www.jard.edu.pl http://dx.doi.org/10.17306/J.JARD.2022.01461

Journal of Agribusiness and Rural Development

pISSN 1899-5241
eISSN 1899-5772

1(63) 2022, 5–13
Accepted for print: 24.12.2021

GENDER ANALYSIS OF ACCESS TO FORMAL CREDIT BY SMALL-SCALE FARMERS IN GREATER LETABA MUNICIPALITY, SOUTH AFRICA

Phetole Previous Mahasha[1], Johannes Jan Hlongwane[1], Lungile Sivuyile Gidi[1]✉

[1]University of Limpopo, South Africa

Abstract. This study is a gender analysis of access to formal credit by both male and female small-scale farmers in Greater Letaba Municipality. The study precisely identified and described the socio-economic characteristics of female and male small-scale farmers, analysed and compared factors influencing access to formal credit by these farmers, and determined the perceptions of female small-scale farmers towards the credit system. In collecting the primary data, structured questionnaires were administered to 140 respondents (70 females and 70 males) using the stratified random technique. The study employed descriptive statistics, principal component analysis and a probit model to analyse the data collected. The probit regression model discovered that farm size, land ownership, gender, age, collateral and extension services had a significant positive influence on small-scale farmers` formal credit access. Based on the study findings, a set of recommendations for achieving equitable formal credit access by female and male small-scale farmers was put forward.

Keywords: formal credit, gender analysis, small-scale farmers, access to credit

INTRODUCTION

Agriculture has long been argued to be the dominant sector of the South African economy. Despite the colossal potential of agriculture within the country, the growing agricultural production has failed to match the demand for agricultural products. The agricultural sector is underperforming in less developing countries to some extent because female small-scale farmers, who are often a valuable resource in agriculture and the rural economy, encounter credit restraints because of their gender (Team and Doss, 2011) and this in turn reduces their productivity. Furthermore, gender inequality with regard to credit access is seen as of the explanation why agriculture fails to progress the way it ought to in South Africa.

Considering the nature of the environment as well as the cultural setting where agricultural endeavours are practised in South Africa, there is a compelling need to reassess the issue of small-scale farmers` credit access based on gender. Credit provision is one of the crucial agrarian policies that policy-makers need to reassess in the country, especially by looking at the gender disparities in agricultural resources distribution to the agricultural sector (Jeiyol et al., 2013). Rural credit has proved to be instrumental in alleviating poverty and developing rural areas if it is given equally among female and male small-scale farmers. Several studies have been conducted in economically developing nations on factors affecting credit access amongst small-scale farmers (Baiyegunhi and Fraser, 2014; Dube et al., 2015). However, most of these studies are not gender-sensitive. In order to fill this gap in the literature, this study examines a gender analysis of formal credit access by small-scale farmers in Greater Letaba Municipality, South Africa.

✉Lungile Sivuyile Gidi, Department of Agricultural Economics and Animal Production, University of Limpopo, South Africa, e-mail: lungile.gidi@ul.ac.za; https://orcid.org/0000-0002-2896-2709

The study seeks to achieve the following objectives;

- Identify and describe the socio-economic characteristics of female and male small-scale farmers in Greater Letaba Municipality.
- Analyse and compare factors that influence access to formal credit by both female and male small-scale farmers in Greater Letaba Municipality.
- Determine the perceptions of female small-scale farmers towards the credit system in Greater Letaba Municipality

LITERATURE REVIEW

Types of credit

The financial markets in economically developing nations, like South Africa, are dichotomous in nature and usually classified into two markets, namely, formal and informal financial institutions (Ghate, 1992). These financial markets are commonly described by the coexistence among informal and formal credit markets (Mohieldin and Wright, 2000).

Role of credit in rural development

In economically developing nations where agriculture is still perceived as a risky venture, more credit might strengthen the willingness of small-scale farmers to embrace advanced technologies intended to increase their income levels and also help risk-averse small-scale farmers to take risks (Rosenzweig and Binswanger, 1992). Kebede (1995) emphasises the importance of credit in ensuring that traditional agriculture is transformed into a modern agricultural sector by purchasing farm equipment, agricultural inputs and embracing modern technologies.

Factors influencing small-scale farmers' access to formal credit

Collateral

One technique that the financial institutions use to diminish the risk of losing their cash, because of uncertainty, is through demanding security (Basu, 2006). Thus, the collateral requirement helps financial institutions to separate unreliable from reliable borrowers, thus enabling them to offer credit only genuine candidates who really plan to pay back the loan. Similarly, the possibility of losing their collateral forces borrowers to think carefully before they invest in risky endeavours.

Gender discrimination and interest rate

Studies show that there is a universal belief that female small-scale farmers are regularly discriminated against in the formal financial institutions, especially in economically developing nations (Morris and Meyer, 1993; Falkingham, 2000). Muravyev et al. (2009) point out that female farmers in Sub-Saharan Africa are likely to be charged higher interest rates compared to the male farmers. On the contrary, Aterido et al. (2013) found no evidence of gender discrimination in many Sub-Saharan countries. In Ethiopia, Kedir (2003) discovered that female-headed households were offered more loans by formal financial institutions than their male counterparts.

Extension services

Worldwide (2010) revealed that even though most small-scale farmers in the developing countries were women, a large proportion of the extension agents who provided those services and trainings were men. Fletschner and Kenney (2014) indicated that in those cultural settings where social norms confine the mobility of women and their communications with men, their ability to attend financial training sessions and to access valuable information regarding credit was compromised. This may be because the male extension officers have a tendency to approach male small-scale farmers more than female small-scale farmers, assuming that extension services will ultimately trickle down from the male family head to all family members (Food and Agriculture Organization, 2010).

Education level and literacy

Across the developing countries, Worldwide (2010) noted that literacy rates among women seemed to lag significantly behind those for men. For instance, female small-scale farmers faced significantly bigger problems in filling out complex loan applications because they had lower financial literacy rates, and this made it difficult for them to explore the financial market (Lusardi and Tufano, 2015). However, a study in Kenya by Saito et al. (1994) contends that if women received similar agricultural production inputs and had similar education level as men, their crop production would increase rapidly.

Biased inheritance rules

Agarwal (2003) showed that biased inheritance rules in traditional societies had a tendency to favour sons over

daughters and wives. This is particularly the case in patrilocal cultures, parents tend to hand down their land to the son for the reason that after marrying, the daughter leaves her family to live with the family of her husband (Grogan, 2007). This is one of the obstacles constraining women from acquiring land, which is usually utilized to secure credit. Regardless of the constitutional guarantee of gender equality, the existing land reform in South Africa has not benefitted many women, especially in rural areas, which is due to customary law practices that deny women access to land (Rangan and Gilmartin, 2002).

METHODOLOGY

Study area

The study was conducted in Greater Letaba Municipality, which is in the Mopani District of Limpopo Province, South Africa. Greater Letaba Municipality is located in the town of Modjadjiskloof, formerly known as Duiwelskloof. The main economic activities in this area revolve around sectors such as agriculture, forestry and fishing, wholesale and retail trade, transport and communication, manufacturing, finance, and business services.

Data collection and sampling method

The primary data was collected from a sample of 140 small-scale farmers using a structured questionnaire. Stratified random sampling was utilized for selecting a sample size of 140 (composed of 70 females and 70 males) small-scale farmers from a sample frame of 1400 small-scale farmer in Greater Letaba Municipality. Stratified random sampling is a probability sampling technique whereby the entire population is first divided into strata. Next, a simple random sample is taken from each stratum and the combined results from each stratum constitute the representative sample. In all, 70 female and 70 male small-scale farmers were taken from each stratum, which gave a total of 140 small-scale farmers.

Analytical techniques

The study employed three analytical techniques to analyse the data, namely descriptive statistics, a probit model and principal component analysis. Descriptive statistics were used to identify and describe the socio-economic characteristics of female and male small-scale farmers. Principal component analysis was utilized in determining the perceptions of female small-scale farmers towards credit system. Principal component analysis (PCA) is a variable reduction technique which is used once measurements for a set of observed variables have been obtained. The aim is to arrive at few variables that will capture most of the variation in the observed variables (Hatcher and O'Rourke, 2013). PCA is particularly useful when the data obtained for many variables have some redundancy. Due to the redundancy, this technique reduces the observed variables to a smaller number of variables known as principal components, which capture most of the variance in the observed variables.

Table 3 indicates all the components extracted from the analysis and commonalities after extraction. The communality is known as the amount of variance within each variable, which can be explained by the principal component. Principal component analysis assumes that all variances associated with variables are common, hence before extraction all the commonalities are 1. All the values found in the extraction column show the proportion of variance within each variable that can be explained by the principal components. The rotated component matrix is the main output of the principal component analysis. The rotated component matrix comprises estimates of the correlation between each of the variables, as well as the estimated components.

The variables such as gender and bank preferences were loaded on component 1, whereas variables such as education level and collateral were loaded on component 2, and finally, the variables labelled geographical location and distance to the nearest bank were loaded on component 3.

Table 1. Kaiser-meyerolkinand bartlett`s test

Kaiser-meyer-olkin measure of sampling adequacy		0.541
Bartlett's test of sphericity	Approx. Chi-square	25.315
	Df	15
	Sig.	0.046

Source: own elaboration.

The extracted components were used to determine female small-scale farmers` perceptions towards the credit system in Greater Letaba Municipality.

Furthermore, a probit model was employed to analyse and compare factors influencing access to formal

Table 2. Total variance explained

Component	Initial eigenvalues			Rotation sums of squared loading		
	total	% of variance	cumulative %	total	% of variance	cumulative %
1	1.575	26.246	26.246	1.465	24.412	24.412
2	1.350	22.495	48.741	1.289	21.487	45.899
3	1.013	16.878	65.620	1.183	19.721	65.620
4	0.767	12.781	78.401			
5	0.730	12.159	90.560			
6	0.566	9.440	100.000			

Extraction method: Principal component analysis.
Source: own elaboration.

Table 3. Rotated component matrix and commonalities

	Component			Commonalities extraction
	1	2	3	
Banks preferences	0.795			0.682
Gender	0.791			0.679
Education level		0.834		0.703
Collateral		0.511		0.508
Geographical location			0.874	0.783
Distance to the nearest bank		0.464	0.593	0.581

Extraction method: principal component analysis.
Rotation method: Varimax with Kaiser normalization.
Rotation converged in 4 iterations.
Source: own elaboration.

credit by both female and male small-scale farmers in the study area. As stated by Nagler (2002), the probit model constrains the estimated probabilities to be between 0 and 1 and relaxes the constraint that the effects of the independent variables are constant across different predicted values of the dependent variable. The model assumes that we observe the values of 1 and 0 for variable Y. However, there is an unobserved latent continuous variable Y* that determines the value of Y. The probit model also includes realistic probabilities and believable error term distribution (Nagler, 1994). Therefore, the probit model is an excellent choice for this study.

Table 4. Description of variables in equation 2

List of variables	Description of variables	Units of measurement
Dependent variable		
Access to formal credit (ACRDT) (Y*)	1 if a farmer (male or female) accessed credit, 0 otherwise	Dummy
Independent variables		
Experience (EXP)	Experience of farmers in farming	Number of years
Education level (EDUL)	1 – if is formal, 0 – otherwise	Dummy
Marital status (MS)	1 – if married, 0 – otherwise	Dummy
Extension services (EXTS)	1 – if farmer receives extension services, 0 – otherwise	Dummy
Collateral (COL)	1 – if a farmer has a collateral, 0 – otherwise	Dummy
Age (AG)	Age of the farmer	Years
Farm-income (FINC)	Farm-income per annum	Rands
Farm size (FS)	Size of arable land	Hectares
Distance (DIS)	Distance to the financial institutions	Kilometres
Gender (GEN)	1 – if is male, 0 – otherwise	Dummy
Land ownership (LO)	1 – if a farmer own land, 0 – otherwise	Dummy
Household size (HS)	Household size of the farmer	Number

Source: field survey, 2018.

The assumption is that can be specified as follows:

$$Y_i^* = \beta_0 + \beta_1 x_1 i + \beta_2 x_2 i + , + \beta_n x_n i + \mu_i \quad (1)$$

and that:

$$Y_i = 1 \text{ if } Y^* > 0$$
$$Y^* = 0 \text{ otherwise}$$

where: x_1, x_2, …, x_k represent vectors of random variable, and u represents a random disturbance term.

Model specification

The specified probit model that was used to analyse small-scale farmers` access to formal credit can be specified as follows:

$$\begin{aligned} \text{ACRDT} = {} & \beta_0 + \beta_1 \text{EXP} + \beta_2 \text{EDUL} + \beta_3 \text{MS} + \\ & + \beta_4 \text{EXTS} + \beta_5 \text{COL} + \beta_6 \text{AG} + \beta_7 \text{FI} + \beta_8 \text{FS} + \\ & + \beta_9 \text{DIS} + \beta_{10} \text{GEN} + \beta_{11} \text{LO} + \beta_{12} \text{HS} + U_i \end{aligned} \quad (2)$$

NB: equation 1 is estimated for both female and male small-scale farmers.

RESULTS AND DISCUSSION

Socio-economic characteristics of male and female small-scale farmers

A total of 140 small-scale farmers (70 males and 70 females) were sampled in the study, of the 140 small-scale farmers, 81 (57.6%) accessed formal credit and 59 (42.1%) did not access formal credit (see Table 5).

Table 5. Proportion of small-scale farmers who accessed or did not access credit

Access to credit	Have access to credit	Do not have access to credit	Total
Frequency	59	81	140
Percentage (%)	42.1	57.9	100

Source: own elaboration.

The results in Table 6 indicate that the majority of farmers in the study area were aged 40–49 (21%) and 60–69 (21.4%). In other words, female small-scale farmers were more inexperienced compared with their male counterparts. Table 7 shows that most male small-scale farmers had more formal education compared to female small-scale farmers. Their level of education tends to make them vulnerable to rejection from financial institutions because they might face some difficulties in completing loan applications (Lusardi and Tufano, 2015).

As shown in Table 7, male small-scale farmers received more extension services from extension officers as compared to female small-scale farmers. This may be explained by the fact that male extension officers have a tendency to approach male small-scale farmer more than female small-scale farmer. This is on the assumption that extension services will ultimately drip down from the male small-scale farmer to all female small-scale farmers (FAO, 2010). According to the results in Table 7, male small-scale farmers owned more land than female small-scale farmers in the study area and this may be explained by biased inheritance laws, which tend to favour the sons over the daughters (Agarwal, 2003).

Empirical results from principal component analysis

Principal component analysis (PCA) was carried out to get the principal components that determine the female small-scale farmers' perceptions towards the credit system. The Kaiser-Meyer-Olkin test (KMO) is used to measure the adequacy of the sample, which ranges between 0 and 1, and the values closer to 1 are suitable. According to Andy (2000) and Kaiser (1974), if the value of KMO > 0.5, then the sample is satisfactory. The value of KMO is 0.541 (see Table 1), which indicates that the sample is satisfactory, and we may proceed with the principal component analysis. Furthermore, Bartlett`s Test of Sphericity can be employed in testing the null hypothesis that the correlation matrix has an identity matrix (Norusis, 1988).

The significant value of < than 0.05 shows that the original data does not produce an identity matrix and are therefore suitable for further analysis (Andy, 2000). As indicated in Table 1, Bartlett`s Test of Sphericity was significant (at 0.046) and this suggests that there was a relationship between the variables that were included in the analysis. KMO and Bartlett's tests were employed to analyse the suitability of principal component analysis. Total variance of 65.6% (see Table 2) is attained for three components. The first component eigenvalue is 1.575 and explains 26.2% of the variance, the second component eigenvalue is 1.350 and explains 22.5% of the variance, whereas the third component eigenvalue is 1.013 and explains 16.9% of the variance in the original data.

Table 6. Socio-economic characteristics of male and female small-scale farmers

Variable	Male small-scale farmers (N = 70)		Female small-scale farmers (N = 70)		Total (N = 140)	
	freq.	%	freq.	%	freq.	%
Distance						
< 10	35	50	28	40	63	45
10–19	22	31.4	26	37.1	48	34.3
20–29	11	15.7	15	21.4	26	18.6
> 29	2	2.9	1	1.4	3	2.1
Total	70	100	70	100	140	100
Experience						
< 10	39	55.7	36	51.4	75	53.6
10–19	27	38.6	23	32.9	50	35.7
> 19	4	5.7	11	15.7	15	10.7
Total	70	100	70	100	140	100
Household size						
< 5	19	27.1	32	45.7	51	36.4
5–9	45	64.3	30	42.9	75	53.6
> 9	6	8.6	8	11.4	14	10
Total	70	100	70	100	140	100
Farm size						
< 1	1	1.4	2	2.9	3	2.1
1–3	52	74.3	42	60	94	67.1
4–6	14	20	22	31.4	36	25.7
> 6	3	4.3	4	5.7	7	5
Total	70	100	70	100	140	100
Age						
< 40	14	20	14	20	28	20
40–49	15	21.4	18	25.7	33	23.6
50–59	14	20	7	10	21	15
60–69	15	21.4	17	24.3	32	22.9
> 69	12	17.1	14	20	26	18.6
Total	70	100	70	100	140	100
Farm income						
< 20 000	12	17.1	11	15.7	23	16.4
20 000–40 000	25	35.7	16	22.9	41	29.3
40 000–60 000	17	24.3	21	30	38	27.1
60 000–80 000	8	11.4	19	27.1	27	19.3
> 80 000	8	11.4	3	4.3	11	7.9
Total	70	100	70	100	140	100

Source: field survey, 2018.

Table 7. Socio-economic characteristics of male and female small-scale farmers0

Variable	Male small-scale farmers (N = 70)		Female small-scale farmers (N = 70)		Total (N = 140)	
	freq.	%	freq.	%	freq.	%
Marital status	Married: 40	57.1	Married: 31	44.3	71	50.7
	Otherwise: 30	42.9	Otherwise: 39	55.7	69	49.3
Education level	Formal: 54	77.1	Formal: 25	35.7	79	56.4
	Informal: 16	22.9	Informal: 45	64.3	61	43.6
Collateral	Have collateral: 45	64.3	Have collateral: 25	35.7	70	50
	Does not have collateral: 25	35.7	Does not have collateral: 45	64.3	70	50
Extension services	Receive Extension services: 41	58.6	Receive Extension services: 34	48.6	75	53.6
	Does not receive extension services: 29	41.4	Does not receive extension services: 36	51.4	65	46.4
Land ownership	Own land: 50	71.4	Own land: 27	38.6	77	55
	Does not own land: 20	28.6	Does not own land: 43	61.4	63	45

Source: field survey, 2018.

The result of principal component analysis indicates that the variables in the above-mentioned components had an influence on the perceptions of the female small-scale farmers in the study area. The female small-scale farmers` perceptions of the credit system that were derived from the principal component analysis are as follows: (i) male small-scale farmers easily acquire credit from formal banks, in contrast to their female counterparts, (ii) small-scale farmers with more education and collateral tended to access formal credit than their counterparts who were uneducated and had no collateral, (iii) small-scale farmers who were nearest to the banks were more likely to access credit than small-scale farmers who were far away.

Empirical results from the probit regression model

Table 8 shows the factors influencing access to formal credit by both female and male small-scale farmers. Moreover, a variable coefficient with a positive sign implies that a variable with a higher value increases the likelihood of acquiring formal credit by small-scale farmers and vice versa, ceteris paribus.

The findings from the study indicated that extension services, land ownership, gender, age, collateral and farm size significantly and positively influenced formal credit access by small-scale farmers. This signifies that small-scale farmers who own land, possess collateral, receive extension services and have a larger farm size are inclined to access formal credit from formal banks. The probit results further indicated that farming experience, marital status, farm-income, and household size had an insignificant negative influence on the small-scale farmers` access to formal credit, whereas education level had an insignificant positive influence on the access to formal credit by small-scale farmers.

CONCLUSIONS AND RECOMMENDATIONS

Based on the study findings, a set of recommendations for achieving unbiased formal credit access by female and male small-scale farmers were put forward. These recommendations could be useful to policy-makers in Greater Letaba Municipality (GLM) to improve existing credit policy. Small-scale farmers' formal credit access is positively influenced by collateral possession, among other things. Since collateral possession is one of the most crucial factors that constrains small-scale farmers from accessing formal credit, it is recommended that the

Table 8. Probit regression coefficients of factors influencing access to formal credit by both male and female small-scale farmers in Greater Letaba Municipality

Independent Variables	Coefficient	Std. Err.	t-ratios	Significant
Experience	–0.001022	0.033243	–0.03	0.975
Education level	0.297161	0.453405	0.66	0.512
Marital status	–0.238819	0.215271	–1.11	0.267
Extension services	1.068274	0.553636	1.93	0.054*
Collateral	2.562894	0.623485	4.11	0.000***
Age	0.037638	0.021944	1.72	0.086*
Farm-income	–2.23e–06	9.25e–06	–0.24	0.810
Distance	0.010979	0.029024	0.38	0.705
Household size	–0.025974	0.091234	–0.28	0.776
Gender	1.024591	0.463919	2.21	0.027**
Farm size	0.248553	0.146075	1.70	0.089**
Land ownership	2.388825	0.615776	3.88	0.000***
Constant	–7.289902	2.165985	–3.37	0.001
Number of observations		140		
–2 Log Likelihood		27.061		
McFadden Pseudo R^2		0.716		

***, ** and * represents 1%, 5% and 10% level of significance, respectively.
Source: field survey, 2018.

government should collaborate with the private sector to assist small-scale farmers to gain access to land, which can be used as a security in acquiring formal credit in GLM.

Additionally, the findings of the study show that male small-scale farmers received more extension services from extension officer as compared to female small-scale farmers. Hence, there is a need for the government to ensure that women are involved in formal agricultural education so that more female researchers or extension agents can be trained for a period of two years. It is advisable that policy-makers should formulate gender sensitive policies that ensure all small-scale farmers have unbiased credit access and other financial services. The government should ensure that vulnerable groups like young people and female small-scale farmers are given land rights to improve their likelihoods of gaining credit access.

REFERENCES

Adegeye, A.I., Ditto, J.S. (1985). Essential of Agricultural Economies. Ibadan, Nigeria: Impact Publishers Nig.

Agarwal, B. (2003). Gender and land rights revisited: exploring new prospects via the state, family and market. J. Agrar. Change, 3(1–2), 184–224.

Andy, F. (2000). Discovering Statistics Using SPSS for Windows: Advanced Techniques for the Beginner (1st ed.). Thousand Oaks, USA: Sage Publication, Inc.

Aterido, R., Beck, T., Iacovone, L. (2013). Access to finance in Sub-Saharan Africa: is there a gender gap? World Dev., 47, 102–120.

Baiyegunhi, L.J., Fraser, G.C. (2014). Smallholder farmers' access to credit in the Amathole District Municipality, Eastern Cape Province, South Africa. J. Agric. Rural Dev. Tropic. Subtropic., 115(2), 79–89.

Basu, P. (2006). Improving Access to Finance for India's Rural Poor. World Bank Publications.

Dube, L., Mariga, A., Mrema, M. (2015). Determinants of access to formal credit by smallholder tobacco farmers in Makoni district, Zimbabwe. Green. J. Agric. Sci., 5(1), 34–42.

Falkingham, J. (2000). Women and gender relations in Tajikistan. Country Briefing Paper.

Fletschner, D., Kenney, L. (2014). Rural Women's Access to Financial Services: Credit, Savings, and Insurance. ESA Working Paper No. 11-07.

FAO (Food and Agriculture Organization) (2010). The State of Food Insecurity in the World 2010, Addressing food insecurity in protracted crises. WFP, FAO.

Ghate, P.B. (1992). Interaction between the formal and informal financial sectors: The Asian experience. World Dev., 20(6), 859–872.

Grogan, L. (2007). Patrilocality and human capital accumulation. Econ. Trans., 15, 685–705.

Hatcher, L., O'Rourke, N. (2013). A Step-by-Step Approach to Using SAS for Factor Analysis and Structural Equation Modeling. SAS Institute.

Jeiyol, E.N., Akpan, S.B., Terver, N.T. (2013). Gender analysis of access to credit by rural small scale farmers in Benue state, Nigeria. Am. Int. J. SocSci, 2(6), 70–78.

Kaiser, H.F. (1974). An index of factorial simplicity. Psychometrika, 39(1), 31–36.

Kebede, K. (1995). Agricultural credit analysis. National Agricultural Policy Workshop.

Kedir, A. (2003). Determinants of access to credit and loan amount: Household-level evidence from urban Ethiopia. International Conference on African Development Archives.

Lusardi, A., Tufano, P. (2015). Debt literacy, financial experiences, and overindebtedness. J. Pens. Econ. Fin., 14(4), 332–368.

Mohieldin, M.S., Wright, P.W. (2000). Formal and informal credit markets in Egypt. Econ. Dev. Cultur. Change, 48(3), 657–670.

Morris, G.A., Meyer, R.L. (1993). Women and financial services in developing countries: a review of the literature. Economics and Sociology Occasional Paper No. 2056. Ohio State University.

Muravyev, A., Talavera, O., Schäfer, D. (2009). Entrepreneurs' gender and financial constraints: Evidence from international data. J. Compar. Econ., 37(2), 270–286.

Nagler, J. (1994). Interpreting probit analysis. New York University. Retrieved May 22nd 2018 from: http://www3.nccu.edu.tw/~tsaich/Pollins686/probit1.pdf

Nagler, J. (2002). Interpreting probit analysis. New York University. Retrieved May 22nd 2018 from: https://www.semanticscholar.org/paper/Interpreting-Probit-Analysis-Nagler/b386d059ad80875d84087ea57bdbb673c8f9f3d9

Norusis, M. J. (1988). SPSS-X advanced statistics guide (2nd Ed.). Chicago, IL: SPSS, Inc.

Owuor, G. (2009). Can Group Based Credit Uphold Smallholder Farmers Productivity and Reduce Poverty in Africa? Empirical Evidence from Kenya (No. 696-2016-47703). European Association of Agricultural Economists (EAAE) 111th Seminar, 26th-27th June 2009, University of Kent, Canterbury, UK.

Rangan, H., Gilmartin, M. (2002). Gender, traditional authority, and the politics of rural reform in South Africa. Dev. Change, 33(4), 633–658.

Rosenzweig, M.R., Binswanger, H.P. (1992). Wealth, Weather Risk and the Composition and Profitability of Agricultural Investments. Econ. J., 103(416), 56–78.

Saito, K.A., Mekonnen, H., Spurling, D. (1994). Raising the productivity of women farmers in Sub-Saharan Africa. The World Bank.

Team, S.O.F.A., Doss, C. (2011). The role of women in agriculture. Economic Development Analysis Division (ESA) Working Paper, 11.

Worldwide, W.T. (2010). Women and agriculture: Growing more than just food.