

Research Article

Determinants of Farm Credits Access by Cereal Farmers in the Ghanaian Economy

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Abstract

Farm credit is one of the major boosters to agricultural productivity among cereal farmers. Cereals contribute immensely to the staple foods in Ghana. In view of this, higher productivity in cereal production addresses the food security issues in the country largely. Despite the impressive performance, yet Cereal farmers experience bottleneck issues in relation to farm credit. These further results in stifling cereal productivity in Ghana. This study seeks to underscore the importance of farm credit among cereal farmers in Ghana. The objective of this study is to identify the factors that influence cereal farmers' access to farm credit in Ghana. The study employed the Ghana Living Standards Survey (GLSS7) of 8,520 households conducted in 2017 by the Ghana Statistical Services (GSS). The ordinary Probit regression was used to estimate the determinants of access to farm credits. The results revealed that farmers' age, marital status (married), religion (Christian), education (tertiary), residence (rural) are all significant positive factors that influence cereal farmers access to farm credits. In view of this, the study recommends that financial institutions disburse credits to Cereal farmers in Ghana based on the education of farmers to the tertiary level. Having said this, it is imperative for many unemployed graduates to venture into cereal farming particularly in rural areas since they are likely to acquire farm credits unlike cereal farmers in peri-urban areas.

Keywords

Farm Credits, Cereals Farmers, Access, Ghana

1. Introduction

Honorati and Johansson; Anderson, Cuevas, Lauer et al. [6, 24] assert that agriculture plays a crucial role in every nation's economy, but they admitted that the views of its role in growth and poverty reduction, globally and in Sub-Saharan Africa varies greatly [24]. The Ghanaian economy is broadly divided into three main sectors, agriculture, services, and industry (MoFA, 1998; AFD, 2000). The agricultural sector is the dominant sector in the Ghanaian economy in terms of its share of Gross Domestic Product (GDP) [32, 33], employment, and foreign exchange earnings. Such dominance was chopped in

the early 1990s. For example, in 1997, the sector employed about 70% of the labour force, contributed about 47% to GDP, and accounted for over 57% of foreign exchange earnings [4, 29, 45]. However, findings from the Annual Progress Report reveals that the agricultural sector employs about 41.3 percent of the active population, which is largely dominated by women [30]. This is a sudden departure from the 70 percent success in the labour force recorded in 1997. Some writers like Honorati and Johansson [24] are of the view that the decline in agriculture begun many years back even before the

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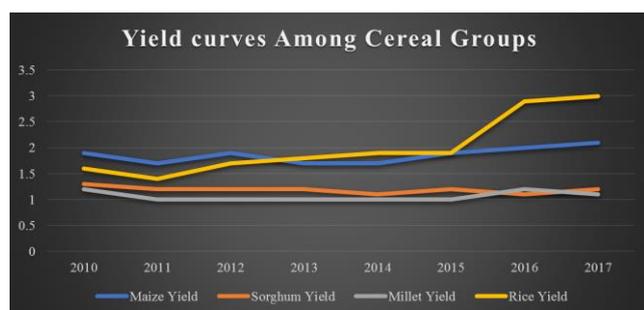
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1990s. That means that even though agriculture seems to be doing well among the other sectors, the marginal increases kept declining, that is to say, that agriculture was increasing at a decreasing rate. They linked the decline to the developmental planning in the 1960s and 1970s which focused on industrialization policy, resulting in an “urban bias” development. Urban bias occurs when industries are located in urban areas or cities. This is a worrying situation since these cities house the industrious factories at the expense of the indigenous areas. Workers also have a mobile attitude and hence move to sectors that are booming or productive. Most of the casual workers in the city traded off agricultural livelihood for city jobs. Most of these workers resort to petty trading and hawking on the shoulders of the streets when they find themselves in the cities. When this situation is prolonged, then the economy shrinks. This is because agriculture is not just a sector where most of the poor and the very poor work but also a sector that has a potentially strong, direct, and indirect impact on economic growth. Therefore, an increase in agriculture in the rural and urban areas brings about a horizontal level of growth and poverty reduction by increasing the standard of living of persons at all levels. Notwithstanding, in poor economies, agriculture productivity growth is vital and critical to both structural change and poverty reduction. Thus it serves as the main driver to industrialization where raw agricultural products are processed for the international markets. Hence reducing the rate of unemployment leads the economy to a potential output region. Again, assert that agriculture productivity tends to be significantly lower compared to other sectors of the economy [8, 10, 24, 40, 44]. They found interesting results when they used the national accounts data (value-added/total employment) to confirm that the average African worker in the non-agricultural sector is six times as productive as an agricultural worker. To them, this new evidence from micro data suggests that these productivity differences are largely due to underemployment (fewer hours worked); productivity differences are much smaller based on per hour worked. In Ghana for example, the agriculture sector engages four out of ten economically active persons in the Ghanaian economy. It has not grown as rapidly desired, although there seems to be evidence of strong growth of structural transformation. This transformation reflected in the declining share of agriculture in total national output, yet this has not translated into expanding opportunities in the other productive sectors that will absorb the growing labour force, particularly among the youth [27] (p. 111). The latter assertion makes such a type of nation import-dependent. Ghana has had the challenge of depending on agricultural imports. This has strong implications for national food security. Afari [3] also confirms this by asserting that low agricultural productivity has been identified as the major cause of food insecurity and food self-insufficiency in Ghana. Secondly, it threatens the stability of the cedi to raise enough foreign exchange for such imports, and lastly, it represents the indirect shipment of much needed jobs abroad. For example, farmers in a devel-

oped country are supplying rice that could have been produced by Ghanaian youths. Even though it is their produce that is imported yet in actual sense, it is their labour that has been imported, and this to a larger extent, kills the local industries. These challenges continue to dwarf the agricultural sector. Addressing some of these challenges will not only solve the food insecurity problems but will create a viable food value chain that can help the youth of this nation to fetch a decent job [27] (p. 111). At the global level, agricultural growth is significantly more effective for poverty reduction among the poorest than non-agricultural growth. This is because more of the poorest are working in agriculture. The poorest are those living on less than one dollar per day. All the other sectors seem to do well if there is an upsurge in agriculture growth. However, for the next level of poverty (two dollars per day), growth in the non-agricultural sectors is more effective. Notwithstanding, no poorer country has ever successfully reduced poverty through agriculture alone, but almost none have achieved it without first increasing agricultural productivity [24] (p. 26). The latter statement underscores the importance of farm credit as a basis for increasing agricultural productivity in every economy.

The agriculture sector in Ghana comprises crops (including cocoa), livestock, fisheries and aquaculture, and forestry and logging. The sector is made up predominantly of subsistence smallholder production units, with weak linkages to the industrial and the service sectors. This is largely the reason why agricultural crops do not fetch the nation much on the foreign front. The weak linkages between the agriculture and services sector is revealed through the inability on the path of the nation to process traditional commodities, which is mostly due to lack of credit [26, 30] (p. 53).

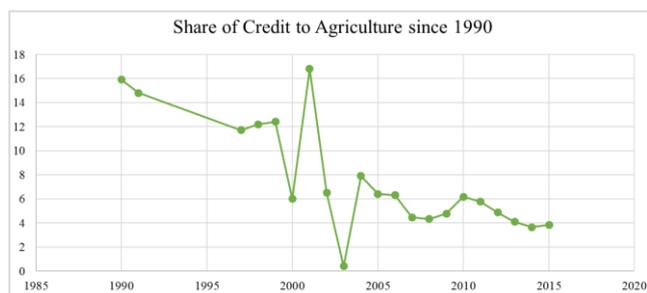
The major agricultural policy in 2017 was the Planting for Food and Job (PFJ). ISSER [27] reveals that although many targets for the PFJ have not been achieved in the 2017 agricultural year, there are positive signs, especially among the cereal crops, that with time (in 2018) some targets are likely to be realized. For instance, using 2016 as a base, maize production increased by over 15 percent representing more than half of the PFJ target. Therefore, with an additional year of supplying the needed, affordable inputs to farmers on time, and curtailing input diversion, the 30 percent target should be achieved. Based on these findings, we can say that among the staple crops in Ghana, the performance of cereals is very significant. In terms of expansions, there was an expansion in the area under cultivation of all cereals in 2017. Rice recorded the least 1.3 percent. The other cereals recorded increases of more than 10 percent each. These increases in the area of land cultivated brought about yield increases in maize, sorghum, and rice except millet, which recorded a drop in yield of over 12 percent [27] (p. 121).



Source: Author's Construct based on SGER (2017)

Figure 1. Yield performance among the various cereal groups.

Figure 1 shows the yield performance of the various cereal groups. Millet and sorghum yields have been constant or stable, whereas maize and rice yields have been upward sloping all across the years under review. This means that maize and rice farmers seem to be enjoying higher yields while the millet and sorghum farmers are enjoying constant returns to scale in the year under review. Ragasa, Chapoto, and Kolavilli [37] assert that despite the impressive performance of cereals yet the average maize yield in Ghana remains one of the lowest in the world, much lower than the average for Africa south of the Sahara. Could it be that a farmer who accesses farm credit can increase his productivity by a wider margin?



Source: Author's construct based on Ghana Agricultural Factsheets

Figure 2. Share of Credit to Agriculture since 1990.

There has been a bias of credit allocation towards large scale farm enterprises. The credit allocation to farmers and especially the small-scale farmers who are in the trade business, has been a challenge in the Kenyan economy [28]. This premise is not different from the Ghanaian economy. BoG [12] assert that the share of credits to the agriculture sector is one of the lowest. In figure 2, 2003 recorded the lowest credit to the Agric sector. ISSER; Asare [9, 25] reveals that over the years, the agriculture sector in Ghana has been characterised by underinvestment, and this has severe implications for food security and poverty reduction in the country. The magnitude of the fall in the agriculture sector output is matched by a sharp increase in the services sector. The contribution of

agriculture to GDP had continued to shrink in a relative sense, even though the sector has been expanding in absolute terms [25]. It is opined that the decrease in the share of agriculture to GDP may be attributed to the inability of farmers to secure farm credits from financial institutions [9].

2. Empirical Literature Review

Several studies have been concerned with the extent to which individual, institutional and socioeconomic characteristics of farmers influence credit access. Empirical studies on the importance of access and use of financial services have unearthed important findings [1]. Prina's [36] study on access to financial services in Sub Saharan Africa (SSA) revealed that an untapped demand for bank accounts by the poor exists. Her study revealed that when administrative and withdrawal fees are excluded, the poor who are mostly smallholder farmers have a great demand for bank accounts. Statistically, the author found that 84% of the poor opened accounts, and 80% of them used these accounts actively. This increase in savings did not crowd out savings in other institutions. Twomlow et al. [43] observes cereal yield data using Residual Maximum Likelihood (REML) and finds out that a wide range of farmers obtained significant yields from micro-dosing technology input support even in the drought season irrespective of the season or the wealth status. The study found out that many farmers who were beneficiaries of the fertilizers applied achieved strong positive returns in yields. Farmers, especially smallholder farmers, struggle to access the credit they need to sustain and expand agricultural operations. Smallholder farmers are often locked out of the formal banking system and fall into the missing middle; thus, their financing needs are too large for microfinance institutions but considered too small and too risky by commercial banks. The situation is dominant in rural areas where the agricultural sector; thus, economic activity can have disproportionate benefits for the poor [15]. In examining trends and patterns in the supply of bank credit to smallholder farmers in South Africa, Chisasa and Makina [14] posits that bank credit to smallholder farmers represents a disproportionately smaller share of the total fraction of credit allotted to the private sector. Thus, the absence of finance to fund operations, acquire capital goods, and meet working capital requirements has arguably been the largest challenge for most smallholder farmers in South Africa. Carsamere [13] employed the probit analysis to identify factors that determine entrepreneurs' financial management in the Kumasi metropolis. The results show that macroeconomic conditions, drawings, daily sales, marital status, size of family, expenses on relatives, source of family's breakfast are the strong determinants of financial management and the desire to increase the growth of the enterprise. He again found out that better access to on the job training in marketing, basic enterprise accounting like the recording of sales, sending sales to the bank, and separate bank account for the enterprise from the family budget are crucial in improving the quality of entre-

preneurs' financial management in the metropolis. He concludes on the fact that most of the entrepreneurs are not satisfied with the level of financial management of their enterprise. More so, these entrepreneurs were found not to have recorded their shop transactions. Adams [2] also found out that access to credit was not gender-biased using the probit model. The study revealed that out of 152 respondents, 122 of them constituting 80% were aware of microcredit availability to farmers. Out of 122 farmers' credit applications, 80 farmers constituting 65% had access. 68 farmers constituting 85% of total credit access, invested part of their credits in their farming activities. The study recommended that early and timely disbursement of collateral-free microcredit loans by microfinance institutions to farmers effectively and efficiently during the farming seasons brings favorable results like higher productivity, thereby increasing farmer profits. Nimoh et al. [31] investigated the factors influencing poultry farmers' access to credit with particular reference to the Agricultural Development Bank (ADB) in the Ga-East Municipality. Primary data was collected from a total of 61 poultry farmers sampled from three communities in the Municipality using the simple random sampling technique. To determine the extent to which borrowers' and enterprises' characteristics influenced access to ADB's credit, the regression probit model was employed. The results of the study indicated that majority of the farmers belonged to a farmer-based organization. Secondary occupation and farmer-based organization membership positively influenced access to credit and were significant at ($p < 0.01$) level, market turnover, and age on the other hand, directly and indirectly, influenced access to credit and were significant at ($p < 0.05$) and ($p < 0.10$) levels respectively. Loan disbursements to farmers in the smallholder category are based on factors like age, education, farm income, extension contact, and distance between home and loan source. Thus banks prefer to give loans to young, experienced, and educated farmers who are more likely to utilize resources efficiently. Anyiro and Oriaku [7] study access and investment of formal microcredit by smallholder farmers in Abia State University, Nigeria, to examine the demand for credits by comparing the amount of loans applied for, the amount the bank approved and the amount actually received by farmers. These three categories are critical because the farmer does not have the guarantee that he will always receive the full amount of credit he applied for. The results of the Probit analysis showed that age, education, farm income, extension contact farming experience, and farm size and distance between home and loan sources were statistically significant. However, the coefficient of membership of cooperatives and gender possessed a negative sign. The chi-square estimate of 22.52 was highly significant, which shows that the data set fits the regression line to a reasonably high level.

Some have also argued that investment in agriculture is dependent on rainfall patterns, climate change, land rentals, to mention but a few [15]. Other researchers have also stressed that African farmers need new technology, which is

high-yielding and a more resilient variety that delivers bountiful harvests. New techniques are beginning to boost yields in rice and cocoa, among other crops. They also need more electricity, more irrigation, and better infrastructure that links them to lucrative regional food markets [17]. However, as wonderful as these recommendations may be, investment in agriculture is the driver that will make the suggestions a reality.

Nimoh et al. [31] reveal that among the constraints that continue to limit both individuals and a group of poultry farmers' access to ADB's credit are high interest rates (47 percent), cumbersome procedure (32 percent) and delay in the repayment of loans by individual members of farmer groups (21 percent). They asserted that in 2005 and 2007 for instance, ADB's interest rates have risen from 18 and 25 percent, thus preventing the many who desired to use ADB's credit. The cumbersome loan making process, coupled with the delay in making loans available at the time they are needed for production, prevent many farmers from individually using ADB's credit. This is disturbing because giving loans to farmers is supposed to be the core mandate of the ADB. Therefore, if ADB fails to give out loans, then what becomes of the other banks? In determining the amount of finance supplied by rural banks to the agricultural sector in indigenous areas in Ghana, Gyabea [23] reveals that less than 10 percent of the total bank loans offered were to the agricultural sector using a survey of seven credit officers and 428 farmers. This implies that banks' allocation to the agriculture sector compares poorly to other sectors. The disproportionate share of farm credit allocation to the agricultural sector, especially farmers, has major implications for both policy and research purposes. In the light of the above literature, Nimoh et al. [31] again postulate that most farmers preferred to borrow from informal financial institutions, citing reasons such as the cumbersome procedures, funds not given at the very time they are needed, high interest rates among others from formal lenders. Their study, however, revealed that most farmers had multiple accounts and mostly supplemented formal institutional funding with credit from either friends or relatives or other convenient sources.

3. Methodology

The data used for the study was round seven of the Ghana Living Standards Survey (GLSS 7), which was conducted by the Ghana Statistical Services (GSS) in 2016/17 in all ten regions of Ghana with a total population of 24,075,944 [21]. The survey studied 8,520 households in 1,000 Enumeration Areas (EAs), consisting of 561 (43.9%) rural EAs and 439 (56.1%) urban EAs [21]. This study used a household questionnaire which consisted of section A and B. Section 1 has the demographic characteristics of the respondents, Age of household head, Number of children, Household size, Religion, Ethnicity, Place of residence thus urban or rural, Locality type thus city, small city, town and rural were used. The

level of education and years of education was captured from section 4. The main variable, loans was taken from section 12, and crop and farm details were sourced from section 8.

3.1. Theoretical Framework for Access to Farm Credits

The theoretical underpinnings of the study is grounded on the theory of credit rationing [38, 39]. The credit rationing theory relies on the assumption that, there exist many lenders and borrowers in the financial market and they all aim at maximizing their satisfaction [39]. Stiglitz and Weiss [39] stated that credit rationing is due to imperfect information (information asymmetry) in the loan market. The binary probit model was then used to estimate the factors influencing access to farm credit by cereal farmers. Several studies on credit accessibility have shown that there is heterogeneity between credit users and non-users when they deal with credit demand and procedures [2, 18, 19]. Feder *et al.* [20] postulate that many models like the OLS used in measuring the access to credit fails to meet the statistical assumptions necessary to validate the conclusions based on the hypothesis tested. To overcome this problem linear probability model, the logit and probit models have been recommended [22]. The models use the Maximum Likelihood Estimation (MLE) method of estimation. The linear probability model will not be ideal for this study because it can record probabilities that are less than Zero (0) and greater than one (1). Secondly, the model uses only one explanatory variable in its estimation, but in this study, we have more than one explanatory variable. Therefore, it is advantageous to use the probit and the logit since the probabilities are between 0 and 1 and the distribution slopes asymptotically. The disparity between the probit and the logit model is that the probit is a cumulative density distribution of the normal distribution while the logit is a logistic density distribution of the normal distribution. The idea behind using the probit model as being more suitable than the logit model is that most economic variables follow the normal distribution, and hence it is better to examine these variables through the cumulative normal distribution. Out of 8,526 cereal farmers, the unique household farmers of this category was narrowed down to 8513. The non-loanable and loanable households in cereal farming were 7,339 and 1,174, respectively.

Therefore, the generalized probit model with a latent dependent variable is specified as:

$$\Pr(Y = 1/X) = \Phi(X'\beta) \quad (1)$$

Pr represents the probability that a farmer will get access to credit or not

Φ also represents the cumulative density distribution of the normal distribution.

X' is a vector of all explanatory variables of the regression

ε is the error term, which is independently identically distributed with zero mean and a constant variance.

The cumulative density function for the standard normal is given as:

$$\Phi(X'B) = \int_{-\infty}^{X'B} \phi(z)dz \quad (2)$$

The practiced probabilities are within the values 0 and 1. The Probit model is estimated by Maximum Likelihood Estimation, and the marginal effect is derived as:

$$\frac{dy}{dx} = \Phi(X'B) \quad (3)$$

From our outcome model specified in equation (1), the Probit model specification for the study will be:

$$\Pr(Y_j = 1) = \Phi(B_{ij}Q_{ij} + B_{ij}E_{ij}\varepsilon_{ij}) \quad (4)$$

Where $j=\{farm\ credit\}$

Total loan access: when a farmer accesses a loan from a source

Formal loans: when a farmer accesses a loan from a formal financial institution or person

$$Y^* = X'\beta + \varepsilon \quad (5)$$

Where Y^* the latent dependent is variable, X' is the explanatory variable of the regression, β is the parameter to be estimated, and ε is the error term which is independently identically distributed with zero mean and constant variance.

In this analysis, the outcome of the response, having access to farm credit or not having access to farm credit, depends on the various covariates, which are the major variables of interest or probability of the outcome. The binary response in this study is whether or not the respondent, in this case, the farmer has access to credit from formal or informal persons or institutions, and if so, what are their productive capacity decisions, or whether respondents did not have any access to credit.

If Y_1 is a dichotomous variable, it can be assumed that Y_1 takes on the value 0 or 1, where 0 denotes the non-occurrence of the events in question, and 1 denotes the occurrence.

3.2. Description of Variables

Available literature identifies that access to credit is influenced by several factors, which include education, family size, household size, age, farmer group or association, gender, location of the credit institution, or bank, amongst others [2, 3, 9, 11]. Ayamga, Sarpong, and Asuming-Brempong [11] observed that women in groups are more likely to have credit access than their counterparts who do not belong to any group. Besides, the study by Thaicharoen, Ayirapruhya and Chucherd [41] and Crook [16] noticed in the empirical literature that individuals and households having low income more especially in developing countries, experience many difficulties in accessing credit. Thaicharoen *et al.* [42] and Crook [16]

argue to the fact that age is a significant constraint of credit. However, Ayamga *et al.* [11] and Thaicharoen *et al.* [41], in their separate studies, noticed that formal education has significant effects in credit scheme assessments [2].

3.3. Binary Probit Model Specification

$$\Pr(Y = 1/X) = \Phi(X'\beta) = Y^* = X'\beta + \varepsilon \quad (6)$$

Pr = probability (1 = when farmer accessed total/formals loan for cereal cultivation in the last planting season, 0 = otherwise),

Φ = Cumulative density function,

β = Coefficient to be estimated

Y^* = Dependent variable

X = Explanatory variable

1 = Access

0 = otherwise,

ε = Random disturbance term

3.3.1. The Functional Form of Credit Access Is Given by

Credit access = f(Age, Age2, Gender, Marital status, Credit awareness, Household size, Religion, Region, Education, Farm size, Type of cropping, Disability, Place of residence)

3.3.2. Statistical Form of Credit Access Is Given by

$$A_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \dots + \beta_k X_k + \mu \quad (7)$$

Where:

A_i = is the vector of dependent variables: Access to farm credits

X_i = is a vector of household, social and farm characteristics

β_o = Constant term

β_i = Corresponding coefficients of the related independent variable

μ = Error term

Table 1. Description of variables for the Binary Probit Model.

Definition	Variable Measurement	Apriori on Farm Credits
Age of household head	Continues: Years	-
Age squared		
Gender	Dummy (1 if a farmer is a male, 2 female)	+/-
Marital Status	Categorical (1 if a farmer is married, 2 otherwise)	+
Religion	Categorical (1 if a farmer has no religion, otherwise2)	+
Level of Education	Categorical (1 if a farmer attained Basic, otherwise 2)	+
Household Size	Categorical (1 if a farmer's HSz. is small, otherwise 2)	-
Region	Categorical (1 if a farmer is from the CR, otherwise 2)	+/-
Place of residence	Categorical (1 if a farmer lives in the urban, 2 rural)	+/-
Poverty Status	Categorical (1 if a farmer is very poor, 2 poor, 3 Non poor)	-
Disability	Categorical (1 if a farmer is disabled, 2 with no disability)	-
Credit Awareness	Categorical (1 if a farmer became aware of credit through media, otherwise 2)	+
Farm Size	Numeric (Measured in Acres)	+
Type of Cropping	Categorical (1 if a farmer practices mono-cropping, 2 mixed croppings)	+

Source: Extracted from Asare [9]

4. Statistical Results

Table 2. Descriptive statistics for the Independent variables.

Individual Variables	Frequency	Percentage
Age of household head		
1. Youth (17-35)	1,986	23.31
2. Adults (36-65)	5,152	60.47
3. Aged (66-99)	1,382	16.22
Sub total	8520	100
Gender		
Males	6,952	81.60
Females	1,568	18.40
Sub total	8520	8520
Education		
None	6,693	78.56
Basic	1,182	13.87
Secondary	576	6.76
Tertiary	69	0.81
Sub total	8520	100
Credit Awareness		
Media	385	13.48
Colleagues/Leaders/Relatives	1950	68.28
Representative from Fin. Inst.	455	15.93
Other	66	2.31
Sub total	8520	100
Household size		
small	4,387	51.49
many	3,411	40.04
huge	722	8.47
Sub total	8520	100
Religion		
No religion	502	5.89
Christian	4,055	47.59
Islam	2,037	23.91
Traditionalist	1,913	22.45
Others	13	0.15
	8520	100
Marital Status		
Married	6,380	74.88

Individual Variables	Frequency	Percentage
Consensual Union	428	5.02
Separated	176	2.07
Divorced	272	3.19
Widowed	985	11.56
Never Married	279	3.27
Sub total	8520	100
Region		
Western	120	1.41
Central	333	3.91
Greater Accra	21	0.25
Volta	713	8.37
Eastern	483	5.67
Ashanti	170	2.00
Brong Ahafo	505	5.93
Northern	1,724	20.23
Upper East	2,656	31.17
Upper West	1,795	21.07
Sub total	8520	8520
Poverty Status		
Very poor	2,527	29.66
Poor	2,300	27.00
Non Poor	3,693	43.35
Sub total	8520	100
Disability		
Pwds	267	3.14
Non-Pwds	8246	96.86
Sub total	8520	100
Place of residence		
Urban	880	10.33
Rural	7,640	89.67
Sub total	8520	100
Type of cropping		
Mono cropping	3,841	45.09
Mixed cropping	4,678	54.91
Sub total	8520	100

Source: Author's computations from GSS [21]

Table 2 indicates that about 81 percent of the respondents

were males, and 19 percent were females. Although Ghana has a population with females being in the majority, the 2010 population and housing census (PHC) results reveal that the majority of the respondents were males.

About 78.56 percent of the respondents had no education, 13.87 percent had basic education, 6.76 percent had secondary education, and 0.81 percent had tertiary education. Even though the results obtained from the 2010 PHC and Adams [2] stipulated that the majority of the people in the Greater Accra Region had at least basic education yet this does not reflect at the national levels. Adams [2], in his study, asserted that the majority of the vegetable farmers in his study area had some level of education, which could enhance the adoption of new techniques. However, the result from this study, in particular, is a worrying situation since almost 80 percent of the cereal farmers had no access to education, which means that such farmers are not likely to employ technology in their farming to enhance productivity. However, there are some farmers though uneducated they are able to use some indigenous technology in production. Some of these indigenous technologies are able to help them forecast the weather and know when to expect rain, and when to plant their crops.

In terms of age, more than 60 percent of farmers were between the ages of 36 and 65. The youth who fall between the ages of 17 and 35 recorded 23.31 percent doing slightly better than the aged who are above 65 recordings 16.22 percent. The increase in the performance of the youth can be attributed to government's PFJ, which has engaged many youths in Agriculture.

Household size represents the number of people living in the household. Small household size has members from one to five. Many household members have six to ten dwellers while huge households have members from eleven to twenty-eight. Cereal farmers with small household sizes dominated this category with 51.47 percent, which means that most cereal farmers do not have more than six dependents in their household. Second, to this was that many household farmers recorded 40.04 percent. Huge household size scored the least percentage of 8.47 percent. This is a sudden departure from previous years that farmers were known to have so many household members in order to help on the farm. A large household size was associated with the prestige and wealth status of that household head. In terms of the marriage characteristics, cereal farmers who are married were 75 percent. This score is good for the development of the nation since

such farmers are in their right frame of their minds to contribute to the national cake. This is because a married person is viewed to be responsible in society. With respect to the regional level analysis, the study reveals that more than 70 percent of the farmers were found in the three northern regions. The highest score of 31 percent was scored by the upper East region with Upper West and the Northern region following at a close range of 21 and 20 percent, respectively. The rest of the regions recorded insignificant scores of below 0.1 percentage points. However, Volta recorded a satisfactory representation of the cereal farmers of 8 percent. Greater Accra and Western regions had the lowest proportion of cereal farmers. This is because most of the farmers in these major regions where industrialization is taking place are dominated by peri-urban farmers. Farmers in these regions have to compete with industries for lands, and in most cases, farmlands are converted into industrial hubs as if to say that the role of agriculture in the national cake is insignificant. Having said this, every nation that neglects the agriculture sector will be at the mercy of poverty since it is agriculture that must drive industrialization. With regards to the poverty status of farmers, the majority of the farmers fall in the non poor category recording a percentage score of 43 percent. However, 30 percent of the cereal farmers were very poor. In referring to the place of residence, the rural household cereal farmers recorded an impressive performance of 90 percent. This is not surprising at all after the study showed that the three Northern regions recorded more than half of the cereal population of farmer households. This proves that the contribution of the rural cereal farmer households far outweighs that of the urban farmers in the same category.

Disabled cereal farmers represented 3.14 percent. This proves that more than 95 percent of the cereal farmers did not have any disability. This variable was included because several disabled associations have expressed their displeasure every now and then that they are being marginalized. This study sets out to unravel this truth. Even if this is true, the statistics reveal that some of those disabled are actively involved in farming. Cereal farmers who practice mono-cropping represented 45 percent. It is believed that farmers who practice mixed kind of farming are wealthier and hence are likely to have access to formal loans compared to the mono-cropping farmers. The statistics reveal that farmers who practice mixed cropping represent 55 percent.

Table 3. Results on the Determinants of Farm Credit using the Binary Probit regression.

Variables	Coefficients	Marginal effects	P-value
Sex			
Male	-0.1335	-0.0408	0.174
Females	Ref		

Variables	Coefficients	Marginal effects	P-value
Age	0.0328	0.0971***	0.007
Age2	-0.0003	-0.0001**	0.011
Marital status			
Married	0.3637	0.0977**	0.044
Consensual Union	0.3160	0.0833	0.130
Separated	0.2001	0.0503	0.430
Divorced	-0.0012	0.0003	0.996
Widowed	0.2553	0.0657	0.233
Never married	Ref		
Religion			
Christian	0.2420	0.0672*	0.092
Islam	0.2374	0.0660	0.107
Traditionalist	0.1959	0.0660	0.212
No religion	Ref		
Education			
Basic	-0.1079	-0.0321	0.159
Secondary	-0.1292	-0.3760	0.127
Tertiary	0.5647	0.1953***	0.001
No education	Ref		
Place of residence			
Rural	0.2997	0.0828***	0.000
Urban	Ref		
Poverty status			
Poor	-0.0259	-0.0080	0.762
Non poor	0.2588	-0.0750***	0.001
Very poor	Ref		
Disability			
Non Pwds	0.2826	0.0761	0.227
Pwds	Ref		
Region			
Central	0.7048	-0.2371	0.393
Volta	0.2088	-0.1515	0.261
Eastern	0.4512	-0.0841	0.068
Ashanti	-0.2423	-0.2440	0.448
Brong Ahafo	0.1373	-0.1704	0.583
Northern	0.5583	-0.0504**	0.023
Upper East	0.5625	-0.0495**	0.017
Upper West	0.2895	-0.1303	0.236
Greater Accra	Ref		

Variables	Coefficients	Marginal effects	P-value
Credit Awareness			
Media	-0.8102	-0.2748***	0.000
Colleagues/Leaders/Relatives	-0.6913	-0.2394***	0.000
Representative from Fin. Institutions	-0.6318	-0.2218***	0.000
Other sources	Ref		
Farm size	-0.05296	-0.0160***	0.007
Household Size	0.0880	0.0056	0.055
Type of Cropping			
Mixed cropping	-0.0655	-0.0196	0.238
Mono cropping	Ref		
Cons	-1.7613	-	0.000
Number of obs. = 2,847	Wald chi2 (33) = 165.87	Prob > chi2 = 0.0000	
Pseudo R2 = 0.0524	Log likelihood = 149.3653		

Source: Author's computations from GSS (21) Note: ***, **, * significant at 1%, 5% and 10% respectively

5. Discussion

The determinants of access to farm credit by farmers are estimated by the Probit model, and the results are presented in Table 3. The iteration log indicates how quickly the model converged, and the log likelihood (-149.3653) can be used in the comparison of nested models. The output shows that 2,847 observations in the data set were used in the analysis. The Wald chi-square value is 165.87 with a probability value [$P > \chi^2 = 0.000$], which means the independent variables are jointly significant at 1 percent, and they explain the access to total loans. This indicates that this model as a whole is statistically significant, and hence the model fits better than a model with no predictors. Pseudo R-squared of 0.0524 is the proportion of the total response variable explained by the regression model. This implies that about 5 percent of the changes that occur in the dependent variable (access to farm credits) are jointly explained by the independent variables. P-value of 0.000 implies that the model is statistically significant at 1 percent, giving that the model was not misspecified. Ten factors from the estimation have a significant relationship with access to farm credits. The details of these determinants, together with their expected signs, are discussed as follows:

Age has a positive statistical significant at 1 percent. However, age square has a negative statistical significant at 5 percent. Therefore, we say that additional years increase the likelihood of farm credit access, but beyond a certain age, additional years will reduce the likelihood of farm credit access. Results from the marginal effects reveal that an addi-

tional year in a farmer's age is more likely to grant him access to total loans by 0.009 percentage points. However, other writers like Adams [2] and Turkson [42] finds age to be insignificant in their studies on loans.

With respect to the marriage variable, only farmers who are married is statically significant at 5 percent for the farm credit. It also has a positive relationship, and this is consistent with the study's apriori expectation. This means that compared to a farmer who never married, the married have a 9.8 percent likelihood of accessing farm credits. This can be attributed to the fact that both formal and informal sources of farm credits or loans tend to have a preference for the married simply because they assume that the married category are more responsible compared to other marital status and are able to increase yield out of the loans they take. The married farmer has a family to take care of and is better able to pay off the loan less likely to default on the loan taken. Ackah & Acquah [1] confirms this finding in their study where a married householder was a significant factor in accessing credits.

Amongst the various religious groups, only Christianity has a positive relationship with farm credit and is statistically significant at 10 percent. This finding was consistent with the apriori expectation of the study.

With respect to education, only cereal farmers who had schooled to the tertiary level was statistically significant at 1 percent, and its positive relationship was consistent with the study's apriori expectation. This means that compared to farmers with no education, the farmer who has been to tertiary has a 19 percent likelihood of accessing to farm credits. This discovery proves that both formal and informal sources of loans tend to be skewed toward farmers who have been to the tertiary. Most studies lumped education together. For instance,

Adams [2] and Turkson [42] all found education not to have a statistical significance with loans.

In relation to the residence of farmers, rural cereal farmers have a positive statically significant at 1 percent, and this is consistent with the study's apriori expectation. Compared to a farmer in the urban area, the rural farmer has an 8 percent likelihood of accessing total credits. This is attributed to the fact that formal and informal sources of farm credits perceive the rural folks to be more hard-working than the cereal farmers in the urban and peri-urban areas.

The poverty status was categorized into very poor, poor, and non poor. The very poor farmer was used as the base indicator, and the results show that farm credit has a way of measuring the poverty status of cereal farmers who apply for loans. Therefore, the non poor farmer less likely to have access to farm credits by 0.075 percentage points. The finding again is consistent with the apriori expectation of the study.

With respect to the regions, only the Northern and Upper East regions had a negative statistical significance at 5 percent, and this is again consistent with the apriori expectations of the study. In using their various marginal effects, we say that compared to a farmer in the Greater Accra region, the farmer in the Northern region has 5 percent less likelihood chance of accessing farm credits likewise the farmer in the Upper East region who also has a 5 percent less likelihood chance of accessing farm credits. Having said this, it is obvious that a cereal farmer from the Northern and Upper East regions are first of all hardworking and can make the most of the credits to increase their yields but with bad roads such a farmer is less likely to have farm credit compared to the farmer in the Greater- Accra region. The poor nature of the roads does not encourage the services of financial institutions in those parts of the country. This confirms the findings of Ackah & Acquah [1], who also find that households in the Northern and Upper East regions were less likely to use financial services than those in the Greater Accra region.

Awareness through media, colleagues, and financial representatives has a negative statistically significant at 1 percent. It has a marginal effect of 0.27478, 0.239446, and 0.2217574, respectively. The findings is consistent with the apriori expectation of the study. Compared to other forms of credit awareness, the farmer with awareness through the media is 27 percent less likely to access farm credits. This result is not consistent with this study's apriori expectation, which hypothesized a positive relationship between awareness and farm credit access. Other writers also like to Okoronkwo *et al.* [35] also found a positive correlation between access to micro-credit and awareness of micro-credit availability. When assessing access and utilization of micro-lending schemes among rural farmers. Again, Anang, Sipilainen, Backman, and Kola. [5] found a positive correlation between awareness and access to credit. The result was obtained when they were assessing factors influencing smallholder farmers' access to agricultural microcredit in Northern Ghana.

The size of the farm has a negative statistical significance at

1 percent. This means an increase in farm size reduces the farmer's likelihood of accessing farm credits by 16 percent. This result is contrary to what Adams [2] found in his study. His study showed that farm size was not statistically significant. His findings revealed that vegetable farmers that possess large farms have a higher probability of accessing credit than their counterparts with smaller size. The negative relationship between farm size and farm credit again disagrees with the findings of Obisesan [34], who reports a positive relationship between access to credit and land area cultivated. Therefore, from the probit regression, the determinants of access to farm credit are age, age square, married cereal farmers, tertiary education, rural cereal farmers, non poor cereal farmer, Credit awareness, farm size, and cereal farmers in the Northern or Upper East regions.

6. Summary and Conclusions of the Study

Household characteristics included age, gender, marital status, education, household size. Poverty status, disability status, and others represented socioeconomic characteristics. In addition to these characteristics were farm characteristics like farm size and type of cropping. The probit model was employed to estimate the factors that determine access to farm credit in the first objective. Constraints faced by the cereal farmers in accessing farm credit and factors influencing access to farm credit were discussed in detail. Socio-economic findings show that most cereal farmers were aware of the availability of farm credit. Only a few farmers were not aware of the credits available to them. The total number of cereal households were 8513. Out of this number, the loanable household cereal farmers were 1,174, representing just about 14 percent. That number represents households that had access to farm credits. Out of this number, 792, representing 67 percent, had access to loans from informal sources like friends and family members, while 382 representing 33 percent came from financial institutions like banks and financial houses. This study supports the findings that informal sources are the major sources of loans in Ghana's credit industry. This means that 33 percent of the cereal farmers accessed credit from formal sources while the remaining 67 percent also accessed credit from the informal sources like such as friends, employers, relatives, amongst others. The results of the study revealed that age, age square, married, tertiary education, rural cereal farmer, credit awareness, poverty status (non poor), farm size and whether the farmer farms in the Northern or Upper West regions were found to be significant out of the total variables incorporated into the probit model in the first objective. It was observed from the study that age, marital status (married), religion (Christian), education (tertiary) and residence (rural) had a positive influence with access to farm credits while age square, poverty status (non poor),

credit awareness (at all levels) and the two regions (Northern and Upper East) had a negative influence on access to farm credit.

7. Recommendations

The findings of the study, recommend banks and other financial institutions whether public or private to ensure an early and timely disbursement of farm credit to cereal farmers particularly cereal farmers in the Northern, Upper West and East regions. More so, Civil Societies Charitable organisations and Non-Governmental Organisations (NGOs) that disburse farm credit should divert their attention to rural areas in the northern part of Ghana that are characterized by many cereal farmers with dire need of farm credits. Furthermore, since education is a significant factor in acquiring farm credit, unemployed graduates in Ghana who venture into cereal farming stand a better chance. In view of this, it is imperative for many unemployed graduates to venture into cereal farming particularly in rural areas since they are likely to receive farm credits compared to young cereal farmers in per-urban areas.

Abbreviations

APR	Annual Progress Report
AGI	Association of Ghana Industries
EAs	Enumeration Areas
PFJs	Planting for Food and Jobs
ISSER	Institute of Statistical, Social, and Economic Research
SGER	State of the Ghanaian Economy Report
BoG	Bank of Ghana
GSS	Ghana Statistical Services
GLSS	Ghana Living Standard Survey
MoFA	Ministry of Food and Agriculture
NGOs	Non-Governmental Organisations
HSz	Household Size
GDP	Gross Domestic Product
SGER	State of the Ghanaian Economy Report
SSA	Sub-Saharan Africa
ADB	Agricultural Development Bank
REML	Residual Maximum Likelihood

Author Contributions

Nana Kwesi Asare is the sole author. The author read and approved the final manuscript.

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Conflicts of Interest

The author declares no conflicts of interest.

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