Determinants of smallholder farmers' access to formal credit: A case of Selected Kebeles in Bilatte Zuria Woreda, Sidama, Ethiopia

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Abstract

Credit is highly demanded in different parts of the world, mainly for capital requirement to improve land, purchase of main agricultural inputs including fertilizers, seeds, pesticides, and purchase of farm machinery. The purpose of this study was to identify determinants that limit smallholder households' access to formal credit in Bilatte Zuria Woreda, Sidama National Regional State of Ethiopia. Primary and secondary data were used and analysed by using SPSS version 20 and STATA Version 14. A sample of 365 households were selected using multistage sampling techniques. Binary logistic regression model was used to analyse the quantitative data. The result of the study revealed that 41 % of the respondents in the study area had access to formal credit while 59 % of the respondents did not. The results further show that credit access was determined by the variables such as farm size, extension service, awareness of availability of credit service, age, income level, lending procedure, number of livestock. The study recommends accessibility of credit to smallholder farmers could be improved by innovative credit schemes that address the needs of smallholder farmers.

Key words: Bilatte Woreda, binary logistic regression, determinants, formal credit, smallholder farmers

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1. Introduction

Access to credit is very critical for smallholders in developing countries of the world. This is all due to total production of farmers and improvement in agricultural production per unit of input. Credit is a very important factor in different aspects of farming activities. Credit is highly demanded mainly for capital requirement to improve land, purchase machinery, seeds, breeding stocks, and fertilizers as well as payment of wages (Chandio et al., 2017).

Access to credit is an integral part of the lives of rural smallholder farmers in order to activate income generating activities and reduce poverty in developing countries (Samuel, 2020). If credit is used to purchase productive resources, it helps economic growth and adds to income. Additionally, credit is needed for farming purposes and as a bridging finance for family and consumption expenses especially between the planting and harvest periods. Thus, lack of access to formal credit by farmers negatively affects productivity (Chisasa, 2019). Credit could also lead to the creation of debt cycles.

Agricultural credit is an essential element for agricultural growth in developing countries. It is a temporary substitute for personal saving and it accelerates technology change to stimulate agricultural production by enhancing smallholder farmers' productivity, asset formation, and food security and subsequently, rural agricultural income (Samuel, 2020).

In Ethiopia, agricultural sector contributed over 85 % of export earnings, 44 percent of total Gross Domestic Product (GDP) and provides a livelihood to almost 73 percent of the population (DAG annual report, 2019). In addition, agricultural sector supports about 85% of the population that is completely dependent on agricultural related livelihoods, most of whom are poor people in the rural countryside. Therefore, agriculture is the fundamental stay of the economy (Kiros, 2012).

Most of the agricultural activities in Ethiopia are undertaken by smallholder farmers. Studies have shown that 94% of the food crops and 98% of the coffee are produced by smallholder farmers (Derrese and Zerihun, 2018). Large private and state agricultural activities produce only 6% of food crops and 2% of the coffee grown (G/Selassie and Bekele, 2013). From this, one can conclude to what extent smallholder farmers are the strategic candidates in enhancing the effort towards overall economic growth in Ethiopia (Derrese and Zerihun, 2018).

Improving agricultural productivity could be critical in reducing rural poverty. Enhancing access to appropriate credit services among resource-poor people has been increasingly considered as one means of tackling poverty. Access to credit helps farmers to acquire necessary farm inputs and technologies, make strategic investments in their farms, exploit opportunities by undertaking value adding activities, and in terms of accessing better market opportunities that fetch them higher return. Agriculture heavily depends on credit more than any other sector because of the seasonal variations in the farm income and a move towards commercial farming (Samuel, 2020).

Provision of access to formal credit is one of the major instruments used to reduce poverty and encourage rural entrepreneurship. Increasing accesses to formal credit holds the promise in reducing poverty and improve development outcomes by enabling the poor to smooth consumption and by increasing or diversify household income. Microcredit is established to benefit poor households who have not collateral and various requirements necessary to gain access to formal credit (Bauchet et al., 2011).

Access to finance is the most critical factor for the use of improved agricultural inputs and technologies. It provides funds for agricultural investments, enhances post-harvest practices, smooth household cash requirement and promotes better management of risks contributing to long term food security. But securing capital to purchase agricultural inputs, investing in farming machineries, and paying for transport to sell agricultural outputs is a challenge that smallholder farmers face in every harvest season (Derrese and Zerihun, 2018).

Credit plays a significant role in covering farm household consumption deficits. This would in turn help the smallholder farming family to work efficiently and effectively in its agriculture. Credit can further help as an income transfer means to remove the inequalities in income distribution among citizens (Assogba et al., 2017).

After harvesting crops during winter season, most smallholder farmers are busy selling their agricultural output in order to settle their earlier bills. Since the majority of the farmers are bringing their output to local market at the same time, the price of crops goes down and they are unable to earn appropriate price for their harvest. This situation indicates to what extent smallholder farmers are exploited because of lack of awareness and absence of access to formal credit and proper marketing channel (Mebrate, 2015). A considerable empirical investigation has been made outside Ethiopia on the determinants of access to formal credit. Studies conducted by Kiplimo et al. (2015), and Chivandire & Muhongayire (2019) indicated that access to formal credit for farmers rise when there an increase in age and education. Similarly, studies by Dzadze et al., (2012) and Dub et al., (2015), Sebatta et al., (2014) also showed that access to formal credit was determined by saving account, extension contact, distance to lending institution and education level of households. In addition, the other study showed that access to formal credit is not determined by education level of households (Chisasa, 2019).

Few researchers in Ethiopia have conducted studies used descriptive research design (Ayele & Goshu, 2018; Kiros, 2012; Muse, 2016; Samuel, 2020; Sisay, 2008). All the studies were conducted out of Bilatte Zuria Woreda. Those studies were used descriptive research design and do not include all variables that affect access to formal credit. This study seeks to fill the gap by adding those omitted variables such as Awareness of Availability of Credit service and Presence of Agricultural Subsidies that affect smallholder farmers' access to formal credit in the Woreda. The inclusion of these additional variables helped the study to explore the determinants that affect smallholder farmers' access to formal credit in the Woreda and it gives solution for the problems to improve access to formal credit.

General Objective

The general objective of this study was to identify the determinants of access to formal credit to smallholders in the Bilatte Zuria Woreda. The specific objectives of study are:

- To examine availability and accessibility of formal credit in study area.
- To identify the effects of demographic, socio-economic, and institutional characteristics of farmers that affect access to formal credit for smallholder farmers in study area.
- To investigate factor affecting small land hold farmers access to formal credit in study area

The research questions that the study addressed are:

a. How smallholder farm household finance their farming in study area?
b. What are the demographic, socio-economic, and institutional characteristics of farmers that affect access to formal credit for smallholder farmers in study area?
c. What are the major factors affecting smallholder farmers access to formal credit in study area?

2. Methodology

The Study Area

This study was conducted in Bilatte Zuria Woreda which is found in Sidama National Regional State, Ethiopia. This Woreda is largest maize production area in Sidama region. This woreda has geographical area of 39.405 square kilometers. It comprises 19 Kebeles of which two is urban Kebeles and the others 17 are rural. The Woreda is located 11056'and 13045' North latitude and 35011' and 35050' East longitudes geographical position and 334 km south of Addis Ababa, capital of Ethiopia (BZWOA, 2019).

Bilatte Zuria woreda is one of the major agricultural woreda in Sidama regional state. Among the 112,473 total population of the Woreda, 26,695 were living in rural areas and engaged in agricultural farming, animal husbandry, and trading activities. The climate condition of the Woreda is tropical and sub-tropical. The rainy months extend from June until the end of October. However, most of the rainfall is received during the months of July and August. The soils in the area are predominantly black and some are soils with vertex properties (IPMS, 2004). Two cropping seasons are there, from June to August and August to October. The main crops grown during these seasons are maize, potato, green pepper, sweet potato, wheat, and in some parts sugar cane and false banana (*Enset*) (BZWOA, 2019). The main livestock species are cattle, goats, sheep and poultry (BZWOA, 2019).

Research design and approach

This research was on the determinants of access to formal credit to smallholder farmers; it has used both descriptive and explanatory research design (Lewis et al., 2009).Mixed methods design as a method that includes both qualitative and quantitative data collection and analysis in parallel form (concurrent mixed

method design in which two types of data are collected and analyzed in sequential form) (Kemper et al., 2003).

Target population of study

The target population of this study was three randomly selected Kebele in Bilatte Zuria Woreda. These were namely, Yirba Gangeeso, Shamanna Goddo, and Maddo Mukaneka Kebele smallholder farmers. The total population of these three Kebele was 4,216 smallholder farmers from which sample was drawn (BZWOA, 2019).

Sampling Technique

A multi-stage sampling technique has been applied to collect the data. Firstly, Bilatte Zuria Woreda was purposively selected from the thirty six Woreda of the Sidama regional state in order to achieve depth understanding of smallholder farmers' determinants to access formal credit and for efficiency reasons given the limited time available for the study. The second stage, three Kebele from nineteen Kebele of the Woreda was randomly selected. At stage three, a proportionate sampling procedure was used to determine the number of smallholder households' to be selected from each of the selected Kebele based on the sample size. At stage four, the smallholder households in each Kebele were stratified into male and female headed farm households were randomly select from each category.

Sample size determination

According to Kothari (2004), the study sample size was determined and the symbol e is taken as indication to the desired level of precision (in this case, e=5%) with the same unit of measure e^2 as the variance of an attribute in the population. Concerned to this fact, the simplified formula developed by Yamane (1967) has been applied to this study as follows:

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

By inserting the above formula $n = \frac{4{,}216}{1+4{,}216\ (0.05)^2}$, $n = 365$

Table 1. Sample size computation for target population of the study

Name of kebeles	Male-headed households	Female-headed households	Total	Proportionate sampling from each Kebele	Strata actual sample size
Yirba Gangeeso	833	49	882	365∗ 882/ 4216 = 76	F =76* 49/882= 4
Shamanna Goddo	754	35	789	365* 789/ 4216 = 68	M=76*833/882=72 F= 68* 35/789=3
Maddo Mukaneka	2,455	90	2545	365* 2545/ 4216 = 221	M= 68*754/789= 65 F=221*90/2545=8 M=221*2455/2545=213

Total	4,042	174	4,216	365	365

Source: *Authors own computation, 2022*

Method of data collection and analysis

For the study both primary and secondary data were collected. The primary data was gathered from the interview responses of individual farmers through structured questionnaires. Secondary data was collected from Bilatte Woreda agriculture Office, and from other formal credit Institutions. Data were analyzed using descriptive and inferential statistics. In the study binary logistic regression model was used to analyze data by using different softwares such as SPSS and STATA. Descriptive statistics such as mean, standard deviation and percentage, were used to describe characteristics that can influence performance in credit use. In addition, mean comparison tools were applied between the characteristics of credit users and non- users and chi-square test was used for dummy variables.

Specification of the Logit Model

Both Logit and probit models guarantee that the estimated probabilities lie between the logical limit of 0 and 1 (Wooldridge, 2002).Due to these advantages, the Logit and the probit models are the most frequently used models when the dependent variable happens to be dichotomous. The logit and probit models are quite similar in most applications. The main difference between the two is in the nature of their distribution, which is captured by Cumulative Distribution Function (CDF). Probit has a normal distribution while logit has a logistic (slightly flatter tails) distribution and therefore, the choice of probit versus logit regression depends largely on the distribution assumption one makes (Gujarati, 2008). Due to its comparative mathematical simplicity, many researchers have used the logit regression model in practice. Sirak and Rice (1994) argues that logistic regression is powerful, convenient and flexible and is often chosen if the dependent variables is of categorical nature and/or it is not normally distributed. Some of the predictor variables in the study objectives are categorical and therefore this study would apply binary logit model to identify the factors that influence access to formal credit services among smallholder farmers. Hence, the logistic model was selected for this study. Therefore, the cumulative logistic probability model is econometrically specified as follows:

$$logit[P(X)] = ln\frac{P(xi)}{1-P(Xi)} = X\beta = \beta 0 + \beta 1x1 + \beta 2x2 + \beta 3x3 \ldots + \beta ixi + \mu \ldots\ldots\ldots\ldots\ldots (4)$$

Where ln is natural logarithm

$P(xi)$ is the probability farmers with formal credit access

$1 - P(Xi)$ is the probability farmers without formal credit access

Xi= represents the i^{th} explanatory variables

βi =is coefficient of i[th] explanatory variables

$$P(Yi = 1) = \frac{1}{1 + e^{(-\beta iXi)}} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (5)$$

Where P (Yi=1) is the probability of a farmer having a credit access

Xi= represents the i[th] explanatory variables

e= denotes the base of natural logarithms, which is approximately equal to 2.718

βi =is coefficient of i[th] explanatory variables

$$1 - P(Yi = 1) = \frac{1}{1 + e^{(\beta iXi)}} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (6)$$

Where $1 - P(Yi = 1)$represents the probability of farmers does not have credit

Xi= represents the i[th] explanatory variables

e= denotes the base of natural logarithms, which is approximately equal to 2.718

βi =is coefficient of i[th] explanatory variables

$$Credit\ acces = \beta 0 + \beta 1Age + \beta 2Sex + \beta 3Edulevl + \beta 4Coll + \beta 5FarmSi + \beta 6SaveCu + \beta 7Excont + \beta 8AACS + \beta 9TLO + \beta 10PAS + \beta 11Income + \beta 12LP + \beta 13Ir + Error \dots\dots (7)$$

Descriptions of abbreviations of above equation as follow:

Age=Age of household, Sex=Sex of household, Edulevl=Education level of household, Coll=Collateral, FarmSi=Farm Size, SaveCu=Saving Culture, ExtS=Extension Service, AACS=Availability of Awareness of Credit Service, TLO=Total Livestock Ownership, PAS=Presence of Agricultural Subsidies, Income=Income of smallholder, LP=Lending Procedures, Ir=Interest rate and $\beta 0$=Constant term $\beta 1$, $\beta 2 \ldots \beta 13$ are the coefficients associated with each independent variables which measure the change in the mean value of access to formal credit.

Table 2: Code of variables, Descriptions, Measurement, Type and their expected sign

Code	Description	Measurement	Type	Expected Sign
AFC	Access to formal credit	access=1, otherwise=0	Dummy	
AGE	Age of household head	Year	Continuous	+
SEX	Sex of household head	Male=1, Female=0	Dummy	+
Coll	Availability of Collateral	ifyes=1,if No=0	Dummy	+
Edulevl	Education Level	Years	Categorical	+
FarmSi	Total farm size	Hectare	Continuous	+

SavCu	Saving culture of household head	if yes=1,no=0	Dummy	+
Inco	Annual income of household	Birr	Categorical	-
TLO	Total Livestock ownership	TLU	Continuous	+
AACS	Awareness of Availability of Credit service	aware=1, otherwise=0)	Dummy	-
PAS	Presence of Agricultural Subsidies	available=1, otherwise=0	Dummy	-
LP	Lending Procedure of lenders	Complicated=1, not=0	Dummy	-
Ir	Interest rate of borrower	1=high, 0=low	Dummy	-
ExtS	Extension Service	Participated=1, Not participated=0	Dummy	+

Source: Author own survey construction 2022

3. Results and Discussion

Results

Cross tabulation of categorical explanatory variables describes the relationship between two categorical variables, we used a special type of table, *cross-tabulation* (or "crosstab" in short). In a cross-tabulation, the categories of one variable determine the rows of the table, and the categories of the other variable determine the columns. The cells of the table contain the number of times that a particular combination of categories occurred. The "edges" (or "margins") of the table typically contain the total number of observations for that category.

Table 3 shows the association between Extension service in row and access to formal credit in column. The proportion of respondents who have no extension service and no formal credit access 67.5% and the proportion of the respondents who have no extension service account and get credit access is 32.5%. The house holds who had extension service and do not get credit access is 48.9% and household head who had extension service and get credit access is 51.1%. Majorities of small land hold farmers who get formal credit were farmers who get information from extension service.

Table 3: Extension service * Access to Formal credit Cross tabulation

			Do you have formal credit access?		Total
			No	Yes	
Do you have extension service?	No	Count	129	62	191
		Expected Count	112.0	79.0	191.0
		% within Extension service	67.5%	32.5%	100.0%
		% of Total	35.3%	17.0%	52.3%
	Yes	Count	85	89	174
		Expected Count	102.0	72.0	174.0
		% within Extension service	48.9%	51.1%	100.0%
		% of Total	23.3%	24.4%	47.7%
Total		Count	214	151	365
		Expected Count	214.0	151.0	365.0
		% within Extension service	58.6%	41.4%	100.0%
		% of Total	58.6%	41.4%	100.0%

Source: survey result 2022

From table 4, the first row shows the results of Chi-Square test of independence: the x^2 value is 13.111[a] with 1 degree of freedom, which results in a p-value of 0.000. Since 0.000 is less than 0.05 we can reject the null hypothesis that the two variables are independent, thus we can say that extension service has an influence on formal credit access to small holder farmers.

Table 4: Chi-Square Tests for extension service

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	13.111[a]	1	0.000		
Continuity Correction[b]	12.352	1	0.000		
Likelihood Ratio	13.173	1	0.000		
Fisher's Exact Test				0.000	0.000
Linear-by-Linear Association	13.075	1	0.000		
N of Valid Cases	365				

Source: Crosstab output from survey (SPSS).

As depicted in the table 5 the survey result in the first row shows 65.9% of respondents said, lending procedure of formal credit institution is not complicated without credit access and 34.1% percentage of respondents said that lending procedure is not complicate with credit access. The second row of the table shows52.5% percentage of respondent said, the lending procedure of formal credit

institution is complicated without credit access and 47.5% percentage of respondent said that lending procedure is complicated with credit access. Majority of households 58.6% responded that without credit access due to lending procedure complication existed in the study area.

Table 5: Lending Procedure * Access to Formal credit Cross tabulation

			Do you have access to formal credit?		Total
			No	Yes	
Do you think the lending procedure is complicated?	Not complicate	Count	110	57	167
		Expected Count	97.9	69.1	167.0
		% within Lending Procedure	65.9%	34.1%	100.0%
		% of Total	30.1%	15.6%	45.8%
	Complicated	Count	104	94	198
		Expected Count	116.1	81.9	198.0
		% within Lending Procedure	52.5%	47.5%	100.0%
		% of Total	28.5%	25.8%	54.2%
Total		Count	214	151	365
		Expected Count	214.0	151.0	365.0
		% within Lending Procedure	58.6%	41.4%	100.0%
		% of Total	58.6%	41.4%	100.0%

Source: survey result 2022

Table 6, depicted in the first row shows that the results of Chi-Square test of independence: the x^2 value is 6.650[a] with 1 degree of freedom, which results in a p-value of 0.010. Since 0.000is less than 0.05 we can reject the null hypothesis that the two variables are independent, thus we can say that lending procedure service has an influence on formal credit access to smallholder farmers.

Table 6: Chi-Square Tests of Lending procedure

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	6.650[a]	1	0.010		
Continuity Correction[b]	6.111	1	0.013		
Likelihood Ratio	6.691	1	0.010		
Fisher's Exact Test				0.011	0.007
Linear-by-Linear Association	6.631	1	0.010		
N of Valid Cases	365				

Source: Crosstab output from survey (SPSS).

The respondents were asked whether they were aware of available of credit service in their community. Only 33.2% respondents were not having awareness and left out without formal credit access. They said that they were not aware because they do not attend farmers meeting and they were not interested in to have information about formal credit service in the community. Respondent who aware of availability of credit service (AACS) were 49.7% with credit accessed service. When we compare responds those who were aware of availability of credit service and accessed to formal credit was found to be 49.7% in the meantime, respondents who were without aware of availability of credit service and accessed to formal credit reached to 33.2%.

Table 7: Awareness availability of credit service * Access to Formal credit

			Did you have formal credit access?		Total
			No	Yes	
Did you have awareness about availability of credit service?	No	Count	123	61	184
		Expected Count	107.9	76.1	184.0
		% within awareness of credit service	66.8%	33.2%	100.0%
		% of Total	33.7%	16.7%	50.4%
	Yes	Count	91	90	181
		Expected Count	106.1	74.9	181.0
		% within awareness of credit service	50.3%	49.7%	100.0%
		% of Total	24.9%	24.7%	49.6%
Total		Count	214	151	365
		Expected Count	214.0	151.0	365.0
		% within Credit Institution	58.6%	41.4%	100.0%
		% of Total	58.6%	41.4%	100.0%

Source: Survey result 2022

Table 8, shows the results of Chi-Square test of independence, the x^2 value is 10.331[a] with 1 degree of freedom, which results in a p-value of 0.001. Since 0.001is less than 0.05 we can reject the null hypothesis that the two variables are independent, thus this tells us there is association between awareness of availability of credit service and formal credit access or awareness of availability of credit service has influence on formal credit access to small land hold farmers.

Table 8: Chi-Square Tests for Awareness availability of credit service

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	10.331[a]	1	0.001		
Continuity Correction[b]	9.659	1	0.002		
Likelihood Ratio	10.383	1	0.001		
Fisher's Exact Test				0.001	0.001
Linear-by-Linear Association	10.302	1	0.001		
N of Valid Cases	365				

Source: Survey result 2022

Discussion

The following interpretation and discussion is based the logistic regression output from the survey.

Age of the household head

In this study ages of the household head were treated as a continuous variable. The coefficient of age ($\beta_{1=}$ -0.022) is negative and statistically significant at 5% level of significance (p-value= 0.019). This implies that aging by one year will result in a 0.978 times declines the probability of getting formal credit access to smallholder farmers keeping other thing constant. It might be due to the fact that older farmers have larger capital basis not to look after formal credit. This finding is consistent with the result of Lawrence et. al., (2009), Chinasa & Kelechi (2015) Gebeyehu et al. (2019), and Waje, (2020), which states that the age of farmers were negatively and significantly associated with probability of accessing credit and the result shows that an increase in household age by one year leads to decrease in the probability of getting farmer‘s access to credit. It might be because older farmers had larger capital basis not to see for credit. This finding disputed the finding of Assogba et al., (2017) who found that age of household’s head does not significantly predict access to formal credit services.

Farmland size of household head

Farmland size is one of the main factors of production in agricultural. In the study area, size of farmland was found to be positive and significant determining factor of farmers’ formal credit access. Keeping other things constant as the size of farmland increased by 1hectare, the probability of getting formal credit access increased by 1.47. The reason for this might be that farmer who is cultivating large size of farmland can utilize much capital for labour and for other farm inputs and this trend leads to increase in demand for formal credit. On the other hand, this result contradicts with studies by Anbes (2005), which revealed that “the level of farm credit for fertilizer and high yielding varieties (HYV) varied inversely with farm size”. This may be true for fertilizer credit use, but in the case of farm labour it is different. Since farming in rural Ethiopia

especially in the study area is extensive, and in extensive farming when the size of the land increases the need for labour proportionally increases. This again increases operational expenses, which leads to the need for additional capital, and additional capital requirement leads to the demand for credit. However, this result is in line with the study of Miller and Ladman, (1983) who applied discriminant analysis to identify a set of socio-economic, physical and psychological factors that influence credit use among small farmers with a view to differentiate between borrowers, potential borrowers, and non-borrowers.

Extension Service (ExtS)

The results also revealed that the variable agricultural extension service was significant at a 5% level of significance (P-value, 0.002) and an odds ratio of 2.095. The results indicated that households who participate in agricultural extension service have a 2.095 times higher probability of having a formal credit access compared to the household that is not part of the agricultural extension service, other things remain constant. The fact that households who were not part of the agricultural extension service had less probability of demand for financial products could be because of the education farmers receive from agricultural extension workers. Farmers who receive an education are more likely to participate due to being exposed to various financial products. This research output is consistent with the finding of David, (2020), Dzadze et al. (2012) and Kiplimo et al, (2015) who noted that extension services play a crucial role in empowering farmers with farming techniques, knowledge and management skills.

Total Livestock Ownership

Total livestock ownership in tropical livestock unit (TLO) in the rural areas constitutes accumulation of wealth, security against emergencies, dowry and also used as a cultural privilege. They can also be easily converted into cash when the requirement arises. For this reason, it was hypothesized to have a negative relationship with the dependent variable by justifying, as the total number of animals in the household increase, the household would be less likely to go for credit. This can be attributed to increase wealth and income base of farm households which makes more money available in the households. As a result, the odds in favour of access to formal credit use decreases by a factor of 0.864 for households who had large number of animals it hypothesized that a negative relationship with the dependent variable by justifying, when the total number of animals of household increases, keeping other thing constant the household would be less likely to go for credit. The result is consistent with the result of Gebeyehu et al., (2019) and that of Sisay, (2008).

Lending procedure

Lending procedures is among the independent variables tested as a determinant of smallholder farmers' access to credit. To get credit from formal credit institutions, farmers are expected to pass different steps. The coefficient of lending procedure is negative (β_{11} =-0.589) and Odds ratio is less than one (Exp(B)= 0.803) this indicates that credits with a long-lending procedure have less probability to access formal financial credit

than credit with a low short-lending procedure. This means that, if credit with a long-lending procedure increases by one more procedure, keeping other variables constant, the probability of getting formal financial credit decreases by 19.7%. This can be due to the fact that the long-lending procedure may discourage the farmers to use or get credit from lending institutions assumed if there is a high demand of credit. This finding is consistent with the works of Nouman et al., (2013), Mebrate, (2015), Assifaw & Adeba, (2016) as well as Julien et al., (2021).

Total annually income of household head (Inc)

Findings of study reveal that total annually income and access to agricultural credit are negatively associated with each other because, the coefficient of income is negative ($\beta_{10=}$ -0.774) and its odds ratio is less than one ($Exp^{\beta 10}$ = 0.461). As the level of income increased access to credit decreased by 0.461. This finding implies that the farmers with higher income had the ability to self-finance their farming operations using their own resources; thus, they were not in need of agricultural credit. The results of this study are in agreement with the findings of Nouman et al. (2013), who reported a negative relationship between income levels and access to credit. Nevertheless, our finding contradicts Akram et al., (2008) who revealed that the relatively higher wage respondents had higher access to credit than relatively lower wage respondents. In addition, Amjad and Hasnu (2013) reported that there was no significant relationship between income and access to agricultural credit.

Awareness of availability of credit service (AACS)

Awareness of availability of credit service is one of the factor influence the formal credit access in this study. And it is statistically significant at 1% of significance level (p-value= 0.006) which is less than 0.01 alpha value. The coefficient awareness of availability of credit service is positive ($\beta_{8=}$ 0.651) and its odds ratio is greater than one (($Exp^{\beta 8}$ =1.918)). This implies that the awareness of availability of credit service is positive gives 1.918 times more likely chance to access formal credit for smallholder farmer compared to household head without awareness of availability of credit service. This means the awareness of availability of credit service increases the chance to access formal credit by 92% for smallholder farmer. This finding is consistence with the work of (Polique, 2006).

Explanatory Variables	Estimated coefficient (B)	Standard Error (S.E).	Wald Statics	Df	Sig.	Exp (B)
AGE	-0.022	0.009	5.548	1	0.019**	0.978
SEX (1)	0.287	0.678	0.180	1	0.672	1.333
Edulevl			0.683	3	0.877	
Edulevl(1)	0.052	0.266	0.039	1	0.844	1.053
Edulevl(2)	0.064	0.346	0.034	1	0.853	1.066
Edulevl(3)	0.414	0.502	0.682	1	0.409	1.513
Coll(1)	-0.065	0.279	0.055	1	0.815	0.937
FarmSi	0.386	0.124	9.784	1	0.002*	1.472
SaveCu(1)	0.106	0.238	0.199	1	0.656	1.112
ExtServ(1)	0.740	0.234	10.014	1	0.002*	2.095
ASACI(1)	0.651	0.236	7.646	1	0.006*	1.918
TLO	-0.146	0.053	7.700	1	0.006*	0.864
Inc			6.172	2	0.046**	
Inc(1)	-0.774	0.334	5.367	1	0.021**	0.461
Inc(2)	-0.487	0.264	3.409	1	0.065**	0.614
LP(1)	-0.589	0.236	6.247	1	0.012**	0.803
Ir(1)	-0.161	0.264	0.373	1	0.541	0.851
PAS(1)	0.486	0.321	2.296	1	0.130	1.626
Constant	-0.845	0.830	1.037	1	0.309	0.429

Source: logistic regression analysis 2022. ***, ** and * represent level of significant at 1%, 5% and 10% respectively.

Conclusion and recommendations

This study investigated the factors influencing farmers' access to formal credit in Bilatte Zuria Woreda in Sidama region. The sample of this study was included 365 smallholder farmers in Bilatte Zuria Woreda. Multi-stage sampling technique was used to collect data using structured questionnaires from smallholders in the study area. Overall, the study results suggested that smallholder farmers in study area have limited access to formal credit. Result of the study indicated that 59.9% of smallholder farmers in the review did not have access to formal credit. This shows that smallholder farmers in the study area may not be adequately financed from formal credit access.

This study was based on binary logistic model. It has established thirteen household-level factors those find to be important in influencing farmers' likelihood to access formal credit, including age, sex, educational level, collateral, saving culture, farm size, extension service, lending procedure, total livestock number, income level, interest rate, presence of agricultural subsidy and awareness of availability of credit service. The estimated results of binary logistic regression analysis showed that age, lending procedure, total annually income level, and number of livestock were negatively influenced farmers' access to credit, while Farm size, extension service, and awareness of availability of credit service were influenced farmers' access to credit positively in the study area.

In obtaining credit from formal sources in rural areas of Bilatte Zuria Woreda, still small land hold farmers have low access to formal credit due to old age, small farm size, and lack of extension service, complex lending procedure, relatively large livestock size, high income level, and lack of awareness about availability of credit service. Thereby, only those farmers who were young age, large farm size, access extension service, not complex lending procedure, a little livestock number, low income level, and have awareness about availability credit service were capable of acquiring formal credit.

The analysis of the study indicated that access to formal credit has positive impact on farmers' living standards. Hence, to improve small land hold farmers formal credit access this study recommended the following:

- Formal credit access to small land hold farmers were expected to improve by innovative credit scheme that address smallholder farmers who have low income, small number or no livestock and by cutting down long lending process.
- Policy measure facilitating access to credit should be developed based on small land hold farmers preference and needs.
- Government may need to consider conducting an information drive aimed at promoting credit awareness.

- Improve complex lending procedure to access formal credit from formal credit institution, for those smallholder farmers losing interest to applying for credit from formal sources.
- Institutions that are involved in development projects need to increase their support to farmers who owned small land size to improve their agricultural productivity. In general, the study result suggests improvement in agricultural policy schemes in accessing credit sources from formal institutions to rural areas will able rural farm households to increase their productivity and to enhance their income for their sustainable life.

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