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RESEARCH ARTICLE

DETERMINANTS OF MICROCREDIT AND AGRICULTURAL INVESTMENT AMONG SMALL FARMING HOUSEHOLDS IN SOUTHERN PROVINCE OF RWANDA: THE CASE OF HUYE DISTRICT

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ABSTRACT

Small farmer access to microcredit programmes has been a major constraint to agricultural development in developing countries. Agricultural investment is observed with an aim of addressing major challenges in the rural areas in order to achieve long-term development objectives. Investing in agriculture through microcredit should increase income and improve production of small farmers. This study examines the use of microcredit programmes among small farmers in Rwanda. It also assesses the factors affecting small farmer's decision to participate in microcredit programmes in Huye District, Rwanda. Primary data was randomly collected using structured questionnaire from 300 small farmers in Maraba, Mukura and Ngoma Sectors of Huye District, Rwanda. Data was analyzed using descriptive analysis and Logit regression. The results from descriptive statistics show that more women small farmers had participated in microcredit programmes than men small farmers. The results shows also that the main purpose of agricultural loans were to buy seeds and fertilizers, to invest in irrigation, to improve in agricultural investment and to enhance agricultural development. The results from Logit model indicated that education, household size, total annual income, cooperative membership and distance are significant variables that influence small farmers' participation in microcredit programmes. Therefore, providing credit to the small farmers could increase their agricultural production and reduce poverty. The implication of these findings is that there is a need to invest in agriculture in order to increase the standard of living of small farmers and food supply in Huye District.

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INTRODUCTION

Investing in agricultural through microcredit programmes could increase income for subsistence small farmers, potential improving agricultural productivity and achieving food security (Langyintuo *et al*., 2008). Microcredit is one of the components of financial services considered as an important tool for agricultural development (Omonona *et al*., 2008). Microcredit is small loans made to poor borrowers and enhances the production capacity of the poor resource small farmers through financial investment in their human and physical capital (Okurut *et al*., 2004). Access to microcredit is considered as one of the key elements in raising agricultural productivity. Small farmers would invest more in their agricultural activity if they had more capital and financial support. Small farmer's participation in microcredit programmes lead to be an effective way to increase investments in agriculture, to generate from inputs and to raise their agricultural production. According to Javed, *et al*.(2006), microcredit was effective in increasing crop production and improving the living standards of the small farmers. Aliou and Zeller (2001) stated that access to credit can significantly increase the ability of poor household to acquire agricultural output. They further indicated that it reduces the opportunity costs of capital –intensive assets relative to family labor, thus encouraging labor-saving technologies and raising labor productivity. Agricultural credit is indeed an integral part of the process of modernization of agriculture of the rural economy. Golait (2007) reported that an increase in supply of credit was not going to address the problem of productivity, unless it was accompanied by investment in other support services. Sriram (2007) stated that agriculture is undergoing fundamental change where in the technology and inputs are moving out of the hands of the farmers to external suppliers. He stated also that increased supply and administered pricing of credit help in the increase in agricultural productivity and the well being of farmers as credit is a sub-component of the total investments made in agriculture. In Rwanda, agriculture currently accounts about 40 per cent of GDP and provides jobs

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to 80 per cent of the population. Most farmers rely on subsistence agriculture; with limited participation in the microcredit programmes, the production remains low and constraints to agricultural growth. The government of Rwanda integrated its national development vision 2020 and the Millennium Development Goals (MDGs) into a comprehensive national development strategic plan (Minecofin, report 2000). The major aspiration of Vision 2020 is to transform Rwanda's economy into a middle income country. However, this will not be achieved unless it transforms from a subsistence agriculture dominated economy to a knowledge-based society, with high levels of savings and private investment. It is expected that agricultural transformation will boost off-farm income as well as both the formal and informal sectors, and consequently reduce the number of the population dependant on agriculture from the present 87 percent to about 50% in the year 2020 (Minecofin, 2007). In order to achieve the Government's long-term development goals, the EDPRS has a strong focus on growth through greater productivity of agriculture (Government of Rwanda, Report 2007).

Rwanda is looking forward to have a productive high-value and market oriented agriculture sector, despite widespread recognition of the strong connection between agricultural development and poverty reduction, there is a continuing under provision of public goods investments for over a decade. Among the developing economies, Rwanda agriculture offers a huge potential to enhance incomes of the rural poor. Only 50 percent of the population will be employed in agricultural production, whilst half of the cultivated area will be farmed using modern technologies (Sam Kanyarukiga, 2004). The Government of Rwanda has over the years treated smallholder agriculture as just a way of life for a peasant population, with little to contribute towards economic growth and poverty alleviation. The farmers have also remained poorly organized and have failed to lobby for an adequate share of public resources. Agriculture has a potential of being an income generating activity for small farmers who lives in rural areas where poverty predominates (Minecofin, 2000). The future prosperity of these rural areas will be determined by development drivers such innovation in agriculture, using technology and competitive farming. However, despite the effort made by the Government of Rwanda to improve agricultural productivity, the existence of modern agricultural inputs such as improved seeds, fertilizers, and pesticides, agricultural productivity is still very low for the reason that small farmers do not have enough cash on hand and lack access to microcredit in order to invest in their agriculture and to purchase inputs. However, providing small farmers with loans could increase investment in agriculture and improve yields and profitability. The objective of the study was to examine the determinants of microcredit use and factors affecting small farmers' participation in microcredit programme to invest in agriculture.

MATERIALS AND METHODS

Study Design

The study used both quantitative and qualitative approaches. The qualitative approach was implemented to gather an in-depth understanding of microcredit programmes used by small farmers. In addition, a quantitative approach was also adopted to examine factors affecting small farmers' participation in microcredit programmes for agriculture investment.

Selection of the Study Area

The study was carried out in Huye District situated in Southern Province of Rwanda and focused on small farmers. Agriculture and livestock are the main activities in the district where small farming dominates the overall economy. The major crops grown are banana, beans, maize, sweet potato, cassava, sorghum and coffee which are the Rwandan's major cash crops. In this area, small farmers were involved in supply of farm inputs, services to agricultural farming.

Sampling procedures

The respondents were sampled using a purposive systematic random sampling technique to select a representative sample of 300 respondents. The sampling frame comprised both participants and non- participants in microcredit programmes. The data was collected through personal interviews using pre-tested questionnaire. The data collected included household characteristics, demographic and economic characteristics, and household asset endowments, among others. The household survey was conducted during September to December of 2015.

Data Analysis Tools

Data was analyzed using STATA 12 program and SPSS 18 (Statistical program for Social Sciences). The analysis includes both descriptive and econometric models.

Empirical Methods

a)Descriptive statistics

To describe the socio-economic factors of small farmers, we used the mean, percentages, tabulation and frequency distribution.

b)Logit model

Logit model was preferred as a binary. It takes a value of one (if small farmers have access to microcredit programmes) and a value of 0 (if small farmers do not have access to microcredit programmes). The dependent variables are dichotomous in nature, that is either a household has access to microcredit programmes or not. It implies that the dependent variable takes only two values of either 0 or 1**.** Logit model is used to examine factors that influence small farmers' access microcredit programmes. In Logit Regression, the probability that small farmers make a decision to access microcredit programmes is a regression model given by:

Taking natural log we obtain:

$$\Pr ob(Y = 1) = \pi = \frac{e^{Z}}{1 + e^{Z}} \text{..... ....} (1)$$

$$Z = \log_{e}\left[\frac{\pi}{1-\pi}\right] \text{..... ....} (2)$$

$$\Pr ob(Y=1) = \pi = \frac{1}{1+e^{-Z}} \quad \text{.....(3)}$$

Equation (3) is a logistic cumulative distribution function where

$$Z = \beta_0 + \beta_i X_i + \mu_i \quad \text{.....(4)}$$

e = 2.71828 is the base of the system of natural logarithms.
β_0 = the constant term or intercept
β_i = regression coefficient
X_i = vectors of explanatory variables
μi = The error term

Variables used in the Logit model

X_1= Gender (1 = male; 0 = female)
X_2 = Age of household head (years)
X_3 = Educational level of the household head (years of formal schooling)
X_4 = Household size (number of household member)
X_5 = Size land (in hectares)
X_6 = off-farm income
X_7 = Total Annual Income
X_8= Membership of Cooperative Association (1 = member; 0 = No member)
X_9 = Distance between Home and Source of microcredit (kilometer)
X10= Annual interest rate (in percentage)
μ = Error term

RESULTS AND DISCUSSION

Characterization of small farmers in Huye District

In Huye District, out of 300 the sampled small farmers, 118 (39.3 percent) were men while 182 (60.7 percent) were female in 3 sectors of Huye District. Table 1 shows that out of 300 households interviewed only 136 (45.3%) were participants while 164 (54.7 %) were non- participants and access to microcredit programmes.

Table 1. Participation in microcredit programmes by Sector per Gender in Maraba, Mukura and Ngoma of Huye District

	Participants N=136 (45.3%)		Non-Participants N=164 (54.7%)		Total N=300 (100%)	
Gender/Sector	Freq.	%	Freq.	%	Freq.	%
Male						
Maraba	28	9.3	25	8.3	53	17.7
Mukura	13	4.4	20	6.7	33	11
Ngoma	14	4.6	18	6	32	10.6
Total	55	18.3	63	21	118	39.3
Female						
Maraba	47	15.6	49	16.4	96	32
Mukura	22	7.3	30	10	52	17.3
Ngoma	12	4	22	7.3	34	11.4
Total	81	27	101	33.6	182	60.7

Source: Author Field survey, 2015

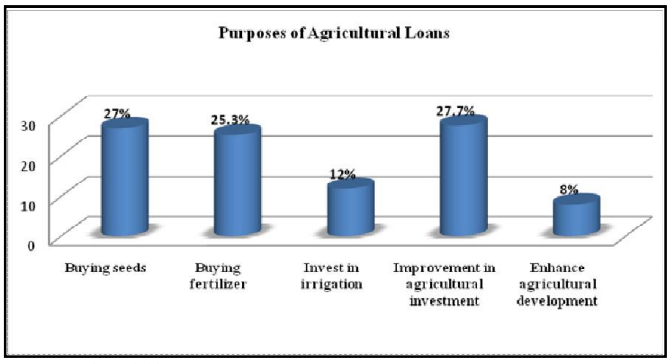
However, the results show that in Maraba sector, 28 (9.3%) male were participants and 25 (8.3%) were non-participants in microcredit programmes while 47(15.6 %) of female were participants and 49 (16.4%) were non-participants. In Mukura Sector, 13 (4.4%) of male were participants and 20 (6.8%) male were non- participants while 22 (7.3%) of female were participants and 30 (10%) were non-participants in microcredit programmes. In Ngoma Sector, 14 (4.6%) of male were participants and 18 (6%) male were non- participants while 12 (4%) of female were participants and 22 (7.3 %) were non-participants in microcredit programmes.

The results show that in Huye District, more women than men participated in microcredit programmes. The results shows that women involved in agricultural activities have increased their agricultural productivity than men. Therefore, in Huye District, microcredit has contributed to economic empowerment of women for creating self-employment and income generating activities in order to increase their livelihood. The results show also that more small farmers in Maraba sector have participated in microcredit programmes than Mukura and Ngoma. Maraba sector is the only sector where the level agricultural commercialization of coffee is much higher than others. As expected the participation in microcredit programmes was lowest in Ngoma Sector.

Descriptive Statistics for explanatory variables used the Model

Table 2 shows that the mean gender was 0.39 while the mean education of respondents was 2, indicating that the small farmers have relatively low education level. The low level of education could have a negative effect on the participation in microcredit programmes. The total annual interest rate was 12.06 percent. In the study areas, the annual interest rate established by commercial Banks and microfinance institutions is very high. This is a big challenges faced by small farmers to access microcredit programmes in order to invest in agriculture as they require collateral. Results also show that the mean household size was reported to be 4.57 approximated to 5 members in the family. The mean Total Annual Income was 366,845 Rwandan Francs equivalent to (466 USD) while the mean of total annual expenditure was 590,277 Rwandan Francs equivalent to (751 USD).

Purposes of agricultural Loans in Maraba, Mukura and Ngoma sectors of Huye District



Source: Author Field survey, 2015

Figure 1. Purpose of agricultural loans

Table 2. Socio-economic characteristics of households

Variables	Mean	Std. Dev.	Minimum	Maximum
Gender	0.39	0.489	0	1
Education	2.00	0.820	1	5
Annual Interest rate (in percentage)	12.06	2.436	7	18
HH Size	4.57	1.882	1	12
Total Annual income (Rwandan francs)	366,845	576,304.203	46,000	4,820,000
Total annual Expenditure (Rwandan francs)	590,277.02	462,306.044	37,000	3,410,000

Source: Author Field survey, 2015

Table 3. Logit Regression of the factors influencing participation in Microcredit Programmes

	Maximum Likelihoods			Marginal Probability		
Variables	Coef.	Std. Err.	P-value	Coef. (dx/dy)	Std. Err.	P-value
Gender	.2815604	.2695499	0.296	.0701141	.06699	0.295
Age	.0709885	.124345	0.568	.0176771	.03097	0.568
Education	.3205724	.1751017	0.067*	.079827	.0436	0.067*
HHsize	.1494227	.0746688	0.045**	.0372083	.01858	0.045 **
Size_HH_land	.239884	.1763893	0.174	.0597344	.04393	0.174
Off_farm_inc	-.0520488	.0397523	0.190	-.0129609	.0099	0.191
Tot_Ann_Inc	1.84e-06	5.41e-07	0.001***	4.57e-07	.00000	0.001***
Coop_memb	.957471	.2666872	0.000***	.2347643	.06304	0.000***
Distance	-.4670435	.160032	0.004***	-.1163003	.03984	0.004* **
Ann_Inter_Rate	-.0128951	.054362	0.812	-.0032111	.01354	0.812
_Cons	-2.120218	1.167294	0.069 *			
Number of Obs = 300						
LR chi2(10) = 67.13						
Prob > chi^2 = 0.0000						
Pseudo R^2 = 0.1624						
Log likelihood = -173.07194						
Predict = .46859676						

***, **, * Represent level of significance at 1%, 5% and 10 %, respectively.
Source: Computed from Field Survey, 2015

We investigated the various purposes of agricultural loans in Huye District as shown in Figure 2. The results show that overall 27 % and 25.3% of the respondents have reported that the purpose of agricultural loans was to buy seeds and fertilizer respectively. 12 % of the respondents have reported that the purpose of agricultural loans was to invest in irrigation while 27.7 % and 8% of the respondents reported that the purpose of agricultural loans was to improve in agricultural investment and to the enhancement of agricultural development respectively.

Estimation results for Factors Influencing the Probability of participation in microcredit Programmes

This section presents the estimation results from the Logit model. The dependent variable is whether ''*The small farmers have participated in microcredit programmes''* represented by 1 and 0 otherwise. The Marginal effects reported in percentage form represent the change in probability of participation with regards to a unit change in the independent continuous (exogenous) variables (*dx/dy*). Logit regression model was used to identify factors influencing participation in microcredit programmes by small farmers. Table 3 shows the maximum likelihood estimates of the Logit model. In the model, coefficients of five out of ten explanatory variables are significant. It is evident from the table that the *education, household size, total annual income, cooperative membership and distance* are significant variables that influence small farmers' participation in microcredit programmes. The marginal effects were an indication of one unit change in an exogenous variable on the probability that a farmer was participant in microcredit programmes.

Education

Education of small farmers was found to be statistically significant at 10% with a positive value of coefficient .0701141. This means that an increase in level of education by 1 year increases the probability of participation in microcredit programmes by 7 percent.

Household size

Household size was found to be significant at 5% with a positive coefficient equal to .0372083. This means that an increase of 1 family member will increase the probability to participate in microcredit programmes for increasing their standards of living by 3.7 percent.

Total Annual Income

Total Annual Income was found to be significant at 1% and influence positively the participation in microcredit programmes. The results show that an increase in the value total annual income increases the likelihood to participate in microcredit programmes. Therefore, the small farmers increase their household per capita income and therefore increase the amount of money that they can invest in agriculture.

Cooperative membership

Cooperative membership was found to be significant at 1% and influence positively the participation in microcredit programmes. It has a positive coefficient equal to .2347643. This means that to be a member of cooperative society will increase the probability of participation in microcredit programmes by 23.4 percent.

Distance

The Distance from homestead to microcredit sources Office was found to be significant at 1 % and influence negatively the participation in microcredit programmes. The coefficient of Distance is equal to -.1163003. There is a negative and significant relationship between participation and distance from microcredit sources. A unit increase in the distance reduces the probability of participation in microcredit programmes by 11.6 percent.

Conclusions and Policy Implications

Agricultural productivity should provide the ability to meet food security and economic development objectives in the face of rapid population growth. Investing in agriculture is essential to the sustainable development goal of reducing poverty. This study analyzed the determinant of microcredit and agricultural investment among small farmers in Huye District, Rwanda. It found that out of 300 households interviewed only 136 (45.3%) were participants while 164 (54.7 %) of households were non- participants in microcredit programmes. The study also finds that the main purpose of agricultural loans were to improve in agricultural investment, to buy seeds and fertilizer, to invest in irrigation and to enhance agricultural development. The study finds the factors that influencing small farmers' participation in microcredit programmes including education, household size, total annual income, cooperative membership and distance. The implication of these findings is that there is a need to invest in agriculture in order to increase the standard of living of small farmers and food supply. Such investments need to promote the establishment of agricultural technology that contributes to reduce poverty and hunger, thereby facilitating the achievement of the Millennium Development Goals. These findings therefore indicate priorities for policymakers and the private sector to invest in linking farmers to financial institutions. It is also suggested to emphasize the importance of improving rural literacy level of the farming communities. The study recommends also that small farmers could improve their level of education as this can enhance the use of appropriate technology and agro-chemicals for increased agriculture production. The government should consider targeted support microcredit programs for small farmers who cannot afford to access microcredit in order to invest in agriculture which lead to an increase of income and agricultural productivity of small farmers in Huye District, Rwanda.

Investing in agriculture and rural development and making those investments as effective as possible is both the means to provide more food for more people and the way to improve rural livelihoods so the poor can buy the food they need. Increased productivity in the agricultural and service sectors, accompanied by strong public and private sector investment activity are key sources of growth, employment and poverty reduction in the short to medium term.

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