WOLKITE UNIVERSITY

COLLAGE OF AGRICULTURAL AND NATURAL RESOURSE

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DETERMINANTS OF MAIZE MARKET SUPPLY IN GURAGE ZONE: THE CASE OF CHEHA WOREDA

A SENIOR RESEARCH PROJECT SUBMITTED TO AGRICULTURAL ECONOMICS: IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE BSc DEGREE IN AGRICULTURAL ECONOMICS

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ABSTRECT

Currently, maize is one of the cash crops and its demand by agro-industries has increased due to the increased capacity of maize processing in line with the expansion of the existing and establishments of new brewery plants. But little attention is paid to problems limiting the production and marketing condition, which in turn affect the market supply of maize. Hence, this study aimed to identify factors that affect market participation decision of households, determine factors affecting the quantity supply of maize in Cheha woreda. The study used both primary and secondary data. The primary data was gathered from 80 maize producing households by using random sampling technique and data also collected from farmers. To analyze the data both descriptive statistics and econometrics models was employed. Tobit model was used to identify factors affecting market participation decision of households and to determine factors affecting quantity supply of maize to the market in the study area. The Tobit model result revealed that out of 13 explanatory variables, 7 were found to significantly influence the quantity of maize supplied to the market amount of maize produced at 1% significance level, access to market information negatively influence at 5% significance level, market distance and current market price affected positively at 5% significance level. Whereas, distance to the market negative effect at 5% significance level, education at 10%, tropical livestock unit at 5% level of significance, extension contact influence at 1%. Both government and non-government actors give emphasis on linking farmers to different information sources to enhance farmers access to information on price, good husbandry practices, quality standard and market demand and also give attention for provision of improved seeds and fertilizer at the right manner in order to enhance production ofmaize.

ACRONYMS AND ABBREVIATIONS

CC	Contingency Coefficient
CSA	Central Statically Analysis
FAO	Food and Agricultural Organization
GDP	Gross Domestic Product
ICT	Information Communication Technology
SNNP	South Nation Nationalities of People
USAID	United State Agency
VIF	Variance Inflation Factor

1. INTRODUCTION

1.1. Background of the Study

Cereals are the most important food crop of the world and it provides the world with a majority of its food calories and about half its protein. Cereals occupy more than half of the world's harvested area and are the most important food source for human consumption. Of the 2.3 billion tons of cereals produced each year, 1 billion are destined for human consumption; 750 million tones are used as animal feed and 500 million tones are processed by industry, used as seed, or wasted. World total cereal production is increase by about 13.4 percent or nearly 68 million tons in 2014 compared to 2013 year (FAO, 2014).

Agriculture is the main stay of the Ethiopian economy employing the greatest proportion of the country population mainly of rural areas, which accounts for about 46% of the GDP of the nation and 90% of its export earnings and hold about 85% of the country's labor force. Agriculture and allied activities are the main source of much of the raw materials, investment capital, and foreign exchange, and labor needed for the economic growth. However, it is still in its primitive stage although there are some improvements in inputs in recent times. In this regard, improving the performance of agricultural sector is of critical importance for fast development of countries‟ economy (Tesfaye, 2009).

The production of cereal crops, such as teff, maize and sorghum is economically and socially important in Ethiopia. Cereals are the major food crops in Ethiopia and 82% of the total land area covered by grain crops and contributes 87% of the total grain production. Cereal production and marketing are the means of livelihood for millions of smallholder households and it represents the single largest sub-sector in the Ethiopian economy, which accounts for roughly 60% of rural employment (Adugna, 2014) and account for over 90% of input consumption in Ethiopia (Ebrahim,2013). The contribution of cereals to national income is also large. According to available estimate, cereal production represents about 30% of gross domestic product (GDP). This calculation follows from the fact that agriculture is 48% of the nation's GDP (World Bank, 2007), and that cereals‟ contribute to agricultural GDP is 65% (Diao *et al.*, 2007).

Maize arrived in Ethiopia slightly later, around the late 17th century (Huffnagel 1961), and was mainly grown as a subsistence crop in the mid-altitudes (1500–2000 m above sea level) in southern, south-central, and south-western parts of the country. The wide adaptability of the crop and the potential to produce more calories and food per area of land cultivated than all major cereals grown in Ethiopia were important factors in considering maize as part of the national food security strategy, including its inclusion under the government-led intensive agricultural extension program with increased production driving market prices down, maize became more affordable (e.g., relative to other staples such as teff and wheat) to rural and urban consumers. It is now increasingly used both separately as well as in mixed flour with other more expensive cereals in traditional Ethiopian diets.

Maize is the most important staple in terms of calorie intake in rural Ethiopia. The 2004/5 national survey of consumption expenditure indicated that maize accounted for 16.7 % of the national calorie intake followed by sorghum (14.1 %) and wheat (12.6 %) among the major cereals (Berhane *et al*., 2011). Compared to the 1960s the share of maize consumption among cereals more than doubled to nearly 30% in the 2000s, whereas the share of teff, a cereal that occupies the largest area of all crops in Ethiopia, declined from more than 30% to about 18% during the same period (Demeke, 2012).

The popularity of maize in Ethiopia is partly because of its high value as a food crop as well as the growing demand for the Stover as animal fodder and source of fuel for rural families. Approximately 88 % of maize produced in Ethiopia is consumed as food, both as green and dry grain. Maize for industrial use has also supported growing demand. Very little maize is currently used as feed but this too is changing in order to support a rapidly growing urbanization and poultry industry. Unlike its neighbour, Kenya, which imports a significant share for its consumption needs, Ethiopia has increasingly attained self-sufficiency in maize production since early this decade and even exports some quantities to neighboring countries (e.g., Sudan and Djibouti) in years of surplus production. If production can be significantly expanded, the potential for maize export to all the neighboring countries including Kenya is very high although the national demand is expected to continue to grow in the coming years (Shahidur, 2010).

The following are major constraints identified as factors that affect maize. These includes: shortage of supply of disease resistant and high yield varieties, weed and pest occurrence, low soil fertility , poor soil drainage, frost and drought, diseases, rising costs of transport, market price fluctuation and others. According to these authors, most farmers are not able to access pesticide and fungicide in the nearby market. Problems of adulteration and selling after expiration dates were often mentioned. At present cooperatives are providing fertilizers but often at unaffordable prices. On marketing side, low price of product, lack of storage and low quality of product are the major problems of the maize marketing activities(Dercon *et al*., 2009) and (Zeng *et al*., 2013).

Despite lower returns to investment in maize production, smallholder subsistence farmers continue to prioritize maize production over cash crops for the market due to household level food security concerns. However, maize productivity is quite low and remaining yield gap huge. The agricultural sector productivity is one of the lowest which is even showing a decreasing trend with causing a decline in per capita cereal consumption (Jema, 2008). Why has productivity in maize production remained low in the study area? Improvements in efficiency and productivity lead to achieve more maize output and food supply which reduce malnutrition and poverty. Therefore, the general objective of the study was to identify determinants of market supply of maize in Cheha woreda.

The specific objectives of the study was to identify factors that affect market participation decision of households and to determine factors affecting the quantity of market supply of maize Cheha woreda. To measure levels of technical, allocative and economic efficiencies in maize production among smallholder maize producers, to identify the demographic, socio- economic and institutional factors that affect economic efficiency in maize production and to estimate the level of responsiveness of maize yield to the main inputs of production, namely seed, labor, oxen and fertilizers. The farmers are also risk averse because of uncertainty in repayment and high interest rates. Producing higher maize yields on existing cultivated land is therefore the surest way of generating the extra maize grain required to feed the nation. To achieve this goal, a number of remedial activities must be put in place (Jones, 2007).

1.2. Statements of the problem

Ethiopian agriculture is characterized by small holdings, low capitalization and low yield per unit of land. Cereal production and marketing are the means of livelihood for millions of households in Ethiopia. It is the single largest sub-sector within Ethiopia's agriculture, far exceeding all others in terms of its share in rural employment, agricultural land use, calorie intake, and contribution to national income. Cereal crops are the major dietary energy supplier all over the world and particularly in Ethiopia. The roles of agriculture remain significant in the Ethiopia economy despite the strategic importance of the industrial sector (Shahidur, 2010).

Agricultural marketing plays a vital role in the production, consumption and the economy in general. However, due to the underdeveloped markets in Ethiopia, the benefits of exchanges cannot be realized and the economy remains trapped in a largely subsistence-oriented structure (Elleni, 2003). The weak performance of the agricultural markets has recognized as a major hindrance to the agricultural development and the overall economy. Some regions experience depressed local price due to surplus production but higher in other regions, even when there is a balance between aggregate supply and demand at national level due to the poor marketing system. So a critical problem stands in the course of formulating appropriate policies and procedures for the purpose of increasing marketing efficiency (Haile, 2009).

Understanding cereal markets is especially relevant in Ethiopia, given the disastrous implications that poorly functioning cereal markets had on food security in the past, when cereal stocks were available in some parts of the country while widespread famine occurred in other parts (Gebremedhin, 2012). Major reasons for historically poorly functioning of cereal markets have included a lack of market information, poor road infrastructure and high transaction costs, and distress sales and lack of storage by small farmers (Seneshaw *et al*, 2013).

In Ethiopia, agricultural growth induces higher overall growth than non -agricultural sectors. This leads to faster poverty reduction since it generates proportionately more income for farm households who represent the bulk of the poor. From within agriculture, staple crops have stronger growth linkage resulting from more than proportionate increase in total GDP. Moreover, such growth linkage becomes stronger overtime (Diao *et al*, 2007).

In Ethiopia the performance of agricultural marketing system is constrained by many factors such as: poor quality of agricultural produce, lack of market facilities, weak extension services which ignored marketing development, poor linkage of research and extension, absence of marketing information and intelligent services, excessive price and supply fluctuations, limited access to credit, inefficient handling including, storage, packaging and transportation problem (Wolday and Eleni 2003).

Farmers in Ethiopia in general and in North region in particular are affected by low producer's price, on one hand, and high consumer's price, on the other hand. One of the reasons for this is lack of proper transport facilities and other infrastructure service. This type of problems discourages market participation and market supply agricultural commodity. Major reasons for historically poorly functioning of cereal markets have included a lack of market information, poor road infrastructure and high transaction costs, and distress sales and lack of storage by small farmers (Seneshaw *et al*, 2013).

In spite of the fact that markets are crucial in the process of agricultural commercialization, transaction costs and other causes of market imperfections could limit the participation of farm households in different markets (Abraham, 2013). This implies that markets could be physically available but not accessible to some of the farm households.

Ethiopia has favorable agro-climatic conditions for a range of crops including malt barley, as well as abundant land for agricultural activities. It is home to 18 major agro-ecological zones and 49 agro-ecologic sub-zones. The country has the soils and climate suitable for growing over 150 types of crops, including high value commodities such as coffee, sesame and other oilseeds, cereals, spices, fruits and vegetables USAID (2012). Farmers produce maize but market participation and market supply of maize to the market is limited. Because of the nature of the product on the one hand and lack of properly functioning marketing system on the other, often resulted in volatile producers 'price of maize grown in the study area mainly for market. However, determinants of market supply of maize were not undertaken in cheha woreda, which have potential production volume. Moreover there was need to employ a commodity market to fully understand and resolve the problem of maize at all levels. This makes undertaking determinants of market supply of maize. Hence, this study attempts to look the whole

determinants of maize marketed surplus in the district. This study were designed to address the prevailing information gap on market participation, marketed surplus and contribute to proper understanding of the challenges and assist in developing improved market development strategies to benefit smallholder farmers.

1.3. Objectives of the study

1.3.1. The general Objective

The general objective of the study was to identify determinants of market supply of maize in Cheha woreda.

1.3.2 Specific Objective

- ✓ To identify factors that affect maize market participation decision of households.
- ✓ To determine factors affecting the quantity of market supply of maize Cheha woreda.

1.4. Basic research Question

1. What are the factors that influence producer market participation decision?
2. What factors determine market supply of maize in the Cheha woreda?

1.5. Significance of the study

The study was generated valuable information on determinants of market supply maize that might assist policy makers at various levels to make relevant decisions to intervene in the development of maize production, and marketing to improve the livelihood of smallholder farmers through market participation and designing of appropriate policies and strategies. The findings of the study might also be useful to farmers, government and non-governmental organization to make their respective decisions. It may also serve as a reference material for further research on similar topics and other related subjects.

1.6. Scope and limitation of the study

The study was conducted in Cheha woreda and important information is collected from sample households in the study area. The study emphasizes on market supply of maize that is factors affecting market participation and intensity of market supply. The study was restricted to the market supply of maize production in Cheha woreda. In addition, the shortage logistics and budgets unable to consider additional sample of maize producing kebeles.

2. LITERATURE REVIEW

2.1. Theoretical Literature Review

2.1.1. Basic Concepts

This section attempts to provide basic concepts of a market, marketing, market participation and marketed surplus, identifying factors influencing market participation and identifying the factors affecting the marketed surplus.

Market: The word "market" has many connotations. Bain and Howells (1988; cited in Muhammed, 2011), define "markets" as a single arrangement in which one thing is exchanged for another. A market consists of buyers and sellers which facilities to communicate with each other. It needs not to be specific place (Crammer and Jensen, 1997; cited in Muhammed, 2011) or spot market. According to Abbot and Makeham (1981; cited in Muhammed, 2011), a market can be defined as an area in which exchange can take place. Kohl's and Uhl (1985; cited in Bosena, 2008) define market is an area for organizing and facilitating business activities and for answering the basic economic questions: what to produce, how much to produce, how to produce, and how to distribute production.

Marketing: The term marketing has a variety of meanings. To some shoppers it means purchasing groceries and all other household needs. From the point of view of farmer or rancher, it means selling their commodities. From the perspective of handler of the commodity, it means storing the commodity, transporting the product in to a form that consumers want, shipping it to retail outlet and promoting its sale (Crammer and Jensen, 1997; cited in Muhammed, 2011). According to Mendoza (1995; cited in Bosena, 2008), marketing is a system, which comprises several and usually stable and interrelated structures that along with production, distribution and consumption, strengthen the economic process. According to Kotler and Armstrong (2004) defined marketing as a social and managerial process by which individuals and groups obtain what they want and need through creating and exchanging products and value with others. Purcell (1979; cited in Muhammed, 2011), forwarded a broader definition i.e. marketing is the set of economic and behavioral activities that are involved in coordination the various stages of economic activities from production to consumption.

According to Lapar *et al.,* (2004) Marketing is the process of planning and executing the consumption pricing, promotion and distribution of idea, goods and services to create exchange that satisfy individual and organizational goals. Marketing is productive because it adds form, time and place utility (or satisfaction).

Agricultural marketing: Consumers spend a large amount of income on basic foods hence with the growth of urbanization; the agricultural marketing system is expected to play a great role in linking the rural and the urban population. Agricultural marketing covers all the activities associated with the agricultural production and food, feed, and fiber assembly, processing, and distribution to final consumers, including analysis of consumers' needs, motivations, and purchasing and consumption behavior (Branson and Norvell, 1983).

Marketed surplus: is the quantity of the total produce which the producer actually sells in the market, irrespective of his total personal requirement (Usha, 2013). It is more practical in nature and refers to that part of the marketable surplus which is actually marketed by the producer, i.e., not only the part which is available for disposal but the part which is actually made available to the market or to the disposal of the non-farm rural and urban population. The term is objective in nature, because it refers to the marketed amount, i.e., to the actual quantity which enters the market (Kumar 2007; cited in Parmod *et al*., 2013). It may be more, less or equal to the marketable surplus.

Market Participation: Various definitions of market participation have been suggested by different authors. Some authors consider market participation as any market related activity which promotes the sale of produce (Key *et al*., 2000; Holloway & Ehui, 2002; Lapar *et al*., 2002; cited in Geoffrey, 2014). According to Jubilee (2014) market participation is defined as the exchange of goods and services for money. Market participation can be referred to as commercialization (Latt & Nieuwoudt, 1988; cited in Muhammed, 2011). It can also be described as an individual's or household's economic transactions with others, in cash or kind (Von Braun *et al*., 1991; cited in Muhammed, 2011). Staal *et al*., (1997, cited in Geoffrey, 2014) mentioned that a low proportion of products exchanged in the market reflect limited market participation. With the three possible states of buying, selling or not trading, (Goetz 1992, cited in Geoffrey, 2014) defines market participation using household purchases and sales.

Volumes of produce traded are used to determine market participation. In agricultural market economy, market participation or commercialization occurs mainly when farmers stop being mostly subsistence farmers and become profit-oriented. Market participation is in that case defined as earnings from market activities (Makhura *et al*., 1997; Makhura, 2001).

2.1.2. Maize Production in Ethiopia

Maize is one of Ethiopia's most important cereals in terms of production, with four million tons produced in 2011 by eight million farmers across two million hectares making it a significant contributor to Ethiopia's economic and social development. There is significant market potential for maize in Ethiopia and eastern Africa. However, once harvested, maize production is extremely vulnerable to significant post-harvest losses due to mold, vermin and theft. Moreover, only a small fraction of the eight million farmers use hybrid maize seed (survey result, 2015).

2.1.3. Maize Producers

In Ethiopia, smallholder farmers almost in all regions of the country dominantly produce maize. In terms of regional distribution, 41.9% of the producers are found in Oromia, 28.6% in Amhara, 18.7% in SNNP, 6.9% in Tigray, and 2.4% in Benishangul Gumuz regional states (CSA, 2013). Farm size considerably varies from less than 0.5 ha to over 10.0 ha and almost 72% of maize producers own less than 2 ha. The smallholder farmers' owning 97% of the total maize land contribute 95% of the national maize production (CSA, 2011). On the other hand, commercial farms owning only 3% of land contribute 5% of the total production.

2.1.4. Effect of market demand factor on maize production

The maize market in general is characterized by a variety of marketing arrangements. Since the liberalization of the marketing system, several private sector entrepreneurs have joined the various parts of the maize supply chain. These entrepreneurs include companies that are active in regional maize grain trading, informal cross border traders, produce agents, small and medium millers, transporters, wholesalers and retail stores. Virtually all the domestic transactions made by these players are spot market and cash based. They sell the maize grain in l00kg bags without any grading and premiums prices for quality produce. However, for milled maize, there are three major grades. The flour is sold in kilograms and prices differ by grade (Jones, 2007).

A typical maize supply chain was noted to have the following shortcomings: This supply chain has too many participants with many speculative traders and agents who make the movement of maize time consuming. There is normally over supply of maize during the harvest season as farmers and traders have no stores. Participants' competition reduces as one goes up the chain. No clear flow of market information. Transactions are 'on spot' market and cash based. The markets are thin and volatile in terms of prices, trading volumes and liquidity. The marketing arrangement is not well developed leading to inadequate market outlets, high transaction costs and minimal value addition (Anderson, 2002). According to Minten, (2010), maize farming in Africa has faced serious challenges that have led to the overall declines of the quantities of maize produced. Denk, (2011) however explains that Africa is a suitable region for maize farming given the suitability of the climatic conditions of the area but the lack of knowledge on the right practices of maize farming has led to the practice decline trends especially in the quantities of maize produced.

2.1.5. Maize Marketing in Ethiopia

Agricultural markets continue to be seen as the means for ensuring that smallholder farmers are effectively integrated into the mainstream of national economies, especially in Ethiopia, Obi *et al*., (2011). Markets provide the opportunity for farm production to contribute to poverty reduction through the cash income realized from sales of farm produce (Minot and Hill, 2007).

Reported on cereal market participation by Sub Saharan Africa smallholder farmer that household size, experience, cultivated land, animal manure, price information, road net and ICT significantly influenced market participation whereas membership in cooperative, radio, livestock owned, off farm income, extension training, research participation, price information, average market distance, credit amount and ICT significantly determined level of participation (Siziba *et al*., 2011).

Reported on market participation of smallholder maize farmers in upper west region of Ghana indicated that age of household head, education status of household head, household size, farm size, off farm income, output produced, access to credit and market information were the significant factors which affect market participation decision whereas age, gender, education, household size, household income, off farm income, quantity of output, access to credit, price,

market information and point of sale of output were significant factors affecting the level of market participation of smallholder maize farmers (Musah *et al*., 2014).

In Ethiopia, participation of smallholder farmers to the maize market has long been considered an important part of the agrarian transformation of low income economies and a means of ensuring food security, enhanced nutrition, and enhanced incomes, Eleni, (2009). This is because the majority of populations live in rural areas where agriculture typically constitutes 50–90% of the total household income contributed mostly by maize production

Despite the importance of maize market in agrarian transformation, smallholders farmers, especially in Ethiopia, have encountered several challenges in participating to markets (Minot and Hill, 2007; URT, 2008; Tilburg and Schalkwyk, 2011). However, this was less of a problem in the era of the marketing boards, when a parastatal organization the marketing board–tended to provide essential output market services such as collection of the harvest, quality assessment, buying and storage (Jayne *et al*., 2006; Barrett, 2007).

According to Shilpi and Umali-Deininger (2007) documented that participation of small holder farmers at the market increases significantly with an improvement in market facilities and a decrease in travel time from the village to the market. Along with transportation costs to the nearest market, the characteristics of the nearest market can also influence the transaction costs of taking products to markets. For instance, a highly congested market with few facilities can add substantially to waiting time, product deterioration and losses, and costs to farmers and traders.

Well-functioning market facilities helps in modernizing agricultural production, creating economic opportunities, improving food security, motivating farmers to acquire and use productivity increasing inputs, assuring effective vertical integration and coordination in input supply, credit and output marketing, and encouraging farmers to specialize in productions where they have competitive advantage (Admassie, 2013).

Generally, market facilities are important aspects for the development of the agricultural sector and poverty reduction in rural areas. Availability of markets for agricultural products is important in stimulating agricultural production. Availability of improved markets facilities in the market also ensure better producer prices for farmers. URT (2010) argue that improvement and construction of rural roads and market infrastructure are important for efficient inputs and

output marketing. Investment in facilities is also important for attracting private investment in agricultural related activities such as agro-processing, increasing producer prices and farmers' income. For example in the context of India, Acharya (2004) noted that congestion and delays in the markets due to lack of proper market infrastructure resulted in long waiting periods for the farmers and hence limit the successful participation of small holder farmers in markets. World Bank similarly explained that lack of market infrastructure and facilities added substantially to marketing costs of the traders.

2.1.6. Maize Market Challenges

New private investment in storage facilities could be vulnerable to huge losses continued to be a major player in the market, offered prices to farmers and millers that did not rise through the marketing season (pan-seasonal prices), or set a narrow margin between its buying and selling prices that could be underwritten by the treasury all of which happened during much of the 2000s (Kaplinsky, 2010). For these and other reasons to be explored below, private investment in grain marketing facilities did not proceed as rapidly as anticipated. The prices change and fluctuation of maize supply produced from the key producing counties are also a challenge.

2.1.7. Market competition

The maize market in general is characterized by a variety of marketing arrangements. Since the liberalization of the marketing system, several private sector entrepreneurs have joined the various parts of the maize supply chain. These entrepreneurs include companies that are active in regional maize grain trading, informal cross border traders, produce agents, small and medium millers, transporters, wholesalers and retail stores. Virtually all the domestic transactions made by these players are spot market and cash based. They sell the maize grain in l00kg bags without any grading and premiums prices for quality produce. However, for milled maize, there are three major grades. The flour is sold in kilograms and prices differ by grade (Jones, 2007).

The maize marketing arrangements are categorized into the typical and the emerging new maize chains. While in all districts, a bigger proportion of the maize produce passes through the typical maize supply chain, there are also institutions and associations that have been set up in the same

districts that market the maize. A typical maize supply chain was noted to have the following shortcomings: This supply chain has too many participants with many speculative traders and agents who make the movement of maize time consuming. There is normally over supply of maize during the harvest season as farmers and traders have no stores. Participants' competition reduces as one goes up the chain. No clear flow of market information. Transactions are 'on spot' market and cash based. The markets are thin and volatile in terms of prices, trading volumes and liquidity. The marketing arrangement is not well developed leading to inadequate market outlets, high transaction costs and minimal value addition (Anderson, 2002).

2.2. Empirical literature on Market supply

A number of studies pointed out factors that centrally affect marketable supply of agricultural commodities. For example, Agete (2014) study factors influencing participation of smallholder farmers in red bean marketing in Halaba special district. The results 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.

Muhammed (2011) the study conducted in Alaba special woreda Among the different variables hypothesized to determine the supply of teff and wheat, econometric result showed that four variables such as quantity produced, access to market information, access to extension service and sex of the household head significantly affected the volume of teff supplied to the market.

Musah *et al*., (2014), reported on market participation of smallholder maize farmers in upper west region of Ghana indicated that age of house hold head ,education status of house hold head house hold size, farm size, off farm income, output produce, access to credit and market information where the significant factor which affect market participation decision. Solomon *et al*., (2015) the study conducted on barley value chain in Ethiopia among different variables hypothesized to determine supply of barley; the econometric result showed that three variables such as distance to road and region, tropical livestock unit and age of house hold head significantly affected volume of barley to the market.

2.3. Conceptual Framework of Market Participation and Marketed

Market participation of smallholder farmers is affected by numerous factors such as, demographic factors, service and information access factors, socio-economic factor and the natural disasters and calamities also affect market participation. These factors would be positive or negative effects. The main approach is that greater market participation of farmers results in more commodities being traded and this may lead to more return being obtained by the farmers. This becomes an incentive to increase production and hence a positive supply response is achieved. The study was based on the following model of study that identifies the independent and the dependent variable of the study. The framework conceptualizes factors affecting maize production as independent variable while quantity supplied of maize produced as dependent variable.

3. METHODOLOGY

3.1. Description of Study Area

3.1.1 Geographical Location

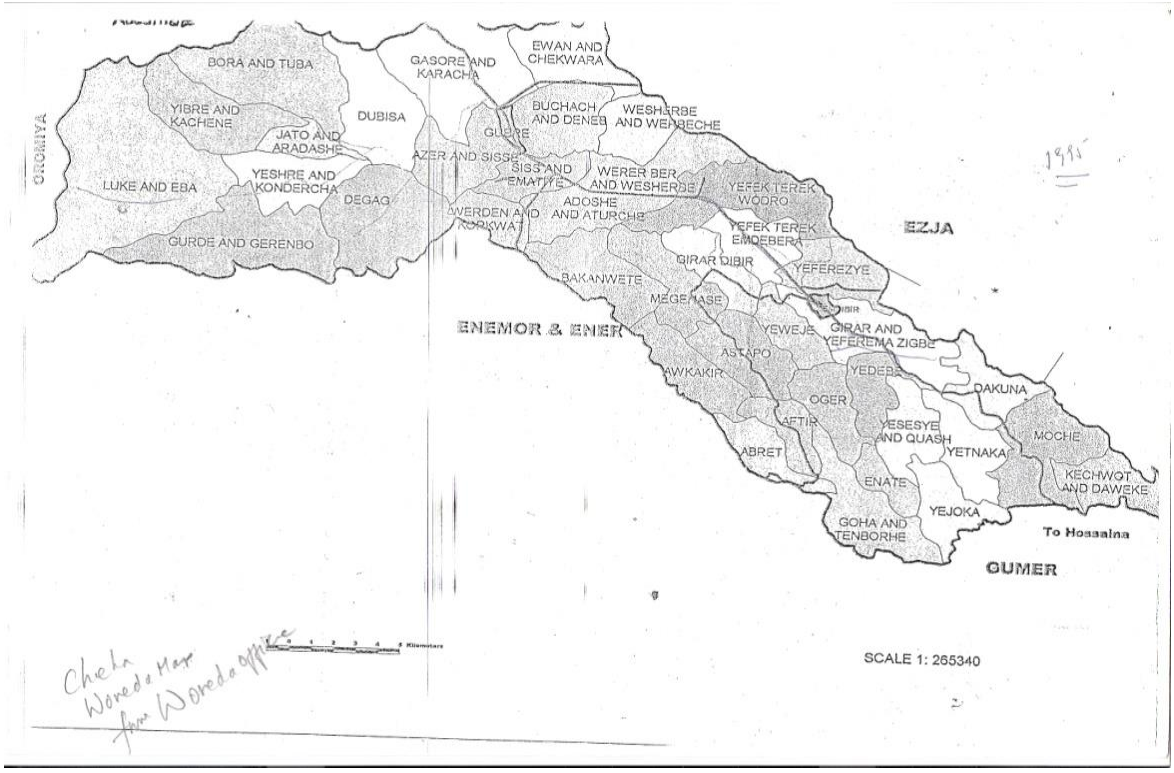

Figure 1 map of cheha woreda

Cheha is one of the 13 Woredas of Gurage Zone in South Ethiopia Nations, Nationalities and Peoples' Region. Cheha woreda is located 177 kms South West of Addis Ababa and 465 kms North West of the Region Capital Hawassa. The Woreda is bordered on the North and by Abeshge and Kebena Woredas, on the, West, & South West Oromiya Region and on the South by Geta & Gumer Woreda, on the east by Ezha Woreda. The total area of the Woreda is 574 sqkm. It has a total of 41 kebeles, of which 39 are rural and 2 are urban. Emdbir is the Woreda capital which is found on the main road from Wolkite to Hossana.The location map is given below. The total population of the Woreda was 126,973 of which 64,914 female and 62,059 male. T rural population was 113,781 (female 58,367 and male 55,414) the urban population 8,595 (female 4,210 and male 4,385), CSA (2007).

Gurage zone is located in the South western Ethiopia with an elevation of 500-2500 Mean above sea level. Which is far from 546Km from Addis Ababa in the south West direction Cheha woreda has mid altitude climate and an average annual maximum temperature of 28℃ and minimum temperature of 12 °c and mean annual rainfall of 1800-2000mm.The study area has on average altitude of 500-2500m above sea level. The farming system practiced in the area is mixed farming system, Cheha worea woreda (Woreda agricultural office, 2018).

The majorly economic activity of the area is mixed farming system mainly crop production and livestock raring. The most commonly cultivated annual cropping the area is Maize, Sorghum, and Tomato. Their annual crops are cultivated by subsistence farming in the study area. We selected the area because of its accessibility, access to information and proximity to the campus.

3.2. Sampling Technique and Sample Size

A combination of different sampling procedure was used to select the samples to successfully meet the objectives of the study. The sample was determined largely by the financial and time constraints. However, effort was made to improve the reliability of the samples by taking care at each level of data collection processes. The sample frame of the study was the list of households in the selected kebeles, which are found in the Cheha Woreda. From the total households 80 of them are selected as sample size. A two stage sampling procedure was employed to select potential maize producer households. First, select some potential maize producer kebeles from 39 kebeles would be selected through random sampling method. During the selection, the kebele's potential for maize production and the accessibility of the areas to travel would be taken into consideration. From 39 kebeles we were select 3 kebeles. In the second stage, using the population list of maize producer farmers from sample kebeles, the intended sample size was determined based on probability proportional to size from the respective kebeles the sample respondent would be selected by using random sampling method. It was an appropriate technique because it avoids bias of representative and all peoples in the population have an equal chance of being selected. We were select 3 kebeles, Gasore, Luke and Yeweje from those kebeles, 410 targets household were selected by using random sampling method, and 220 were male and 190 female. Therefore, a total sample size obtained 80 households.

From the total household of the kebeles N=410 farmers N1= 150 from Gasore, N2=100 from and Luke, N3 =160 from Yeweje was taken at target household. In order to take to take atotal sample sample size relevant to target study was apply yaman formula (1967) of $n=N/1+N\ (e)^2$. In addition to this, we are going to use proportionate sampling that was enabling us in taking samples from each sub starata which are to be selected from the target population

$N=N1+N2+N3$

$N=150+100+160$

$N=\underline{410}$

$N=N/1+N\ (e)^2$

$N= 410/1+410(0.1)$

$N= 80.392 \sim \underline{80}$

Where, N=target population, n= sample size, e=error at (90%) confidence interval.

We have to proportionate sampling to obtain how many respondents are selected from each stratum by using formulas; nh= nh (Nh)/N.

Where; nh= sample size for stratum, Nh is number of households for stratum h, Nis total sample size.

nh1=n (Nh1)/N	nh2= n (Nh2)/N	nh3= n (Nh3)/N
= 80(150)/410	= 80(100)/410	=80(160)/410
= 29.26~29	=19.51~20	= 31.21~ 31

So that, nh1= 29, nh2 =20 and nh3= 31, Gasore, Luke and Yeweje are the sample size of the strata of the three kebeles respectively.

3.2.1. Data Source and Collection

The sources of data were being both primary and secondary sources. The situations of the marketing system and the producing farmer were assessed thoroughly through rapid market appraisal and formal survey. Data was collected on production, buying and selling, pricing, market participation, problem and opportunities and characteristics of the market.

Primary and Secondary Data Collection Method: the primary data was collected from producer through interview schedule. In addition, secondary data was collected from supporting institutions such as, available reports from trade and industry office and records from the agriculture and rural development offices of the study area and published journals from websites and unpublished literatures from different sources.

3.3. Data Analysis

Data from the field would be edited, coded, and cleaned to ensure consistency, uniformity, and accuracy. Data would be entered into computer software for analysis STATA computer program was used to process the data. Two types of analysis, namely descriptive and econometric analyses were used for analyzing the collected data.

3.3.1. Analysis of descriptive Statistics

To describe the characteristics of the households by descriptive statistics like mean, percentage and frequency was employed.

3.3.2. Econometric Analysis

Econometric analysis was used to for processing the data obtained from the survey. The appropriate econometric models that can help to identify the factors affecting the amount of maize sold to the market and the market participation decision is Tobit model.

Tobit model was used because of the restrictions put on the values taken by the regression and, this model can be called limited dependent variable regression model. The data had a censored sample as dependent variable, that is household didn't supply maize even if they produce maize from the total samples, the data were censored, and Tobit estimation is relevant. If zero values of dependent variables were the result of rational choice of farmers, a Tobit model was more

appropriate (Abrar, 2004). Thus, maximum likelihood Tobit estimation (Tobin, 1958) was used in the analysis of factors affecting sales volume. One can concern with the model; recall that in a Tobit with left-censoring at zero.

$Y^*i = \beta 0 + \beta_i X_{i+} Ui$ ……. (1)

Where

Y^*i = market supply of maize (dependent variable)

$\beta 0$ = an intercept

βi = coefficients of i^{th} independent variable

Xi = independent variable, and 'i' is 1, 2, 3…., n

Ui = unobserved disturbance

i=1, 2 ..... n

Where: - $y=y^*$ if $y^*>0$,

$y=0$ if $y^* \leq 0$ and

$y=\max(y^*, 0)$

The parameter estimates of the above model may not be Best Linear Unbiased Estimator (BLUE) when some of the assumptions of the Classical Linear Regression (CLR) models are violated, thus, it is important to check the presence multi collinearity among the variables that affect supply of maize in the area. There are two measures that are often suggested to test the existence of multi collinearity. These are: Variance Inflation Factor (VIF) for association among the continuous explanatory variables and Contingency Coefficients (CC) for dummy variables. To detect multi collinearity problem for continuous variables, variance inflation factor (VIF) define.

Therefore, for this study, variance inflation factor (VIF) was used to detect multi co-linearity problem for continuous variables. On the other hand, contingency coefficient was used to check multi co-linearity of discrete (dummy) variables. It measures the relationship between the raw

and column variables of a cross tabulation. The formula for contingency coefficient is as follows

$$CC = \sqrt{\frac{\chi^2}{\chi^2 + N}}$$

Where, CC is contingency coefficient,

χ^2 is chi-square value and N is total sample size. The decision criterion with the contingency coefficient is that if the value of CC is greater than 0.75, the variables are said to be collinear (CC > 0.75).

3.4. Variables Definitions and Hypothesis for Market Supply of Maize

Dependent Variable

Quantity supplied to the market (QUASUP): it is a continuous variable which represents dependent variable the actual supply of maize by farm household to the market measured in quintals.

Independent variables

1 Quantity of maize produced (QMP): it is measured in quintals as a continuous variable. High maize production was hypothesized to have a positive effect on market participation and extent of participation as measured by the quantity of maize supplied in the market.

2. Farm allocated to maize (FARM): the total land used for maize production is measured in terms of number of hectares the household owns and it was expected to affect the household level of maize marketable supply positively because, a producer who owns a large area of land for maize production than a producer who own less area of land and under the same input utilization condition can produce more.

3. Current market price (CMP): current year price is expected to affect the market supply of maize positively because prices stimulate marketable supply. If the current market prices are low producers store the produce until the price rises after meeting their immediate needs. It is measured in birr per quintal.

4. Distance to market (MKT DIS): distance to the market is a continuous variable measured in kilometers from the household residence to the market centers. The closer the residence of the household to the rural market center, the more is the quantity of marketable supply. The assumption here is that the closer a household is to the market, the more the household is

motivated to produce maize and supply it to the market. Therefore, this variable is expected to have an inverse relationship with marketable supply.

5. Market information (MKT INFO): this variable is measured as a dummy variable taking a value of 1 if the farmer had access to market information and 0 otherwise. It has been hypothesized to affect marketable supply of maize positively. Producers that have access to market information are likely to supply more maize to the market than informed producers. The finding is consistent with the findings of Astewel (2010) access to market information positively and significantly affects market participation and quantity supply of rise to the market.

6. Education of household head (EDU HH): it is a dummy variable and refers to the formal schooling of a respondent during the survey period. Those household heads who had formal education determines the readiness to accept new ideas and innovations, and easy to get supply, demand and price information and this enhances farmers' willingness to produce more and increase volume of sales. Therefore, formal education was hypothesized to positively influence market participation and marketed surplus.

7. Family size (FAM SIZE): it is a continuous variable, measured in man equivalent i.e. the availability of active labor force in the household, which affects farmer's decisions to participate in market. Since production is the function of labor, availability of labor is assumed to have positive relation with volume of supply. However, family size is expected to have positive impact on market participation and volume of sales, but larger family size requires larger amounts for consumption, reducing marketable surplus.

8. Age (AGE): it is a continuous variable measured in years. A farmer with longer period of experience in production was assumed to have a better knowledge than who has a lower experience in agriculture because through time producers acquire skill about marketing and supply better than those who are less experienced. It is also assumed that as age increases the production capacity will decrease and amount produced and marketed supply decrease. Hence, both inverse and direct relation is assumed to the amount supplied Eleni.Z (2009).

9. Off-farming participation (OFFF PART): it is a dummy variable that show obtained from non-farming activities by the household head. This income may strength farming activity or reluctant to produce maize to generate money rather than getting income from non- farming activities. However, getting income from non- farming activity is assumed to have direct or inverse relation with market participation and marketable surplus Gebre-medhin B. (2012).

10. Tropical livestock unit (TLU): a continuous variable and measured by tropical livestock unit. It could be that ownership of livestock is negatively associated with crop output market participation by offering alternative cash income sources. According to Rehima (2006) this variable influenced the quantity of supply negatively. This is mainly due to the fact that farmers with more tropical livestock unit tend to specialize in livestock production.

11. Sex of household head (SEX): it is a dummy variable; both men and women participate in production of maize. Male households to have a better tendency than female household to enter into maize market and volume supply. Literature indicate that female-headed households have less access to improved technologies, land, and extension services as compared to male headed households Tufa *et al*., (2013). Male households would have been observed to have a better tendency than female household to participate in the market and volume of supply.

12. Extension Contact: This refers to the number of contacts with extension agents that the respondent made in the month. Farmers who have a frequent contact with extension agents are expected to have more information that influence farm household's supply for maize from the product sources. Therefore, it was hypothesized that this variable positively influences farmer's access to use formal credit.

13. Market participation decision (MKT PART): it is a dummy participation decision dependent variable that was regressed for the respondents who participate in maize market = 1, and = 0 for the respondents who did not participate in 2018/2019. In the study all producers do not participate in marketing maize since; it serves as consumption purpose.

Table 1 Expectation of the independent variables

Independent variables			
Variable name	Types of variable	Description	Hypothesized sign/ effect
QMP	Continuous	In number	+
FARM	Continuous	In number	+
CMP	Dummy	Bad=0, better=1	+
MKTDIS	Continuous	In kilometer	-
MKTINFO	Dummy	Yes =1, No=2	+
EDU	Continuous	In year	+
FAM SIZE	Continuous	In number	+/-
AGE	Continuous	In number	-/+
OFFFPART	Dummy	Yes =1, No =0	-/+
TLU	Continuous	In number	-
SEX	Dummy	Male=1female=2	-
EXTC	Continuous	In number per month	+
MKT PART	Dummy	Market particiant=1, nonmarket participant=0	+

4. RESULT AND DISCUSSION

This chapter presents descriptive results of socio-economic characteristics in relation to market participation and marketed surplus of small scale farmers. It also provides empirical results of the Tobit model with detail explanation of significant variables.

4.1. Descriptive Statistics

Table2. Percentage market position of sample household

market participation decision	Frequency	Percent
non market participant	45	56.25
market participant	35	43.75
Total	80	100.00

Source; Owen survey data 2019

The distribution of maize producer farm households on their position in maize market indicated that about 56.25% of the sample households were participant and the remaining 43.75% were non participant sample households.

4.1.1. Demographic characteristics in relation to maize market supply

Table3. Demographic and Socio-economic characteristics of sample respondents (continuous variables).

Variables	observation	Mean	Minimum	Maximum
Age	80	44.9625	23	70
Quantity maize produce	80	26.375	8	100
Farm	80	1.140625	0.25	5
Family size	80	6.1875	3	9
Tropical livestock unit	80	8.795134	4.5	14.8
Market distance	80	14.6375	4	25
Education	80	3.6125	0	12

The survey on the age of sample household, measured in years. The result in Table 2 showed that the youngest maize supply was 23 years old and the oldest was 70 years old. Average household heads age for market supply of maize was 44.9625 years In terms of family size, the minimum family size among maize supply was 3 members while the maximum were 9 members. The average family sizes were 6.1875.

In terms of livestock owned, the smallest livestock owned by farmers were 4.5 while the largest livestock owned were 14.8. In terms of quantity of maize produced, the smallest amount produced by the household on a yearly basis was 8 quintal while the highest amount was 100 quintals. Adequate size of landholding is a basic factor in the process of boosting productivity and production. In terms of land size, the smallest land size owned by farmers was 0.25 while the largest land sizes were 5 hectares. In terms of market distance, the smallest market distance for farmers was 4 while the largest market distances were 25km.

4.2. Econometrics Result

4.2.1. Factors Affecting Maize Market Supply

The hypothesized determinants of maize market participation and market supply are summarized in Table 3 where eight variables are continuous and the remaining five variables are dummy variables. Before running the Tobit models, the hypothesized explanatory variables were tested for the existence of multi collinearity problem that is the situations where the explanatory variables are highly inter correlated (Maddala, 1983). Variance Inflation Factor (VIF) was computed to check association between continuous and discrete variables. The VIF values shown in indicate that all the continuous explanatory variables have no serious multi collinearity problem as shown below.

$$CC = \sqrt{\frac{\chi^2}{\chi^2 + N}}$$

$$= \sqrt{\frac{5.68}{5.68+80}} = \underline{\mathbf{0.257}}$$

Table 4 Variance Inflation Factor (VIF) test

Variable	VIF	1/VIF / tolerance
eduyr	2.94	0.340411
qmp	2.93	0.341098
farm	1.66	0.602628
familysize	1.43	0.701018
age	1.28	0.780041
mktdis	1.22	0.818597
tlu	1.20	0.836608
offfpart	1.14	0.878818
Mean VIF	2.29	

Tobit model

Using the Tobit model was appropriate to identify the factors affecting the participation and the volume of supply of maize to the market. The Tobit model estimated results of the variables that are expected to determine quantity maize supply is presented in table. Out of 13 variables, 7 were found to be significantly influence the quantity of maize supplied to the market. Accordingly, quantity of maize produced, education, tropical livestock, extension contact, market information, distance to the market and current price significantly affected the quantity of maize supply to the market.

Table 5 Interpretation significant variables of Tobit regression result

variables	observation	Coefficient	P>t
Market participation	80	.5494462	0.868
Sex	80	-.5972371	0.761
Age	80	-.1072421	0.171
Quantity maize produced	80	.4595954	0.000
Market information	80	-8.671886	0.023
Farm size	80	1.062381	0.424
Family size	80	-.0855551	0.920
Tropical livestock unit	80	-1.008061	0.011
Off-farm participation	80	.6982779	0.717
Market distance	80	-.4529825	0.013
Extension contact	80	6.568965	0.000
Current market price	80	6.057185	0.013
Education year	80	.671552	0.055
constant	80	16.185	0.165

Number of observation	Prob > chi2	LR chi2	Log likelihood	Pseudo R2
80	0.0000	161.4	-126.36389	0.3898

Source: model output, 2019

Quantity of maize Produced of (Qmp): Quantity of maize produced was positively and significantly related with the probability of participating and quantity supplied to the market at 1% significance level. If the quantity maize produced increases by one unit the supply of maize to the market also increases by the same unit. This implication is that maize is the major cash crop for the farmers and markets seemed the most important factor motivating farmers to

Access to market information (mkt info): Information access is also another factor, which positively and significantly affected quantity supply. Access of market information increased the probability of producers' market participation and farmers enhance to supply maize to the market. The implication is that obtaining and verifying information helps to supply more. This is in line with the findings of Astewel (2010) access to market information positively and significantly affects market participation and quantity supply of rice to the market. However, according to our study unexpected this variable was found to have a negative and significantly affected maize quantity supply of the households at 5% significance level. This happen because of information gaps between supplier and demander. This indicates that the market information there was existing but not symmetric at right way and right time.

Distance to market (Mkt dist): Distance was one of the explanatory variables, which had negative relationship with the probability of market participation and extent of participation to the market. It was significantly and negatively affected the market supply at 5% significance level. If the distance of the market increases by one kilometer the maize producer supply participate to the market decreased by 0.4529 units. The closer the residence of the household to the market center, the more is the probability of participation and quantity of market supply of maize. This finding is in line with Geoffrey (2014) who found that a greatest distance to the market increases transaction costs and marketing costs and this hampers the extent of market participation.

Current market price: Price was one of the explanatory variables which had significantly and positively affected market supply at 5% significance level. The implication is that if the price of maize is increased by one unit, the extent of market supply of maize increased by 6.057 units of quintal. Current market price plays a vital role in market participation. This implies that the value of market price of maze is high; farmers are more likely to participate in maize marketing.

Extension Contact: extension was one of the explanatory variable which had significantly and positively affected market supply at 1% significance level. If the number of contacts with extension agents that the respondent made increases the maize producers also increase the supply? of maize into the market by 6.568 unit. Farmers who have a frequent contact with extension agents are expected to have more information that influence farm household's supply

for maize from the product sources. Therefore, it was hypothesized that this variable positively influences farmer.

Number of Livestock: a continuous variable and measured by tropical livestock unit. It could be that ownership of livestock is negatively associated with crop output market participation by offering alternative cash income sources. If the tropical livestock unit of the household increased by one unit the quantity of maize produced decreased by 1.008 units and the supplied also decreased by the same unit. This is mainly due to the fact that farmers with more tropical livestock unit tend to specialize in livestock production.

Education: If the education of the household increase by one year the quantity supplied to the market increased by 0.671 units. continuous variable household heads who had formal education determines the readiness to accept new ideas and innovations, and easy to get supply, demand and price information and this enhances farmers' willingness to produce more and increase volume of sales. Therefore, formal education was hypothesized to positively influence significant the market supply at 10%.

5. CONCLUSION AND RECOMMENDATION

5.1. Conclusion

Maize arrived in Ethiopia slightly later, around the late 17th century (Huffnagel 1961), and was mainly grown as a subsistence crop in the mid-altitudes (1500–2000 m above sea level) in southern, south-central, and south-western parts of the country. The popularity of maize in Ethiopia is partly because of its high value as a food crop as well as the growing demand for the stover as animal fodder and source of fuel for rural families. Approximately 88 % of maize produced in Ethiopia is consumed as food, both as green and dry grain. Maize for industrial use has also supported growing demand. Very little maize is currently used as feed but this too is changing in order to support a rapidly growing urbanization and poultry industry.

The study was conducted in cheha wereda. The main purpose of this study was to examine the factors determining the market supply and market participation of maize producers.

The data were generated by using pre-tested structured questionnaires. Data were obtained both from primary and secondary sources. The primary information was collected by interview schedule from 80 random selected sample households who produced maize in the year 2018/2019 through formal sample survey. Moreover, secondary data were extracted from relevant sources to supplement the primary data.

The descriptive statistics revealed that about 35 or 43.75% were market participant and the rest 45 or 56.25% of the sample households were non-market participant in maize market. Significant differences were recorded among maize market participants and non-participants in terms of quantity of maize produced, market information, off farm, market distance and price allocated to maize and quantity of maize produced.

The determinant of maize market participation and volume of supply was estimated using Tobit model. The Tobit model result reveals out of thirteen explanatory variables which were hypothesized to explain households market supply of maize, seven of them significantly affected the quantity supplied to the market. As a result, quantity of maize produced, education, extension contact, and current price had a significant and positive influence on quantity maize supplied to

the market. Whereas, distance to market, market information, tropical livestock had a negative and significant effect on quantity maize supplied to the market.

5.2. Recommendation

The amount of maize produced positively influenced market supply. Hence, policies that would improve farmers maize production capacity through provision of improved seeds and fertilizer at the right time, price and place, expand access to credit, adopt new technology introducing contact farming to farmers. Hence, increasing production and productivity of maize is better alternative to increase market supply of maize.

Market information had negative relation on market supply of maize. To reduce the information gap between supplier and demander the government should be creating good market networks and linking farmers to reliable markets information is relevant to increase market supply. In addition to this, both government and non-government actors give emphasis on linking farmers to different information sources to enhance farmers' access to information on price, good husbandry practices, quality standards, and market demand. Because maize is among the commodities with an increasing average in the study area, links would be created between producers and market information channels.

Distance to the market had a negative effect on market supply of maize. Thus the concerning body would try to construct market near to their village like cooperative and gather maize from farm gate by giving adequate market information about maize. In addition, improving rural infrastructure in the form of establishing roads and strengthening the already started construction of roads would assist non participant farmers to participate in the market and as a result market supply of maize will be enhanced through low cost of transportation.

Current market price plays a vital role in market participation. This implies that the value of market price of maze is high; farmers are more likely to participate in maize marketing. Therefore, the finding of this work suggested that government and farmers shall play a vital role in addressing the problem of price variation.

6. REFERENCES

Abraham T. (2013). Value Chain Analysis of Vegetables: The Case of Habro and Kombolcha Woredas in Oromia Region, Ethiopia MSc. Thesis Haramaya University.

Adugna G. (2009). Analysis of Fruit and Vegetable Market Chains in Alamata, Southern Zone of Tigray: The Case of Onion, Tomato and Papaya. MSc. Thesis Haramaya University

Anderson, S. & Baland, J. (2002). "The economics of ROSCAs and intra household resource allocation. 117(3) 963-995. Oxford University Press.

Astewel T. (2010). Analysis of Rice Profitability and Marketing Chain: The Case of Fogera Woreda, South Gondar Zone, Amhara National Regional State, Ethiopia. MSc. Thesis Haramaya University

Bosena Tegegne (2008). Analysis of Cotton Marketing Chains: The Case of Metema Woreda, North Gondar Zone, Amhara National Regional State. MSc thesis Haramaya University.

Branson, R. E. and Norvell, N. 1983. Introduction of Agricultural Marketing, McGraw Hill Book Company, New York. 365p.

Berhane Lake, Hailu Gebre &Fekadu Alemayehu. 1996. Barley production and research. pp 1–8, in: Hilu Gebre and J. Van Leur (eds.). Barley Research in Ethiopia: Past Work and Future Prospects. Proceedings of the first Barley Research Review Workshop, 16–19 October 1993. IAR/ICARDA, Addis Ababa, Ethiopia

CSA. 2013. Agricultural Sample Survey 2012-2013. Volume I, Area and Production of Crops, Central Statistical Agency, Ethiopia.

Demeke M., Di Marcantonio F., 2012. Analysis of incentives and disincentives for teff in Ethiopia. Technical notes series, MAFAP, FAO, Rome.

Diao X., 2007. Demand constraints on agricultural growth in east and southern Africa: A general equilibrium analysis. Development Policy Review, 25(3): 275-292.

Ebrahim Esa (2013). Land Suitability Assessment for Sorghum and Maize Crops Using a SLA and GIS Approach in Dera Wereda, ANRS, Ethiopia.

Eleni Z. (2009). A Market for all Farmers: Market Institutions and Smallholder Participation.

CEGA Working Paper Series No. AfD-0903. Center of Evaluation for GlobalAction. University of California, Berkeley.

FAO (food and agriculture organization). 2014. Food balance sheets; Faostat.Rome.

Gebre-medhin B. (2012). Market orientation and market participation of smallholders in Ethiopia: Implications for commercial transformation.Proceeding of International Association of Agricultural Economists (IAAE) Triennial Conference. Foz do lguacu,Brazil.

Geoffrey Sigei and Hillary Bett and Lawrence Kibet (2014). Determinants of Market Participation among Small-scale Pineapple Farmers in Kericho County, Kenya Egerton University

Haile A. (2009). Analysis of sesame production, supply, demand and marketing issues in Ethiopia

Holloway G. and Ehui S. (2002). Expanding Market Participation among Smallholder Livestock:

A Collection of Studies Employing Gibbs Sampling and Data from the Ethiopia

Jema Haji. (2008). Economic Efficiency and Marketing Performance of Vegetable Production in the Eastern and Central Parts of Ethiopia. Ph.D Thesis. Swedish University of Agricultural Sciences, Uppsala, Sweden. 64P.

Jayne T.S., Mather, D. and Mghenyi, E. (2006). Smallholder Farming Under Increasingly Difficult Circumstances: Policy and Public Investment Priorities for Africa, Department of Agricultural Economics, Michigan State University International Development Working Papers 86.

Jubilee S. (2014). Determinants of Smallholder Farmer Market Participation in the Broiler Industry Gauteng Province in South Africa. University of Pretoria South Africa.

Kaplinsky, R. and M. Morris. (2010). A Handbook for Value Chain Research. Paper for IDRC. Brighthton: Institute of Development Studies (IDS)

Key N., Sadoulet E. and DeJanvry A. (2000). Transactions Costs and Agricultural Household Supply Response. American Journal of Agricultural Economics.

Kotler, P. And G. Armstrong, 2004. Principle of marketing, 10th edition. Hall of indiapvt.Ltd. New Delhi. Pp 5-12.

Lapar ML, Holloway G, Ehui S (2004). Policy options promoting market participation among smallholder livestock producers: A case study from Philippines. Food Pol. 28(2003):187-211

Makhura M., Kirsten J. and Delgado C. (2001). Transaction Costs and Smallholder Participation in the Maize Market in the Northern Province of South Africa. Seventh Eastern and Southern Africa Regional Maize Conference, 11-15 February, Pretoria, South Africa. McGraw Hill Book Company, USA.

Minot, N. and Hill, R.V. (2007). Developing and Connecting Markets for Poor Farmers. 2020

Focus Brief on the World's Poor and Hungry People. Washington, DC.

Muhammed U. (2011). Market Chain Analysis Of Teff And Wheat Production In halaba Special Woreda, Southern Ethiopia; MSc thesis Haramaya University.

Muhammed Urgessa, 2011. Market chain analysis of teff and wheat production in Halaba special woreda, southern Ethiopia. Msc thesis submitted to the School of Graduate Studies, Haramaya University, Ethiopia.

Musah A.B., O.A., Yaw Bonsu and WSeini, 2014. Market participation of smallholder maize farmers in the upper west region of Ghana. African journal of Agricultural Research

Obi, A., Herman, D. van Schalkwyk and van Tilburg, A. (2011).Market access, poverty alleviation and socio-economic sustainability in South Africa. Unlocking markets to

smallholders. Lessons from South Africa. Mansholt publication series -Volume 10

RehimaMussema, 2007. Analysis of Red Pepper Marketing: the case of Alaba and Silitie in SNNPRS, Ethiopia. An MSc. Thesis Presented to School of Graduate Studies of Haramaya University, Ethiopia.

Seneshaw Tamiru, Bart Minten, Ermias Engeda and Tadesse Kuma (2013). Using evidence in unraveling food supply chains in Ethiopia: The case of teff from major production areas to Addis Ababa IFPRI ESSP-II EDRI; Ethiopian Economic Association Conference: Addis Ababa

Shahidur Rashid, GashawAbate, Solomon lemma, JamesWarner, Leulsegged kasa and Nicholas Minot, 2015: barleyvalue chain in Ethiopia: research for Ethiopia's agriculture policy (reap): analytical support for the Agricultural Transformation agency (ATA).

Siziba S., K. Nyikahadzoi, A. Diagne, A.O. Fatunbi and A.A. Adekunle. 2011. Determinants of cereal market participation by sub Saharan Africa smallholder farmer. Learning public journal of agriculture and Environmental studies

USAID (United States Agency for International Development), 2012. Value chain analysis of off-season vegetables sub-sector in Nepal. Nepal Economic Agriculture, and Trade Activity. USAID general development office. Kathmandu, Nepal.

Usha T. (2013). Assessment of Marketable and Marketed Surplus of Major Food-grains in Haryana. Agricultural Economics Research Centre, University of Delhi. Wing Tai Cheung Printing Co. Ltd, Rome. 58p.

Yamane T., 1967. Statistics: An Introductory Analysis. 2nd Ed., New York: Harper and Row.

7. APPENDIX

Appendix A: the Tobit regression result

quasup	Coef.	Std. Err.	t	P>t	[90% Conf.	Interval]
sex	-.488966	1.936141	-0.25	0.801	-3.717622	2.73969
age	-.1066484	.0776412	-1.37	0.174	-.2361207	.0228238
qmp	.4524573	.0739566	6.12	0.000	.3291294	.5757853
mktinfo	-8.803996	3.731038	-2.36	0.021	-15.02577	-2.582221
farm	1.219427	1.252635	0.97	0.334	-.8694325	3.308286
familysize	-.1622857	.8189107	-0.20	0.844	-1.527878	1.203307
tlu	-.9942394	.3851973	-2.58	0.012	-1.636584	-.3518952
mktdis	-.4402241	.175313	-2.51	0.014	-.7325711	-.147877
extspw	6.578382	1.401404	4.69	0.000	4.24144	8.915325
cmktp	5.946909	2.349327	2.53	0.014	2.029237	9.864581
eduyr	.675161	.3444521	1.96	0.054	.1007622	1.24956
mktpartdc	.5543483	3.313771	0.17	0.868	-4.971605	6.080301
_cons	16.81793	11.44812	1.47	0.146	-2.272633	35.9085

APPENDIX B: Conversion factor for Tropical Livestock Unit (TLU)

Animal category	Livestock Unit (LU)
Calf	0.25
Weaned calf	0.34
Heifer	0.75
Cow and ox	1.00
Horse	1.10
Donkey (adult)	0.70
Donkey (young)	0.35
Sheep and goat (adult)	0.13
Sheep and goat (young)	0.06

Appendix C: Survey Questionnaire

1. Sex of household head 1. Male 2. Female

2. Age of house hold head _____ year

3. Education level household head

1. Illiterate 2. Read and write 3. Years of formal education _____ 4. Other

4. Age and sex of family member

Age of household category	No female	No male
<10		
10-13		
14-16		
17-60		
>60		

5. Quantity of maize produced in 2009 E.C _____ (in quintal)

6. Have you ever participated in maize marketing? 1. Yes 2. No

7. If your answer for question #2 is yes, Quantity of maize marketed _____ (in quintal)

Quantity of maize consumed _____ Quantity of maize saved for seed _____

8. What was your input for maize production and in 2008/09?

Type		Amount	Value in birr	Cash =1, Credit=2
Fertilizer	DAP			
	UREA			
	Organic			
Insecticide				
Herbicide				
Seed				
Other				

9. From where did you get those inputs?

a) Cooperative b) market c) agricultural office d) own production
e) if other specify

10. What type of maize variety are you using?

a) Improved seed b) local c) both

11. Did you store maize in 2009/10? 1. Yes 2. No

12. If yes for question no 8 for what purpose?

a) Expecting high price b) lack of market demand

c) Consumption purpose d) if other specify

13. Did you participate off-farm activity? 1 yes 2 no

14. If yes what type of activity?

a) Paid daily labor b) petty trade c) handicraft d) other

15. Did you get market information for maize?

1. Yes 2 No

16. If yes how did you get information on supply, demand & price of maize in the markets?

	Use coded	Source of information
Supply		1. Cooperative 4. extension agent 2. Telephone 5. Others 3. Radio
Demand		
Price		

17. Who decided on your selling price 2009/10? _

a) Myself c) negotiation

b) By the market d) cooperative e) other (specify

18. Total land holding size (in hectare or in timad)……

19. Land size under maize production ……. (In hectare or in timad)

20 Extension contact ……..

21. Market Distance…….

22. Tropical Livestock Unit …….

23. CURRENT Market Price……