



Group-Based Credit Re-payment: Evaluation of Factors for Default Among Smallholder Farmers in Nakuru District, Kenya

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Abstract: Agriculture contributes 23% to the Gross Domestic Product (GDP) of Kenya and is practiced by 80% of the rural population. At least 50% of smallholder farmers are constrained in accessing quality inputs due to inadequate credit. In addition most farmers default on the repayment of loans. Therefore this study aimed at determining the level and determinants of default in payment of loans among the farmer group members in Nakuru. The study used a multi stage sampling technique to sample 50 farmer group members. The data was collected using a pretested questionnaire and the data analysed using descriptive and qualitative methods. The results of the Logit regression showed that the default in repayment of loans is significantly affected by the level of education, age of the group, farm income and interest rate. Therefore it is recommended to increase farmer group trainings, adopt technologies to raise production and reduce interest rates on loans.

Keywords: Default, Credit, Micro Finance, Groups, Interest

1. Introduction

The vision 2030 is the development blue print that covers the period between 2008 and 2030 in Kenya (Republic of Kenya (RoK, 2007). On the other hand the poverty reduction strategy targets a growth of 8.2 % in the real GDP between 2013 and 2017 coupled by at least an annual growth of 6.5% in agriculture (International Monetary Fund (IMF, 2014). Currently, Agriculture contributes at least 23% to the Gross Domestic Product (GDP) of Kenya and 80% of the rural population practices agriculture (Mabiso *et al.*, 2012). In addition, Agriculture is a key factor in attaining the Millennium Development Goals (MDGs) of reducing hunger and poverty (RoK, 2013). However, this growth experienced fluctuations between 2006 and 2011 in the different sub sectors that constitute agriculture in Kenya (Kenya Institute for Public Policy Research and Analysis

(KIPPRA), 2013; Kibaara *et al.*, 2009; Karugia *et al.*, 2013). For example according to Kenya National Bureau of Statistics (KNBS), (2012), the crops and horticulture sub sector experienced a growth in agriculture GDP of -6% in 2008, which rose to 6% in 2010. On the other hand the farming of animal had a growth in agricultural GDP of 4% in 2007 and 6% in 2011.

The rise in productivity in agriculture has been linked to the introduction and adoption of technology in Kenya (Kibaara *et al.*, 2009). On the other hand, the decline in agriculture productivity has been linked to poor soil fertility, land fragmentation and lack of reliable, adequate and sustainable finance for smallholder farmers among other factors (Yamano and Kajima, 2010; Owuor and Shem, 2012). This lack of finance leads smallholder farmers to use

low quality inputs that result in low agriculture productivity (Njeru *et al.*, 2014; Schroeder *et al.*, 2013).

According to The republic of Kenya (RoK, 2012), the financial sector contribute 4% to the GDP of Kenya and is composed of insurance, pension funds, capital markets and quasi banking institutions. This sector was earmarked in the strategy for wealth creation for realizing the Vision 2030. Specifically the increased access to credit by resource constrained individuals is a focus in the strategies. However the sector is characterized by high interest rates of 18.15% and a low accessibility by the resource constrained individuals (RoK, 2013). In addition there is a weak policy framework for the regulation of the financial sector that occasionally results in financial losses.

The structural adjustment programme (SAPs) introduced in the 1990's resulted in a shift in the role of providing credit to smallholder farmers from Government to the private sector (Heidhues and Obare, 2011). Consequently a gap emerged in the provision of credit to smallholder farmers in Kenya. However, the financial institutions had regulations that included the need for collateral; a fixed repayment period and an interest on loans (Central Bank of Kenya (CBK), 2013). These conditions were not sustainable for the smallholder farmers and only 50% of them are able to access credit (CBK, 2013). The micro credit institutions emerged to provide credit to the resource poor farmers in Kenya. There was a concurrent emergence of farmer groups in the rural areas, which the farmers used in accessing inputs, extension services, market information and credit for improved agriculture production (Owuor & Shem, 2012). A large number of the farmer groups adopted the Grameen Banking model that spread throughout the world from Bangladesh (Grameen Bank, 2013).

In Kenya these MFIs include Kenya Rural Enterprise program (K-REP), Women Development Company (WEDCO), Faulu Kenya, Kenya Women Finance Trust (KWFT), Family Finance and Equity Bank (RoK, 2006). MFIs in Kenya had a total of 1,475,664 active borrowers in 2011 and offered loans with a book value of Ksh.28.6 Billion (Ayele, 2013; Association of Microfinance Institution in Kenya (AMFI-K), 2013). The number of borrowers has since grown by 5.5%, with 65.6% being women (AMFI-K, 2013). Despite the existence of the regulations for lending by the micro credit institutions, there are still cases of default in the loans repayments (Amwayi *et al.*, 2013). The results are the poor performance of these MFIs and farmer groups (Omino, 2005). The members of the farmer groups are likely to pay penalties as guarantors to the loan defaulters (Odongo & Kendi, 2013).

Nakuru district is found within the Rift Valley province, which has the second highest concentration of MFIs in Kenya (AMFI-K, 2013). The MFIs provide credit for agriculture production to smallholder farmers. However most of the farmers default on the repayment of the loans that they receive from the MFIs. Therefore the objective of the study was to analyse the repayment of loans in group based credit in Nakuru District.

2. Literature Review

There are different studies that have been conducted on credit access by smallholder farmers. On the other hand a few of the studies have focused on the default of payment within farmer groups.

According to Hazell *et al.*, (2010) farmer groups are avenues of addressing institutional failures that lead to low agricultural productivity. In addition cooperatives are a tool to alleviating the challenges faced by smallholder farmers and access to credit (Asamoah & Amoah, 2014). However, the weak intervention by government agencies is a factor that leads to low access of credit (Calice *et al.*, 2014). Participation in Farmer groups has also been shown to raise farmer yields and incomes, while allowing farmers to overcome market challenges (Mwaura, 2014; Olwande *et al.*, 2013; Zarafshani *et al.*, 2010). Studies have shown that access to credit through farmer groups increased the number of livestock by farmers (Khurshed iqbal *et al.*, 2012). The farmer groups have also been shown to be good contact point for contract farming (Nham, 2012).

Papias and Ganesan (2010) reported that adequate financial credit lead farmers to break out of the poverty cycle. The increased credit levels allow farmers to use the modern and updated technology in agricultural production to improve on yields (Muhonganyire *et al.*, 2013). Credit can influence the risk levels of farmers and generate jobs (Baileygunhi and Fraser, 2014). Farmers avoid taking loans due to high risks that are associated with credit (Okojie *et al.*, 2010). According to Akpan *et al.*, (2013) credit is an intermediate factor in the production of technology. However, short term credit has been found to have no impact on the agricultural productivity (Reyes *et al.*, 2012).

The micro credit institutions require collateral that is mostly in the form of land or salary, which most of the smallholder farmers may not have (Ngeno *et al.*, 2011). The loans that are extended by most financial institutions have strict lending and screening conditions (AMIF-K, 2013; Nawai and Shariff, 2013). A large number of smallholder Farmers are unable to afford the high costs of credit based on the prevailing interest rates (Okojie *et al.*, 2010).

Mohammed *et al.*, (2012) analysed the determinants of default in loan repayment in Punjab and reported that poor supervision, misuse of loans, high interest rates and frequent changes in business significantly influenced the default in repayment of loans. The other determinants of default in loan repayment as shown by other studies include age, sex, marital status, experience of borrowers in projects and distance to markets (Mohammed, 2014). Studies have also shown that education significantly determines the default in the repayments of loans by smallholder farmers (Odonkor, 2013; Gebremedhin, 2012).

The smallholder farmers may default on loans due to intra group dynamics such as adverse selection, moral hazards and free riders, which prevents future access to loans by groups (Hui shung *et al.*, 2010). Bichanga and Aseyo (2013) reported that loan default occurred due to poor supervision

by the micro finance institutions. The other reason was the use of the credit obtained for other purposes other than the original purpose (Mehmood *et al.*, 2012). A study by Asamoah & Moah (2014) reported that micro credit institutions have innovative ways of mobilization of savings, repayments and lending procedures to improve on their performance. Participation in groups reduces the risk of defaulting on the repayment of loans by members (Hui shung *et al.*, 2010).

The terms that are set by institutions that offer loans have an effect on the default on repayments of loans. These factors include repayment period, purpose of the loan, monitoring of the loan, security and the type of loans (Gebremedhin, 2010; Nawai and Sharif, 2013; Mensah, 2010). In addition other factors such as loan size and loan cycle period (Nawai & Sharif, 2013).

3. Methodology

3.1. Study Area and Data Collection

The study was carried out in Nakuru District, which is found in the Rift valley province, Kenya. According to RoK (2013) Nakuru is located 35° 28' and 35° 36' East and latitude 0° 13' and 1° 10'. The altitude of Nakuru is 1850 meters above sea level (a.s.l). The area of Nakuru District is 1,392.55 Km². The average rainfall received in Nakuru is 1270mm and average temperature of 26.5°C. The current population of Nakuru is estimated at 457,495 people and projected to reach 760,000 in the year 2015. The main crops that are grown in Nakuru include coffee, wheat, barley and maize. Livestock keeping is an important economic activity in Nakuru and the main livestock include dairy cows, goats and poultry. Tourism is an important economic activity, with the main tourism attraction being Lake Nakuru, The Hyrax Hill, and Lake Elementaita. There are other activities include commerce, industry and tertiary.

3.2. Population of the Study

The population of the study was the registered groups with the ministry of Gender, children and Social development. All the 5 self-help groups (SHG) were registered with the ministry. A total of 50 farmers were selected using a multi stage random sampling. The first stage involved the random selection of 2 divisions from 16 divisions in Nakuru District. The second stage involved the selection of 5 self-help groups (SHGs) from the 2 selected divisions. The third stage involved the selection of every 5th farmer, from a list that was provided at the group level, to give a total of 25 farmers per group and a total of 50 farmers from the two groups.

The Data was collected through the use of a semi structured questionnaires and included information on the household characteristics. The data was collected by trained enumerators after pretesting was done to the questionnaire. The study used both primary and secondary sources of data.

3.3. Empirical Model

A Logit regression is suitable in the analysis where the outcomes can be categorized into at least two or more groups. In most of the cases the responses are classified into two categories based on a set threshold value, which is normally 0. The term Logit is used to refer to natural logarithm of the odds (logs odds) and shows the probability of falling into one of the two categories (Wooldrige, 2009). Several studies have applied the Logit regression to analyses the factors that determine the access to credit by smallholder farmers, adoption and dissemination of technologies (Oeba *et al.*, 2012; Ng'eno *et al.*, 2011; Bayegunhi *et al.*, 2014; Okello *et al.*, 2010). Therefore the Logit regression is preferred for it is easily adoptable to different situations.

The dependant variable in a logistic regression is a latent or unobserved variable that is represented by the outcomes of the responses. The probability of an individual willing to perform an action is shown, $0 \leq P \leq 1$. The two probabilistic relationships are represented as follows:

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

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

The Logit model depends on the assumptions of the distribution of the logistic distribution of the error terms. The odds ratio in the Logit model is represented as follows:

$$P_i = F(Z_i) = F\left(\alpha + \sum_{i=1}^n \beta_i x_i\right) = \frac{1}{1 + e^{-Z}} \quad (3)$$

$$(1 - P_i) = \frac{1}{1 + e^{Z_i}} \quad \text{or} \quad \frac{P_i}{1 - P_i} = \frac{1 + e^{Z_i}}{1 + e^{-Z_i}} \quad (4)$$

$$Z_i = \ln\left(\frac{P_i}{1 - P_i}\right) = \alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n \quad (5)$$

$$Z_i = \ln\left(\frac{P_i}{1 - P_i}\right) = \alpha + \sum \beta_i x_i + u_i \quad (6)$$

3.4. Variables Used in the Model

Empirically, described as:-

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon$$

Where Y= is the observed response of loan repayment (0, 1),

β_0 is a regression constant (intercept)

β_1, \dots, β_8 are the regression or slope coefficients for their respective explanatory variables

X_1 = Level of education of the farmer

X_2 = Age of the group

X_3 = Land size

X_4 = Farm income

X_5 = Family size

X_6 = Interest rates

ε = Error term (this captures explainable variables such as loan size, loan repayment period, age of the farmer, gender of head etc). The explainable variables here have been considered together since the repayment is not individual but guaranteed by the group members, since the study is group based credit repayment. The Table 1 shows the variables and their hypothesized effects.

Table 1. Description of variables.

X Variable	Description	Hypothesized effect
Education of farmer	Years of schooling	(+)
Farm income	Kshs	(+)
Land size	Acres	(-)
Family size	No. of dependants	(-)
Interest rate	Kshs	(-)
Age of the group	Years	(+)
Loan size	Kshs	(-)
Repayment period	Years	(-)

4. Research Findings

4.1. Descriptive Characteristics

Table 1 shows a summary of the socioeconomic characteristics of the members of the farmer groups. The mean age of the members of the group was 37.94 years, which is similar to the mean age of group members in Kenya (Odongo and Kendi, 2013). However the average years for experience in farming was 15.18 years that was lower compared to those in other studies (Kirui *et al.*, 2013). On the other hand the average group membership had an average of 7.86 members, which was higher compared to the group membership intensity of other groups in Kenya (Kangogo

2013). The average land sizes owned by the individual members were 2.05 acres, which was smaller compared to other studies that reported an average land size of 4.29 acres (Kangogo 2013). However the group appears to have been in existence for longer period compared to other groups, which had an average duration of 3 years for group membership (Amwayi *et al.*, 2013).

Table 1. Summary of farmer group members socioeconomic characteristics (n=50).

Variable	Mean	Std. Dev.	Min	Max
Age(Years)	37.94	22.08741	0	70
Experience in farming (Years)	15.18	13.70638	0	54
Number of group members	30.22	10.01283	0	50
Land size (acres)	2.05	1.797759	0	8
Duration of group membership (Years)	7.86	5.23370	1	25
Family size	6.68	2.307397	0	11
Education (Number of years)	13.1	4.974424	4	22
Loan size (Kenya Shillings)	1220.02	2620.93	0	10,000

Table 2 shows the summary of the socioeconomic characteristics of the farmer group members. Membership savings and borrowing was an important component of the microcredit groups. The results shown on Table 3 indicate that majority of the group members were married and had a source of income. However, there were single members with no source of income, which may indicate that this group had no restriction on membership. The main source of credit for the group was Non-Governmental organizations, with additional credit from cooperatives, Banks and Microfinance institutions (MFI) (Table 3). However institutions were the main source of awareness in regards to credit. Most of these group members owned individual land and belonged to active groups.

Table 2. Summary of group characteristics (n=50).

Membership savings and borrowing	Frequency	%	Source of credit	Frequency	%
Yes	30	60	Cooperatives	6	12
No	14	28	Banks	6	12
Non response	6	12	Non- Governmental organizations(NGOs)	28	56
			Micro finance institutions(MFI)	10	20
Marital status			Group activity		
Single	14	28	Yes	40	80
Married	36	72	No	10	20
Income source			Land tenure reform		
Yes	40	80	Individual	34	68
No	10	20	Family	13	26
Group affiliation			Hired /leased	1	2
Self	25	50	Source of awareness on credit		
Ministry of Agriculture	1	2	Institutions	25	50
CDA	2	4	Friends	16	32
Non-Governmental Organization(NGOs)	10	20	Others	9	18
Group members	12	24			

The results showed on Table 4 indicate that the main purpose for taking loans included: farm improvements, while other reasons included school fees, buildings and business. In order to access the loans the lending institutions had set conditions for collateral, groups and organized membership.

The results shown on Table 4 indicate that the most of the group members took an average of more than one month to receive the loan from the micro finance institutions. This could mean that most of the institutions had long process before releasing the loans.

Table 3. Loans and Income Status of Groups Members (n=50).

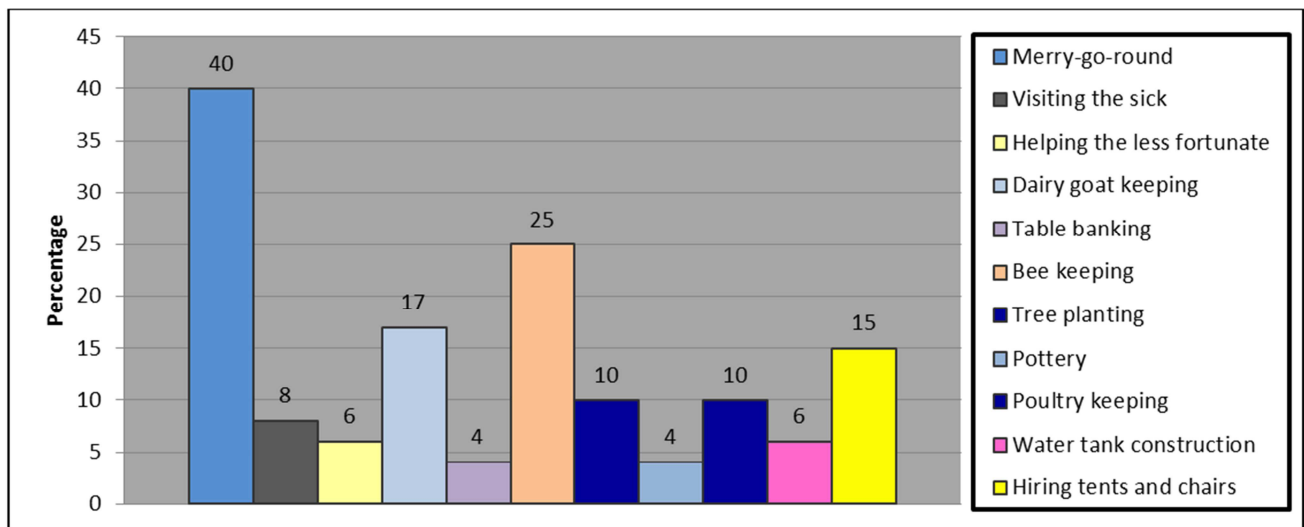
Purpose of loans	Frequency	%	Requirements for loans	Frequency	%
School fees	9	18	Collateral	8	16
Buildings	4	8	Formed groups	23	46
Farm improvements	25	50	Organized memberships	16	32
Business	8	16	Non response	3	6
Non responses	4	8	Monitoring loans by MFI		
Loan repayment			Yes	26	52
Yes	25	50	No	24	48
No	23	46	Monthly income earning		
Non response	2	4	0-1000	8	16
Duration to receive loan			1001-2500	22	44
Less than 2 weeks	6	13	25001-4000	4	8
2 weeks-1 month	19	40	4001-6000	1	2
More than 1 month	13	27	>6001	7	14
Non response	10	20			

4.2. Challenges to Group Members

The study sought to establish the challenges that the group leaders faced. According to the results of the study 11 (23%) respondents indicated that they were a poor attendance of group meetings. The study also established that the other challenge for the group leaders was the delay in submission of members' contribution as some members takes too long to surrender their contributions, indicated by two (4%) respondents. According to three (6%) respondents, lack of commitment by some members of the group made the life of the group leaders difficult. There was also lack of member co-operation and inadequate finances (indicated by 5, 10%

respondents). The membership according to two (4%) was mainly comprised of the youth who are very dynamic. Some leave for further studies and or even get employment away from the region hence no steady membership. Lack of adequate resources to initiate projects was equally cited as a challenge to the leadership of the groups by three (5) respondents.

Asked to name some of the activities, 40 percent (%) of the respondents indicated that they had merry-go-rounds. The study further established that 25 percent (%) of the respondents indicated that they were keeping bees, while 17 percent (%) indicated that they were keeping dairy goats. Figure 1 presents summary of the findings.

**Figure 1.** Farmer group activities.

4.3. Group Training

The study sought to establish whether the respondents had received any group training. According to the results of the study 96 percent (%) of the respondents indicated that indeed they had received group trainings. Asked to indicate the type

of training they have participated in, 12 (25%) respondents indicated that they had received training on dairy (cow and goat) rearing and management. Others included good farming systems (6 respondents, 12.5%), leadership [4(8%) respondents], (Figure 2).

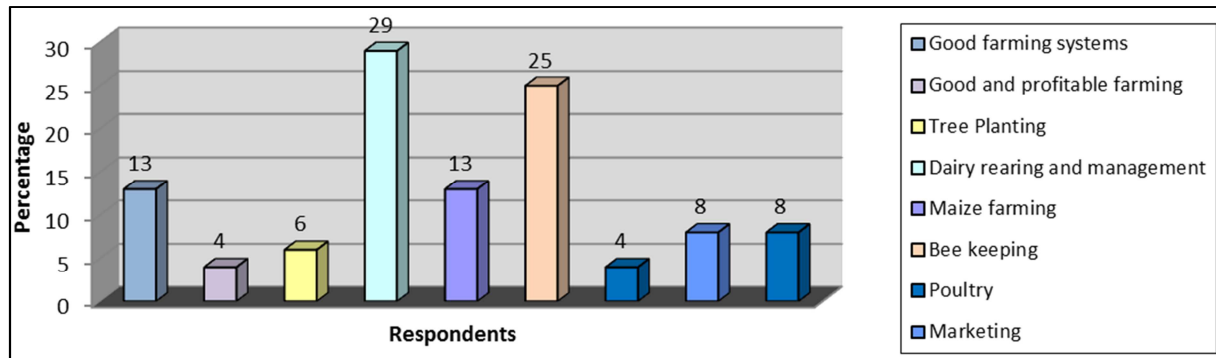


Figure 2. Farmer group training.

4.4. Problems Faced in Crop Production

Respondents were asked to indicate the problems they faced in crop production. According to the findings of the study in figure 3, it was apparent that 47 percent (%) of the respondents indicated that weather was their major challenge

in crop production. The study also established that pests were a big problem to the farmers as 46 percent (%) of the respondents indicated that pests were a problem. Marketing equally post a challenge to the respondents as 38 percent (%) of the respondents indicated so.

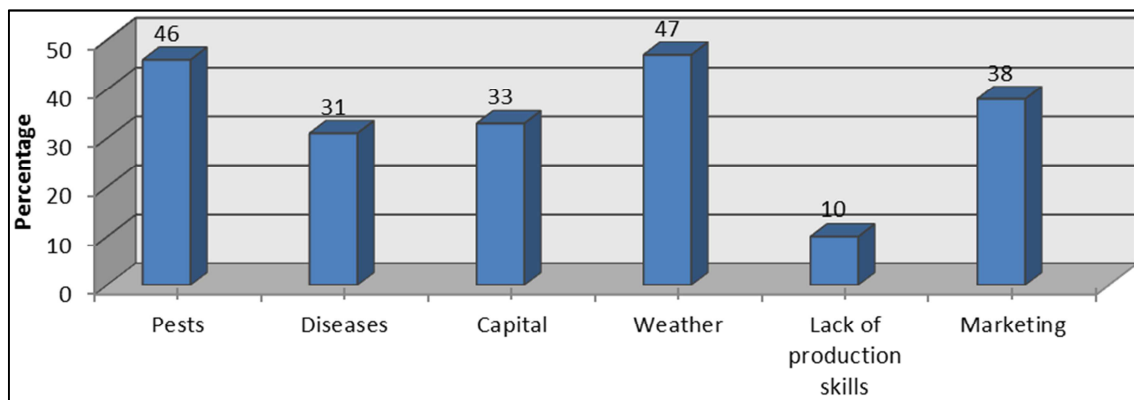


Figure 3. Problems in crop production.

The interest rate that was charged by the credit institutions was 10% as 69 percent (%) of the respondents indicated so. Asked how they considered the interest rate charged, 72 percent (5) of the respondents indicated that it was fair.

4.5. The Determinants of Default in the Repayment of Loans

The Table 5 and 6 shows the results of the Logit regression that was used to analyse the determinants of default in the loan repayments.

Table 4. Omnibus tests of models co-efficient.

		Chi-square	df	Sig
Step 1	Step	13.693	6	.000
	Block	13.693	6	.000
	Model	13.693	6	.000

Table 5. Model summary.

Step	-2 log likelihood	Cox & Snell R square	Nagelkerke R. Square
1	38.035(a)	.303	.407

Estimation terminated at iteration number 20 because parameter estimates changed by less than .001. The likelihood ratio chi-square of 13.693 with a p-value of 0.0001 tells us that our model as a whole fits significantly than the empty model (Model 0).

It is evident from the results of the study that the value of Cox and Snell R squared is 0.303; this implies that about 30 percent of the variation in the smallholder farmers' loan repayment data is explained by the farmers' level of education, age of the group, size of the farm land, farm income, family size, and the interest rates of the loan. The model appears useful for making predictions since the value of Cox and Snell R Squared is more than 0.25.

Table 6. Factors determining the default of loan repayment.

	B	S.E.	Wald	Sig.	Exp (B)
Step level of education	.184	.486	2.144	.015**	1.202
Age of group	.309	.414	1.558	.045**	1.362
Size of land	.569	.189	4.000	.019	0.001
Farm income	.046	.407	4.013	.049**	1.047
Family size	.437	.189	5.000	.019	0.763
Interest rate	.720	.808	4.535	.033**	1.179
Constant	-4.525	2.586	17.061	.080	0.250

The study show that all the variables had a positive relationship as is depicted by the beta co-efficient values. With their p-values less than 0.05, the level of education, age of the group, farm income and interest rate variables are statistically significant. The model regression results therefore show that the level of education, age of the group, farm income and interest rate were significant factors that affected smallholder farmers' credit repayment.

The results in Table (7) show that there was a positive relationship between the level of education and the probability of defaulting on loan repayment. This variable was significant at 5% level of significance. This indicated that those group members with high levels of education were more likely to default on repayment of loans. This may be as a result of prioritization of spending their income in other areas other than loan repayments. The results agree with those of Ezihe *et al.*, (2014) that found a positive relationship between the education level and default in loan repayment among smallholder maize farmers in Nigeria. However they contrast with the results of Amwayi *et al.*, (2013) that found a negative relationship between education level and default in loan repayment among groups in Kenya.

The results in Table (7) showed that there was a positive relationship between the age variable and the default in loan repayment. Age is related to experience and therefore it was expected that the more experienced group members were less likely to default on loan repayment. This was because of the savings they may have accumulated, level of trust gained and the contacts they had made with other micro financial institutions. This variable was significant at 5% level of significance. The increase in the age of the group member increased the odds of defaulting on the loan repayment. These results contrast those of Amwayi *et al.*, (2013) that found a negative relationship between the age of group members and default in loan repayment among group members in Kenya. On the other hand Odonkor (2013) did not find any relationship between age and default in loan repayment among women fish processors in Ghana.

The farm income was found to be statistically significant at 5% and had a positive relationship with default on loan repayment (Table 7). This indicated that as the farm income increased there was an increase in the odds of default in the loan repayment. Farm income is associated with profits made in the farm, which should allow for the repayment of the loans. Therefore this could indicate that the farm income levels of the group members were not sufficient to allow for the repayment of loans. These results contrast with those of Odonkor (2013) that showed a negative relationship between price and consequently income and default in the loan repayment among fish processors in Ghana.

The Table (7) shows that Interest rates had a positive relationship with the probability of defaulting on the loan repayment. The results were significant at 5% level of significance. This may indicate that increasing the interest rate on loans lead to an increase in the odds of default in the repayment of the loans. High interest rates lead to default in the repayment of loans because the farmers in the group may

not meet the amount required (Haque andHossain, 2008). The results agree with those of Nawai and Shariff (2013); Odongo and Kendi (2013) that found a negative relationship between the loan repayment schedule and the loan default among micro entrepreneurs in Malaysia. However Mensah (2012) did not find any significant relationship between interest rates and loan default among customers in rural banks in Ghana.

5. Conclusion and Recommendations

The study analysed the loan default among farmers who belonged to farmer group and the factors that determined the default in loan payments. The study found that 50% of the farmers defaulted on payment of the loans. These groups were mainly formed through individual initiatives, with nongovernmental organizations (NGOs) identified as the key sources of their loans. Most of the farmers that were surveyed were married, with an average of 13 years of schooling relatively young (38 years), with land sizes of 2.5 acres and belonged to groups that had average membership of 8 members. The results of the study showed that the default in repayment of loans is significantly influenced by the level of education, age of the group, farm income and interest rate.

Therefore it is recommended to enhance training of farmer groups on microfinance operations through collaboration with relevant ministries. In addition the agriculture production should be improved to raise income through adoption of modern technologies. The improved agriculture production will reduce the loan default by farmer groups. There is also a need to develop a policy that will lower interest rates through

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