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COLLEGE OF AGRICULTURE AND NATURAL RESOURCE

DEPARTMENT OF AGRICULTURAL ECONOMICS

SENIOR RESEARCH PAPER ON DETERMINANTS OF MARKETABLE SURPLUS OF CHICKPEA IN CASE OF WOLISO DISTRICT ETHIOPIA

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TABLE OF CONTENT PAGE

ACKNOWLEDGEMENT ..... **I**

ACRONOMY ..... **II**

ABSTRACT ..... **III**

1. INTRODUCTION **1**

1.1 BACKGROUND 1

1.2 STATEMENT OF THE PROBLEM 3

1.3 SIGNIFICANCE OF THE STUDY 4

1.4 OBJECTIVE 4

1.4.1 GENERAL OBJECTIVE 4

1.4.2 SPECIFIC OBJECTIVE 4

1.5 SCOPE AND LIMITATION OF THE STUDY 5

1.5.1 Scope of the study 5

1.5.2 Limitation of the study 5

2.LITERATURE REVIEW **6**

2. THEORITICAL REVIEW **6**

2.1.1 Concept and definition 6

2.2 EMPERICAL REVIEW 8

2.2.1 Marketing of chickpea in Ethiopia 9

3. METHODOLOGY ..... ERROR! BOOKMARK NOT DEFINED.

3.1 DESCRIPTION OF THE STUDY AREAS ..... **ERROR! BOOKMARK NOT DEFINED.**

3.1.1. Agro-climatic environment 11

3.1.2. Production system 11

3.1.3. Population and population density 11

3.1.4 Urban infrastructure and social services 11

3.2. TYPES OF DATA AND METHODS OF DATA COLLECTION 12

3.2.1 Research Design 12

3.2.2 Research approaches 12

3.3. SOURCES AND METHODS OF DATA COLLECTION 12

3.3.1. Primary data source and collection 13

3.3.2 Secondary data 13

3.4 SAMPLING TECHNIQUE AND SAMPLE SIZE (SAMPLING PROCEDURE) 13

3.5 method of data analysis 14

3.5. MODELING MARKETABLE SURPLUS OF CHICKPEA 14

4. RESULT AND DISCUTION 18

4. 1 DESCRIPTIVE 18

4.2 ECONOMETRIC RESULTS 21

4.2.1 Determinants of Marketable Surplus RESULT 21

4.2.2 Test of goodness or fit 22

4.2.3 test of multicolnearty test 22

5. CONCLUSION AND RECOMMENDATION 24

5.1. CONCLUSIONS. 24

5.2.RECOMMENDATION. 24

REFERENCES 24

APPENDEX A 27

APPENDEX B 29

APPENDEX C 31

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ACRONOMY

EEA	Ethiopian Economy association
FAO	Food and agriculture organization
FAOSTAT	Food and agriculture statistics
MOARD	Ministry of agriculture and rural development,
WHO	World health organization

ABSTRACT

Chickpea is an important pulse crop grown on black soil. Area under Chickpea has been expanding due to its diversified usage. The objective of this research paper is to identify the determinants of marketable surplus of chickpea in case of woliso district, and identifying chickpea's marketing status in woliso district is the specific objective of this study. To examine these determinants, Potential producer kebeles are selected purposively. Respondents from each kebeles are selected based on probabilistic simple random sampling techniques and accordingly sample of 70 respondents were taken. To collect relevant data, structured interviews were applied. To analyze the data both descriptive statistics and econometrics models (for analyzing determinants of marketable surplus) were employed. Determinants of marketable surplus were analyzed by using multiple linear regression model. accordingly age, land size, household size, market information and credit access were significant factors that affect marketable surplus of chickpea in the study area. vif shows that there was no problem of multicollinearity. Descriptive statistics was applied to describe dummy variables and characteristics of respondents.

1.INTRODUCTION

1. 1 Background

Chickpea is a very important pulse crop that grows as a seed of a plant named Cicer arietinum in the leguminous family. This pulse is estimated to be at least 7,500 years old and was originally cultivated at Mesopotamia and the eastern Mediterranean. Currently, it is grown in India, middle East, South America, Canada and various parts of Africa. It contains 25% proteins, which is the maximum provided than any pulse and 60% carbohydrates. It occupies third position in the list of the food legumes which are cultivated throughout the world (FAOSTAT 2008). Chickpea is cholesterol free and is a good source of dietary fibre, vitamins and minerals. Chickpea-based pulse diet has been shown to reduce the total plasma cholesterol levels in obese subjects (Agriculture and Agri-Food Canada (2006) Chickpea: Situation and outlook).

Chickpea is crop which consumes low labor and its production demands low external inputs compared to cereals. In Ethiopia, chickpea is widely grown across the country and serves as a multi-purpose crop (Shiferaw et al., 20016S). First, it fixes atmospheric nitrogen in soils and thus improves soil fertility and saves fertilizer costs in subsequent crops. Second, it improves more intensive and productive use of land, particularly in areas where land is scarce and the crop can be grown as a second crop using residual moisture. Third, it reduces malnutrition and improves human health especially for the poor who cannot afford livestock products. It is an excellent source of protein, fiber, complex carbohydrates, vitamins, and minerals. Fourth, the growing demand in both the domestic and export markets provides a source of cash for smallholder producers. Fifth, it increases livestock productivity as the residue is rich in digestible crude protein content compared to cereals.

Chickpea production works well in rotation with cereals such as wheat and teff widely grown in relatively well-drained black soils. Globally, chickpea is adapted to black soils in the cool semi-arid areas of the tropics, sub-tropics as well as the temperate areas. It is the third most important pulses gown in the world after bean and pea and constitutes 20% of the world's pulse production (Joshi et al.,2013). Chickpea was first produced in the Middle East about 7, 000 years ago. At present, it is produced in over 40 countries represented in all continents. However, the most Known chickpea producing countries are India, Turkey, Pakistan, Iran, Mexico, Australia, Ethiopia, Myanmar, and Canada.

There are two types of chickpea produced globally, namely Desi and Kabuli chickpeas. Kabuli chickpeas have a larger cream-colored seed with a thin seed coat whereas the Desi type has Smaller, reddish brown-colored seed with a thick seed coat, on average, world production consists of about 75% of Desi and 25% of Kabuli types (Agricultural and Agro- food Canada, 2004). Although Kabuli types can be profitably adapted in the country, Ethiopia traditionally produces largely the Desi types. Morphologically, Desi types have pink flowers while the Kabuli types are characterized by white flowers. It is grown at the end of the main rainy season using residual soil moisture. This allows farmers to practice double cropping, which in turn increases productivity of scarce land resource and serves as an additional source of income.

In the export market, chickpea contributes a significant portion of the total value of pulse exports. For example, chickpea constituted about 48% of the pulse export volumes in 2002. During this period of time, the exported volume accounts about 27% of the total quantity of chickpea production while the balance remains for domestic market (Shiferaw et al. 2007). Generally chickpea is advantageous pulse crop in increasing the nutritional status of household, increasing soil fertility, and by holding high export share. So this research were focused on identifying determinants of marketable surplus of chickpea in woliso distric

1.2 Statement of the Problem

The structure and functioning of the chickpea marketing system is constrained by several factors (Bekele et al., 2010). First, the supply originates in small quantities from several highly dispersed small producers that supply non-homogeneous Desi types to local markets. Given the low productivity of the crop at present the marketed surplus by individual farmers and the overall traded volume are low, and hence per unit transaction costs for individual farmers and rural traders are high.

Second, there is no efficient mechanism for delivering market information to the producers and traders at local markets on issues related to seasonal prices, demand, and quality requirements in different markets across the country. Third, there is lack of credit and extension service that improves that performance of the farmers. Fourth, the Desi chickpea varieties currently grown by farmers in the country are not able to satisfy the amount and attributes required by diverse markets (Fafchamps and Hill 2012)..

Beside to this low amount of chickpea is taken to the market because of, higher transaction costs incured by individual farmers and rural traders. Transaction costs are largely fixed costs that can be spread across more production and large area cultivated (Matungul et al., 2009). This shows the limited participation of farmers in the existing markets as this can lead to the imperfections in farmers' choice of alternative marketing channels and selling time for their produce.

According to Bekele et al. (2007), the high transaction costs and inadequate access by market participants to timely and accurate information about prices, quality-price relations and demand patterns in various markets push smallholder farmers to sell their small marketed surplus at the farm gate with lower prices and leads to highly speculative behavior and extreme uncertainly in chickpea markets respectively. Generally, chickpea's market surplus is constrained by several factors like, sources of supply, inefficient information, lack of selected variety of chickpea and etc. due to this we need to conduct this study on woliso district in order to address these problems. The problems are often seen in this area because; no studies had conducted on it before.

1.3 Significance of the Study

Information on the market performance of high value crops, such as chickpea might provide appropriate production and consumption incentives thereby enhancing agricultural productivity and reducing the food insecurity problem in the country. In a country where livelihood diversification through production of high-value crops were given due emphasis, improvement in chickpea production and marketing can make a significant contribution to the national economy and thus brings growth.

Due to this effect, these goals require appropriate interventions by the government and private institutions with the aim of improving the market information flow and institutional infrastructures, to help the market in achieving the national policy objectives. The means of meeting these needs can be meet by evaluating the economic performance of high value crops like chickpea production and marketing.

This study would generate valuable information on chickpea marketing which may help policy makers to take relevant decisions and intervene in the development of chickpea production and supply. In general, governmental and nongovernmental organizations who are interested in high value crops market chain may use the result of this study to take appropriate policy measures or can be used as base line information for further study.

1.4 Objectives of study

1.4.1General objective

To identify determinants of marketable surplus of chickpea in case of Woliso District .

1.4.2 Specific objectives

To see status of chickpea marketing in the study area.

To identify the proportion by which determinants are influence chickpea's market surplus in the study area.

1.5 Scope and limitation of study

1.5.1 Scope of the study

This study is carried out in oromia national state, south west shewa zone, woliso district. The study will have carried out in two kebeles for 70 sample house hold. Moreover, the study is mainly focused indentifying marketable surplus of chickpea in the study area.

1.5.2 Limitation of the study

Lack of proper documentation on the required information is one limitation. This ultimately reduces the number of valid data case in the analysis. Other limitations of the study are that some cooperatives were not cooperating to deliver information regarding to marketing of chickpea. Moreover, the efforts of getting reliable data might be affected by doubtful respondents.

2. LITERATURE REVIEW

2. 1 THEORITICAL REVIEW

2.1.1 Concept and definition

Market: Originally the term market stood for the place where buyers and sellers are gathered to exchange their goods and service. Market is an area in which one or more sellers of a given products or services and their close substitutes exchange with and compete for the patronage of a group of buyers. The term market mean the place where buying and selling takes place, an area in which a good is sold, a group of people carrying on buying or selling, or the commodity traded (Larson,2009).

According to Kilingo and Kariuki (2014) market is defined as an institution within which the forces of demand and supply operate; sellers, and consumers are in constant communication, and there is change of title to goods and services. Potential consumers make up a market, which is people with the desire and with the ability to buy a specific product (Eric and Kerin, 2013). Kotler (2016) also defined market as a place that consists of all potential customers sharing a particular need or want who might be willing and able to engage in exchange to satisfy that need and want.

Marketing: Marketing is the process of bringing sellers and buyers together for the purpose of exchanging title to goods and services (Kilingo and Kariuki, 2014). According to Kotler (2010) marketing is defined as a social and a managerial process whereby individuals and groups obtain what they need and want through creating and exchanging products and value with others.

Marketing has basic productive value, in that it adds time, form, place and possession utilities to products and commodities. Through the technical functions of storage, processing and transportation, and through exchange, marketing increases consumer satisfaction from any given quantity of output.

the American Marketing Association representing marketing professionals in the US and Canada states that marketing is the process of planning and executing the conception, pricing,

promotion, and distribution of ideas, goods, and services to create exchanges that satisfy individual and organizational objectives (Eric and Kerin, 2008).

Marketing system: Is defined as the sequential set of kinds or types of business firms through which a product passes during the marketing process (Branson and Norvell, 2012). Also they define marketing system as the totality of product channels, market participants and business activities involved in the physical and economic transfer of goods and services from producers to consumers. It is usually seen as a "system" because it comprises several, usually stable, interrelated structures that, along with production, distribution, and consumption, underpin the economic process.

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, 2011).

Market surplus: also called excess supply, is the amount by which the quantity of a good offered for sale by producers in a market exceeds, the quantity demanded by consumers. In addition, a surplus occurs at prices above the equilibrium price (Kotler and Armstrong, 2008). Surplus is the residual with the producer after meeting the requirement for seed, payment in kind and consumption by peasant at source. Agricultural products differ from manufactured goods in terms of supply and demand. Supply is peculiar because of the seasonal biological nature while demand is relatively stable throughout the year. (Eric and Kerin, 2012).

2.2 EMPERICAL REVIEW

2.2.1 Determinants of chickpea market surplus

There are various determinants of marketable surplus of chickpea. Among them cultivated area, seed variety, access to credit, number of oxen owned, age ,sex, extension service, martial status of household, household size and education has influence on determining the marketable surplus of chickpea.

Cultivated area: The chickpea cultivated area can influence marketed surplus of chickpea either positively or negatively. Different finding implies that the larger the cultivated land allocated to chickpea production the larger the amount produce and thereby raising the amount produce available for sale. Thus, a hectare increases in cultivated area under chickpea production increase the amount of chickpea sold (Shewaye et al., 2016).

Improved Seed variety: As expected improved seed variety was found to affect marketed surplus of chickpea positively. This implies that, households who have access to improved seed of chickpea were more likely to supply large amount of chickpea to the market. (Yaynabeba and Tewodros 2013), reported that the chickpea producers who had access to input supply like improved seed varieties participated in the market more by increasing amount of chickpea marketable surplus compared to those who did not have access to improved variety.

Access to credit; credit access also influences chickpea's marketed surplus either positively or negatively. This means that credit services are the most important sources to solve financial constraints that hold back agricultural marketing related to marketing and transaction costs. Thus, households who had access and use credit sell more products of chickpea than non-users keeping other factors constant (Tewodros 2013).

Number of oxen: this variable affected chickpea marketed surplus as every other variables. In Ethiopia oxen are usually supports in farming activities, specially digging land, thrashing.

Therefore the farmer that has many oxen produces large quantity of crops and supply a large amount to the market than farmers that has few oxen (Samuel, R. L., 2016).

Household size: family size is taken as the major problems of the growth special in developing countries due to these different countries are implementing family saving policy now a day, for areas one that household with small family size can produce and deliver more than household with large family size (EEA 2016).

2.2.2 Marketing of chickpea in Ethiopia

Underdeveloped market linkages and problems of low economies of scale and high transaction costs often push smallholder farmers to sell their small marketed surplus at the farm-gate with lower prices (Fafchamps and Hill 2012; Shiferaw et al, 2015). This implies that in a developing country like Ethiopia the value of outputs that gained in the market is not substantial to induce producer smallholder farmers to create a good agro-economic potential. Thus, output markets and demand are important determinants to adopting improved technologies that ending in fetching high profit for farmers.

Chickpea marketing system in Ethiopia is under- developed and poorly organized. The export market outlet is relatively new and highly variable depending on production conditions in the major importing countries in South and West Asia and competitiveness with strong competitors' exporter countries such are India, Pakistan and Tanzania (based on Birhanu Adnew's National Report, 2009).

At present, the growing demand in domestic markets and low incentives for exporters resulting from low volume, poor quality and Poor price competitiveness in export markets seem to favor domestic markets. As Desi production has still been dominating, most of what is traded in domestic as well as export markets seem to be the Desi type chickpea. According to CSA data (June 2015/16), the total production of Chickpea in 2010 E.C was 444,146 tons. Of this total production volume, approximately 25% is brought into the market as a surplus volume. The two major regions, Amhara and Oromia, make up more than 90% of the total supply of chickpeas followed by Tigray and SNNP.

From the total Chickpea production in 2007 E.C, the marketable surplus volume of Kabuli was 34,346 tons and that of Desi was 80,141 tons. About 80% of the total surplus volume is destined for export market. Data sources from FAO indicate that a total of 48,739 tons of chickpea valued at Birr 454.5 million was exported into different countries in 2014. During same period, the weighted average export price of chickpea was Birr 9,324 per ton compared to local market price of Birr 1,180 per ton. The main destinations for the Ethiopian chickpea were India, Pakistan and UAE with market share of 35%, 34%, and 24% respectively.

Chickpea Production Volume by Type: Ethiopian Chickpea production consists of 70% of Desi and the rest 30% is a Kabuli Chickpea type. From the total Chickpea production in 2010E.C, the marketable surplus of Kabuli was 34,346 tons and that of Desi was 80,141 tons. Therefore; the government bodies adapt production policy and marketing policy to market demand for the crop to fetch competitive prices for smallholder farmers and exporters.

3. METHODOLOGY

3.1 Description of the Study Areas

Woliso woreda is found in oromia national regional state, south west showa zone, located on the way to wolkite and jimma and found 114km from Addis Ababa. This district has three towns and thirty five kebeles.

3.1.1. Agro-climatic environment

it has a latitude and longitude of 8°32′N 37°58′E with an elevation of 2063 meters above sea level .Woliso dstrict have dega (22%) and weyne dega (78%).The annual rainfall received by this district ranges between 950-1035mm . In this district there is a natural hot-spring, which makes the town one of the leading tourism heritages in Ethiopia. In addition wonchi lake which a popular tourist destination found in this district.

3.1.2. Production system

People in woliso distric are mainly involved in agriculture as their main job. The method of production is mainly traditional which is time consuming and less productive. The production system is mainly depending on seasonal rain which forces farmers to produce once per year. Currently new methods of production are introducing like planting in rows, provision quality seeds.

3.1.3. Population and population density

based on figures published by the Central Statistical Agency in 2005, this woreda has an estimated total population of 262,700, of whom 134,655 are men and 128,045 are women; 53,612 or 20.41% of its population are urban dwellers,

3.1.4 Urban infrastructure and social services

Woliso have modern infrastructure facilities like telephone, 24 hours electric power, road that connects, banks. The major infrastructure found in this district is Geresu Duki Comprehensive Secondary School, Oromia Institute of Water Technology, Ambo University – Faculty of Social Science (Waliso Campus) and other private institutes and colleges.

3.2. Types of Data and Methods of Data Collection

3.2.1 Research Design

There are many types of research designs. Among these, descriptive research is one of the research design used in social researches. Descriptive research is defined as a purposive process of gathering, analyzing and classifying and tabulating data about prevailing conditions, practices, beliefs, processes that are going on, effects that are being felt, or trends that are developing; and then making adequate and accurate interpretations about such data with or without the aid of statistical methods. Therefore, this study will be directed towards collecting and analyzing; and interpreting market surplus of chickpea the study area.

3.2.2 Research approaches.

There are two types of research approaches in research designs. These are qualitative and quantitative research approaches. Qualitative research is any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification (Strauss and Corbin 2012 cited in Paul 2014).

While Crewswell (2016) and Paul's (2014) study emphasized that quantitative methods are used chiefly to test or verify theories, identify variables to study, relate variables in questions or hypothesis, use statistical standards of validity and reliability, and employ statistical procedures for analysis. Hence, qualitative methods, for the analysis of non-statistical procedures of information and quantitative methods of multiple regression econometrics models will be applied.

3.3. Sources and methods of data collection

Both primary and secondary sources of data will be used for this paper. The data will be collected from different individuals, government and non-government institutions which have relevant information related to the subject matter.

3.3.1. Primary data source and collection

The primary data source will be collected from sources such as farmers, whole sellers, retailers, consumers, woliso district agriculture office, and communication office. For primary data collection, semi structured interview, and personal observation will be used as major instruments for collecting the data. The reason for using interview is: it is easy to administrate, flexible, it allows Control over the environment, it allows control over the order of the question ,it gives a chance of correction the miss understanding by the respondents and completes of the question is guaranteed.

3.3.2 Secondary data

In addition to primary data, secondary information on non-labor inputs, labor input costs, average seed and grain output prices for crops grown will be gathered from woliso district agriculture office, bacho woliso farmes, and input providers.

3.4 Sampling Technique and Sample Size (sampling procedure)

The paper will employ both simple random sampling method of probability sampling method and purposive method of non-probability sampling method .hence; two kebeles will be selected intentionally based on their potential production of chickpea and based on their distance from the market. Thus; we have intentionally taken Guddo Godetti and cirechaa kebeles. from the selected kebeles we have selected the farmers by simple random sampling technique of probability sampling. Consequently we have chosen 128 farmers from guddo godetti and 105 farmers from Cirrecha kebele. Regarding number of sample size the we decided use yemane formula.

Sample size = target population /1+ target population $(e)^2$

i.e , $n= N /1+N(e)^2$

$n=233/1+233(0.1)$

$n=70$

Where: n = statistically acceptable sample size

N = Total size of target population

e = level of precision (depends on level of significance)

e= level precision at 90% significance level, which is equal to 0.1

3.5 Analytical Methods Adopted (methods of data analysis)

Both descriptive and econometric methods were used to analyze the data. Descriptive statistics is used to identify marketing status of chickpea in the study area, whereas econometrics model is to indentify marketable surplus of chickpea in woliso district. Econometric model support us to estimate determinants of marketable supply of chickpea.

3.5 .1Modeling marketable surplus of chickpea

3.5.1.1 Variables definitions and hypothesis for marketed surplus of chickpea

Farmers utilize food crops produced for consumption, seed, gifts and sales. However, it is unquestionable that quantity allotted for seed and gifts by household are insignificant compared to quantity allotted for consumption. This shows that marketable surplus (difference between production and consumption and seed) is heavily determined by production made from a given area under the crop and consumption made from the harvested grain by the household. The quantity of production made from a given area under the crop in turn also varies based on differences in productivity of crops and geographical locations.

The most relevant variables chosen in the marketable surplus function therefore are: areas under Kabuli and Desi chickpea, and family size age and sex of farmer, market information and number of visits by extension agents to introduce improved seed, number of oxen owned by households and household size, are variables expected to influence marketable surplus the crop by smallholder farmers. Therefore, the important variables and the hypothesized effects are discussed below:

1. 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 was also assumed that as age increases the

2. Sex : This variable is a dummy variable. We gave a value of 1 if the household head is male and 0 if the head of household is female. It is expected that males to supply more than females since they have better access to land.

3. Martial status: this variable also dummy variable, we have categorized the martial status of household and gave the value of 1 for single, 2 for married, 3 for divorced, and 4 for windowed. The martial status of the household is expected to affect the market surplus of the chickpea they produce.

4. Access to credit: Access to credit is measured as a dummy variable taking value of 1 if the farmer had access to credit and 0 otherwise. This variable was expected to influence the marketable chickpea positively on the assumption that producers use the credit for production purpose.

5. Market information: This variable was 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 chickpea positively. Producers that have access to market information are likely to supply more chickpea to the market than uninformed producers.

6. Extension service: This variable was measured as a dummy taking a value of 1 if the household head has contact with a development agent and 0 otherwise. Extension service was expected to have positive effect for market participation through its stimulation of production .

7. Number of oxen owned: It is a continuous variable which is expected to influence production participation then by supply positively. It was expected that participation probability of farmers would increase as farmers increased their number of oxen because even if there is a limited land there will be proper and timely land preparation then by increase in productivity Kindie (2007).

8.Variety of chickpea:This variable was measured as a dummy taking a value of 0 if the household head has grow Desi type 1 if the household produces Kabuli type and 2 if the household used to produce both Desi and Kabuli varieties of chickpea is expected to be different. The market oriented Kabuli is expected to have higher demand than domestic Desi type hence, it is expected supply of Kabuli type of chickpea to be higher than that of Desi type. In this part of the analysis factors affecting marketable supply was analyzed. In this study, multiple linear regression models were employed to analyze factors affecting chickpea market supply in woliso district.

9. Education: it is expected literate house hold would have supply higher quantities of chickpea than an illiterate household. It is a dummy variable, thus we gave a value of 0 for illiterate, 1 for literate.

10. Land size: The total land used for chickpea production was measured in terms of number of hectares the household owns and it was expected to affect the household level of chickpea marketable supply positively because, a producer who owns a large area of land for chickpea production than a producer who own less area of land and under the same input utilization condition can produce more.

11. Household Size: A household with more number of family members is assumed to supply less amount chickpea to market than those households with relatively less number of family members because of the increase in consumption. Households with large family size may produce more and supply more. Hence, in this study either positive or negative relation between family size and marketable supply chickpea is expected.

The model used for the analysis was specified as: $Y_i = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3\ X3 + \beta 4X4 + \beta 5X5 + \beta 6X6 + \beta 7X7 + \beta 8X8 + \beta 9X9 + \beta 10X10 + \beta 11X11 + U_i$

Where: y is response or dependant variable

X1= age, x2= sex, x3=marital status , x4=access to credit, x5=market information, x6=extension service, x7=oxen, x8=chickpea variety, X9=education, x10, land size x11=household size.

U_i = disturbance term

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, β8, β9, β10, β11are 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. Accordingly, this statistical technique was used to explain the following relationships. Regress performance (as dependent variable) on the selected linear combination of the independent variables using multiple regressions. Regress income (as dependent variable) on the selected linear combination of the independent variables using multiple regressions.

4. RESULT AND DISCUTION

This chapter analyses determinants of chickpea marketable surplus using descriptive statistics and econometrics model (multiple linear regression).

4.1 DESCRIPTIVE RESULT

Table (1) Summary of dummy variables

Dummy variables	Frequency	percent	cumulative
Sex of household			
Female	12	17.14	17.14
male	58	82.86	100
Total	70	100	
Martial status			
Single	1	1.43	1.43
Married	51	72.86	74.29
Divorced	9	12.86	87.14
Windowed	9	12.86	100
Total	70	100	
Credit access			
No	35	50	50
Yes	35	50	100
Total	70	100	
Market information			
No	38	54.29	54.29
yes	32	45.71	100
Total	70	100	
Extension service			
No	34	48.57	48.57
Yes	36	51.43	100

Total	70	100	
Chickpea variety			
Desi	33	47.14	47.14
kabul	21	30	77.14
Both	16	22.86	100
Total	70	100	

As indicated in the above table (1) 82.86% of the respondents who engaged in production and supply of chickpea in the targeted kebeles were men population. The rest of respondents whose accounts 17.86% of the total respondents who involved in production and supply of chickpea were women. From the table it can understand that men population was involved well than women in production of chickpea.

As the above table shows, 72.86% of respondents who engaged chickpea production and marketing in selected kebele are married, while 12.86%, 1.43% and again 12.86% are divorced, single and windowed respectively. Regarding respondent's credit access, 50% of household who engaged in chickpea production has access to credit service, while 50% has no credit access. Even though; half of household has access to credit, till the distribution of this facility is not enough in the study area.

The above table also describes 54.29% of farmers who involved on chickpea production and supply has no market information, while the rest 45.71% has market information. This affects the production and supply of the chickpea in selected area; hence farmers who have market information would highly contribute to the chickpea production and supply.

Regarding to extension service, 51.43% of the respondents get extension service, Rest of the respondents whose accounts 48.43% of the farmers did not get extension service. This shows half of the respondents had an access to extension service which is very important to make farmers aware about different varieties and new technologies. However; still around half of the farmers have no access of extension service. So it needs an administrative attention, because extension is mandatory to increase farmer's productivity.

Regarding the proportion of chickpea variety produced by farmers in the study area, the descriptive result shows that 47.14% of respondents produce and supplies Desi type of chickpea, While 30% of the respondents produce and supplies Kabuli type of chickpea and the rest of the respondents whose accounts 22% percent of farmer's produce and supplies both Desi and Kabuli type. This implies that the larger numbers of farmers are participating on production desi type chickpea.

Table (2) Summary of continuous variables

Variables	Observations	Mean	Standard devotion	minimum	maximum
Age	70	48.47143	11.25685	25	79
Land size	70	2.885714	2.632257	5	12
Household size	70	5.3	2.33654	1	9
oxen	70	3.685714	1.876961	1	10

The above table shows the continuous variable within respondents whose engaged in production and supply chickpea in the study area. As it have shown on the table, the average ages of farmers participated in the production and supply of chickpea in the study area is 48.47, while the minimum and the maximum ages of framers are 25 and 79 respectively.

Beside to these, from the selected households, the smallest land holding is 0.5 hectare while the largest one is 12 hectare on average; landholding size was about 2.8 hectare. Family size of the respondents range from 1 up to 10 having mean of 5.3. Since the respondent's life is depend on farming, the households have 3.7 oxen on average, and number of oxen held by household is 1 while the maximum is 10.

4.2 Econometric Results

4.2.1 Determinants of Marketable Surplus

In order to identify the most determinant variables in this study, an attempt has been made by using multiple linear regression modle.

Table(3) multiple linear regression

```
. regress marketsurplus Age Sex Martialstatus Creditaccess Marketinfo Extensionservice Oxen chickpeavariety Education landsize
> inhectare householdsize, level(90)
```

Source	SS	df	MS		
Model	99.1282187	11	9.01165625	Number of obs	= 70
Residual	35.5182099	58	.612382929	F(11, 58)	= 14.72
				Prob > F	= 0.0000
				R-squared	= 0.7362
				Adj R-squared	= 0.6862
Total	134.646429	69	1.95139752	Root MSE	= .78255

marketsurplus	Coef.	Std. Err.	t	P>|t|	[90% Conf.	Interval]
Age	-.0185232	.0097036	-1.91	0.061	-.0347433	-.002303
Sex	.0437013	.2748488	0.16	0.874	-.4157231	.5031256
Martialstatus	.1394264	.171325	0.81	0.419	-.1469524	.4258053
Creditaccess	.9900504	.5496518	1.80	0.077	.0712784	1.908822
Marketinfo	-1.067102	.5161822	-2.07	0.043	-1.929928	-.2042764
Extensionservice	.4775499	.418474	1.14	0.258	-.2219514	1.177051
Oxen	-.0720325	.0659555	-1.09	0.279	-.1822807	.0382156
chickpeavariety	-.0179354	.1314601	-0.14	0.892	-.2376779	.2018072
Education	.4631541	.3321061	1.39	0.168	-.0919788	1.018287
landsizeinhectare	.2524613	.0420031	6.01	0.000	.182251	.3226717
householdsize	-.214926	.0600929	-3.58	0.001	-.3153745	-.1144775
_cons	1.855584	.8135378	2.28	0.026	.4957123	3.215455

The above regression table illustrates the most significant factors that determine the market surplus of chickpea by the farming house hold. Thus respondents Age, Credit access, market information, land size, and household size, are factors that significantly affect market surplus of chickpea.

As a result; Age, market information, and household size negatively affect dependent variable (chickpea's marketable surplus).This implies a unit changes in age of household, decreases the marketable surplus of chickpea -0.08232 units. Holding other factors constant (Credit access, market information, land size, and household size). Same is true for market information, a unit change in market information, changes dependant variable by -1.067unit and also household size is significantily influence chickpea market surplus in the study area. A unit change in household size, decreases market surplus by -0.21426 unit.

Credit access, and land size positively influence the dependent variable. This means when households credit access increases by one unit, house hold marketable surplus of chickpea increase by 0.9900504 units, holding other factors constant. Therefore credit access should be encouraged in the study are hence it highly incentive. Also the table it is shown that as a land size increase by one unit household's marketable surplus of chickpea increases by 0.2524613unit, holding other significant variable constant.

4.2.2 Goodness of fit:

One of the techniques used to assess the goodness of fit of a model is R square. In the above regression table the value of R square indicate that 68.6% of dependent variable is explained by explanatory variables.

4.2.3 Test of multicolinearity.

As we are producing multiple correlations and regression model we need to be aware of certain features of the Multicollinearity. That means, when two or more independent predictors are highly correlated with each other this is known as multicollinearity. As a general rule of thumb, predictor variables can be correlated with each other as much as 0.8 before there is cause for concern about multicollinearity (Perry R.et al., 2004: 323). in order to identify the multicollinearity problem of the quantitative variables we use VIF (variance inflation factor). The VIF of each independent variable less than 10 indicates the absence of series problem of multicollinearity.

Table (4)

```
. vif
```

Variable	VIF	1/VIF
Creditaccess	8.63	0.115827
Marketinfo	7.56	0.132307
Extensions~e	5.00	0.199987
Education	3.11	0.321470
households~e	2.22	0.450174
Martialsta~s	1.74	0.574067
Oxen	1.73	0.579110
landsizein~e	1.38	0.726031
Age	1.34	0.743825
chickpeava~y	1.27	0.789705
Sex	1.23	0.815312
Mean VIF	3.20	

The above table indicates the absence of molticollinearity problem; hence the VIF is less than 10.

5. CONCLUSION AND RECOMMENDATIO

5.1. CONCLUSIONS

This research was conducted in a two selected kebeles of Wolso district (Guddo Godetti, and chirecha) on factors affecting marketable surplus of chickpea. The results Descriptive statistics shows the proportion of respondents who has an access to credit, extension service, and market information. Beside to this, descriptive statistics provides the percentages of men and women respondents who involved in production and supply o f chickpea. It also describes the proportion of chickpea variety produce by respondents in the study area.

Econometric tests for variables that affect marketable surplus were conducted to supplement model predictions and survey results. The Result shows yield credit access considerably influence marketable surplus. Farmers who have an access to credit have the capability of producing and supplying more than the farmers that has no access to credit.

Land size also affects supply of chickpea positively. Farmers who have large land holding supplies more than those who hold smaller land .In general most of the farmers have small land holding which affect reduces their supply. On other side Age, market information, and household size negatively farmer's chickpea's marketable surplus in the study area.

5.2. Recommendation

- Farmers' access to credit should be encouraged more.
- Farmers should be well trained to adopt new methods of production which help them to produce more of chickpea from given plot of land.
- Peoples in the productive age should majorly participate in the production.
- Farmers should have appropriate and time based market information.
- Family saving program should be implemented.

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APPENDEX A

Interview

1) Age
2) Sex
3. a) Education b) Uneducated

4 Marital status

a. Married c. divorced
b. Single d. windowed

5 Land size in hectare ----------

6 Number of animals you have

a) Livestock_____ b) Oxen

7 Do you produce chickpea?

a. Yes b. No

8 For how many years do you involved in chickpea production

If question number 8 is yes ,which kind of chickpea do you produce

a. Desi type b. Kabuli type c. c. both

9 Area under Kabuli in hectare----------

10 Area under Desi in hectare----------

11 How many quintal do you produce per year

a. 2017/2018…….quintal of Desi and……quintal of Kabuli
b. 2018/2019……. Quintal of Desi and……quintal of Kabuli.

12 Do you get extension service on production of chickpea?

a) Yes b. no

13 Do you have access to credit?

a)Yes b)No

14. Do you supply your chickpea to market?

a. Yes b. No

15 If question number 13 is yes then how much quintal do you supply? ----------?

a. More than 10 c. 2-5 quintal

b. b. quintal4-6 quintal d. 7-10 quintal

e. Less than 2 quintal

15. To whom do supply

a. Whole seller c. Retailer

b. Assembler d .Consumer

16. Reason for choosing particular buyer?

a. Better price c .Shorter Distance e.Other reason

b. Timely pay d. Reliable weight

17. When do you supply

a. January
b. February
c. March
d. April
e. May
f. June
g. July
h. August
i. September
j. October
k. November
l. December

18. Where do you supply your chickpea?

1.9 How far is your home from market?

20 Do you get market information?

21 Do you know the market price of chickpea?

a. Last year b. This year

APPENDEX B

Table (1) Summary table of dummy variables

Dummy variables	Frequency	percent	cumulative
Sex of household			
Female	12	17.4	17.4
Male	58	82.86	100
Total	70	100	
Martial status			
Single	1	1.43	1.43
Married	51	72.86	74.29
Divorced	9	12.86	87.14
Windowed	9	12.86	100
Total	70	100	
Credit access			
No	35	50	50
Yes	35	50	100
Total	70	100	
Market information			
No	38	54.29	54.29
Yes	32	45.71	100
Total	70	100	
Extension service			
No	34	48.57	48.57
Yes	36	51.43	100
Total	70	100	
Chickpea variety			
Desi	33	47.14	47.14
Kabuli	21	30	77.14
Both	16	22.86	100
Total	70	100	

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APPENDEX C: REGRESSION TABLE

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