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FACTORS AFFECTING MAIZE PRODUCTION AND MARKETING; THE CASE OF ABESHEGE WOREDA, GURAGE ZONE, SNNPR OF ETHIOPIA

A SENIOR RESEARCH

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June, 2019

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WOLKITE, ETHIOPIA

APPROVAL SHEET

WOLKITE UNIVERSITY

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First of all we would like to thanks the God for giving us spiritual support. In this world life is like a ladder once come up the other comes down. We have challenged strong resistance when we prepare this proposal essay major of time when we meet a difficult, but we again thank God. Second we would like to acknowledge for wolkite university college of agriculture and natural resource especially department of agribusiness and value chain management which facilitate the course of research method and helps to have good knowledge to do this study. Third our deepest appreciate goes to our advisor Lalisa (MSc) for his valuable comment and suggestion on the paper and encouraged to us work in a better way. Fourthly, we extremely grate full to our families, who give in encouragement and held us financially.

ABRIVATION AND ACRONYMYS

ANOVA	Analysis of Variance
FAO	Food Aid Agricultural Organization
FAOSTAT	Food and Agriculture Organization Statistics Database
GDP	Gross Domestic Product
IFPRI	International Food Policy Research Institute
IPCC	Intergovernmental Panel on Climate Change
NALEP	National Agriculture and Livestock Extension Program
OLS	Ordinary least square
USDA	United States Department of Agriculture
WFP	World Food Program
WMO	World Meteorological Organization

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ABSTRACT

The research was conducted to analysis the factors that affect maize production and marketing in Abeshege district with specific objectives identifying factors affecting the quantity of maize production ,analyze the market channel choices by maize producers and to identify the main challenges and opportunities of maize production and marketing in the study area. From 26 maize producer's kebeles, 3 kebeles were purposively selected based on their production potentials. Sample respondents were selected based on systematic random sampling technique due to the homogeneous population in their production. Descriptive analyses (mean, frequency, standard Error, and percentages) and econometrics model (OLS) were used to analyze data. The ordinary least square regressions (OLS) model result shows that the quantity of maize produced were significantly andpositively affected byfamily size, income, livestock, and improved seed, while age of household is affected significantly and negatively. The choices of the market channel to sale their product depends on the distance between farmers and consumers, price preference, availability and accessibility of marketing facilities. The majority of farmers indicated that drought, pest's diseases, and poor transportation, and lack of market service as the major challenges in the productionand marketing of maize and the opportunity for the production andmarket of maize arecreate job opportunity for the community, decrease the level of poverty,create market access, increase the consumption of maize in the district, on the basis of the results of this study, the following recommendations are drawn. Farmers sell their products based on market situation in order to minimize and alleviate the existed problems.Ordinary least squares (OLS) model results indicated that output level is determined by the availability of input level. So, to increase the output level, improving input distribution system is crucial.Then we recommended the producers should use the improved breeds rather than local breed and fertilizer in order to increase productivity.In addition, recommended that extension workers should pay more attention more advising on market oriented commodities.

Key Words: Maize,Constraints,Factors Affecting, Market channels, Opportunities

1. INTRODUCTION

1.1. Background of the Study

Maize was domesticated in Central America some 6,000 to 10,000 years ago. It spread to the rest of the world in the 16th through18th centuries. World-wide more than 400 million people, primarily in sub-Saharan Africa and Central America, white maize plays a major role in the diet (Morris, 2004). Development of technology, including hybrid technology; increased water availability through government-funded infrastructural projects; and the supply and use of inorganic fertilizer and other farm chemicals are important factors contributing to maize production growth.

Maize is by far the most important cereal crop in the four largest countries of eastern Africa. Combined production of 17.2 million tons in 2016, despite ongoing drought, is nearly 50% more than a decade ago. Remove middle-income Kenya, which had a 14% decline, and the increase for Ethiopia, Tanzania and Uganda was nearly 70% versus population growth since 2006 of 27%. Having increased output, one of the next major challenges is to reduce the high levels of cancer-causing aflatoxins in the region's maize. Food safety, the dominance of smallholder farmers, government market intervention, regional trade and food security are all key aspects of the maize economy in eastern Africa as examined country by country in the survey that follows (David, 2016).

In Africa perspective Maize cultivation in Nigeria had suffered various problems, rural-urban migration, low yield, pest and diseases, climate change, poor shortage facilities, shortage of key inputs and shortage of irrigation water. Nigeria has experience shortages in maize production in the past. Prices of maize and other product derived from maize boosts up during low production seasons and falls drastically when there is a surplus production, however, due to inadequate marketing facilities in the control, farmers loses some of the product. Since farmers do not know future of maize production and prices while deciding to cultivate this and other crops. There is need to forecast cultivation area, yield and production of maize in Nigeria. (Akande, 2007)

Maize is staple cereal crop with the highest current and potential yield from available inputs. According to farm field yield trials, when cultivated with fertilizer, hybrid seed, and farm management practices. If yield potential is realized, maize can also contribute towards improving food security and reducing land degradation and increasing the aggregate revenue generated from maize. Maize is among the key commodities for food security in West and Central Africa(Kaminski and Zoma, 2013).

Agriculture in Ethiopia is the foundation the country's economy, accounting for half of Gross Domestic Product (GDP) 83.9% of exports, and 80% of total employment. Agriculture accounts for 46.3% of the national GDP, 83.9% of exports and 80% of the labor force. Agriculture continues to be the dominant sector in Ethiopia's economy, with cereals playing a central role. Ethiopian agriculture is predominantly rain fed subsistence agriculture; troubled by recurrent droughts. Agriculture plays a significant and decisive role in the social and economic development of the country. However, owing to natural and manmade causes the country has not properly benefited from its abundant natural resource conducive to agricultural development, and consequently failed to register the desired economic development that would enable its people pull out of the quagmires of poverty (IFRI, 2010).

In a study conducted in Ethiopia on Enhancing the Contribution of Maize to Food Security in Ethiopia, the increment of production in the 1990s indicates a green revolution for food self-sufficiency in Ethiopia. However, the availability of quality seed with necessary inputs at the right time and place with a reasonable price is crucial. Unavailability of improved infrastructure and maize grain marketing represents major limiting factors for maize production. Wise utilization and conservation of natural resources was also have a significant impact on maize grain production. (Nigussie, 2006)

1.2 Statement of the Problem

Agriculture is a backbone for developing world both in household consumption and to increase the national GDP. Maize is one of the important crops to cover this aspect. But the declining trends on quantities of maize produced has been evident at the global and regional level with a majority of the world producers of maize recording significant declines in the quantities of maize exported (Pingali, 2001). Farmers have not adopted the use of the modern technologies through government agencies and have not received some training on maize production through programs such as the NALEP program. So, declines in maize production have persisted. In the study area there are a number of factors that affect and not alleviated the production potential of producers. The majority of farmers indicated that drought, pests diseases, and fertilizer shortageas the major challenges in the production of maize. Marketing challenges related low price of product, lack of market information, poor transport, and lack of storage. Therefore, the current finding is emphasing and trying to answer for the problems related to factors affecting quantity maize production, marketing channels choices by the producer and the opportunities and challenges that may face to farmers in maize production and marketing in the study area.

1.3 Objective of the Study

- The general objective of the study is analyzing factors that affect maize production and marketing in Abeshege district.

1.3.1 Specific Objectives

- To identify factors that affect quantity of maize production in the study area.
- To analyze the market channel choice by maize producers in the study area.
- To identify main challenges and opportunities of maize production and marketing in the study area.

1.4 Research Questions

- What are the probable factors affecting quantity maize production in the study area?
- What are the marketing channels choices by the producer in the study area?
- What are the opportunities and challenges in maize production and marketing in the study area?

1.5 Significance of the Study

The study is important to a number of stakeholders which include: farmers, researchers, extension agent, policy makers etc. Farmers know reasons why they are not able to maximize maize production; they were in a position to know the causes and determining that affect maize production; they were learn best farming practices to enhance sufficient collection of maize quantities. Maize collection and manufacturing plants had insights on determining factors that affect maize production, they advised on ways to maximize quantities of maize quantities and this result to higher production in their region of operation. Donor communities were educate to enlighten on the challenges, provide monetary support, and collaborate with farmers on solutions to maize producing farmers on the existing problems. Researchers were adding exiting pool of knowledge on the concept of maize, document information on effective ways on maximizing productivity.

1.6 Scope and Limitations of the Study

The scope of the study was establishing the factors that influence maize production on Abeshege District. This Woreda is found in Gurage zone known for medium scale production of maize. Objectives were formulated to capture the essence of maize production from the farmers on Woreda. The study was limit to only the factors that influence maize production the crops available. The basic factors that determine/limit the scope of any research are time and finance, due to this the study covers only three selected Kebele in Abeshge district based on their production potential. The study was limited in terms of the willingness of the respondents to participate in the study. The researcher therefore aimed to assure the respondents that the data being collected is for confidential and academic purposes only.

2. LITERATURE REVIEW

2.1 Theoretical Literature Review

2.1.1 Definition and concept of maize

Maize (*Zea mays* L.) is an exhaustive cereal crop. It is a multipurpose crop that provides food for human, feed for animals especially poultry and livestock and raw material for the industries (Khaliq*et al*., 2004). It is the third most important cereal crop after wheat and rice.

Maize is staple cereal crop with the highest current and potential yield from available inputs. According to farm field yield trials, when cultivated with fertilizer, hybrid seed, and farm management practices. If yield potential is realized, maize can also contribute towards improving food security and reducing land degradation and increasing the aggregate revenue generated from maize. Maize is among the key commodities for food security in West and Central Africa (Kaminski and Zoma, 2013).

2.1.2Operational definition of terms

Income: A factor of production that is not wanted for itself but for its ability to help in producing other goods (Martinez, 2000). In this study the term income was used to refer to the monetary requirement in the maize production process.

Production: it is the quantity (value) of agricultural output per unit quantity (value) of input(s) used in production (OECD, 2001).

Input: Insertion of all the necessities production cycle to bring forth agricultural output in terms of seeds, fertilizers, pesticides, implements, capital, human labor, weeding, harvesting, threshing, all management operations and method of cultivation.

Market: this are the targeted group of buyers that are ready and willing to buy the farmers produce at an agreed price determined the buyer and the seller.

Marketing channel: It is a business structure of interdependent organizations that reach from the point of product origin to the consumer with the purpose of moving products to their final consumption destination (Koler and Armstrong, 2003)

Linear regression: is a method of estimating or predicting a value on some dependent variable given the values of one or more independent variables

2.2 Empirical literature review

2.2.1 Factors of maize production

Factors that influence productivity of a particular producer may be classified into three. These are:-

A. The quantity and quality of inputs used including land, labor and capital, fertilizer, seeds farm and farmer characteristics and external factors such as government policy (Wiebe, 2006).

B. Capital inputs among others include seed, fertilizer, and farm equipment (Abay, 2007).

C. Farm and farmer characteristics on the other hand include factors such as size and topography of area cultivated, location of the farm with respect to input and output markets, age, gender, education level, household size, access to extension services, and access credit (Michele, 2007).

The amount of land that can be sown and harvested is, clearly, tied to available and affordable labor supply. Planting and harvesting are both activities that require far more labor than the rest of the agricultural cycle. In communities where these activities are shared, productivity on individual plots may be greater than if families had to provide all the labor that they could not afford to hire. Communal farming, although no longer common, provides some of the same advantages (Morris, 2004). High labor costs may discourage extra hand cultivation and marginally lower outputs. But low agricultural wages discourage participation in the agricultural economy, where industrial or other opportunities exist Scarcity of labor more than land is also a major constraint on production in much of Africa, where larger land areas since colonial times have experienced labor bottle necks, as men were drawn off to work in the mines or to do other waged work and left women to clear, plant, and weed, with peak agricultural labor demands during the hungry season (Richards 2009). In such contexts, the problem of hunger is linked to underproduction in a vicious cycle.

2.2.2 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. Rural livelihoods in many areas depend on the viability of maize production as a commercial crop. On the other hand, the food security of the growing urban population and many rural households who are buyers of maize depends on keeping maize prices at tolerable levels. For many years, policy makers have attempted to strike a balance between these two competing objectives how to ensure adequate returns for domestic maize production while keeping costs as low as possible for consumers. Maize marketing and trade policy has been at the center stage of debates over this food price dilemma, including discussions over the appropriateness of trade barriers and the role of

government in ensuring adequate returns to maize production, (Ministry of Trade and Industry, 2010).

2.2.3. Quantity of maize produced on Abeshege district

Maize production in Abeshege district has been a source of nutrition to many households providing carbohydrates which is a vital ingredient to human health Food in primary schools for lunch so that student can actually save on time wasting and concentrate on their studies. Another very important aspect with effect of maize production is it supports efforts of the government to make food secure country and alleviate hunger to its citizens.

Improving the productivity of maize-based farming could significantly reduce hunger, enhance food security and alleviate poverty through increasing the purchasing power of the farmers. Increases in agricultural productivity lead also to agricultural growth and can help to alleviate poverty in poor and developing countries, where agriculture often employs the greatest portion of the population. As farms become more productive, the wages earned by those who work in agriculture increases. At the same time, food prices decrease and food supplies become more stable. Laborers therefore have more money to spend on food as well as other products.

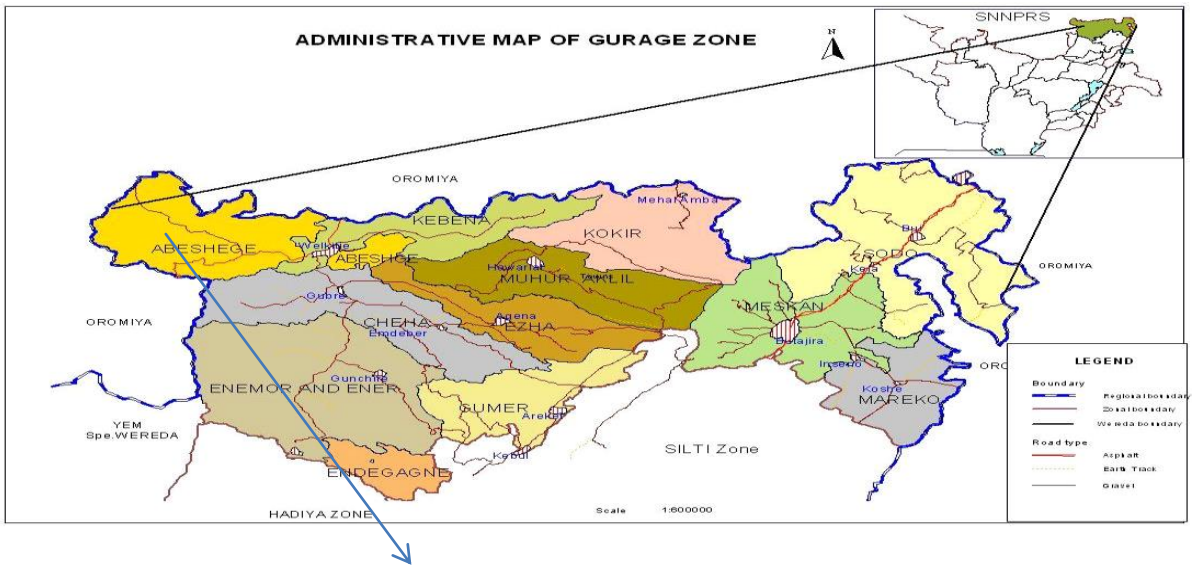
However, it is not only the people employed in agriculture who benefit from increases in agricultural productivity. Those employed in other sectors also enjoy lower food prices and a more stable food supply. Their wages may also increase. Agricultural productivity is becoming increasingly important as the world population continues to grow a productive farm is one that provides most of the resources necessary for the farmer's family to live, such as food, etc. It is a farm which ensures food security as well as a way to sustain the well-being of a community.

3. RESEARCH METHODOLOGIES

3.1 Description of the Study Area

Abeshege is one of the 13 Districts of Gurage Zone of SNNPRS, Ethiopia. It is located about 158 km southwest of Addis Ababa and 258.5 km northeast of Hawassa town, the capital of SNNPRS. Wolktie town is the administrative set of the District. The district is bordered on the south by the River which separates it from Cheha District, on the west and north by the Region and on the east by Kebena District. The District is composed of 26 rural kebeles and 3 urban kebeles. The District had total population about 61,424, of which 32,450(52.8%) are men and 28,974(47.2%) women (CSA, 2007).

The District has two Agro ecologies which are Woina-dega (10%) and kola (90%) agro climatic zones. It receives annual rainfall of 801-1400 mm, which is bimodal and erratic in distribution. The economy of the District is dominated by crop farming mixed with livestock husbandry. The major crops produced in the District include maize, Teff, sorghum, common beanAgriculture and Rural Development Office (ARDO) (CWARDO, 2008).



Study district

Figure 1map of study area

3.2. Type and source of data

In the study both qualitative and quantitative data was used. Qualitative data are expressed in the form of verbal descriptions rather than numbers such as the constraint and opportunity of maize production and marketing, and quantitative data are those data that could be expressed in numerical form include family size, education level, income, land size, livestock, and distance to the market . In order to collect reliable data, both primary and secondary sources of data would be used. To achieve the purpose of this study, the primary data would be collected through questionnaire; interviewing farmers to generate primary data such as what factor maize production in the selected Keble's. Secondary sources of data was gathered from different published and unpublished documents, electronic sources, written documents & reports of agricultural offices about the maize production.

3.3. Sampling Size and Sampling technique

In this study we select three kebeles out of 26 rural kebeles purposively by their production potential. The required sample respondents was selected randomly from the selected kebeles in the given study area due to the homogeneous population in their production. The sample size of the study was determined by using (Yemane, 1967) formula. Accordingly, the formula to calculate sample size stated as follows:

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

Where, n= the sample size of the study

N= total house hold in production in the sample district (748)

e= designated error 10 %(0.1)

n= $\frac{758}{1+758(0.1)2}$ = 88

n = 88, but due to several constrains that is; by time, lack of capacity, far of distance, finance and such reasons the study does not covered all respondents. Out of 758 maize producing household sampled 75 maize producer were randomly selected from Walga 38(50%),Jejebagosorie 20(27.5%) and T\Geraba 17(22.5%).

3.4 Data Analysis

A descriptive statistical analysis and econometrics model of analysis was used to analyze the data.

3.4.1. Analysis of descriptive statistics

Descriptive statistics was used to describe the demographic characteristics in a quantitative form. It aims to summarize a data set quantitatively. Descriptive statistical would be used to describe coefficient of variation, variance, standard deviation, standard error etc. So we used the descriptive statistics to describe how much a variation occurs within the data collected related to maize production.

3.4.2. Econometric Analysis

To analyze the determining factor affecting maize production the study was used multiple linear regression model of OLS (ordinary least square) estimation. It could be an essential method of econometric analysis to recognize and realize patterns of the influencing factors.

Regress Performance on Selected Variables

The equation of regressions on this study is generally built around two sets of variables, namely dependent variable (quantity of maize) and independent variables (The basic objective of using regression equation on this study is to make the study more effective at describing, understanding and predicting the stated variables.

$$Yi = \beta0 + \beta1X1 + \beta2X2 + \beta3\ X3 + \beta4X4 + \beta5X5 + \beta6X6 + \beta7X7 + \beta8 + \ldots. + \beta\ 11x11 + \mu i$$

Where: Y is the response or dependent variable-β0, is the intercept term- constant which would be equal to the mean if all slope coefficients are 0.

β1, β2, β3, β4, β5, β6, β7, up to β11 are the coefficients associated with each independent variable which measures the change in the mean value of Y, per unit change in their respective independent variables.

X1=sex of household X2=age of household X3 =family size, X4=distance to the market, X5 =access to credit X6=income X_7 =land size, X8= education level, X9= fertilizer, X10=total livestock in the household, X11=improved seed, U=Error term/omitted variable.

Definition of dependent variables

Production Quantity (Q): It is a continuous variable representing dependent variable. It is the amount of maize produce by the household and measured in quintal. It is the quantity (value) of agricultural output per unit quantity (value) of input(s) used in production (OECD, 2007).

The Independent variables are:

1. **Sex of household head(X1):** It is a dummy with value of 0 for men and 1 for female house hold participating in production and marketing of maize. male household heads may observe to have a better tendency than female household heads to enter into maize production and marketing business. Thus, this variable is expected to have negative relationship with volume of marketable surplus.
2. **Age of the household head(X2)**: This is a continuous variable measured in years. As an individual stays long, he/she have better knowledge and decide to allocate more size of land, produce more and supply more. . A study made by Amos (2007) indicated that age of farmers was found to have positive effect on technical efficiency of smallholder maize farmers. It was also assume that as age increases the production capacity and amount produced was decrease. Hence, both inverse and direct relation is assumed to the production of maize.
3. **Family size (X3):** This is a continuous variable representing the total number of family members in the household. Family is an important source of labor supply. In smallholder production, the size of household is a means to have more supply of lab ours. Since labor is the main input in crop production, as the farmer has large family size, he/she would manage crop plots on time (Fekadu, 2004). Hence, size of the household is expected to have positive association between production and technical efficiency of the farmer.
4. **Distance to market (X4):** It is a continuous variable measured in kilometers. The closer the market the lesser the transportation charges, reduced transaction costs, and reduce other marketing cost. Berhanu and Hoekstra (2008) on enhancing market orientation of smallholders on grain market in Ethiopia revealed negative relationship between grains market and distance to market. Therefore, as the market becomes far

from the farm the market was low. Thus, distance to the nearest market was hypothesized to have negative relationship with marketed surplus of maize.

5. **Access to credit (X5):** This is a dummy variable which represents whether the farmer has obtained credit or not during the production season. If the farmer has taken credit during the given production season, the variable takes a value of 0 for farmer has access to credit and 1 otherwise. It is hypothesized that farmers who have access to credit sources are more efficient than others are. This is because, access to credit is an important source of financing and it enables the smallholder farmers to purchase agricultural inputs on time that would increase their productivity (Ike and Inoni 2006
6. **Income(X6):** is continuous variable for a factor of production and it is important for its ability to help in producing other goods (Martinez, 2000). In this study the term capital was used to refer to the monetary requirement in the maize production process. It is expected to affect the maize production positively because, when farmers have enough capital, they can produce enough quantity of maize. Because they can perform the farming system at the require time.
7. **Land size(X7):** The total land used for maize production was measured in terms of number of hectares the household owns and it was expected to affect the household level maize production positively because, a farmer who owns a large area of land for maize production than a farmer who own less area of land and under the same input utilization In support of the finding here, Kindie, (2007) and Solomon (2011) found that, thearea of land allocated for sesame and groundnut production in Metema and Babile District significantly and positively affected farm level production of sesame and groundnut.
8. **Education Level(X8):** It is a continuous variable and refers to schooling year for formal education of household heads. Education enhances information acquisition and adjustment abilities of the farmer, thereby improving the quality of decision-making (Fakoyaet al., 2007). Thus, education would have positive effect on maize production.
9. **Livestock (Tropical Livestock Unit (X9).** This refers to the total number of animals possessed by the household. Livestock is considered as another asset which is liquid used for pulling heavy load, it is a source of power. It is assumed that household with larger TLU have better economic strength and financial position to purchase sufficient

amount of fertilizer (Techane, 2002; Legesse, 1992). Hence, live stock owned by household was hypothesized to affect maize production positively

10. **Fertilizer(X10):** Is any material of natural and synthetic origin that applied to soils or plant tissues to supply one more plant nutrient essential to the growth of plants. Fertilizer would artificial or natural (compost).This important is one of the most inputs which increase the quantity of maize.
11. **Improved Seed (11):** This is a dummy variable and takes a value of 0 if a farmer uses improved seed and 1 otherwise. Improved seeds are associated with high productivity level and better capacity to resist diseases (Abay, 2007). It was expected to a positive relationship with production.

4. RESULT AND DISCUSSION

4.1. Results of Descriptive Statistics

4.1.1. Demographic and socio-economic characteristics of the sample households

As the table shown below, the results revealed that both male and female households engagement in production and marketing of maize. Of the total interviewed maize producers 69.33% were male and the remaining 30.67% were female. As well as the marital status of the respondent were 77.33% married, 10.67% single, 6.67 %widower and 5.33%Divorced.

Table 1 Sex and Marital status of household

Sex of household head	Frequency	Percent (%)
Male	52	69.33%
Female	23	30.67%
Total	75	100.0%
Marital status	Frequency	Percent (%)
Married	58	77.33%
Single	8	10.67%
Divorced	4	5.33%
Widower	5	6.67%
Total	75	100.00%

Source: survey result 2019

As table 2 indicates, the average age of the sampled household head is about 42.827years implying that majority of them were in working ages. The average family size for maize producers was 4.55 persons per household. The average education level of sample respondents were 5.333 with standard deviation of 3.3. The average land size for these sampled farmers was found to be 1.37 hectare. The average distance to the market for the sampled farmer was 3.05. This implies that farmers walk about 2.82 km on average to reach the nearest market from their residence. The average total farm income of sample respondent is about 3292 ETB,

Table 2Demographic and socio-economic characteristics of sampled households for continuous variables

Variable	Obs.	Mean	Std. Dev.	Min	Max
Age of household	75	42.827	10.413	22	65
Total family size	75	4.557	1.450	2	7
Distance to market	75	3.047	1.395	1	6
Income	75	3292	1868.281	600	7500
Land size	75	1.373	.889	0 .25	3
education level	75	5.333	3.302	0	10
Total livestock(TLU)	75	4.588	1.191	2.3	7

Source: survey result 2019

4.2 The Marketing Channel Choices of Maize Producers

Marketing channel: It is a business structure of interdependent organizations that reach from the point of product origin to the consumer with the purpose of moving products to their final consumption destination (Koler and Armstrong, 2003). Marketing channel as defined by Stern *et al.,* (1996) is a set of interdependent organizations involved in the process of making a product or service available for consumption or use. The choices of the market channel to sale their product depends on the distance between farmers and consumers, price preference, availability and accessibility of marketing facilities (like storage, transport, infrastructures and others).Maize flow begins with producers who, after harvest, decide how much to store for household consumption, seed and payment in kind and sell the remaining food grain to a trader or consumer in order to settle debts and contributions, taxes and to purchase consumer good (Rashid S. *et al,* 2010). The analysis of marketing channels is intended to provide a systematic knowledge of the flow of the goods and services from their origin (producer) to the final destination (consumers). The main marketing channels identified from the point of production year until the product reaches the final consumer through different intermediaries were:

I. Producer ⇨ Consumer (14.67%)

II. Producer ⇨ Wholesaler ⇨ Consumer (56%)

III. Producer ⇨ Retailer ⇨ Consumer (16%)

V. Producer ⇨ Collector ⇨ Wholesaler ⇨ Consumer (13.33%)

In the study area producers sold their maize to different actors within the same production year. There were farmers who sell their produce through more than one channel (multiple channels) but their number was limit. Consequently, they were merged to their respective channel to which large proportion of their produce among available alternative channels for maize selling to wholesaler took the largest proportion of the product. Of total maize producing households, the proportion of maize producers who sold for wholesaler was 56%, Proportion of households who sold for consumer was 14.67% and, were as the proportion of household who sold for retailer and collector are 16% and13.33% respectively.

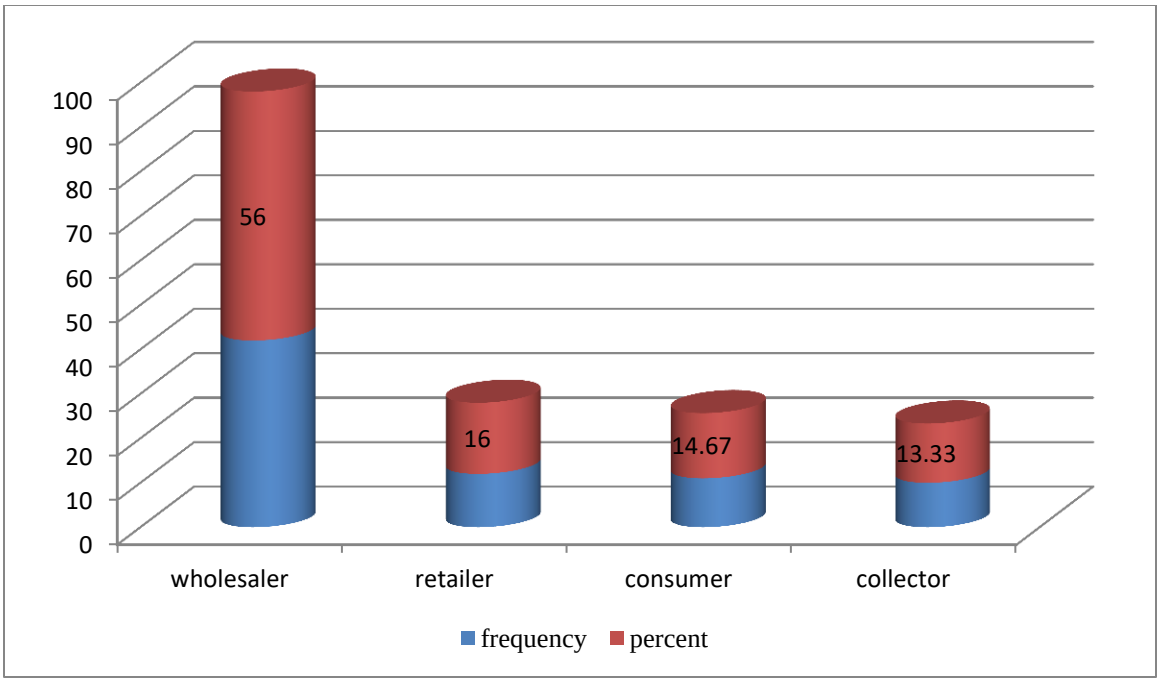


Figure 2Market channel choice of maize producer

Source survey result 2019

4.3. Econometric Model Result

Econometric analysis is one of the important methods of analyzing the significance relation of the independent and dependent variable. In this study, the researcher uses the p-value to test the significant effect of the independent variable on the dependent variable, and in the study multiple linear regression modelsthe ordinary least square regressions (OLS) model was used . Multiple linear regression models area method of estimating or predicting a value on some dependent variable given the values of one or more independent variables

4.3.1. Factors that affect quantity of maize production.

For this study, 11 explanatory variables were included in the model estimation to identify factors affecting quantity of maize production at household level. In this regard, the result of multiple linear regression models revealed that of 11 variables included in the model 5 variables significantly affect the quantity of maize at household level. Four explanatory variables; family size, income, fertilizer and livestock are positively and significantly affected, while age of household was negatively and significantly affected quantity of maize produce. The model was statistically significant at 1%, 5% and10% level indicating the goodness of fit of the model to explain the relationships of the hypothesized variables. Coefficient of multiple determinations (R2) was used to check goodness of fit for the regression model. Hence, R2 indicates that 87.87% of the variation in the quantity of maize produce was explained by the explanatory variables included in the model.

Table 3 Factor affecting quantity of maize production

Variable	Coef.	Std. Err.	P>|t|
Sex of household	0 .417	1.134	0.714
Age of the household	-0.113	.052	**0.033****
Family size	0 .680	.3656	**0.067***
Distance to market	0.391	.399	0.330
Access to credit	-1.193	1.127	0.294
Income	0.006	.0003	**0.000*****
Land size	-0.0156	.713	0.983
Education Level	0 .069	.164	0.676
Fertilizer	2.789	1.104	**0.014****
Total live stock	1.167	.463	**0.014****
Improved Seed	-0.728	1.118	0.517
_cons	-5.534	3.553	0.124

Number of obs = 75 R-squared = 0.8787 Adj R-squared = 0.8576

Where: ***, ** and * are statistically significant at 1%, 5% and 10%, respectively.

Source: survey result 2019

1. **Age of the household head (x1):** This is a continuous variable measured in years. A study made by Amos (2007) indicated that age of farmers was found to have positive effect on technical efficiency of smallholder maize farmers. But the variable affects the production of maize negatively at 5% significant levels. A one year increase in the age of household level would result in a decrease the quantity of maize production by 0.113 qt. This might be because as an individual becomes old and older, he/she has unable to actively engage in the production activity.

2 Family sizes: It is a continuous variable, measured in number. Production is a function of labor, and availability of labor is assumed to have positive relation with quantity of maize produce. , as the farmer has large family size, he/she would manage crop plots on time (Fekadu, 2004). Therefore, as hypothesized, family size positively and significantly related quantity of maize produce with at 10% significant level. The coefficient 0.68 indicates that an increase in number of family size by one resulted in an increase in, the quantity of maize produce by 0.68qt.

3. **Income:** is continuous variable for a factor of production and it is important for its ability to help in producing other goods (Martinez, 2000). Has strongly positive effect on the maize production. The table reveals that the income has a positive relationship with maize production and it's significant at 1% level; this shows that when income increase by 1 birr, the maize production positively increased by 0.0055qt.Means that the income of the household increase, the ability of purchasing power of fertilizer, improved seed, and pesticide increase.

4. Fertilizer: also shows a significance and positive relationship with quantity of maize production, indicating that the increase in the habit of fertilizer usage of the farmer increases the quantity of maize production. This is because the fertilizer has the capacity to kill the herbicides, acidic and basic property of soil and it increases the adaptability of the seed to the soil environment. The table reveals that the fertilizer is significant at 5% level; this shows that when farmers use 1kg fertilizer, their quantity of maize production is positively increased by 2.789qt.

5. Total livestock (Tropical Livestock Unit (TLU).shows a significance and positive relationship with quantity of maize production. This indicating that the increase in to the total number of animals possessed by the household, considered as another asset which is liquid used for pulling heavy load, it is a source of power, The table reveals that the Livestock is significant at 5% level; this shows that when livestock increased by 1TLU, their quantity of maize produce is positively increased by 1.167qt.

Multicollinearitytest: One of the classical assumptions of the regression model is that the explanatory variable is uncorrelated. Multicollinearity tested by variable inflection factorVIF. In the study there is no linear correlation between the explanatory variable because the value of VIF is 1.22. When there is linear correlation between the explanatory variable the VIF value becomes greater than or equal to 10.

4.4 Opportunities and Challenges in Maize Production and Marketing

4.4.1. Opportunity in production of maize

- ✓ Suitable agro-ecological condition.
- ✓ Create awareness about the production of maize (land sowing, land preparation harvesting, storage and others) for the household by district agricultural office that how they.
- ✓ Support the households by giving different extension service to the households.
- ✓ Create job opportunity for the community.
- ✓ Decrease the level of poverty.

4.4.2 Opportunity in marketing of maize

- ✓ Increase the consumption of maize in the district.
- ✓ Increasing of the number of traders, collectors and other actors in the district.
- ✓ Built different market and farm gate to sell maize produce.

4.4.3 Production Challenges in Maize Production for the producers (farmers)

Maize grows by Abeshge district households either independently on particular plots or intercropping if with other crops in many areas. This crop is produced during both main rainy season (Meher) and during in short rain season (Belg) using rainfall. The production of Maize in study area is hampered by various factors. The majority of farmers indicated that drought, pests diseases, and fertilizer shortage as the major challenges in the production of maize. According to our questionnaires that we obtain from the respondents shortage of land, shortage of oxen, cost of fertilizers & diseases of the plant (maize) are highly and majorly affects the respondents.

4.4.5 Marketing Challenges in Maize Production for the producers (farmers)

Marketing challenges related low price of product, lack of market information, poor transport, and lack of storage.

Poor transportation: Poor transportation facilities and poor road infrastructure especially for producers that are located at remote areas are the major obstacles to transfer products from farm area to marketing center and inputs to and from the markets. The problem forces the marketing cost be higher Less demand of local consumers: The local consumers mostly preferable other areas coming milk product.

Poor marketing skill: To increase their bargaining power in the exchange process, producers require marketing skill. However, producers lack experience or marketing skills, to use the opportunities in different market alternatives. Because of these trainings were given to cooperative management expert and on keeping quality and standardization by the woreda agricultural and rural development expert. Hence, this needs to be further strengthened in a continuous and coordinated way.

5. SUMMARY, CONCLUSIONS AND RECOMMENDATION

5.1 Summaryand Conclusions

This study was conducted in Gurage Zone of SNNP Regional State, Abeshege district, Ethiopia. The study aims to identify the factor that affects maize production and marketing. The specific objectives of the study were to identify the factor that affect the quantity of maize production, to analyze the market channel choice by maize producers and toidentify major challenges and opportunities of maize production and marketing for the producers. The data for this study were collected from 75 maize producers randomly selected from three selected kebels in Abeshigeworeda.The data were generated from both primary and secondary sources. The primary data were generated through a formal survey using interview and questioner's schedule. Outof the total 75 household respondents, 69.33% were male and the remaining 30.67% were female. The analysis was made using descriptive statistics and econometric models. The descriptive statistics analysis made use of tools such as mean, percentage, standard deviation and frequency distribution. The study indicates that the respondent's minimum family size is two and the maximum family size is seven, the average number of the family size is 4.55. The average size of own cultivated land was nearly 1.37ha. In this study the term income would be used to refer to the monetary requirement in the maize production process. The average income of the respondents is 3292 were as the average number of livestock of the household is 4.58.To identifying the factorsthat affecting quantity of maize production, Ordinary least square model (OLS) was used. The significant factors that affect maize production are age of household, family size, income, livestock, and improved seed. Age of household affect significantly and negatively while family size, income, livestock, and improved seed have a significant and positive relationship with quantity of maize production. In the study area producers sold their maize to different actors within the same production year. There were farmers who sell their produce through more than one channel (multiple channels). The proportion of their produce among available alternative channels for maize selling to wholesaler took the largest proportion of the product 56%. Maize production provides an opportunity for market integration to small household farmers in the district. Though, high cost of transporting, lack of an adequate market information allow farmers to improve negation coverage with brokers and other buyers, low price of product, insufficient access to appropriate seed varieties are major marketing

constraints. Most of the time maize produced long rain season compared to vegetable. However, disease, drought, seed, cost of fertilizers and shortage seed are the main challenges for production and productivity of maize.

5.2 Recommendation

Following the findings and conclusions from the study, the following recommendations were drawn:

- The district extension workers should pay more attention to the rural farmers on how to use improved seed on their farmland and impacting more skills and experience base on how to use modern farm implement and how to maintain the farm produce so as to increase the level of crop production in the local government area of the state.
- high cost of transporting, lack of an adequate market information allow farmers to improve negation coverage with brokers and other buyers, low price of product, insufficient access to appropriate seed varieties are major marketing constraints therefore it is highly recommended that extension workers should pay more attentionmore advising on market oriented commodities.
- In addition government should help the rural farmers in the provision of fertilizer, maintaining a good road, and provision of social amenities in to the rural settlement.
- The agricultural sector should develop new technologies that was help the farmers to employ more labor and reduces the migration of the active labor force from rural to urban areas.
- Farmers sell their products based on market situation in order minimize and alleviate the existed problems.
- The Abeshge District or local government should allocate more funds for the agricultural sector within the national budget to ensure there is an easy working channel by the farmers to improve maize production. This have a more positive impact in the economy of the country as there were more products sold.
- Ordinary least squares (OLS) model results indicated that Quantity of maize is determined the availability of input supply. So, to increase the output level, improving input distribution system is crucial. This requires improving input supply system in terms of not only providing input facilities but also timely distribution and optimum access of improved

varieties.The model result also shows that family size is important factor for production of maize. In smallholder production, the size of household is a means to have more supply of labors.Since labor is the main input in crop production, as the farmer has large family size, he/she should manage crop plots on time. The model result also revealed that the farmers being need to income. Capital refers to the monetary requirement in the maize production process. Because they can perform the farming system at the require time. Therefore, the household should have an additional income to increase their production and productivity.

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7. APPENDEX

APPENDEX-A

Source	SS	df	MS		
Model	8604.31592	11	782.210538	Number of obs =	75
Residual	1187.47075	63	18.8487421	F(11, 63) =	41.50
				Prob > F =	0.0000
Total	9791.78667	74	132.321441	R-squared =	0.8787
				Adj R-squared =	0.8576
				Root MSE =	4.3415

prodqua	Coef.	Std. Err.	t	P>|t|	[90% Conf.	Interval]
sexhh	.4175676	1.134458	0.37	0.714	-1.476299	2.311434
agehh	-.1133521	.0520276	-2.18	0.033	-.2002071	-.0264971
famsz	.6806468	.3656283	1.86	0.067	.0702661	1.291028
distmrkt	.3912216	.3988484	0.98	0.330	-.2746167	1.05706
accescr	-1.19282	1.126629	-1.06	0.294	-3.073617	.6879757
incom	.0055072	.0003223	17.09	0.000	.0049692	.0060452
landsiz	-.0155013	.7131375	-0.02	0.983	-1.206015	1.175012
educlev	.0691626	.1648907	0.42	0.676	-.2061064	.3444315
fertil	2.789962	1.104781	2.53	0.014	.9456375	4.634287
livsto	1.167247	.4635153	2.52	0.014	.3934539	1.941041
impros	-.7279088	1.117864	-0.65	0.517	-2.594073	1.138255
_cons	-5.533699	3.553001	-1.56	0.124	-11.46509	.3976893

. vif

Variable	VIF	1/VIF
landsiz	1.58	0.633044
incom	1.42	0.702626
distmrkt	1.22	0.822324
livsto	1.20	0.835542
fertil	1.20	0.835656
accescr	1.18	0.846304
educlev	1.16	0.859401
agehh	1.15	0.867728
impros	1.15	0.872893
famsz	1.10	0.905650
sexhh	1.09	0.918408
Mean VIF	1.22	

APPENDEX-B

WOLKITE UNIVERSITY

COLLEGE OF AGRICULTURE AND NATURAL RESOURCE, DEPARTEMENT OF AGRIBUSINESS AND VALUE CHAIN MANAGEMENT

SURVEY QUESTIONNAIRES

Title: Factors affecting maize production and marketing; the case of AbeshegeWoreda, Gurage zone, SNNPS of Ethiopia

SECTION A: I). Demographic characteristics of sampled household

1. Name of the Farmers/respondent.....

2. Woreda…… kebeles……..

3. Sex of the household head 0. Male 1. Female

4. Age of household_____

4. Educational status in schooling grade----------

5. Religion 0. Orthodox 1.Muslim 2.Catholic 3.Protestant 4. Others

6. Marital status 0. Married 1.Single 2.Divorced 3. Widower

7. Family size by age category

Age category (year)	Male	Female	Total
<14			
14-64			
>64			
Total			

SECTION B: Production Habit

4. Have you practicing maize production? 0. Yes 1. no

5. If yes in question no 4, for how long have you been practicing maize farming?

1. Less than 2 years 3. Between 5 – 10 years

2. Between 2 – 5 years 4. Over 10 years

6. If no in question no 4, why? ----------

I. LAND HOLDING

1. Is a shortage of land your problem for maize production? 0. Yes 1. No

2. How many hectare of land do you have your own in 2010?.. .....

3. How many hectare of land do you have for cattle grazing …….....

5. Which type of livestock do you have?

S.N	Lives took Categories/types	Number	Remarks
1	Oxen		
2	Cow		
3	Sheep and goat		
4	donkey		
total			

SECTION C: PRODUCTION AND MARKETING CONDITIONS

Production and marketing of maize

1. How many years' experience in maize production.... ……

2. How many quintals of maize you gained in 2010 year? _____

3. How many total quintals of maize did you sell in 2010.....

4. How many quintals of maize did you allocate for consumption in 2010 …

5. Distance of your home from nearly market center in Km……..

6. Distance from your residence to farm area in Km……

7. Where do you sell your produce most?

1. Wolkite 2. woliso 3 . walga 4. endibre

8. Did you have a contract agreement with buyers to sell maize in 2010? 0. Yes 1. No

9. How is the attractiveness of price of maize in 2010? 1. Very attractive 2. Moderate 3. Low

10. To whom did you sell most of your maize? 1. Wholesaler 2. Retailers 3.Consumer 4.Cooperative 5.Farm gate or local collector 6. Brokers

11. What made you to select to sell to above channel? 1. Price preference 2. Distance 3.Customer 4. Others (specify) _____

12. Did you face difficulty in finding nearby buyer when you wanted to sell maize in 2010? 0. Yes 1. No

SECTION D: IMPUT APPLICATION

13. Do you use fertilizer? 0. Yes 1. no

14. If your answer is yes in question no 13 what types of fertilizer you use?

1. Organic fertilizer 2. Inorganic fertilizer 3. Both organic and inorganic fertilizer

15. How money quintals of fertilizer per hectare you use?

1. Less than one quintal 2. Two- three quintal 3. More than three

16. is the price of fertilizer fluctuates? 0. Yes 1.no

17. If your answer is yes in question no 16 what is the reason?

18. Do you use labor force? 0. Yes 1.no

19. If your answer is yes in question no 18 how much labor you use per month?

1. Less than 20 people 3. Between 31-50 people

2. between21-30 people 4. Greater than 50 people

20. Is labor is expensive? 0. Yes 1. no

21. If your answer is yes in question no 21 what is the reason?

22. Do you use improved seed 0. Yes 1. no

23. Did you get advisory service about maize production and marketing activities in the last years? 0. Yes 1. No

X. Credit access

1. Did you get either formal or informal credit in 2009/2010? 0. Yes 1. no
2. .If you yes how much amount of cash you had received?_____ETB

XI. Access to Market information and knowledge flow

1. Is there access to information flow problems for you in 2010? 0. Yes 1. No
2. What do you think the most relative important and reliable information for you?
3. What kind of technology did you get so far?

XIV. Farm and non-farm income

1. What is the total income (birr) received from total maize production in 2009/2010 respectively..... And …….
2. What is the total income (birr) you earned from other farm production in 2010? ……

XV. Opportunities and threats

1. What are the existing opportunities that help you in maize production and marketingactivities?_____
   _____

What constraints may you faced with in the process of maize production and marketing activities?_____
_____