

Determinants of Smallholder Farmers' Access to Agricultural Finance in Zambia

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Abstract

Smallholder farmers in Zambia face many challenges in accessing financial services including limited access to financial markets. Despite the numerous reforms undertaken by the Government and the donor community, including financial sector reforms, many rural farmers have remained in poverty with limited capacity to access safety nets like loans to militate against hunger and disease. This paper set out to find out factors that affect smallholders' decision to access rural finance and the intensity of their participation in the financial markets.

A household survey was conducted in five provinces from which thirteen districts were purposively selected. Employing both purposive and random sampling techniques, a pre-tested questionnaire was administered on 1,326 households. Data was analysed using a double huddle model. Results indicated that education level of household head, size of household and number of daily meals served significantly influenced decision to access finance while loan payback period, having a phone and personal savings influenced the intensity of participation in the rural financial market.

Keywords: smallholder farmers, agricultural finance, double huddle model, Zambia

1. Introduction

1.1 Agricultural Finance in Perspective

The agricultural sector in Zambia supports about 80% of the population that is exclusively dependent on agricultural related livelihoods many of whom are poor people in the rural country side. In order to improve the status of poverty and improve rural lives, access to rural finance and intensity of smallholder participation in the financial markets are very important components. Increased Access to rural finance therefore should focus on improving access to banking services and credit in rural areas.

In 2011, the Agricultural sector contributed over 16% to GDP and continues to be the largest employer of the Zambian labour force and Government targets over 500,000 new jobs in the agriculture sector over the next 5 years (Budget, 2013). Agricultural finance refers to financial services, including savings, transfers, insurance and loans, potentially needed to power and move the agricultural sector, that is to say farming and farm-related activities including input supply, processing, wholesaling, and marketing. Most of these activities are conducted in rural areas, in addition to large processing facilities and agribusinesses, as well as largely subsistence-level smallholders located in urban and peri-urban areas (Meyer, 2011).

Dianne and Zeller (2001) made a distinction between access to credit and participation in credit programs when they defined credit access as when a household is able to borrow from a particular source although it may not borrow at all and the extent of access measured by the maximum amount it can borrow. However, a household is said to be participating if it is borrowing from a source of credit. The authors clarified that it is possible for a household living in a risky environment to benefit from mere access to credit even when it is not actually borrowing. Zeller and Sharma (1998) refuted the myth that poor households in developing countries, who often earn less than a dollar a day, are not creditworthy or able to save that has been firmly put forward in recent years. The authors argued that Poor households place special value on reliable and continued access to different types of financial services, available at reasonable cost and catering for their specific needs and added that

microfinance facilities can enable farmers to invest in land improvements or agricultural technology such as high-yielding seeds and mineral fertilizers that increase incomes while sustaining the natural resource base.

Diagne and Zeller (2001) also noted that in many African countries, the majority of smallholders are left out of the rural financial system. These smallholder farmers' households, characterized by average landholdings of less than one hectare, do not grow enough food to feed themselves even though they concentrate almost exclusively on the production of maize or cereals, the major staple foods. Consequently, as land is a binding constraint in most areas, increases in agricultural productivity, in particular in the growing of maize or cereals, and increased diversification into other food and cash crops as well as nonfarm enterprises are key requirements for poverty alleviation.

1.2 Agricultural Finance in Zambia

Zambia, like many developing countries faces a challenge of high interest rates (Budget, 2013). The high interest rates in the end affect access to agricultural finance negatively with the number of borrowers reducing with reducing amounts borrowed especially from the formal financial sector. Mrak (1989) reported that commercial banks in Zambia are concentrated in urban areas (Lusaka and Copper belt) and in provincial centres and that they collect a major part of their savings in these areas, while their savings mobilization role in rural areas is rather negligible.

In 1992/93, Zambia undertook financial sector reforms which saw a marked increase in the number of Microfinance Institutions (MFIs) and by 1999 there were about thirty MFIs (Maimbo & Mavrotas, 2003). Taylor et al. (2009) highlighted that Zambia's market for agricultural finance is fundamentally dysfunctional. From the farmers' perspective, credit is scarce and expensive and heavily skewed towards the larger, corporate sector and that loan terms are often too short to accommodate the long term nature of agriculture, and the processing of loan applications by banks often takes too long.

The whole purpose of accessing agricultural finance for smallholder farmers would be to facilitate operational and capital investment where farmers get credit to buy seed, fertilizer and other equipment during the planting season. However, in many cases this is not the case, to the extent that many interventions aimed at facilitating farmers' access to credit have failed to deliver it at the right time and in the right proportions. Meyer (2011) expounded on this concern by stating that except in the case of double or triple cropping, credit obtained after harvest does not directly solve the seasonal need for working capital to plant a new crop.

1.3 Determinants of Farmer Access to Agricultural Finance

Farmer access and efficient utilization of credit finance is very vital in increasing farm productivity, increasing rural household incomes and reducing poverty levels in agrarian societies. However, in Zambia in particular and Africa in general, farmer access to agricultural finance is still low. Meyer (2011) and AUC and MFW4A (2012) stated that the reasons why agricultural finance has not been able to meet the needs and expectations of clients. This the authors reported was in terms of both sustainable access and suitability of financial products and services are mainly; reluctance of financial institutions to lend to the agricultural sector, high risks associated with lending to the agricultural sector especially smallholder farmers who lack collateral and production and political risks prevalent in Africa. Schrieder and Sharma (1999) noted that availability of appropriate finance to women can lead to better income distribution among household members which essentially means that women are enabled not only to protect their own well-being, but also the well-being of their children.

Taylor et al. (2009) argued that agricultural finance can be profitable – even in a country like Zambia – as banks in other countries have demonstrated. But the agricultural sector demands a specialised, innovative approach and that loan terms must be matched to the agricultural cash cycle, for example, and mechanisms must be built in to guard against the risk of unforeseen changes in prices. Giving examples of such developments as: the use of non-traditional forms of security, agricultural equipment leasing, developing the agricultural insurance market, developing hedging mechanisms and exploring the use of international lines of credit and risk mitigation.

Sunday et al. (2013) noted that increasing cost of labour and farm size are significant factors that drive farmers to demand and seek for agricultural credit. The authors explained that this kind of demand for agricultural credit is a result of the ever growing need to sustain the farm business by the investing farmer. However, Nyikal (2007) differed by stating that smallholder agriculture, characterized by subsistence production, does not exhibit effective demand for credit, and funding it therefore requires means other than the competitive credit market.

Ezeh and Anyiro (2013) found a significant difference between women farmers who accessed credit and their counterparts who had no access. The authors stated that the former group performed better than the latter when it came to annual farm income, farm size and fertilizer use levels. Reardon et al. (1994) argued that nonfarm

income would be another source of funds for investment in agriculture because nonfarm income can also serve as collateral and thus facilitate access to credit. The authors added that the practical implication is that programs that provide credit for nonfarm activities during the dry season (to help farmers build up their own liquidity), or that spread risk by lending for both farm and nonfarm activities, will be more effective than those focusing only on traditional agricultural credit.

Smallholder farmers in many parts of Africa and in Zambia in particular access agricultural finance or credit through a number of channels. Some of these channels are formal while others are informal. The same farmers have a wide range of ways of utilising the agricultural finance once it is accessed. Burritt (2006) reported that the majority of households in Malawi lacked access to finance from either formal (Banks, NGOs, etc.) or informal sector sources (money lenders, family and friends, Rotating Savings and Credit Associations, etc.). Burritt (2006) further added that in many economies households rely on a combination of formal and informal sector suppliers of finance, often making trade-offs in terms of convenience (informal sector players tend to be better positioned) and depth of services offered (formal sector players tend to offer a wider variety and more stable sources of finance). In the absence of formal intermediaries, however informal suppliers provide deposit, credit and transfer services that provide value to clients for which clients are often willing to pay dearly to access.

Wichern et al. (1999) identified the main sources of agricultural finance for Zambian smallholder farmers as Zambia Co-operatives Federation Finance Services (ZCF-FS), Credit Union and Savings Association (CUSA) and Lima Bank which were issuing credit mainly in the form of short-term (seasonal) loans to smallholders. The authors however highlight that the economic reforms later led to the collapse of credit to smallholders after banks were liquidated, leaving only 11% of them receiving credit in the 1990s.

Burritt (2006) classified agricultural finance utilisation by smallholders into three broad categories; production credit (for seed, pesticides, fertilisers, animal traction/tractor services and credit for field production); commercialisation credit (for warehouse credit, fixed term credit and overdraft facility) and lastly transformation credit utilised for processing purposes and usually by processing companies. Diagne and Zeller (2001) highlighted and recommended that the risk of drought in much of rain-fed Sub-Saharan Africa and other countries constitutes a considerable challenge for developing sustainable rural financial institutions. In such environments, a strategy providing for greater diversification of the portfolio of assets and liabilities of the rural financial institutions, as well as adequate provisions for loan defaults is a necessary precondition for rural financial institutions to be able to offer their clientele reliable access to future credit and savings services.

Diagne and Zeller (2001) reported that the level of interest rates charged on loans seemed not to be an important factor for households in deciding in which microfinance institution to participate. Non-price attributes of credit institutions and their services such as the types of loans provided and the restrictions on their use, as well as the types of nonfinancial services provided such as training in the management of microenterprises play a larger role.

1.4 Study Objectives and Research Questions

The main objective of this study was to assess smallholder farmers' access and avenues to agricultural finance. The specific objectives were to; Characterise the various avenues through which smallholder farmers' access and utilise agricultural finance, determine factors that influence smallholder farmers' decision to seek agricultural finance and determine the factors that influence the intensity of smallholder farmers' participation in the agricultural finance sector in Zambia.

The study was guided by three questions:

- 1). Does farmer's household size affect their decision to access agricultural finance?
- 2). Does loan payback period affect the size of agricultural loan a farmer takes?
- 3). Do farmer's personal savings affect the size of loan taken?

2. Method

2.1 Study Area and Sampling Procedure

The study was conducted in five provinces of Lusaka, Southern, eastern, Central and Western. The districts selected purposively from these provinces included; Mongu, Kaoma, Mumbwa, Chibombo, Katete, Chipata, Petauke, Chongwe, Kafue, Kalomo, Mazabuka, Siavonga and Choma. These were purposively selected because they were being piloted for a government rural financial scheme. A pre-tested structured questionnaire was used to collect the data at household level. A two-stage sampling procedure (purposive and random) was used to ensure each household had equal chance of being selected in the sample. A total of 798 households that had

accessed credit in the last one year and 528 that had not accessed credit were randomly selected. This gave a total sample size of 1,326 households.

2.2 Analytical Methods

In this section statistical and econometric methods used to achieve the stated objectives are described in detail and models clearly spelt out. Data was edited and coded to ensure accuracy, validity, uniformity, consistency and completeness. A double-hurdle model as previously used by Sunday et al. (2013) was employed to determine factors which influence the decision of smallholder farmers to seek agricultural credit and the factors that influence their intensity of participation in agricultural financial markets once they make a decision to seek agricultural finance. Characterisation of the various avenues through which smallholder farmers access and utilise agricultural finance was done through generating descriptive statistics using Stata12 computer program. Measures of dispersion and central tendency in addition to data normality tests were employed to carry out the detailed analysis.

The study employed the independent double-hurdle model with the assumption that access to and size of loan by a smallholder farmer are two distinct or independent decisions. In addition, different sets of decision variables are believed to influence the decisions of a smallholder farmer to access agricultural finance and actually borrow a given amount as loan from any credit available source. The double-hurdle model assumes that smallholder farmers make two sequential or independent decisions with regard to access to agricultural finance and acquisition of a loan or credit. In this model, a different latent variable is used to model each decision process. Each hurdle is conditioned by the smallholder farmer's socio-economic and environmental as well as credit institution characteristics. The model considers the possibility of zero outcomes in the second-hurdle arising from the individuals' deliberate choices or random circumstances. The model assumes that zero values can be reported in both decision stages (Green, 2003). The zeros reported in the first-stage arise from zero access to credit by the smallholder farmers; and those in the second hurdle come from zero loan acquisition from a credit source due to a farmer's deliberate decision or random circumstances. The first hurdle is the agricultural finance access equation estimated with the normal Probit model as described in Equations (4) and (5).

Smallholder farmers are partitioned into two categories, participants in agricultural finance ($S_n > 0$) and non-participants ($S_n = 0$). Where S_n are agricultural loans taken. Let y_1 represent the category to which the farmer belongs, since the participant, non-participant partitions give an ordered response. Let the ordered response y_1 be such that;

$$y_{1i} = 0 \text{ if } S_{ni} = 0 \quad (1)$$

$$y_{1i} = 1 \text{ if } S_{ni} > 0 \quad (2)$$

Where, the index equation is written as,

$$y^*_{1i} = \beta_{1i}X_{1i} + \varepsilon_{1i} \quad (3)$$

Where, y^*_{1i} is a latent discrete accessibility choice variable that denotes binary censoring, which is the utility the farmer gets from participating in the agricultural finance sector. X_{1i} is a vector of explanatory variables hypothesized to influence agricultural finance accessibility choice, β_{1i} is a vector of parameters and ε_{1i} is the standard error term.

The threshold index equation for the binary model is stated as;

$$y = \begin{cases} 1, & \text{if farmer is a participant} \\ 0, & \text{otherwise} \end{cases} \quad (4)$$

The empirical model used to estimate the Probit model or the first hurdle equations is given below. The equation is stated below, estimating decision to access and participate in the agricultural finance.

$$A^*_{iaf} = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \varepsilon_{iaf} \quad (5)$$

Where, A^*_{iaf} is the agricultural finance access decision among smallholder farmers in the study area which takes the value of 1 for those that have access and 0 otherwise.

X_1 = Age of household head (years);

X_2 = Household head's level of education (years spent at school);

X_3 = Farmer saves money (1=yes, 0=no);

X_4 = Interest at borrowing (%);

X_5 = Number of family meals/day;

X_6 = Loan payback period offered by the lenders (months);

X_7 = Capacity to access a formal lender;

X_8 = Household size (number of people in the household);

\mathcal{E}_{iaf} = Stochastic error term.

Finding the determinants of participation intensity was achieved by estimating the equation of the second hurdle. The second hurdle involves an outcome equation, which employs a truncated Tobit model to determine factors affecting the actual amount of loan borrowed by a smallholder farmer. This stage uses observations only from respondents who reported positive or greater than zero amount of loan borrowed. The truncated model, which closely resembles Tobit's model, is expressed as shown in Equation (7).

$$Y_i^* = X_i' \beta_2 + v_i, v_i \sim N(0, \sigma^2) \quad (7)$$

Y_i is the observed size of loan borrowed by the sampled respondent. For a smallholder farmer who does not borrow, Y_i cannot be measured and was set to be equal to zero (0). This indicates that the observed loan borrowed is zero either when there is censoring at zero $Y^* \leq 0$ or if there is faulty reporting, or due to some random circumstance.

The empirical model used to estimate the truncated Tobit model of agricultural finance access and participation among smallholder farmers is given below;

$$Y_{iaf}^* = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \mathcal{E}_{iaf} \quad (8)$$

Where,

Y_{iaf}^* = Amount of loan borrowed by a farmer measured in Zambian Kwacha (ZMK)

X_1 = Gender of household head (Male=1, Female =0)

X_2 = Household head's level of education (years spent at school)

X_3 = Farmer saves money (1=yes, 0=no)

X_4 = Interest at borrowing (%).

X_5 = Number of family meals/day

X_6 = Loan payback period offered by the lenders (months)

X_7 = Type of lending source (formal=1, Informal=0)

X_8 = Household size (number of people in the household)

\mathcal{E}_{iaf} = Stochastic error term

3. Results

3.1 Characterisation of Smallholder Farmer Access to and Utilization of Agricultural Finance

Results in Table 1 indicate that there was a significant difference ($P \leq 0.01$) between the education levels of those farmers that accessed agricultural finance and their counterparts who did not. Those who accessed finance had one year higher in terms of education as compared to their counterparts. This is attributed to the fact that education empowers a farmer to make informed decisions and identify market opportunities where they exist. Odulaja and Kiros (1996) found that farmer's ability to produce and sell more produce in a market was highly and positively related to their education levels and continued to assert that farmers, who had attained secondary education and had combined it with informal education, were more likely to produce and sell more.

Table 1. Characteristics of smallholder farmers in accessing agricultural finance

Characteristic (Variable)	Overall mean (n=1,326)	Finance borrowers (n=798)	Finance non-borrowers (n=528)
Age of household head	44.56 (12.65)	44.96(12.49)	43.96(12.87)
Education level of household head	7.54(3.80)	7.77(3.71)	7.19(3.90)***
Interest at borrowing (%)		22.78(13.03)	
Daily number of meals in the household	2.84(0.62)	2.87(0.58)	2.80(0.66)**
Average payback period(months)		4.46(3.41)	
Annual crop output (kg)	2,349.47(4,129.71)	2,452.20(4,119.60)	2,186.38(4,145.42)
Number of children in school	1.96(1.72)	2.08(1.69)	1.78(1.75)***
Household size	5.75(2.38)	5.91(2.30)	5.52(2.48)***
Total annual farm income (ZMK)	18,852.08(49,014.33)	19,395.77(33,198.69)	18,028.80(66,151.31)

Standard deviations in parentheses; Significant level: * = 10%; ** = 5%; *** = 1%.

Results in Table1 above further indicated that those who accessed agricultural finance had a significantly ($P \leq 0.05$) higher number of daily meals as compared to those who had not accessed. The farmers who accessed finance could afford 2.9 meals as compared to 2.8 for those who had not accessed finance. The explanation for this outcome is that households that accessed agricultural finance were able to increase their output in production of foodstuffs which enabled them to have more meals per day as compared to their counterparts who had not accessed agricultural finance. These results are supported by what Sogo-Temi and Olubiyo (2004) found that an increase in credit made available to agricultural sector greatly enhances agricultural production activities.

Households that had accessed agricultural finance were found to have a significantly ($P \leq 0.01$) higher number of children at school than their counterparts who had not accessed the finance, as shown in Table1 above. The former group had on average 2.1 children at school while the latter had 1.8 children. This result points to the fact that the number of children at school come with increasing need for finances for school fees and other requirements which pushes household to seek finance to cater for education needs. De Janvry et al. (2006) noted that households are likely to draw on a number of other coping strategies: for example using household assets, taking out loans, asking for assistance and that whether households have access to these is likely to influence their decision-making processes.

Related to the above, there was a significant ($P \leq 0.01$) difference between the household sizes of those farmers who accessed agricultural finance and those who did not. Results in Table1 indicate that those who accessed agricultural finance had bigger household sizes than those who had not accessed it. The reason for this is that with bigger families, households tend to look for ways of smoothing consumption burdens by borrowing in times of scarcity. Dianne and Zeller (2001) however, found a negative but significant relationship between household size and participation in credit programs in Malawi. The explanation given was that in many cases the larger household size is because of unproductive members who put a lot of pressure on a few who earn income.

Table 2 results show that generally the level of food security as measured by the household access to and availability of food throughout the year is very low. Only 27.85% of the farmers in the overall sample indicated that their households are food secure. However, there was a significant difference ($P \leq 0.01$) between food security for borrowers and non-borrowers with only 24% of borrowers and 33% of non-borrowers being food secure. This can be explained by the fact that, the borrowers do not invest the borrowed funds to produce food for home consumption, but they produce for sale or use the borrowed funds for non-food items like school fees and construction. It also explains the subsistence and non-commercialised nature of the non-borrowers where they invest much of their energy in producing for home consumption. In support of this explanation, Reardon et al. (1994) stated that nonfarm activity sometimes draws resources away from farm activity and does not lead to reinvestment of profits in the farm.

In relation to food security of a household, results in Table 2 further indicated that there was a significant difference ($P \leq 0.05$) between consistency of meals served daily in a household between borrowers and non-borrowers. It is indicated that 73% of borrowers had three daily meals consistently as compared to 67% of

non-borrowers. This is in conformity with the result above showing that borrowers usually use part of their borrowed funds to cater for buying food which enables them to have the three daily meals consistently as compared to their counterparts who do not access borrowed funds. Simtowe and Zeller (2006) found results that indicated that households that accessed credit were more likely to adopt better production technologies and hence produce more for consumption.

As a proxy for information access, possession of a mobile phone by a household in Table 2 is indicated to have a significant difference ($P \leq 0.01$) between borrowers and non-borrowers. A higher percentage of the former had mobile phones (80%) as compared to the latter (71%). This shows that access to information plays a role in accessing credit services. This can be through sharing information on availability of such services or bridging linkages to where borrowing terms are better. Besley (1994) noted that imperfect information or the lack of it does not only affect the borrowers only, but also the lenders, leading to the adverse selection and moral hazard phenomena.

Results in Table 2 above further reveal significant differences ($P \leq 0.01$) between borrowers and non-borrowers in terms of savings and where they save. It is indicated that 87% of the borrowers had savings and 85% of them saved with a formal institution. However, 66% of non-borrowers had savings and 63% saved with a formal institution. These results are positive indicators that smallholders can actually save and that given the right platform, they can accumulate enough savings from which credit can be created. Nyirenda (2007) found that in Zambia the level of voluntary savings was very low, rural people only saved after being forced through compulsory fees stated by lending institutions.

Table 2. Other characteristics of smallholder farmers in accessing agricultural finance

Characteristic (Variable)	Overall sample (n=1,326)	Finance borrowers (n=798)	Finance non-borrowers (n=528)
		Percentages	
Household head gender (female)	24.83	25.06	24.48
Household is food secure throughout the year	27.85	24.19***	33.40
Family has three daily meals consistently	70.37	72.90**	66.54
Household has a phone (proxy for access to information)	76.83	80.45***	71.35
Farmer has savings	78.32	86.70***	65.65
Farmer saves with a formal institution	76.60	85.34***	63.38
Family experienced a hunger season in the last one year	27.85	24.19***	33.40
Farmer has a bicycle (proxy for ease of transport)	67.98	69.13	66.22
Borrower is a youth (≤ 35 years)	26.31	24.43*	29.14

Significant level: * = 10%; ** = 5%; *** = 1%.

Table 2 results also indicated that fewer female household heads and youth were either borrowers or non-borrowers. It is shown that only 25% of the borrowers were females and 24% of the non-borrowers were females still. Only 24% of the borrowers were youth who accessed credit and 29% of those who had not borrowed were youth. This result is an indication that females are still left out of the financial sector and therefore their access to assets is still low yet they make up the majority of the population. Fletschner and Kenney (2011) noted that many women's access to financial services is mediated through their husbands and yet if they had direct access, it would lead to higher investment in human capital which would have long term impact on child health, nutrition and education.

3.2 Factors Affecting Smallholder Farmer'S Decision to Access Agricultural Finance

The results in Table 3 show the parameters that influence smallholder farmers' decision to seek and access agricultural finance. The results are from the first stage of the double hurdle model. The results indicated that

education level of the household head had a positive and significant ($P \leq 0.05$) effect on the decision to access agricultural finance. This means that educated household heads have the capacity to read the financial market signals like interest rates and repayment terms and find it less scaring to seek credit. In addition, education empowers the borrower with confidence because they can have a clear plan on how to invest the funds. Diagne and Zeller (2001) also found a positive effect of education level of the household head and decision to access agricultural finance. The authors also single out the fact that education enables the decision makers, who in most cases are the household heads to make informed decisions regarding borrowing.

Results further indicated that number of meals served in the household per day had a negative and significant ($P \leq 0.01$) effect on the decision to access agricultural finance. This means that those who could afford to produce enough food to provide three meals per day did not have the incentive to seek for credit to buy food. In addition, this result points to the subsistence behaviour common among many smallholders in Africa, where they produce enough for home consumption and a little for selling to cater for immediate cash needs. Nyirenda (2007) also found that many households that faced food insufficiency due to bad seasons leading to crop failure were more likely to seek credit in the face of food insecurity.

Results further indicated that the size of a household had a negative and significant ($P \leq 0.01$) effect on the decision to access agricultural finance. This result shows that bigger household sizes constrained farmers to seek agricultural finance due to the many demands that they come with. Therefore, the farmers instead tend to become subsistence and use the little resources at their own disposal rather than seek for credit that will add to the burden already at hand. In relation to this result, Wanyama et al. (2006) also found household size to have a negative effect on access to agricultural loans. However, the effect was found not to be significant.

Factors like a farmer having savings and interest rate at borrowing had a positive sign on the coefficient though not significant at any of the three conventional levels of significance. However, interest rate at borrowing having a positive sign is counter intuitive but it might be that since many rural credit seekers lack the ability to read financial market signals, they usually do not take interest rates as an issue. However, Basu and Srivastava (2005) highlighted the negative effect of interest rates on borrowers by stating that poor borrowers are cut off by high formal sector interest rates from access to agricultural finance and end up paying higher interest rates to informal lenders. Loan payback period and age of the household head had negative though not significant effects on decision to seek agricultural finance.

Table 3. Factors that influence smallholder farmers' decision to access agricultural finance

Variable		
<i>Dependent variable: Access to Agricultural finance (yes=1, No=0)</i>	Coefficient	Std. Err
Age of household head	-0.0008	0.0041
Education level of household head	0.0289**	0.0146
Farmer saves money (yes=1, No=0)	0.1535	0.1494
Interest at borrowing	0.0052	0.0043
Number of family meals/day	-0.2506***	0.0904
Loan payback period (days)	-0.0173	0.0191
Capacity to access a formal lender (yes=1, No=0)	-0.2610*	0.1505
Household size	-0.0635***	0.0217

Significant level: *=10%; ** = 5%; *** = 1%.

3.3 Factors Affecting Smallholder Farmer'S Intensity of Participation in the Agricultural Finance Market.

Results in Table 4 indicate that education level of the head of a household had a positive and significant ($P \leq 0.01$) impact on the amount of loan taken once a decision to access agricultural finance has been made other factors being constant. This is because at certain education levels, a farmer is able to make informed decisions concerning the amount needed to undertake a particular project through making business plans or budgets. Basu and Srivastava (2005) also found out that illiteracy of borrowers especially in rural areas, negatively impacts on their intensity of participation in loan acquisition. The authors also cited lack of ability to comprehend and analyse the formal documents required before a loan is taken.

Results further revealed that farmer's personal and voluntary savings have a positive and significant ($P \leq 0.01$) effect on the amount of loan money a farmer takes out once a decision to take a loan has been made (Table 4). This is like so because usually a farmer with voluntary savings has set targets to invest the saved and borrowed money, hence that kind of farmer has confidence to take on a certain amount of loan that they know they will pay back. Dupas and Robinson (2010) supported this finding when they also found that access to a savings account by Kenyan women had a substantial, positive impact on levels of productive investments which led to increased income levels and hence household expenditures.

Loan payback period was also found to have a positive and significant ($P \leq 0.01$) effect on the size of loan taken by a smallholder farmer once the decision to take a loan has been made. This is because in most cases agricultural loans are given seasonally with longer payback periods as compared to other types of loans. This slightly longer grace period pushes farmers to take out larger loans in conformity with longer payback periods. Barham et al. (1996) found supporting evidence in Guatemala that the length of the payback period has a positive and favourable effect on low income rural borrowers in participating in the financial system as borrowers. The authors also noted that in some cases the payback periods ranged between 326 and 535 days, which were really long enough.

Number of meals served in a household had a positive and significant ($P \leq 0.01$) impact on the amount of loan a farmer takes out once a decision has been made to access agricultural finance. This is because usually when households are used to providing a certain number of meals to their members, they struggle to maintain that number even in face of challenges like hunger seasons. Instead these households tend to borrow more to sustain the status quo. In relation to the number of meals, household size was found to have a positive and significant ($P \leq 0.10$) effect on the size of loan taken by a smallholder farmer once they make a decision to access agricultural finance. This is like this because the bigger the size of the family, the larger the demand to take out a bigger loan to cater for the needs of a bigger family ranging from food, school fees and other necessities. Nyirenda (2007) acknowledged that the average family size in Zambia was really large with 53% of rural households having between six and ten persons, adding that this puts pressure on land leading to low productivity and food insecurity which hence pushes households to seek alternatives to sustaining lives including borrowing.

Table 4. Factors that influence size of loan (Intensity) that a smallholder farmer seeks at an agricultural finance providing institution

Variable	Coefficient	Std. Err
<i>Dependent variable: Size of loan borrowed (currency: Kwacha)</i>		
Gender of household head (male=1, female=0)	-43.3675	379.4036
Education level of household head	296.4672***	76.9062
Farmer saves money (yes=1, No=0)	1706.4900***	557.6047
Interest at borrowing	29.8938	36.4906
Number of family meals/day	1905.2530***	592.0563
Loan payback period	788.7784***	295.0697
Lending source (formal=1, informal=0)	-570.2536	1411.4480
Household size	190.3667*	101.8492

Significant level: * = 10%; *** = 1%.

3.4 Conclusions and Recommendations

The findings of this research revealed that there is still a long way to go if the rural smallholder farmers in Zambia are going to access and fully utilize agricultural finance. Much of the work is lying on the shoulders of the government to put in place policy frameworks and reforms in the financial sector to enable more outreach of the existing institutions to rural areas as well as emergence of new players. To achieve this, it would also require revisiting bank branch-licensing policies and strengthening the supervision of rural formal banking institutions so as to ensure financial discipline/reduce moral hazard problems. Some of the factors found to hinder farmers from accessing agricultural finance where it is availed were actually in the farmers' control much as the government has to play a sensitization role. Issues like controlling household size and education can be improved

through state intervention working with its citizens within the existing social-economic set up.

Results also revealed that once a smallholder farmer decides to access the agricultural finance market to borrow, household characteristics like education level of household head, household size, farmer's voluntary savings and number of daily meals served in the household play a big role in determining the intensity of participation as measured by the size of the loan taken. However, other external factors like loan payback period that are mainly determined by the lender were also found to be in play in determining intensity of participation by the smallholders.

Based on these findings, it is therefore recommended that smallholder farmers be assisted with cheaper loans with longer payback periods to enable them invest in farm activities that will generate sustainable incomes. However, the policy makers also ought to put in place mechanisms through which formal lending institutions can increase outreach in the rural areas in addition to empowering farmers to establish rural savings and credit cooperatives that can help mobilize savings which can be used to create credit for those who want to borrow short term loans.

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