



Agricultural Credit Effects on Smallholder Crop Farmers Input Utilisation in the Eastern Cape Province, South Africa

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ABSTRACT Agricultural credit is crucial and significant factor for agricultural productivity, especially for smallholder farmers. Despite numerous reforms undertaken by the government to transform smallholder agriculture and improve its contribution to rural welfare, these farmers lack credit to purchase inputs. The objective of this paper was to investigate the effects of agricultural credit on input use by smallholder crop farmers in the Eastern Cape. A total of 300 farmers were sampled with the use of snowball sampling techniques. Descriptive analysis and propensity score matching were employed to measure the effects of agricultural credit on input use and it was established that agricultural credit had a substantial influence on input use as well as success of smallholder crop farmers. This recommends that availability of credit has a potential to transform smallholder agriculture in South Africa. The study recommends that government and relevant stakeholders must develop an effective agricultural credit approach to improve the necessities of the smallholder farmers.

INTRODUCTION

In South Africa, agriculture plays an important role as it contributes to poverty alleviation, employment, food security and gross domestic product of the country (GDP) (Mayowa 2015). Agriculture continues to be an ultimate apparatus for sustainable growth, poverty alleviation and improved food security in emerging nations (Nzomo and Muturi 2014). Agricultural sector has grown by 22 percent and contributed by 1 percent to the state's Gross Domestic Product (GDP) in 2017. South Africa wants to upturn food production and nutrition safety due to the ever-increasing population, which may end up overtaking the food supply from the agricultural sector. Moreover, the agricultural sector remains a significant provider of employment for many people living in rural areas (Chisasa 2014).

According to World Bank (2017), employment in agriculture (5.5% of total employment) in South Africa was reported at 5.55 percent in 2017. Researchers argued that agriculture is estimated to be home and source of living and livelihood to 86 percent of the societies who live in remote areas. Agriculture is (as well as further a) source of employment to almost 1.3 billion

smallholder farmers and dispossessed workforces in South Africa (Matsane and Oyekale 2014). As an outcome of great reliance on agriculture for livings, approximately 48.3 percent of the South African populace is living below the poverty line particularly in the Eastern Cape Province. While agriculture remains an indispensable support for sustainable development, employment and poverty alleviation in the country, it endures to face encounters and undeveloped restrictions at the global, regional and national levels that necessitate pressing courtesy.

There are various definitions recycled to define emerging growers in South Africa and its definition depends on the context, country and ecological zone (Machethe et al. 2004). DAFF (2012) define smallholder farmers as non-productive, regressive, non-commercial, survival gardening positioned in fragments of past fatherland zones and growing their welfares from principal agriculture while Aliber et al. (2010) states smallholder farmers as those farmers who descend welfares and livings from principal agriculture and harvest primarily to generate and produce an income as well as those who yield for their own consumption, but eliminating are those who earn wages from farm work. However, unindustrialized under the smallholder structure is branded by little levels of production equipment and small-sized farm with production

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mainly for subsistence commitments, leaving little marketable surplus (Baloyi 2010). Smallholder farmers are categorized by frail fiscal, societal wealth and incomplete access to sanctioned alternative, suggesting that it is problematic to adjust these undesirable production features independently. By the way, farmers remain stuck as well as remain to function inside the specified production limitations and they do not obtain sustaining revenues from their agricultural activities as to purchase inputs.

World Bank (2017) and Chandio et al. (2018) argued that agricultural credit offers a discontinuity to growers for satisfactory usage of inputs, adoption of current machineries and more appropriate distribution of possessions to improve food security and eliminate poverty. Furthermore, agricultural credit is an important factor because it is a painstaking as one of the strategic resources for increasing production to the high limits subsequently improving living values and livelihoods of the rural poor farming community. Nzomo and Muturi (2014) stated that agricultural credit allows farmers to placate their currency desires stimulated by the manufacture sequence. Farming fiscal is an indispensable portion for agrarian development in emerging republics and is a provisional supplementary for private reserves besides it hastens equipment adjustment to encourage farming productivity by improving emerging farmers' output, quality establishment, nourishment safety and then, rustic farming revenue (Kiplimo et al. 2015). For example, in India and Brazil, agricultural supporting is given very high precedence. Kiplimo et al. (2015) however, argued that World Bank through its remote supporting member, Worldwide Funding Organization (IFC), between additional groups consumes also endorsed agrarian funding because of its importance for refining emerging growers' efficiency in developing countries. The accessibility of prescribed funding to the emerging growers is indispensable if they are to harvest a saleable leftover and thus subsidize to the growth progression (World Bank 2017).

In spite of many stories being told globally and government efforts to support smallholder farmers (such as Parastatal organizations' started to succeed and aims comprised Ithala Development Finance Corporation in KwaZulu Natal Province, Agricultural Development Banks of Ciskei and Transkei, Agribank of the North West Province, Gazankulu Development Finance

Corporation, Lebowa Development Finance Corporation both in Limpopo Province, and Uvimba Finance Corporation in the Eastern Cape) authentic backing has largely deteriorated in selected fragments of the emerging domain (Chauke et al. 2013) and yielded little impact. Owing to absence of security from the government, as a result these institutes have distorted or compound with other establishments to live up and support smallholder farmers. The major problem facing farmers is inadequate availability to credit or money boundaries, which hamper the approval of more well-organized and up-to-date equipment in the farming sector. This shortage of funds does not only confine farmers' likelihood to upsurge productivity but it affects consumption capacity as well as input purchase. Most of the smallholder farmers do not have access to credit, which makes it hard for them to run their farming smoothly, as a result, these farmers do maintain their currency capitals so as to simplify production and consumption in the growing seasons and subsequent sequence.

Subsequently, availability of credit to smallholder agri-business segment is static a key delinquent that threatens several smallholder farmers in South Africa and it has been noted that smallholder farmers are not competitive as commercial farmers are because of lack of factors of production. Waweru (2016) argued that the reason for such low competitiveness from smallholder farmers is credited to lack of credit, financial illiteracy and lack of significant collateral to use when sourcing for funds in financial institutions. According to Korir (2015), the unapproachability of credit, principally for smallholder farmers, has insufficient the choice of deeds, nature of equipment used and the gage of procedures that a farmer can approve on his farm. As a result of such, farmers are forced to use traditional technologies which are obsolete to inputs used in farming and it's affecting their productivity. Additionally, small credit access is highlighting blatantly as lone of the foremost restrictions to enhanced input use, output expansions, and overcoming rural poverty confronted by smallholder farmers (Kiplimo et al. 2015). As a result, agricultural output is limited due to a small adaptation of upgraded machineries, unpredictable markets, inadequate access to credit and markets and absence of business acquaintance among farmers (Nzomo and Muturi 2015).

Additionally, the role of agriculture in the economy is weakening, food importation upsurge hence leading to the dejection of the locally manufactured nutrition, which has decreased farmers' projected revenue which might have remained and used to expand their farm production and input use. The unapproachability to agricultural credit by small crop holders has resulted in inadequate operations in the farm and technological input use (Alila and Atieno 2006) which is being used worldwide as to increase productivity to meet the increasing population growth (Njuguna and Nyario 2015). Smallholder farmers are further constrained by shortage of fiscal assets around and thus the main difficulties fronting deprived households. According to Temesgen et al. (2018), the inefficient and inaccessibility of formal financial institutions in providing credit services to the deprived and farmers are adversely affecting agricultural production. As a result, smallholder farmers' output is deteriorating at an accumulative speed because of shortages in input use utilization which hinders the approval of more well-organized and up-to-date machineries in the farming sector. Furthermore, this deficiency of credit incomes not lone prohibits the potentials of improved output, but it likewise impedes the size for even feasting and poverty decline among households.

Main argument is that smallholder farmers are confronted with shortage of security and is the main cause for farmers' failure to profit from loan schemes and convenience of credit is challenging because of collateral disputes confronted by farmers (Saqib et al. 2018; Rahman et al. 2014). Thus result in farmers resorting to informal foundations due to their suitable distribution, no need for surety, and resistance in loan dealings. Farmers want money immediately, particularly during ploughing and after reaping period for the subsequent increasing season to cover money deficiencies and non-payment of their latest crop. Moreover, up-to-date farming is grounded on high-yielding seeds, manures, and plant security procedures which are luxurious and most prominently necessitates input. Utmost of their inputs are attained in currency or from traders on a credit-in-kind beginning, leading to augmented necessity of farm households on credit markets. A well-organized credit market offers farmers with the chance to encounter consumption necessi-

ties and proper input use, thus, resulting in upgrading to farmers' livelihoods.

In view of the above, smallholder farmers with no doubt deserve special attention as they contribute highly on rural livelihoods and poverty reduction. Particular that a hefty fragment of Eastern Cape Province's population is involved in agriculture, it would be convenient to identify effects of credit access on input use options, and suitable approaches for refining output through credit fiscal facilities access that will help as an effort for legislators in conveying pastoral credit strategy.

Objective of the Paper

The paper aims to identify and investigate the effects of agricultural credit on input use by smallholder crop growers in the Eastern Cape Province of South Africa.

MATERIAL AND METHODS

Location Description

The study was done in the Eastern Cape Province and is the subsequent biggest jurisdiction but yet the poorest of them all in South Africa. The Region is the subsequent largest Province in terms of apparent region in South Africa which is gifted with highlands, waterways, and plain grasslands with small bushes and woodlands (Fig. 1). The province is intensified by rising poverty, unemployment and inadequate economic openings which influences people's livings, the condition is even worse in the previous homeland areas of this province where very few progress exertions have thrived. Eastern Cape Province inhabits about 168,966 square kilometers, hence, around 14 percent of South Africa's entire capacity and the situation is separated into dual sections, the Western and the Eastern section (ECDRAR 2011). The unemployment rate is projected at 35 percent and a huge sum of individuals (2.5 Million) make a breathing through societal endowments and committed farming. The gap between the former homelands and the rest of South Africa has not deteriorated in the period 2001 to 2011. According to the 2011 South African survey, the Eastern Cape Province's people was projected to be 6 562 053 out of 51 770 560 of South African entire resi-

dents (Statistics South Africa 2013), of the 6 562 053 people, 60 percent resides in remote zones.

Agriculture is the most practiced sector in remote areas and is the greatest used get-up-and-go for household endurance as its performance is high and it is contributing highly to households as well as improving households' rural livelihoods (DEDEAT 2013). Provinces' agrarian sector hires about 70 000 people on profitable farms, with an extra 436 000 reliant on smaller farms, which are regularly in the prior native land parts of the Ciskei and Transkei as they derive their livelihoods from agriculture. The Province's regular poverty level is projected at 74.9 percent (StatsSA 2013) and the province's level of food insecurity (78%) is above the average national level of 64 percent (DEDEAT 2013). Hlomendlini (2015) stated that a large percentage of households in the province who are involved in farming and in most cases, they are not farming for business and income rather they are practicing farming to supplement other income sources and for household purposes. Majority of smallholder farmers in the province lacks production inputs and credit, as a result, they mostly depend solely on traditional meth-

ods and indigenous knowledge for farming which limits their agricultural productivity. Hence the study was carried out on smallholder farmers to check the impact of credit on input use as a form of improving their products as the majority of rural dwellers depends on farming for a living.

Data Gathering

The research was carried in the Eastern Cape Jurisdiction of South Africa inside four Region Municipality of the province. These Districts are renowned for their bulky zones of decent cropland and inordinate earths which ensembles crop production farming. A stratified procedure was employed by which smallholder crop farmers in the Eastern Cape were selected and within which 300 food plot-holders were enumerated. The unit of analysis for this study was smallholder crop farmers in the Eastern Cape Province. The study made use of non-probability sampling procedure in the form of snowball sampling. This sampling was used primarily because it was easy to identify respondent potential and then the respondents were recruiting

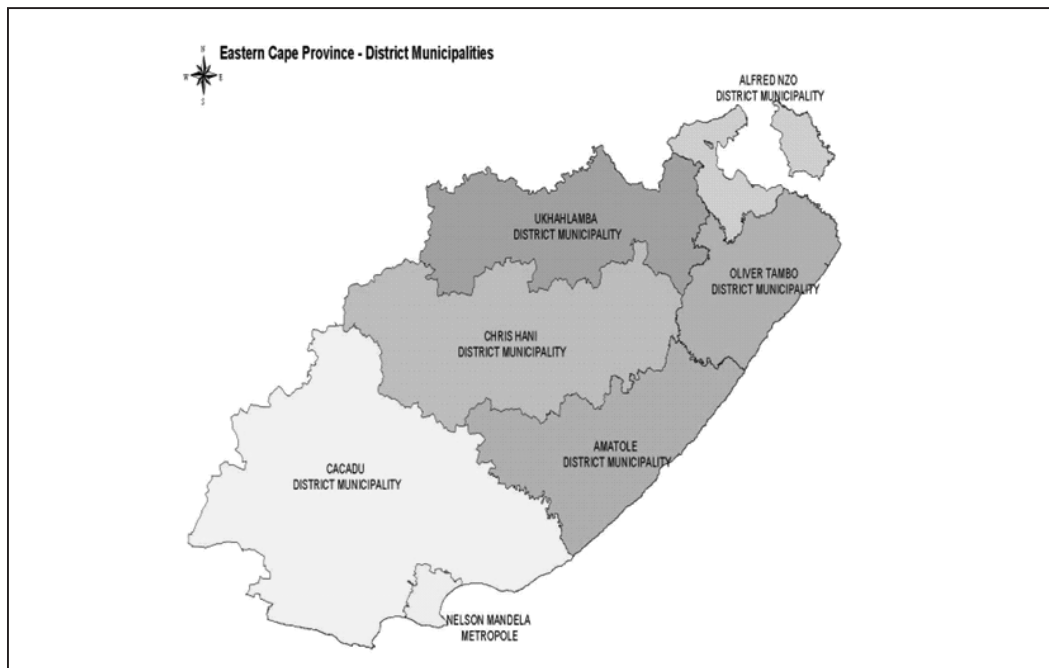


Fig. 1. District Municipalities of the Eastern Cape Province

Source: ECDC 2013

other smallholder crop farmers to form part of the participants as it was hard to get farmers to participate. The paper used principal and secondary data collection. The statistics was composed from two growing seasons between 2015/16 and 2016/17 seasons.

The study used mixed approach data design in collecting data and to generate these data types used for this study. For secondary data, a list of irrigation schemes were attained from officials and Extension officers in Department of Agriculture, Farm Organization and Chiefs. Researchers and enumerators made consultations with the above mentioned groups in obtaining historical studies done in these regions on linked subjects and gaining understandings into present and potential procedure advantages for the region entirely. Overall, records and material attained at this period were cooperative of delineation and acquisition a profounder indulgent of the study area.

Primary data was collected using methodical and multipronged data collection technique. Principal records were collected over a single-visit farmer and family's appraisal by designed questionnaire to produce socio-economic, crop production, input utilization, and access to the credit information that diverse from family to family. Table 1 offers the pertinent statistics collected by this process.

Data Analysis

Data collected from the survey in this study was coded by the researchers by conveying an arithmetic value in order to enable easier workability on the SPSS program version 22 and STATA version 15. The Microsoft Office Excel 2010 software set was used to capture the implied data. This made it easier for the researcher to check for mistakes before analyzing the data in SPSS and STATA. SPSS and STATA were the only software's used to carry out all the analysis for this study. The study made use of descriptive statistics in the form of percentages, frequencies, mean, standard deviations, minimum and maximum. Lastly the study made use of Logistic Regression to estimate factors influencing access to agricultural credit and Propensity Score Matching to estimate effect of agricultural credit on input use of smallholder crop farmers in the Eastern Cape Province.

Analytical Model

This study adopted the Logistic model to measure features impelling admission to agricultural credit by smallholder crop farmers' in the study region. The method has been used for this kind of a state where the calculation of the existence or lack of a consequence established on standards of an agreed forecaster variables required. According to Chauke et al. (2013), the logistic MODEL measurement can be used to guesstimate likelihoods relations for all of the autonomous variables in the model. The logistic regression model is suitable to a wider variety of exploration circumstances than discriminant examination. The word "logit" denotes to the ordinary logarithm of the probabilities (log likelihoods) which stipulates the likelihood of deteriorating interested in one of two groups on specific flexible of concentration (Wooldridge 2009). The regression scrutiny comprises two distinct substitutes and at this case, admission to credit is a qualitative reliant on variable where it takes the values 0 and 1, which is binary (Basamba et al. 2012). This study customs a binomial logistic model given that the reliant on variable is binary: 0 when a farmer is having no access to credit and 1 when partaking access to credit.

For this paper, two choices existed and accessible, specifically "access to credit" or "no access to credit" a twofold regression was established up to explain $Y=1$ for a state anywhere the grower retrieved subsidy and $Y=0$ for states wherever the grower did not retrieved subsidy from either official or unofficial credit foundations. Assuming that X is a trajectory of descriptive variables and p is the likelihood that $Y=1$, dualistic probabilistic associations as quantified by Wooldridge (2009). This can be measured as follows:

$$p(Y = 1) = \frac{e^{\beta x}}{1 + e^{\beta x}} \quad (1)$$

$$p(Y = 0) = 1 - \frac{e^{\beta x}}{1 + e^{\beta x}} = \frac{1}{1 + e^{\beta x}} \quad (2)$$

Where

Calculation (2) is the inferior answer level, that is, the prospect that growers did not have admission to credit from prescribed and unprescribed credit places, this will be the likelihood to be demonstrated through the logistic technique by settlement. Together, the calculations illustrates the effect of the logit alteration of the

likelihoods proportions which can otherwise be symbolized as:

$$\log it[\theta(x)] = \log \left[\frac{\theta(x)}{1 - \theta(x)} \right] = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n \quad (3)$$

Besides thus permitting its approximation as a linear model for which the ensuing descriptions apply:

θ = logit alteration of the likelihoods ratio; = the intercept term of the model

β = explanatory variables exhibited and

X_i = forecaster variables.

The previous processes were possible within the STATA. In relative to Calculation (3), the examination created the odds relations exhausting the supreme probability technique. The logistic regression in this study can be stated as follows:

$$Y_i = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \dots + U_n \quad (4)$$

Where

Y_i (AC) = the reliant on variable distinct as the admission to credit by smallholder farmers = 1 and 0 otherwise α = constant and capture of the equation

β = slope of the discrete predictor (or instructive) variables demonstrated

X_i = forecaster variables.

U_n = correction error term.

Propensity Score Matching

Propensity score matching was used to investigate the effects of agricultural credit on input usage by smallholder farmers. A propensity is a semi-parametric method that stretches a regular of agricultural credit access assumed by Logit model.

Propensity score matching model can be normally embodied as follows. (1)

For the analysis the reliant on variable will be agricultural credit (credit access=1 no access=0).

ATT stands for the regular consequence of agricultural credit on smallholder farmers.

$Y_d=1$ Id=1 is the credit admission outcome experimental on smallholder farmers.

While $y_d=0$ Id=0 is the alteration experiential on farmers with no admission to agricultural credit.

$P(x)$ is the propensity score.

Logit regression Model was used in this form:

(2)

Where:

$\ln(P_i / 1 - P_i)$ = Logit for impact on household income and food insecurity

$1 - P_i$ = Effects of credit on input use of the smallholder farmers

P_i = no diversification

β = coefficient

X = covariates

U_t = error term

Data

The data collected in the survey is illustrated in Table 1.

RESULTS AND DISCUSSION

Farmers' involvement in agricultural credit services is subjective and adversely affected by socioeconomic, fiscal, communal features of farmers and supplementary factors. From the study results, the bulk of farmers have no admission to agricultural credit with (78%) while 22 percent have admission to agricultural credit.

Table 1. Agricultural credit access. $\log it(P_i) = \ln \left(\frac{P_i}{1 - P_i} \right) = \alpha + \beta_1 X_1 + \beta_n X_n + U_n$ $[y_d = 0, p(x)]$
it, both financial institutions and informal. The study results show that the majority of growers were male-headed farmers with (80%) while females were 20 percent. This displays that mainstream of the farmers are males, which may be credited to the comprehensive labor obligation. Majority of the farmers fall between 35 and 46 years with (60%) and they spend 12 years in school. This infers that supreme of them are still active and fall within the age bracket of young people and the insinuation is that the farming in the study area is largely occupied by young and active individuals. Family size plays a significant part in farming and most farmers depend mainly on family labor for farming. The results elucidate that the regular household size is 4 which members per household. The normal monthly income acknowledged by smallholder farmer whether grants, remittances and agricultural production is R7 000. Majority of smallholder farmers have admission to extension services (60%) while (70%) of farmers are members of farm organization. Most of the farmers are using organic inputs (68%) while (27%) are using inorganic fertilizer, and (5%) of them are using both.

Table 1: Definition and units of measurements of key variables modeled

<i>Dependent variable</i>	<i>Definition</i>	<i>Value</i>	<i>Hypothesized relationship</i>
AC	Access to credit	A dummy variable coded 1 if have access to credit, 0 otherwise	
<i>Independent variable</i>	<i>Definition</i>	<i>Value</i>	
GENDER	Gender of the household head	A dummy variable coded 1 if male, 0 otherwise	+/-
AGE	Age of the household head	Continuous	+/-
YRSPSCHL	Years spent in school by the household head	Continuous	+/-
Distance to an agricultural credit institution	Distance to the agricultural credit institute	Continuous	+/-
Irrigation	Use of irrigation	A dummy variable coded 1 if irrigate, 0 otherwise	+
Extension services	Whether a farmer has access to extension services	A dummy variable coded 1 if access to extension services, 0 otherwise	+
Farm membership of an organization	Whether a farmer is a member of a farm organization	A dummy variable coded 1 if a member of farm organization, 0 otherwise	+
Household size	Household size of the family members	Continuous	+/-
Farm size	Farm size of the farmer	Continuous	+/-
Farm experience	Years being the farmer	Continuous	+/-
Occupation	Occupation of households	A dummy variable coded 1 if a farmer, 0 otherwise	+
Household income level	Household Income level of the household head	Continuous	+/-

Source: Field Survey 2018

Estimates of Factors Affecting Access to Agricultural Credit

Table 2 illustrates the estimation outcomes from the Logit regression and model fit is also explained. The principal one is the pseudo-R squared and the second ones are the Likelihood ratio Chi-square which is a valuation of how well the model ordered defendants appropriately built on assessed likelihoods. The likelihood ratio Chi-square of 197.006 with a p-value of 0.0000 expresses that our model is statistically substantial. The R Squared (98%) and adjusted R square (88%) recommends a good-fit (Table 2).

From the results, the gender of the household plays an important role. Sex of family head was establish to be a positive influence on the smallholder farmers' admission to agricultural credit and substantial at (5%). This result infers that a smallholder farmer is more likely to retrieve agricultural credit if the farmer is male as all other factors held constant. This is due to the

Table 2: Logistic regression estimates of determinants of farmers' access of agricultural to credit

<i>Variable</i>	<i>Coefficient</i>	<i>Std Error</i>	<i>Significance</i>
Gender	0 .912	1.096	0.021**
Age	-0.072	0.063	0.001***
Years spent in school	0.128	0.141	0.000***
Monthly income	0.432	0.266	0.026**
Distance	-1.122	0.930	0.127**
Farm organization	0.366	0.655	0.013**
Farm size	0.423	0.695	0.000***
Farm income	0.014	0.254	0.001***
Extension services	0.254	0.019	0.012**
Constant	0.045	0.085	0.968

Significance denoted as follows: ** (5%) and *** (1%)

Number of observers 130

log likelihood 197.006

Prob>Chi2 0.000***

Adjusted R 0.978

R-squared 0.876

Source: Field Survey 2018

Table 3: Effect of agricultural credit on smallholder farmers input use

Output variable	Kernel Matching Method		
	ATT	Standard error	p-value
Input use	5512.723	2860.551	0.010**
	Nearest Neighbors Matching Method		
	ATT	Standard error	p-value
Input use	6301.745	6301.745	0.002***

Model summary Number of observation =120

Matches requested =7Treatment model =Logit

Notes: ***, ** and * means significant at 1% and 5% levels, respectively.

Source: Results from Stata (Version 13) generated from Field Survey 2018

fact that the study is dominated by male farmers. These results are in line with Sebopetji and Belete (2009), on their study on features influencing smallholder farmers' decision to use credit, where they found gender to significantly affect credit use positively. The coefficient of the age of the family head was establish to be a negative effect on the smallholder farmers' admission to agricultural credit and substantial at (1%). The outcome suggests that when the smallholder farmers' age increases, the likelihood of retrieving agricultural credit declines. The implication of the negative influence of the age of the smallholder farmer on the likelihood of retrieving agricultural credit is that the elderly farmers' may be unwilling to undergo lengthy credit application process which also indicates risk aversion of older farmers. Generally, elderly growers are risk averse and they are not interested to bear risk adhere to credit repayment. The results are in line with Saqib et al. (2017) who found that the increase in farmers' age will reduce chances of farmers accessing agricultural credit.

Education was establish to be a positive effect on the smallholder farmers' admission to agricultural credit and substantial at (1%). The results suggest that admission to agricultural credit rises by 0.128 at (1%) level with an increase in years spent in school by smallholder farmer, all other factors held constant. Farmers who have spent more years in school have bet-

ter knowledge and understanding of agricultural credit and thus are more likely to retrieve agricultural credit than their uneducated farmers. The results are in line with Mitra and Prodhan (2018), Mayowa (2015) and Lefophane et al. (2013) who found out that as the farmers spent more years in school as they obtain a more formal education, the likelihood of attaining agricultural credit rises. Family income has a statistically significant level at (5%) and was found to have a constructive outcome on smallholder farmer admission to agricultural credit. This implies that the higher the households' monthly income, the more likely that a credit agent will lend the farmer with 0.432 at (5%) level. This means that admission to agricultural credit upsurges with a rise in family monthly income.

The farm income variable was establish to have a constructive outcome on the smallholder farmers' admission to agricultural credit and was statistically substantial at 1 percent. The result infers that access to agricultural credit will increase by 0.014 at (5%) with an increase in farm income of smallholder growers. The effect of this is that the more the smallholder farmer earns the probability of accessing agricultural credit will increase because the finance institute is sure the smallholder farmer will pay back the loan. The results are in line with Mayowa (2015) who found out that agricultural credit access increases with a rise in the farm revenue of the smallholder farmer all other factors held constant. Membership of farm organization was established to have a constructive effect on the amount of agricultural credit accessed by farmers and was statistically substantial at (5%) level. A positive coefficient of being a member of farm organization implies that a unit increase in being an affiliate of farmer-based connotation rises the amount of agricultural credit accessed by farmers by 0.366 at (5%) level compared to farmers who are not members of farmer-based organizations.

Farm size has a significantly constructive influence on the smallholder farmers' admission to agricultural credit and was statistically substantial at (1%) level. This suggests that a 1 percent rise in farm size will upsurge the amount of agricultural credit retrieved by farmers by 0.423 at 1 percent level. This means that as the farm size increases, farmers demand credit also increases by the size of the estimated coefficients. The results are in line with the conclusions of

Abdul-Jalil (2015) who found that a rise in farm size will result in an upsurge in admission to agricultural credit by farmers. Family size was established to be substantial at (5%) and was negatively related with access to credit. Family size had an adverse effect on families' credit contribution and statistically substantial at 5 percent level. This implies that as a sum of reliant on family member upsurges their participation in credit use will decrease. This owing to the fact that the actuality of reliant on family members in the households' increases with dynamic labor that generates revenue for the household member decreases. These results are in line with Temesgen et al. (2018) who found out that as house side is increasing, the access to agricultural credit does increase.

Distance covered by farmers from their home to agricultural credit organisations was adversely affecting farmers' admission to agricultural credit and was statistically substantial at (5%) level. This suggests that a component rise in distance travelled by farmers to agricultural credit institutions will decrease access to agricultural credit by 1.122 at 5 percent level. The results are in line with conclusions of Temesgen et al. (2018) who establish that a rise in distance travelled by farmers to agricultural credit will decrease access to agricultural credit by farmers. Admission to extension services was established to have a constructive effect on farmers' admission to agricultural credit and was statistically substantial at 5 percent level. This suggests that a unit rise in access and frequent visits from extension agents will upsurge farmers' chances of accessing agricultural credit by 0.254 at (5%) level. The results mean that those farmers receiving additional extension service to have a high probability of accessing agricultural credit service than those farmers with no frequent contact with extension services.

Effect of Agricultural Credit Access on Input Use

The purpose of this paper was to estimate the effect of agricultural credit on input use of smallholder farmers. So here through the use of Propensity Score Matching (PSM) we were evaluating if there is substantial effect between farm inputs used by farmers with credit with those farmers without credit. This subdivision evaluates how credit influencing the procurement of

inputs by smallholder farmers. The outcome on the input was estimated in fluctuations in funds, employed labor, family labor, magnitude of farm and superiority of seeds used. A propensity scores matching was done to select the harmonizing things. The use of the matching assets certifies that an evaluation set is created with visible features disseminated consistently diagonally quintiles in both the handling and assessment clusters (Nkala et al. 2011). The adjacent Neighbor and Kernel corresponding methods were used to evaluate the outcomes of agricultural credit on input use of the smallholder farmers. Table 3 presents the propensity score matching assessments of the effects of farmers' access of agricultural credit to input use.

The estimates for the average input use earned from emerging farmers having admission to agricultural credit assortments from R 5512.72 to R 6301.75, depending on the matching method used. All estimates are significantly different from zero at 1 percent to 5 percent critical level. The results show that the higher the amount of credit obtained from the agricultural institution, the more inputs are purchased by smallholder farmers for use on the farm. The agricultural credit institute was found to be statistically significant at 5 percent with a coefficient of 2860.551 in Kernel Matching Method. This suggests that a growth in the extent of agricultural credit will result to an escalation in inputs used by smallholder farmers which will lead to higher crop yields and as agricultural credit access should be a vital area if want to transform smallholder farmers. Furthermore, the amount of agricultural credit obtained from the agricultural institution has a significantly positive coefficient of 6301.74. Agricultural credit consequence can be due to a number of issues that influences smallholder farmer's admission to credit. The result is in line with Keelson (2017) who found out that credit scheme input has an effect on the productivity of smallholder farmers.

CONCLUSION

The findings of this paper confirmed the significance of agricultural credit on smallholder crop farmers. Smallholder farmers practice farming as their main activity, however, the majority of smallholder farmers in the study area have no admission to agricultural credit. Between 12 explanatory variables, which were theorized to im-

pact farmers' admission to agricultural credit, the important variables comprised in the regression such as gender, years spent in school, farm income, household income, access to extension services, member of farm organization and farm size were positively and significantly affect farmers admission to agricultural credit service while the age of the farmer and distance from Agricultural Credit Institute were negatively and significantly affect farmers admission to agricultural credit. The paper concludes that access to agricultural credit has an effect on input use by smallholder farmers. The outcomes display that the higher the amount of credit obtained from the agricultural institution, the more inputs are purchased by smallholder farmers for use on the farm.

RECOMMENDATIONS

The demand and usage of credit have gradually been considered as an operative instrument for rising and improving the productivity and revenue ranks of farmers in rural areas. This study recommended that the institutional sources of credit need to revise their policies and financial mechanism. The government must enhance policies that are linked to agricultural credit and make it flexible to enable smallholder farmers' access credit. Policy makers and NGO's should enhance credit education through sustained capacity building for farmers to improve their knowledge and ability to apply for credit as well as interpreting credit information. Official credit foundations must suitably diminish the attention degree of agricultural credit, and familiarize a superior attention degree funding procedure for input use. This paper recommends that in order to assist smallholder farmers, the interest charged on credit facilities should be revised downwards to upsurge demand for credit finance by the smallholder farmers to enable them to grow their farm businesses which will in effect have a ripple effect on the economy.

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REFERENCES

Abdul-Jalil M 2015. *Determinants of Access to Credit and its Impact on Household Food Security in Kara-*

- ga District of the Northern Region of Ghana*. M Thesis, Published. Ghana: College of Agriculture and Natural Resources.
- Aliber M, Baiphethi M, de Stage R, Denison J, Hart T, Jacobs P, van Averbek W 2010. Strategies to support South African smallholders as a contribution to the government's second economy strategy. In: L Smith (Ed.): *Situation Analysis, Fieldwork Findings and Main Conclusions*. South Africa: Institute for Poverty, Land and Agrarian Studies Research Report, 1(41): 28.
- Alila P, Atieno R 2006. Agricultural Policy in Kenya: Issues and Processes. *Paper presented during the Future Agriculture Consortium Workshop*, IDS, 20 22 March, Kenya.
- Baloyi JK 2010. *An Analysis of Constraints Facing Smallholder Farmers in the Agribusiness Value Chain: A Case Study of Farmers in the Limpopo Province*. M Inst Agrar. Pretoria, South Africa: University of Pretoria,
- Chandio AA, Jiang Y, Wei F, Guangshun X 2018. Effects of agricultural credit on wheat productivity of small farms in Sindh, Pakistan: Are short-term loans better? *Agricultural Finance Review*, 78(5): 592-610.
- Chauke PK, Motlathlana ML, Pfumayaramba TK, Anim FDK 2013. Factors influencing access to credit: A case study of smallholder farmers in the Capricorn District of South Africa. *African Journal of Agricultural Research*, 8(7): 582-585.
- Chisasa J 2015. An econometric analysis of bank lending and agricultural output in South Africa: A survey approach. *The Journal of Applied Business Research*, 31(1): 163-174.
- Eastern Cape Province Department of Rural Development and Agrarian Reform (ECDRAR). 2011. *Strategic Plan 2010/11-2014/15 (Updated 2011/12); Towards Vibrant, Equitable and Sustainable Rural Communities and Food Security*. South Africa
- Department of Agriculture, Forestry and Fisheries (DAFF) 2012. A Framework for the Development of Smallholder Farmers Through Co-operative Development. From <<http://www.nda.agric.za>> (Retrieved on 22 January 2019).
- Homendlini PH 2015. *Key Factors Influencing Smallholder Market Participation in the Former Homelands of South Africa: Case Study of the Eastern Cape*. MSc Dissertation, Published. South Africa: Stellenbosch University.
- Keelson RB 2017. *Effect of Input Credit Scheme on the Productivity of Smallholder Cocoa Farmers in the Amenfi West and Prestea-Huni Valley Districts of the Western Region: A Case Study of Opportunity International*. MPhil Thesis, Published. Ghana: University of Ghana, Legon.
- Kiplimo JC, Ngenoh E, Bet JK 2015. Evaluation of factors influencing access to credit financial services: Evidence from smallholder farmers in the Eastern Region of Kenya. *Journal of Economics and Sustainable Development*, 6(17): ISSN 2222-2855
- Korir GK 2015. *Factors Affecting Access to Credit by the Small Business Producer Groups*. MSc Dissertation, Published. Kenya: University of Nairobi.
- Lefophane MH, Belete A, Jacobs I 2013. Technical efficiency in input use by credit and non-credit user emerging farmers in Maruleng Municipality of Lim-

- popo Province, South Africa. *African Journal of Agricultural Research*, 8(17): 1719-1724.
- Machethe CL 2004. Agriculture and Poverty in South Africa: Can Agriculture Reduce Poverty. *Paper presented at the DBSA/HSRC/UNDP: Conference on Overcoming Underdevelopment in South Africa's Second Economy*. Pretoria, 28-29 October.
- Matsane SH, Oyekale AS 2014. Factors affecting marketing of vegetables among small-scale farmers in Mahikeng Local Municipality, North West Province, South Africa. *Mediterranean Journal of Social Science*, 5(20).
- Mayowa BT 2015. *Determinants of Agricultural Credit Acquisition from the Land Bank of South Africa: A Case Study of Smallholder Farmers in Peri-urban Areas of Mopani District, Limpopo Province*. M Thesis, Published. South Africa: University of Limpopo.
- Mitra S, Pradhan MDSH 2018. Factors determining credit access of tomato farmers in a selected area of Bangladesh. *National Journal of Multidisciplinary Research and Development*, 3(1): 406-410.
- Njuguna E, Nyairo N 2015. Formal conditions that affect agricultural credit supply to small-scale farmers in rural Kenya: Case study for Kiambu County. *International Journal of Sciences: Basic and Applied Research*, 20(2): 59-66
- Nkala P, Mango N, Corbeels M, Veldwisch GJ, Huising J 2011. The conundrum of conservation agriculture and livelihoods in Southern Africa. *African Journal of Agricultural Research*, 6(24): 5750-5770.
- Nzomo M, Muturi W 2014. The effect of types of agricultural credit programmes on productivity of small scale farming businesses in Kenya: A survey of Kimilili Bungoma Sub County. *Journal of Economics and Sustainable Development*, 5(23): ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online).
- Rahman S, Hussain A, Taqi M 2014. Impact of agricultural credit on agricultural productivity in Pakistan: An empirical analysis. *International Journal of Advanced Research in Management and Social Sciences*, 3(4): 125-139.
- Saqib SE, Kuwornu JKM, Panezia S, Ali U 2017 Factors determining subsistence farmers' access to agricultural credit in flood-prone areas of Pakistan. *Kaset-sart Journal of Social Sciences*, 30(1): 7.
- Sebopetji TO, Belete A 2009. An application of Probit analysis to factors affecting small-scale farmers' decision to take credit: A case study of the Greater Letaba Local Municipality in South Africa. *African Journal of Agricultural Research*, 4(8): 718-723.
- Statistics South Africa (Stats SA) 2013. *What Census 2011 Says About Household Agriculture. Statistical Release: Agricultural Households*. Statistics South Africa, Pretoria.
- Temesgen F, Duguma H, Hailu C 2018. Factors affecting credit use for rural farming at household level: Evidence from smallholder farmers' of Toke-Kutaye District. *Journal of Agricultural Economics and Development*, 7(2): 7-12.
- Waweru D 2016. *Factors that Affect Access to Credit Finance by Small Scale Women Entrepreneurs in Gilgil Sub County, Nakuru County- Kenya*. M Dissertation, Published. Kenya: University of Nairobi.
- Wooldridge JM 2009. *Introductory Econometrics, A Modern Approach*. 4th Edition. Michigan State University.
- World Bank 2017. *The Africa Competitiveness Report 2017 Addressing Africa's Demographic Dividend*.

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