, 2012).

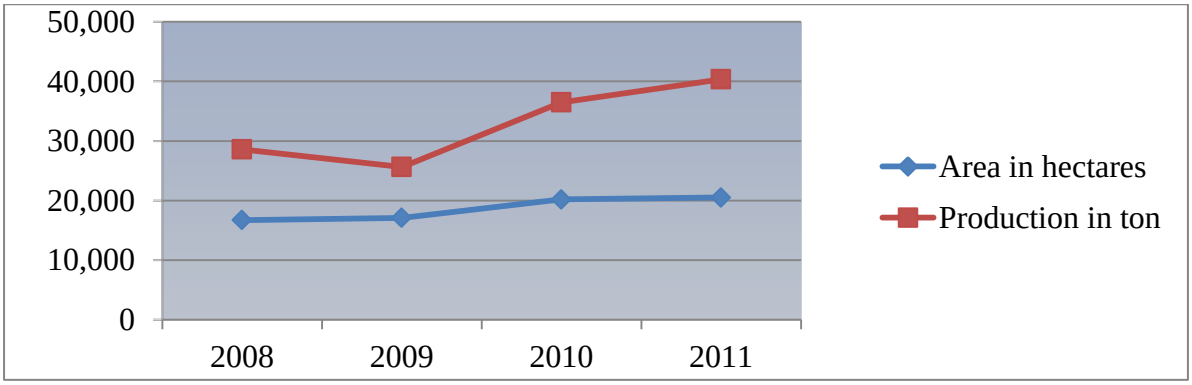

Figure 1.1: Average area and annual production of red bean in Halaba Special District

Source: Halaba Special District Marketing Department (2013)

In Halaba Special District, producers' relative market participation has been declining steadily. In 1997, the proportion of red bean sold was 44 percent out of the total production and in 2004 the proportion supplied to the market was 54.5 percent. In the recent years, the proportion of red bean marketed has declined (CSA, 2008; HSDMD, 2012). For instance, the total proportion of red bean supplied to the market was 13.9, 9 and 10 percent in 2008, 2010, and 2011 respectively (CSA, 2008; HSDMD, 2012).

1.2. Problem Statement

Despite the increase in production of and international demand for red bean from Ethiopia, and the existence of cost and time advantages of the country over some major exporting countries, farmer participation in red beans market has been declining steadily in HSD. Previous studies indicate that the proportion of red bean sold from the district decreased from 44 percent to 10 percent of total production between 1997 and 2011 (Co-SAERSAR, 1997; IPMS, 2005; Shahidur

et al., 2010). Additionally, HSD Marketing Department also reported that while red bean production is increasing, farmers' market participation is declining (HSDMD, 2012). This decline indicates that farmers' participation in red bean market is not matching increasing production and land allocation efforts.

In HSD, there are many brokers along the red bean marketing chain hence competing off the benefits with smallholder farmers; the brokers were the ones setting red bean prices (HSDMD, 2012). Ethiopia formulated a strategy to develop its agricultural markets through registering it under Ethiopian Commodity Exchange (ECX) whereby prices are determined based on force of demand and supply, transparently (Bindera, 2009). Since, red bean is not among the commodities handled under ECX, there is no channel to convey price information directly from export markets to red bean farmers. Furthermore, there is lack of coordination between producers and cooperatives and between cooperative and traders, which may jeopardize the transactions. Moreover, the stakeholders have not fully understood marketing channels and constraints of traders and other marketing actors along the red bean value chain (IPMS, 2005).

Previous studies on red bean in Ethiopia have concentrated on agronomic factors (Gidago et al., 2011; Katungi et al., 2011), on factors affecting adoption of the crop (Ayalew, 2011; Negash, 2007) and on breeding. To date, information on factors influencing the participation of producers in the red bean market in Ethiopia is lacking. In particular, in HSD, the constraints facing traders and cooperatives while supplying the produce to the market have not been elucidated. Understanding farmers' market participation and trading channels in HSD is important as an opportunity to increase smallholder farmer incomes.

1.3 Purpose and Objectives

The purpose of this study was to assess the factors determining the participation of smallholder farmers in the red bean market chain in Halaba Special District, Ethiopia. The specific objectives of the study were:

1. To characterize the red bean market channels in Halaba Special District.
2. To identify the constraints faced by farmers, traders and cooperatives in red bean marketing in Halaba Special District.
3. To examine the factors that influence market participation decision and the extent of participation of red bean farmers in Halaba Special District.

1.4 Research Questions

The research questions addressed were:

1. What are the main marketing channels for red bean in Halaba Special District?
2. What are the constraints of farmers, traders, and cooperatives in supplying red bean into the market in Halaba Special District?
3. What are the factors that influence producers' market participation and the extent of their participation along the market chain of red bean in Halaba Special District?

1.5 Justification of the Study

In the past, the efforts in developing agriculture in Ethiopia mainly focused on the supply side of the sub-sector without giving much attention to the demand side (Aysheshm, 2007). Experience showed that smallholder farmers could not benefit from increased production of crops in the absence of markets or demands. Different countries' governments have learnt from the past failure that the appropriate way out to the problem of food insecurity is to follow market-oriented production systems by giving equal emphasis to both supply and demand issues.

Red bean play a central role in economic development and is a key contributor to poverty reduction in Ethiopia. Because red bean constitute one of the major exportable pulses in Ethiopia, identifying the factors that influence farmer participation in the market is important for increasing their income. The results of this study could serve as a major input in the formulation of appropriate marketing policies and strategies in HSD by identifying interventions that improve

efficiency of the marketing system. Furthermore, the findings of the study will be used as a reference material by policy makers, NGOs (non-government organizations), red bean producers, other market intermediaries along the value chain and serve as a benchmark for further related studies. The study fills the gap in existing literature on factors affecting smallholder red bean farmers' market participation, their extent of participation, constraints of producers, traders, cooperatives, and available marketing channels on red bean market chain at HSD.

1.6 Organization of the Thesis

This thesis is organized into five chapters. Chapter 1 deals with the introductory part, which constitutes the background, problem statement, objectives, research questions, as well as the justification of the study. Chapter 2 presents the literature review. Chapters 3 and 4 deal with the methodology, and results and discussion, respectively. The final section summarizes the findings of the study with some policy recommendations.

CHAPTER 2

LITERATURE REVIEW

2.1 Economic Importance of Common Beans

Common beans are the most important food legumes for direct consumption in the world. Farmers grow common beans, which are consumed as dry bean, and snap beans (the green pods are consumed as a vegetable). Common bean's demand 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 an important source of protein and income for smallholder farmers. The residue of the crop is used as animal feed.

2.2 Common Beans Production and Marketing in the World

In 2011, the annual production of common bean was 23.3 million MT and the area devoted to the crop was 29.2 million hectares (FAOSTAT, 2013). Figure 2.1 presents area and production of common bean in the world.

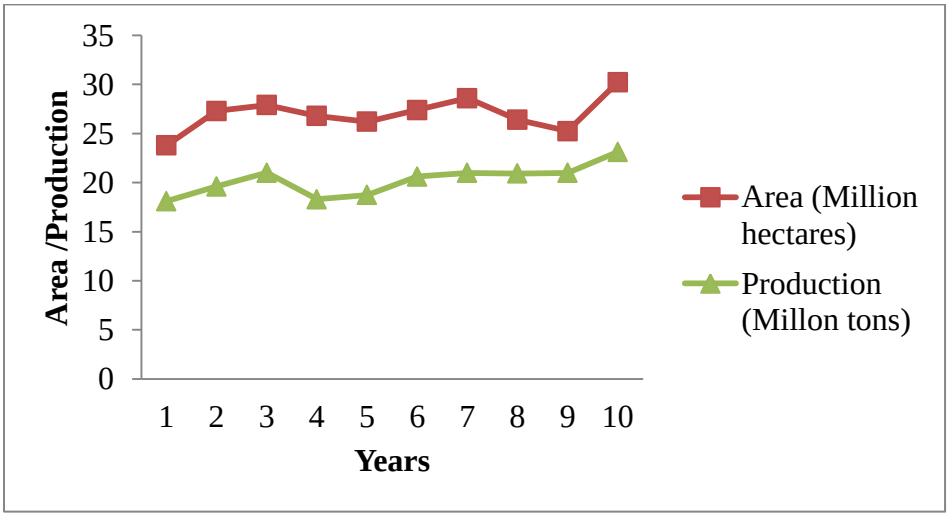

Figure 2.1: Common beans area and production trends in the world

Source: FAOSTAT (2013)

Following increased demand for common beans, its production and area allocation is increasing in the world. The world's major common bean producers are India, Brazil, Myanmar, and China. In 2010, China was the leading exporter of common beans followed by Myanmar. In Africa, Kenya, Ethiopia, Uganda, and Cameron are the largest producers of common bean in their respective order, and Ethiopia is the leading exporter in Africa (FAOSTAT, 2013).

2.3 Common Beans Production and Marketing in Ethiopia

Globally, in 2010 Ethiopia ranked the eleventh producer of common beans and eighth in amount exported in the world. The country is the third largest producer and leading exporter of common beans in Africa (FAOSTAT, 2013). Common bean is one of the crops whose production and marketing could be a potential pathway for improving rural livelihoods. Figure 1.3 below presents area and production trends of common beans in Ethiopia.

Figure 2.2: Trends of total area and production of common beans in Ethiopia

Source: FAOSTAT (2013)

Ethiopia produced 0.7 million MT of common bean in 2004 and in 2010 the country's average production increased to 0.36 million MT annually. The common bean is used as a source of foreign currency, food crop, means of employment, source of cash, balance of payments and plays great role in the country's farming system. An increasing trend of common bean production has been observed since 2006. This could probably be attributed to a number of reasons including increased use of common bean as a substitute for long maturing crops and poor

distribution and unreliability of rainfall. Moreover, common beans are important crops in various intercropping systems in Ethiopia (Birachi et al., 2011; Bindera, 2009; Negash, 2007). Furthermore, the Ethiopian government removed export restrictions with the aim of stimulating domestic production to meet increasing international demand for common beans (MARD, 2011). Additionally, investments by big companies from Italy, United Kingdom, and Turkey indicate promising market prospects (Legese et al., 2006).

2.4 Red Bean Production and Marketing in Ethiopia

Consistent production statistics for red bean are unavailable because its production is often lumped together with those of other *Phaseolus* species. In Ethiopia, red bean production is exclusively undertaken by smallholder farmers using minimal purchased inputs in an area of up to 1.5 hectares per household in a season (Bisschop and Dijk, 2007). The crop is a principal food staple particularly in Southern and Eastern parts of the country and is used as a source of income generation (Bisschop and Dijk, 2007). A red bean processing company called Agricultural Commodity Suppliers (ACOS) brought an improved red bean variety from the USA. The newly introduced variety has seen yields double from 1,000 kg/ha to 2,000 kg/ha in the past few years. Furthermore, the company motivates the farmers by paying 10-15 percent higher price than the general market price based on the quality of farmers produce (*ibid*).

Ethiopia has well known markets for red bean in the Southwestern areas of the Rift Valley and almost all red beans for export are grown in these areas of the country. The Ethiopian red bean has high demand from African, Arabs, Asian, and some European countries in the recent years (Bindera, 2009). The country's red bean exporters include Ethiopian Grain Trade Enterprise (EGTE), Arba and Tinyaky, a Syrian–Turkish Company, ACOS, Poortman and others (Legesse et al., 2006). Ethiopia exports red bean to different parts of the world. Leading importers are Pakistan, United Arab Emirates, Djibouti, East Timor, Yemen, India and Saudi Arabia with average of 3,928, 2,667, 563, 340, 283, 238,237 MT per year respectively. The amount of red bean exported to Panama, Angola, Italy, Russia Republic, South Africa, Lebanon, France, and Switzerland is dismal. The red bean exported in 2008 was collected from SNNPR particularly from Sodo, Shashemene, and Moyale areas (Bindera, 2009). This indicates that the market for the crop is expanding in different parts of the world.

There are few studies done in Ethiopia on beans; most of them focus on adoption, agronomic aspects, breeding, and disease resistance aimed at increasing yield. A study conducted at Areka Agricultural Research Center, in Ethiopia on the response of haricot beans to phosphorus application revealed that phosphorus application significantly and positively influenced the grain yield of haricot beans (Gidago et al., 2011). Ayalew (2011) found that attending field days, demonstration, access to credit and membership in seed production groups had positive and significant effect on adoption and intensity of adoption on haricot bean in Ethiopia.

Katungi et al. (2011) assessed common beans farmers' access to market and its effect on intensification and productivity and fertilizer application in Ethiopia. The objective of the study was to evaluate the effect of market access and factors on the adoption of land-enhancing technologies such as fertilizer and high yielding varieties on the productivity of common beans. The study used Heckman two-stage econometric procedures to analyze factors that affect producers' input market participation. The study found that access to extension service, access to credit services, farm size, adoption of improved varieties, and nearness to urban centers significantly and positively market participation. The number of dependents per household had a negative but significant effect on common beans farmers' participation in the input market. The study concluded that increasing access to credit and information, and reducing the risks and uncertainties of using fertilizer through insurance could increase farmers' fertilizer use. The study was on the input market side, indicating farmers' output market participation was not studied. The current study addresses the factors that affect red bean farmers' market participation decision after production to fill the gap left by the previous study.

Ferris and Kangaze (2008) evaluated marketing opportunities for haricot beans in Ethiopia using descriptive statistics. The study focused on evaluating market opportunities and laxity in exploiting the existing opportunities. The study found a strong potential for growth in the regional markets for Ethiopian red bean farmers to supply bean deficit countries such as Kenya and other export markets overseas destination. Additionally, the study found that there was poor investment on bean and that price volatility, weak trade associations, and weak market information delivery, lack of finance, and poor infrastructure. These were identified to be the major challenges on the red bean value chain. The study concluded that any intervention that support increased production and marketing of this crop is likely to provide direct benefits to the

more vulnerable groups in the country. Ferris and Kangaze (2008) applied associative relationship analysis whereas the current study uses causal (regression) analysis to assess which factors affect producers' market participation and to what extent those factors influence the intensity of red bean producers' participation in Ethiopia.

2.5 Red Bean Production and Market in Halaba Special District

HSD is one of highest red bean producer in SNNPR (IPMS, 2005). The annual average production of the district was 34,170 MT between 2009 and 2011 while the average land allocation in the same period was 19,262 ha. Furthermore, red bean production covers one third of the total cultivated land area during the short rainy seasons. As shown in Figure 1.1, production in the district was increased by about 70 percent between 2008 and 2011. The increase in production is attributed to producers' income generation from the crop and home consumption (HSDMD, 2012). The crop is preferred by many farmers in the district because of its suitability in intercropping with maize and other crops. In addition, its drought and disease resistance compared to white bean, the relatively low cost of production, use of its residue as animal feed, and its fast maturity (Bisschop and Dijk, 2007). Out of the 79 *Kebele* administrations (KA) in HSD, 45 are well known producers of the crop (IPMS, 2005).

Negash (2007) assessed the determinants of adoption of improved haricot bean production package in HSD. A Tobit model was used to identify factors affecting farmers' adoption and intensity of adoption of improved technology package on haricot bean. The study found that access to extension service, credit, and market information had positive and significant influence on adoption and intensity of adoption of the crop. It was concluded that development interventions should be done to improve institutional support to improve adoption of the crop. Fair attempt was done with regard to adoption of the crop in the district; however, post-production issues on the crop were silent. The current study addressed post-production issues like factors affecting red bean farmers' market participation decision and extent of participation and challenges of traders in red bean market. The previous study was used in identifying the gap and the type of red beans adopted in the district.

2.6. Concept and Analytical Methods in Market Participation

Market participation is both a cause and a consequence of economic development (Reardon and Timmer, 2005). It enhances the links between the input and output sides of agricultural markets (Gebremedhin and Jaleta, 2010). Farmers with low market participation have low agricultural productivity and they are also the poorest (Mathenge et al., 2010). Higher market participation can drive productivity by providing incentives, information, and cash for purchasing inputs. Higher productivity could drive market participation because farmers with high productivity have surplus to participate in the market, *ceteris paribus* (Barrett, 2008; Rios et al., 2008).

Market renders producers the prospect to specialize based on their comparative advantage and thus producers enjoy welfare gain from trade (Reardon and Timmer, 2005). According to the theory of trade households participating in markets by selling surplus of their produce on a comparative advantage base can benefit from direct welfare gains as well as opportunities that emerge from economies of large-scale production (Barrett, 2008). Agricultural market participation leads farmers from subsistence production to market oriented production, that further increase their market participation (Haddad and Bouis, 1990).

Most empirical studies evaluating market participation and the extent of participation use the Heckman's (1979) sample selection model (e.g., Mussema and Dawit, 2012; Katungi et al., 2011; Alene et al., 2008,) while some researchers used the more restrictive Tobit model to analyze market participation and extent of participation (e.g., Holloway et al., 2000). In cases where farmers have two types of decisions to make, the Heckman two-step model is more appropriate (Heckman, 1979). This is because Heckman two-step model deals with a sample selection bias by computing lambda (λ), or selection term, from the participation equation and including it as an explanatory variable to correct for self-selection in the second stage regression. The selection bias is viewed as an omitted variable and corrected by this procedure (Wooldridge, 2002). Due to its ability to correct for self-selection bias, the Heckman model was considered for use in this study.

2.7 Importance of Market Participation for Rural Households Economic Development

The significance of participating in product markets is based on the premise that incomes and, thus livelihoods of smallholder producers are likely to improve if they have better access to

markets for their produce (World Bank, 2008). Markets and improved market access for poor rural households are a precondition for increasing agriculture-based economic development and increasing rural household incomes (World Bank, 2008). Thus, commercialization is enhanced with the establishment of efficient and well-functioning markets because they lower transaction costs, minimize risk, and allow uniform information flow to all actors in a commodity value chain. Hence, linking smallholder farmers to markets is vital for sustainable development of the agricultural sector in agriculture-based economies (*ibid*).

Market participation is a major pathway for rural people in assuring better income and improving their food security. Improving access to markets has paramount importance in increasing smallholders' market participation and the extent of their participation, *ceteris paribus* (World Bank, 2008; Jayne et al., 2005; Key et al., 2000). Avoiding factors that limit access to markets by smallholder producers will enhance market participation. For example, improving infrastructure will enhance market access primarily limited by high transaction costs created by poor infrastructure. Improving infrastructure will increase smallholders' market participation and the extent of their participation (*ibid*).

2.8 Empirical Studies on Factors Affecting Market Participation Decision and Extent of Participation in Agricultural Product Markets

Lapar et al. (2002) analyzed policy options promoting market participation of smallholder livestock producers in Philippines with the objective of designing appropriate policies to effect benefits to smallholders. The study used a Heckman two-stage model. The results revealed that, number of animals, technology, availability of funds, availability of alternative occupations, number of household members, and extension service significantly affected livestock keepers' market participation. In addition, market search, making contract, and price negotiation affected producers' market participation. Moreover, except for the level of formal education, all factors that affected market participation also affected the extent of market participation. In conclusion, improving extension visitation appeared important in precipitating market participation and appeared to be the most appropriate policy option. This study focused on red bean because factors that affect livestock farmers' market participation decision are likely to be different from factors that affect red bean farmers' market participation decision; beans are of shorter terms than livestock in general.

Mathenge et al. (2010) examined the factors influencing market participation of crop producers and their impacts on income and poverty among the poor and marginalized groups in Kenya. The objective of study was examining most significant constraints to market participation for the different social groups. The study used a Heckman two-stage model, and modeled participation in input and output markets. The study found that female-headed households had higher bean market participation than male-headed households. Land size, membership to a group; distance to a tarmac road had positive and significant effects on bean market participation, while price had a negative but significant effect. The study found that per capita land size had positive and significant effect while crop price had negative and significant effect on extent of beans market participation. Mathenge et al.'s study contributes to current one in identifying factors that affect output market participation and specification of the model. The main difference is that while Mathenge et al.'s study focused only on poor and marginalized farmers, the current study considers all farmers producing red bean as no producer preference reported so far.

Masuku et al. (2001) assessed the factors influencing the decision to sell maize and choice of marketing chain by smallholder farmers in Swaziland using a logistic regression. The study found that the decision to participate in the maize market was influenced by off-farm income activities, past experience, access to information, participation in agricultural schemes, family members without education, and farm size. The choice of the maize marketing chain was influenced by transportation costs and farm size. Accordingly, efforts to enable farmers to easily access agricultural information in a manner that they can understand would be among the other factors that needed improvement. In addition, the study recommended that policies that would enable farmers to organize themselves and their marketing activities to reduce transportation costs and increase the area under cultivation be designed to ensure efficient utilization of the formal markets and subsequently improve farmers' income. Masuku's study concentrated on market participation decision only whereas the current study stretched its objective to encompass market participation decision and extent of their participation**.** The previous study was benefited the current study in identifying factors affecting market participation decision.

Gebremedhin and Hoekstra (2007) studied cereal marketing and household market participation in Ethiopia, with respect to *teff*, wheat, and rice. The study aimed at analyzing the market participation of farm households, market actors, market channels, and determinants of household

market participation for these crops. Descriptive statistics and regression analysis were used. The study found that smallholder farmers' participation in agricultural marketing had a significant role in improving the use of agricultural inputs and enhancing productivity apart from increasing production. The result of the study revealed that important market places for buyers are either those located at the district urban centre or in the peasant associations within the district. This implied that markets outside the districts were not important for producers and the important selling channels were wholesalers and urban collectors for the crops. The study is relevant to the current one in developing appropriate method of characterizing marketing channels and identifying important buyers for producers output in the markets.

Mussema and Dawit (2012) evaluated the market chain of red pepper at HSD and Silti zone of Ethiopia. The objective of the study was to identify factors affecting volume of pepper supply. The study used a Heckman two-stage model to assess the factors that affect red pepper producers' output market participation. The study found that the quantity of red pepper produced and extension service had positive and significant influence on market participation, while yield of cereals had negative and significant effect on market participation. The study also found that livestock numbers and non-farm income negatively and significantly influence the amount of red pepper supplied to the market. It was concluded that policies that would improve pepper production capacity by identifying new technologies and create stable demand for surplus production would enhance farmers' decisions on marketable surplus. As a result, policy should be designed on integrated farming system to minimize income risk and to improve the livelihood of the farmers. Attempt was made in analyzing red pepper market participation and extent of participation. However, the results obtained for red peppers cannot be generalized to red bean because pepper is produced for commercial purpose only whereas red bean production is for both commercial and household subsistence. That is, the production drivers are not the same. The red bean production in Ethiopia is already on record to be increasing. The previous study was used in specifying the model.

2.9 Summary

Reviews of literature outlining market participation of smallholder farmers have been presented. Ethiopia's production and export position at global level was highlighted. The prominence of bean in the livelihoods of the smallholders in the study area and on the country's export earnings

has been reviewed. The different types of common bean like red, mottled, white, and black bean have been explored. In the country, most of the past studies on smallholders' market participation were focused on livestock and cereal crops. Those conducted on bean were focused on adoption, agronomic improvements, and how markets accessibility affects smallholders input market participation. Studies that have been conducted on common bean market opportunity in Ethiopia identified different opportunities of local as well as international markets. No past study has been undertaken on the factors influencing red bean farmers' market participation in Ethiopia. In most of the past market participation studies, a Heckman two-step model was applied mainly to correct for self-selection bias. Generally, there is scanty information on the factors influencing farmers' participation in the marketing of red bean in HSD of Ethiopia and hence this study.

CHAPTER 3

METHODOLOGY

3.1 Theoretical Framework

In order to analyze market participation of smallholders in red bean market in HSD of Ethiopia, an agricultural household model framework was applied. According to Singh et al. (1986) and Key et al. (2000), the household model assumes that a household maximizes utility subject to a set of constraints. Following Singh et al. (1986) and assuming absence of transactions costs, the household's problem is to maximize the utility function:

1. Maximize $U(C, Z_u)$ the utility function ……(3.1)

   Subject to:

2. $\sum_{i=1}^{N} P_i^m m_i + T = 0$ the cash constraint ……(3.2)
3. $q_i - x_i + A_i - m_i - c_i = 0$ the resource balance (where i= 1,….N)……...(3.3)
4. $G(q, x; z_q) = 0$ the production technology ……(3.4)
5. $c_i q_i x_i \geq 0$ the non-negativity condition ……(3.5)

where, C is consumption, Z_u is exogenous shifter of the utility function, p_i^m is the market price of good i, m_i is quantity that the household decides to sell in the market (positive for sell and negative for purchase), and T represents exogenous transfers and other incomes. On the other hand, q_i represents how much to produce, x_i how much input to use, A_i the endowment in good i, c_i how much of good i to consume, G the production technology, and z_q exogenous shifters of the production function.

The cash constraint equation (3.2) states that expenditures on all purchases must not exceed revenues from all sales and transfers. The resource balance equation (3.3) states that, for each of the N goods, the sum of the amount consumed, used as input, and sold, is equal to what is produced and bought plus the endowment of the good. The production technology equation (3.4) relates inputs (e.g., land, labor, etc) to outputs.

According to Jagwe (2011) and Key et al. (2000), incorporating proportional transaction costs and fixed transaction costs into the household cash constraint yields:

$$\sum_{i=1}^{N}[(P_i{}^m - t_{pi}{}^s(z_t^s))\delta_i^s - (p_i^m + t_{pi}^b(z_t^b))\,\delta_i^b)]m_i - t_{fi}^s(z_t^s)\delta_i^s - t_{fi}^b(z_t^b)\delta_i^b + T = 0 \ldots (3.6)$$

where the household pays the fixed cost t_{fi}^s if it sells good **i** and pays t_{fi}^b if it buys good i. To solve the household problem, a Lagrange expression is derived and first order conditions for the consumption goods obtained from equations (3.1) to (3.6).

The decision price, p_i, is thus defined as:

$$p_i = \begin{cases} p_i^m - t_{pi}^s \text{ if } m_i > 0 \text{ for a selling household} \\ p_i^m + t_{pi}^b \text{ if } m_i < 0 \text{ for a buying household} \\ \tilde{p_i} = \frac{\mu_i}{\lambda} \text{ if } m = 0 \text{ for a self} - \text{sufficient household} \end{cases} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.7)$$

The supply curves for the selling, buying, and non-participant households in the presence of transaction costs are given by:

$$\begin{cases} q^s = q(p^m - t_p^s - t_f^s, z^q) \text{ sellers} \\ q^b = q(p_m + t_p^b + t_f^b, z_b) \text{ buyers} \\ q^a = q(p, z_q) \text{ non} - \text{participants} \end{cases} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.8)$$

For empirical analysis, the current study focused on the selling households. Accordingly the linear expression of equation (3.8) was assumed for the supply functions and the proportional transaction costs as follows (Jagwe, 2011):

$$q(p, z_q) = p\beta + z_q\beta_q \text{ and } t_p^s = -z_t^s\beta_p^s \text{ where } t_p^b = -z_t^b\beta_p^b \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.9)$$

This leads to linear expressions for the supply curve of sellers as follows:

$$q^{s*} = p^m\beta_m + z_t^s\beta_t^s + z_q\beta_q \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.10)$$

where, z_t are exogenous characteristics that affect transaction costs when selling; z_q are production shifters; z_c, are consumption shifters, and α_t^s, α_q^s, and α_c^s are their coefficients, respectively. The econometric specification of market participation as a seller can thus be obtained by adding an error term to equation (3.11) as follows:

$$q^{s*} = p^m\beta_m + z_t^s\beta_t^s + z_q\beta_q + \mu \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.11)$$

with a linear production threshold, $\underline{q}^s$, expressed as:

$$\underline{q}^s = z_t^s \alpha_t^s + z_q \alpha_q^s + z_c \alpha_c^s \ldots \ldots \ldots (3.12)$$

where q^{s*} is the latent supply if a household is a seller and it is observed when it is higher than the threshold for market participation, $\underline{q}^s$. Thus, if $q^{s*} > \underline{q}^s$ then the household is participating in the market as a seller. The expression in equation (3.13), therefore, allows for the identification of parameters β_i using probit analysis. The factors affecting the decision of smallholder farmers to participate in the red bean market can be determined on the basis that (Jagwe, 2011):

$$q^{s*} > \underline{q}^s \equiv \text{Prob}(Y = 1) = X_i \beta_i + \mu \ldots \ldots \ldots (3.13)$$

The estimation of coefficients in equation (3.12), $\beta_m, \beta_t^s, \beta_q$, captures the intensity of participation among the smallholder farmers.

3.2 Marketing Margins

Marketing margin is the difference between the value of a product or group of products at one stage in the marketing process and the value of an equivalent product or group of products at another stage (Smith, 1992). It measures the share of the final selling price that is captured by a particular agent in the marketing chain (Mendoza, 1995). The total gross marketing margin (TGMM) is the difference between price per unit of that product at the farm gate and the price per unit when sold to the final consumer (Smith, 1992).

$$\text{TGMM} = \frac{\text{End buyer price} - \text{First seller price}}{\text{End buyer price}} * 100 \ldots \ldots \ldots (3.14)$$

In order to gauge the level of equity in the distribution of benefits accrued along the value chain, producer's gross margin (GMMP) which is the portion of the price paid by the end buyer that goes to the producer was calculated as:

$$\text{GMMP} = \frac{\text{End buyer price} - \text{marketing gross margin}}{\text{End buyer price}} * 100 \ldots \ldots \ldots (3.15)$$

Because precise marketing costs are frequently difficult to determine in many agricultural marketing chains in developing countries due to price data limitations, the gross rather than the net marketing margin is calculated. Thus, the marketing margin in this study was understood as

gross marketing margin (Scott, 1995). The gross marketing margins were used to compare the benefits farmers got from each red bean marketing channel and the higher value indicated the higher gross returns to the farmers.

3.3 Empirical Model

In most empirical studies on market participation and extent of participation, the Heckman two-step model has been used. It is also possible to use a Tobit model that accounts for the clustering of zeros due to non-participation. However, a major limitation with the Tobit model is that it assumes that the same set of parameters and variables determine both the probability of market participation and the extent of participation (Blaylock and Blisard, 1993). The Heckman two-step model relaxes these assumptions by allowing different mechanisms to verify the discrete probability of participation and the level of participation (Wooldridge, 2002). The model allows for separation between the initial decision to participate ($y>0$ vs $y=0$) and the decision of how much to participate (y is quantity of red bean sold in this case) given ($y>0$) (*ibid*). In this case, it is assumed that a different set of explanatory variables influences participation and the extent of participation differently (Mathenge et al., 2010). For these reasons, this study used the Heckman two-step model to examine the factors that influence red bean farmers' market participation and extent of that participation in Halaba Special District.

In the Heckman two-step model, the decision to participate in the market can be seen as a sequential two-step decision-making process due to the influence of various types of transaction costs and other constraints associated with production on household market participation decisions (Heckman, 1979). The empirical model used to assess the factors influencing households' decision to enter into the market and their level of participation in the market given their entry into the market was specified as follows:

$$\textbf{RBMKPD} = \alpha_0 + \alpha_1(GND)_i + \alpha_2(AGH)_i + \alpha_3(FSZE)_i + \alpha_4(EDLV)_i + \alpha_5(OFFI)_i + \alpha_6(OWNT)_i + \alpha_7(FRSZE)_i + \alpha_8(AMRB)_i + \alpha_9(DSMK)_i + \alpha_{10}(PRRB)_i + \alpha_{11}(NOEX)_i + \alpha_{12}(MINFO)_i + \alpha_{13}(ACICR)_i + \alpha_{14}(MCOO)_i + \alpha_{15}(AQST)_i \quad \text{..... (3.16)}$$

$$\textbf{EXRBMP} = \beta_0 + \beta_1(GND)_i + \beta_2(AGH)_i + \beta_3(FSZE)_i + \beta_4(EDLV)_i + \beta_5(OFFI)_i + \beta_6(OWNT)_i \beta_7(FRSZE)_i + \beta_8(AMRB)_i + \beta_9(DSMK)_i + \beta_{10}(PRRB)_i + \beta_{11}(NOEX)_i + \beta_{12}(MINFO)_i + \beta_{13}(ACICR)_i + \beta_{14}(MCOO)_i + \beta_{15}(AQST)_i \quad \text{.....(3.17)}$$

Table 3.1:Description of variables in the empirical model

Variable	Description	Unit of measurement	Exp. Sign
RBMKPD	Red bean market participation decision	Dummy (1=participate, 0=otherwise)	-
EXRBMP	Red bean supplied to the market in 2012	Kilogram	-
Independent Variables			
GND	Gender	Dummy (1= male, 0= otherwise)	(+)
AGH	Age of household head	Year	(+/-)
FSZE	Family size	Number of people in the house in 2012	(+/-)
EDLV	Education status	Number of years in School	(+/-)
OFFI	Off farm income	Birr (ETB)	(-/+)
OWNT	Ownership of means of transportation	Dummy (1= yes, 0= otherwise)	(+)
FRSZE	Size of farm allocated to red bean	Hectares (Ha)	(+)
AMRB	Quantity of red bean produced in the 2012	Kilogram	(+)
DSMK	Distance to the nearest market	Kilometers	(-)
PRB	Average price of red bean in the year 2012	Birr per Kg (ETB)	(+)
NOEX	Number of extension visit in year 2012	Number of days	(+)
MINFO	Access to market information	Dummy (1=access, 0= otherwise)	(+)
ACICR	Access to informal credit	Dummy(1 =access, 0 = otherwise)	(+)
MCOO	Membership in a cooperative	Dummy (1= yes, 0= otherwise)	(+)
AQST	Awareness about quality standards	Dummy (1=aware, 0=otherwise)	(+)

Source: Author (2013)

In the Heckman two-step procedure, the household first makes a separate decision on whether or not to participate in the red bean market. In this case, the dependent variable, Y, is binary in the sense that the household either participates (Y=1) or it does not (Y=0). The appropriate model to estimate the binary decision process is the probit (Greene, 2003; Gujarati, 2004), which in this study was used to assess the factors influencing farmers' participation in red bean market in HSD of Ethiopia (see equation 3.16). The ordinary least square (OLS) technique would yield inefficient estimates due to the presence of selectivity bias in the sample. In the second stage, an OLS was used to evaluate the factors that influence the quantity of red bean supplied to the market once the farmer has decided to participate in the market (see equation 3.17).

3.4 Justification for Inclusion of Various Independent Variables

Gender (GND): This was coded as a dummy variable. Male-headed households in Ethiopia have been observed to have a higher tendency than female-headed households to enter into agricultural marketing. For instance, Mussema and Dawit (2012) found that male-headed households participated more in pepper market in Selti and Aalaba Special districts in Ethiopia than their female-headed counterparts. In this study, therefore, GND was hypothesized to have a positive relationship with market participation and the extent of participation.

Age of the household head (AGH): Age was measured in years as a continuous variable. Previous studies report mixed results on the relationship between age and market participation. For example, Mathenge et al. (2010) found that the age of the household head had a positive and significant effect on market participation of marginalized and poor smallholders in Kenya. This may be due to the fact that older farmers have more experience than young farmers in participating in markets or as the farmer gets older s/he may not be able to sell more of her/his produce as compared to younger farmers due to social networks fomented over a period of time. In contrast, Tshiunza et al. (2001) found a negative association between age and market supply in cooking banana marketing in Nigeria. Therefore, the expected effect of age on market participation and extent of market participation in this study was deemed indeterminate.

Family size (FSZE): This was measured by man-equivalent as a continuous variable. This variable was used as a proxy for availability of active labor force in the household. This variable was expected to affect farmers' decisions to participate in market positively. Wolday (1994)

found that household size had a positive and significant effect on quantity of *teff* marketed. However, Singh and Rai (1998) found the marketed surplus of buffalo milk in Haryana to be negatively affected by family size. In this study therefore, family size was expected to have an indeterminate relationship with market participation and the extent of participation in the red bean market in HSD.

Education level (EDLV): This was measured as a continuous variable denoting the number of years of formal schooling of the household head at the time of the survey. Household heads with more years of formal education were expected to have a higher ability to accept new ideas and innovations, and therefore would be more willing to produce and supply red bean for sale. Thus, education was hypothesized positively to influence market participation and the extent of participation. Holloway et al. (2000) found that education had a significant and positive effect on the quantity of milk marketed in Ethiopian highlands. Gani and Adeoti (2011) found that in Nigeria, farmers' market participation decision was positively influenced by the level of education. However, Lapar et al. (2002) found that formal education of the household head was negatively associated with market participation. They explained that the phenomena might have been caused by the risk aversion nature of educated household heads that diverted their attention to other business. In this study, therefore, the household heads' years of formal education was hypothesized to have an indeterminate effect on their market participation decision as well as extent of participation.

Off-farm income (OFFI): Off-farm income was measured in ETB as a continuous variable that shows the amount of income obtained by the household head from non-farm activities. This income may strengthen the farming activity or make the household head reluctant to produce red bean to generate money from beans. Getting income from non-farm activities was expected to have either a positive or a negative relation with market participation and marketable surplus. This expectation was supported by Martey et al. (2012) who found that an increase in off-farm income reduced maize market participation whereas an increase in off-farm income increased the extent of cassava market participation in Ghana.

Ownership of means of transport (OWNT): This was coded as a dummy variable that referred to the ownership of transportation means with one, and zero otherwise. Households with own transportation means may be engaged in more of red bean production that increases the farmers'

volume of red bean supply. So, in this study, ownership of own transportation means was expected to influence red bean market participation and volume positively. Masuku et al. (2001) found that ownership of transportation means significantly enhanced probability of market participation of households in Swaziland.

Farm allocated to red bean (FRSZE): This was measured in hectares as a continuous variable indicating the total size of land allocated to red bean in 2012. Total farm size allocated to red bean was expected positively to influence the quantity of red bean marketed and therefore the probability of market participation. Mussema and Dawit (2012) found that as land allocated to red pepper increased in Aalaba Special District the amount of pepper marketed also increased. Martey et al. (2012) also found that maize and cassava market participation increased as farm size increased. This was because increase in farm size provides opportunity to increase surplus production, which is critical in improving market participation.

Quantity of red bean produced (AMRB): It was measured in kilograms as a continuous variable. High red bean production was hypothesized to have a positive effect on market participation and extent of participation as measured by the quantity of red bean supplied in the market. Wolday (1994) observed that output of food grains (wheat, *teff,* and maize) had a positive effect on the quantity supplied to the market in Ethiopia. In Ghana, Martey et al. **(**2012) found that an increase in production of cassava increased farmers' market participation.

Distance to the nearest markets (DSMK): This variable was measured in kilometers as a continuous variable. The closer the household is to the red bean market the lower the transportation cost and the better would be farmers' market access. Hence, **DSMK** was hypothesized to be negatively related to market participation and the extent of participation. Mussema and Dawit (2012) found that market participation among smallholder pepper producers in Silte and Aalaba in Ethiopia was negatively associated with distance to the market. Martey et al. (2012) in Ghana found distance to nearest market to be significantly associated with a lower level of cassava sales and every additional kilometer reduced the extent of market participation by 0.4 percent. In Ethiopia, it was reported that smallholder households who were away from market centers had lower market participation (Gebremedhin and Jaleta, 2012).

Price of red bean (PRB): This was a continuous variable measured as the annual average price of red bean in the Halaba Kulito and Guba markets in 2012. The price was expected to positively affect market participation and the quantity supplied in the market because when producers are well paid, this will motivate them increase their market participation and quantity of red bean sold. Goetz (1992) observed a significant and positive relationship between grain price and the quantities sold in markets in Sub-Saharan Africa (SSA).

Number of extension visit (NOEX): This variable was coded as a continuous variable to proxy for number of contacts between farmers with public extension workers. Farmers who have contact with extension agents are more likely to have knowledge about production, quality, and price of inputs and information on markets and output prices of poultry (Zeberga, 2010). It was observed that number of extension visits by an extension agent had significant and positive effect on quantity of milk marketed in Ethiopia (Holloway et al. 2000). In this study, therefore, number of contact with extension workers was expected to have a positive relationship with market participation decision and the extent of participation.

Access to market information (MINFO): This was coded as a dummy variable and was expected to influence positively market participation decision. The market information considered was information on prices, demand, buyers, and other relevant information that could contribute sellers' marketing decision. MINFO was expected to influence positively the participation as well as the extent of participation. Goetz (1992) found that better information significantly raises the probability of market participation among potential selling households. In Nigeria, Gani and Adeoti (2011) found that access to market information positively and significantly influenced farmers' market participation decision.

Membership to cooperatives (MCOO**):** This was coded as a dummy variable, which took the value of one if the farmer was a member of cooperative and zero otherwise. This variable was expected to affect the household supply of red bean positively. This is because, producers who are members of cooperatives are likely to get inputs and market information and thus could participate and supply red bean to the market than non-members. Alene et al. (2008) found that membership in farmer organizations significantly raised the probability of market participation for selling households in Kenya. Furthermore, Gani and Adeoti (2011) also found membership to

cooperative society positively and significantly affect market participation decision by farmers in Nigeria. This means, market participation would be motivated if they belonged to a cooperative society. Cooperative members would likely here access to information and other inputs that encourage them to participate in the market.

Access to credit (ACIR): This was coded as a dummy variable taking a value of one if the household had access to credit and zero otherwise. This variable was expected to influence the marketable supply of red bean producers positively on the assumption that access to credit improves the financial capacity of red bean producers to buy more improved production inputs, thereby increasing red bean production, which would also increase market participation. Alene et al. (2008) found that limited access to credit constrains farmers' ability to buy agricultural inputs, which in turn reduces farmers' market participation in Kenya. Martey et al. (2012) found that access to credit from both formal and informal sources had a positive effect on smallholder maize and cassava farmers in Ghana. Negassa (2009) found credit to have a positive relation with likelihood of selling raw milk in Ethiopia, indicating access to credit increased milk market participation.

Awareness about quality standards (AQST): This variable was coded as a dummy variable. For those households who produce and participate in the red bean market, awareness about quality standards of the crop was expected to increase producers' market participation and extent of market participation decision. Govindasamy et al. (1998) found that majority of consumers' decision to purchase food items was determined by quality of the produce. This indicates that consumers were willing to pay for quality products. In Ethiopia, one of the bottlenecks of performance of agricultural marketing was poor quality of agricultural produce (Wolday, 1994). Somano (2008) found that milk quality was one of the factors that determined traders' price setting for milk and butter in Ethiopia. Emergence of quality standards and food safety requirements constrained farmers in developing countries, those countries exporting fresh food item face increasing constraint to access markets all over the world (Ruben et al., 2007). In this study, awareness about red bean quality standards was expected to have positive relation with market participation decision as well as the extent of participation.

3.5 Inverse Mill's Ratio

The first stage of the Heckman model yields an inverse Mill's ratio (IMR) which is then used in the second-stage as an explanatory variable to account for self-selection bias.

The Inverse Mill's Ratio was estimated as:

$$\boldsymbol{\lambda_i = \frac{f(X\beta)}{1 - F(X\beta)}} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (\mathbf{3.19})$$

where f(Xβ) is density function and 1-F(Xβ) is the cumulative distribution function.

The Inverse Mill's Ratio was statistically significant (p = 0.021). This implies that the correction for selectivity bias was significant. This shows that sample selection bias would have resulted if the red bean supply equations were estimated without considering the discrete decision to participate in red bean market.

3.6 Diagnostic Tests

3.6.1 MulticollinearityTest

Multicollinearity is a situation whereby there exist strong linear relationships among independent variables is more than 75 percent (Gujarati, 2004). If two variables are highly collinear, then this will result in inefficient estimates. In this study, before running the Heckman two-stage model, multicollinearity was tested using a Pearson correlation matrix. The results are presented in Appendix 1. Based on the results presented, there was no evidence of multicollinearity on the data.

In addition to the Pearson correlation matrix test, multicollinearity was tested using the Variance Inflation Factor (VIF) method to assess the degree of association among continuous and dummy explanatory variables. The results are presented in Appendix 2. According to Gujarati (2004), the Variance Inflation Factor (VIF) is calculated as follows:

$$\mathbf{VIF_{(Xj)} = \left(1 - R_j^2\right)^{-1}} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3.20)$$

Where, VIF is variance inflation factor

R_j^2 is the multiple correlation coefficients between explanatory variables, the larger the value of R_j^2 the higher the value of $VIF_{(Xj)}$ causing higher collinearity in variable (X_j).

As a rule of thumb, if the VIF is greater than 10 the variable is said to be highly collinear (Gujarati, 2004). In this study, there was no evidence of multicollinearity since there was no VIF value greater than 10 (see Appendix 2).

3.6.2 Heteroskedasticity Test

Heteroscedasticity is a situation in which the variance of the dependent variable varies across the data or unequal spread or variance, which shows that the conditional variance of Y_i increases as X increases (Gujarati, 2004). The problem associated with heteroscedasticity is that an estimator is inefficient; (*ibid*).The Breusch-Pagan statistics are standard tests of the presence of heteroskedasticity in an OLS regression. The principle is to test for a relationship between the residuals of the regression and p indicator variables that are hypothesized to be related to the heteroskedasticity (Baum et al., 2003).These tests are available in Stata, following estimation with regress, using *hettest* (Baum et al., 2003). Hence, in this study heteroskedasticity was tested using Breusch-Pagan statistics. On the courses of testing, first the regression model was run and then *hettest* was ordered on stata 12 statistical packages. In this study, there was no evidence of heteroskedasticity since there was no p-value significant, indicating homoskedasticity (see Appendix 3).

3.6.3 Goodness-of-Fit Test

The goodness-of-fit of the models were assessed using pseudo R-squared and probability of model joint significance value for probit model and probability of joint significance and adjusted R-squared values for OLS model (Madala, 1983). Pseudo R-squared is calculated and the obtained values indicated that the independent variables included in the regression explain significant proportion of the variations in the red bean farmers' likelihood to participate in the market. The pseudo R-square, value ranges from zero to one with higher values indicating a good fit of the model (Maddala (1983). In this study, the R-square value is 66 percent indicating the fitness of the model. When probability of joint significance of the model is significant, then

this indicates that the independent variables are explained the dependent variable, indicating fitness of the model (Appendix, 9).

3.7 Study Area

Halaba Special District is found in Southern Nations, Nationalities and People's Region (SNNPR), located 315 km from Addis Ababa and 90 km from regional capital, Hawasa, on the main road to Arbaminch (Figure 3.1). The district has 79 rural *Kebele* Administrative (KA) and five urban KA, and Kulito is the capital. The district is called "special" because it has a special status where the administration directly reports to the regional state. The latitude and longitude of study area is $7^{o}19'12"$N and $38^{o}4'47''$E respectively (JICA, 2012; IPMS, 2005). The District is located east of Kembata Tembaro zone, west of Oromia region, North, and Southeast of Hadiya zone and South East of Silte zone (IPMS, 2005).

The altitude ranges from 1,554 to 2,149 Meters Above Sea Level (M.A.S.L), but most of it is about 1,800 M.A.S.L (IPMS, 2005). Except for a few hills; the district has agriculturally suitable land in terms of topography. Despite recurrent drought, flooding has also been a major problem in the area. Rainfall has been a major limiting factor in agricultural production in the area. As a result, it is among the districts in SNNPR where drought is observed recurrently affecting many households. The annual rainfall varies from 857 to 1,085 millimeters; the annual mean temperature also varies from 17^{o}C to 20^{o}C. The district receives a bimodal rainfall where short rains occur between March and April while long rains occur from July to September. Both seasons experience erratic rainfall such that most of the time crops fail due to uneven distribution of rainfall over the growing period. The total area of the district is 64,116.25 hectares (ha) of which 48,337 ha (75 percent) are considered suitable for agriculture (JICA, 2012).

Halaba Special District has two major farming systems: (i) *teff*/bean/livestock farming system and (ii) pepper/livestock farming system. Of all the 79 KA, 45 belong to the *teff*/bean/livestock farming while the other 34 KA have the pepper/livestock farming system. In the *teff*/bean/livestock farming system, bean is the most important crop for household income generation and food security and has been identified as a priority marketable commodity in the district (IPMS, 2005).

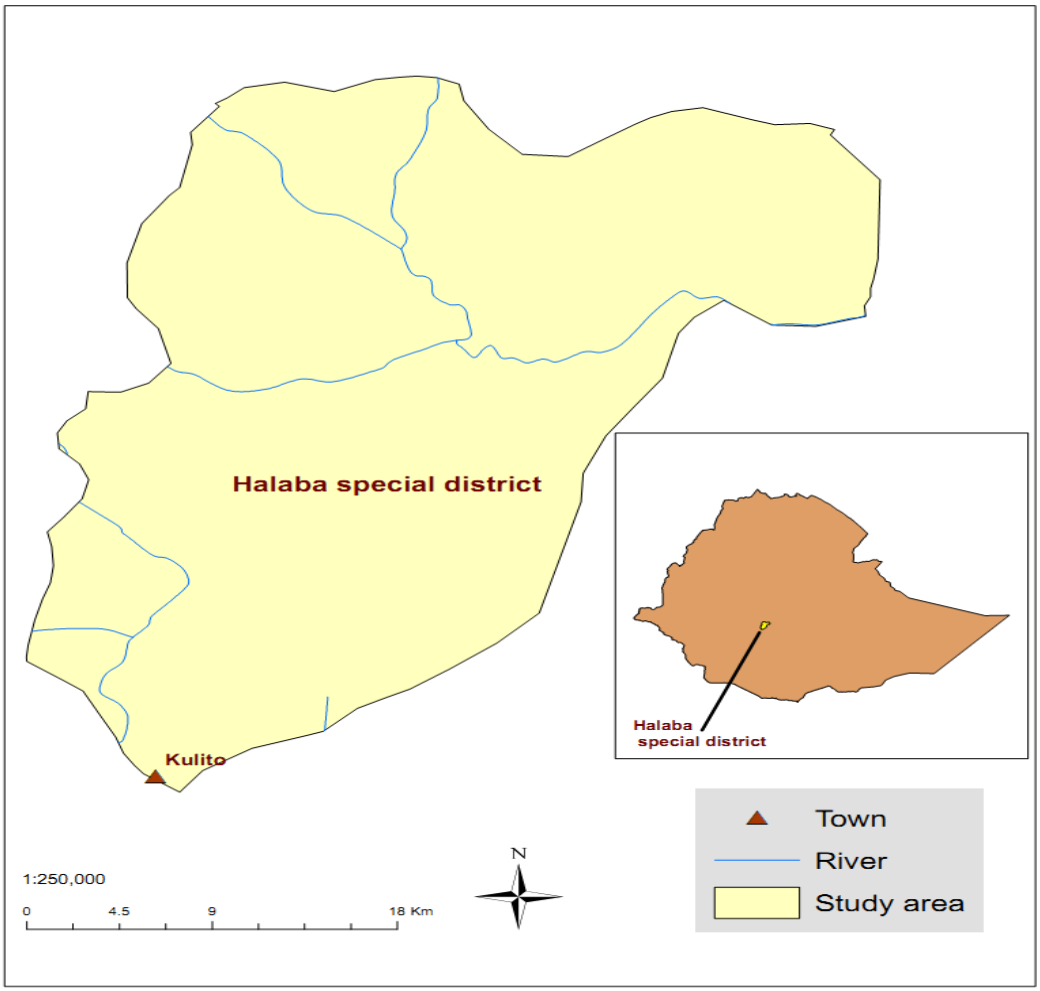

Figure 3.1: Map of Halaba Special District

Data Source: ILRI GIS Data Base (2011)

3.8 Sampling Techniques

A multi-stage sampling procedure was employed in order to draw a sample from red bean producers. First, the district was selected purposively because of red bean production potential and the existing low market participation. Secondly, red bean producing KA were identified. Out of 79 KA in district, 45 KA were dominant red bean producers. Thirdly, five KA and four villages were randomly selected from each of the five KA. Based on the information from the District Agriculture and Rural Development office, producers in each village were grouped into those who were participating in the market and those who did not participate in the red bean market; proportions to size were calculated. Based on the proportions done, random number

table were used to come up with samples 150 red bean farmers. In order to get the sample of traders, stratified sampling was employed. First, the traders were grouped into homogenous categories, i.e., different types of traders like rural assemblers, urban collectors, cooperatives, and cooperative union. Then 33 respondents were purposively selected from the groups of market actors.

3.8.1 Determination of Sample Size

3.8.1.1 Sample Size of Red Bean Producers

The sample size of red bean producers were estimated using Cochran (1963) formula:

$$\mathbf{n = \frac{Z^2pq}{d^2}} \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots . \ldots \ldots \ldots \ldots \ldots \ldots \mathbf{3.21}$$

where n is the sample size, Z is statistical certainty related to the error risk, which equals 1.96 for an error risk of 5 percent level of significance; p is the proportion of red bean to total farmers, in this case it was assumed to be 0.89 because 89 percent of the smallholder farmers were red bean producers; q equals (1-p) representing the weight variable assumed to be proportion farmers not producing from the total farmers and is computed while d is the margin of error, expressed as a fraction of 0.05 and represents allowable errors assumed. Based on this formula, the sample size for red bean producers was 150.

3.8.1.2 Sample Size of Traders

Table 3.1 presents the sample sizes of wholesalers, primary cooperatives, cooperative union, urban collectors, and rural assemblers. There were four licensed wholesalers, eight primary cooperatives, and one cooperative union known as Mancheno Farmers’ Union. Due to the small number of licensed wholesalers, all of them and Mancheno farmers union were interviewed. Out of the eight cooperatives, four of them were interviewed. The exact number of urban collectors and rural assemblers was not known but to understand the market channel from farm to fork, 12 urban collectors and assemblers were interviewed from Kulito and Guba markets.

Table 3.2: Sample size of market traders surveyed in HSD

Traders	Total number	Sample size
Licensed wholesalers	4	4
Primary cooperatives	8	4
Cooperative union	1	1
Rural assemblers	-	12
Urban collectors	-	12

Sources: Author (2013)

3.9 Data Sources

Primary data was used for this study. The data were collected from a sample of red bean farmers, traders, primary cooperatives, and cooperative union using a semi-structured pre-tested questionnaire and informal interviews. The latter comprised two focus group discussions (FGDs) and key informant interviews with producers, urban collectors, rural assemblers, wholesalers, elders of the community, female representatives of KA, chairperson of KA and development agents, to generate more information on the market chain. During the FGDs, the major challenges for producers, cooperatives and traders were elicited. In addition, farmers' view in selling their red bean to cooperatives, farmers' main information channels, challenges associated with consuming red bean, challenges related to brokers in market places, and motivation of farmers in producing red bean were identified.

Two types of questionnaires were developed, one for farmers and the other for traders. A checklist was used to guide the FGDs and key informant interviews (see Appendix 4). The questionnaire for farmers captured information on farmer and farm characteristics and the factors affecting farmers' red bean market participation and the extent of their participation (see Appendix 5). The questionnaire for traders covered trader characteristics; trading activities, constraints of marketing, source of market information and other relevant information (see Appendix 6).

3.10 Data Analysis

The questionnaire data were captured in SPSS. Both descriptive and econometric analyses were undertaken on the data using STATA version 12 and SPSS Version 16 computer packages (for both t-test for quantitative data and chi-square for qualitative data). The data from FGD and key informant interviews were analyzed qualitatively and used in the text to boost the information from STATA and SPSS analysis.

3.10.1 Analysis of Marketing Channels and Constraints of Farmers, Traders and Cooperatives

Descriptive statistics were used to characterizing marketing channels, and the constraints faced by each actor. This involved the computation of means, frequencies, percentages, and standard deviation of red bean farmers, and other market actor characteristics. This part of the analysis answered research question one and two on their respective order. The first research question was answered by describing the main marketing channels of red bean in HSD. The second research question was answered by identifying the constraints of farmers, traders and cooperatives along the red bean marketing chain in HSD.

3.10.2 Analysis of Factors Affecting Red Bean Farmers' Market Participation Decision and their Extents

Red bean farmers' market participation decisions and extent of participation were estimated using the empirical model, (which one? the multinomial logit, probit? Name it here). The empirical models in equations 3.16 and 3.17 were fitted into the data. The third research question was answered based on the output of the model. In this part, all significant variables (α and β less than10 percent) indicated that they influenced red bean farmers' market participation decision and extent of participation. The non-significant variables indicated that they did not influence red bean farmers' market participation decision and extent of participation. Table 3.3 summarizes the meaning of each variable and its hypothesized signs.

CHAPTER 4

RESULTS AND DISCUSSION

4. 1 Comparison of Demographic and Socio-Economic Characteristics of Red Bean Farmers in Halaba Special District

4.1.1 Demographic Characteristics of Farmers

Table 4.1 shows the difference between red bean market participants and non-participants with regard to their demographic characteristics. The mean age of red bean market participants and non-participants was 41 and 42 years respectively and were not statistically different (p = 0.588). On the other hand, the number of years of formal education of the household head was statistically different between the two groups (p = 0.079). The mean years of formal education for participants were 1.6 years while for non-participants it was 2.2 years. This indicates that participants were relatively less educated than their counterparts.

Table 4. 1: Demographic characteristics of red bean farmers in HSD

Variables	Participants (n=85)		Non participants (n=65)		
	Mean	Std	Mean	Std	P-value
Age (Years)	41	7.8	42	11.6	0.588
Education (years of schooling)	1.6	2.8	2.2	0.9	0.079*
Family size in the year 2012	6.6	2.6	7.9	2.6	0.648
Farming experience (years)	22.1	8.4	23.9	10.3	0.161

Source: Survey data (2013)

*****, **, * = significant at 1, 5 and 10 percent respectively**

On average, red bean market participating families had seven members while a non-participating one had eight family members. The two means were statistically not significant different (p = 0. 0.648). The mean farming experience was 22 for participants while 23 for non-participants, but there was no statistical significant difference between the two groups (p = 0.161).

Table 4.2 shows the distribution of red bean farmers in HSD according to gender and marital status. Participating female-headed households were 46.4 percent compared to 53.6 percent non-

participants. There was no significant difference between red bean market participating and non-participating households in terms of gender and their marital status ($\chi 2$ = 1.5 and 4.1) respectively.

Table 4.2: Distribution of red bean farmers in HSD according to gender and marital status

Variables		Participants		Non- participants		
		n	%	n	%	$\chi 2$-value
Gender of the household head	Female	13	46.4	15	53.6	1.5
	Male	72	59.0	50	41.0	
Marital status of the household head	Single	2	2.4	4	6.2	4.1
	Married	57	67.1	46	70.8	
	Widowed	8	9.4	8	12.3	
	Polygamous	18	21.2	7	10.8	

Source: Survey data (2013)
*****, **, * = significant at 1, 5 and 10 percent respectively**

4.1.2 Socio-Economic Characteristics of Red Bean Farmers in HSD

(a) Resource ownership of the household

Resource ownership was characterized in terms of different species of livestock, number of mobile phones owned, number of working radios, number of bicycles and cart owned, and land area owned by the household. The livestock species found in the study area were cattle, goats, sheep, donkeys, horses, and poultry. In the district, they kept oxen for traction power and donkeys for agricultural produce transportation from farm to store and from store to the market.

Table 4.3 presents the mean of various items owned by the households in HSD. TLU (tropical livestock unit)[1] was used to compare livestock ownership. The mean number of livestock owned

[1]TLU is a standardized method in which number of various livestock species can be expressed as a single figure that express the total amount of livestock present irrespective of the specific composition. Calf=0.25, calf weaned=0.34, heifer=0.75, cow or ox=1.0, horse=1.1, donkey adult=0.7, donkey young=0.35, sheep and goat adult=0.13, sheep and goat young=0.06, chicken=0.013, bull=0.75 (Storck et al., 1991).

by red bean market participants was 6.5 TLU while non-participants owned only 2.9 TLU. There was a significant statistical difference between red bean market participants and non-participants with regard to TLU (p = 0.001). Additionally, red bean market participants had significantly more communication equipment (mobile phones and working radio owned) compared to their counterparts (p = 0.004) and (p = 0.001) respectively.

The mean size of land owned by red bean market participants and non-participants was 2.1ha and 1.4 ha per household respectively. The land owned by market participants and non-participants households had significant difference (p = 0. 001), more land size was owned by market participants than non-participants who had 2.1 ha, and 1.4 ha respectively. Land in the study area is one of the major constraints that limit farmers' production potential. During FGD sessions, it was stressed that there was no option for newly formed households to have their own farmland. The only chance for such households was to share what the household had in the past. The mean annual off-farm income for market participants and non-participants was 897.9 and 640 ETB per household per year respectively but not statistically significant different (Table 4.3).

Table 4.3: Summary of resource ownership and off-farm income by households in HSD

Item	Participants n=85		Non-participants n=65		
	Mean	Std	Mean	Std	P-value
Tropical livestock units (TLU)	6.5	5.9	2.9	2.4	0.001***
Number of mobile phones owned	1.6	0.9	1.1	0.6	0.004***
Number of working radios	1.3	0.6	0.9	0.2	0.001***
Total land holding in ha	2.1	1.1	1.4	0.5	0.001**
Off-farm income	897.9	1158.0	640.0	2542.3	0.82

Source: Survey data (2013)

*****, **, * = significant at 1, 5 and 10 percent respectively**

(b) Ownership of means of transport

On average, market participants had 1.6 bicycles, which was statistically higher than the 0.9 bicycles owned by non-market participants (p = 0.006). The mean number of bicycles and animal drawn carts were statistically different between market participants and non-participants (p = 0.

0.011). It was reported that market participants owned 1.3 animal drawn carts while non-participants owned 0.9 animal drawn carts (Table 4.4). Red bean farmers mainly used donkeys and horses as a means of transport. During the FGDs farmers pointed that their main transportation means was animal drawn cart (a cart drown by oxen, donkey, and horse), and pack animals (animals used for loading directly on their back without using cart). No farmer reported use of vehicle to transport red bean to the market or to their store. This could be due to accessibility of cheaper local animal transportation trend.

Table 4.4: Number of transportation means owned by red bean farmers in HSD

Item	Participants n=85		Non-participants n=65		
	Mean	Std	Mean	Std	T-value
Number of bicycles owned	1.6	0.9	0.9	0.3	0.006***
Number of animal drawn carts owned	1.3	0.5	0.9	0.3	0.011**

Source: Survey data (2013)
*****, **, * = significant at 1, 5 and 10 percent respectively**

(c) Main sources of income in HSD

Table 4.5 presents the main sources of income for red bean farmers in HSD**.** The primary source of income was both livestock and crop production for 64.7 percent of market participants and 44.6 percent of non-participating households. The number of red bean market participants who engaged in both livestock and crop production was significantly higher than that for non-participants ($p = 0.026$). About 34 percent of red bean market participants reported that their main source of income was crop production whereas only 1.2 percent of market participant households obtained their income from petty trade and daily labor. As a result, most of red bean farmers get their income from mixed livestock and crop enterprises, followed by crop production whereas the non-participants obtain their income mainly from crop production followed by livestock and crop production. Households participating in the market had their income from both livestock and crop production while those non-participant households obtained their income mainly from crop production.

Table 4. 5: Main sources of income for red bean farmers in HSD

Item	Participants		Non-participants		
	n	%	n	%	χ2-value
Crop production	29	34.1	36	55.4	7.3**
Livestock and crop production	55	64.7	29	44.6	
Petty trade and daily labor	1	1.2	0	0	

Source: Survey data (2013)

*****, **, * = significant at 1, 5 and 10 percent respectively**

(d) Participation in off-farm activities

Table 4.6 presents off-farm income activities practiced by red bean farmers in HSD. The main types of off-farm activities involving red bean market participant were petty trade followed by donkey cart (donkey pulling cart for transportation of farm produce) while for non-participants both petty trade and donkey carts were equally important. Among non-market participant, none of them had horse carts. The reported annual average off-farm income of red bean market participants and non-participants was ETB 897.9 and ETB 640 respectively and were not statistically different (p = 0.278) (Table 4.3).

Table 4.6: Off-farm activities of red bean farmers in HSD

Item	Participants		Non-participants		
	n	%	n	%	χ2-value
Petty trade	11	12.9	3	4.6	3.9
Donkey cart	6	7.1	3	4.6	
Horse cart	3	3.5	0	0	
Paid daily labor	1	1.9	2	3.1	

Source: Survey data (2013)

*****, **, * = significant at 1, 5 and 10 percent respectively**

4.2 Discussion

Table 4.1 indicates that households with relatively lower number of years of schooling were market participants while those with relatively better educational status were not market participants. Even though, education level was statistically different between red bean farmers

market participation and non-participants, in real sense the difference between the group could not make difference since the difference is very small.

The analysis of resource ownership indicates that red bean market participants owned more resources than non-market participants (Table 4.3). This implies that in HSD, market participants were better-off compared to non-participants. Additionally, market participants had more access to information than their counterparts because they had more information communication equipment like mobile phones and working radios. This implies that their market participation helped them to earn money and buy equipments needed by the household.

There was a significant difference between red bean market participants and non-participants with regard to ownership of means of transportation like bicycle and draught animals. This might be because those farmers who had own transportation means sold more as compared to those who did not have own transport means. Gebremedhin and Jaleta (2010) found that ownership of some means of transportation like equines increased farmers' market participation in Ethiopia. This is because of relatively low cost using their animals for transportation. Mathenge et al. (2010) also found that ownership of some means of transportation had a positive impact on farmers' market participation decision in Kenya. Improvemnt on farmers resource ownership could enhance farmers access to market information because when farmers had resource then they could buy communication equipemnts and hence get information from their networks. The results of the study indicated that, farmers who had own transportation means participated in the red bean market, indicating that the ownership to transportation mean motivated them to participate in the red bean market.

4.3 Access to Different Services

4.3.1 Access to Credit

Table 4.7 shows that among the red bean market participants, 11.8 percent accessed credit while among the non-participants, only 4.6 percent had credit access at the time of the survey. Access to credit was low for both participants and non-participants at the end of the surveys.

Table 4.7: Red bean farmers' access to different services in HSD

Item		Participants		Non participants		
		n	%	n	%	χ2-value
Access to credit	Yes	10	11.8	3	4.6	26.9
	No	75	88.2	62	95.4	
Access to field	Yes	48	56.5	18	27.7	0.532***
demonstrations	No	37	43.5	47	72.3	
Access to market	Yes	81	95.3	40	61.5	26.9***
information	No	4	4.7	25	38.5	

Source: Survey data (2013)

*****, **, * = significant at 1, 5 and 10 percent respectively**

The chi-square test in Table 4.8 indicates that there was a significant statistical difference between market participants and non-participants with regard to their reasons for not accessing credit from the government ($\chi 2 = 0.532$). Out of the total 150 respondents, 20 percent of market participants and 12 percent of non-participants reported that they did not access credit from government because of inadequate supply. About 27 percent of red bean market participants and 49 percent of non-participants indicated they were not willing to take credit from formal sources because of high interest rate. Furthermore, among the market participants, three percent and four percent from non-red bean market participant did not take credit from formal sources due to restrictive procedures. Inadequate information was one of the reasons that hindered red market participants and non-participants' credit application from formal sources as reported by 4 percent of both groups of farmers. In the district, majority of red bean market participants (44 percent) and non-participants (29 percent) did not take credit because of their religion that disallowed them to pay interest for any borrowed money. About 12 percent and 4.6 percent of market participants and non-participants, respectively, had access to informal credit (mainly from friends and relatives) during the year preceding the survey.

Table 4.8: Reasons of red bean farmers not to access formal credit in HSD

Reasons for not accessing credit	Participants		Non-participants		
	n	(%)	n	(%)	**χ2-value**
Inadequacy of supply	17	20.0	8	12.3	8.7*
High interest rate	23	27.1	32	49.2	
Restrictive procedures	3	3.5	3	4.6	
Inadequacy of information	4	4.7	3	4.6	
Religion	38	44.7	19	29.2	

Source: Survey data (2013)
*****, **, * = significant at 1, 5 and 10 percent respectively**

4.3.2 Access to Field Demonstrations

Table 4.7 shows that out of 150 red bean farmers interviewed in HSD, 44 percent attended field demonstration during the year preceding the survey. Among sampled red bean farmers who participated in the market, 56.5 percent attended field demonstration while among non-participants, only 27.7 percent attended the field demonstration. The chi-square test ($\chi 2$ **=8.7)** indicate that there was a significant statistical difference between red bean market participants and non-participants with respect to access to field demonstrations. The result indicated that participation in field demonstrations seemed to enhance market participation

4.3.3 Access to Market Information

Table 4.7 shows that about 95 percent of red bean market participants and 61.5 percent of non-participants had access to market information. This observation indicates that access to market information was not a problem in the study area especially for red bean market participants because about 95 percent of them accessed market information. There was a significant difference ($\chi 2$ = 26.9) between market participants and non-participants in terms of access to market information. During the FGDs, farmers reported that there was information accessibility although it was not reliable because some of the information they had earlier about the market on red bean prices was outdated.

Table 4.9 shows main sources of market information in HSD. There was a statistically significant difference between market participants and non-participants on access to price information

sources at ($\chi 2$ = **21.3**), whereas there were no differences on sources of information on husbandry, quality and demand of red bean ($\chi 2$ = 4.7, 8.1 and 12.7) respectively. Among the households that accessed market information, more than 24 percent of market participants and non-participants got price information from MARD. In HSD, most of red bean market participants (42 percent) farmers received price information from other farmers. In the study area, MARD is most important information source on price, demand, husbandry, and quality of red bean for both market participants and non-participants. Farmer-to farmer information transmission was the second most used source of information for red bean market participants and non-participants farmers. In the study area, NGOs and DAs were not important sources of information for both red bean market participants and non-participants as few farmers used them.

Table 4.9: Main sources of market information in HSD

	Participants (n=85)				**Non-participants (n=65)**			
Source	**Pri.**	**Hus.**	**Qua.**	**Dem.**	**Pri.**	**Husb.**	**Qua.**	**Dem.**
MARD	24.3	53.8	52.8	39.8	24.8	34.3	33.5	21.3
NGO	0.5	5	6	4.5	0.5	3	1	1
Other farmers	42.3	10.4	9.9	18.3	15.4	4.9	6	5.3
traders	9.4	1.8	4.3	13.4	2.3	0.8	2.5	15.4
DA	1.5	4	4	3	0.5	0.3	0.1	0.2
$\chi 2$-value	**21.3*** **	**4.7**	**8.1**	**12.7**				

Source: Survey data (2013); pri=price, Hus=crop husbandry, qua=quality, and dem=demand; *, **, * = significant at 1, 5 and 10 percent respectively**

Table 4.10 presents the main information delivery channels in the study area on price, husbandry, quality, and demand of red bean. As shown, extension agents were the most important information delivery channels in the district for both red bean market participants and non-participants. Farmer-to-farmer information delivery system was the second most important channel in circulating price, husbandry, and quality and demand information on red bean in the district. About 3 percent of red bean farmers participating in the market obtained information on red bean quality from the radio whereas only 2.3 percent of non-participants obtained it from the

same source. Brokers were important information transmission channels of price 9.2 percent and 4.7 percent of market participants and non-market participants respectively relied on them.

Table 4.10: Information delivery channels on different red bean market attributes in HSD

Item	Participants (n=85)						Non-participants (n=65)					
Inform. delivery Channels	Radio	Extension workers	Other farmers	Personal	Traders	Brokers	Radio	Extension workers	Other farmers	Personal	Traders	Brokers
Price (%)	8.3	22.6	27.	8.3	7.4	9.2	4.8	11.3	14.1	2.8	2.4	4.7
Crop Husba-ndry (%)	1.5	27.9	11.9	0.3	0.3	1.2	2.0	53.2	15.2	0.5	0.0	0.7
Quality (%)	2.9	56.3	9.6	0.0	2.9	2.0	2.3	28.9	7.2	2.1	1.7	0.6
Demand (%)	3.9	40.1	20.4	4.5	5.6	2.5	6.2	16.2	11.7	1.7	7.0	0.2

Source: Survey data (2013)

4.3.4 Membership in a Farmer Cooperative

Table 4.11 presents that out of 85 farmers who participated in red bean market, 22.4 percent were members of Metoma farmer Cooperative Society. Only 1.5 percent of the non-market participants were members of the cooperative. Membership in a red bean cooperative society was statistically significant between market participants and non-participants ($\chi 2 = 13.8$). This result implies that only few farmers were members of cooperative, and among the members, majority were red bean sellers. Among members of the primary cooperative, the majority were red bean market participants (see Appendix 7).

4.3.5 Awareness about Quality Standards and Production According to Quality Standards

About 78 and 38 percent of red bean market participants and non-participants respectively were aware of red bean quality standards demanded by traders in the market (Table 4.11). The level of awareness was statistically different between the two groups ($\chi 2 = 25.3$). The result implies that farmers who were red bean market participants were more aware of quality standards as compared to non-participants.

Red bean farmers were asked whether they knew and produced according to quality standards demanded by the market. Quality standards were defined as the ability of producers to meet customer's needs and expectations (UNIDO, 2006). Out of 85 red bean market participants, 47 percent produced red bean according to quality standards while 15 percent out of 65 non-participants produced red bean according to quality standards. There was a statistically significant difference ($\chi 2 = 18.6$) between red bean market participants and non-participants in terms of producing according to quality standards (Table 4.11).

From the FGDs, the color of the red bean, texture (shriveled or not) and cleanness were among the major criteria of quality standards perceived in the study area. During the FGDs, farmers reported that they were working to keep the quality as it was needed by the customers through keeping the grain soil-free and avoiding over and under drying. However, although the farmers were working to keep the quality standards red bean traders pointed out that most of the red bean produce from HSD was of inferior quality and they preferred to buy from other nearby districts.

Table 4.11: Membership, awareness and standard among red bean farmers in HSD

Item		Participants		Non-participants		
		n	%	n	%	$\chi 2$-value
Membership to cooperative	Yes	19.0	22.4	1.0	1.6	13.8***
	No	66.0	77.7	64.0	98.5	
Awareness about quality standard	Yes	67.0	78.8	25.0	38.5	25.3***
	No	18.0	21.2	40.0	61.5	
Produce according to quality standard	Yes	40.0	47.1	10.0	15.4	18.6***
	No	45.0	52.9	55.0	84.6	

Source: Survey data (2013)

*****, **, * = significant at 1, 5 and 10 percent respectively**

4.3.6 Discussion

In HSD, both red bean market participants and non-participants did not have much access to credit due to various reasons, such as inadequate supply, high interest rate, restrictive procedures, and religion (Table 4.8). Among the red bean market participants, the major barrier in credit access was religion whereas for non-participants group the dominant factor was high interest

rate. Studies show that credit has a positive and significant effect on smallholders' market participation decision. For instance, Alene et al. (2008) found that of maize supply and fertilizer demand and credit enhanced credit worthy smallholders' market participation in Kenya. Mussema and Dawit (2012) also found that among red pepper farmers in Alaba Special District, Ethiopia, about 61 percent needed credit whereas only 11 percent of them had received the credit, indicating disparity between demand and supply of credit.

The results on field demonstration participation (Table 4.7) indicate that most of the farmers who attended field demonstration were better in participating in red bean market. This might be related to the knowledge that they acquired during field visit which would have motivated them to produce surplus and participate in the red bean market. Additionally, attending the field demonstration might have helped them to communicate with other farmers and gain knowledge or exchange ideas on production techniques and quality issues, and this could enable them to produce according to the market demand and thereby participate in the market. The result tallies with that of Negash (2007) who found that field visits and training contributed positively to farmers' adoption decision of haricot bean in Alaba Special District of Ethiopia. On the other hand, Lapar et al. (2002) found that improving farm-specific skills through field demonstrations (visits) by extension agents was important in enhancing the market participation decision.

Access to market information is extremely limited in the Ethiopian grain market (Wolday, 1994). Furthermore, farmers have limited access to quality and timely information on market prices (*ibid*). In contrast, farmers in HSD had access to market information although there was inadequate organized market information system for use by farmers. Aysheshm (2007) found that in sesame marketing, access to market information was not a problem; rather, it was the quality of information accessed by the farmers that was woefully low. During FGD sessions, farmers indicated that they had access to market information although it was neither timely nor reliable. Access to timely and accurate market information is the fundamental element in commodity marketing (*ibid*). Djalalou et al. (2012) also noted that up-to-date market information could enhance the quality and increase incomes for actors along the market chain participating in the marketing of pineapple in Benin.

Awareness about quality standards and production according to quality standards were analyzed in this study. The results show that farmers who were aware about red bean quality standards

participated better in red bean market as compared with those unaware about quality standards. This might be due to the fact that the awareness created enabled them know how to produce red beans according to consumer demand, which enhanced their market participation. Djalalou et al. (2012) found that smallholder farmers' low level of awareness of the required quality in the market led to the rejection of their produce in the market. Aysheshm (2007) found that sesame traders in Ethiopia were very serious in identifying sesame quality standards in the market and only those who produced high quality sesame were able to sell at high prices. Wolday (1994) also noted that in Ethiopia poor product quality was one of the bottlenecks that hindered farmers' market participation in Alaba and Siraro markets. In HSD, the farmers who produced according to the quality standards participated better compared to those who did not. This might be associated with consumers' willingness to pay higher price for quality produce and when farmers get higher price this could motivate them to participate in the market.

4.4 Farmer Perception of Keeping of Farm Records in HSD

4.4.1 Record Keeping among Respondents

In HSD, not all the sampled households kept farm records. Farmers in the district reported various reasons why they did not keep farm records. Farm records were reported to be important in farm management, obtaining credit, for cost-benefit analysis of the production, farm decision making, in enhancing farmers' compliance to income tax requirements. Montshwe (2006) found that despite the importance of farm records in improving farm management, only 13 percent of the farmers surveyed kept farm records in South Africa.

4.4.2 Reasons for not Keeping Records in HSD

Out of 150 households interviewed, neither market participant nor non-participant farmers kept farm records in the district. Table 4.12 shows that there is significant difference between red bean market participants and non-participants ($\chi 2 = 33.0$). Among red bean market participants and non-participants, 36 percent and 18 percent respectively were not used to keeping farm records due to lack of knowledge on its importance. Additionally, 14 percent and 15 percent red bean market participant and non-participants respectively did not keep farm records because of inadequate information. Lack of education (illiteracy) hindered 4 percent of red bean market participants and 8 percent of non-participants from keeping their farm records. Unwillingness

was not a problem for red bean market participants while about 2 percent of the non-market participant farmers reckoned that they were unwilling to keep farm records because they had other businesses that they were running (Table 4.12).

Table 4.12: Major reasons for not keeping farm records in HSD

Item	Participants		Non-participants		χ2-value
	n	%	n	%	
Lack of knowledge	54	36	28	18.7	33.0*
Lack of information	21	14	23	15.3	
Lack of education	7	4.7	13	8.7	
Unwillingness	0	0	4	2.7	

Source: Survey data (2013)

*****, **, * = significant at 1, 5 and 10 percent respectively**

4.5 Production and Supply of Red Bean in HSD

4.5.1 Main Sources of Labor

Figure 4.1 presents main sources of labor available in HSD. About 60 percent of red bean market participants used family labor while 84 percent used family labor. In the district, 23 percent of market participants used hired labor while only 6 percent of non-participants use hired labor. Additionally, 17 percent of red bean market participants used *debo* labor while 10 percent of non-participants used *debo* as a source of labor. *Debo* is a source of labor in which two or more people come together and work for each other in turns. From the study, the use of family labor in red bean production was common for both market participants and non-participants.

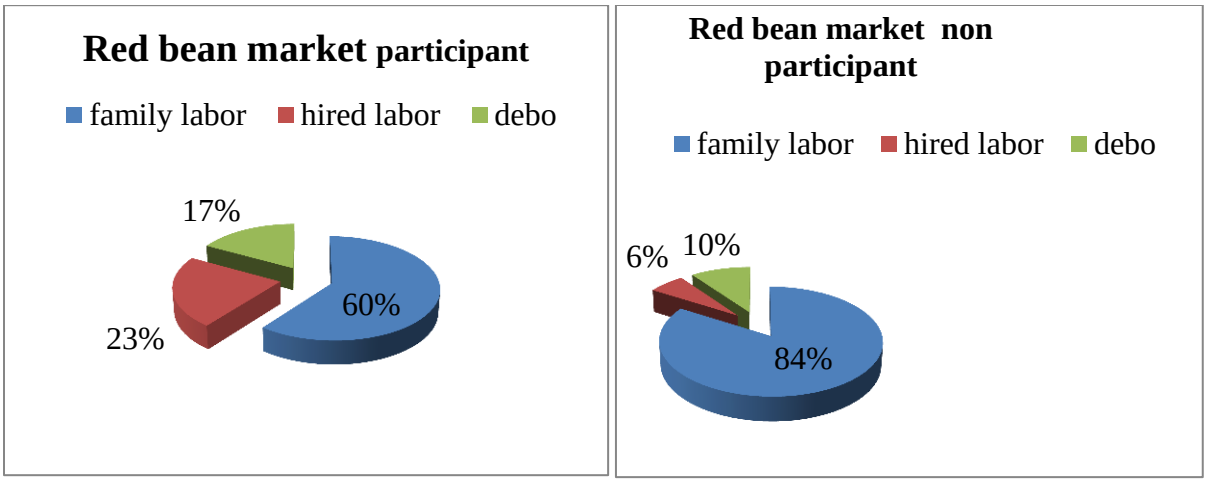

Figure 4. 1: Percentage of main sources of labor in HSD

Source: Survey data (2013)

4.5.2 Sources of Planting Materials

Planting material is a major input that affects productivity and production of crops. In HSD, farmers used both local (*Red Wolayita*) and improved red bean varieties (*Nasir*) as planting material. The results of analysis indicated that there was no significant difference between red bean market participants and their non-participant counterparts with regard to type of seed used ($\chi 2=3.6$). About 95 and 88 percent of red bean market participants and non-participants respectively used improved seed (*Nasir*) (Table 4.13). The rest used the local variety (*Red Wolayita*). During the FGDs, farmers complained that timely access to improved seed was a major bottleneck. The red bean farmers preferred *Nasir* variety because of its disease resistance, high productivity, and better demand in the market.

Table 4.13: Type of red bean planting material used in HSD

Item	Participant		Non-participant		
	N	%	n	%	χ2-value
Improved seed (nasir)	81	95.3	57	87.7	3.6
Local (Red Wolayita)	4	4.7	8	12.3	

Source: Survey data (2013)

*****, **, * = significant at 1, 5 and 10 percent respectively**

4.5.3 Discussion

The results of the study show that a major source of labor was family labor for both red bean market participants and non-participants. This might be associated with the culture of using family labor for farming activities among rural Ethiopians. Additionally, this could have been because of lack of funds to hire labor to substitute family labor. Furthermore, red bean market participants were better in using hired labor and *debo*. This could be because red bean market participants may have higher income to hire labor as compared to non-market participants. The result showed that market participants were better in using *debo*. This might be associated with the social network they had in the past within the community. Moreover, these farmers were market participants and had cash income. As a result, other farmers might have been willing to work for them.

In HSD, most of the market participants and non-participants used improved red bean seed. The *Nasir* seed variety was most preferred among both groups. This might be due to its better taste and market demand. Susceptibility to disease could be another cause forcing farmers to plant *Nasir* instead of the local variety, *Red Wolayita* (IPMS, 2005).

4.6 Red Bean Marketing in HSD

4.6.1 The Red Bean Market Channels in HSD

The flow of red bean from farmers to different channels is presented in the Figure 4.2. The figure representing the channels was considered only the red bean sold to the market. This part of the research result answered research question one by describing the major available red bean marketing channels. There were seven red bean-marketing channels in the study area. In terms of quantity of red bean sold by farmers, only three market channels seemed important, i.e., urban collectors, wholesalers, and rural assemblers. About 19.5 percent of the farmers sold directly to wholesalers and the major portion was sold to urban collectors (79 percent), 0.7 percent sold to primary cooperative while 0.8 percent sold to rural assemblers.

On figure 4.2, the arrow from NGOs back to farmers shows the flow of red beans from NGOs to farmers in the form of aids. In the year preceding the survey, NGOs bought red beans from cooperative union and distributed them to farmers as planting materials to enhance household food security. In the district, cooperative union, urban collectors and rural assemblers channeled

all what they bought to wholesalers. There was no broker who bought red beans with his/her own money and sold to any traders; instead, brokers bought the red beans on credit. Additionally, wholesalers and rural assemblers gave money to their brokers in the morning of every market day and transported the produce to the store in the same day in the afternoon or the morning of the next day.

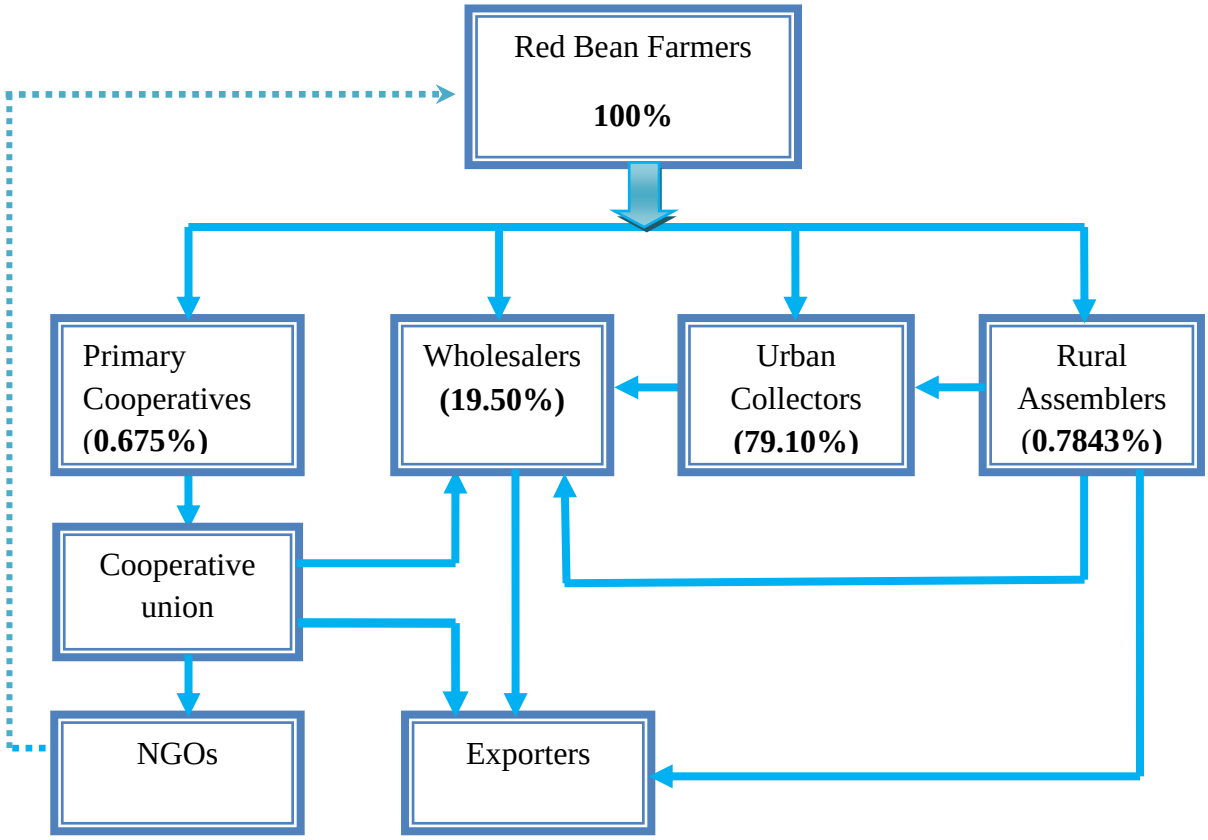

Figure 4. 2: Marketing channels of red bean in HSD

Source: Survey data (2013)

Channel I: Farmers → Urban Collectors → Wholesalers → Exporters → Consumers

Channel II: Farmers → Wholesalers → Exporters → Consumers

Channel III: Farmers → Rural Assemblers → Urban Collectors → Wholesalers → Exporters → Consumer

Channel IV: Farmer → Rural Assemblers → Wholesalers → Exporters → Consumers

Channel V: Farmers → Rural Assemblers → Exporters → Consumers

Channel VI: Farmers → Primary Cooperatives → Cooperative Union → Wholesalers → Exporters → Consumers

Channel VII: Farmers → Primary Cooperatives → Cooperative Union → Exporters → Consumers

4.6.2 Major Market Actors and their Role in Red Bean Marketing Chain in HSD

(a) Producers

Producers are the first step in the marketing chain. Red bean producers in HSD harvest and consume some at home, give some as gift, some preserved as planting material for next season, some lost due to post harvest problem and supply the rest to the traders in the market. Table 4.14 shows red bean Production, consumption, post-harvest loss, gift and land allocation in HSD.

On average, red bean market participants produced 430.6 kg while non-participants produced 161.2 kg of red bean in the year preceding the survey. From this production, 302.94 kg (or 70 percent) was sold to wholesaler, urban collectors, rural collectors and primary cooperative. The quantity of red bean consumed by red bean market participants and non-participants was 103.06 kg and 137.5 kg respectively. These amounts were not statistically different between the two groups ($p = 0.891$).

The average land size under red bean production was 0.6 and 0.4 ha per household among market participants and non-participants respectively (Table 4.14). The average land size was significantly different between the groups ($p = 0.019$) indicating that participants of red bean market had significantly larger farm size than non-participants. According to FGDs, farmers had the desire to increase land allocation if they were certain about market and on time access for improved seed. The participants of FGDs indicated that farmers threshed bean on un-cemented floor, which contaminated them with soil thereby reducing quality. No red bean processing was reported at the farm level in the study area, other than thrashing and storage.

The quantity of red bean preserved for seed, the post harvest loss and the quantity given as gift by market participants was not significantly higher than those of their counterparts ($P= 0.169$). During the FGDs, it was pointed out that there were no market arrangement between farmers and buyers; this indicates that there is need to work on improving this market environment.

Rural assemblers paid farmers 4.10 ETB/kg **(1USD=18.5 ETB)** of red beans while wholesalers paid 5.60 ETB/kg (Table 4.15). Few farmers sold their produce to wholesalers while most of the farmers sold their red bean to urban collectors at an average price of 4.88 ETB/kg.

Table 4.14: Production, consumption, post harvest loss, gift and land allocation in HSD

Item	Participants		Non-participants		
	n	Per 100Kg	n	Per 100Kg	P-value
Quantity of red bean produced in 2012 (Kg)	85	430.6 (346.7)	65	161.2 (92.5)	0.005***
Quantity of red bean consumed in 2012	73	103.1 (85.7)	62	137.5 (80.1)	0.891
Quantity of red bean sold in 2012	85	302.9 (286.1)	0	0	0.006***
Quantity of red bean preserved for seed	49	47.1 (36.5)	30	21.0 (14.2)	0.009***
Quantity of red bean lost due to post harvest losses	43	26.9 (18.1)	18	22.1 (17.2)	0.768
Quantity of red bean used as gift	37	29.6 (23.6)	18	22.1 (15.9)	0.169
Land allocated for red bean in 2012 (ha)	85	0.6 (0.4)	65	0.4(0.3)	0.019**

Source: Survey data (2013); the numbers in parenthesis indicate standard deviation.
*****, **, * = significant at 1, 5 and 10 percent respectively**

(b) Brokers

Brokers are agents who work for a commission on behalf of other participants (Mussema, 2006). Red bean farmers were unable to determine the price of their produce because there were too many brokers working for illegal traders (traders who did not have trading licenses and who competed with licensed traders in market places) and wholesalers. They specialized in bringing the buyers and sellers together but most of the time they allegedly cheated farmers; almost all farmers complained about brokers. The brokers had very strong linkages with wholesalers and illegal red bean traders. Ketema (2007) also reported that brokers are the ones who decide on the

price of goat and sheep markets in Alaba Special District in Ethiopia. These intermediaries played important roles in collecting red bean for wholesalers, illegal traders, non-resident wholesalers and they got their reward on the basis of the quantity they had bought. There was no formal contractual agreement but oral agreement would be made by the traders and the brokers. The brokers were responsible for bringing red bean from market to buyers store and based on the agreement, the traders would pay them (see Appendix 8).

(c) Urban collectors

The mean age, education level and trading experience was of urban collectors were 40.3, 5.8 and 4.2 respectively. The urban collectors play important role in the red bean collecting system and reselling back to district wholesalers. They bought red bean directly from farmers and rural assemblers. They bought large quantities (79 percent) of red beans directly from farmers and sold to the district wholesalers. The motivation behind their trading was profit from commodity trade. Urban collectors did not have any contractual agreements with farmers. They purchased red beans directly from farmers and did not involve brokers. These traders did not grade red bean but sorting and cleaning were done in 2012. Urban collectors mainly used pack animals and animal cart for transportation of red beans. These traders reported that they did not keep red bean trade data mainly due to lack of knowledge on importance of trade record keeping. The costs incurred by urban collectors were on cleaning, packaging, and transportation and storage. The total gross margin was 16.3 and 7.1 percent in channel I and III respectively. Among the traders the least margin was received by urban collectors (Table 4.16).

Table 4.15 below indicates different types of marketing costs related to the transaction of red bean by urban collectors, rural assemblers, wholesalers, primary cooperatives, and cooperative union.

Table 4.15: Selling price and marketing costs of red bean actors in HSD

Actor	Prices, cost and profit	Ch-I	Ch-II	Ch-III	Ch-IV	Ch-V	Ch-VI	Ch-VII
Farmers	Selling price (ETB/kg)	4.9	5.05	4.1	4.1	4.1	4.3	
	Marketing cost							
Primary Coop.	Selling price (ETB/kg)					5.83	5.83	5.83
	Marketing cost					0.6	0.6	0.6
	Marketing profit					0.6	0.6	0.6
Coop. Union	Selling price (ETB/kg)					7.9	7.9	7.9
	Marketing cost					1.1	1.1	1.1
	Marketing profit					1.3	1.3	1.3
Rural Assemblers	Selling price (ETB/kg)			5.4	5.8	7.2		
	Marketing cost			0.7	0.7	1.5		
	Marketing profit			0.6	1.0	1.6		
Urban Collectors	Selling price (ETB/kg)	6.2	-	6.2				
	Marketing cost	0.3	-	0.2				
	Marketing profit	0.9	-	0.6				
Wholesalers	Selling price (ETB/kg)	7.75	7.75	7.75	7.75	-	7.75	
	Marketing cost	1.1	1.1	1.1	1.1	-	0.3	
	Marketing profit	1.6	2.2	1.6	1.9	-	0.7	

Source: Survey data (2013); Ch-represents channel

(c) Primary cooperatives society

There were 40 primary cooperatives in HSD during the survey period. Of these, eight participated in red bean marketing. Among the primary cooperatives, Nape Keno participated in

improved red bean seed production, and sold the seed to the cooperative union that solicited for markets. The four cooperatives visited included Nape Keno, Amelamo Grain Trading Service, Metoma Grain Trading, and Upper Bedenea Cooperative Society. These cooperatives were mainly trading with *teff*, maize, and red bean in the district. None of them bought grains contaminated with soil or stones and with shriveled grains as these would compromise the quality demanded by the cooperative union.

There was contractual agreement between the cooperative societies and the cooperative union such that the former were expected to supply the latter quality red beans. The cooperative union was expected to buy the beans based on the agreement made. There was no contractual agreement between the cooperatives and farmers; farmers were free to sell their produce anywhere they wished and at any price.

The cooperatives used both animal carts and trucks for transporting red beans, the former for short distances while the latter for relatively longer stretches. All the cooperatives stored what they bought (15,900 kg) and sold it latter to the cooperative union at an average price of ETB 5.83/kg for the commodity that they bought for 4.3 ETB/kg (Table 4.15). The total gross margin for primary cooperatives was 21.3 percent in channel VI and VII (Table 4.16).

(d) **Cooperative union**

There was one cooperative union in the district called Mancheno that cooperatives societies were affiliated to. The cooperative union was established in Kulito town in 2004 with eight cooperative society members, although it started buying red bean from the cooperative societies in 2008. The union bought the produce from cooperative societies working in rural areas where there was production. The union traded trades in maize, wheat, *teff*, red bean, red pepper, white bean, and millet seed. The union participated in the market by buying red bean through cooperative societies, and reduced price volatility of different commodities in the district. The cooperative union considered red bean variety, color and size of the grain as major quality attributes and the inspection was done by only visual observation. The variety traded by the union was called *Nasir*. The major means of transportation was trucks. It supplied NGO and wholesalers. The term of payment with both suppliers of the union and buyers of the union was

cash. The nearest cooperative society was 5 km away and the farthest 100 km away from the union.

The constraints that hindered the cooperative union from supplying red bean to markets consistently were (i) low quality of red bean, (ii) price fluctuations, (iii) inadequate storage facilities, (iv) inconsistent supply from cooperative societies, (v) illegal market/traders, (vi) distance from union to the market, (vii) inconsistent demand from traders at different levels and (viii) financial capacity to support cooperative societies working in rural areas, to buy as much as possible and to build storage facilities (Table 4:18). Producers and traders also seemed inept in handling the produce, resulting in poor quality.

It was reported that the union paid an additional 10 to 15 percent on the normal market price, yet not all producers were willing to sell through this channel. The reason could be that the cooperative bought only high quality red bean, and some farmers did not have knowledge about those standards and failed to sell to the union. During the FGDs, some of the producers indicated that they did not want to waste their resources transporting beans to the cooperative because of the probability of rejection due to poor quality. To fill up this quality gap, farmers requested training on red bean quality and standard issues. In the district, the cooperative union was controlled by the government. There was contractual agreement between the cooperative union and the cooperative societies in which the union expected to buy all the produce from cooperative societies and the cooperative society were expected to realize the expected minimum quality requirements. The cooperative union also had contractual agreements to supply required quantity and quality of red beans to its clients. The total quantity of red bean that was bought by the union in 2012 was 32,473 kg. The costs incurred by the cooperative union were transportation, loading and unloading, cleaning, sorting, packaging, rent for store and grading. They bought for 5.5 ETB/kg and sold 7.9 ETB (Table 4.15). Total gross margin for cooperative union was 20.5 percent of end buyer's price in channel VI and channel VII (Table 4.16).

(e) Rural assemblers

The mean age, education level and trading experience of rural assemblers were 38.2, 4.9 and 5.2 respectively. Assemblers mainly bought small lots of red beans directly from farmers in rural markets and roadsides and finally sold to wholesalers, urban collectors, and exporters, depending

on best price offered. Every rural assembler added value, such as cleaning, and sorting. The entire rural assemblers did not get any credit from banks but obtained credit from friends and relatives. Rural assemblers fumigated, sorted, cleaned, and stored red beans for some time until they got reasonable price in the market. The main sources of information on price of red bean were customers, such as urban collectors, wholesalers, and exporters. They used their own financial resources and their local knowledge to bulk red bean from farmers. The assemblers used animal carts to collect red bean from the market. They used animal carts and trucks (especially when selling to exporters). There was no contractual agreement between assemblers and farmers and there was no contractual agreement between assemblers and their buyers. The costs for rural assemblers were transportation, loading, and unloading, rent of store, fumigation, cleaning and grading. Rural assemblers bought red bean directly from farmers at farm level and sold to urban collectors, wholesalers and even exporters. Assemblers handled about 34,100 kg of the total production. They paid ETB 4.1/kg and received ETB 5.4, 5.8 and 7.2/kg when they sold to urban collectors, wholesalers and exporters respectively (Table 4.15). The total gross margin for rural assemblers was 24.3, 29.7, and 43.3 percent of end buyer's price in channel III, IV and V respectively. Rural assemblers received higher net marketing margin when they sold to exporters directly. The second channel with higher gross margin was when they directly sold to wholesalers (Table 4.16).

(f) Wholesalers

The mean age, education level and trading experience of wholesalers were 49, 6.3 and 13.5 respectively. Wholesalers are traders who buy large quantities of red beans and resell to other traders both in local and export markets. With regard to quantity handled, wholesalers were the major actors, and channeled the produce to exporters and other wholesalers. These traders graded the produce based on color and size. In HSD, 75 percent of the wholesalers sold red beans to exporters and other markets outside the district, and 25 percent sold to other wholesalers within the district. Wholesalers mainly used trucks for transportation. They had brokers in different markets in and outside the district to assemble red beans for them. Wholesalers bought red bean from farmers, urban collectors and rural assemblers and the remaining portion was satisfied through their brokers. They played a significant role in price formation at the local level, based

on price information accessed from exporters. They also provided price information, credit to selected reliable clients, and were in good position in accessing price information from exporters.

There was no contractual agreement between wholesalers and their suppliers with regard to red bean trade. They had some informal contractual agreements with their buyers when wholesalers sold their output to other traders on credit. The quantity handled by wholesalers was 805,000 kg in 2012 and the price received was ETB 7.750/kg (Table 4.15). The cost incurred by the wholesalers was on transportation, loading and offloading, rent of store, sorting, grading, cleaning, and packaging. All wholesalers received credit from commercial banks and informal sources (friends and relatives). Wholesalers total gross margin was 24.8, 34.8, 24.8, 24.8, and 24.8 percent of end buyer's price in channel I, II, III, IV and VI respectively (Table 4.16).

(g) Exporters

Red bean exporters are the last marketing chain link in the domestic trade. The exporters had the necessary capital, facilities, and knowledge. The terminal market was in Adama, the capital city of Oromia Regional State, and Moyale, which is in the boarder of Ethiopia and Kenya. They contributed to price formation for the wholesalers based on the price of international market.

(h) Consumers

For many people, particularly the medium to higher income urban consumers, beans are considered a poor man's or a farmer's food crop. Majority of traders who did business in pulses preferred selling chickpea, lentils, faba beans. In some towns white and red beans were sold in the poorer section of the market where there were no fixed stalls (Ferris and Kaganzi, 2008). Every farmer in the district produced red beans at least to feed his or her family, and sold the surplus. Red beans were mainly consumed by the local people during harvesting of the crop, and this is the time when most farmers faced shortage of food. Except boiling, farmers indicated that they did not know of other ways to prepare different dishes of red beans. In the southern part of the country the level of red bean consumption was about 9 to 15kg per year (*ibid*).

(i) Retailers

There were no data on red bean retailers because during the period of the survey all the retailers had shifted from red bean retailing to trading in other commodities like *teff*, maize and red

pepper due to the seasonal nature of red bean market in HSD. The main red bean traders were women, who sold beans in small lots such as cups (Ferris and Kaganzi, 2008).

4.6.3 Discussion

Red bean market participants used more land for the crop in comparison to their counterparts but consumed less. Higher land allocation that resulted in higher production coupled with low consumption might help market participants to participate in the market (Table 4.14). In the district, there was contractual agreement between the primary cooperatives and the cooperative union. Primary cooperatives were responsible of supplying quality red bean to the cooperative union (HSDMD, 2012). In HSD, cooperative union in turn had a responsibility of buying what the primary cooperative bought and sought for market and finally channeled it to better rewarding markets. In the district, the cooperative union was given the assignment of working with primary cooperatives, searching for markets, and bargaining with other traders, and supplied to deficit markets outside the district. The government gave this assignment to the cooperative union because they had better market information and bargaining power that supported these primary cooperatives working in rural areas, with limited reliable market information and bargaining power (HSDMD, 2012).

Along the red bean marketing chain, producers, brokers, urban collectors, rural assemblers, wholesalers, primary cooperative and cooperative union were found to be the major market actors. The producers mainly sold their red bean to urban collectors, rural assemblers, primary cooperative, and wholesalers. Urban collectors bought higher quantity of red beans directly from farmers and resold to wholesalers. Wholesalers handled huge quantity of red bean and sold it to other markets outside HSD. They were the major actors in channeling red beans to markets outside the district. This finding corroborates that of Mussema (2006) who found that in Alaba Special District wholesalers were the major outlet of red pepper to other markets.

4.6.4 Marketing Arrangements of Red Beans in HSD

4.6.4.1 Marketing Costs and Margins

All the urban collectors interviewed had no intermediaries to buy red bean on their behalf. However, all the wholesalers used intermediaries (brokers) who bought red beans on their behalf. Among the rural assemblers, 92.3 percent bought red beans directly from producers and only 7.7

percent of them used intermediaries (brokers). The terms of payment for urban collectors to supply red bean to the next marketing agent was cash whereas usually rural assemblers and wholesalers sold red bean to exporters on credit. Traders bought red bean from producers on cash basis. No contractual agreement was reported among the different actors except primary cooperatives and the cooperative union.

The marketing costs of the traders included transportation cost, rent for store, packaging, cleaning, sorting, grading, and brokerage (only for rural assemblers and wholesalers). From the results it is observed that wholesalers incurred relatively higher marketing costs, which was associated with intensive work on cleaning, sorting, grading, and long distance transportation to sell the red bean to the next actors while urban collectors incurred the least marketing cost. The urban collectors incurred the least marketing cost; the low market cost was because they did not work intensively on cleaning, sorting, and grading. The selling price for farmers was different within different marketing channels; the highest selling price was recorded when wholesalers directly bought from farmers. When farmers sold their produce to wholesalers directly, they incurred relatively higher costs because farmers did intensive cleaning and sorting activities whenever they targeted selling their produce to wholesalers. When wholesalers bought red bean directly from farmers they did not pay for brokerage, this reduce their marketing costs, hence offered relatively higher price for farmers.

The total gross marketing margin (TGMM) was highest in Channel VI followed by channel III, that accounted for 66.6 percent and 56.2 percent of the end buyer's price, respectively. The result reveals that producer's share in end buyer's price was less than 60 percent in all channels except channels II. The analysis of total gross margins indicated that highest gross margin was accrued by producers in all channels (Table 4.16).

Table 4.16: Marketing margins of traders for seven different channels

Margins (%)	Marketing channels						
	I	II	III	IV	V	VI	VII
TGMM	41.07	34.84	56.17	54.45	43.29	66.59	41.82
GMMpco						21.32	21.32
GMMcou						20.50	20.50
GMMra			24.33	29.67	43.29		
GMMuc	16.30		7.07				
GMMwh	24.77	34.84	24.77	24.77		24.77	
GMMp	58.93	65.16	43.83	45.55	56.71	33.41	58.18

Source: Survey data (2013)

Where, **TGMM** is total gross marketing margin, **GMMpco** is gross marketing margin of primary cooperative**, GMMcou** is gross marketing margin cooperative union, **GMMra** gross marketing margin of rural assemblers, **GMMuc** is gross marketing margin of urban collectors, **GMMwh** is gross marketing margin of wholesalers, **GMMp** is gross marketing margin of producers (farmers share).

4.6.4.2 Discussion

All the wholesalers who were interviewed responded that they had their own brokers who could buy red beans on their behalf while all urban collectors did not have brokers. This could be because wholesalers dealt with huge amount of red beans that could not be collected by only the wholesalers themselves while urban collectors dealt with small amount of red beans and bought directly from the farmers at the market place. Aysheshm (2007) found that in Ethiopia along sesame market chain wholesalers used brokers and commission agents to collect sesame grain. Jagwe (2011) reported that wholesalers of banana in Rwanda, Burundi and Democratic Republic of Congo handle the largest volume of banana and have intermediaries who can collect banana from different sources. Majority of rural assemblers bought red beans directly from farmers and this is because rural assemblers are traders who live next to the farmer and buy directly from the farmer. Aysheshm (2007) reported that in Ethiopia, along sesame value chain rural assemblers buy small lots of sesame directly from farmers and sold to wholesalers and exporters. Farmers received higher price when they sold directly to wholesalers. This could be because when

wholesalers buy red beans directly from farmers, then there is no cost of brokerage hence they pay more. It is not simple for a given farmer to sell his/her produce directly to wholesalers because brokers are always there blocking the way for farmers. This indicated that it is good for farmers to sell their produce directly to wholesalers to get higher gross margin from their red bean.

4.7 Major Constraints in Red Bean Production and Marketing in HSD

4.7.1 Major Production Constraints

Table 4.18 presents five major constraints experienced by red bean farmers were (i) incessant price fluctuations (65.3 percent), (ii) access to improved seed (60 percent), (iii) access to credit (62.7 percent), (iv) access to fertilizer (50 percent), and (v) inconsistent demand in the market (66.7 percent). These results answered the research question constraints of farmers in red bean production and constraints.

Table 4.17: Major production constraints experienced by red bean farmers in HSD

Constraints		n	Percent	Constraints		n	Percent
Brokers	Yes	100	66.7	Absence of demand	Yes	58	38.7
	No	50	33.3		No	92	61.3
Inconsistent	Yes	99	66	Poor road	Yes	56	37.3
demand	No	51	34		No	94	62.7
Price	Yes	98	65.3	Shortage of labor	Yes	37	24.7
fluctuation	No	52	34.7		No	113	75.3
Access to credit	Yes	94	62.7	Shortage of land	Yes	63	42
	No	56	37.3		No	87	58
Access to	Yes	91	60.7	Weak coordination	Yes	43	28.7
improved seed	No	59	39.3	among actors	No	107	71.3
Ownership of	Yes	76	50.7	Transportation service	Yes	33	22
oxen	No	74	49.3		No	117	78
Less return	Yes	75	50	Storage facility	Yes	32	21.3
	No	75	50		No	118	78.8
Access to	Yes	75	50	Sale tax	Yes	31	20.7
fertilizer	No	75	50		No	119	79.3
Distance to	Yes	59	39.3	Access to price	Yes	30	20
market	No	91	60.7	information	no	120	80

Source: Survey data (2013)

According to the focus group discussion, brokers were major problem in the district as 66.7 percent of respondent farmers complained about them especially in Kulito and Guba markets. A common problem facing farmers was the unfair trade practices imposed by brokers at the market place. Farmers were cheated through incorrect weighing scales, and any protest from them would trigger a rejection of their produce by these brokers. The brokers lured the farmers with ‘good price’ and later allegedly adjusted the scales during measurement to give a low reading, hence higher weight for the supposedly “good price.” The farmers were dissatisfied by the transaction process leaving them feeling robbed by brokers who also altered the reading of the weighing

scales. The illicit transaction process was made hasty as the traders quickly mixed the red bean with their bulk leaving the farmers with no power to file their complaints.

Price setting is a major problem of marketing in HSD. Farmers depend on traders' price and there is no room to negotiate with traders. During the focus group discussion farmers revealed that traders and brokers set the price and it is usually unstable. In addition, there is no channel to convey information directly from export markets to farmers since red bean is not among commodities traded by ECX (Ethiopian Commodity Exchange). Out of the sample farmers, 50 percent reported that returns from red bean was very little and sometimes losses were higher than benefits. According to the focus group discussion, farmers did not benefit much from red production but still kept on producing because the crop is important in saving life during the months of hunger (the period before maize maturity) commonly known to farmers as 'bridge'. The other reason that kept farmers in red bean production is that the crop matures faster and farmers use the land that has been used for red bean again for *teff* meaning farmers use the land twice in a year. *Teff* is a cash crop that is produced by all red bean farmers in the form of crop rotation. The total gross margin analysis showed that farmers' share was higher than those of all the actors along the market chain of red bean (Table 4:16). Though farmers got highest market share, because of high production costs farmers were not making much profit from the business.

Access to credit and improved seed was among the major constraints scoring 62.7 percent and 60 percent respectively. Solving such critical problems associated with farmers could improve the livelihood of the producers in the district. Weak coordination among marketing actors, transportation, sale tax and price information were among the constraints which were not critical as they were reported as constraints by a few red bean producers (Table 4.17)

4.7.2 Major Marketing Constraints

The five major marketing constraints were (i) low quality of red bean supplied by producers, (ii) price fluctuation, (iii) high number of informal traders, (iv) inconsistent supply, and (v) shortage of finance (Table 4.18).

Table 4.18: Frequency of major red bean marketing constraints in HSD

Item		n	Urban collector	n	Rural assemblers	n	Wholesalers	n	Cooperatives
Price fluctuation	Yes	11	91.7	11	91.7	3	75	4	100
	No	1	8.3	1	8.3	1	25	0	-
Low quality	Yes	11	91.7	10	83.3	3	75	4	100
	No	1	8.3	2	16.7	1	25	0	-
Informal traders	Yes	11	91.7	7	58.3	3	75	2	50
	No	1	8.3	5	41.7	1	25	2	50
Access to credit	Yes	9	75	8	66.7	3	75	4	100
	No	3	25	4	33.3	1	25	0	-
Financial capacity	Yes	9	75	11	91.7	4	100	3	75
	No	3	25	1	8.3	0	-	1	25
Inconsistent supply	Yes	10	83.3	10	83.3	3	75	2	50
	No	2	16.7	2	16.7	1	25	2	50
Brokers	Yes	8	66.7	10	83.3	1	25	0	-
	No	4	33.3	2	16.7	3	75	4	100
Inconsistent demand	Yes	8	66.7	11	91.7	3	75	3	75
	No	4	33.3	1	8.3	1	25	1	25
Storage facility	Yes	4	33.3	8	66.7	1	25	1	25
	No	8	66.7	4	33.3	3	75	3	75
Weak coordination among actors	Yes	7	58.3	9	75	2	50	4	100
	No	5	41.7	3	25	2	50	0	-
Distance to market	Yes	3	41.7	3	41.7	1	25	1	25
	No	9	58.3	9	58.3	3	75	3	75
price information	Yes	4	33.3	5	41.7	0	-	2	50
	No	8	66.7	7	58.3	4	100	2	50

Table 4.18 continued

Item		n	Urban collector	n	Rural assemblers	n	Wholes-alers	n	Cooper-atives
Poor road	Yes	2	16.7	3	25	0	-	1	25
Facility	No	10	83.3	9	75	4	100	3	75
Transport	Yes	2	16.7	3	25	0	-	2	50
facilities	No	10	83.3	9	75	4	100	2	50
Sale tax	Yes	2	16.7	8	66.7	1	25	0	-
	No	10	83.3	4	33.30	3	75	4	100

Source: Survey data (2013)

Both assemblers and wholesalers reported that their financial capacity was among the major constraints of marketing. All wholesalers stated that low quality red bean, price fluctuation, access to credit, informal traders, and inconsistent demand and supply were the major constraints in red bean marketing. During the FGDs, it was reported that the quality of red beans produced in the district was very poor and it was recommended that the government or other concerned organizations should give training to farmers on methods of threshing and storing red bean. Traders reported that if the quality of red beans was improved, then farmers could eventually join good market and make money from the business.

4.7.3 Discussion

The brokers exploited producers because the former were better informed about quality and price information and farmers were obliged to sell for the price offered by brokers otherwise no power to negotiate. Brokers were reported as challenges of not only red beans marketing but also red pepper marketing in Alaba Special District (Mussema, 2006). Urban collectors reported that they did not use intermediaries in buying or selling of red beans. This is related to high brokerage cost, wrong price information and cheating about the quality of red beans. Few rural assemblers used brokers in rural areas because the latter had better information about red bean sellers and non-sellers. Ketema (2007) found that brokers abused sheep and goat farmers and brokers were the major challenges of sheep and goat marketing in Halaba Special district in Ethiopia. It was also reported that sheep and goat brokers requested high rate of commission or misinformed and repelled purchasers.

All the wholesalers in HSD used intermediaries because of their huge demand on quantity of red beans. For wholesalers to satisfy the huge demand, it was necessary to have brokers who bought red beans on their behalf to satisfy the market demand. In the case of wholesalers, there were few problems associated with brokers because wholesalers were better informed about price and quality, had long trading experience and had strong social networks in the market that helped them not to be victims of brokers (Mussema, 2006).

Traders reported inconsistent supply of red beans as a major challenge that influenced their trade negatively. This implies that most red bean farmers did not have grain stores and hence sold their produce soon after harvest thereby depressing prices. The other reason could be that most farmers did not have credit sources and after harvesting, the produce was sold to fulfill other family demands like school fees and settling credit that may have been taken during the red bean production (Aysheshm, 2007).

There were a number of constrains that hindered traders not to be involved in the red bean market. Among the traders, the main constraints were price fluctuation, low quality, informal traders, limited financial capacity, and low access to credit. Due to low level of awareness about red bean quality, farmers produced red beans with low quality. Mussema (2006) found that red pepper traders faced constraints like credit in Alaba Special District and Silt District. Informal traders were the other major challenge to formal and licensed traders of HSD. The problem was serious because these informal traders had very strong linkage with brokers. As a result, licensed traders had little access to red bean supply (JICA, 2012).

4.8 Factors Influencing Red Bean Farmers' Market Participation and Extent of Participation in HSD

4.8.1 Factors Influencing the Decision to Participate in Red Bean Market in HSD

The results of the study indicated that the model explained 66 percent of the variations in the likelihood of red bean farmers' market participation decision. In addition, the estimated probability greater than chi-square value (Prob > chi-square = 0.0000), suggests that all the model parameters were jointly significant in explaining the dependent variable at less than 1 percent significance level, indicating the goodness-of-fit of the model (see Appendix 9). Table 4.19 presents the maximum likelihood estimates for fitting equation 3.16 into the data.

As shown on Table 4.19 below, farmers' decision to participate in the red bean market in HSD was significantly and positively influenced by the price of red beans, quantity of red beans produced, access to market information, ownership to transportation means, number of extension visits, awareness of red bean quality standards and access to credit. On the other hand, the gender of the household head had a significant but negative effect on farmers' decision to participate in the red bean market in HSD. Furthermore, family size positively influenced farmers' market participation decision. Age of household head, education, off-farm income, farm size, distance to market, and cooperative membership had no effect on farmers' decision to participate in the red bean market. All the nine significant variables answered part of research question three, indicating an improvement on them could result in an increase on red bean farmers' market participation decision in HSD.

As it was expected, gender of household head was significantly and negatively contributed (it was coded as "1" for male and "0" for female) to red bean market participation decision ($p = 0.019$) (Table 4.19). The result implies that there is higher probability of red bean market participation if the head of household is female. Currently the government of Ethiopia and different NGOs within the country are providing gender specific training for farmers that might help female farmers to have higher probability of red bean market participation. The result of the study revealed that a shift from male-headed to female-headed household would increase the probability of market participation by 1.4 percent. Gizachew (2005) found that in Ethiopia female-headed households had a higher tendency to participate in the dairy market than male-headed households. This is because in Ethiopia females are the ones who participate in the processing of dairy products. Onoja et al. (2012) reported that in Nigeria female-headed households had higher probability of fish market participation than male-headed households. The gendered nature of the fish business comes from the fact that skills and tasks training for the acquisition of knowledge is gender specific in the study area.

Table 4.19: Factors that influence farmers' market participation - probit model result

Market participation decision	Coefficients	P-value	Marginal effects	Remarks
Demographic and socio-economic factors				
Gender	-1.089 (0.464)	0.019	-0.014	Significant
Age of household head	-0.028 (0.025)	0.266	-0.0036	Insignificant
Family size	0.178 (0.084)	0.033	0.023	Significant
Years of education of household head	-0.031 (0.069)	0.655	-0.0039	Insignificant
Off-farm income	-0.001 (0.001)	0.326	-0.000033	Insignificant
Ownership to transportation means	0.651 (0.388)	0.094	0.083	Significant
Farm level factors				
Farm size	-0.402 (1.450)	0.782	-0.051	Insignificant
Quantity of red bean produced	0.006 (0.002)	0.018	0.0007	Significant
Distance to market	0.061 (0.044)	0.164	0.0078	Insignificant
Institutional factors				
Price	0.907 (0.365)	0.013	0.12	Significant
Number of extension visits per year	0.067 (0.033)	0.045	0.0085	Significant
Access to market information	4.197 (1.840)	0.023	0.54	Significant
Membership in a cooperative	-0.094 (0.883)	0.916	-0.012	Insignificant
Access to credit	3.265 (1.892)	0.084	0.42	Significant
Awareness about bean quality standard	0.686 (0.413)	0.097	0.087	Significant
Constant	-9.186 (2.821)	0.001	0.12	Significant
Log likelihood = -34.58; Pseudo R^2= 0.6631; LR Chi-square = 136.11; Probability > Chi-square = 0.0000, Number of observations = 150				

Source: Survey data (2013)

*****, **, * = significant at 1, 5 and 10 percent respectively**

As expected, the price of red beans turned out to be positively and significantly related to market participation decision (p=0.013). A unit increase in the red bean price increased the probability

of farmers participating in the market by 12 percent. This suggests that price is among drivers that encourage red bean farmers' market participation decision in HSD. This is related to farmers' decision to sell when there is high price because they need to increase their income to purchase other consumption items and production inputs. Price signals generated and transmitted to active actors along the value chain can influence production and consumption decision of the actors (Timmer, 1974). Onoja et al. (2012) found higher probability of fish market participation with an increase on price of fish in Nigeria. The author justified that households with higher expectation of making profits from price signals are more likely to participate in fish marketing in the study area.

The quantity of red bean produced had a positive and significant influence as expected *a priori* (p=0.018). The marginal effects revealed that a unit increase in the quantity of red beans produced increased the probability of market participation by only 0.07 percent. This can be explained by the fact that red bean is among the cash crops grown in HSD; the higher the produce the higher the farmers' motivation to sell more to generate more income. Additionally, red beans were rarely consumed in the study area by urban dwellers. This finding tallies with that of Mussema and Daniel (2012) who observed that in Ethiopia when farmers produce more pepper, it motivates them to sell more. This is because, pepper is a cash crop for most of the farmers, the higher the output, the higher is the farmer willing to participate in the market. Holloways et al. (2000) also found that in Ethiopia an increase in the number of livestock increased livestock farmers' market participation decision.

As expected, access to market information positively and significantly influenced farmers' market participation decision at (p = 0.023). A shift from lack of access to market information to access of market information increased the probability of producers' market participation decision by 54 percent. Availability of market information that could be used by farmers enhances market participation decision because market information will motivate farmers to plan effectively on time and produce according to the market demand and hence increase market participation decision. Aysheshm (2007) noted that in Ethiopia access to market information on sesame significantly influenced farmers' market participation decision. Additionally, Coetzee et al. (2004) found that in SSA the availability of usable market information strengthens producers' negotiating ability during transactions with buyers, and as a result, prevents possible exploitation

by better-informed buyers of the commodity. This eventually motivates producers to participate in the market. Key et al. (2000) also found that access to price information increased maize farmers' market participation decision in Mexico. This is due to the fact that availability of information reduces the cost of searching market information and encourages farmers to participate in the market.

As shown in Table 4.19, ownership to a means of transport positively and significantly influenced red bean farmers' market participation decision ($p = 0.094$). A shift from lack of means of transportation ownership to owning one increased the red bean farmers' market participation by 8.3 percent. This suggests that when farmers own transportation means, it motivates them to produce surplus and participate in the market because they own the means of transport to bring production inputs from the source and convey outputs to the market. The findings corroborates that of Mathenge et al. (2010) who found that in Kenya, ownership of means of transport had a positive and significant effect on the probability of farmers participating in maize, roots and tuber crop markets. Alene et al. (2008) also found that in Kenya ownership of means of transport positively and significantly influenced farmers' market participation decision because transportation equipment help producers to access production inputs from the source.

Family size had a positive and significant relationship with market participation decision ($p = 0.033$). The marginal effects of the variables indicate that a unit increase in family number increased farmers' market participation decision by 2.3 percent. Red bean production is labor intensive; those households with large family sizes need less investment to hire labor for red bean production because their family members can be used as a major source of labor. This encourages farmers to produce surplus red bean and participate in the market. This finding tallies with that of Somano (2008) in Ethiopia who found that labor force encouraged farmers' milk market participation. In Ghana, Martey et al. (2012) found that local farming communities had large family sizes for agricultural purposes and that this labor force motivated them to participate in cassava market. Lapar et al. (2002) found a decline in market participation among Philippines smallholder milk producers with an increase in the number of household members. As the number of family members increased, farmers might not have excess milk to participate in the market.

As expected *a priori*, an increase in the number of extension visits significantly and positively affected farmers' market participation decision ($p = 0.045$). The marginal effect result indicated that an extra extension visit would increase the likelihood of farmers participating in the red bean market by 0.9 percent. This could be attributed to the fact that an increase in the number of extension visits would avail up to date information regarding agricultural technologies that might improve productivity and therefore increase the marketable surplus. The finding corroborates that of Negash (2007) who found that frequent extension visits increased the likelihood of adoption of improved haricot beans in Alaba Special District of Ethiopia. The authors reasoned that frequent extension visits provided current information and this made the farmers conscious of production and production techniques of the commodity.

As expected, awareness about red bean quality standards positively and significantly influenced the probability of red bean farmers participating in the market ($p = 0.097$). A shift from lack of awareness of red bean quality standards to awareness about the quality standards increased the likelihood of farmers participating in the red bean market by 8.3 percent. This implies that when farmers' expertise on quality standards of red beans increased, it enhanced their market participation decision. This is because when farmers obtain knowledge on quality standards demanded by the customers they can produce according to quality requirements and participate in the market. Reardon and Barrett (2000) argue that product grades and standards were among the bottlenecks for smallholder farmers leading them to exclusion from participating in the market. Djalalou et al. (2012) also argued that strict quality standards requirements suppressed the amount of pineapples exported from Benin to two percent of the total production, indicating that quality standards limited pineapple farmers' market participation decision. Furthermore, it was reported that in New Jersey State University, the buying decision of 63 percent of consumers was based on product quality, indicating how quality hinders farmers' market participation decision (Govindasamy et al., 1998).

As expected, access to credit positively and significantly influenced the likelihood of farmers in HSD participating in red bean market ($p = 0.084$). A shift from lack of credit to access of the same increased the probability of market participation by 42 percent (Table 4.19). This could be attributed to credit accessibility that allows farmers to purchase agricultural inputs like fertilizers, improved seeds and other production-enhancing technologies, which increase production and

therefore the marketable surplus. Credit is among the major constraints that hinder red bean production and hence farmers' market participation decision. Red bean farmers might have liquidity constraints to buy inputs like improved seeds and other production inputs that determine red bean productivity. Wolday (1994) reported that in Ethiopia marketing systems were constrained by limited access to credit. Randela et al. (2008) also found that access to credit had a positive and significant impact on producers' likelihood to participate in cotton market in South Africa, because availability of credit reduces transaction costs of both in input and output markets.

4.8.2 Factors Influencing the Extent of Red Bean Market Participation in HSD

The results of second-stage Heckman selection estimation for the level of participation are given in Table 4.20. The coefficient of Mills ratio (Lambda) in the Heckman two-stage estimation is significant at the probability of less than 5 percent. This indicates sample selection bias, existence of some unobservable farmer characteristics determining farmer's likelihood to participate in red bean market and thus affecting the level of participation. The goodness of fit for the second stage (OLS) was assessed using adjusted R-squared (Martin, 2012). The adjusted R-squared is 0.47, indicating that 47 percent of the variations on dependent variable (extent of red bean market participation) was explained by the independent variables (see Appendix 9).

As shown in Table 4.20, ownership of means of transport, quantity of red beans produced and price of red beans positively and significantly influenced the extent of market participation among the respondents. On the other hand, family size had a negative but significant effect on the extent of market participation. Out of the fifteen variables analyzed in this study, only four significantly influenced red bean farmers' extent of market participation, and this enabled answering part of the third research question of the study.

Family size had a negative but significant effect on the quantity of red bean supplied to the market at probability level of $p = 0.004$. The negative sign indicates that as the family size increases the quantity marketed would be decreased. This could be because a big family size increases the quantity of red bean needed for home consumption thereby reducing the marketable surplus. A unit increase in family size would reduce the amount of red beans to be sold by 12.30 kg (Table 4.20). This finding corroborates that of Gani and Adeoti (2011) who found that an

increase in family size reduced the amount of cassava sold in Nigeria. It was justified that an increase in family size is an increase on the number of mouse, which reduces marketable surplus.

Table 4.20: Factors influencing the extent of farmers' participation in red bean market in HSD

Variable	Coefficients	t-ratio	Remarks
Gender	4.397 (27.419)	0.873	Insignificant
Age of household head	1.354 (1.304)	0.299	Insignificant
Family size	-12.302 (4.274)	0.004***	Significant
Education level of household head	-1.123 (3.450)	0.745	Insignificant
Off-farm income (ETB)	0.014 (0.009)	0.131	Insignificant
Ownership to transportation means	64.454 (22.569)	0.004***	Significant
Farm level factors			
Farm size (ha)	19.743 (41.370)	0.633	Insignificant
Quantity of red bean produced (Kg)	0.762 (0.053)	0.000***	Significant
Distance to market (Km)	-0.848 (2.649)	0.749	Insignificant
Institutional factors			
Price	33.578 (18.678)	0.072*	Significant
Access to Market information	82.987 (53.444)	0.120	Insignificant
Access to credit	7.283 (37.934)	0.848	Insignificant
Membership in a cooperative	11.007 (24.882)	0.658	Insignificant
Awareness on red bean quality standards	38.631 (29.283)	0.187	Insignificant
Constant	-324.960 (105.76)	0.002***	Significant
Inverse Mills Ratio	59.558 (25.817)	0.021**	Significant
Rh0 = 0.718; Sigma = 82.977; Wald chi^2 (14) = 806.89; probability >Chi-square = 0.0000; Number of observation = 150; censored = 65; uncensored = 85			

Source: Survey data (2013)

*****, **, * = significant at 1, 5 and 10 percent respectively**

As hypothesized *a priori*, ownership of means of transport positively and significantly influenced the extent of red bean farmers' market participation at ($p = 0.004$). Thus, a shift from lack of ownership to ownership of a means of transport would increase the extent of farmers participating in the red bean market by 64.5 kg (Table 4.20). This is because 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. This finding corroborates that of Gebremedhin and Jaleta (2012) who found that ownership of equines as a means of transport increased market participation because of equines reduce marketing costs. Mathenge et al. (2010) also found that the quantity of maize sold was positively related with ownership of transport equipment in Kenya. This is because ownership of transportation means reduce costs of transporting output from farm to market. Key et al. (2000) also found that ownership of a means of transport reduced variable transaction costs thus increasing the extent of market participation among Mexican maize farmers.

As was hypothesized, the amount of red bean produced was positively and significantly related to extent of red bean market participation ($p = 0.000$). A unit increase in the quantity of red beans produced would lead to a 0.79 kg increase in the quantity of red beans supplied to the market (Table 4.20). Those farmers who produced more also sold more, which is consistent with expectation. The findings of this study are consistent with that of Negassa (2009) also found that an increase in the quantity of milk produced in Ethiopia increased extent of market participation. Moreover, higher productivity could drive market participation because farmers with high productivity have surplus to participate in the market, *ceteris paribus* (Rios et al., 2008).

As was expected *a priori*, the price of red beans was positively associated with the quantity of red bean supplied to the market ($p = 0.072$). This reflects the law of supply, namely, *ceteris paribus* as the price of a good rises, the quantity supplied rises (Mas-Colell et al., 1995). A unit increase in the price increased the quantity of red bean sold by 33.6 kg (Table 4.20). This could be due to higher prices received by the red bean producers that generated more profits for the business. The results are consistent with Mathenge et al. (2010) who found that in Kenya, when tea, coffee, and sugarcane prices increased, the quantity sold also increased. This is justified as higher output price acts as an incentive to sell**.** Key et al. (2000) found that in Mexico, a one

percent increase in the selling price of maize increased the probability that households sell by 0.77 percent. In Mexico an increase in price of maize motivates farmers to sell more.

CHAPTER 5

SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Summary

In Ethiopia, pulses are important food and cash crops that play a crucial role in the country's economy. They improve farmers' food security, and are an affordable source of protein diet in the country. There is a wide range of common beans in Ethiopia. Red and white beans are the main commercial varieties with increasing market demand both locally and internationally. Although there is huge local and international demand for quality red bean, the country is unable to meet the demand in international market whereas there is huge un-marketed production in the country. This is aggravated by low market participation of smallholder red bean producers.

The study was conducted in HSD of SNNPR administrative region. The District was chosen because of low smallholder market participation among red bean producers despite its huge production. The main purpose of this study was to examine the factors determining the market participation of smallholder farmers, and the constraints of traders and cooperatives in the red bean market chain in the District. A multi-stage sampling procedure was employed in order to draw a sample from red bean producers. In order to get the sample of traders, stratified sampling was employed. Descriptive and econometric models were used to identify factors and to what extent those factors influenced farmers' likelihood to participate in red bean market in HSD.

The descriptive statistics revealed that among the sampled farmers, 56.6 percent were red bean market participants. Significant differences were recorded among red bean market participants and non-participants in terms of education level, family size, farming experience, membership to cooperative, awareness of quality standards, access to field demonstrations, access to market information, and ownership of means of transport.

The major red bean market actors were producers, primary cooperatives, cooperative unions, rural assemblers, wholesalers, exporters, urban collectors, and brokers. There were eight major red bean market channels in HSD. The major marketing limitation of red bean producers, traders, and cooperatives were found. It was noted that wholesalers had higher education level and trading experience compared to urban collectors and rural assemblers. Wholesalers used intermediaries in buying red beans and all traders made payments in cash to farmers. In red bean

marketing, color, size, variety, shrinkage, and breakage were main criteria used in grading the commodity.

The first stage results of the Heckman two-stage model (participation decision stage) showed that out of the fifteen variables hypothesized to influence red bean farmers' market participation decision, nine were statistically significant. The factors that significantly and positively influenced the likelihood of farmers participating in the red bean market were price, ownership of means of transport, number of extension visits per year, quantity of red bean produced, awareness about quality standards, market information, access to credit and family size. The result indicated that increase in the values of the variables also increased market participation decision of red bean farmers. Gender negatively but significantly influenced red bean market participation, indicating that female-headed households were more likely to participate in red bean marketing than their male-headed counterparts. In the second stage (extent of participation decision), only four out of fourteen factors were statistically significant. The positive ones were red bean price, ownership of means of transport and quantity of red beans produced. Thus an increase in any of these variables increased the extent of market participation. Only family size negatively influenced extent of red bean market participation among the survey respondents. This implies that an increase on family size would reduce the extent of market participation. This is due to an increased number of family members who fed on the crop.

5.2 Conclusion

In Ethiopia, there is huge potential for red bean production and marketing. In Halaba Special District, there were seven major red bean marketing channels and among the channels farmers received highest gross marketing margins in channel two, where farmers sell directly to wholesalers. In the district, six major market actors were identified such as farmers, urban collectors, wholesalers, rural assemblers, primary cooperatives and cooperative union.

In Halaba Special District, farmers red bean production and marketing constraints were identified to be brokers, price fluctuation, access to improved seeds, and access to credit. Traders and cooperatives reported that their constraints in the red bean marketing were low quality red bean, informal traders, price fluctuation and shortage of credit. Therefore, improving both red bean production and marketing could improve livelihood of the farmers.

The important role of red bean quantity produced was explained through its significant influence on market participation decision and the extent of market participation, indicating the need for enabling environment for increasing smallholders' ability to produce quality red beans. Credit was a crucial factor that influenced red bean farmers' market participation decision. This implies that availability of credit especially during planting could encourage farmers to produce surplus and participate in the market. This is suggestion derives from the fact liquidity was among the major challenges cited by farmers that constrain production.

Improving access to red bean market information appears important in market participation decision as well as the extent of market participation. Reliable information and information presented in an understandable manner is most valuable. Ownership of a means of transport among producers eased the transportation costs and therefore positively influenced both market participation decision and extent of market participation.

5.3 Recommendations

1. There should be a strong emphasis on creating good market networks and linking farmers to reliable markets information. Both government and non-government actors should invest on linking farmers to different information sources to enhance farmers' access to information on price, good husbandry practices, quality standards, and market demand. Because red beans are among the commodities with an increasing acreage in the study area, links should be created between producers and market information channels. This can be done either by assigning marketing specialists to work at a fee for farmers at the district level or through registering the crop under the Ethiopian Commodity Exchange (ECX) in which market information can be delivered directly from ECX to farmers as it applies coffee, white beans, and sesame.

2. This study showed that awareness on quality standards and number extension contacts per year significantly influenced the probability of farmers' participating in the red bean market. Thus, the government and/or private sector players (e.g., traders, exporters, etc) should train farmers on quality standards of red beans demanded by consumers. Training on production and post-harvest handling techniques could address this challenge. Strong extension intervention is vital to assist farmers in producing high quality red beans and increase production through consistent follow up, and keeping of farm records.

3. During the survey farmers, urban collectors and rural assemblers complained that brokers were the major challenge in red bean marketing. There is an urgent need for government intervention with regard to Halaba Kulito and Guba market brokers' activities. It is critical to formulate rules and regulations for brokers working along the value chain of red beans in the district. Specifically, red bean farmers are victims of brokers' habits and the District Agricultural and Rural Development and Marketing Departments should work together with red bean farmers to harmonize the operations of brokers along the chain.

4. The amount of red bean produced positively influenced market participation decision and extent of market participation. Hence, policies that would improve farmers' red bean production capacity such as supply of improved seeds and credit to farmers should be explored.

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APPENDICES

APPENDIX 1: Pearson correlation coefficients for testing for multicollinearity

	PRC	OTR	NEX	AMT	AGE	OFI	GND	AQT	DIS	MIF	EDU	FRS	MSH	FSI
PRC	1													
OWNT	0.2	1												
NOEX	0.4	0.3	1											
AMRB	0.5	0.4	0.6	1										
AGH	0.1	0.0	0.0	0.1	1									
OFFI	0.1	0.2	0.2	0.1	-0.1	1								
GND	0.1	0.2	0.2	0.1	0.0	0.1	1							
AQST	0.2	0.2	0.4	0.2	-0.1	0.2	0.3	1						
DSMK	-0.1	-0.3	-0.1	-0.2	0.1	-0.1	0.0	-0.2	1					
MINFO	0.1	0.2	0.3	0.1	0.0	0.1	0.1	0.3	-0.2	1				
EDLU	0.1	0.1	0.1	0.2	-0.2	0.0	0.2	0.3	0.0	0.0	1			
FRSZE	0.3	0.3	0.5	0.6	0.0	0.1	0.1	0.2	-0.2	0.1	0.0	1		
MCOO	-0.2	-0.3	-0.4	-0.4	0.0	-0.1	-0.1	-0.3	0.2	-0.1	-0.2	-0.3	1	
FSZE	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.2	-0.1	0.1	0.0	0.3	-0.1	1

PRC=price, OWNT=ownership to transport, NOEX=number of extension visit per year, AMRB=amount of red bean produced, AGH, OFFI=off-farm income in 2012, GND=gender, AQST=awareness about quality standards, DSMK=distance to market, MIF=market information, EDLU=education level, FRSZE=farm size, MCOO=membership to cooperative, FSZE=family size

*Presence of value greater than 75 percent indicates presence of Multicollinarity on the data set

APPENDIX 2: The results of variance Inflation factor (VIF) analysis

Variable	VIF	1/VIF
AMRB	2.75	0.362988
FRSZE	1.97	0.506383
NOEX	1.90	0.527318
AQST	1.51	0.661777
OWNT	1.40	0.715510
PRC	1.40	0.716374
MCOO	1.38	0.725164
FSZE	1.35	0.742039
MINFO	1.31	0.763502
DSMK	1.24	0.806057
EDLV	1.20	0.831461
AGH	1.18	0.848580
GND	1.16	0.864771
OFFI	1.15	0.871957
ACICR	1.14	0.879703
Mean VIF	**1.47**	

*VIF value greater than 10 indicates presence of Multicollinarity on the data set

APPENDIX 3: Results of heterokedasticity test

Item	Probability Breusch-Pagan method
Gender	0.125
Age of household head	0.679
Family size	0.394
Education status	0.381
Off farm income	0.241
Ownership of means of transportation	0.305
Size of farm allocated to red bean	0.469
Quantity of red bean produced in the 2012	0.765
Distance to the nearest market	0.121
Price of red bean in the year 2012	0.310
Number of extension visit in year 2012	0.2934
Access to market information	0.588
Access to informal credit	0.126
Membership in a cooperative	0.305
Awareness about quality standards	0.224

*Presence of probability value less or equal to 10 percent indicates the presence of heterokedasticity in the data set

APPENDIX 4: Checklist for Focus Group Discussion

Focus group discussion questions with actors along the market chain of Red bean on "Analysis of factors influencing participation of smallholder farmers in Red Bean market in Halaba Special District, Ethiopia" for M.Sc. 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 market chain by each actor?
3. Is there land shortage for red bean production? How do you transport the produce?
4. Which types of red bean variety is common in the district? Why? Is it availability?
5. What is the average amount of red 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 producers' decision to participate in red bean market and the amount they are supplying to the market?
9. What are the major constraints that affect producers, urban collectors, rural assemblers, and wholesalers to operate in the red bean marketing?
10. What type of relationship exist between

Actors	No relationship	Weak	Strong
Farmers and farmers			
Farmers and brokers			
Farmers and urban collectors			
Farmers and wholesalers			
Farmers and cooperative			
Farmers and rural assemblers			
Brokers and urban collectors			
Brokers and wholesalers			
Urban collectors and wholesalers			
Urban collectors and cooperative			
Brokers and illegal traders			

APPENDIX 5: Producers' Survey Questionnaire

Questionnaire for producers on "Analysis of factors influencing participation of smallholder farmers in Red Bean market in Halaba Special District, Ethiopia" for M.Sc. Research project

1. General Information

1. Questionnaire number: _____

2. Name of the enumerator: _____Signature: _____

3. Date: _____/ _____/_____

4. Name of Kebele administration _____

5. Name of the village _____

2. Household Characteristics

1. Name of the respondent _____
2. Who is the head of the household, i.e. decision maker? _____
3. Age of the household head _____
4. Sex of the household head 1. Male [ ] 2. Female [ ]
5. Marital status of the household head

   1. Single [ ] 2. Married [ ] 3. Divorced [ ] 4. Widowed [ ] 5. Polygamous [ ]
6. Education level of the household head 1. Number of years in school_____
7. Farming experience of household head: _____ years
8. Number of family including the respondent _____

Name, age, sex, and education level of family (Use the code)

3. Land Use

1. Total land holding owned _____ (ha)
2. Total land hired in _____ (ha)
3. Cultivated area _____ (ha)
4. Red bean growing area _____ (ha)
5. Land allocated for other crops _____ (ha)

4. Production

1. Production of Red bean and major crops in 2012.

	Type of crop	Quantity produced	Quantity consumed	Stored for seed (kg)	Gift (kg)	Quantity sold 2012	Price in 2012 per 100 kg
1	Red bean						
1	Red						
2	Maize						
3	*Teff*						
4	Other						

2. The best cash crops relative to level of income 1st _____

2nd _____ 3rd _____

3. Which type of red bean Variety are you using? 1. Local [ ] 2. Improved [ ] 3. Both [ ]
4. Is labor force available for production of red bean?
   1. Yes [ ] 2. No [ ]
5. What is your source of labor for producing red bean?
   1. Family labor [ ]. 2. Hired labor [ ] 3. Debo [ ] 4. All [ ]

5. Marketing aspects

1. Are you selling red bean to any market? 1. Yes [ ] 2. No [ ]
   (The following questions (2 up to 5) under this sub topic is only for those who participate in the market)
2. Experience in the marketing of red bean (Years) _____
3. Total quantity sold and average selling price:

Red bean type	Total quantity sold			Average selling price		
	2010	2011	2012	2010	2011	2012

4. How do you transport red bean from farm to market?
   1. Head loading [ ] 2. Pack animals [ ] 3. Animal cart [ ] 4. Trucks [ ]

5. Others _____

1. To whom are you supplying your red bean?

1. Local assemblers [ ] 2. Wholesalers [ ] 3. Retailers [ ] 4. Urban collectors [ ] 5. Consumers [ ] 6. Informal traders [ ] 7. Other/specify _____

5. Where could (did) you get them/buyers?

1. At the farm level [ ] 2. At the local market [ ] 3. on the main road [ ]

4. At the district market [ ] 5. Others/specify_____

6. What are marketing costs you incur when you take your produce to the market?

Items	Cost (birr)	Remark
Sales tax		
Transport cost		
Loading and unloading		
Packing		
Others		

7. How many kilometers you need to travel to get the following?

1. The nearest Cooperatives _____ Km 2. The nearest market for selling red bean _____ Km

3. Local assemblers (if there is) _____Km. 4. The district market _____ Km

8. Do you have your own transportation means like donkey, horse, mule, cart, and track?

1. Yes [ ] 2. No [ ]

9. Did you know the nearby market price before you sold your red bean? 1. Yes [ ] 2. No [ ]

10. Do you have access to market information? 1. Yes [ ] 2. No [ ]

10.1 From which source did you get information on supply of red bean markets?

1. Other red bean farmers [ ] 2. Personal observation [ ] 3. Radio [ ] 4. Broker [ ]

5. TV [ ] 6. Telephone [ ] 7. Extension agents [ ] 8. Newspaper [ ] 9. Other

10.2 Which one is/are your source of information on demand of red bean markets?

1. Other red bean farmers [ ] 2. Personal observation [ ] 3. Radio [ ] 4. Broker [ ]

5. TV [ ] 6. Telephone [ ] 7. Extension agents [ ] 8. Newspaper [ ] 9. Other

10.3 Which one is/are your source of information on price of red bean markets?

1. Other red bean farmers [ ] 2. Personal observation [ ] 3. Radio [ ] 4. Broker [ ]

5. TV [ ] 6. Telephone [ ] 7. Extension agents [ ] 8. Newspaper [ ] 9. Other

10.4 Do you have awareness about the quality or variety of red bean that is important for market?

6. Credit

1) Do you have access to credit?

1. Yes [ ] 2. No [ ]

2) Have you received formal credit last year (2012)?

1. Yes [ ] 2. No [ ]

3) If yes, how much did you take? _____

4) What is your source of the credit?

1. Bank [ ] 2. NGO [ ] 3. Microfinance [ ] 4. Relatives or friends [ ] 5. Other _____

5) What problem do you perceive in taking formal credit?

1. Inadequacy of supply [ ] 2. High interest rates [ ] 3. Restrictive procedures [ ]

4. Others (specify) _____

7. Extension Service

1. Do you have access to extension service? 1. Yes [ ] 2. No [ ]
2. Did you get extension service in relation to red bean production in 2012? 1. Yes [ ] 2. No [ ]
3. If yes, what type of extension service did you get?
   1. Technical advice 1. Yes [ ] 2. No [ ]
   2. Price information 1 Yes [ ] 2. No [ ]
   3. Input use 1. Yes [ ] 2. No [ ]
   4. Credit use-making 1. Yes [ ] 2. No [ ]
   5. Other _____
4. How often the extension agent contacted you?

1. Weekly [ ] 2. Once in two week [ ] 3. Monthly [ ]

4. Twice in the year [ ] 5. Once in a year [ ] 6. Any time when I ask them [ ]

5. Have you ever attended any demonstration field days arranged by development agents regarding red bean production?

   1. Yes [ ] 2. No [ ]

6. Have you ever heard about quality standards of red bean that is excellent for exporting?

   1. Yes [ ] 2. No [ ]

7. If yes from where?

   1. Cooperatives [ ] 2 other farmers [ ] 3. From radio [ ]

   4. Extension agents [ ] 5. Never heard [ ] 6. Other _____

8. Are you a member of primary cooperatives? 1. Yes [ ] 2. No [ ]

9. If yes, please could you mention the primary cooperative that you are participating?

   _____

8. Other income

1. What is the type of off-farm activity in which the household is involved in?

   1. Paid daily labor [ ] 2. Petty trade [ ] 3. Handcraft [ ]

   4. Other, specify _____

2. What was the estimated amount of off farm income for last year (2012)? _____ Birr.

3. How many livestock do you have?

   1. Ox _____ 2. Cow _____ ___ 3. Sheep _____

   3. Goat _____ 4. Donkey _____ 5. Mule _____ 6. Horse _____

3. Please could you tick the major constraints that you are facing while or to supply red bean to the market?

1. Access to improved seed 1. Yes [ ] 2. No [ ] 2. Access to fertilizer 1. Yes [ ] 2. No [ ]

3. Inconsistent demand 1. Yes [ ] 2. No [ ] 4. Ownership of oxen for plough 1. Yes [ ] 2. No [ ]

3. Price fluctuation 1. Yes [ ] 2. No [ ] 4. Distance to market 1. Yes [ ] 2. No [ ]

5. Access to credit? 1. Yes [ ] 2. No [ ] 6. Access to price information 1. Yes [ ] 2. No [ ]

7. Transport service 1. Yes [ ] 2. No [ ] 8. Absence of demand 1. Yes [ ] 2. No [ ]

9. Storage facilities 1. Yes [ ] 2. No [ ] 10. Week coordination among marketing actors

1. Yes [ ] 2. No [ ] 11. Sale tax 1. Yes [ ] 2. No [ ]

12. Poor road facility 1. Yes [ ] 2. No [ ] 13 .Brokers 1. Yes [ ] 2. No [ ]

15. Lack of awareness on the type of variety that is standard for marketing

16. Shortage of labor force

17. Shortage of farmland

18. Less return from selling

17. If yes, can you mention the marketing agents who are causing problem in the red bean market?

18. Other _____.

APPENDIX 6: Traders (urban collectors, rural collectors, wholesalers, primary cooperative and union) survey questionnaire

Questionnaire for traders, cooperatives, and unions on "Analysis of factors influencing participation of smallholder farmers in Red Bean market in Halaba Special District, Ethiopia" for M.Sc. Research project

1. General information

Name of enumerator: …….Signature: ……

Date: … /…/… Checked by ……..

2. **Demographic Characteristics**

1. Name of the trader/Primary Cooperative/Cooperative Union _____

2. Age of the trader/Primary Cooperative/Cooperative Union _____

3. Sex of the trader 1. Male [ ] 2. Female [ ]

4. Marital status of the trader 1. Single [ ] 2. Married [ ] 3. Divorced [ ] 4. Widowed [ ]

5. Polygamous [ ]

5. Education status of the trader 1. Illiterate [ ] 2. Literate [ ]

3. Subject Questions

1. What type of business were you involved in?

1. Supplier/Wholesaler [ ] 2. Broker & commission agent [ ] 3. Retailer [ ]

4. Retailer & Broker [ ] 5. Local collector [ ] 6. Assembler [ ]

7. Broker/commission agent [ ] 8. Cooperative union [ ] 9. Cooperative [ ]

2. How long have you been engaged in red beans trading? _____Years

3. What is the motivation behind your participation in red bean marketing?

1. Profitability of the commodity [ ] 2. Low transaction cost [ ] 3. Less competition [ ]

4. There is no any option [ ] 5. Other/specify_____

4. Would you please list the major actors in the market chain of red bean in your area? _____

4. Purchasing & Processing

1. Do you have any arrangement with suppliers of red bean? 1. Yes [ ] 2. No [ ]

2. If yes, what kind of arrangement you practiced? 1. Contract with producers [ ]

2. Contact with [ ] local traders [ ] 3) other/specify _____

3. Do you have your own intermediaries who collect red bean from farmers?

1. Yes [ ] 2. No [ ]

4. If no, how do you access the produce from farmers? _____

5. From which market you bought red bean in 2012?

1. Village market [ ] 2. District market [ ] 3. other district market [ ]

4. Zonal market [ ] 5. Other (specify) _____

6. To who did, you supplied your red bean in 2012?

1. Farmers/producers [ ] 2. Retailers [ ] 3. Wholesalers [ ] 4. Village assemblers [ ]

5. Cooperative union [ ] 6. Cooperatives [ ] 7. Traders [ ] 8. Other (specify) [ ]

7. Average quantity purchased in a year _____

8. Average monthly price per 100 Kg of red bean _____

9. How many days did you operate in marketing of red bean in a month _____

10. Terms of payment with suppliers 1. Cash [ ] 2. Credit [ ] 3. Both [ ] 4. Advance payment[ ]

11. Did you use brokers to purchase red bean? 1. Yes [ ] 2. No [ ]

12. If brokers were used, what was the advantage of using brokers?

1. You could get buyers and sellers easily [ ] 2. Reduce transaction costs [ ]

3. Purchased at lower price [ ] 4. Sell at higher price [ ]

5. Other (specify) _____

13. Is there any problem related with using brokers? 1. Yes [ ] 2. No [ ]

14. If there is problem, what problems did they create?

1. Cheating quality [ ] 2. Wrong price information [ ]

3. Cheating scaling (weighing) [ ] 4. Charged high brokerage [ ]

5. Other (specify) _____

15. How do you measure your purchase? 1. By standard weighing (kg) [ ]

2. By traditional weighing materials [ ] 3. Other (specify) _____

16. Do you pack your purchase? 1. Yes [ ] 2. No [ ]

17. If yes, what were your packing materials? _____

18. What is the cost of packing? _____Birr/100 kg

19. Did you process /clean/ your red bean? 1. Yes [ ] 2. No [ ]

20. If yes how? _____

21. What is the cost of processing/ clearing_____Birr/100 kg

22. Did you grade your red bean? 1. Yes [ ] 2. No [ ]

23. If yes what was the basis of your grading?

1. Color [ ] 2. Size [ ] 3. Taste [ ] 4. Other (specify _____

24. What is the cost of grading per 100 kg _____ Birr

5. Transport & value addition

1. How far is the purchasing market place from your residence?

1. Longest _____ kms 2. Nearest _____Kms

2. What is the most frequently used mode of transport red bean from purchasing sites to market?

1. Head [ ] 2. Pack animals [ ] 3. Animal cart [ ] 4. Trucks [ ]

5. Others……

3. Average cost of transportation you incur to transport 100 kg of red bean:

- From purchase, center /collection point to the store? _____Birr/100 kg
- From store to cooperatives? _____ Birr/100 kg
- From store to market? _____ Birr/100 kg
- From cooperative to Cooperative union? _____ Birr/100 kg
- From cooperative union to traders? _____ Birr/100 kg

5. How much was the loading and unloading expenses per 100 kg? _____

6. Are there any activities you are doing on the red bean you purchase before you supply to the buyers? 1. Yes [ ] 2. No [ ]

7. If yes, could you mention the activities you do as a value addition before you sell it

Activities	Estimated cost per 100 kg

6. Selling practice

1. Where did you sale red bean in 2012?
2. To whom did you sell in 2012? _____
3. How many quintal/100 kg/ you sold in the year 2012? _____
4. Average quantities of red bean sold per month in this market?
5. How many weeks did you operate in this market?
6. Terms of payment with buyers

1. Cash [ ] 2. Credit [ ] 3. Advance payment

7. What are prices of red bean during scarce and abundant seasons

		Scarce	Abundant	Commonly
Red bean	Selling price			
	Purchasing price			

3. Please, could you tick the major constraints that hinder you from supplying red bean to the market?

1. Low quality 1. Yes [ ] 2. No [ ] 2. Inconsistent supply 1. Yes [ ] 2. No [ ]

3. Price fluctuation 1. Yes [ ] 2. No [ ] 4. Distance to market 1. Yes [ ] 2. No [ ]

5. Access to credit? 1. Yes [ ] 2. No [ ] 6. Access to price information 1. Yes [ ] 2. No [ ]

7. Transport service 1. Yes [ ] 2. No [ ] 8. Demand 1. Yes [ ] 2. No [ ]

9. Storage facilities 1. Yes [ ] 2. No [ ] 10. Week coordination among marketing actors

1. Yes [ ] 2. No [ ] 11. Sale tax 1. Yes [ ] 2. No [ ]

12. Poor road facility 1. Yes [ ] 2. No [ ] 13 .Brokers 1. Yes [ ] 2. No [ ]

15. Linkage among cooperatives 1. Yes [ ] 2. No [ ]

16. Financial capacity of the cooperative 1. Yes [ ] 2. No [ ]

17. Illegal/informal market 1. Yes [ ] 2. No [ ]

18. Linkage between cooperatives and union 1. Yes [ ] 2. No [ ]

17. If yes, can you mention the marketing agents who are causing problem in the red bean market _____?

18. Other _____.

6. If you have any recommendation or advice in order to improve marketing of red bean in the area _____

APPENDIX 7: Percentage of members and non-members of primary cooperative in HSD

	Number of the members	Percentage
Members	20	13.3
Non-members	130	86.7
Market participants	19	22.35
Non-market participants	1	1.54

Source: Survey data (2013)

APPENDIX 8: Relationships between different actors along red bean market chain in HSD

First Ansha *kebele*

No	Actors	No relationship	Weak	Strong
1	Producers and producers			✓
2	Producers and brokers		✓	
3	Producers and urban collectors		✓	
4	Producers and wholesalers	✓		
5	Producers and cooperative	✓		
6	Producers and rural assemblers			✓
7	Brokers and urban collectors			✓
8	Brokers and wholesalers			✓
9	Urban collectors and wholesalers		✓	
10	Urban collectors and cooperative	✓		
11	Brokers and illegal traders			✓

Continued Kufe *kebele*

	Actors	No relationship	Weak	Strong
1	Farmers and farmers			✓
2	Farmers and brokers	✓		
3	Farmers and urban collectors	✓		
4	Farmers and wholesalers			✓
5	Farmers and cooperative	✓		
6	Farmers and rural assemblers			✓
7	Brokers and urban collectors			✓
8	Brokers and wholesalers			✓
9	Urban collectors and wholesalers		✓	
10	Urban collectors and cooperative	✓		
11	Brokers and illegal traders			✓

APPENDIX 9: Probit and OLS models test of fitness

Probit model		OLS	
Number of observation	150	Number of observation	150
LR Chi-square (15)	136	Probability > F	0.0000
Probability > chi-square	0.0000	Adjusted R^2	0.47
Pseudo R^2	0.663		
Log likelihood	-34.58		

APPENDIX 10: Lists of red bean farmers attended the FGD in HSD

First Ansha *Kebele*

No	Name	Village	Gendre	Education statuas	Occupation in the value Chain
1.	Shek -Jemal Bekara	Sidea Abagona	Male	6	Assembler and Chairman of the KA
2.	Zayiton Ebiro	Aje Darm	Male	5	Urban red bean collector
3.	Dube Halaga	Malorto	Male	4	Assembler
4.	Zayitun	Worabicho	Female	6	Assembler
5.	Bekelech	Aje Darm	Female	3	Red Bean Producer
6.	Wabala Babiso	Widanto	Male	0	Urban red bean collector
7.	Kedir Hussen	Abisalasto	Male	10	Red Bean Producer
8.	Kedir Tekiye	Sede	Male	4	Red Bean Producer
9.	Dubala Yesuf	Darm	Male	1	Red Bean Producer
10.	Befata Hussen	Darm	Male	5	Red Bean Producer
Name of the KA 1st Ansha, Place where the FGD held Ansha Farmers Training Center (FTC), Date of FGD 13-06-2013-, Starting time 3:00 Ending time 5:05, Number of people who attend the FGD 10.					

Kufe *kebele*

No	Name	Village	Gender	Occupation	Edu. level	Occupation along value chain
1	Yadisa Onike	Farzana	Male	Chairman of the KA	12	Farmer
2	Handino Hamiza	Azara	Male	Farmer and trader	3	Farmer
	Ramato Dawoid	Azara	Male	Farmer and trader	6	Assembeler
4	Zarifame Hebiso	Azara	Femal	Female reperes.	-	Farmer
5	Bergena Abino	Safato	Male	Trader	2	Farmer
6	Baharu Ribo	Safato	Male	Farmer	10	Assembeler
7	Suragi Alkawir	Farzana	Male	Youth representa.	10	Urban collector
8	Salome Tasfaye	Urago	Femal	Farmer	-	Farmer
9	Muhidin Jemal	Farzana	Male	Trader	9	Urban collector
10	Muhidin Asamo	Toko	Male	Trader	8	Farmer
Name of the KA Kufe, Place where the FGD held Kufe kebele administration office, Date of FGD 23-06-2013 E.C, Starting time 3:00 Ending time 5:05, Number of people who attend the FGD 10.						