

INSTITUTIONAL CREDIT AND THE EFFICIENCY OF RESOURCE USE AMONG SMALL SCALE FARMERS IN KENYA

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1. Introduction

The use of agricultural credit programmes in many Low Income Countries (LICs) has been seen as one of the major means for promoting agricultural development. Many development agencies and the governments of these countries have therefore emphasised the establishment of credit programmes to provide credit to small-scale farmers in order to accelerate rural development. The main reason underlying this doctrine has been that often small-scale farmers do not have adequate financial resources and therefore without external finance in the form of credit, cannot undertake the level of investment needed for agricultural development (Adams and Von Pischke, 1992). Lack of credit is therefore seen as denying farmers the opportunity to expand their production beyond their current level (Abbott, 1976). Loans allow farmers to purchase large capital items sooner than they would otherwise do. Credit is regarded as an effective means of bringing labour, land and management into productive use and intensifying the productivity of those resources already employed. This potential gain in productivity resulting from credit use is the main motivation underlying many government programmes seeking to provide credit to the farm sector.

Based on the argument that small-scale farmers lack access to commercial bank services, specialised farm credit institutions have been established in the LICs to provide financial assistance for agricultural production. They cater for the financial needs of specific target groups, or certain agricultural subsectors (Von Pischke, 1978). Such institutions have pursued policies guided by the development priorities of the specific governments (Adams and Vogel, 1986). They are expected to provide an impetus to agricultural innovation, especially to the small-scale subsector.

Agriculture is an important sector in the Kenyan economy, contributing up to 28% of the GDP. In the recent past however, the sector has shown a fall in its growth rate (Republic Kenya, 1992). It is also a major contributor to the export earnings and employment generation. A lot of importance is therefore laid on the development of the sector, as is echoed in the various policy documents (Republic of Kenya, 1986, 1989a). A notable feature of the Kenyan agriculture is the importance of small-scale sector which has continued to increase in the recent past (Republic of Kenya, 1986). Small-scale farmers are therefore seen as having the potential for increasing the country's agricultural production. Yet without adequate financial resources, these farmers cannot acquire and

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use the improved inputs necessary for increased production.

Therefore, the provision of credit to small-scale farmers draws from the importance of the small-scale sector to the country's agriculture, and has therefore been promoted, based on the assumption that without adequate financial resources to these farmers, they cannot increase their productivity. Agricultural credit is therefore seen as an important means of enabling the small-scale farmers to increase their production and eventually farm incomes. Recent efficiency studies in Kenya have shown that for small-scale farmers to realise the best possible results from their production technology and efforts, access to cash is crucial (Aguilar and Bigsten, 1993).

For a long time, credit in Kenya has been viewed as having two basic functions to the small-scale farmer (Republic of Kenya, 1973):

- To enable the farmers have access to the factors of production;
- To facilitate economic efficiency in production through increased productivity.

In the Sessional Paper Number One of 1986, the role of credit is given as being to facilitate the efficient use of resources by farmers. The provision of credit is necessary "to help farmers adopt and intensify their use of modern practices" (Republic of Kenya, 1986).

Although increasing amounts of funds have been made available to agricultural credit, its role in enabling farmers to increase the efficiency with which they use the acquired resources is not empirically established. This is important if the contribution of credit to agricultural production is to be realised. Given that scarce productive land is a central issue in Kenya's agriculture, one of the main options for increasing production lies in the farmers adopting improved practices in order to increase the productivity of available resources (Republic of Kenya, 1986). If funds are made available to facilitate the purchase of modern production inputs, the productivity, and hence incomes of the small-scale farmers financed will improve, and this will enhance the potential for increasing agricultural production.

2. The Institutional Credit System in Kenya

2.1 Agricultural Credit Policy Framework in Kenya

Among the policies aimed at increasing small-holder agricultural production the provision of agricultural credit to small-scale farmers has been a popular one. This is because credit has been considered necessary for the expansion of both food and cash crop production. The provision of credit to the agricultural sector is regulated by the government through the formulation of policy guide-lines to the financial institutions

(regarding their contribution to agriculture). The Central Bank of Kenya has tried to encourage financial institutions to become more involved in the agricultural sector, mainly through the introduction of lending targets. Since 1975, commercial banks have been required to lend 17% of their deposits to agricultural sector. Since 1980, the nonbank financial institutions were required to lend 10% of their deposits to agriculture. The government's objective on credit has therefore been to ensure that most farmers have access to credit, which with other incentives like prices and an efficient marketing system can lead to higher output in the agricultural sector. The Sessional Paper Number One of 1986 also notes that the strategy of crop intensification cannot be achieved unless farmers have adequate cash flows to purchase the necessary inputs (Republic of Kenya, 1986). It has therefore been considered necessary to provide both long-term and seasonal credit especially to small-scale farmers to enable them adopt and intensify their use of modern practices. During the 1989-93 plan period, lending for food production especially to small farmers was to be enhanced. The Central Bank of Kenya is to consider several proposals, among them requiring a certain percentage of agricultural lending to be devoted to small-scale farmers. It is also noted that within the budgetary constraints, credit allocation to agricultural sector is to be increased.

It is however not clear whether the introduction of agricultural lending quotas and targets has induced greater involvement of these institutions in agriculture than might have otherwise occurred (Masini, 1987). Despite the fact that periodic Central Bank of Kenya circulars and government policy statements have sought compliance with these targets, many financial institutions have not met them, and despite the high priority accorded to increased investment in agriculture, the increase has not been appreciable. This is mainly because the commercial banks have not been able to meet their target lending to the agricultural sector. This is attributed to the fact that commercial banks prefer not to put their assets in risky areas such as farming, and the inefficient credit processing by the institutions concerned (Republic of Kenya, 1989a). In addition, many commercial banks are not willing to lend directly to farm enterprises because they do not have the branch network to service rural loans and the expertise to do so. The importance of providing other incentives in the form of infrastructure, pricing, input supply, and marketing has been emphasised in addition to the low interest rate policy aimed at encouraging lending to agriculture.

The government commitment to providing credit to farmers from its own sources and donors is further emphasised. To enable financial institutions to cover the high costs of relending to farmers, it has been considered necessary to offer them loans at subsidised

rate. Different measures have also been proposed to make funds more widely available to small-scale farmers. These include among others, increasing the flexibility in collateral requirements and repayment periods for particular types of loans. Under these measures farmers are not to be given access to more than one public loan scheme for the same purpose. The cooperative movement is further to assume an increasing role in providing credit to the small-scale farmers. At the institutional level, individual institutions have translated the government objectives to their lending policies, emphasising lending to small farmers and for food production (AFC, 1991).

In addition to lack of credit funds to the borrowers, inefficient administration of the credit programmes has been identified as the main problem for the institutions involved (Republic of Kenya, 1989c) as well as the duplication of existing funding sources and lending criteria. These have led borrowers to accept loans for inappropriate purposes, and obtain credit for the same purpose from more than one source. Directing credit for specific purposes implies that farmers are induced to apply for and accept credit for purposes for which they do not have the capacity to manage or for which they do not intend to use the funds.

In the face of limited public funds to finance agricultural credit, short and long-term strategies to improve the agricultural credit system are necessary. These include the specialisation of credit institutions in evaluating and supervising the particular types of credit they provide. For an effective credit system, the total credit for each farmer should ensure an optimal credit mix for production, loan repayment capacity, and improved standard of living.

2.2 Sources of Institutional Credit for Farmers

Agricultural credit is defined by the Central Bank of Kenya as lending for primary production and includes direct lending to farm enterprises, agricultural cooperatives, and direct lending to parastatals for onlending. The credit types are long-term, medium-term and short-term credit. The long-term credit is intended mainly for land purchase or for making permanent improvements on the farm with a repayment period of up to over ten years. The medium-term credit is intended for farm development and has a repayment period of two to ten years. The short-term credit is mainly for crop planting, purchase of seasonal inputs, or meeting other recurrent costs and has a repayment period of not more than 18 months. In Kenya, agricultural credit is available through a number of institutions in the organised credit market in addition to individuals operating in the informal market. The main agricultural credit institutions are; Agricultural Finance Corporation (AFC), commercial banks, the cooperative movement under the Cooperative Bank of Kenya, and

the Kenya Grain Growers Cooperative Union (KGGCU).

AFC is a government parastatal established mainly for the purpose of providing credit to farmers and operates different schemes in the district mainly for maize and wheat farming, dairy farming farm infrastructure and farm machinery. The credit terms range from short to long term. The main credit programmes are the Farm Development Loans which is meant to finance all agricultural activities except land purchase. These include farm infrastructure, dairy farming and other miscellaneous farm expenses. The amount of loan disbursed is meant to cover 80% of the financed activity and the farmer must provide 20%. The other credit programme is the Seasonal Crop Credit meant for financing the production of maize and wheat. The loan disbursed covers 75% of the total cost of producing the crop, with the farmer having to provide 25%. AFC loans are divided into two main categories; the small-scale loans for up to Kshs. 50,000, and the large-scale loans for amounts exceeding Kshs. 50,000.

The Cooperative Bank of Kenya also administers credit programmes in the district through various marketing cooperative societies. The prime motivation of the cooperative movement in the district, as in other parts of the country, has been to provide a channel for marketing of agricultural produce and supply farm inputs to farmers. However, they have increasingly changed and become multipurpose in their objectives. Due to the inadequacy of collateral by small-scale farmers and the risky nature of their farming activities, most of them have not had access to commercial sources of credit. The cooperative movement has therefore evolved credit programmes enabling them to receive production credit from their societies. The main programmes run through the cooperative societies in the district are the Cooperative Production Credit Scheme (CPCS), which has been concentrated on dairy production in the district. The Dairy Development Fund (DDF) is a credit programme which provides credit for dairy production. The Farm Input Supply Scheme (FISS), is meant to provide different forms of inputs to farmers through their cooperative societies.

3. Methodology

3.1 Data Type and Sources

The data used in the study was collected from a field survey conducted during the months of April to September 1992. Primary data was collected from farmers who had received credit from the Agricultural Finance Corporation (AFC), and the four selected cooperative societies under the Cooperative Bank of Kenya between the years 1990-

1991. A structured questionnaire was used to interview the 95 farmers sampled from both institutions. In addition 35 farmers who had not received credit during this period were also interviewed.¹

3.2 Classification and Definition of Variables

The variables used in the analysis were defined as follows:

- Output is the gross value of total production for maize and wheat during the 1991 crop season;
- Land is the total land in acres under cultivation during the survey;
- Family labour is the number of family mandays employed on the enterprise;
- Hired labour is the number of mandays hired for the enterprise;
- Farm materials is the value in Kshs of fertilizers, seeds and pesticides used;
- Management index is the component of access to extension, farming experience and level of education;
- Loan value is the amount of credit received in Kshs by the farmer.

3.3 Model Specification

The production function approach was used to estimate the production behaviour of the farmers. The Cobb-Douglas production function was estimated. This model has been popularly used mainly because of the ease of its estimation and manipulation (Upton, 1979; Heady and Dillon, 1961; Chennareddy, 1967; Sahota 1968; Gykye and Whyte, 1977) among others.

The general form of the function is specified as follows:

$$Q = AX^{b_1} \dots e^U \quad (1)$$

where Q = total output

A = constant term of the regression;

b_i = elasticity of production with respect to the i^{th} input;

X_i = i^{th} input used in the production process;

U = is the error term;

e = the base of the natural logarithm.²

1. For a detailed discussion of the sampling procedure and grouping of the variables, see Atieno, (1994) forthcoming.

Specified in this form, its regression coefficients equal the elasticities of output with respect to the various inputs. These elasticities are also independent of the unit of measurement. This model provides a compromise between an adequate fit of data, computational feasibility and sufficient degrees of freedom for statistical testing (Heady and Dillon, 1961; Griliches, 1963). It facilitates the estimation of the marginal resource productivity at the mean level, efficiency measures, and the computation of returns to scale. The model is estimated in its log-linear form which is specified as follows:

$$\ln Q = \ln A + b_1 \ln X_1 + U \quad (2)$$

Where \ln is the natural logarithm and the other parameters are as specified in (1) above.

Assuming that errors are small and normally distributed, such a logarithmic transformation of variables presumes a nearly normal distribution of errors in the data (Heady, and Dillon 1961). It also enables the data to approach normality even if the errors are not normally distributed. It also permits comparison of the results of two random samples.

Several studies have used the Cobb-Douglas production function approach to assess the impact of credit on factor productivity at the farm level with differing results. Coyler and Jimenez (1971) estimated the unrestricted Cobb-Douglas production function using cross-sectional data from credit and noncredit farmers to assess the effect of credit on the participant farmers of a credit programme in Columbia. Their results showed that the coefficients of credit and operating expenses were more significant for the credit farmers than in the noncredit farmers. They concluded that credit can be an important input in agricultural production and should therefore be provided.

Gyekye and White (1978) used the Cobb-Douglas production function on aggregate time series data to analyse the resource productivity of farmers, and hence the impact of institutional credit on agricultural production in Ghana. They concluded that credit had no impact on the productivity of other factors.

Salami (1988) using cross-sectional data estimated the Cobb-Douglas production to assess whether credit extended to small-scale farmers improved farm efficiency in agricultural development in Ghana. The results showed that credit can help improve the production organization of the farmers. The current study analyses the contribution of credit in raising farm production by facilitating efficient resource use by farmers in the context of existing institutional credit lending policies.

2. See Koutsosyiannis (1987, p. 137).

4. Analysis of Efficiency in Resource Use and Productivity by the Farmers

4.1 Production Function Estimation and Analysis

The Cobb-Douglas production function specified in section 3.3 was estimated for both credit and noncredit farmers using the Ordinary Least Squares technique. The loglinear form of the estimated functional relationship is specified as follows:

$$\ln Y = \ln A + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + b_7 \ln X_7 \quad (3)$$

where the variables are defined as follows:

- Y = gross value of farm output;
- b_i = elasticity coefficient to be estimated;
- X₁ = total land under agricultural production;
- X₂ = family labour;
- X₃ = hired labour;
- X₄ = value of capital used in the production process;
- X₅ = loan value received during the period;
- X₆ = management index;
- X₇ = total value of farm materials.

The correlation matrix for both credit and noncredit farmers are presented in the appendix. Both matrices show no high intercorrelation, suggesting no serious multicollinearity among the specified variables for both groups of farmers. The results of the regression for both credit and noncredit farmers are presented in Table 1:

Table 1: Production Elasticities of the Respective Factors of Production for Credit and Noncredit Farmers, Nakuru District. 1991

Variable	Credit farmers (n = 85)		Noncredit farmers (n = 35)	
	Elasticity Coefficient	T-Value	Elasticity Coefficient	T-Value
Constant	8.27 (.694)	11.913**	6.89 (1.125)	6.124**
Land	-	-	-	-
Family labour	-	-	-	-
Hired labour	.12 (.057)	2.026*	.13 (.078)	1.726+
Farm materials	.28 (.093)	2.946*	.53 (.121)	4.344**
Management	.27	1.859+	.27	1.903+

	(.144)		(.141)
Loan value received-	-		-
Farm Capital	.16	3.537**	-
	(.044)		
Σbi	.83		.93
R^2	.63		.67
SEE	.38		.30
F-ratio	10.7**		7.1**

** significant at the 1% level - * significant at the 5% level - + significant at the 10% level

Figures in brackets are standard errors.

The dependent variable is in Gross value of total output.

Source: Computed from survey data 1992.

The results of the estimation show that the R^2 for both groups of farmers are statistically significant as indicated by the significance of the F-ratio at the 1% level. From the specified variables, the elasticities of hired labour, farm materials, management and farm capital are statistically significant for credit farmers while for the noncredit farmers, only hired labour, farm materials and management were found to be statistically significant.

The estimated coefficients are the elasticities of production with respect to the factors of production showing on average the percentage change in the value of output resulting from a given percentage change in the given input. Traditional theory of production stipulates that the more technically efficient farms will have a higher constant term compared to the less technically efficient ones (Koutsoyiannis, 1987). From the results we therefore conclude that the credit farmers with a higher constant term appear to be more technically efficient than the noncredit farmers who show a lower constant term. This does not however mean that the credit farmers are having maximum technical efficiency, as this is not tested. Allocative efficiency of both groups of farmers is tested and discussed in a later section.

Among the specified variables, all had the expected signs. However, for credit farmers, family labour, land and loan received were not picked during the stepwise regression, hence their coefficients would not be significantly different from zero at the specified significance levels. The fact that the coefficient of loan received was not statistically significant should not necessarily be taken to imply that credit is not significant in raising the level of production. There are other factors which together with credit are necessary in increasing farm production as revealed in the earlier sections. This result may also imply that credit is not given in sufficient amounts such that it can result in significant increases

in production. The coefficient of farm materials was .28 for credit farmers and .53 among the noncredit farmers, implying that this variable alone has the potential to contribute more to output than any other variable among the two groups of farmers. This underscores the importance of improved seeds and fertilizer use in increasing production in this region. This means that a one percent increase in farm materials is associated with a .28% increase in output among credit farmers while for noncredit farmers it will lead to a .53% increase in output. For credit farmers, this variable is followed by the management index with a coefficient of .27, farm capital with .16, and hired labour with .12. For noncredit farmers, the coefficients are .27 for management index, and .13 for hired labour. The relatively high elasticity of production with respect to farm materials and hired labour among the noncredit farmers than the credit farmers could be due to the fact that the noncredit farmers are using lower levels of these inputs and substantial increase in production can still be realised among these farmers by increasing the level of utilisation of these inputs.

The relative proportionate increase in output resulting from increased use of these factors among the credit farmers would be lower than that resulting among the noncredit farmers. The relative importance of these factors in contributing to output is also identified by ranking the factors based on the magnitude of their absolute t-values. It should be noted that this method of ranking is the same as that based on the adjusted beta values (Desai and Mellor, 1993). Based on this ranking, it is observed that among the credit farmers, farm capital has the highest contribution to output, followed by farm materials, hired labour and then management index. Among the noncredit farmers, farm materials has the highest contribution to output, followed by management and then hired labour. Farm materials therefore appear to be relatively more important in terms of its contribution to output, underscoring the importance of fertilizers, improved seeds and pesticides in increasing farm production. Farm capital also contributes more to output among the credit farmers. Provision of credit aimed at increasing farm production should therefore emphasise the use of these inputs.

Returns to scale are used to show the proportionate increase in output resulting from a given proportionate increase in inputs. The returns to scale are increasing, constant, or decreasing if the sum of the estimated elasticities ($\sum b_i$) is greater than, equal to or less than unity respectively. For both functions, this sum is less than unity, showing that the farmers are experiencing decreasing returns to scale. This implies that both groups of farmers are operating on the rational part of the production. An important issue now is how efficiently they are organising their production activities so as to maximise their profits given the

prevailing input and output prices.

4.2 Marginal Value of Productivity Measures

In order to examine the efficiency with which the farmers are using their resources, the Marginal Value of Productivity (MVPs) for the respective factors were calculated. From the Cobb-Douglas production function, the marginal factor productivities can be computed from the estimated production elasticities and the average productivity measures as follows:

$$MVP = b_i \cdot AVP = Q/X_i \quad (4)$$

where:

MVP = marginal value product for the given factor of production;

b_i = the estimated elasticity of production for the i th input;

AVP = the average value product;

Q = the total value of production; and

X_i = the value of the i th input.

The (MVP) gives the absolute response per unit of factor input and enables the comparison of relative efficiencies of resource use within the given farms. With all the variables (inputs and outputs) measured in monetary units using the sample mean prices, the marginal products represent the net increase in gross income realised from the application of an additional shilling's worth of a given input. Using the estimated production elasticities and the average value of productivities (AVP), the MVPs were estimated and are presented in Table 2 below.

Table 2:
Marginal Productivity Measures of the Specified Factors of Production for Credit and Noncredit Farmers, Nakuru District, 1991

		Credit farmers	Noncredit farmers
Land	(Kshs/acre)	—	—
Family labour	(Kshs/manday)	—	—
Hired labour	(Kshs/manday)	77.5	31.7
Farm materials	(Kshs/Ksh)	7.3	9.1
Farm capital	(Kshs/Ksh)	5.1	—

Source: Computed from survey data 1992.

The MVPs for land, family labour and capital (noncredit farmers) were not computed

since they were dropped during the stepwise regression. The marginal value product for hired labour is higher among the credit farmers than the noncredit farmers, implying that one additional manday hired would add more to the output among the credit farmers than it would among the noncredit farmers. For farm materials, the reverse is true, with one extra Ksh. Spent on farm materials resulting in higher additional output among the non credit farmers than the credit farmers. This shows that credit farmers are using less hired labour in proportion to other inputs than the noncredit farmers who appear to be using more hired labour in relation to the other inputs. In contrast, credit farmers appear to be using proportionately more farm materials in relation to the other inputs than the noncredit farmers. This is not the case with noncredit farmers whose use of farm materials is lower. The high marginal value product of farm materials among the noncredit farmers can also be attributed to the high production elasticity of this factor input among this group of farmers and the low level at which it is used. Therefore given the production elasticity, the high marginal productivities and the low level of utilisation of these inputs, production levels could be substantially increased by increasing the level at which they are used.

4.3 The Marginal Returns to Opportunity Cost Ratios (MROCRs)

The marginal returns to opportunity cost ratios provide a measure of the efficiency of resource use prevailing on the average throughout the sample. It statistically measures the mean efficiency of resource use by each sampled farm population. It is computed as the ratio of the marginal product to the marginal cost given as the opportunity of the respective factor. For profits to be maximised, the ratio of the marginal product to the marginal cost must equal one (Heady and Dillon, 1961). This means that the revenue from using one additional unit of an input is equal to the cost of acquiring that additional unit. A ratio of less than one implies that too much of the resource is being used under the existing price conditions, implying inefficient resource use. If the ratio is greater than one, it indicates that too little of the resource is being used, and increased use of the resource would result in increased profits.

For the given production resources used, their opportunity costs represent the market prices that prevailed on the average during the production period. For land, its rental value is used as the market price. The prevailing wage rate of Kshs. 35 per man day in Nakuru district was used as the marginal cost of labour. On the assumption that the employment of additional labour would imply the purchase of hired labour, the market wage rate of labour is taken as the opportunity cost of a unit of both hired and family labour in this study. This reflects the benefits forgone by the family in order to participate in the particular

activity (Gittinger, 1984). The marginal cost of capital was obtained by using the prevailing market rate of interest of 16.5% (Republic of Kenya, 1992). For the farm materials, (comprising seeds, fertilizer and pesticides) the marginal cost was taken as the market price of these inputs. Since the inputs were measure in monetary terms, the marginal cost is taken as equivalent to Ksh. 1. This is because it is the extra amount spent to acquire an extra unit of these inputs. The marginal cost for each resource input together with the computed efficiency measures are presented in Table 3 below.

Table 3: Marginal Return to Opportunity Cost Ratios (MROCR) for the Specified Factors Among the Credit and Noncredit Farmers, Nakuru District, 1991

Factor Input	Credit farmers (n=85)			Noncredit farmers (n=35)	
	MC	MVP	MROCR	MVP	MROCR
Land		-	-	-	-
Family labour	35				
Hired labour	35	77.5	2.2	31.7	0.9
Farm materials	1	7.3	7.3	9.1	9.1
Farm capital	1.16	5.1	4.3		-

Source: Computed from survey data 1992.

From the results, we observe that the MROCRs are greater than unity for all factors except for hired labour among the noncredit farmers. These ratios indicate that too little of the respective resource inputs, namely, hired labour, farm materials, and farm capital are being used in relation to the prevailing market conditions. Hence the farmers are allocatively inefficient in the use of the available factors of production. Production could be increased by increasing the use of these inputs. The high values of marginal productivities also confirm these results. The value of MROCR of less than unity for hired labour among the noncredit farmers shows that these farmers are using too much of this factor in relation to the level at which they use other inputs. This can be explained by the fact that in comparison to other factors like fertilizers, pesticides and capital, the noncredit farmers find it cheaper to hire labour and also compensate for the use of family labour which is committed to nonfarm activities. They therefore display a tendency to use more hired labour in production in relation to other factors. Given the prevailing market conditions, the farmers are using this factor inefficiently.

Too little use of the inputs by both the credit and noncredit farmers is a further reflection of the inadequacy of the lending criteria in ensuring efficient resource use by farmers. For

the credit farmers, the fact that it does not consider the cost of producing the product being financed means that the optimal use of the required inputs can not be guaranteed. For the noncredit farmers, the lending criteria excludes many small farmers from credit hence the inability to use the necessary input levels. Farmers lacking alternative sources of finance are therefore forced to use inadequate quantities of the recommended inputs. The credit lending policies therefore do not ensure efficient use of resources by the farmers. Hence inadequate funds for credit farmers and lack of funds for the noncredit farmers is one important possible explanation for the observed low level of factor use by the farmers in the district. The other possible explanation lies in the marketing arrangements for the commodities characterised by delayed payments and low prices, giving farmers little incentive to invest more resources in the production of these commodities.

5. Conclusions and Recommendations

The findings of this study clearly show the need for farmers to increase their use of modern farm inputs, if the objective of increasing farmers' productivity has to be achieved. Based on the Cobb-Douglas production function estimates, farm materials and management index had the highest production elasticities for both credit and noncredit farmers. A unit increase in the use of these factors would lead to the highest percentage increase in the output of the sampled farms. Ranking the factors according to their relative contribution to output shows that capital have the highest contribution to output for credit farmers, while farm materials has the highest contribution to output among the noncredit farmers. From the measure of returns to scale obtained, both groups of farmers experienced decreasing returns to scale for the factors of production employed. This implies that a one percentage increase in the use of all the factors of production would lead to a less than one percent increase in the value of output. But although this is the rational level of production, farmers are not allocatively efficient yet as is shown by the efficiency measures. Better management information and utilisation of resources are also important and should be emphasised if the benefits from increased expenditure on these inputs are to be realised.

While credit may offer small-scale farmers the opportunity to invest in modern inputs, there is no guarantee that they will be used in such a manner as to realise the full extent of output gains possible (Taylor, Dromund, and Gomes, 1986). With reference to this situation, in order to maximise the benefits from credit provision, farmers should receive the amounts of funds which ensure that they use the adequate levels of inputs. For the farmers already receiving credit, emphasis should be laid on enabling them to use the

amount of capital, in addition to fertilizers, improved seeds and pesticides in quantities which ensure maximum profits from their farming activities. For the noncredit farmers, increasing the use of fertilizers, improved seeds, and pesticides, in addition to the ability to hire more labour should be given priority. It is therefore important to incorporate the cost of these inputs in the credit disbursement criteria if credit is to facilitate increased efficiency in resource use. This implies the need for increased financial resources to farmers in the form of credit to purchase the recommended inputs in adequate amounts, accompanied by better management information to the farmers.

It has been observed that the lending strategies employed by the institutions in the district mainly result in inadequate funds being disbursed to farmers. On the average, the amount of credit provided for the different activities considered was found to be less than the amount needed to successfully carry out the project or enterprise financed.³ The other shortcoming is that the provision of extension services is not adequate so as to ensure proper implementation of the project. This may be responsible for the low usage of the recommended inputs among the farmers, resulting in the inefficient farm organisations observed. Providing subsidised credit without considering farmers' ability to use it profitably is not the solution to increasing farm production. Efficiency measures further show that both groups of farmers displayed allocative inefficiency in their operations, reflecting the inadequacies in the lending strategies and the incentive structure. Therefore the farmers surveyed, both credit and noncredit farmers, do not meet the requirement for economic efficiency. From these results, the need for farmers to increase the use of modern farm inputs is obvious. However the current credit lending conditions do not ensure that farmers who lack the necessary resources get them in sufficient amounts. Neither does the existing incentive structure encourage efficient use of the available resources by the farmers.

An important implication for credit policy here is that credit as a means of increasing resource use by farmers is still necessary. However the policy environment surrounding its provision is critical to achieving this goal. Using credit to increase agricultural production in the district therefore requires a change in the lending policies currently being used to ensure farmers' access to adequate credit for their production activities. This is necessary if the ultimate goal of credit, which is increasing the farmers' net income is to be achieved. In addition, an improved credit evaluation and supervision is also necessary to ensure

3. For example in the case of SCC, where the amount of funds given per acre is Kshs. 2,700 in comparison to the cost of producing one acre of the financed crop which is Kshs. 6,630 per acre for maize and Kshs. 4,639 for wheat, (Ministry of Agriculture, 1992).

profitable use of credit by farmers.

The allocative inefficiency displayed by these farmers reflect their inability to adjust the level of their input uses to the prevailing market conditions. Hence in addition to providing credit, the use of such funds to facilitate efficient resource allocation is also an important consideration in any credit programme. Increased provision of credit should therefore be accompanied by an improved incentive structure.

In order to facilitate the profitable use of resources by farmers through credit programmes, the following measures will have to be considered:

1. Strengthening the provision of extension services together with credit in order to facilitate the efficient and beneficial use of credit facilities by farmers. This will require more emphasis on training programmes to increase the competence of the AFC and Cooperative officials in loan supervision and evaluation, in addition to the extension services provided by the Ministry of Agriculture.

There is also need for increased educational effort for potential loanees not only on technical information on farming practices, but also on loan implications, marketing opportunities, and the various aspects of credit use which affect their benefits from credit.

The government should combine training of borrowers with proper loan evaluation and supervision to facilitate efficient utilisation of available resources through credit funds. The extension system should emphasise a sound loan appraisal system to determine the economic viability of the intended loan purposes and the farmers' ability to implement it. There should also be a continuous loan supervision while at the same time encouraging the participation of farmers in decisions regarding credit use.

2. Establishing realistic produce marketing arrangements especially where marketing is used as a channel for credit repayment. This is necessary in order to reduce the high costs incurred by the farmers in marketing their produce through the appointed agents. This will also reduce the probability of loan default as a result of farmers' failure to deliver their produce through the appointed dealers.

Under the current process of liberalisation of produce marketing, loan recovery through produce marketing may no longer be the most effective way to ensure loan repayment. Therefore it is strongly suggested that farmers should not be restricted to market their produce through the appointed channel alone.

3. The lending terms and conditions which specify the loan disbursement criteria, credit

purpose, and repayment terms should be tailored to the farmers' production needs and potentials in light of the existing economic incentives. The criteria for determining the amount of credit disbursed for any enterprise should be adjusted, with the cost of the financed activity being an important determinant of the amount of funds disbursed. Specifically, credit meant for crop production should be adequate to cover the production costs incurred by the farmer if he is to use the level of inputs which ensure maximum profits. The repayment terms should also be improved so that they are properly aligned with the cash flow generated by the financed activity.

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Abstract

Agricultural credit programmes have been used increasingly as an important means for promoting the development of the agricultural sector in many developing countries, based on the justification that lack of adequate financial resources denies farmers the opportunity to increase their productivity to their potential level. In Kenya, the provision of agricultural credit to farmers is considered an important instrument for increasing agricultural production and farm incomes, particularly among the small-scale farmers, who are constrained by lack of adequate financial resources from using improved inputs necessary to increase farm productivity. Using cross sectional data from Nakuru district in Kenya, the article analyses the role of agricultural credit in increasing efficiency in the use of production resources by small-scale farmers. The Cobb-Douglas production function is used to estimate the production organisation of the farmers, and their efficiency in resource use. The results show that the farmers display inefficient use of available resources. This means that the provision of credit meant to increase farm productivity should also be accompanied by measures to ensure that farmers use adequate input levels in order to maximise their efficiency. For farmers to increase their benefits from credit programmes, the article recommends strengthening the provision of extension services with credit, in addition to adjusting the lending criteria, to be based on the production cost of the financed enterprise and the farmers' management potential to undertake its production so as to ensure efficient resource utilisation.