International Scholars Journals

International Journal of Agricultural Extension and Rural Development ISSN 3254-5428 Vol. 6 (3), pp. 622-627, March, 2018. Available online at www.internationalscholarsjournals.org © International Scholars Journals

Full Length Research Paper

Analysis of factors influencing microfinance credit uptake among smallholder coffee farmers in Tharaka Nithi county, Kenya

Anderson, K. Mbuba*, Eric K. Bett, Charles Ndenga and Newton Nyairo

Department of Agribusiness Management & Trade, Kenyatta University, P.O BOX 43844, Nairobi, Kenya.

Accepted 14 February, 2018

Microfinance institutions play a critical role in improving production and productivity of smallholder farmers by availing necessary financial resources when needed. Despite the benefits of microfinance credit on production, its uptake and use in the study region is still low. Consequently, it's not known what factors influence the uptake and use of microfinance credit among smallholder coffee farmers in Tharaka Nithi county. The objective of this study was to find out the factors that influence the uptake of micro finance credit among smallholder farmers in Tharaka Nithi County. A total of 390 smallholder coffee farmers were selected through multi-stage sampling procedure. Primary data was collected by the use of structured questionnaires. Both descriptive and probit regression methods were used to analyze data. Results indicated that coffee farming experience, gender of the household head, number of coffee trees and access to extension services had significant influence on the uptake of microfinance credit. In conclusion any agricultural policy intervention on financing smallholder coffee farmers should focus on these factors to enhance uptake and efficiency in management.

Keywords: Smallholder coffee Farmers, micro finance, credit uptake, probit regression.

INTRODUCTION

In the last twenty five years, various interventions have been made by different stakeholders such as donors, international organizations, government and non-governmental organizations (NGOs) towards promoting an active microfinance sector in Kenya. Microfinance is viewed as a tool that can empower low income earners to work on their own to reduce poverty and over dependence on government support. Microfinance institutions were introduced and viewed as alternative source of financial services in rural areas. It was believed that microfinance will enable smallholder farmers to easily access credit facilities without collateral (IFAD, 2003a). Microfinance is currently being used across the world to help farmers boost their agricultural production. In Kenya microfinance is seen as a better option to assist the low income farmers in rural counties to commercial agriculture. Apart from Microfinance institutions, government and non-governmental organizations (NGOs) offer subsidized credit to smallholder farmers in rural areas of many developing countries (Miller, 2011). There is a link between microfinance and agricultural production in most parts of the world. For instance, a study by Girabi and Mwakaje (2013) in Tanzania reported that adoption of microfinance credit in crop production resulted in yields of 31.8 bags of sunflower and maize per acre among the beneficiaries compared to 17.7 bags for non-credit beneficiaries. In Kenya microfinance institutions have shown a positive trend reaching out to 832,794 borrowers with a loan portfolio of kshs. 49.1 billion, according to the Association for Microcredit Institutions (AMFI, 2013). This translates to 15% annual growth. The institutions are also providing a broad range of credit products and services to sectors such as

*Corresponding author email: Kimathi.mbuba@gmail.com.

agriculture, business, asset financing and housing (AMFI, 2013). However, despite this remarkable growth posed by microfinance institutions, credit uptake by smallholder coffee farmers in the study area is still low (Alila and Obado, 2009). The study therefore sought to investigate factors influencing microfinance credit uptake by smallholder coffee farmers.

MATERIALS AND METHODS

Study area

Tharaka-Nithi County borders the Counties of Embu to the South and South West Meru to the North and North East, Kirinyiga and Nyeri to the West and Kitui to the East and South East. The county lies between latitude 000 07' and 000 26' South and between longitudes 370 19' and 37046' East. The total land area of the County is 2,662.1 Km^2 of which 360km^2 is occupied by Mt Kenya forest. The county is made up of three constituencies namely; Maara, Tharaka and chuka-Igambang'ombe. Temperatures in the upper region range between 14^oC to 30^oC while those in the lower region range between 22^oC to 36^oC. Tharaka constituency lies in the lower side and experiences temperatures of up to 40^oC at certain periods. The county has a bi-modal rainfall pattern with the long rains falling during the months of April to June and the short rains in October to December. The rainfall ranges from 2,200mm in Chogoria forest to 500mm in Tharaka. The highest altitude of the county is 5,200m in Chuka/Igambang'ombe and Maara while the lowest is 600m Eastwards in Tharaka. The high altitude areas experience reliable rainfall while middle areas of the county receive moderate rainfall. The lower regions receive low, unreliable and poorly distributed rainfall. Majority of the people in this area are farmers who rely on rain-fed agriculture and livestock keeping. The climate is favorable for dairy farming and cultivation of tea, coffee, maize, cowpeas, pigeon peas, tobacco and a variety of other food crops. However, there are unusual climate variability incidences arising from climatic change. Maara and chuka-Igambang'ombe constituencies were purposively selected due to the presence of many active MFIs that target smallholder farmers. The area is also among the major coffee growing zones in Tharaka-Nithi County due to relatively favorable climatic condition.

Sampling procedure and Data Collection

The study employed a multistage sampling technique. The first stage involved purposive selection of two sub counties in the county thus Maara and Chuka-Igambang'ombe were picked due to the presence of many active MFIs that target smallholder farmers. The sub counties are also among the major coffee growing zones in Tharaka-Nithi County. In the second stage, three wards namely Chogoria, Karingani and Magumoni were purposively selected out of ten wards in Maara and Chuka-Igambang'ombe constituencies due to their high concentration of smallholder coffee farmers and their proximity to the urban areas where most of microfinance institutions are located. A total of 130 smallholder coffee farmers comprising of microfinance adopters and non-adopters were randomly selected from each of the three wards making a sample size of 390 farmers. The sample size was computed based on the formula outlined by Mugenda and Mugenda (2003)

$$n= z^2pq/ d^2$$

Where:
n=required sample size
z=the value of standard normal deviate at the required confidence level (at 95% the standard value is1.96)
p=the proportion of target population estimated to have the characteristics being measured. In this case the prevalence is small holder coffee farmers that have used microfinance.
q=the estimated proportion of the population without the characteristics being measured i.e. q=1-p
d=the level of statistical significance which gives margin of error at 5 %(standard value of 0.05)
In the study area, it was estimated from previous studies that approximately 50% (0.50) of smallholder farmers adopted microfinance. Moreover; statistically a proportion of 0.5 results is sufficient and reliable sample size, particularly when the population proportion is not known with certainty (Kothari,2005). Using the standard values listed above, the required sample size was computed as follows;

$$n=\frac{1.96^2*0.5(1-0.5)}{0.05^2}$$

n=384 households
The data was collected from an increased number of 390 smallholder coffee farmers in order to take care of the incomplete questionnaires and non-response. Primary data was collected from the selected farmers by use of structured questionnaires.

Empirical model specification.

This study aimed at determining socioeconomic and demographic factors that influence the decision of farmers to take or not to take microfinance credit to fund coffee farming activities. Considering the dichotomous nature of the farmer, a qualitative response model was appropriate. Qualitative response models relate the probability of an event to various independent variables. In order to examine the factors that influence the decision to take microfinance credit by farmers, we applied probit model for binary choice (yes, no) responses.
The probit analysis provides statistically significant results of factors that influence the decision to adopt the microfinance credit. The probit model used for the analysis was expressed as:

$P(X) = Pr (D= 1|X) = F (\beta 1X1 + \ldots\ldots\ldots\ldots\ldots\ldots + BkXk)$ (1)

The probability p(x) of choosing any alternative over not choosing it can be expressed as in (1) where D is the indicator of participation, D =1 if a farmer is an adopter of microfinance credit and 0 if he is a non-adopter of microfinance credit. X_1 represents a set of independent variables which are similar across all smallholder coffee farmers.

The relationship between a specific variable and the outcome of the probability is interpreted by means of the marginal effect, which accounts for the partial change in the probability. The marginal effect associated with continuous explanatory variables Xk on the probability Pr (D = 1 | X), holding the other variables constant, can be derived as follows (W.H.Green, 2011):

$$\partial p(x) = \varphi (x'_1 \beta) \beta_k, / \partial x_1 k \quad (2)$$

Where φ represents the probability density function of a standard normal variable. The marginal effect on dummy variables should be estimated differently from continuous variables. Discrete changes in the predicted probabilities constitute an alternative to the marginal effect when evaluating the influence of a dummy variable. Such an effect can be derived from the following:

$$\Delta = \Phi (x\beta, d = 1) - \Phi (x\beta, d = 0). \quad (3)$$

The marginal effects provide insights into how the explanatory variables shift the probability of frequency of microfinance credit uptake. Using the econometric software STATA version 13.0. The variables taken into account were; age of the farmer, education level of the household head, household size, area under coffee, number of coffee trees, off farm income and access to extension services. Marginal effects were calculated for each variable while holding other variables constant.

RESULTS AND DISCUSSION

Socio-economic, demographic and farm characteristics of the smallholder coffee farmers

Results in table 1 reveal that five variables had significant differences between the two groups. They included; number of years of experience, gender of the household head, number of trees, coffee yields and the frequency of contact with the extension services. The average age of the farmers was 40 years with a standard deviation of 0.0536. This suggests that smallholder coffee farming cluster is skewed towards the ageing. This concurs with the findings of the Coffee Research Foundation (2010) baseline survey conducted under quality coffee and commercialization project. Comparison of the ages between credit beneficiaries and non- credit beneficiaries did not indicate any statistical significance. Majority of the farmers in both credit and non-credit beneficiary groups lies between 35 to 45 years (70.5%). This could be explained by the fact that this group consists of the most economic active segment of the population. The results also revealed that 42 percent of coffee farmers had primary school education as their highest education level. 25% of the coffee farmers did not complete their primary school education or did not go to school at all, 26 % of the coffee farmers completed secondary school level and 5% had tertiary education. A comparison of education level between credit adopters and non-credit adopters showed no significant different. This indicates that education does not seem to vary much between the two groups suggesting a weak influence of formal education on access to microfinance credit in the study area. Additionally the educated may have other sources of income to use in their farming activities which may lower their chances of decision to borrow. The findings also concur with the study of Battese and Coelli, (1995) who concluded that educated people are more efficient hence reducing their chances of decision to borrow.

Credit non-adopters had an average of 10 years farming experience which was higher compared to that of credit adopters of 9 years experience. The difference was statistically significant at 5%. This implied that the non-users accumulated resources for a good number of years which they had practiced coffee farming. This would encourage reinvestment towards coffee production.. The findings contradicts those of Ugwumba and Owuanaso (2012) who reported that use of credit was more with the experienced and would spend higher amount of capital on procuring farm inputs. However, the findings are in line with those of Mal *et al.,* (2012) which revealed significant difference on experience where non-adopters of Bt Cotton had more experience compared to the adopters in India. There was significant difference on sex of the household head between the credit beneficiaries and non-credit beneficiaries. The difference was statistically significant at 10% levels. This connotes that households headed by women accessed microfinance credit more frequent compared to the households headed by men suggesting that women were more active in seeking and accessing microfinance credit compared to men. The findings refutes those of Challa and Tilahun (2014) which revealed no significant difference on gender of the household head between the adopters and non-adopters of modern agricultural technology in West Wollega, Ethiopia. Both credit adopters and non-adopters had an average of four individuals per household. There was no significance difference in household size between microfinance credit adopters and non-adopters. The average farm size among adopters was 3.9 acres while that of non-adopters was 3.8 acres. The difference in the size of the farm among microcredit adopters and non-adopters was not

Table 1. Description of dependent and independent variables.

Variable	Code	Type	Measurement
microfinance credit uptake	D	Dummy	Yes=1,No.=0
Age of household head	AGE	Dummy	Yes=1,No=0
Sex of household head	SEX	Dummy	male=1,female=0
Level of education head	EDU	Continuous	years in school
Farming experience	FEXP	Continuous	years
Household size	HSZ	Continuous	No. of persons
Area under coffee	ARUCOF	Continuous	Acres
Number of coffee trees	COFTR	Continuous	coffee trees
Off farm activities	OFFACT	Dummy	Yes=1,No=0
Access extension services	EXTSER	Continuous	No. of times

Source: Authors Survey 2015.

statistically significant. The average area under coffee for credit adopters was 1.5 acres while that of non-adopters was 1.4 acres .This shows no significance difference in the area under coffee between the two groups.

Adopters and non-adopters had an average of 222 and 154 trees of coffee respectively. The difference in the number of coffee trees between microfinance credit adopters and non-adopters was significant at 1%.The results in table 2 show significance in yields in the year 2015 between microfinance adopters and non-adopters. The difference was significant at 1% level. The results showed that smallholder coffee farmers that received credit had higher yields of 789.7kgs as compared to the yields of non-adopters of 437.9kgs.This means that coffee yields to a greater extent is determined by whether a farmer gets credit from microfinance institutions or not. These findings are in line with those of Girabi et al. (2013) who found that maize and sunflower farmers who had received credit recorded higher yields per hectare compared to those that did not. The findings reveals that, on average adopters sought for extension services three times in a year compared to non-adopters' two times in a year. However a comparison between microfinance credit adopters and non-adopters indicated a significance difference at 1% level. This implies that those farmers that seek extension services are more likely to borrow as compared to those farmers that do not. This can be attributed to the fact that extension service messages equip farmers with important information on the available opportunities hence enabling them to make rational decisions. The findings concur with those of Benjamin et al. (2015) who found that borrowers were more experienced than non-borrowers. The findings of this study also agrees with those of Nyagaka et al. (2010) who reported that frequent access to extension services equips the farmer with necessary information about the availability of needed resources, market prices as well as the profitability status.

Coffee farming experience had a negative effect on the decision to access credit services ($p<0.05$) as indicated in table 3. The coefficient showed that if the number of years in coffee farming experience increased by one unit, the probability of decision to access credit decreased by 1.32 percent *ceteris paribus*. The probable reason for this could be that as farmers gain experience in coffee farming, they become more efficient hence minimal external funding is needed. The findings corroborates with those of Fleisig (1999) who found that farmers experience was an important factor in adopting modern technologies and accumulation of assets and resulted into decreased dependence on credit. However the finding contradicts the study by Kgowedi et al. (2003) which associated increased credit needs with increased accumulation of assets. A negative and significant relationship was observed between gender and access to microfinance credit. Gender of the household head had a coefficient of -0.0942 with a p value of 0.50 which was statistically significant at 5%. This indicated that women were more likely to go for microfinance credit than their male counterparts. The result agrees with Khalid (2003) and Ololade and Olagunju (2013) who reported a negatively significant relationship between gender and access to credit, with women being more likely to go for credit. The finding further agrees with the assertion by Jazairy et al. (1992) that women are more credit-worthy and have higher loan repayment rates compared to men. The results in Table 3 showed a positive and highly significant relationship between number of coffee trees and the probability of the farmers to access credit at 1% level. This indicates that an increase in the number of coffee trees by one unit will lead to an increase in probability of taking microfinance credit by 0.1%. This implies that famers with more number of coffee trees are likely to go for credit compared to those with fewer coffee trees. This can be attributed to the fact that those with large number of trees employ capital intensive technologies on the farm hence need for credit uptake.

Table 2. Descriptive Summary of socioeconomic, demographic and farm factors of adopters and non adopters.

Variables	Adopters		Non-Adopters		Pooled		
	Mean	Std.Err	Mean	Std.Err	Mean	Std.Err	P-value
Age	39.28	0.3848	39.75	0.3731	39.52	0.536	0.3793
Education	2.16	0.0638	2.06	0.0598	2.11	0.0437	0.2659
Experience	9.47	0.319	10.42	0.3133	9.95	0.2246	0.0345**
Gender of household head	1.3	0.0321	1.4	0.0346	1.3	0.237	0.0515*
Household Size	3.6	0.1468	3.55	0.1289	3.58	0.0975	0.8133
Farm size	3.93	0.1394	3.87	0.144	3.9	0.100	0.7590
Area under coffee	1.538	0.0533	1.495	0.05	1.52	0.037	0.5604
No.of trees	222.5	10.021	154.99	6.872	188.75	6.304	0.0000***
Yield 2015	789.7	43.136	437.86	13.085	613.78	24.212	0.0000***
Other off farm Activities	2.46	0.0780	2.523	0.078	2.49	0.055	0.5463
Frequency of Extension	2.53	0.0444	1.96	0.0583	2.248	0.040	0.0000***

Source: Survey, 2016 * significant at 10%, ** Significant at 5 % and *** Significant at 1%

Table 3. Results of probit model on factors influencing microfinance credit uptake.

Independent variables	Marginal effects	Std. Error	Z	P>|z|
Age	-0.0027	0.0045	-0.62	0.538
Education	0.0149	0.0261	0.57	0.569
Coffee farm Experience	-0.0132	0.0051	-2.56	0.010**
Gender of house head	-0.0942	0.0481	-1.96	0.050**
Household size	0.0111	0.0117	0.95	0.34
Farm size	-0.0073	0.0126	-0.58	0.564
Area under coffee	-0.0099	0.0356	-0.28	0.781
Number of trees	0.0010	0.0002	5.37	0.000***
Off farm income	-0.0206	0.0209	-0.99	0.323
Access to extension	-0.2123	0.0249	-8.52	0.000***

*Source: own Survey, 2016 * significant at 10%, ** Significant at 5 % and *** Significant at 1%* Number of observations 390; LR chi2 (11) 95.46; Prob > chi2 0.00; Log likelihood -222.598; Pseudo R2 0.1766.

Access to extension services had a negative and significant relationship at 1% level of significance with access to microcredit implying that seeking extension services reduced the probability to take credit by 21.23%. Access to extension services acquaints farmers with foundation of improved agricultural intervention; further training makes farmers to be cost effective hence reducing the amount of credit needed in production. These findings concur with the study by Seyoum et al. (1998) who reported a 14% difference in

technical efficiency between farmers who accessed credit and those who did not access credit. On the other hand the results contradicts with Muhongayirea et al. (2013) and Sanusi and Adedeji (2010) who reported a positively significant relationship between extension contact and access to formal credit in Rwanda. Age, education, household size, farm size, area under coffee and off farm income was found statistically insignificant in relation to credit access.

CONCLUSIONS AND RECOMMENDATIONS

The variables in the empirical model have shown significant influence on the uptake of microfinance credit among smallholder coffee farmers in Tharaka-Nithi county. Experience of the farmer on coffee farming, gender of the household head, number of coffee trees the farmer had and frequency of the extension services significantly influenced the decision to take microfinance credit in the study area. Based on the results the study recommended that policy focusing on improving production and productivity of smallholder coffee farmers through credit utilization should incorporate these factors in their strategies. These policies should target on reviewing the experience of the farmer to accommodate new innovations, removing or minimizing the barriers that hinder equal access to credit across the gender, improving the scale of coffee farming and embarking on farmer training as a core factor in farming.

REFERENCES

Battese, G.E and Coelli, T.J. (1995). "A Model for Technical Inefficiency Effect in Stochastic Frontier Production for Panel Data; *Empirical Economics*, Vol.20, 325-45

Benjamin TA, Timo Stefan B, Jukka K (2015). Factors influencing smallholder farmers' access to agricultural credit in northern Ghana. African Journal Agricultural Research.10 (24): 2460-2469

Coelli T, Battese G (1996). Identification of factors which influence the technical inefficiency of Indian farmers. Austr. J. Agric. Econ. 40(2):103-128.

Coffee research foundation (2010, 2012). Annual reports, Nairobi, Government printers.

Girabi, F., & Mwakaje, A. E. G. (2013). Impact of microfinance on smallholder farm productivity in Tanzania: The case of Iramba district. *Asian Economic and Financial Review, 3*(2), 227-242.

Gujarati DN (2007). Essentials of Econometrics, 4th edition. New Delhi, Mc-Graw-Hill.

IFAD (2003). Transforming rural institutions in order to reach millennium development goal. *Discussion paper No 4.29.*

info@amfikenya,.(2013) association of microfinance institutions in Kenya. retrived January 2018, from http://www.amfikenya.com

Mal, P.A., Asif, R.A., Bauer, S. & Michael, P.S. (2012). Bt Cotton Adoption: A Double Hurdle Approach for North Indian farmers. AgBioForum*, 15*(3), 294 - 302.

Miller, C. (2011). Microcredit and crop agriculture: New approaches, technologies and other innovation to address food insecurity among the poor. *2011 Global Microcredit Summit Valladolid, Spain.*

Nchare A. (2003). Analysis of the factors affecting the technical efficiency of Arabica coffee farming, Afr.Econ.Res.consort.p.163.

Nyagaka DO, Obare GA, Omiti JM, Nguyo W (2010). Technical efficiency in resource use: Evidence from smallholder irish potato farmers in Nyandarua North District, Kenya. Afr. J. Agric. Res. 5(1):1179-1186.

Sebopetji TO, Belete A (2009). An Application of Probit Analysis to Factors Affecting Small-Scale Farmers' Decision to take Credit: A Case Study of Greater Letabo Local Municipality in South Africa. African Journal of Agricultural Research. 4(8):718-723.

Ugwumba, C.O.A., Omojola, J.T., (2012). Credit Access and Productivity Growth among Subsistence Food Crop Farmers in Ikole Local Government Area of Ekiti State, Nigeria, ARPN Journals.

W. H. Greene, *Econometric Analysis*, Prentice Hall, 7th Edition edition, 2011.