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## Factors Influencing the Outcome of Formal Credit Requests by Small-Scale Rice Farmers in Teso District, Kenya

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**Keywords:** *small-scale farmers, formal credit, outcome of credit application and technology adoption.*

**GJMBR-A Classification:** *JEL Code: E5, J59*



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# Factors Influencing the Outcome of Formal Credit Requests by Small-Scale Rice Farmers in Teso District, Kenya

Millicent J.I. Ekasiba<sup>α</sup>, Paul A. Odundo<sup>σ</sup>, Charles M. Rambo<sup>ρ</sup> & Samwel O. Mwanda<sup>ω</sup>

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**Keywords:** *small-scale farmers, formal credit, outcome of credit application and technology adoption.*

## 1. INTRODUCTION

Agriculture plays a key role in the Kenyan economy both directly, for instance, through food production and indirectly through employment creation

through the value chain from the farm gate to retail stores. In this regard, agriculture contributes up to 25 percent of the national Gross Domestic Product (GDP) and provides employment opportunities to over 75 percent of the national workforce. Small-scale farming accounts for 75 percent of the total agricultural output and about 70 percent of marketed agricultural produce [Kibaara, 2006; Government of Kenya (GoK), 2010]. The Agricultural Sector Development Strategy (ASDS) 2010-2011 defines small-scale farmers as those undertaking their production in farms averaging 0.2 to 3 hectares, mainly for commercial purposes. Based on this, small-scale farmers produce over 70 percent of maize, 65 percent of coffee, 50 percent of tea, 80 percent of milk, 85 percent of fish and 70 percent of beef and related products (GoK, 2010).

Various empirical studies, including Stamoulis (2007) and World Bank (2008) note that the growth of small-scale agricultural sub-sector is the primary remedy to poverty, particularly in developing economies. In this regard, the expansion of small-scale farming has a great potential to reduce poverty by increasing incomes of farmers and reducing expenditure on food (Stamoulis, 2007; World Bank, 2008). According to Ravallion (2001) an increase in household income by 2 percent translates to a fall in poverty level by about 4 percent on average. Besides, the GDP growth originating from agricultural sector is about four times more effective in reducing poverty than GDP growth of other sectors (World Bank, 2008). Thus, the growth of small-scale farming has immense potential in alleviating poverty and reducing hunger in line with the Millennium Development Goal (MDG) number one.

### a) Access to formal credit by small-scale farmers

Nonetheless, the growth of small-scale farming requires sustainable access to affordable formal credit to facilitate expansion and adoption of new technologies, which would boost and sustain production. Although all business ventures, including farming require capital to grow and realize their potential, small-scale farming in Kenya has not received adequate support from the financial sector, regarding access to formal credit (Kibaara, 2006). Hence, access to formal credit stands out as one of the key impediments to the adoption of new technology by

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small-scale farmers in most parts of the country, including Teso District. Due to a limited access to formal credit, Kenyan small-scale farmers rely on retained earnings and credit from informal sources, which are often unpredictable, unsecure and have a limited scope for risk-sharing. Consequently, to cope with the growing demand for food, credit requirements of small-scale farmers become too complicated for informal credit sources, thus, the need to enhance access to formal credit (Kibaara, 2006; Odhiambo, 2007).

Formal credit facilities are important for the expansion of farming activities and technology adoption to improve production towards food security in the country (Odhiambo, 2007). As noted by Atieno (2001), access to affordable credit services is considered a good catalyst for the expansion of farming activities, adoption of new technology and economic development in the country. Nevertheless, access to formal credit by small-scale farmers remains a key concern, mainly due to unfavorable lending policies in terms of collateral requirement, prescribed minimum loan amounts, high cost of transaction and complicated loan application procedures (Atieno, 2001). The marginalization arises because most small-scale farmers find it difficult to provide collateral that commensurate with prescribed minimum loan amounts. Besides, most farmers find loan application procedures too cumbersome for their financial and technical capacity (Atieno, 2001; Kibaara, 2006). Furthermore, financial institutions are often reluctant to lend to small-scale farmers due to the high risk of agricultural activities, resulting from erratic weather conditions; as well as lack of credible credit history and collateral (Odhiambo, 2007).

A study conducted by the United Nations' Food and Agricultural Organization (FAO) notes that that in Africa agriculture accounts for only 2 percent of the commercial credit, a situation that undermines agricultural sector's meaningful contribution to poverty eradication in the continent's fragile economies (FAO, 2004). Most small-scale farmers are by-passed by formal credit provided by financial institutions for lack of collateral and credit history (Pearce, 2004). A World Bank study also confirms that financial institutions have not been fully responsive to the financing needs of agricultural ventures due to perceived inherent risks. As a result, the share of credit provided to the sector by financial institutions has been lower compared to the proportion that goes to the manufacturing, trade and other service sectors. This continues to impede expansion and technology adoption (World Bank, 2008).

Most small-scale farmers cope with funding constraints by depending on their savings from low incomes, while some farmers rely on micro-credits provided by friends, relatives and informal money lenders. In view of this, there is no doubt that limited access to formal credit impedes the ability of small-scale farmers to adopt new technology and improve

yields towards food security (Pearce, 2004; Kibaara, 2005).

#### b) *Introduction of new rice varieties in Teso District*

Rice is the second most important cereal crop after maize in terms of consumption, and is mainly grown by small-scale farmers as a commercial and food crop in Kenya. However, for the past decade rice production has been lagging behind the consumption trends, which are triggered by population growth and high urbanization rates. However, due to progressive change in eating habits, rice consumption has increased to 12 percent as compared to 4 percent for wheat and 1 percent maize, between 2003 and 2008 [Ministry of Agriculture (MoA), 2008]. The national rice consumption is estimated at about 300,000 metric tons against an annual production of between 45,000 and 80,000 metric tons. This prompts the importation of about 180,000 metric tons annually and an average cost of KES 7 billion (Kouko, 2005; Kega & Maingu, 2006).

However, the wide gap between the demand and rice production is a challenge in many African countries, leading to cyclical and recurrent famines in the continent. Based on this situation, new rice varieties, dubbed 'New Rice for Africa' (NERICA) were developed by the West African Rice Development Association (WARDA) in 2000, after several years of research. The NERICA varieties combine traits of the hardy African and Asian rice varieties (WARDA, 2001). These varieties have been bred and selected for high yields, short maturation periods, tolerance to a biotic stresses particularly moisture, salinity and high response to mineral fertilization, amongst other traits. Owing to its success, the new varieties were distributed to various parts of the continent for pilot studies and adoption.

In Kenya, NERICA technology was introduced in 2003 by the Government for pilot studies, which were conducted in various parts of the country, including Coastal and Western and regions. In the Western region, pilot studies were conducted in the Lake Basin Development Authority (LBDA) Alupe Farms in Chakol Division of Teso District. The studies concluded that small-scale rice farmers would be better off if they changed from traditional upland rainfed rice variety, *Dourado precoce*, to improved varieties due to the high minimum rate of returns ranging from 148-303% expected from the change. However, anecdotal information shows that the rate of adoption of the new varieties has been too low and failed to meet project implementers' targets.

As noted by field reports compiled by Kenya Agricultural Research Institute (KARI), small-scale rice farmers in Chakol Division continue to grow traditional varieties, which are low-yielding (KARI, 2004). Although farmers cite various reasons for the slow rate at which new rice varieties were being adopted, financial constraints emerge as the most critical factor, which in

turn, impedes access to inputs and equipment. This factor was also identified by Okech, Wawire, Kor, Okiya, Otieno and Onyango (2006) in their study which compared the traditional and improved rice varieties in terms of net returns. Secondary factors delaying the adoption of new rice varieties include high poverty levels, inadequate access to extension services, inadequate knowledge of crop husbandry practices associated with the new varieties, cultural beliefs associated with the traditional rice varieties and fear of change.

Like any business venture, small-scale rice farming requires sustainable access to formal credit to allow the adoption of new technology that would boost and sustain production (Pearce, 2004; Odhiambo, 2007). Small-scale rice farmers require financial support to lay down necessary infrastructure, acquire farm inputs and equipment, access extension services and markets (Kandinate, 2007). However, most commercial banks shy away from financing small-scale farmers through prohibitive collateral requirements, high interest rates, as well as demand for credit track record, which most farmers don't have (Pearce, 2004; Kibaara, 2006; Odhiambo, 2007; World Bank, 2008). In view of this, the study was conducted to investigate and document factors influencing the outcome of credit applications by small-scale rice farmers in Chakol Division, Teso District.

#### c) *Statement of the Problem*

The role of small-scale farming in the realization of the first MDG on poverty alleviation and hunger reduction by 2015 is a well-documented fact (Ravallion, 2001; GoK, 2010; Kibaara, 2005; Stamoulis, 2007; World Bank, 2008). New rice technology was introduced in Kenya in 2003 to boost production to meet escalating consumption trends (Okech *et al.*, 2006). However, there are indications that the rate at which the new technology is being adopted is way below targets set by project implementers, including the MoA, KARI, LBDA and funding partners. As noted in periodical field reports compiled by KARI, despite the introduction of new and more promising rice varieties, small-scale rice farmers in Chakol Division continue to grow the low-potential traditional varieties. The key reason cited by farmers for their reluctance to adopt new technology is financial constraints, which impedes the development of infrastructure and acquisition of necessary inputs and equipment (KARI, 2004; Okech *et al.*, 2006).

It needs no mention that farming, like other business ventures, requires sufficient capitulation funding to facilitate infrastructural development, access to inputs, crop management and marketing (Pearce, 2004; Odhiambo, 2007; Kandinate, 2007). Although commercial banks play a key role in supporting economic development, most of them shy away from financing small-scale farmers due to perceived high risk of failure, which is primarily associated with extreme

weather conditions (Pearce, 2004; Kibaara, 2006; Odhiambo, 2007; World Bank, 2008). This situation suggests an eminent funding gap for small-scale rice farmers. Field reports indicate that some farmers are coping with the situation by sourcing credit from other sources, such as friends, relatives, shylocks and self-help groups; however, informal credit is barely enough to suffice their funding needs (Kibaara, 2006; Odhiambo, 2007; Kandinate, 2007).

In spite of this reality, no comprehensive study has been done to document factors influencing the outcome of applications for formal credit by small-scale rice farmers in Chakol Division. The information generated by the study will go a long way in supporting decisions of the Government and stakeholders to improve access to formal credit for such farmers. Besides, the information will enable lobby groups strengthen their advocacy for formal credit as a way of enhancing adoption of new rice varieties for better net return, economic development and food security.

#### d) *Purpose and Objectives*

The broad objective of the study was to assess factors influencing the outcome of applications for formal credit by small-scale rice farmers. More specifically, the study investigated farmers' demographic, socio-economic and farm attributes influencing the decision of financial institutions to either award or fail to award credit.

## II. DATA AND METHODOLOGY

The cross-sectional survey design with both quantitative and qualitative approaches was applied to guide the research process. Primary data was collected from small-scale rice farmers in Chakol Division of Teso District between March and June 2011. The farmers were identified through a register compiled and maintained by the Lake Basin Development Authority. Using the register, systematic random sampling was preformed to give every farmer an equal opportunity for selection. The sampling process yielded a total of 375 farmers; however, only 322 were successfully interviewed by the end of June 2011. This gives a response rate of 85.9 percent. Selected farmers were traced to their homes from where they were interviewed.

Both quantitative and qualitative analysis techniques were used in the study. While quantitative analysis generated cross-tabulations with chi-square and binary logistic regression, the qualitative component elicited qualitative information based on the opinions and experiences of the farmers. Binary logistic regression is used to predict the proportion of variation in a dichotomous variable from a set of independent variables (Aldrich & Nelson, 1984). When applying the model, the predicted variable takes the value 1 with a probability of success  $\theta$ , or the value 0 with probability

of failure  $1-\theta$ . In this study, the dependent variable was the *outcome of credit request*, with only two possible

values – *successful* or *unsuccessful*. The model is often expressed as indicated below: -

$$\text{Logit } [\theta(Y)] = \log \left( \frac{\theta(Y)}{1 - \theta(Y)} \right) = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_i X_i + \varepsilon$$

Source : Aldrich & Nelson (1984)

Where:  $Y$  = the predicted variable *outcome of credit application*;  $\theta(Y)$  = the probability that credit request was *successful*;  $1-\theta(Y)$  = the probability that credit request was *unsuccessful*;  $\alpha$  = the constant term of the equation;  $\beta_1, \beta_2, \dots, \beta_i$  = the regression co-efficients associated with independent variables;  $X_1, X_2, \dots, X_i$  = independent variables and  $\varepsilon$  = the error term. Although the model has several output parameters, this study was

interested in the  $Exp(\theta)$  or *odds ratios*. The Statistical Package for Social Sciences (SPSS) and Microsoft Excel packages were used to facilitate quantitative analyses. Figure 1 below shows the conceptual framework used in the study, which shows that access to formal credit was influenced by various factors, conceptually categorized as socio-economic, farm attributes and demographic factors.

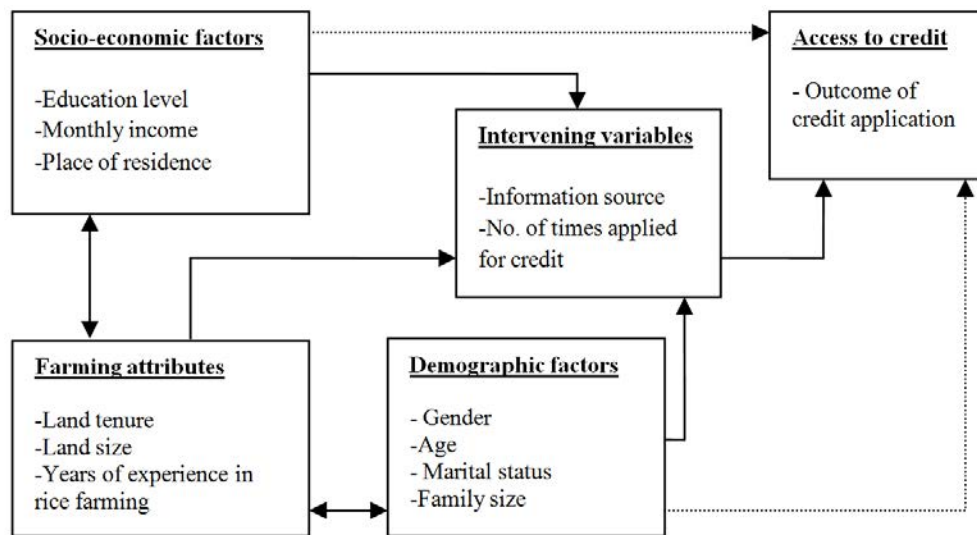


Figure 1: Conceptual framework

However, the effect of independent variables on the dependent variable is likely to be confounded by a set of intervening variables, which include the source of information about credit services and the number of times one has applied for credit in the past, among others. Furthermore, qualitative data was processed and analyzed following three steps. In the first step, data was organized under each thematic area. Data was then summarized into daily briefs after each interviewing session. The second step involved description of daily briefs to produce interim reports, while in the third step, data was analyzed systematically for patterns, content and meaning to the study objectives (Best & Khan, 2004).

### III. STUDY FINDINGS

The findings have been organized under four key thematic headings, including farmers' demographic profile, socio-economic factors and farm attributes, in line with objectives of the study. Variables under each

concept have been correlated with the outcomes of formal credit requests by small-scale rice farmers in Chakol Division of Teso District. Financial institutions referred to here, included commercial banks and microfinance institutions. The study covered a total of 322 small-scale rice farmers sampled randomly. Of this lot, 216 (67.1%) had ever applied for credit from financial institutions, while up to 106 (32.9%) rice farmers had never applied for credit. Regarding the frequency of application, figure 1 shows that 100 (46%) rice farmers had applied for credit once, 40 (19%) had applied twice, while 41 (19%) had applied for credit more than thrice.

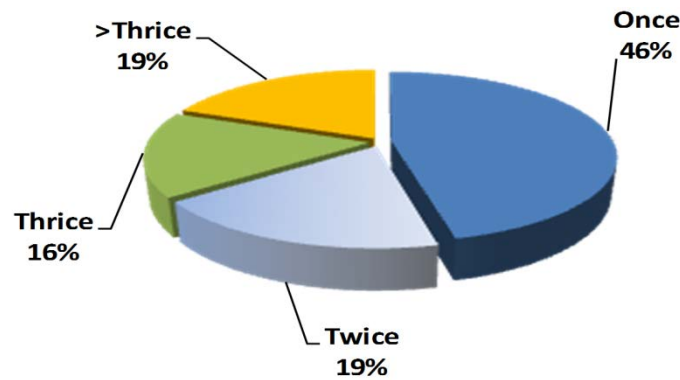


Figure 1: Number of times rice farmers have applied for credit in the past

Farmers who had applied for credit were further requested to indicate the status of their last application, whether it was successful or not. In this regard, 77 (35.6%) farmers reported that their last application for credit was successful, the majority, 139 (64.4%) were unsuccessful. There is no doubt that this outcome frustrated the desire of many farmers to adopt new rice varieties. Without proper funding many rice farmers were not able to access inputs and necessary equipment, forcing some of them to postpone the idea of trying out the new varieties. Farmers felt it was safer to plant old varieties with which they were familiar, rather than try out new ones whose demand for input was higher. From the management perspective, change is a fearful process that requires comprehensive information and motivation to be achieved. Adoption of new technology involves change in the mindset, which requires support in terms of financial security to mitigate inherent risks.

Farmers who had never applied for credit cited various reasons for their non-action. Out of 106 farmers, 61 (57.4%) cited the fear of default in repayment, particularly due a high risk of crop failure, low yields and poor marketing infrastructure, which would enable rice farmers to fetch good prices for their produce. Up to 43 (40.6%) farmers believed that the process of credit access was too complicated and required people with

education to understand. Such sentiments referred to the amount of paperwork involved in the application process for credit, which was then linked to lack of information on how to access credit services for small-scale rice farmers. Another 24 (22.6%) farmers cited high interest rates charged as the main challenge, while 27 (25.5%) mentioned phobia associated with bank credit, based on negative experiences of their acquaintances who failed to service their credit due to poor yields and low returns from rice farming.

a) *Farmers' demographic profile and credit access*

The study found that more than two-thirds of rice farmers who requested for credit from formal financial institutions were unsuccessful in their applications. This sub-section examines how selected demographic factors correlate with the success or failure of applications for credit from formal financial institutions. As indicated in figure 1, out of the 77 successful applicants, 57 (74%) were men and 20 (26.0%) were women. This shows that the success of applications for credit favored men more than women, which may have implications on the extent to which men and women adopted the new rice varieties. This finding is reinforced by the proportion of men and women who were unsuccessful in their applications.

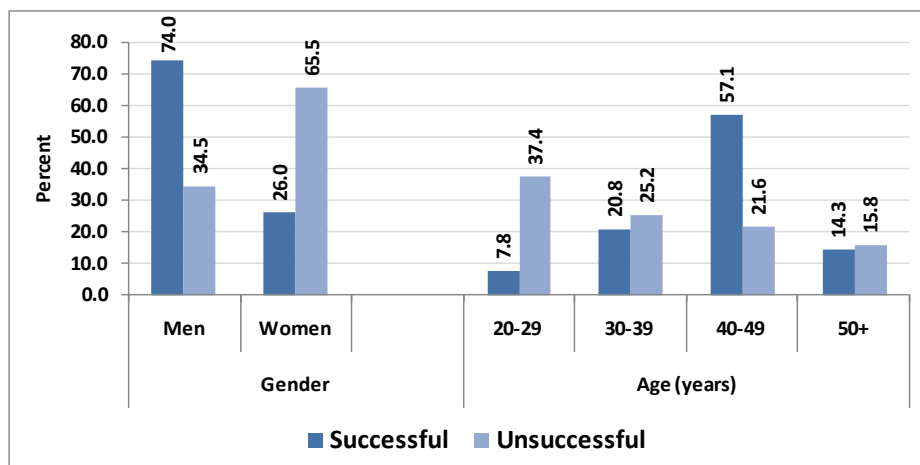


Figure 1: Gender, age and the success of credit applications

The figure also shows that the majority of rice farmers who were unsuccessful in their applications were women (65.5%). The analysis obtained a calculated  $\chi^2$  of 26.782, with 1 degree of freedom and a p-value of 0.000, which is significant at 0.01 error margin. This implies up to 99 percent chance that the success of credit request by rice farmers in Chakol Division was significantly associated with gender. This confirms that access to credit services was skewed in favor of men, further implying that men were more likely to be in the frontline in the adoption of new rice varieties because of economic advantages.

Using logistic regression models, the analysis showed that credit requests by men were about 1.8 times more likely to be successful than applications made by women. In this regard, variation between members of the two groups regarding credit access was significant at 0.01 error margin, implying up to 99 percent chance that men had greater chances of accessing credit from formal financial institutions than women. This logically follows that male farmers in the study area had a greater advantage in the adoption of new rice varieties than female farmers.

Farmers who participated in this study were aged between 20 and 61 years. The results presented in

table 1 show that the majority of rice farmers whose applications for credit were successful (57.1%) were in the 40-49 years age bracket, followed by those aged 30 to 39 years (20.8%). Among those whose applications were unsuccessful, up to 37.4 percent were aged 20 to 29 years, followed by those in the 30-39 years age group. Based on this pattern, the analysis obtained a calculated  $\chi^2$  of 8.224, with 3 degrees of freedom and a p-value of 0.053, which is significant at 0.1 error margin. This suggests up to 90 percent chance that the success of credit application significantly associated with rice farmers' age.

Given that the favored age groups - 30 to 39 and 40 to 49 years, this suggests that the prime age of productivity was one of the factors likely to influence the decision of financial institutions to provide credit or fail to do so. People aged 30 to 49 years fall in the most active groups and marks the peak of human productivity. The age bracket also coincides with the time when families are formed and raised. Hence, financial institutions prefer lending to farmers in the said age brackets more than those in higher or lower brackets.

*Table 1:* Demographic profile and success of credit applications

Demographic factors	Successful		Unsuccessful	
	Frequency	percent	Frequency	percent
<i>Marital status</i>				
Single	2	2.6	6	4.3
Married	58	75.3	98	70.5
Divorced/separated	13	16.9	11	7.9
Widowed	4	5.2	24	17.3
<b>Total</b>	<b>77</b>	<b>100.0</b>	<b>139</b>	<b>100.0</b>
<i>Family size</i>				
No children	1	1.3	5	3.6
1-4 children	23	29.9	45	32.4
5-9 children	48	62.3	79	56.8
10 children +	5	6.5	10	7.2
<b>Total</b>	<b>77</b>	<b>100.0</b>	<b>139</b>	<b>100.0</b>

As regards marital status, the results show that 75.3 percent of the farmers whose applications were successful were married at the time of the study, while 13 (16.9%) were either divorced or separated. Among those whose applications were unsuccessful, 98 (70.5%) were in marital unions at the time of the study. There is no doubt that the success of credit applications favored rice farmers in marital unions. This suggests that family responsibility was one of the factors considered by financial institutions before awarding loans requested. In relation to this, the analysis obtained calculated  $\chi^2$  of 17.551, with 3 degrees of freedom and a p-value of 0.010, which is significant at 0.05 error margin. This implies up to 95 percent chance that the success of credit application by rice farmers in study area linked to marital status.

Consequently, farmers who were likely to adopt the new rice varieties were people having family responsibility. This is logical because children need food to grow and develop fully. Children are more vulnerable to food insecurity than adults. Further analysis using binary regression models confirms that married farmers were about 2.1 times more likely to obtain successful outcomes in their credit applications than unmarried farmers and 1.4 times more likely to be successful than those widowed. In each scenario, variation between the groups was significant. Based on this, rice farmers in marital unions were likely to take the lead in adoption of new rice varieties due to economic advantages.

The results summarized in table 1 further show that 62.3 percent of the rice farmers whose applications were successful had between 5 and 9 children, followed

by 29.9 percent who reported having 1 to 4 children. Among those whose applications were unsuccessful, 56.8 percent had between 5 and 9 children, while those having 1 to 4 children were 45 (32.4%) rice farmers. Based on this pattern, the analysis obtained a calculated  $\chi^2$  value of 1.056, with 3 degrees of freedom and a p-value of 0.587, which is not significant. This suggests lack of relationship between family size and the success of application for credit by rice farmers in the study area. In other words, the success of credit applications had no link with applicants' family size.

b) *Farmers' socio-economic profile and credit access*

Socio-economic attributes captured by this study include education level, usual place of residence, average income and land tenure/ownership. The results

presented in figure 2 show that of the 77 successful credit applicants, 24 (31.2%) had attained university education, while 35 (45.5%) had college education. Among those who were unsuccessful, up to 69 (49.6%) reported having secondary education, while 15 (10.8%) had college education. However, more than a third (38.8%) of the farmers in this group, compared to 6.5% in the groups whose credit requests were successful had attained primary education or below. Generally, the analysis reveals that the success of credit applications favored rice farmers with at least secondary education. In other words, farmers with secondary education and above stood a better chance of getting favourable results on their applications than those who had less than secondary education.

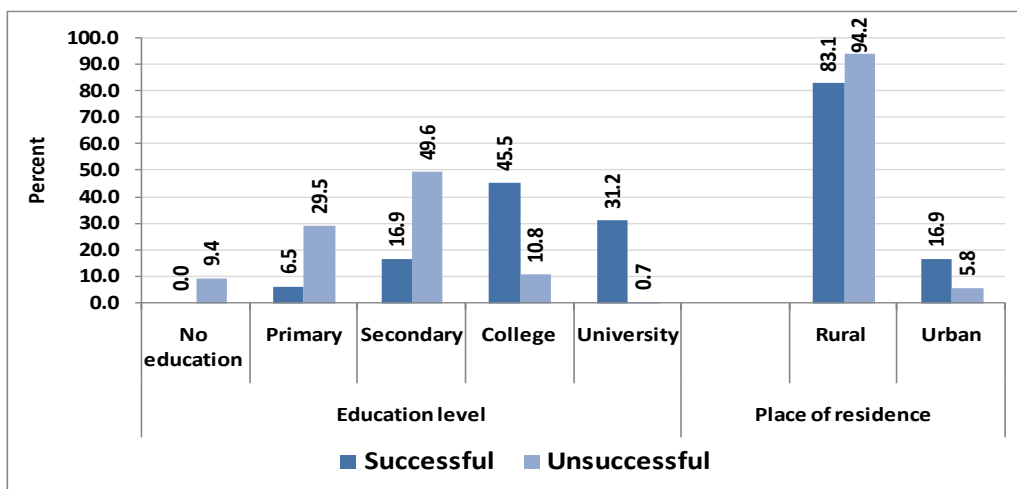


Figure 2: Education level, place of residence and the success of credit applications

By virtue of being in a better position to access credit services provided by formal financial institutions, rice farmers with some secondary education upwards were more likely to adopt new rice varieties than those who were lowly educated. In this regard, the analysis obtained a calculated  $\chi^2$  of 26.991, with 4 degrees of freedom and a p-value of 0.000, which is significant at 0.01 error margin. This implies up to 99 percent chance that the success of credit requests was significantly linked to rice farmers' education level. Furthermore, binary logistic regression results show that credit requests by university graduates were about 3.7 times more likely to be successful than requests made by farmers with no formal education. In this regard, variation between the two groups is significant at 0.01 error margin. Hence, access to credit services provided by financial institutions significantly correlates with farmers' educational attainment.

In addition, figure 2 indicates that among the 77 successful credit applicants, up to 64 (83.1%) were rural dwellers. Similarly, most farmers whose credit requests were unsuccessful [131 (94.2%)] resided in rural areas. Bivariate analysis obtained a calculated  $\chi^2$  value of

2.641, with 1 degree of freedom and a p-value of 0.988, which is not significant. This implies that the success of credit applications was not significantly correlated to applicants' usual place of residence. In other words, the decision to award or not award loans to rice farmers was based on factors different from applicants' place of residence.

Regarding average income, the results in table 2 show that out of 77 successful credit applicants, up to 33.8 percent were in the KES 60,000-79,000 income bracket, while 19.5 percent were earning between KES 40,000 and 59,999. Among farmers whose applications were unsuccessful, 27.3 percent were in the KES 60,000-79,000 income bracket. Notable from the results, though, is that more than one-third of those whose applications were unsuccessful compared to only 11.7% of the successful applicants were earning below KES 40,000.



Table 2 : Average income, land tenure and the success of credit requests

Variables	Successful		Unsuccessful	
	Frequency	percent	Frequency	percent
<i>Average income</i>				
<KES 20,000	2	2.6	22	15.8
KES 20,000-39,999	7	9.1	31	22.3
KES 40,000-59,000	15	19.5	26	18.7
KES 60,000-79,000	26	33.8	38	27.3
KES 80,000-99,999	12	15.6	18	12.9
KES 100,000-149,000	10	13.0	4	2.9
KES 150,000 +	5	6.5	0	0.0
<b>Total</b>	<b>77</b>	<b>100.0</b>	<b>139</b>	<b>100.0</b>
<i>Land tenure</i>				
Owens land singly	67	87.0	83	59.7
Owens land jointly with family	10	13.0	42	30.2
Owens land jointly with non-family	0	0.0	13	9.4
Rented land	0	0.0	1	0.7
<b>Total</b>	<b>77</b>	<b>100.0</b>	<b>139</b>	<b>100.0</b>

In this regard, the analysis yielded a calculated  $\chi^2$  value of 12.323, with 6 degrees of freedom and a p-value of 0.021, which is significant at 0.05 error margin. This means up to 95 percent chance that the success of credit requests was significantly tied to applicants' income level. Rice farmers whose average income was above KES 40,000 per month were considered more favorably than those whose incomes were below the stated amount. This is based on the assumption that having a high level of income influences one's credit-worthiness. A study conducted by Pearce (2004) noted that access to formal credit was significantly linked to applicants' ability to repay their loans, which is indicated by average income. Consequently, rice farmers with average incomes above KES 40,000 were better placed to access credit resources, which enhanced their chances of adopting new rice varieties to improve production, food security and economic status.

More still, multivariate analysis results indicated that rice farmers earning KES 150,000 or more were about twice more likely to have successful credit requests than farmers whose income was below KES 20,000 per month. Variation between top and bottom earners was significant at 0.01 error margin, implying up to 99 percent chance that average income was one of the factors influencing access to credit services by rice farmers in Chakol Division.

The study also found that up to 87.0 percent of the 77 successful credit applicants owned land singly, while 13.0 percent owned land jointly with family members. Sole ownership was also the most dominant mode of land ownership among rice farmers whose applications did not go through. However, up to 9.4 percent reported joint ownership of land with non-family members. Bivariate analysis obtained a calculated  $\chi^2$  of 7.359, with 3 degrees of freedom and a p-value of

0.036, which is significant at 0.05 error margin. The results imply that the success of applications for credit by rice farmers in the study area was significantly related to the type of land tenure. In other words, rice farmers owning land solely were better placed to access credit from formal financial institutions than those who owned land jointly with other parties. Consequently, rice farmers owning land solely were also favored when it comes to the adoption of new rice varieties.

Further analysis indicated that rice farmers owning land solely were 2.6 times more likely to have their applications successful than those farming on rented land. In this regard, variation between rice farmers owning land solely and those practicing agriculture on rented land is significant at 0.05 error margin, implying up to 95 percent chance that type of land tenure significantly influences the success of credit requests from financial institutions.

#### c) *Farming attributes and credit access*

Factors covered by the study included land size, years of experience in farming rice and the number of times farmers had applied for credit. The study found that out of the 77 successful credit applicants, up to 46.8 percent owned between 2.5 and 2.9 acres of land, while 28.6 percent had 2.0 to 2.4 acres. The results in table 3 further shows that about 75.5 percent of the successful credit applicants had at least 2 acres of land. Contrastingly, 58.3 percent of those whose applications were unsuccessful compared to 10.4 percent of the successful applicants had below 1.5 acres of land. The analysis obtained a calculated  $\chi^2$  value of 17.645, with 4 degrees of freedom and a p-value of 0.012, which is significant at 0.05 error margin, implying up to 95 percent chance that the success of credit requests was significantly associated with the size of land owned by

applicants. In other words, the size of land was one of the factors considered by financial institutions before loans were awarded to applicants.

Multivariate analysis results indicated that rice farmers owning 2.5 to 2.9 acres of land were about 2.3 times more likely to have successful credit requests than those owning less than 1 acre of land. The variation between largest and smallest land owners is significant

at 0.01 error margin; thus, suggesting up to 99 percent chance than farmers with 2.5 to 2.9 acres of land were better placed to access credit provided by financial institutions. Hence, the size of land owned by farmers influences the chances of their credit requests being successful; thus, the larger the land size the greater the chances that credit requests will be successful.

*Table 3* : Farming attributes and the success of applications for credit

Variables	Successful		Unsuccessful	
	Frequency	percent	Frequency	percent
<i>Acreage</i>				
0.2-0.9 acres	2	2.6	44	31.7
1.0-1.4 acres	6	7.8	37	26.6
1.5-1.9 acres	11	14.3	23	16.5
2.0-2.4 acres	22	28.6	19	13.7
2.5-2.9 acres	36	46.8	16	11.5
<b>Total</b>	<b>77</b>	<b>100.0</b>	<b>139</b>	<b>100.0</b>
<i>No. of times applied for credit</i>				
Once	8	10.4	92	66.2
Twice	15	19.5	25	18.0
Thrice	19	24.7	16	11.5
>Thrice	35	45.5	6	4.3
<b>Total</b>	<b>77</b>	<b>100.0</b>	<b>139</b>	<b>100.0</b>

Regarding the frequency of applications, the study found that up to 45.5 percent of the 77 successful farmers had applied for credit more than thrice, while 24.7 percent had done so three times. Among farmers whose credit applications were unsuccessful, up to 66.2 percent had applied for credit only once. This variation had significant implications on the probability of obtaining favourable results in application for credit from financial institutions. The analysis further yielded a calculated  $\chi^2$  of 11.365, with 3 degrees of freedom and a p-value of 0.034, which is significant at 0.05 error margin. This means up to 95 percent chance that the success of credit application is significantly associated with the number of previous credit requests made to financial institutions. This further implies that the success of credit requests was related to the number of times one applied for such credit. In other words, rice farmers applying for credit repeatedly without losing hope stand a chance of being successful than those who applied once and gave up due to unfavourable outcome.

Access to credit services provided by financial institutions may be influenced by the number of previous requests made by an individual. In this regard, the results show that farmers who had requested for credit more than thrice earlier were about 2.7 times more likely to succeed than those making request the first time. Variation in access to credit between the two groups is significant at 0.05 error margin, which confirms that the

number of previous applications influences the success of current request for credit.

Farmers in the study area report varying levels of experience in rice cultivation. In this regard, out of 77 successful credit applicants, figure 3 shows that 39 (50.6%) participants reported experience of 15 years or more in the cultivation of rice, while about one-third (31.2%) had 10 to 14 years experience. Notable from the results summarized in figure 3 is that up to 69.1 percent of those whose applications were unsuccessful compared to only 18.2 percent of successful applicants reported an experience below 10 years. Based on this, the analysis yielded a calculated  $\chi^2$  value of 27.319, with 3 degrees of freedom and a p-value of 0.000, which is significant at 0.01 error margin. This implies that the success of credit requests was significantly associated with applicants' farming experience. Farmers with 10 years of experience in rice cultivation were more favored by the success of credit applications. They were also better placed when it comes to the adoption of new rice varieties.

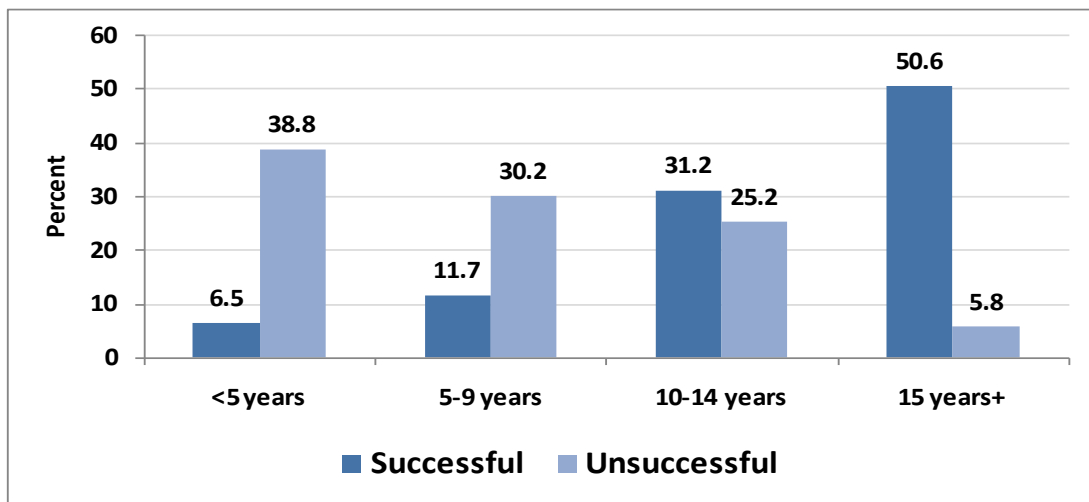


Figure 3 : Years of farming experience and the success of credit requests

The results obtained from binary logistic regression analysis indicates that rice farmers with 15 years or more of experience were about 1.8 times more likely to get successful outcomes in their application for credit from financial institutions. The variation in access to credit services between the two groups is significant at 0.01 error margin, suggesting up to 99 percent chance that the duration of farming experience

influences access to credit. The results show that the longer that the farming experience the greater the chance that a farmer's credit requests will be successful. Figure 4 shows the results obtained when the change in -2 Log Likelihood (-2LL) associated with each covariate are plotted on a scattergram and a trendline fitted.

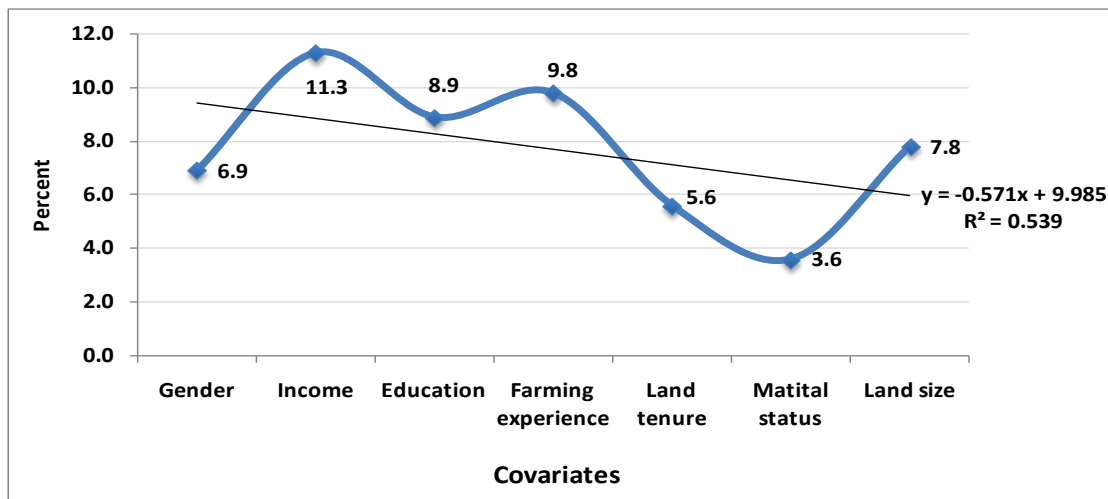


Figure 4 : Effect of covariates on the success of credit requests

Figure 4 shows that income level accounts for highest proportion of variance in the success of credit requests by rice farmers (11.3%); this is followed by years of experience in cultivating rice (9.8%), educational attainment (8.9%) and land size (7.8%). In the fifth place gender (6.9%), followed by land tenure/ownership (5.6%) and marital status (3.6%). The sum of proportions of variance accounted for by the covariates is 53.9 percent. This implies that the regression model explains up to 53.9 percent of variance in the success of credit requests by rice farmers.

d) Information sources and access to credit by rice farmers

Access to information is a critical factor influencing farmers' access to credit facilities provided by formal financial institutions. Availability of relevant information is a motivating factor for an individual to take steps to request for credit. For this matter, participants who had ever applied for credit from the institutions (216) were requested to state how they came to know about the availability of credit services. The results presented in figure 5 show that radio was the main source of information on credit services provided by

financial institutions, as cited by 34 (44.2%) rice farmers whose credit application was successful and 93 (66.9%) of those whose applications were unsuccessful. The next important source of information for members of both groups is friends, which was stated by 19 (24.7%)

rice farmers whose requests were successful and 51 (36.7%) rice farmers whose requests were unsuccessful. Also important were newspapers, financial institutions (formals) and road shows organized by the instructions or their agents.

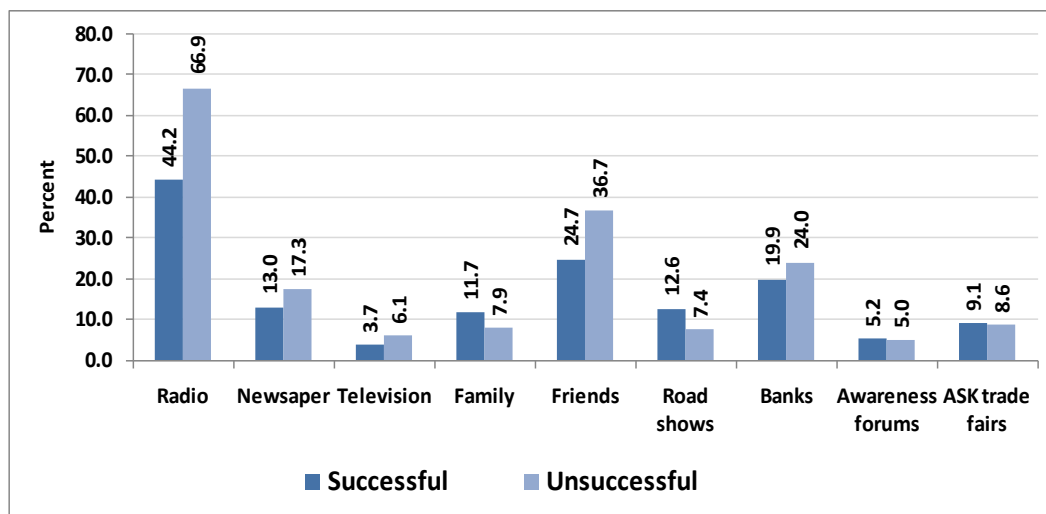


Figure 5 : Main sources of information about formal credit

Bivariate analysis obtained a calculated  $\chi^2$  value of 9.677, with 8 degrees of freedom and a p-value of 0.057, which is significant at 0.1 error margin. This suggests up to 90 percent chance that rice farmers whose applications for credit were successful and those whose requests were unsuccessful were significantly different in terms of information sources about credit services. The significance of relationship between these two variables is marginal implying that members of the two groups were not far apart regarding their information sources. However, the role of mass media, particularly radio and friendship networks are key to reaching out for rice farmers in Chakol Division.

#### IV. SUMMARY, CONCLUSIONS AND IMPLICATIONS

The broad objective of this study was to determine factors influencing access to formal credit by small-scale rice farmers in Chakol Division, Teso District. The study was necessitated by the slow response of community members to the adoption of new rice varieties provided by the Government of Kenya after successful field trials. Although the slow response of community members in the adoption of new rice varieties was linked to various factors, inadequate access to formal credit services emerged as the primary challenge cited by community members, as indicated in anecdotal literature (KARI, 2004).

As noted by Atieno (2001), credit approval by financial institutions is a process involving various steps, the most critical being risk evaluation based on the information provided by an applicant. Risk evaluation

involves information such gender, age, marital status, family size, average income, education level, type of business venture, years of experience in managing similar ventures, farm size, type of land tenure and expected output per unit if land, among others. Based on this, the factors covered by this study were grouped into three categories, namely, demographic, socio-economic and farm attributes. The study found that access to formal credit provided by financial institutions was significantly related to various factors, including gender, marital status, education level, income level, type of land tenure, land size, farming experience and number of previous credit requests.

Through multivariate analysis, the study found that credit requests by men were about 1.8 times more likely to be successful than applications made by women. This logically follows that male farmers in the study area had a greater advantage in the adoption of new rice varieties than female farmers. However, it's worth noting that until recently, women have been at a disadvantaged position to access formal credit, particularly due to limited access and ownership of properties such as land and capital equipment, which may be used as collateral to secure formal credit. Creating special credit packages for women rice farmers in response to their unique socio-economic attributes, challenges and circumstances may be a positive step in empowering women to access formal credit, intensify rice farming and play a more important role in alleviating poverty and hunger as envisaged by the first MDG.

In relation to education level, the study found that the higher the education level the greater the

chances of rice farmers accessing formal credit. In other words, rice farmers with university and college education were about 3.7 times more likely to access formal credit than those with no formal education. Nonetheless, pegging credit access on education level may lock out many rice farmers with lower formal education. In this study, up to 27 percent of the rice farmers had less than secondary education. Although education level is an important criterion for accessing loans, locking out many rice farmers with no education may limit the potential of small-scale farming in poverty alleviation and hunger reduction. This necessitates a training program on credit access and management; without which, even farmers with university education run a risk of mismanaging credit funds.

Overall, the main factors influencing access to formal credit include income level which accounts for the highest proportion of variance in the success of credit requests by rice farmers at 11.3 percent. This is followed by years of experience in cultivating rice (9.8%), educational attainment (8.9%), land size (7.8%), gender (6.9%), followed by land tenure/ownership (5.6%) and marital status (3.6%). The regression model explains up to 53.9 percent of variance in the success of credit requests by rice farmers.

The study found that about one-third (32.9%) of the farmers had never made any attempt to secure formal credit. The reasons cited by this group, included the fear of default in repayment, complicated application procedure and phobia associated with bank credit. These reasons can be attributed to a common denominator, which is lack of information. Initiating appropriate measures to inform rice farmers and help them meet prequalification conditions will go a long way in making formal credit services more responsive the financing needs of small-scale farmers. Financial institutions should design appropriate messages on credit products, interest rates and prequalification conditions, which should be disseminated to rice farmers through the mass media, particularly radio and other forums such as ASK shows, farmers' training centres and public barazas among others. The information should be mainstreamed in government structures such as provincial administration and agricultural extension services. Disseminating such information is particularly necessary to help clear misconceptions and myths associated with formal credit; thus, make financial institutions more responsive the financing needs of small-scale rice farmers.

Furthermore, financial institutions should initiate a comprehensive lending package that includes a training program, targeting small-scale rice farmers with information and skills on how to manage credit funds and honor their credit obligations as scheduled. This requires financial institutions to provide technical and managerial advice to rice farmers on how to create bigger investments out of their farms. This kind of

support should nurture a strong, mutual and sustainable partnership between the institutions and rice farmers.

## V. LIMITATION

The study was conducted between March and June, which coincided with long rains in western Kenya. The poor condition of the rural access roads frustrated mobility within the study area. Consequently, although 375 rice farmers were sampled, only 215 interviews were successfully conducted within the first two months. As a remedy, the study duration was extended by one month, which in turn, improved the response rate to 85.9 percent.

## VI. SUGGESTIONS FOR FURTHER RESEARCH

Small-scale rice farmers remain inadequately served by financial institutions in terms of formal credit. As a result, such farmers have been coping by sourcing financial support from alternative sources, albeit not sufficient to address their financing needs. This study did not assess coping measures initiated by small-scale rice farmers in Chakol Division and the effectiveness of such measures. This is an area that future studies should consider for empirical investigation.

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