



Agricultural Financing and the Role of Formal Financial Institutions in Improving Rural Livelihood: In Case of West Guji Zone Selected Weredas

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ABSTRACT

Agricultural sectors play an important role in the process of economic development of a country, especially in developing countries like, Ethiopia. Credit is vital to increase the productivity of agricultural operations or to diversify the economic activities of rural households. However, one major constraint facing farmers is lack of access to formal sector credit that enable them to take advantage of economic opportunities to increase their level of output, hence move out of poverty. As a result, this study aimed to examine access to agricultural financing and its role in improving the rural poor livelihood in the case of West Guji zone. To achieve this objective, both descriptive and explanatory designs along with quantitative research approach were employed. The target population of this study comprises of smallholder farmer in West Guji zone particularly households of three randomly selected woredas (Dugda dawa, Bule Hora and melkasoda). Out of 51,835 total numbers of rural households in three selected woredas, 397 samples were selected purposively. This study utilized direct elicitation approach and ordinary least square method (OLS) to analyze the data. By using the direct elicitation approach, this study found that, about $\frac{3}{4}$ or 75% of farm households were credit constrained. In other words, only $\frac{1}{4}$ or 25% of rural farmers have access to agricultural credit. The result also reveals that the share of formal institutions were only 10% while the remaining 90% of credit demand of households were financed by semi-formal and informal institutions. In addition to this, the simple regression result also reveals that there is a significant and positive relationship between access to finance and agricultural productivity. However, a credit constraint had a negative impact on the agricultural growth. Therefore, the study recommended that it is critical to strengthen both the agriculture and financial sectors through inaugurating an intelligible strategy with consistent regulation and policies that match the sectors' needs and in line with the realistic capacities of all the actors in both sectors.

Key Words: *Agricultural Financing, Credit constraint, agriculture productivity, rural financial service.*

1. INTRODUCTION

Ethiopia's economy depends on agriculture that contributes 43% of the GDP, 80% of employment, generates an estimated more than 75% of the export earnings and agriculture directly supports 85% of the population's livelihoods, NBE (2015). It is also stated in the Ethiopia's Agriculture Sector Policy guide that the most prominent and enduring economy-wide strategy to guide development efforts has been agricultural development-led industrialization (ADLI). Farming is believed to be a generator of employment directly and indirectly while ensuring food security for Ethiopians. Critically, agricultural growth was an important driver of poverty reduction in Ethiopia: Each percent of agricultural growth reduced poverty by 0.9 percent compared to 0.55 percent for each percent of overall GDP growth (World Bank, 2015). The Government of Ethiopia has made marked progress in agriculture over the past decade. However, from the point of view of the financial sector, agriculture is a less attractive field of business than other sectors of the economy. The reason is that, Agricultural businesses are characterized by cyclical performance, seasonal production patterns, high capital intensity, leasing of farmland, participation in government programs, and annual payments of real estate loans. Because of these characteristics, a loss in agricultural lending is frequent and large (Arindam B, 2007). Moreover, several characteristics of the agricultural sector make it less attractive to serve for financial institutions than other sectors; these include low levels of profitability due to limited economies of scale as well as high transactions costs for financial institutions when serving the sector. The latter, in turn, are determined by small transaction sizes, "lumpy" repayments, illiquid and perishable collateral, risky cash flows with high covariance across borrowers, physically dispersed clients living in difficult to reach locations, and diverse sub-businesses with distinct dynamics Amha and Peck, (2010).

In an agriculture-dominated economy, for raising agricultural production, among the several inputs needed the important input that enables the farmers to use the other inputs is the capital or credit. It is not only a primary and paramount factor but also all the other factors are being utilized properly with the help of it. The problems or hindrances, if any, of the agricultural sector would be easily solved if adequate and timely credit provided is available. In Ethiopia, the financial service offers to the agricultural sector face gaps in terms of access, product quality, and quantity. In terms of access, only few financial institutions serve rural areas in Ethiopia that leads to low levels of financial inclusion. The role of the current growing microfinance institutions and other financial cooperatives in providing financial services to the mostly unbanked community is unquestionable. However, still there is a huge demand supply gap. The overall Ethiopian economy is significantly credit constrained. In addition agriculture is strongly affected by this credit crunch compared with other sectors of the economy due

to its sectorial specificities Amha and Peck, (2010). Besides, the sector still has difficulties in accessing credit from the formal financial institutions to increase their performance through modern farming. To sum up, the current global financial system and number of factors are hindering the development of solid financial services in rural areas in most developing countries like Ethiopia:

First, transaction costs in rural areas are higher than in urban areas due to more dispersed population with weak infrastructure. This idea was supported by International Fund for Agricultural Development IFAD, (2009). As stated in the study conducted by Amha and Peck (2010), particularly in Ethiopia geographically dispersed clients living in difficult to reach locations; with on average 81 people per square kilometer. The Ethiopian population is more dispersed than most Africa countries such as Nigeria, Uganda, Malawi, and Ghana. This is problematic especially in the rural sector where 83 percent of the population lives. In addition to this, it is the fact that only 12 percent of the road network in Ethiopia is paved, and road density remains at only 30 km of road per square kilometer of land, one of the lowest densities in Africa. Only about 30 percent of the population in Ethiopia has access to all-weather roads. Telephone and Internet penetration is also very low compared with other African countries, which prohibits the use of remote banking channels that would allow financial institutions to reach clients more cost effectively than with traditional institutions. NBE reports (2009) moreover, currently there are about 38 legally registered MFIs in Ethiopia which mainly address the financial needs of the rural poor but which meet only 20 percent of the demand for credit for the agricultural sectors as stated in the study of Amha, (2011). This idea is also supported by the study conducted by Wegayehu B. and, Mmatlou K. (2017), stated that the demand for microcredit is far from the supply, an estimated of 80 percent of rural demand for loans is still uncovered. This reveals there is a need to conduct studies in order to identify the challenges that hinders farmers from accessing credit markets.

Second, and more importantly, the risk factors inherent in agriculture often inhibit financial institutions from lending. These include production risks linked to natural hazards (such as droughts, floods and pests), farmers' weak ability to provide collateral (either because the farmer lacks title to land to offer as a loan guarantee or the value of the land may be too low) and the volatility of prices (IFAD, 2009). Third, the financial sector may not be sophisticated enough in some developing countries such as Ethiopia. The availability and innovation on sector-specific financial instruments and services is usually poor. Even though financial services may be available, they may not be suitable for all types of agricultural activities, which will have diverse needs with respect to timing for disbursements, amounts and risks among others. On the other hand, the offer of financial products

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may only be available to large-scale farming operations with sound track records and therefore may not meet the specific needs of the client. Besides this, it is also stated in the report of NBE, (2019) that, about 34.6 percent of bank branches were located in Addis Ababa. This also indicates that only limited numbers of formal institutions were serving the massive demand of rural credit. In other word, the researcher was inspired from the observed low rural banking density in Ethiopia and the subsequent lack of extensive access to financial services by smallholder farmers. Hence, the researcher aimed to examine access to agricultural finance by identifying challenges of agricultural financing in order to search for the appropriate financial model for rural farmers to fill the gaps.

1.1. Research Questions

This study tried to answer the following four major research questions:

1. What are the roles of formal financial institutions in improving the rural livelihood?
2. From where the rural farmers get financial services?
3. How access to finance affects the growth of agricultural products?
4. What are the challenges of access to agricultural financing in West Guji zone?

Thus, the main objective of this study was to examine access to agricultural finance and the role of financial institutions in improving rural poor livelihood of selected woredas in west Guji Zone.

In line with the general objective, the study tried to achieve the following specific objectives:

1. To assess the roles of formal financial institutions in improving the rural livelihood.
2. To identify the major financial service provider for agricultural sectors.
3. To determine the effect of access to finance on the growth of agricultural products.
4. To pinpoint the challenges of access to agricultural financing.

1.2. Research Hypothesis

In addition to the above stated research objectives the following single research hypothesis was tested empirically through this study. It was developed based on the following theoretical justification: Access to finance is critical for the growth of the agriculture sector. Access to credit, however, has an economic benefit only when that access generates a broadly defined net economic surplus after having deducted the private and social costs of loan provision (including the opportunity costs of scarce public funds in alternative poverty reduction policies). While the evidence on the impact of credit on household welfare, agricultural technology adoption, and on agricultural sector, growth is mixed. Many literature reports shows that mixed may have positive/negative or no significant impact of access to

credit on household welfare. However, based on this preliminary justification the formulated hypothesis was:

Ho: There is no any relationship between access to finance and agricultural growth.

H1: There is a relationship between access to finance and agricultural growth.

1.3. Theoretical framework

The provision of financial services to agricultural players (i.e., the consumer perspective of agricultural finance) analyzed in the context of the overall agricultural finance "ecosystem." This ecosystem in turn consists of four key elements: (1) the characteristics of the financial sector, (2) the characteristics of the agricultural sector with relevance to financial services, (3) the capabilities and performance of financial sector players, and (4) the agricultural consumer perspective. The characteristics of the financial sector, such as industry structure, regulation, and countrywide technological infrastructure, determines how banks serve other sectors including agriculture. They also determine the capabilities and performance of financial sector players, for example, how well they perform risk management or how profitable they are. The characteristics of the agricultural sector with regard to finance, e.g., its size and risk-return profile, further specify how banks serve agricultural clients, i.e., what level of access or services they offer. Financial institutions' capabilities and the specifics of the agricultural sector together determine how and what services are provided to agricultural customers, i.e., the agricultural customer perspective. All these factors also directly or indirectly affect agricultural productivities. The conceptual framework for this study was adopted from the diagnostic study conducted on Agricultural financing By Wolday Amha and David Peck (2010 p.14):

Figure: 1 summarizes this framework and illustrates the relationship between these four elements.

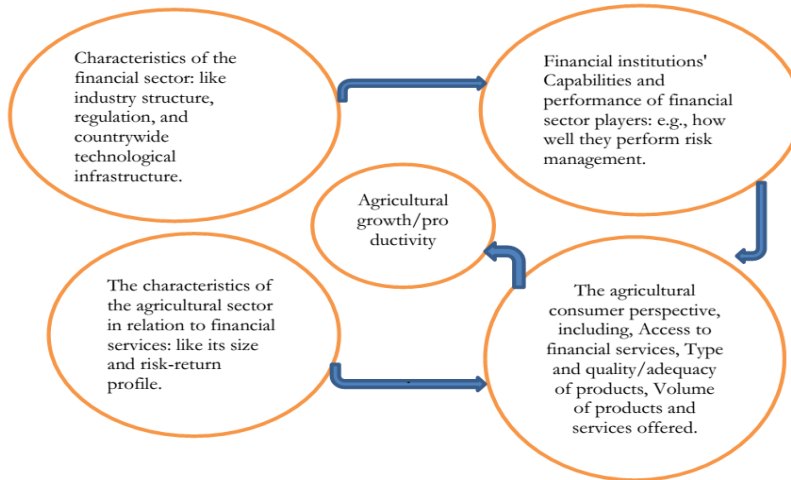


Figure 1: Conceptual framework

2. Research Design and Methodology

The researcher used both descriptive and explanatory research design because descriptive type of research design is essential to observe, describe and document aspect of situation as it normally occurs. Then, explanatory research design builds on descriptive research reports and goes to identify the reasons for something that occurs. It looks for causes and reasons. Thus, it enables the researcher to get a deep understanding about the area being investigated. Since, the aim of the paper was to examine the challenges of agricultural finance and the effects of access to finance on agricultural development, these two types of study are invincible to achieve the stated objective. This study employed quantitative approach in order to understand and analyze the possible challenges of agricultural finance. Quantitative research approach translates the research problem in to specific variables, research questions and hypothesis to be tested. Yesgat (2009) noted that, a “quantitative research approaches test the theoretically established relationship between variables using sample data with the intention of statistically generalizing for the population under investigation”. Thus, this study would be conduct to test the relationship between access to agricultural finance and agricultural growth. The study used survey strategy using self-administered questionnaire due to the following reasons: surveys are relatively inexpensive (especially self-administered surveys), the rapid turnaround in data collection and surveys are used to generalize from a sample to a population so that inferences can be made about some characteristic, attitude, or behavior of the intended population (Babbie, 1990), than other

method. Hence, for this study mainly primary data was used. Primary data were collected from the smallholder farmers through questionnaires.

As noted by Cohen et al. (2005) the “questions of sampling arise directly out of the issue of defining the population on which the research will focus”. Further, they stated, “factors such as expense, time and accessibility frequently prevent researchers from gaining information from the whole population. Therefore, they often need to be able to obtain data from a smaller group or subset of the total population in such a way that the knowledge gained is representative of the total population under study” (Cohen et al. (2005) P.92 Thus, the target population of this study were smallholder farmers in West Guji Zone. In the zone, there are a total of nine 9 woredas and according to the data of Zone trade and industry office the total households both in urban and rural were 327,252. Hence, as noted by Cohen et al. (2005), covering the entire households in the Zone was both costly as well as time consuming. Because of this, the researcher decided to select only three woredas (Dugdawa, Bule Hora and Melkasoda) through simple random sampling because this technique gives equal chance for each woredas being included in the sample and to ensure the representativeness of the sample. The total number of rural households in three selected woredas was 51,835. As stated above, to select the woredas probability sampling method particularly simple random technique was used while to select households from each woredas non-probability sampling method particularly purposive technique was used. Under the purposive sampling, the organizers of the inquiry purposively choose the particular units of the universe for constituting a sample out of a huge one will be typical or representative of the whole. Therefore, the technique was used for this study, because the data would be only gathered and obtained from those household who were engaged in farming activities. For sample size determination, Yamane (1967), sampling formula for calculation of sample size was used for this study. According to him, given total number of population (N), sample size can be calculated based on the following formula:

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

Where:

N=Total population

n=Sample size and

e= the level of precision

Degree of precision: Researcher must take into account two factors when considering the size of the sample needed to ensure a valid survey: the amount of acceptable error and the expected magnitude

of the population proportions. Sampling error also called the ‘degree of precision’. Is the margin of permissible error between the estimated value and the population value. In other words, it is the measure of how close an estimate is to the actual characteristic in the population. Unfortunately, there are no broad rules of thumb as to the acceptable margin of error. High level of precision requires larger sample sizes and higher cost to achieve those samples. A good way to determine the acceptable margin of error is to look at literature describing similar surveys to see what margin of error was used. By considering this case 5% was used for this study. Therefore, given this 5% sampling error, the total sample was calculated as follows using the above formula:

$$n = \frac{51835}{1+51835(0.05)^2} = 396.93692 \approx 397$$

Hence, the sample size calculated were allotted to each woredas according to the proportion of the total households under table 3.1

Table 3.1: sample size from each woredas

Selected Woredas	Total number of Rural households	Samples taken from each woredas in proportion to the total population.
Bule Hora woreda	28,784	221
Melka Soda Woreda	10754	82
Dugda Dawa	12297	94
Total number of households	51835	397

Source: Calculated by the author based the data taken from zone trade and investment office

2.1. Methods of data analysis

As stated in the literature part, there are two frequently used methodologies for measuring household access to credit and credit constraints. These are the indirect and direct methods of identifying credit-constrained households. The former method infers the presence of credit constraints from violations of the assumptions of the life-cycle or permanent income hypothesis (LCH/PIH), while the latter collects information directly from household surveys on whether households perceive themselves to be credit constrained using a step by step sequential procedure Boucher et.al, (2006). On the relative importance of these procedures, this study argues that the direct approach, which is also called the 'direct elicitation approach', enjoys substantial improvements compared to the procedures followed by the LCH/PIH to detect credit constraint issues (see similar papers by Ali and Deininger, 2012; Ali et.al, 2014).

Therefore, in light of the direct approach, researcher directly began by eliciting credit-constrained farmers from those who are not. Finally, if a typical farmer were constrained, further investigation on

the causes and forms of constraint that the farmer experienced would be analyzed. In addition, in order to empirically investigate the impact of credit constraints on agricultural productivity, Ordinary Least Square method (OLS) was employed to establish a relationship between access to credit and agricultural output using Eviews9 software packages. Commonly, agricultural output function depends upon the inputs like land, labor, capital and quantities of other inputs such as water, fertilizer, pesticides etc. However, in this study, agricultural output is used as dependent variable and output is assumed a function of availability of credit, labor force, cropped area, water and all those inputs, which are purchased, with the help of credit such as seeds, fertilizers, tractors and tube wells. However, instead of taking seeds, fertilizers, tractors and tube wells, only credit was taken as independent variable for this study with the assumption that, credit is used to buy all these inputs.

2.2. Model Specifications

Based on the above discussion the model showing the impact of credit on agricultural output was developed as follows:

$$AGg_{it} = \alpha + \beta_1 ACC + \epsilon_{it}$$

Where AGg_{it} is, the dependent variable or it is the agricultural output of farmer (i) to the period t, which starts from the year 2015 to 2019, α is the intercept of the equation. β is the slope coefficient for independent variables. Where $i = 1, 2, 3, \dots, 397$ sampled farmers whose credit request was fully or partially accepted and received credit and ϵ represents the error term.

3. Analysis and Discussions of Results

This section of the paper focuses on the analysis and discussion of the findings. Three hundred ninety seven (397) smallholder farmers were taken as a sample from the three woredas, but only 380 were responded to the questionnaires; this resulted in 95.7% response rate. Summary of descriptive statistics and simple regression results from the Eview 9 output were presented in a tabular form from where detailed analysis and discussion of the result was given. As already stated in the methodology part, this research applied “Direct elicitation approach” of credit constraint testing. Therefore, according to this approach, the definition or theoretical justification for credit constraint was given bellow in Figure2 and the analyses were built on this justification. The model was adopted from Ali, et, al (2014).

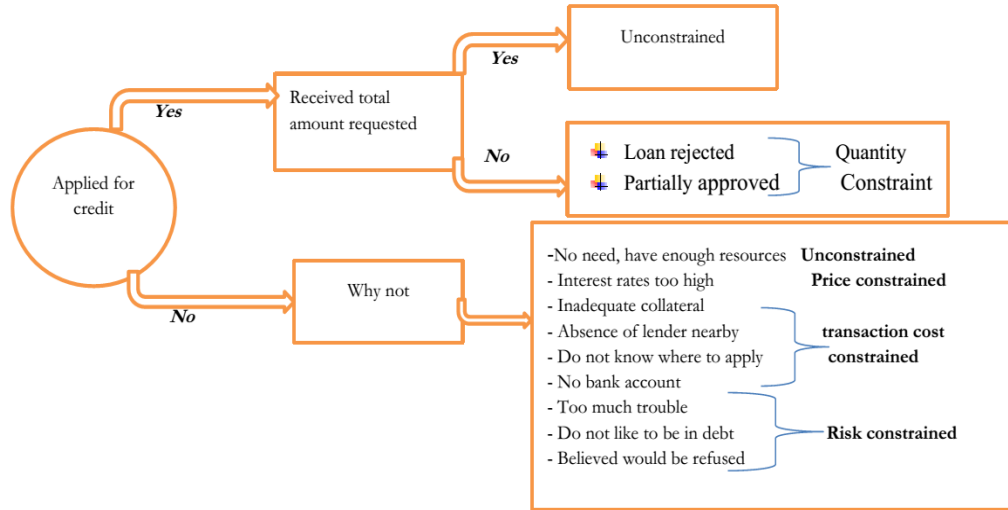
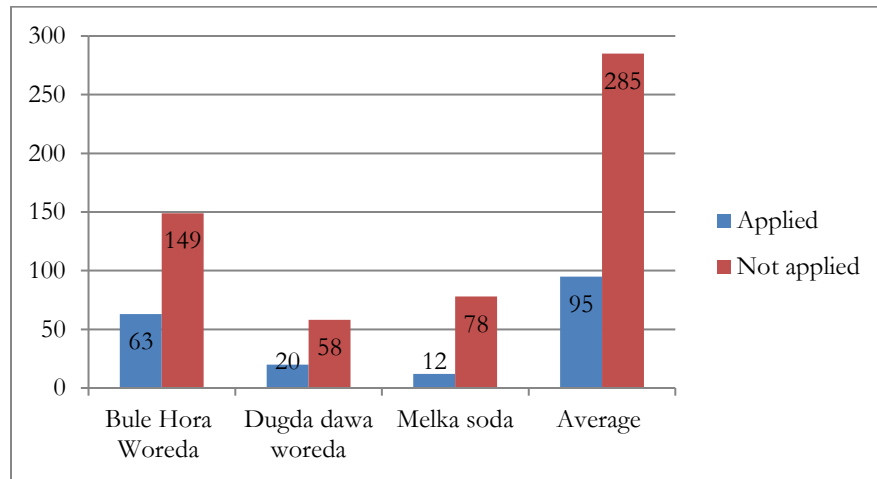


Figure: 2 definition of credit constrained

3.1. Application for Agriculture finance

As stated earlier, the first step in the survey based direct elicitation approach was seeing the agricultural credit application status of the household. It proceeded with another question for non-applicants to see the reasons why they are not applied as it will help us to investigate the challenges that discourage the farmers. Hence, the following Figure 4.1 shows the credit application status of farmers.

Figure 4.1 credit application status of the households



Source: authors own survey result 2019/2020

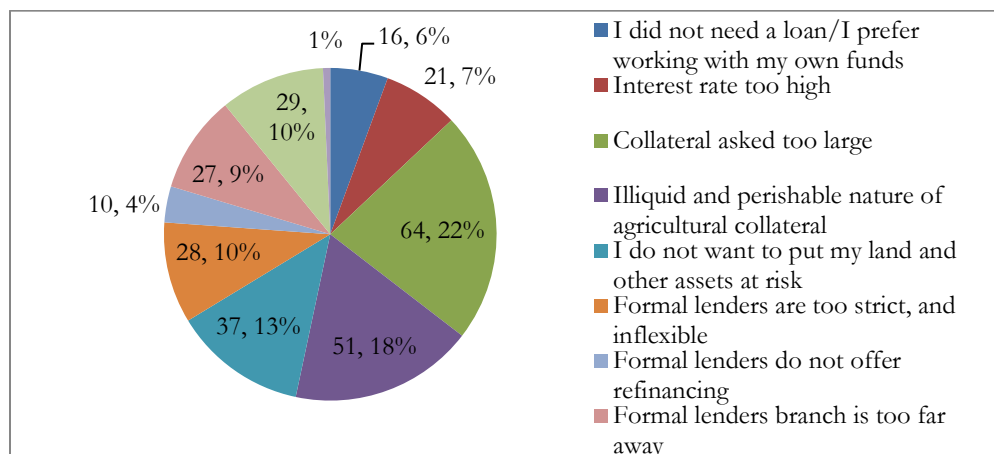
As it is marked from the above Figure 4.1, among those households participated in the survey, only (95)25 percent of them applied for agricultural production credit from all sources. The credit application pattern of households is also not uniform for the three-targeted woredas where the study relies on. Compared to Bule Hora and Dugda dawa woreda, households in Melkasoda woreda were

less applied for credit. This massive variation may be explained by lack of technical infrastructure or distance from the zonal city where most formal institutions are operating inhibits the use of remote channels as an alternative. That means, formal financial institution branches are concentrated in urban areas where only a small fraction of the population lives. Consequently, these households are then forced to rely on informal channels significantly at worse conditions than those who are offered by financial intermediaries. However, apart from the stated meager reasons of more and less application status of households, the following part provides us the aggregated reasons for not applying which gave us the foundation to decide on households' groupings of being credit constrained or unconstrained.

3.2. Reasons for not applying for Agricultural credit

This is one of the strengths of direct elicitation approach as it shows us the participant's reasons for not applying for agricultural credit. On the survey questionnaire, non-applicant households had been given options to choose among different reasons for not applying. By analyzing those reasons, the researcher reached on concluding remarks in grouping the households as either has access to finance/ unconstrained or restricted from access to finance/ constrained. This also helps the researcher to identify the challenges of agricultural financing.

Figure 4.2: Reasons for not applying for agricultural credit



Source: authors own survey result 2019/2020

As clearly indicated on Figure 4.2 above, among the entire non-applicants 6 percent of them responded that they did not apply because they do have their own fund to finance their agricultural activities. On the other hand, 7 percent of non-applicant households reported that they did not apply because the interest rate the lenders charged is very high. These groups of households are called price-

rationed households. They are not credit constrained as they can still obtain loan on the ongoing market interest rate, which they considered it very high. These are the only two reasons i.e. having own fund and price rationed of non-applicants that label them as credit unconstrained. The remaining all reasons for not applying for agricultural credit are associated with credit rationing in one way or the other.

Again from Figure 4.2, above we can also see that many of the households (22 percent) responded that they fail to apply for credit because the collateral requirement of credit is very high and (18 percent) unaffordable on their stake (illiquid and perishable nature of agricultural collateral) respectively hinder them from getting credit. Typical collateral in the agricultural sector is agricultural output, farming equipment, land or buildings. Agricultural output is normally perishable, which limits its use as collateral and also since, farmers generally cannot own land titles. Land is also not acceptable collateral in this business even under the new land registration scheme. The above Figure 4.2, also exhibit that households are not applied for credit because they do not want to put their land and other assets at risk (13 percent), Formal lenders are too strict and inflexible (10 percent), it's too time consuming to deal with Formal lenders (10 percent) and Formal lenders branch is too far away (9 percent) respectively. To justify this, as stated in the conceptual framework access to finance is determined by three basic factors among these one is the financial regulation or policy; NBE was empowered to license, supervise, and regulate the delivery of financial services to the poor through MFIs. However, there is lack of openness and flexibility for the financial sector to offer the financial instruments needed for the rural sector.

3.3. Agricultural Credit application Result or the outcome

Application of households may end up with three different answers from financial service providers, i.e. they may get full approval, partial approval or totally reject, after applying for credit, the final result is up to the interest of the credit provider, it may be formal, semi-formal and informal sources of credit where the household applied.

The following Figure 4.3 depicts the response of credit suppliers for farm household's application.

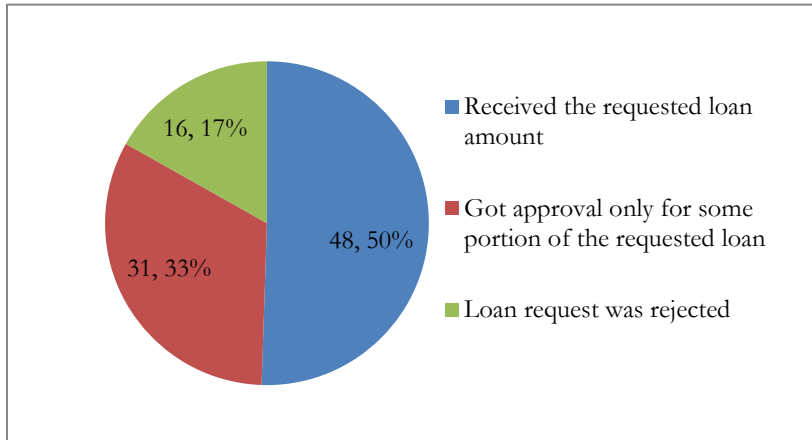


Figure.4.3, Agricultural credit application result of households

Source: authors own survey result 2019/2020

As revealed in Figure 4.3 above, 50 percent of households get the amount of credit they applied. Hence, those households who are able to obtain the total amount of credit they demand are counted as unconstrained as there is no any excess demand for credit. While the remaining households those who got partial approval and rejected at all 33 and 17 percent respectively are combined to accounting 50 percent. These two groups of households are labeled as credit constrained.

3.4. Sources of agricultural finance for rural households

The diverse system of agricultural finance enables a wide variety of actors to be financiers. Different actors cover different risks and instruments. However, the most common finance providers for farmers and small entrepreneurs are: Micro Finance Institutions, saving and credit cooperatives and unions or mutual credit guarantee schemes, Idir, Ikub, family and friends are some of them. As already discussed in Figure 4.3, out of the 95 households applied for agricultural credit, only 79 households got credit either fully or partially. The following Figure 4.4 in the next page presented the recognized source of finance for the smallholders.

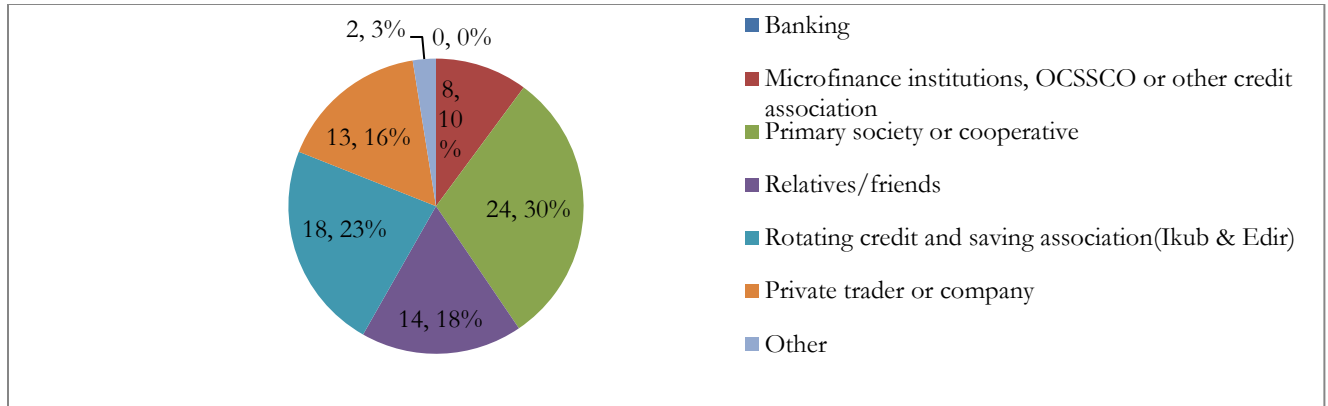


Figure 4.4: source of credit for rural households

Source: authors own survey result 2019/2020

The above Figure 4.4 shows the source of agricultural credit for those households who got credit. The largest share is founded by primary society or cooperatives. From the entire partially or fully accepted households, 30 percent of them obtained credit from primary society or cooperatives. This is because agricultural inputs are delivered by *kebele* cooperatives on cash or credit as per the ongoing strategy of the Ethiopian fertilizer and other agricultural input delivery system. The second higher supplier of agricultural credit is from rotating credit and saving association (Ikub & Edir) 23% followed by Relatives/friends 18%, Private trader or company 16% and Microfinance institutions, OCSSCO or other credit association 10% respectively. This implies that formal financial institutions are playing fewer roles in rural agricultural financing compared to semi-formal and informal institutions. This idea is also supported by the number shown in Figure 4.4, the share of formal institutions were only 10% while the remaining 90% of credit demand of households were meet by semi-formal and informal institutions.

3.5. Application for credit and credit constraint Status of Households

Formerly, in the above three Figures (Figure 4.1, 4.2 and 4.3), the agricultural production credit application status and its outcome have been seen. Now this part explains the credit constraint status of applicants and non-applicants. Parts of households did not apply because they did have their own funds while other non-applicants are considered as discouraged households. Therefore, did not applied does not mean credit unconstrained as far as these households are discouraged, i.e. they are counted as credit constrained households. So let us see if application significantly reduces the possibility of being credit constrained. The following Figure 4.5 presented the credit constraint status of households:

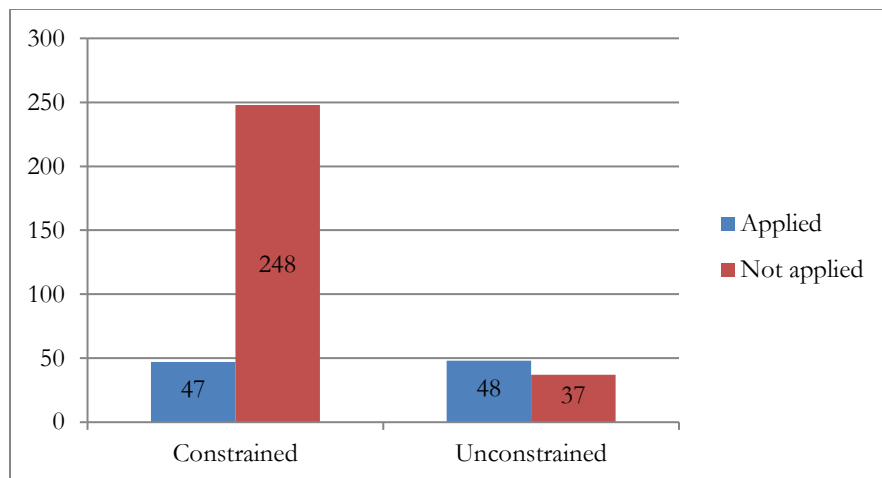


Figure 4.5 Credit constraints Status

Source: authors own survey result 2019/2020

According to the above Figure 4.5, among the constrained groups of households 47 (16%) of them are applicants while the remaining 248(84%) are non-applicants. However, from the total unconstrained household groups, 48(56.5%) were applicants and the remaining 37(43.5%) were non-applicants. This does not mean that non-applicants have a relatively good probability of being unconstrained. However, if we see the relative possibilities of applicants and non-applicants to be credit constrained and unconstrained, applicants enjoy a considerable advantage over non-applicants. Generally, out of 380 households 285 (248 applied plus 37 non-applicant) about 75% were credit constraint. Whereas the remaining 95 (47+48) or 25% were unconstrained.

3.6. The type of credit rationing faced by the Households

As it is stated on the analysis model presented by figure2, of this paper and based on the reviewed literature, there are four types of credit rationing. These are: transaction cost rationing, risk rationing, quantity rationing and price rationing. A typical household experiencing the first three types of credit rationing is said to be credit constrained. On the other hand, households, which are counted to be price rationed, are not constrained, as they are able to obtain credit at the ongoing market interest rate. Figure 4.6, bellow identified the type of credit rationing experienced by the households based on the data presented on the table 4.2 above.

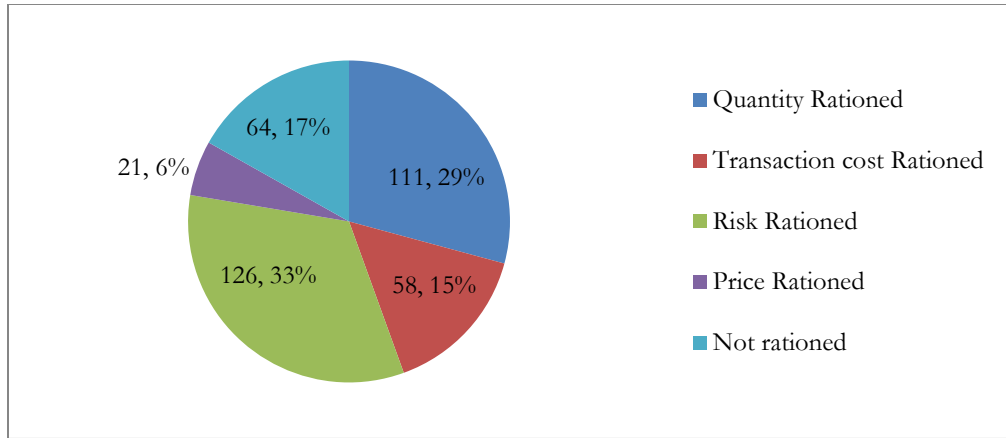


Figure 4.6 Types of credit rationing

Source: authors own survey result 2019/2020

From the above Figure 4.6, one can realize that from the entire households considered in the study, 33 percent of them are risk rationed or also called demand side constraint. Risk rationed farmers do not face a binding limit, but the limiting constraint comes from the demand side. Their demand is lower because of the risk-sharing rules associated with the loan contract. Risk rationed households includes; those who has constrained due to illiquid and perishable nature of agricultural collateral, those who do not want to put their land and other assets at risk, those who perceives Formal lenders are too strict, and inflexible and Formal lenders do not offer refinancing.

In the above Figure 4.6, the second highest number accounts 29 percent of constrained households, which is quantity rationed or supply-side-constrained. A quantity-rationed farmer faces a binding credit limit. Therefore, the limiting constraint comes from the supply side. Quantity rationed farm households include those who are applied but totally rejected, partly accepted, and who did not applied because the institutions they want to apply needs collateral guarantee. The remaining types of rationing which are counted for credit constrained households are transaction cost rationing which accounting almost 15 percent from the overall 380 credit constrained households. These households include those who are constrained due to Formal lenders branch is too far away and too time consuming to deal with Formal lenders. Finally, households in either of the last two rows leveled as price rationed and not rationed accounting 6 and 17 percent, respectively, are counted as unconstrained households.

3.7. Regression Analysis

This section of the paper focuses on the analysis of simple regression results. The regression outcomes from the Eview 9 were presented in a tabular form, from where detailed analysis and discussion of the result was given. As already stated on the methodology part, the dependent variable of this study

was agricultural productivity, which is measured based on the average output in terms of Quintals. Whereas, independent available of the study was, access to finance/credit which is measured by the total amount of credit borrowed by the farmer. Due to the data used for this study is a cross-sectional data there is no need to test for data stationary or unit root test, but some of the necessary Diagnostics tests are conducted to check the validity of OLS model assumptions as follows:

3.7.1. Diagnostics tests

Assumption 1: Errors have zero mean or $E(u_t) = 0$

The first assumption required is that the average value of the errors is zero. If a constant term is included in the regression equation, this assumption will never be violated. Since the regression model used in this study includes a constant term, this assumption cannot be violated.

Assumption 2: Homoscedasticity (variance of the errors are constant $var(u_t) = \sigma^2 < \infty$)

It assumes that the variance of the errors is constant; this is known as the assumption of homoscedasticity. If the errors do not have a constant variance, they are said to be heteroscedastic. The presence of Heteroscedasticity makes ordinary least square estimators not efficient because the estimated variances and covariance of the coefficients (β_i) are biased and inconsistent. Thus, the tests of hypotheses are no longer valid. There are many methods used to test the existence of Heteroscedasticity, in this study the researcher used Breusch-Pagan-Godfrey test.

Table: 4.1, Heteroscedasticity test

Heteroscedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.538127	Prob. F(1,77)	0.4654
Obs*R-squared	0.548273	Prob. Chi-Square(1)	0.4590
Scaled explained SS	0.641370	Prob. Chi-Square(1)	0.4232

Source: Regression output of Eview 9

From Breusch-Pagan-Godfrey test result above, it is obvious to say that there is no evidence for the presence of Heteroscedasticity because both the test-statistics i.e. F-and χ^2 reveals the absence of Heteroscedasticity since the p-value is more than 5% significant level. Therefore, the **H0**: that the variances disturbances are homoscedastic will not be rejected.

Normality test

One of the most commonly applied tests for normality is the Bera—Jarque (BJ) test. BJ uses the property of a normally distributed random variable that the entire distribution is characterized by the first two moments the mean and the variance. Bera and Jarque (1981), Formalize these ideas by testing whether the coefficient of skewness and the coefficient of excess kurtosis are jointly zero. A normal

distribution is not skewed and is defined to have a coefficient of kurtosis of three (3) with the histogram should be bell-shaped and the Bera--Jarque statistic would not be significant. This means that the p-value given at the bottom of the normality test screen should be bigger than 0.05 to not reject the null of normality at the 5% level. Figure 4.7, below presents the BJ test result for normality:

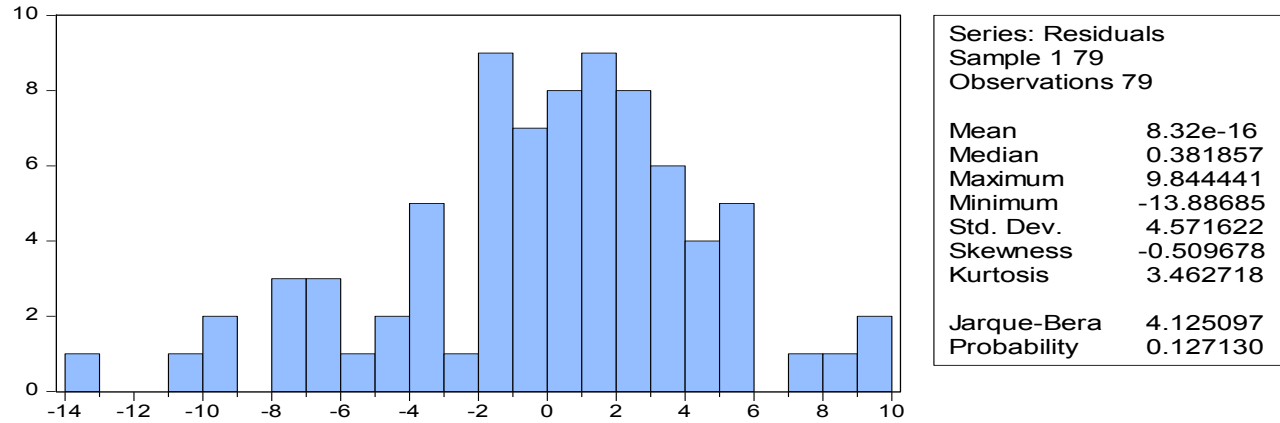


Figure: 4.7, normality test

Source: Regression output of Eview 9

Based on the test result above, the residuals were normally distributed because the kurtosis is almost near to 3 and its Jargue-Bera is insignificant at 5%, significant levels. In addition the histogram is relatively bell-shaped. Therefore, **H0:** that states residuals follow a normal distribution would not be rejected.

3.7.2. Regression Result

The summary of the regression outcomes from the Eview9 were presented in table (4.2), from which detailed analysis and discussion of the result was given.

Table: 4.2, Simple regression result

Dependent Variable: AGG

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ACC	0.000654	7.40E-05	8.833226	0.0000
C	12.54331	1.786365	7.021696	0.0000
R-squared	0.503309	Mean dependent var		27.64557
Adjusted R-squared	0.496858	S.D. dependent var		6.486748
S.E. of regression	4.601212	Akaike info criterion		5.915507
Sum squared resid	1630.178	Schwarz criterion		5.975493
Log likelihood	-231.6625	Hannan-Quinn criter.		5.939539
F-statistic	78.02588	Durbin-Watson stat		1.863852
Prob(F-statistic)	0.000000			

Source: Regression output of Eview 9

From the above regression outcome, it would be observed that the coefficient of determination of R-squared and Adjusted R-squared were 50.3% and 49.7% respectively. This implies that 49.7% of the change in agricultural productivity is successfully explained by the selected independent variable i.e. access to finance (credit). However, the remaining 50.3% changes in agricultural productivity were caused by other factors that were not included in the model. As already, stated earlier, agricultural output is not only affected by access to finance or credit but also depends upon other factors like land, labor, capital and quantities of other inputs such as water, fertilizer and pesticides. However, for this study it is assumed that all those inputs, which affect agricultural productivity, are purchased with the help of credit. Thus, it is possible to say that the model is an average fit with almost 50 percent predictive power. Regarding to the adequacy of the model the F-test which measures the existence of linear relationship between the dependent and independent variable revealed that a highly significant relationship exist between the variables.

In addition, it could be observed from the above Table (4.2), estimated regression result that access to credit (independent variable) was statistically significant at 1% of significance level. This implies that variation in this variable i.e. access to credit does affect agricultural productivity as per the model. Again, the result disclosed that the coefficient of explanatory variable was positive. This positive relation between access to credit and agricultural productivity found in this study confirms the findings of Abdelhafidh Dhrifi (2014). Access to credit significantly and positively contribute to improvements of agriculture productivity in the presence of a good quality of institutions.

The logical explanation for this finding is that credit serve as to purchase other agricultural inputs since the greater the proportion or availability of credit for farmer is the more use of necessary inputs and resulted in high agricultural productivity. In other words, providing credit to smallholders, adoption of new technology (e.g. hybrid maize) is being encouraged and the ability of smallholders to bear risk has increased through diversifying their agricultural activities and consequently, farm productivity will grow. Hence, from the result of regression output revealed in table 4.9 above, one could say that, a 0.65% change/increase in agricultural finance raises agriculture productivity by about 1%. Therefore, the findings of this study implies that access to a properly functioning financial system is likely to be beneficial to farmers, enabling them to improve their agriculture productivity, then improves their livelihoods and contribute to the development of their country. However, in opposite saying, lack of access to finance or a credit constraint had a negative impact on the adoption of

agricultural innovation, which ultimately might lead to limited agricultural growth, development and increased poverty.

4. Conclusions and Recommendations

4.1. Conclusions

In an agriculture-dominated economy like Ethiopia, for raising agricultural production among the several inputs needed, the important input that enables the farmers to use the other inputs is credit. However, the rural population represents a marginalized segment of society as far as access to financial services is concerned despite the important role that rural farmers play in the development of the rural economy and the national economy at large. Thus, smallholder farmers observed from low rural banking density in Ethiopia and the subsequent lack of extensive access to financial services inspired this study. To fill this gap the study developed both theoretical and empirical models to understand how credit constraints or lack of access to finance affects agricultural productivity.

Through, the use of the direct elicitation approach of this study found that $\frac{3}{4}$ or 75% (indicated by Figure 4.5) of farm households were credit constrained. In other word, only $\frac{1}{4}$ or 25% of rural farmers have access to agricultural credit. This unquestionably high rate was mainly attributed to risk constraint, quantity constraint and high transaction costs. Accordingly, 33% of constrained farmers were risk-constrained, 29% were quantity-constrained, 15% were transaction costs constrained, and 6% were price-constrained. Consequently, Credit constraint has many effects on the livelihood of farmers. For instance, constraints in credit markets can influence level of farm profits and farmer's resource allocation decisions, Credit constrained farmers will not be able to smooth their expenses over time implying that they will not make long-term investments and Farmers without adequate capital cannot invest in a new technology irrespective of that technology's potential benefits. Besides this, the study also indicated that being far away or distance from and to potential lenders resulted; the farmers were in higher probability of not applying for loans because farmers become discouraged due to high transport costs to reach the lenders. These distances also undermine farmers' ability to get sufficient information about financial services proposed by banks or microfinance institutions and the associated requirements to acquire such services.

The study further investigated the presence of widespread source of agricultural credit for smallholder farm households and it found that semi- formal and informal institutions are the major credit suppliers of small farmers. Formal financial institutions are playing fewer roles in rural agricultural financing compared to semi-formal and informal institutions. According to the survey result, the shares of

formal institutions were only 10% while semi-formal and informal institutions financed the remaining 90% of credit demand of households. According to the micro financing proclamation no 626/2009, the main purpose of a micro financing institution is collecting deposits and extending credit to rural and urban farmers and people engaged in other similar activities as well as micro and small scale rural and urban entrepreneurs. However, in this study the contribution of MFIs in financing small farm household is less (only accounted 10%) compared to the contributions of other semi-formal and informal institutions.

Finally, this study also found a statistically significant and positive relation between access to credit and agricultural productivity. According to the result, a 0.65% change/increase in agricultural finance raises agriculture productivity by about 1%. Therefore, this study finding implies, access to a properly functioning financial system is likely to be beneficial to farmers, enabling them to improve their agriculture productivity, then improves their livelihoods and contribute to the development of their country.

4.2. Recommendations

Based on the major findings of this study the following points were forwarded by the researcher as recommendations:

- As revealed in the result of this study, one challenge for access to agricultural finance or credit constraint was financial sector policy or regulation and capability of the actors of financial sectors. Thus, to attract finance and consequently, investment in the agriculture sector, it is critical to strengthen both the agriculture and financial sectors. This requires an intelligible strategy with consistent regulation and policies that match the sectors' needs and in line with the realistic capacities of all the actors in both sectors.
- The study also found that formal financial institutions are playing limited roles in rural agricultural financing compared to semi-formal and informal institutions or there is a gap in financial inclusions. Hence, to strengthen the role of financial institutions in rural areas and, at the same time, increase financial inclusion among the very poor, channeling public payments through existing financial institutions is recommended. Doing this would give more individuals the chance to interact with financial institutions and become familiar with this system.
- The other finding of the study indicated that being far away or distance from potential lenders resulted farmers in higher probability of not applying for loans because farmers become

discouraged despite the high transport costs to reach the lenders. As a result, to ensure a sufficient supply of credit in rural areas, the government could provide additional and targeted incentives for financial institutions to properly serve it. The purpose of these incentives would be making the rural sector financially attractive to serve for both public and private financial institutions.

4.3. Research implications and limitations

This paper provided information about agricultural financing challenges of rural farmers so that better understanding of challenges towards agricultural finance may assist policy makers in designing sustainable financial systems. This could serve resource poor farmers escape from poverty and its complements due to agriculture finance are strategically important for eradicating extreme poverty and boosting shared prosperity. However, the study was limited only to examine the effect of access to finance on agricultural productivity even if many variables determine the growth of agricultural outputs. Moreover, the study limited itself to short term credit; that would be distributed for agricultural production only.

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