

SMALLHOLDER CREDIT REPAYMENT IN KENYA  
A CASE STUDY OF LUGARI DIVISION IN KAKAMEGA DISTRICT

BY  
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Research Paper Submitted to the Department of Economics, University of Nairobi,  
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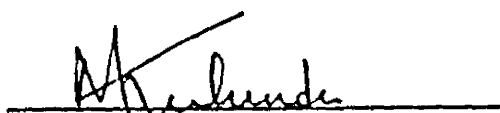
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## ABSTRACT

Less than a fifth of Kenya's total land is productive agriculturally. Shortages of additional productive agricultural land implies that productivity and employment on small scale farms which are the bulk of Kenya's arable land can be increased through land use intensification. Land use intensification involves use of improved inputs such as fertilizer and seeds besides improved tillage and husbandry practises. These inputs are not available on the farm and some farmers are not able to purchase them due to their meagre income. Provision of agricultural credit is one of the major strategies being used to speed up agricultural development in Kenya's small scale farms sector. One of the setbacks of smallholder credit programs has been poor loan repayment.

The major concern of this study was to find the relative importance of the factors affecting loan repayment performance by smallholder farmers with a major aim of proposing measures that can help in improving the smallholder credit repayment performance. Primary cross-section data collected from a rural area in Kenya was analyzed by ordinary least square (OLS) regression methods.

The main findings of the study are that loan diversion, use of purchased farm inputs, farm income (ratio of farm income to loan advanced to farmers), sources of income from farming activities and farmers attitude towards loan repayment have statistically significant influence on loan repayment. The study further found that late loan issue and inadequate supervision and technical advice on improved farming methods have statistically significant influence on loan diversion.

Loan repayment performance by smallholder farmers can be improved through use of agricultural credit on the intended purpose, attaining a high ratio of farm income to loans advanced to farmers, increased use of purchased farm inputs, concentration by farmers on a few farming activities which contribute highly towards

income, changing the attitude of farmers towards loan repayment so that they have the feeling and opinion that loan should be repaid and by providing a ready market for farm produce. In addition to the above stated measures, timely issue of loan funds and adequate technical advice and loan supervision can help reduce the proportion of loan funds diverted to other uses.

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## CHAPTER ONE

## INTRODUCTION

## 1.1 Background

In Kenya, as in most developing countries, the agricultural sector contributes the largest share of Gross Domestic Product (GDP). The sixth Development Plan indicates that, in 1988 agriculture contributed 29.9% of the total GDP. The sector also provides livelihood to the population, raw materials to agro-based industries, and earns about 60% of foreign exchange to the country through agricultural exports. It also employs most of the rural population i.e about 75% of the total national labour force.<sup>1</sup>

Despite the importance of agriculture in the economy, scarcity of productive land coupled with a high population growth rate is a major problem. Of Kenya's 575,000 sq km of land, less than a fifth is productive agriculturally. With the present population estimate of 22 million people the per capita productive land is very small (about 0.45 hectares). Population density in some districts is very high. For example, Kakamega, one of the most densely populated districts in Kenya had a population density of 295 persons per sq km in 1979. The district's population density was projected to be 415 in 1988. This implies that the district's per capita agricultural land was expected to be less than 0.241 hectares in 1988.

If agriculture has to continue playing a leading role in the economy, productivity must be increased. Development of smallholder agriculture, the dominant agricultural sub-sector, is identified by the government as a priority area that can contribute a lot in increasing agricultural output, employment and per capita income.

<sup>1</sup>The fifth development plan reports that 85% of the population live and work in the rural areas and that a bout 75% of the labour force are engaged in pastoralism and farming.

This is clearly indicated in development plans 1979/83 and 1984/88 where one of the government's objectives is the improvement of farm productivity in the small scale farm sector.<sup>2</sup> According to the 1978 estimates there were about 1.7 million smallholder farmers in Kenya (see the plan for agriculture and livestock development 1984/88). With the high increase in population, the present estimate of smallholder farmers must be more than 1.7 million. In terms of gross marketed output small farms are becoming increasingly important, because in 1985 their share of marketed output was 54% (Economic Survey, 1987). They also account for more than 60% of the non-market production. The rest of agricultural output comes from some 3,200 large farms, plantations and ranches.

Due to the shortage of additional productive agricultural land, farm productivity and employment, especially on small farms, can be increased through land use intensification and development of the marginal lands. Land use intensification involves the use of some improved inputs such as fertilizer, seed, herbicides etc besides improved tillage and husbandry practices. These inputs are not available on the farm and hence need to be purchased. Some farmers can finance such purchases from their own resources but most farmers require financial assistance in the form of agricultural credit. Agricultural credit is given in kind, in cash or in a combination of both. In kind credit is given in material form, e.g in the form of fertilizers, improved seed varieties and pesticides among other things.

There are three types of agricultural credit; short term credit, medium term credit and long term credit. These three types are based on the length of time for

<sup>2</sup>There is no generally accepted definition of small scale farms in Kenya as the definition vary with the author and the purpose for which the definition is sought. In this study, we adopt the definition used in the Integrated Rural Survey 1976-79. The survey defines small scale farms or smallholdings as any farms with less than 20 acres (8 hectares). This definition suits this study since most of the farmers in the study area have farm holdings not exceeding 20 acres.

which the loan is extended. Generally, short term credit takes less than two years, medium term credit takes between two and ten years and long term credit takes more than ten years. In most cases short term credit is required by smallholder farmers for crop planting and to meet recurrent cost of livestock production and other unavoidable expenditures. Medium term loans are required for purchase of farm machinery and equipment, purchase of livestock, planting and raising of permanent crops and for making small permanent improvement on the farm. Long term loans are used for the purchase of land or for making costly permanent farm improvements.

Agricultural credit to small farmers come from different sources. In the 1970's most credit to smallholder farmers were issued through credit institutions, mainly Agricultural Finance Corporation (AFC) and Cooperative Bank of Kenya (CBK). At present, agricultural credit in Kenya is made through commercial banks, parastatal bodies (eg AFC) and credit schemes sponsored by aid agencies and by the government through the ministry of cooperative development and/or agriculture. Informal credit involving loans from relatives and friends, money lenders and rotating credit associations is also of major importance. In this category, the borrowing from and lending by relatives and friends is common. This kind of borrowing/lending does not impose formalities required by formal institutions. The borrower talks directly to the lender instead of following the usual procedure of obtaining loans. Interest rate may not be charged on the borrowed funds. Money lenders fall under commercial lenders. They charge very high interest rates. For rotating credit associations, a lump sum fund composed of fixed contribution from each member is distributed at a fixed interval to each member. Despite the importance of the informal credit, its national value cannot be easily quantified.

Commercial bank's credit to smallholder farmers, however, is very small. For example, in 1987, of the total commercial banks credit to agriculture, smallholder

farmers received 18.9%, large scale farms 37.9%, cooperative societies 24.2% and marketing boards 19% (Central Bank of Kenya, 1988). Given that Central Bank defines small farms as farms with less than 50 hectares of land and the fact that most of the banks prefer lending to customers with regular non-farm income, then the loans to smallholder farmers didn't go to typical small farmers but employees who have farms as a second source of income. Hence, most smallholder credit comes from public credit institutions, mainly AFC and CBK. Robert (1980) reports that over 70% of all borrowers from AFC are small scale farmers by the corporation's own definition. CBK loans to farmers is given through cooperative societies.

Both the government and Aid agencies in Kenya have a strong support for smallholder credit programs (see the 1974/78 Development Plan). This support is based on the assumption that most smallholder farmers cannot improve their farming due to lack of adequate funds to purchase the necessary farm inputs. It is, therefore, generally acknowledged that credit to smallholder farmers is most important for improving farm productivity. It is also felt that credit can enable smallholder farmers who in most cases have limited financial resources to undertake farm development that they would otherwise be unable to undertake. The development of small farms and improvement of productivity on the farm if accomplished would go a long way in raising the living standards of Kenya's predominantly rural population.

Smallholder credit, however, has had little success despite the support from government and aid agencies. One of the setbacks of smallholder credit programs has been poor loan repayment record noted right from the 1960's when the programs expanded. Heyer (1973), for instance, indicates that 70% of the total number of smallholder loans in 1966 were overdue (i.e 42% of the total amount of smallholder loans). Of this, 47% (22% of the total amount of loans to smallholder farmers) had been overdue for more than one year. The smallholder farmers were more frequent

in arrears than other borrowers. According to development plan 1970-74 smallholder farmers were still 50% in arrears which suggested little improvement in the earlier record.

Tables 1.0 and 1.1 below, show the repayment position of loans issued by AFC and CBK - the two major credit institutions which issue loans to smallholder farmers throughout the country. Table 1.0 shows that annual arrears on AFC loans to smallholder farmers as a percentage of the total amount of loan disbursed to smallholder farmers in the period 1980-86 ranged between 23% and 44%. As evidenced in the table, the arrears have been increasing over the years in absolute terms. For example, in 1980 arrears was about K£2.8 millions but increased to K£6.2 millions in 1986 which is a very large increase. The rate at which the arrears accumulate each year also appears to be increasing. Table 1.1 shows the arrears on seasonal credit scheme for AFC and CBK. Seasonal credit scheme is one of the credit schemes designed to reach most smallholder farmers especially those producing maize. The table shows that for AFC loans, arrears on seasonal credit ranged between 25% and 65% in the period 1980-85 while for CBK, arrears ranged between 68% and 89% in the period 1980-82. It is estimated that at least 25% of the arrears on loans issued by both institutions are uncollectible and eventually end up being written off.

TABLE 1.0: AFC Amount of Loan Disbursed to Smallholder Farmers, Arrears and Arrears as a Percentage of Amount Disbursed from 1980 to 1986 (K£ millions)

Year	Amount Disbursed	Arrears	Arrear as a percentage of amount disbursed
1980	8.65	2.00	23
1981	10.24	4.52	44
1982	10.24	3.60	35
1983	10.21	4.03	39
1984	12.74	4.05	32
1985	13.40	4.89	36
1986	18.14	6.22	34

Source: AFC Annual Report and Accounts 1980-86

TABLE 1.1: AFC and Cooperative Bank of Kenya (CBK) Seasonal Credit Scheme; Amount Disbursed, Arrears and Arrears as a Percentage of Amount Disbursed from 1980 to 1985 (Kshs. Millions)

Year	Amount Disbursed		Arrears		Arrears as a % of Amount Disbursed	
	AFC	CBK	AFC	CBK	AFC	CBK
1980	199.6	20.7	049.3	14.1	25	68
1981	379.4	32.9	153.5	29.2	40	89
1982	228.1	06.9	068.5	05.1	30	77
1983	185.7	-	067.3	-	36	-
1984	196.6	-	128.3	-	65	-
1985	397.7	-	145.1	-	36	-

Source: AFC internal Documents  
CBK internal Documents

## 1.2 Statement of the problem

Although agricultural credit to smallholder farmers is considered by the government as the most important way to help them undertake farm development and purchase farm inputs, loan repayment has been very poor (see tables 1.0 and 1.1). The credit provided to smallholder farmers has to be repaid to sustain credit facilities in the long run, to cover administrative costs and to pay the interest on

loans. Hence, loan repayment is necessary if smooth running and efficiency of most credit programs and provision of funds for future lending is to be realised. Any credit scheme has therefore to ensure that the percentage of unrecovered loan funds is low.

Failure by farmers to repay their loan on time or to repay them at all is a serious problem facing both agricultural credit institutions and smallholder farmers. Recovery of overdue loans is expensive for a lender. It may involve legal expenses, transport costs for visits to defaulters farms etc. This implies that the administrative cost of overdue loans increases the overall cost of lending without increasing the revenue by the same amount. Arrears also diminish the lenders ability to generate resources internally and limits a credit institution's access to external sources of funds. Unrecovered loans cannot be recycled by lenders to new borrowers, hence, smallholder farmers who might otherwise have had access to credit are denied access because of poor loan repayment. Furthermore, attempts to recover overdue loans consumes the time of senior management of credit institutions and saps their energy required for long term planning. Thus poor loan repayment may result in the collapse of smallholder credit programs. Sessional paper no 1 of 1986 notes that most credit schemes have been hampered by late loan repayment and widespread default.

Several measures including sanctions and legal action against bad payers have been used in the past to improve the recovery of smallholder loans. These measures, however, are ineffective or may be inappropriate due to a number of reasons. For example, denying bad payers further access to credit may encourage farmers not interested in getting another credit to default. Again, fore-closure, i.e. seizing the borrower's movable property and land is not popular politically and few institutions may be willing to carry it out. Legal action against defaulters may be



very expensive; the legal expenses for recovering loans from smallholder farmers may exceed the amount of loan to be recovered.

Taking into account that good loan repayment is essential for sustaining credit programs in the long run and for financial viability of the credit institutions, a sound solution(s) to poor loan repayment is necessary. To this end, knowledge about the factors that lead to late loan repayment and default can be an important solution to these problems. As of now, information on these factors in Kenya is still fragmentary because it does not indicate the relative importance of the factors and is limited in statistical analysis. This study attempts to fill this information gap on smallholder credit repayment through a comprehensive case study of the issue in Lugari division of Kakamega district.

### 1.3 Objectives of the study

The objectives of this study are:

- 1) To quantify the various factors postulated to have influence on loan repayment performance by smallholder farmers in Lugari Division of Kakamega District.
- 2) To specify and quantify the relationship between loan repayment performance and several factors postulated to influence loan repayment by smallholder farmers.
- 3) To determine the relative importance of these factors.
- 4) On the basis of number 2&3 above make policy recommendation on how to improve loan repayment record by smallholder farmers in the study area and other similar ones.

#### 1.4 Significance of the Study

As it has already been indicated above, credit to smallholder farmers is considered as the most important factor for improving farm productivity. It is also important because it enables smallholder farmers to undertake farm development which they would otherwise be unable to undertake due to lack of funds. However, poor loan repayment retards the success of most smallholder credit programmes. This study will provide vital information that will enable effective measures to be undertaken to improve loan repayment rate and hence attain success of smallholder credit programs. Success of smallholder credit programs may have far reaching benefits to the entire economy e.g. increasing small farm productivity through use of purchased inputs such as fertilizers, high yielding seed varieties and increasing farm employment through intensive use of land. Increased small farm productivity will increase farm output, income and hence the standard of living of people in the rural areas.

Furthermore poor loan repayment by smallholder farmers poses a big problem to money lenders mainly credit institutions because they incur high costs of trying to recover the loans yet there has been little attempt to estimate and analyze the relative importance of the factors that have been put forward as affecting smallholder loan repayment. Money lenders and policy makers therefore have little information as to where and how to channel efforts in order to minimize poor loan repayment. This study will help bridge the information gap by determining the relative importance of the factors.

The empirical analysis to be carried out in this study will provide the rationale for better credit administration with possible pay off in improved loan repayment.

## CHAPTER TWO

## LITERATURE REVIEW

## 2.1 Previous Studies

A number of studies relating to loan repayment by smallholder farmers have been carried out in Kenya and other developing countries. The studies give different views about loan repayment performance but they have some observations in common.

Vasthoff (1968) analyses the loan repayment performance of farmers under AFC loan scheme in Kenya. His analysis focuses on smallholder farmers with loans issued between July 1961 and June 1964. He observes that repayment situation for loan funds as for 1966 is very discouraging. Of the 108 sample farmers, 70 of them were in arrears. He points out that a considerable amount of loan is spent on items other than those intended but misappropriation of the total amount is rare. He indicates that use of loan funds on non-intended items is particularly present when the amount of loan is disproportionately high in relation to the cost of the intended investment. He does not however indicate whether poor loan repayment is as a result of use of loan funds on non-intended items.

Mosher (1966), Miller (1975) and Wainaina (1977) attribute poor loan repayment to loan diversion. Mosher in his book *"Getting Agriculture Moving: Essentials for Development and Modernization"* indicates that sometimes farmers go into debt when they borrow agricultural credit but use it to finance consumption. These makes repayment impossible as credit consumed is degenerative of capital and hence default.

Miller carried out a study on use of group loan by small maize and rice farmers in Western and Kwara states of Nigeria. His investigation reveals that loan delinquency results from loan diversion. He identifies the failure to provide credit on time as a major factor leading to loan diversion. He points out that non-farm use

of credit intended for farm purpose accounts for over a half of the funds borrowed in 1973. Boakye (1979) seems to support Miller's view. He points out that in many cases credit institutions fail to approve loans in time and in other cases loan funds are disbursed too soon. The result is that the funds, whether in cash or in kind, are diverted to other purposes. Okorie (1986) also observes that the extent to which loan funds are diverted to other uses depend primarily on timeliness of loan disbursement.

Wainaina considered the problem of loan repayment among other aspects of smallholder farmers credit in Githunguri division of Kiambu district. He notes that although the exact figures are not available as to the actual amount of loan funds diverted, it's apparent that the practice is widespread. He suggests that peasant education on sound agricultural practices will help reduce the problem.

Similar views are expressed by Von Pischke (1976) who notes that the purpose for which credit is given is not necessarily the one on which the loan funds are spent. He points out that some borrowers who talk of farm development to their bank managers use their loan proceeds for investment in taxis, shops, school fees and colossal binges. He adds that even when loan proceeds for investment is given in kind loan diversion is not infrequent. In an earlier study, Von Pischke (1974) points out that borrowers may convert part of their loan proceeds to cover transport cost and other outlays not covered by the loan but which are essential for the establishment of the enterprises. The study by Msambichaka and Mabele (1976) seem to be in agreement with that of Von Pischke (1976). They compare the situation in Tanzania with that of Indian small cooperative farmers, where credit is used for marriage, hospital expenses, school expenses, payment of seasonal workers, lending to relatives, entertainment and other expenses.

Cabrera (1976) states that there are several credit recovery problems in

Phillipines as credit obtained is used for non-agricultural ventures. He points out that misallocation is a result of conservativeness of the lending institutions.

Two major observations are clear from the preceding literature. One is that there seem to be a consensus that loan diversion has some bearing on poor loan repayment. The second is that there are certain factors which compel smallholder farmers to divert the loan funds from their intended purpose. The factors seemingly vary greatly.

While it may be true that loan diversion causes default, existing literature does not provide a valid empirical evidence. Von Pischke (1974) seems to be the only one who has based his argument on empirical data. Using a sample of twelve borrowers from Murang'a, Von Pischke obtains a correlation coefficient of 0.71 between loan diversion index and arrears index indicating that diversion and default may tend to go together. However, no valid conclusion can be drawn from this coefficient given that a sample size of 12 borrowers is small. Thus it's likely that the sampling error involved is large. For a valid conclusion we need to use a large sample size which is in line with the statistical law of large numbers. There is need, therefore, to investigate the relationship further using a large sample size and possibly establish a causal relationship and the relative significance of loan diversion as a factor affecting loan repayment. This study also aims at going further to determine the causes of loan diversion and their relative significance.

Harmsworth (1974) has studied the problems of loan repayment on million acre settlement schemes in Kenya. She explains loan repayment performance using the following variables, nature of crops, economic status, social obligation, knowledge and skills, attitudes and motivation and communication. She points out that all the variables have some bearing on loan repayment but with varying importance. She indicates that economic status is the most important factor affecting loan repayment.

She attributes poor loan repayment to insufficient farm income. In a later study on the same schemes, Harmsworth (1979) indicates that there is a clear correlation between schemes which may be assumed to have high income and better repayment and conversely between the apparent lower income schemes and low rates of repayment. Her analysis of individual records from two representative schemes tend to reinforce the argument in that all those individuals with better repayment record were in higher income groups. She, however, notes that other farmers had sufficient income but were unwilling to repay while in some cases farmers with low income had better repayment record.

She states that the size of income per se is not the only factor of importance in economic status that affect loan repayment but also the relationship between income and expenditure. She points out that social obligation determines to a greater extent the way in which income is used. She notes that the most important feature of social obligation on settlement schemes is young large families. Hence, the major obligation of all farmers is the maintenance and care of the family and educating the children. Social obligation of the type outlined above determines to a greater extent how money is used and thus what proportion of income may be set aside for loan repayment.

It is worthwhile to note the following concerning the study by Harmsworth (1974,1979). She stresses economic status as the most important variable influencing loan repayment but does not state how important it is, when compared to other variables studied. The other variables she considered were found to have some bearing on loan repayment performance but her study gives no information on the extent of their importance. She talks of income as a factor affecting loan repayment but does not specify which concept of income she is referring to. Furthermore, we cannot overlook the fact that the settlement schemes loans were issued to all farmers

who were settled on former European farming areas to enable them to pay for the land they had been settled on. Repayment criteria was not the uppermost point on which the credit was given.

The study by Weisal (1973) on the Vihiga maize credit scheme supports that conducted by Harmsworth (1979). Weisal points out that the most immediate problem facing the maize loan scheme is the increasing default rate. He notes that all those who had not repaid their loans had low income compared to those who had repaid all the loans and that they had few sources from which to draw in meeting their highest priority expenditure. He states that the primary reason given by those who had not repaid their loans is that they spent their income on school fees, medical expenses and basic household expenditures. He indicates that the financial difference between those who had repaid all the loan (RA'S) and those who had repaid none (RN'S) is reflected primarily in the higher percentage of non-farm employment among RA'S (50% of the RA'S had non-farm employment compared to 26% of RN'S). Weisal also notes that the profitability of the crops financed by loan is too low to generate a sufficient cash surplus to allow loan repayment. Thus Weisal's study seem to suggest that farmers with off-farm income have good repayment record compared to farmers without off-farm income.

The study by Weisal reveals several factors influencing loan repayment performance, but does not provide information on their relative importance. By focusing his study on comparison between those who had repaid all the loan and those who had repaid none, it ignores considering farmers who had repaid part of their loan. He does not also indicate which concept of income he is referring to.

Von Pischke (1977) analyses the relationship between repayment performance of AFC loans in settlement areas of Rift Valley province and several other variables - for example farm family size, off-farm income, farm income, age, school fees paid

annually, networth among other things. He indicates that age, off-farm income and school fees paid annually have no correlation with loan repayment.

This seem to contradict Weisal's observation (1973) that a high percentage of those who had repaid all the loan had non-farm employment compared to those who had repaid none. The findings by Von Pischke also contradicts the suggestion by Harmsworth (1979) that social obligation in terms of school fees payment might have negative effects on loan repayment. With respect to size of farm family, Von Pischke observes that those families with more than seven persons are slightly worse payers than those with below seven. Von Pischke's analysis also indicates that there is a small but significant positive relationship between the reported networth and repayment performance.

However, by analyzing the relationship between loan repayment performance and variables like total cash crop acreage and total cultivated acreage, Von Pischke implicitly assumes that the higher the acreage under cultivation and cash crops the better the loan repayment performance. This depends on several factors such as crop performance, use of loan fund, revenue from the farm sales etc which he ignores in his analysis.

The study by Gachanja (1979) presents a contradictory view to those by Harmsworth (1979) and Von Pischke (1977). Gachanja while writing on factors affecting loan repayment among Integrated Agricultural Development Project (IADP) small scale farmers in Machakos and Kakamega districts regressed loan repayment rate on family size, farmer's education, yield (in kilograms per acre) value of purchased inputs, crop area (in hectares) etc. She divided smallholder farmers into two categories. Those who had little farm assets and those with more. Her study concludes that there is no significant difference in loan repayment between the two groups of farmers. This tends to indicate that there is no difference in loan



repayment between farmers with high farm income and those with low farm income.

Gachanja also disagrees with the fact that large family size has a negative effect on loan repayment. She agrees that where children are dependants they may have negative effects on loan repayment but cites the role of children in farm production. She points out that children provide farm labour facilitating higher production and consequently good loan repayment. Gachanja indicates that farmers education and size of land under maize are positively related to repayment but are not significant. A contradictory view to that of Gachanja is revealed in an article by Kosgei (1989). From a sample taken from AFC's borrowers accounts on default, Kosgei observes that borrowers with high literacy level have high default rate.

Gachanja's study has several limitations. She uses data from IADP records for Kakamega and Machakos districts which might differ substantially from those obtained from farmers themselves. Her study ignores diversion of loan funds as a factor influencing loan repayment.

Other literature on loan repayment attributes poor loan repayment to crop failure. Ross (1951) explains default from the perspective of crop failure. His views are that agricultural production is prone to natural hazards such as pests, floods, draughts and hailstones. Such hazards inhibit realization of the projected output. There is divergence between estimated and actual output leading to default. Gachanja (1979) seem to support this view. She indicates that in Kakamega the actual farm yield of maize which was 2354 kg/ha was less than the expected maize yield which was 4,050 kg/ha. She attributes poor loan repayment to this divergence between actual and expected yield.

Gunatilleke (1973) carried out a defaulters survey in Colombo. On the basis of reasons given by farmers he identifies the major causes of default as crop failure and low income. Crop failure accounted for 30% of the total defaulters and income

and that low income stems from low productivity. However, further investigation revealed that only 10% of those who mentioned crop failure as their main reason for not repaying loan had actually used their loan on crop production. This percentage is too small for one to conclude existence of any meaningful relationship between the two variables. Harmsworth (1974) seem to support the above view. She indicates that crop failure only occupies a subordinate position in explaining default. These studies, however, do not indicate the relative significance of crop failure in explaining loan repayment. Furthermore the studies reveal contradictory views about the effect of crop failure on loan repayment. Some attribute default to crop failure while others suggest that crop failure has minor effects on default. The effect of crop performance on loan repayment will be subject to further investigations in this study. Gunatilleke limits his analyses on reasons given by farmers which may be faulty.

In connection with farm income and productivity there is the question of technology. Boakye (1979) while reviewing problems of loan repayment in low income countries concludes that though evidence is inconclusive there appear to be a direct relationship between loan repayment and the available new technology. He indicates a few projects which successfully provided profitable technology to farmers. Donald (1976) summarizes the conditions for success in small farmer credit programmes as being new technology or new crop available with adequate marketing potential.

Harmsworth (1974) notes that technology has some bearing on loan repayment. She points out that the farmers she interviewed used improved farm technology which includes improved seed varieties and application of fertilizer but most of the inputs were thinly applied that productivity could hardly be improved by their use. She indicates that a bag of maize seed (10 kg) is used to cover one and a half acres while the recommended rate is 10 kgs per acre. Similarly fertilizer was stretched

beyond its usefulness. Von Pischke (1977) notes that if productivity is improved by the use of new technology, farm income will also increase if other issues like price remain favourable. This implies that loan repayment rate will increase.

Gachanja (1979) indicates in her study that the use of purchased inputs is negatively related to repayment and is significant. The main purchased inputs she refers to are fertilizer and improved seeds. These seem to indicate that adoption of improved technology which included use of fertilizer and improved seeds has got negative effect on loan repayment. She, however, concludes that farmers who use large quantities of purchased inputs are not always good loan repayers.

Harmsworth (1979) and Von Pischke (1974) indicate that loan administration can lead to default. Harmsworth notes that administrative inadequacies is a big element in poor loan repayment by low income smallholder farmers on the million acre scheme. She concludes that there is poor record and file keeping such that farmers are not aware of the loan overdue. Von Pischke notes that poor loan repayment is a function of poor supervision and follow up. Lele (1976) recognizes the need to facilitate loan repayment. She states that poor extension services as a factor in loan administration is deterministic in loan repayment.

Boakye (1979) points out that many credit institutions fail to stress loan repayment in their education programs or vigorously pursue loan collection. He further points out that some credit institutions expect farmers to make long trips to the lenders office to repay loans. He terms it a reasonable expectation perhaps where the borrower lives close to the lender's office but frequently a trip to the lenders office involves a long inconvenient journey on the part of the borrower.

The study by Weisal (1973) reveal the same problem. Weisal points out that a significant group of farmers expressed considerable sensitivity to transport cost of travelling to the Vihiga headquarters to obtain loan from stockist and to Kakamega

to repay it. The transport problem is compounded by the fact that several trips were often needed (due to misinformation concerning when loan is available and the ultimate supply of loan by stockist).

Donald (1976) states that usually loan administration is affected by the political structure. To him politicians usually make statements which to borrowers imply that loans should not be repaid. Harmsworth (1974) observes the same. She notes that in million acre schemes many farmers have not repaid credit due to political statements which imply that all farmers shall be issued with title deeds. Therefore, defaulters stand to benefit and see no reason to repay the loans. However, Vasthoff (1968) is of the opinion that political statements hardly explain poor loan repayment record of the farmers. He points out that every farmer he interviewed in the field knew of his obligation to repay the borrowed money.

## 2.2 Overview of the Literature

The reviewed studies reveal a wide range of factors affecting loan repayment by farmers. The factors revealed are related to use of loan proceeds, socio-economic conditions of the farmer, loan administration, use of purchased farm inputs and crop performance. However, most of the studies are descriptive and offer little or no statistical support for their conclusions. Descriptive analysis deals with methods of describing large masses of numbers and is not useful especially when conclusions are to be drawn from the numbers observed. For some studies, the issues of loan repayment was not the main thrust, rather it was a side issue. Consequently, it was not given a detailed analysis. The studies that based their conclusions on statistical data are few and some of them arrive at contradictory results and conclusions concerning the relationship between loan repayment with some of the variables. Some studies like that of Gachanja (1979) have several limitations, one of them is that she

uses data from IADP records for Kakamega and Machakos districts which might differ substantially from those obtained from farmers themselves. Furthermore, some of the studies such as that of Von Pischke (1974) used small sample size to estimate the relationship between some of the factors and loan repayment. Such a small sample size may involve a large sampling error which may lead to inaccurate results and conclusion. With the exception of the study by Gachanja (1979) the studies that attempted to investigate the relationship between the factors and loan repayment using statistical techniques exclusively used correlation coefficient technique. Correlation coefficient shows the degree and direction of association between variables. It does not show the causal relationship between the farmers loan repayment performance and the variables and therefore fail to indicate the relative importance of the factors in explaining loan repayment. It's one of the objectives of this study to determine the relative significance of the factors affecting the loan repayment. Gachanja's study (1979), however, relies on a single regression equation in which the dependent variable is related to a set of independent variables. Single equation model does not explain the interdependence that may exist between the explanatory variables themselves or how these explanatory variables are related to other variables. Our study in determining the relative importance of the factors that affect loan repayment performance, uses a model consisting of a number of equations in which the behaviour of the variables is jointly determined.

## CHAPTER THREE

## METHODOLOGY

This chapter presents the data source, sampling procedure, difficulties encountered in data collection and limitations of the sample and data. We also present; the model used and estimation procedure of the model, the definition, measurement and justification of the variables.

The data for this study was collected by administering a structured questionnaire to individual smallholder farmers in Lugari Division of Kakamega District. In addition, some information was gathered through general discussions with the farmers and agricultural officers and also through consultation with officers of lending institutions and agricultural officers. The questionnaire was constructed in a way that made it possible to gather data and other general information about the following aspects of the sample farmers in the year of loan issue.

- (i) Characteristics of the sample farmers and farms - for example age and general education of the farmers, size of the farms, acreage under cultivation and pasture etc.
- (ii) Loan given and loan repayment performance as per the time of field survey.
- (iii) The purpose for which loan is given and the actual use of loan.
- (iv) Farm and off-farm income.
- (v) Loan administration (mainly loan supervision and provision of extension services)
- (vi) Crop performance.
- (vii) Use of purchased farm inputs (mainly fertilizer, improved seeds, pesticides)
- (viii) Time of loan issue and sources of farm income.

### 3.1 Sample selection

The sample respondents were selected at random from smallholder farmers in Lugari Division who had borrowed from PFP Lugari Enterprise Development Project, Cooperative Societies and AFC between January 1987 and May 1989. Farmers in Lugari are always busy on their farms during the months of March and April, the period during which we carried out our field work. In this period most of the farmers are occupied on their farms either planting or weeding. This enabled us to interview most of the farmers that fall in our sample from their farms (or home).

A list of 858 smallholder loanees by the three lending institutions in the study area was obtained.<sup>1</sup> However, poor transport in the area of study, lack of resources and limited time for the field work made it impossible to interview all these farmers and hence sampling was essential. A simple random sampling procedure was employed. Each of the 858 farmers was given a number running from 1 - 858. Each number was written on a small white piece of paper of about equal size and shape using a blue ball point pen. The small pieces of paper were then folded and mixed up in a container from which we selected the farmers to be interviewed at random. In this way a sample of 60 farmers was selected. 60 is roughly 7% of the 858 farmers. The interview was carried out by the author with the help of two assistants. It involved moving from one farm to another, administering a structured questionnaire (see the appendix 2).

During the 1979 population census, there were a total of 10,678 households

<sup>1</sup>the list of 858 farmers includes: 395 from PFP Lugari Enterprising Development Project, 301 from AFC and 162 from Cooperative Societies. This figure could have been higher if we obtained full list of those farmers who borrowed from the three institutions. The list of those who borrowed from AFC was got from extension officers - they indicated that they had lost some of the lists. That of the cooperative societies was got from the Ministry of Cooperative Development Lugari Division Office. The officer in charge of the office indicated that the list was incomplete. The list from PFP Lugari was also incomplete. We got it through one of their agents who is a good friend after the manager refused to provide us with one.

in Lugari Division. At the time we conducted the survey, the figure was definitely well over 11,000 due to subdivision of land resulting from high population growth rate. If we assume that every household in the study area owns a piece of land and is headed by one person, the farmer, then the total number of farmers in Lugari can, with a fair degree of accuracy, be estimated at a conservative figure of 11,000. This being so, the number of farmers from which the study data was chosen represented about 7.8% of the total farmers in Lugari.

### 3.2 Problems Encountered in the Survey

As is often the case with studies which involve field work not all the respondents who fell into the sample were interviewed. Six of the interviews proved to be a failure thus reducing our sample size to 54 farmers. Two of the interviews failed because the respondents refused completely to talk to us. They suspected that my two assistants and I were Criminal Investigation Department (CID) officers in disguise. We could not also find two of the farmers to be interviewed and none of their family members (wife and children) could provide the information we wanted. One of the farmers provided only half the information we required and hence the interview failed. Again at the time of collecting data heavy rains often interrupted our field work and muddy conditions prevailed everyday. One of the already filled questionnaire dropped in water and could not be recovered.

### 3.3 Limitations of the Sample and Data Collected.

The sample excludes three groups of farmers in the study area:

(a) All farmers who did not borrow from the three institutions mentioned above at the specified period (i.e. January 1987 to May 1989). It is possible that some of these farmers who did not borrow from the three institutions at the specified period,



borrowed in periods before. These farmers could have provided important information for our study if given a chance. However, we considered the period before 1987 to be far back that farmers who borrowed in this period could not have remembered very well what they did with the loan funds and activities carried on the farm. Hence, they could not have provided fairly accurate information for our study. It is also possible that some of the farmers may have borrowed agricultural loan from other formal institutions and informal sources. However, a pilot survey conducted before carrying out our field work indicated that very few farmers knew of the existence of other major institutions lending agricultural credit in the study area apart from the three mentioned. It also showed that those who got loan from informal sources such as relatives, friends and women groups were unwilling to disclose the information because they felt such information was confidential to reveal to a third party. This indicated that the inclusion of this group could have not added much weight to the data we collected.

(b) All farmers who borrowed from the three institutions at the specified period but had large farms (normally referred to in the study area as special plots). It is possible that these people could provide useful information concerning loan repayment if they were given a chance. Since ideally the sample should be chosen with the objective of the study in mind, it is justifiable in the case of this study to leave out these farmers who could not provide data on smallholder farmers credit repayment.

(c) Smallholder farmers who borrowed from the three institutions at the specified period but whose names we had not received at the time of sampling. This group could have provided useful information and could have been included in our sample if we had received their names in time. Given that these farmers come from the same Administrative Division with those interviewed, it is likely that they share the same values and ecological conditions. In any case, we hope that they could not have

provided any information which is far different from the one we got.

The results of this study also need to be interpreted with caution because most of the borrowers (farmers) interviewed were illiterate and did not keep "proper" records. Computations based on their data are likely to have some inherent errors. Nevertheless, efforts were made to minimize the possible errors by cross-checking responses of borrowers.

Despite the exclusion of the three groups from the sample frame, the data collected from the sampled farmers is reliable. The interviewed farmers provided information on smallholder agricultural credit repayment - the information that was required for this study.

### 3.4 Area of Study

The study was carried out in Kakamega district specifically in Lugari division. Lugari is one of the ten administrative divisions in Kakamega district and has a total land area of about 536 sq. km. It lies in the lake Victoria basin which has temperatures ranging from a minimum of 14<sup>o</sup>c to a maximum of 32<sup>o</sup>c and rainfall ranging from 1,250mm to 2,000mm per annum (see appendix 1). Population density in this division was estimated to be 180 persons per sq. km in 1988 compared to 128 persons per sq. km in 1979 and population growth rate was estimated to be 7% in 1979 (Kakamega development plan 1984-88). The main crops grown in Lugari include maize, beans, sorghum, millet, etc. Cash crops include mainly sunflowers but efforts are being made to encourage farmers to grow coffee. Farmers in this area also keep livestock mainly native and cross-bred cattle. Very few farmers keep grade cattle due to the latter's low resistance to diseases. For example, in 1983 there was a total of 80,000 zebu cattle as compared to 25,000 grade cattle. On the whole, cattle population in Lugari reduced by 68.3% in the period 1983 to 1987 (Kakamega District

Development Plan 1988-93). Others include sheep and goats.

Agricultural credit in this Division is provided mainly by AFC, Cooperative Societies and PFP Lugari Enterprise Development Project.

The main reasons for selecting Lugari as the area of study are as follows:

- 1) Farmers in this division are exposed to a number of credit institutions such as AFC, cooperatives, PFP Lugari Enterprise Development Project and others. It is easy, therefore, to get farmers who have borrowed agricultural credit from these institutions. Institutions such as AFC and Cooperatives societies have been experiencing loan repayment problems.
- 2) Lugari is typical of many medium altitude areas where crop farming especially growing of maize is practised. Therefore, findings on the Lugari data can be generalized to other similar areas.
- 3) Land in Lugari is surveyed and farmers know their plot acreage well thus making it easy to locate farmers to be interviewed during the sample survey.
- 4) The researcher does not have any problem communicating with the farmers.

### 3.5 Analytic and Econometric Model

Arrears on loan given to farmers expressed as a percentage of total amount of loan given to the farmers is regressed on the factors identified to have influence on loan repayment performance. These factors include loan diversion (the percentage of loan funds spent on non-intended uses). But loan diversion is also influenced by other factors which we also consider in this study. This leads us to using a recursive type of model in this study.<sup>2</sup> A system of equations is recursive (rather

<sup>2</sup>For more information on recursive model see: Pindyck E.S. and Rubinfeld D.L. (1976), pp. 322 - 23; Johnstone J. (1984), pp. 467 - 67; Dhyrome P.J. (1974), pp. 308 - 311.

than simultaneous) if each of the endogenous variables can be determined sequentially (Hendryck and Rubinfeld 1981: 322). The hypothesized model is as shown below:

$$LA = F( LD, CP, FY, OY, FI, FE, SFY, FA, LM, U_1 ) \quad (i)$$

$$LD = F( FD, SA, TOLI, SFY, LM, FE, U_2 ) \quad (ii)$$

Where:

LA = Arrears on Loan given to Farmers as a Percentage of the Total Amount of Loan advanced to the Farmers.

LD = Loan Diversion (The Proportion of Loan Funds Diverted to non-intended purpose).

CP = Crop Performance.

FY = Farm Income (ratio of farm income to loan funds given to a farmer).

OY = Off-farm Income (in Kshs. per annum).

FI = Purchased Farm Inputs (in Kshs. per acre per annum).

FE = General Education Level of the Farmer (a dummy variable).

SFY = Sources of Income from farming activities (number of income sources on the farm).

FA = Farmer's Attitude towards Loan Repayment (a dummy variable).

LM = Loan Administration (a dummy variable).

FD = Farm Dependants (total number of dependants on the farmer).

SA = School Expenses (in Kshs. per annum).

TOLI = Time of Loan issue (a dummy variable).

$U_1$  = Error Term of Eq (i).

$U_2$  = Error Term of Eq (ii).

We assume that  $COV( U_1, U_2 ) = 0$ . This assumption might be adopted as a

reasonable approximation either because all the disturbance terms have small variances, or because the system of equations is more or less recursive Allard (1974). Equation one is crucial for our study. It enables us to determine the relationship between loan repayment performance and the factors identified to have influence on smallholder loan repayment.

### 3.6 Estimation Procedure

The appropriate estimation procedure for our recursive model is the Ordinary Least Squares (OLS). In a recursive model, the endogenous variables are determined sequentially. We follow this sequence in estimating our model. First we estimate  $LD_i$  in Eq. (ii) and use the result for  $LD_i$ , together with the other explanatory variables to estimate  $LA_i$  in Eq (i). OLS is appropriate for Eq (ii) since  $TOLI_i$ ,  $FE_i$ ,  $SA_i$ ,  $LM_i$ ,  $FD_i$  and  $SFY_i$  are exogenous and therefore not correlated with  $U_2$ . The endogenous variable  $LD_i$  and the exogenous variables  $FE_i$ ,  $FI_i$ ,  $FY_i$ ,  $OY_i$ ,  $FA_i$ ,  $SFY_i$ ,  $CP_i$ ,  $LM_i$  are not correlated with  $U_1$  (since the only error term affecting  $LD_i$  is  $U_2$  in Eq (ii)). Therefore, given the values of the independent variables in Eq (ii) we solve for  $LD_i$ . Then, knowing the value for  $LD_i$  from Eq. (ii), and  $FA_i$ ,  $FI_i$ ,  $FY_i$ ,  $OY_i$ ,  $SFY_i$ ,  $CP_i$ ,  $LM_i$ ,  $FE_i$  allow us to solve for  $LA_i$  in Eq (i).

Following the above sequence we specifically estimate the model above as shown below

$$LD_i = a_0 + a_1FD_i + a_2SA_i + a_3TOLI_i + a_4SFY_i + a_5LM_i + a_6FE_i + U_2 \quad (i)$$

$$LA_i = e_0 + e_1LD_i + e_2CP_i + e_3FY_i + e_4OY_i + e_5FI_i + e_6FF_i + e_7SFY_i + e_8FA_i + e_9LM_i + U_1 \quad (ii)$$

where:  $i$  is the  $i^{\text{th}}$  observation and runs from 1 to 54.

Qualitative information is also analyzed and used as a basis for recommendation.

### 3.6 Definition, Measurement and Justification of the Variables used.

#### Loan Diversion

Loan diversion is taken to refer to the use of agricultural loan proceeds by the borrowers in a manner other than intended according to the terms agreed upon by lenders and borrowers. We assume that agricultural credit is aimed at boosting no more than agricultural productivity. Therefore expenditure of agricultural credit on farm inputs such as improved seed variety and fertilizer, purchase of grade cattle, cultivation, etc constitutes expenditure of agricultural credit on intended purpose. If, however, loan is meant for purchase of fertilizer, for example, and the farmer uses it on purchase of cattle or for cultivation, it is treated as loan diversion. Expenditure of agricultural credit on food, school fees, medical expenses, repayment of loan from other sources, opening up business among other things, which do not contribute directly to agricultural productivity is taken here as expenditure on non-intended purpose and hence constitute loan diversion.

Smallholder farmers may be unable to repay their loan owing to use of the loan funds for purchase of food, school fees, medical expenses and ceremonies which are degenerative of income. The farmers may fail to repay their loan when they use the funds to start a business which has proved a failure in the past or if successful may not generate enough funds to repay loan in time. They may also reloan the funds at higher interest rate and be unable to recover the loan or give part of the loan to friends and hence fail to raise enough funds to repay the loan in time or repay at all. Loan diversion may be caused by late delivery of the loan funds and poor loan supervision. The proportion of loan funds used for purposes other than those intended will be taken as a measure of loan diversion.

### Crop Performance

One of the major objectives of smallholder agricultural credit is to help the farmers increase farm productivity. The output got is expected to be enough for the repayment of the loan and for the farmers' own use. Crop failure, therefore, may result into poor loan repayment. We talk of crop failure when the actual average yield per acre is less than the targeted yield per acre. Crop failure may be as a result of drought, floods, poor farming practises, diseases and pests. The average yield per acre of maize and beans which are the major crops grown in the study area is used to indicate whether the actual average yield per acre is less than, equal to or greater than the expected average yield per acre. We obtained from extension officers in the study area, information on the expected average number of kilograms of maize and beans per acre in a year since we had anticipated that farmers might over estimate the targeted yield to create an impression that their failure to repay is due to crop failure. On the basis of this information, we gave the following score: two for a farmer whose maize and beans yield per acre is less than their expected average yield per acre, one for a farmer whose either maize or beans yield is less than the expected average yield per acre and zero for a farmer whose both maize and beans yields are equal to or greater than their expected average crop yield per acre in the year of loan issue.

### Loan Administration.

Loan administration includes screening process of borrowers, provision of extension services, supervision, processing of loan forms, farm visit, etc. When a financial institution grants a loan one of the generally accepted obligation of the institution is supervision. Intuitively people tend to associate loan repayment with profitability of the business on which loan is spent. Therefore, it makes common and

economic sense that funds be utilized along the lines originally proposed. Similarly lending agencies are expected to provide technical advice especially to smallholder farmers, who by and large, tend to be less educated, risk averse and resistant to technological innovations than the large scale farmers. Such technical advice embrace information on new high-yielding seed varieties, new effective pesticides, inorganic and organic manure etc. Frequent farm visit for the purpose of supervision by loan agencies may strengthen the relationship between the lending agencies and farmers apart from ensuring that the loan is used for the intended purpose. In this case a farmer tries his best to repay the loan to maintain the good relationship. Sometimes both supervision and extension services is carried out by extension officers on behalf of the lending institutions. Farmers' visits to the lenders office for advice and to demonstration farms where farming methods are taught practically is taken to be equivalent to visits by the agents or extension officers. Inadequate extension and supervision result in loan diversion and low productivity and hence low farm income which may result in poor loan repayment. We contacted field officers of the lending institution and extension officers on the number of visits they consider adequate for each farmer in a year and on the basis of the information a dummy variable is used as follows:

1 if a farmer received inadequate advice and loan supervision.

0 if otherwise.

#### Farm Dependants

We define farm dependants as the number of children and relatives who stay with the farmer on permanent basis on the farm and are dependent on the farmer. The farmer has the obligation to maintain and take care of the entire family and relatives who depend on him for food, clothing, medical care, school fees among other



things. It is, therefore, expected that the higher the farm dependants, the greater the loan funds diverted to meet the obligations. It is also expected that the higher the farm dependants the higher the income that a farmer is likely to spent in meeting the obligation implying that little cash, if any, is left to meet repayment of the loan resulting in poor loan repayment.

#### **Total Farm Income**

Total farm income is the revenue a farmer receives from the sale of farm produce. It is a function of quantity produced and price of the product. Improving the net income of a farmer is the ultimate objective of making credit available to the farmers. Farmers who receive high farm income are expected to have a good loan repayment record. In this context, however, measuring farm income in absolute terms is misleading because it ignores the amount of loan to be repaid. Therefore, total farm income here is measured as a ratio of total farm income a farmer received in the year of loan issue to total loan funds issued to him in the same year.

#### **Education Level of the Farmer**

Several channels exist through which a farmer can be educated on farming methods, use and importance of repaying agricultural credit. This includes magazines which talk about farming, publications by the credit institutions and agricultural programmes on radio. Most of the magazines, articles and radio programmes are in Swahili and English. It is only farmers who know how to read and write in the two languages that can benefit from such education channels and therefore put the knowledge they get into practice on their farms. More educated farmers are expected to use the loan funds for the intended purpose and practise modern methods of

farming. They are, therefore, expected to harvest high farm yield and have good loan repayment record than the less educated farmers. In this study, a farmer who can read and write Swahili and English is considered as educated while a farmer who cannot read and write Swahili and English is considered as not educated. A dummy variable is used to capture the education level of the farmer as follows:

- 1 if the farmer is not educated
- 0 if otherwise.

#### Use of Purchased Farm Inputs

Purchased farm inputs are defined here to include fertilizer, improved seed varieties and chemicals such as pesticides. Use of this inputs is an indication that farmers adopt new or improved technology. Use of purchased inputs is aimed at increasing farm productivity and hence farm output. Assuming that other factors like price do not change, increase in farm productivity results in increased farm income. This implies a farmer's income is enough to repay the loan and for his own use. Arrears on loan are expected to be low when there is more and proper use of the purchased farm inputs. The amount of money spent on these inputs per acre in the year of loan issue is taken as a measure of purchased farm inputs used.

#### Off-farm Income

We define off-farm income to include income received from non-farm employment such as wage employment and running of off-farm business such as shops. Farmers with off-farm employment can use the income they get to repay the loan if farm income is not enough. It is likely that farmers with high off-farm income do not divert their loan funds to other uses. Average annual off-farm income is used as a measure of off-farm income. Farmers with high off-farm income are

expected to have good loan repayment record.

### School Expenses

We define school expenses to include college fees, school fees and building funds that a farmer is expected to pay in one year. Parents attach a lot of importance on their children's education and are likely to divert loan and/or forgo to repay the loan to meet the expenses. We expect loan diversion to be high when the school expenses are high. The total amount of school expenses in the year of loan issue is used as a measure of school expenses.

### Time of Loan Issue

Time of loan issue refers to the timeliness of loan disbursement in relation to when the funds are required for key farm operations such as land preparation, purchase of seeds and other farm inputs, planting and weeding depending on the purpose for which the farmer intended to put the loan. Timely issue of the loan funds is necessary if for example farmers have to plough, purchase farm inputs and plant in time. Untimely loan delivery to farmers may result into late implementation of the project (e.g. late ploughing and planting) which results in low crop yield. Late delivery of loan funds may also result into the funds being diverted to other uses not intended for. This may result into poor loan repayment. Most farmers in the study area go for loans to enable them purchase fertilizer and seeds. The planting period for the crops (maize and beans) is March and therefore any loan issue beyond the month is considered untimely. A dummy variable is used to capture this variable as follows:

1 if loan is issued late (after the month of March).

0 if otherwise.

### **Sources of Income from Farming Activities**

These include income from activities such as crop and livestock farming. For example if a farmer grows maize, beans, sunflower and also has cows which produce milk, then he has four sources of income from farming activities. The sources of income indicate the diversification of farm activities. In this case, if there are many of these source of income and one source fails to provide enough income, other sources provide enough income to enable the farmer to repay the loan. Farmers with many of these sources are expected to have better loan repayment record and may not divert as much of the loan funds compared to farmers with a few sources.

### **Farmer's Attitude Towards Loan Repayment.**

This refers to the feeling or opinion of the farmers towards loan repayment. The feeling or opinion of a farmer may be as a result of the farmer's past knowledge of the people who got loan, never repaid and; (a) their property was auctioned, (b) were taken to court of law, (c) their property was not auctioned and were not taken to court of law. It may also be as a result of past knowledge of farmers who got loan and repaid in time or the farmer's own experience in using the loan and understanding of loan agreement. Farmers who have repaid their loan and have the opinion that loan should not be repaid, may influence those who have not repaid against repaying. Farmers who have repaid their loan may influence those who have not repaid to repay. Farmers who have not repaid their loans and have the opinion or feel that loan should not be repaid are not likely to repay their loan or may repay a small portion of the loan anticipating the rest to be written off. A dummy variable is used to capture this variable as follows:

- 1 if a farmer feels or is of the opinion that loan should not be repaid.
- 0 if otherwise.

The field survey conducted is such that it allows us to measure the above variables.

## CHAPTER FOUR

## RESULT OF THE FIELD WORK

This Chapter is divided into two sections; section one and section two. In section one, we present the basic data obtained from field work. In section two, we present the computer solutions to the model used in this study. On the basis of the information from these two sections, we hope to assess the loan repayment position for smallholder farmers in the study area and to suggest possible solutions to the present situation.

## SECTION ONE

## 4.1 Basic Data Collection

In this section we present basic data that reviews the following information concerning smallholder farmers in Lugari Division of Kakamega District:

- (a) The extent to which they repay the agricultural credit.
- (b) Use of the agricultural loan by the farmers.
- (c) The extent to which farm income covers the loan funds.
- (d) Relationship between loan repayment and crop performance, farm income, use of purchased farm inputs, use of loan funds etc.
- (e) Relationship between use of loan funds and time of loan delivery, loan administration, etc.
- (f) The problems farmers face in repaying their loans.

The format of our data presentation is broadly outlined below:

- (A) Characteristics of the sample farmers and farms.
- (B) Loan given and arrears on the loan given to the sample farmers.

- (C) Relationship between agricultural credit use and loan repayment performance, time of loan issue and loan administration.
- (D) Relationship between the ratio of farm income to loan funds given to each farmer and loan repayment performance.
- (E) Relationship between crop performance and loan repayment performance.
- (F) Relationship between farmers' attitude towards loan repayment and loan repayment performance and
- (G) Relationship between sources of income from farming activities and loan repayment.

(A) Characteristics of Sample Farmers and Farms:

In this subsection, we present tables showing personal characteristics of the farmer e.g. age, general education level, occupation and characteristics of the sample farms e.g. size of the sample farms and the farming activities. The major aim of this subsection is to provide basic information and understanding of the type of farmers and farms included in the sample and major activities undertaken on the farms.

Table 4.1: Age Distribution of the Sample Farmers.

Years	No. of farmers	As a percentage of sample size
25-35	09	16.7
36-45	10	18.4
46-55	11	20.3
56-65	18	33.3
66-75	05	09.4
over 75	01	01.9
Total	54	100

The table above shows that most (i.e 33.3%) of the sample farmers are in the age group 56-65 years. If we assume that a person is most productive on the

farm between the age 25 and 65 years, then we can say that 88.7% of the whole sample is productive. Thus, 88.7% of the sample should play a vital role in the generation of national product.

Table 4.2: General Education of the Sample Farmers.

	No. of farmers	As a % of sample size
Can read and write Swahili and English	22	40.7
Cannot read and write Swahili and English	32	59.3
Total	54	100.0

The table above reveals that the majority of farmers (i.e nearly 60%) cannot read and write Swahili and English. This may partially account for poor record keeping on the farms.

Table 4.3: Off-farm Employment by the Sample Farmers

Name of job	No. of farmers	as a percentage of sample size**
teacher	04	07.4
business(shop)	04	07.4
business agents	02	03.7
Total	10*	18.5

\* this figure excludes 44 farmers who had no off-farm employment.

\*\* sample size is 54.

According to table 4.3 above, only ten of the sample farmers had off-farm employment. This shows that most of the sample farmers are employed on the farm. Four of the ten farmers were teachers, two were business agents and four others run their own business apart from farming.



Table 4.4: Size of the Sample Farms.

Size of the farms owned (acres)	No of farmers	As a % of sample size	Farm acreage	cultivated acreage	acreage under pasture
01-05	16	29.6			
06-10	23	42.6			
11-15	14	25.9			
16-20	01	01.9			
over 20	00	00.0			
Total*	54	100	462.25	357	105.25

\* the totals for farm acreage and cultivated acreage was arrived at by summing up the figures provided by the farmers.

Total cultivated acreage as a percentage of total farm acreage is 77.2%.

Total acreage under pasture as a percentage of total farm acreage is 22.8%

Mean size of the sample farms is 8.56 acres

mean acreage under cultivation is 6.61

Mean acreage under pasture is 1.95.

According to the table above, 98.1% of the sample farmers own less than 16 acres of land. Of the 98.1%, the majority (i.e. 42.6%) of the sample farmers own between 6-10 acres of land. About 77% of the total sample farm acreage is cultivated leaving only 23% of the remaining land mainly for pasture. This points out the predominance of crop farming over other farm activities in the study area (we indicate the types of crops grown later in this section). On the average, each farm has 1.96 acres of land under pasture. This implies that if a farmer has to keep many cattle on the farm he has to find an alternative grazing field for them.

Table 4.5 below, indicates that the majority (i.e. 57.4%) of the sample farmers cultivated between 6-10 acres of land in the year of loan issue. Only 5.6% of the sample farmers had over 10 acres of land under cultivation. According to table 4.6 below, the majority (i.e. 53.7%) of the sample farmers have between 0-1 acre of land under pasture. This reflects the low priority put to livestock farming. The sample farmers who own between 0-1 acres of land under pasture graze their cattle

on government land and in forests.

Table 4.5: Acreage of Sample Farms Under Cultivation.

Size of the farm cultivated (acres)	No. of farmers	As a percentage of sample size
01-05	20	37
06-10	31	57.4
11-15	03	05.6
16-20	00	00
Total	54	100

Table 4.6: Acreage of Sample Farms Under Pasture.

Acreage under pasture	No. of farmers	As a percentage of sample size
0.0 - 01	29	53.7
1.1- 04	19	35.1
4.1- 06	03	05.6
6.1- 10	03	05.6
over 10	00	00
Total	54	100

Table 4.7: Crops Grown on the Sample Farms.

Crops	No. of farmers	Total acreage put under crop*	Total acreage under each of the crops as a % of the total acreage cultivated**
Maize	54	325	91
Beans	51	281	78.7
Millet and sorghum	07	009	02.5
Sunflower	07	017	04.8
Others (coffee & groundnuts)	06	011	03.1

\* the figure was arrived at by summing up the acreage under each crop that was provided by the farmers (see appendix 2).

\*\* Total acreage under cultivation is 357

According to table 4.7 above, all the 54 sample farmers grew maize, fifty one of the 54 sample farmers grew beans. The two crops occupy most of the cultivated land. For example maize occupies 91% of the total cultivated land while beans are on 78.7% of the total cultivated land. It is important to note that the two crops are intercropped. Sunflower is the third most important crop but it only occupied 4.8 percent of the cultivated land in the year of loan issue. Other crops which include coffee and groundnuts only occupied 3.1% of the total acreage cultivated.

Table 4.8: Livestock Kept on the Sample Farms.

Cattle and goats and sheep	No. of farmers		as a percentage of sample size	
	cattle	goats and sheep	cattle	goats and sheep
zero	00	33	00	61.1
01 - 04	22	13	40.8	24.1
05 - 08	20	04	37.0	07.4
09 - 12	08	02	14.8	03.7
over 12	04	02	07.4	03.7
Total	54	54	100	100

Total heads of cattle = 316

Total number of goats and sheep = 126, goats were 16 and sheep were 110.

From table 4.8 above, all the sample farmers keep cattle. The majority of the farmers i.e 77.8% of the sample farmers keep between 1 - 8 heads of cattle on their farms. Heads of cattle totalled to 316, out of which 10 were bulls, 113 cows, 32 calves and 111 oxen. Most of the farmers keep oxen because they use them for ploughing the land. The farmers indicated that use of an ox-plough is convenient and saves them from high expenses of hiring tractors. The farmers believe that for the animals to concentrate on ploughing they must be castrated and this could explain why the number of bulls is small. Note that most of the cattle kept are the

native type. The farmers keep very few grade cattle because they are not resistant to diseases. The same table indicates that 61.1% of the farmers do not keep sheep and goats. Judging from the total number of goats (16) and sheep (110), goats seem to be unpopular to most farmers because they are considered by the farmers to be destructive and stubborn.

Table 4.9: Farm Dependants on the Sample Farms.

No. of farm dependants	No. of farmers	As a % of sample size
None	00	00
01-05	08	14.8
06-10	28	51.9
11-15	13	28.1
16-20	02	03.7
over 20	03	05.5
Total	54	100

As indicated in the table above, 51.9% of the sample farmers had between 6-10 dependants. Also revealed from the table is that all the sample farmers had at least some dependants (see definition in chapter 3). Of the total sample farmers, 85.2% had over five dependants. This may indicate the obligation the farmers have in taking care of their families and relatives.

(B) Loan and Arrears on loans given to the Sample Farmers.

Table 4.10 below shows that, out of the 54 sample farmers, twenty nine (i.e about 54%) had not completed repaying their loans. Only 44.4% of the farmers had repaid part of the loan while 9.3% of the farmers had repaid none of the loan funds. Loans totalling Kshs. 361,175.05 were given to the 54 sample farmers. Arrears on this loans during the time of survey was Kshs. 127,790.90 (which is 35.4% of the total loan

funds). This percentage of arrears on loan is high particularly if it has to be written off as bad debts.

Table 4.10: Loan Repayment Performance by the Sample Farmers.

Repayment position	No. of farmers	As a % of sample size	Loan given	Arrears on loan given	Arrears as a % of loan given
Have repaid all loan	25	46.3			
Have repaid part of the loan	24	44.4			
Have repaid none of the loan fund	05	09.3			
Total*	54	100	361,175.1	127,790.9	35.4

\* the totals for loans and arrears on loans given was arrived at by summing up the figures provided by the farmers.

Table 4.11: The Intended Purpose of the Loan Funds Borrowed by the Sample Farmers.

Items	No. of farmers	As % of sample size
a and b	43	79.6
a, b and c	05	09.3
a, b and d	04	07.3
a, b and e	01	01.9
a, b and f	01	01.9
Total	54	100.0

Where: a= purchase of fertilizer  
 b= purchase of improved seeds  
 c= purchase of pesticides  
 d= purchase of sacks  
 e= purchase of livestock  
 f= ploughing land

Table 4.11 above, shows that all farmers seek loan to enable them purchase fertilizer and seeds (hybrid maize seeds). The table shows that 43 (i.e 79.6%) of the

sample farmers got loan purely for purchasing fertilizer and improved maize seeds. The remaining 20.4%, in addition to going in for loan to enable them purchase fertilizer and seeds; five (or 9.3% of the sample) took loan to purchase pesticides, four (or 7.3%) took loan to purchase sacks, one (1.9%) took loan to purchase livestock and the other took loan to plough land. It is clear from table 4.11 that the major purpose for which the sample farmers got loan for, was to enable them to purchase fertilizer and improved seeds.

The problems encountered in trying to repay the loan funds as stated by farmers include:

1. Lack of a ready market for the major farm produce and low prices.
2. High interest rate or double interest rate charges on the loan funds given.
3. Confusion as to which institution to repay the loan funds to.
4. Poor transport facilities and high transport costs
5. Low farm produce.
6. Lack of interest by the lending institution field agents in the farming activities of the farmers.

We elaborate on the first three of this problems .

(a) Lack of a Ready Market and Low Prices for Major Farm Produce .

The major farm produce in Lugari are maize and beans. Farmers complained of lack of a ready market for these produce especially at the time of harvesting. Because of lack of a ready market for the produce, low prices prevail at the harvesting period. Hence, farmers who sell their produce immediately after harvesting get low farm income which is not enough for their own use and for repayment of loan. Market for the produce may be available after some times when

farmers are faced with other problems (such as school fees and purchase of fertilizer for the next planting season) which require financial solution. Therefore, farmers end up using the revenue from the sale of their produce to clear these problems. However, one of the cooperative officers in the study area pointed out that the societies start buying the produce immediately it is harvested. But some farmers who borrowed loans from the cooperative societies evade repaying the loans by selling the produce to other marketing agents or organisations or use other farmers who did not borrow from the society to sell their produce to the cooperative so as to evade repayment through deduction.

Kenya Grain Growers Cooperative Union (KGGCU) which is the buyer of the farm produce, gets maize and beans from farmers without outright payment. Payment is effected after a long period of time or not at all. Farmers who obtain credit from AFC are supposed to repay their loan through the KGGCU either by use of cash or taking the maize to the union. Farmers, however, lack finance to pay for transportation of the maize to the union.

**(b) High Interest Rate or Double Interest Rate Charges.**

Farmers who borrowed from one of the institution complained of the high interest rate charges. Sometimes compound interest is charged so that income received is not enough to repay both the principle and the interest payments. Most of the farmers who borrowed from AFC complained of being charged double interest. They pointed out that AFC directs them to get the in kind credit through the KGGCU. AFC charges some interest rate on the loan and KGGCU also charges some interest on the same loan resulting in double interest charges. With KGGCU earning interest rate, it may not be willing to enforce loan repayment because it stands to gain in future when interest payment is high.

(c) Confusion as to which Institution to Repay the Loan to.

This is closely related to (b) above. Farmers get permission from AFC to get loan through KGGCU. When it comes to repayment KGGCU demands the payment directly from the farmers. Hence, farmers are confused as to whether to repay the loan to AFC or KGGCU. Some farmers complained that even after repaying the loan to AFC, they still received letters from KGGCU demanding for repayment of the loan.

It is quite interesting that none of the farmers mentioned use of loan as one of the problems which could result in inability to repayment of the loan. May be they were keen not to mention it for they thought we could blame loan diversion for poor loan repayment. However, the data we collected can enable us to identify the possible relationship between loan use and loan repayment. This is done in the subsection below.

C. Agricultural Credit Use and Loan Repayment Performance, Time of Loan Issue and Loan Administration.

Table 4.12 below reveals that nineteen (or 35.2%) of the sample farmers used all their loan funds on the intended purpose while thirty five (or 64.8%) of the sample farmers diverted part of their loan funds to other non-intended use. Twenty three of the 35 sample farmers diverted less than a half of their loan funds while twelve diverted more than a half. None of the farmers diverted all the loan funds. Twelve (or about 63%) of the 19 farmers who used all the loan funds on the intended purpose had repaid all the loan funds, six had repaid part of the loan funds and one had repaid none of the loan funds. Thirteen of the twenty three farmers who diverted less than half the loan funds, had repaid all the loan funds, nine had repaid part and one had repaid none. None of the twelve sample farmers who diverted more than half the loan funds had repaid all the loan funds, nine had repaid part of the



loan funds and three had repaid none. This makes us suspect that there is a direct relationship between diversion of loan funds and poor loan repayment.

Table 4.12: Credit Use and Loan Repayment Performance by the Sample Farmers.

Credit use	No. of farmers	as % of sample size	repaid all	repaid part	repaid none
Used all the loan on intended purpose	19	35.2	12	6	1
Diverted less than 1/2 of the loan funds to other non-intended use	23	42.6	13	9	1
Diverted more than 1/2 the loan funds to other non-intended use	12	22.2	00	9	3
Diverted all the loan funds	00	00	00	0	0
Total	54	100	25	24	5

Total amount of loan diverted = Kshs. 138,564.10 (is sum of the amount provided by farmers).

Total amount of loan advanced to the sample farmers = Kshs. 361,175.1

Total amount of loan diverted as a percentage of the total loan funds given = 38.4

#### Causes of Loan Diversion

We found that 38.4% of the total loan funds given to the sample farmers was diverted to other use. This percentage could be higher if the farmers were sincere to tell us how they actually used the loans. This high percentage of diverted loan funds provide a good reason for investigating what factors influence the farmers to divert the loan funds. Some of the factors may be deduced from the

list of items on which the diverted funds were spent (see table 4.13) while the other factors may be deduced from the timing of loan issue and subsequent supervision.

Table 4.13: The Items on which the Diverted Loan Funds was Used

Item	number of times mentioned
Start business	02
Pay school fees	16
Family food and medical expenses	12
Transport costs	10
Hiring farm labour and renting land	09
Buying iron sheets and purchase of wire	03
Gave to friends part of the loan funds	08

From the table above, sixteen of the 35 farmers who diverted their loan funds talked of having used part of the diverted funds to pay school fees. The farmers believe that education is essential for a better future of their children and would not hesitate to use the loan funds to pay school fees for their children. Purchase of family food and medical expenses were mentioned twelve times as items on which loan funds were spent. The farmers believe that life is precious and once lost cannot be recovered. Hence, they would rather spend part of the loan funds to purchase food and pay for medical services for the family than let them die of hunger and illness. "After all with good health you can find alternative source of income to enable you repay the loan" commented one of the farmers. From this, we can argue that some smallholder farmers are poor and, thus, perceive the loan funds as an alternative source of income to enable them meet their basic needs. Other items of importance mentioned are; transport costs for transporting the in kind loan to the farmers home (mentioned ten times) and hiring of farm labour. The fact that

Some of the farmers used part of the loan funds to hire labour indicates that loans given is not enough to cover all the production costs. This could be true if we recall that the loan was mainly for purchase of fertilizer and improved seeds.

The way loan funds is issued also could lead to diversion of loan funds by the farmers. For example, fertilizer for planting and top dressing is given at the time of planting. Fertilizer meant for planting may be used for the intended purpose if it is issued at the time of planting. But fertilizer meant for top dressing ends up being sold. This is because other issues which require financial solutions may crop up between the time of planting and the time when fertilizer is to be top dressed and hence farmers sell this fertilizer to get funds to enable them solve their problems.

Some of the farmers interviewed complained of having received the loan very late. This may also lead to loan diversion since the farmers may be tempted to sell the fertilizer and put the money into other uses.

Table 4.14: Loan Diversion and Time of Loan Issue.

Use of loan	No. of farmers	as a % of sample farmers	Timely loan Issue	Late loan issue
Used all loan on intended purpose	19	35.2	13	6
Diverted less than 1/2 the loan funds	23	42.6	17	6
Diverted more than 1/2 the loan funds	12	22.2	02	10
Total	54	100.0	32	22

Table 4.14 shows the relationship between loan diversion and timeliness of loan issue. The table shows that thirty two of the 54 sample farmers received loan

on time and the remaining twenty two received it late. Out of the thirty two farmers who received loan in time, thirteen used all the loan for the intended purpose, seventeen diverted less than a half of the loan funds while two diverted more than a half of the loan funds. On the other hand, out of the twenty two farmers who received the loan funds late, six used all the funds on intended purpose, six diverted less than a half while ten diverted more than a half. Ten of the farmers who received their loan funds late, diverted more than half the loan funds and are more than those who received loan funds in time and diverted more than half the funds. This may indicate a close positive relationship between late loan issue and diversion of loan funds. An official of one of the lending institutions indicated that late loan issue is as a result of late application and approval of the loans.

Table 4.15: The Proportion of Loan Funds Diverted and Loan Administration.

Use of loan funds	No. of farmers	Received adequate supervision	Received inadequate supervision
Used all loan funds on intended purpose	19	06	13
Diverted less than half the loan funds	23	12	11
Diverted more than a half of the loan funds	12	02	10
Total	54	20	34

Table 4.15 shows that those farmers who received inadequate extension services and supervision and diverted more than half the loan funds are ten compared to two who received adequate technical advice and supervision and diverted more than half the loan funds. This makes us suspect that there is a positive

correlation between inadequate loan supervision and advice and loan diversion.

Most of the sample farmers indicated that they were not satisfied with the advice and supervision given by both extension officers and loan agents. Asked why, they gave the following reasons.

- (i) The visits are not regular so that at the time farmers need to be advised most of the officers are not available to give the advice.
- (ii) The advice given by the extension officer and/or loan agents is not very useful for the farmers for it does not take into account time factor and financial ability of the farmer. For example most of the farming techniques they teach the farmers are time consuming and require large sums of money.
- (iii) The farmers also indicated that they received no practical advice. Thus there are no demonstration farms where farming techniques can be taught practically.
- (iv) Some pointed out that they are only visited by agents of the lending institutions when they come to demand for repayment. This shows that apart from advancing loan and collecting loan dues, the lending institutions do not engage in any other activities that could keep them in touch with the farmers.

The above reasons may be genuine given that some of the lending institutions - cooperative societies and AFC - mainly depend on extension officers for loan supervision and provision of extension services. Infact one of the cooperative officers in charge of the Lugari division indicated that they do not have transport facilities and enough manpower to enable them provide extension service to the farmers. This reflects the fact that the projects are implemented without adequate technical support due to lack of expert personnel. Some of the extension officers we talked to indicated that they were not paid for visiting the farmers on behalf of the lending institutions yet it increased their work load.

2). The Relationship Between Ratio of Farm Income to Amount of Loan Advanced to each Sample Farmer and Loan Repayment Performance.

Table 4.16: The Ratio of Farm Income to Loan Advanced to the Farmers and Repayment Performance by the Sample Farmers.

Size of the ratio <sup>a</sup>	No. of farmers	As a % sample size	Repaid all loan	Repaid part of the loan	Repaid none
1:3 - <2:1	22	40.7	2	15	5
2:1 - <4:1	12	22.2	8	04	0
4:1 - <6:1	07	13.0	5	02	0
6:1 - <10:1	06	11.1	5	01	0
10:1 & above	07	13.0	5	02	0
Total	54	100	25	24	5

\* ratio calculated using the figures the farmers provided on total farm income and loans advanced.

Table 4.16, shows that twenty two (i.e 40.7%) of the sample farmers had a ratio of farm income to loan funds given of 1:3 - <2:1. Of the twenty two farmers, two had repaid all the loan funds, fifteen had repaid part of their loans and five had repaid none. The number of those farmers who had repaid all their loan funds is higher than those who repaid part of the loan funds for subsequent ratios of farm income to loans advanced. It is worth noting that all farmers who attained a ratio of farm income to the loan funds advanced of two to one and above at least attempted to repay their loans. This may indicate that there is a negative relationship between the ratio of farm income to loans advanced to farmers and proportion of arrears on the loans. All the two farmers who had repaid all their loans and had a ratio of farm income to loan of 1:3- <2:1 had sold part of their land. If they used the funds from the sale of land to repay the loan, then we can conclude that none of the farmers who attained a ratio of farm income to loans advanced of 1:3- <2:1 is able to repay all the loan funds. This conclusion is subject to confirmation because the farmers

indicated that they sold part of their land to repay settlement loans. Some of the farmers pointed out that the crops they grow do not fetch enough income to enable them repay the loan. They were of the opinion that the introduction of new crops which fetch high revenue could help improve loan repayment. However, some of the farmers who attained a high ratio of farm income to loans advanced had not repaid all their loan funds. This may indicate the tendency of the farmers to appropriate additional farm income generated out of the loaned activities towards their immediate consumption demand rather than repaying the loan.

#### E). The Relationship Between Crop Performance and Loan Repayment Performance.

We attempt to show in this section the relationship between crop performance and loan repayment. Crop performance is dependent on exogenous weather conditions, farming methods employed and other natural factors such as diseases, pests etc. As indicated earlier (in chapter 3) the essence of providing loan is to increase farm production. Crop output is expected to be enough to pay for credit and generate a surplus for the farmer's own use. This implies that crop failure (which is due to draughts, diseases, poor farming methods etc) may cause poor loan repayment. In this study crop failure was taken to be any situation where actual average crop yield per acre is less than the expected average yield of the crop per acre in the study area and we refer only to the two major crops in the study area (maize and beans).

About two thirds of the seventeen farmers whose crops performed well had repaid their loan funds, four had repaid part of the loan funds and one had repaid none (see table 4.17 below). Only five of the eighteen farmers whose crops had failed to attain their average yield per acre had repaid all their loan while the remaining two thirds had either repaid part of their loan funds or none. This makes us

aspect that poor loan repayment is as a result of crop failure.

Table 4.17: Crop Performance and Loan Repayment by Sample Farmers.

Crop performance	No. of farmers	repaid all loan	repaid part of the loan	repaid none
Both crop yields less than their expected average yield per acre	18	05	10	3
Only one of the crop yields is less than its expected average yield per acre	19	08	10	1
Both crop yields were equal to or greater than their expected average yield per acre	17	12	04	1
Total	54	25	24	5

(F) Relationship between Farmers Attitude Towards Repayment of Loan and Loan Repayment Performance.

Table 4.18: Farmers Attitude Towards Loan Repayment and Loan Repayment Performance.

Feelings and/or opinion	No. of farmers	repaid all the loan	repaid part of loan	repaid none
Should repay the loan	37	18	17	2
Should not repay the loan	17	07	07	3
Total	54	25	24	5

To capture the attitude of the farmer towards loan repayment, we asked the farmers to tell us, from their own experience of using the loan whether they feel or have the opinion that the agricultural loan should be repaid. Out of the 54 sample



farmers, thirty seven were of the opinion that loan should be repaid while seventeen indicated that loan should not be repaid (see table 4.18). A majority, i.e about 60% of the seventeen farmers that felt loan should not be repaid had repaid part or none of the loan funds advanced to them. The farmers who had repaid none of the loan advanced to them and had the feeling that loan should be repaid were two compared to three who had repaid none and had the opinion that loan should not be repaid. This makes us surmise that attitude of the farmer towards loan repayment has some bearing on loan repayment performance.

When the farmers who had the opinion that the loan should not be repaid were asked why they had such an opinion, the most outstanding answers they gave are:

- i) Loan should just be given free of repayment obligation to every farmer as a way of boosting agriculture and reducing the many obligations the farmers already have.
- ii) Some indicated that the loan did not help them improve their farm produce and hence should not be repaid. However, remember that some of the farmers diverted the loan funds to other uses and this could be the result of low farm productivity.
- iii) Loan should not be repaid because past experience has shown that those who repay their loan end up being poorer than they were before.

When the farmers who felt or had the opinion that loan should be repaid were asked to give reasons for their feelings and/or opinion, five outstanding answers they gave are:

- (i) Loan should be repaid to make loaned funds available for other farmers who would like to borrow.
- (ii) Repay so that you may be able to acquire another loan.

- c) Repay to avoid accumulation of debt.
- d) Repay to avoid follow up and harassment by the lenders.
- e) Enable the institution plan well for its activities.

#### 4. The Relationship Between Use of Purchased Farm Inputs and Loan Repayment Performance.

Table 4.19: Use of Purchased Farm Inputs and Loan Repayment Performance by Smallholder Farmers.

Repayment Position	No. of farmers	spent less than Ksh. 550 on purchased inputs	spent more than Ksh. 550 on purchased inputs
repaid all loan	24	08	16
repaid part of the loan	25	12	13
repaid none of the loan	05	05	00
Total	54	25	29

The purchased inputs referred to here are fertilizers, seeds and pesticides. The amount of money in shillings spent on these inputs per acre indicate the extent of their use. According to table 4.19 above, twenty five of the sample farmers spent less than Ksh. 550 on purchased farm inputs while twenty nine of the sample farmers spent more than Ksh. 550 on purchased farm inputs. Of the twenty nine farmers who spent more than Ksh. 550 on purchased farm inputs, sixteen had repaid all their loan funds indicating that more than a half of these farmers had repaid all the loan funds. Seventy percent of the twenty five farmers who spent less than Ksh. 550 on purchased farm inputs had repaid part or none of the loan funds advanced to them.

The way the inputs are used matters a lot because use of fertilizer and maize seeds was sometimes over applied or over stretched. For example, some farmers used a 50 kg bag of compound fertilizer and 10 kg bag of maize seed to plant more than 1.5 acres of land. Other farmers used more than two and a half 50 kg bags of compound fertilizer and one and a half 10 kg bags of maize seed in planting one acre of land. The right measure is two 50 kg bags of compound fertilizer and a 10 kg bag of maize in one acre. Stretching the use of the inputs and over application of the inputs result into low farm productivity and hence poor loan repayment. Most farmers also complained of the high input prices.

## SECTION TWO

### 4.2 Solutions to the Model Used

In this section we present the computer results of the model presented in chapter three. We used a recursive model with two equations in which the endogenous variables are determined sequentially. We follow the same sequence in presenting the results.

The first equation we estimate in our model according to the sequence is:

$$LD_i = a_0 + a_1FD_i + a_2FE_i + a_3TOLI_i + a_4LM_i + a_5SA_i + a_6SFY_i + U_2$$

The symbols used in the equation are as defined in Chapter 3. The results are presented in equation form as shown below.

$$LD_i = 0.088 + 0.004 FD_i + 0.09 FE_i + 0.188 TOLI_i + 0.158 LM_i + 1.062 * 10^{-5} SA_i - 0.048 SFY_i$$

(.669) (.638) (1.187) (2.536) (2.094) (1.02)  
 (-1.38)

$R^2 = 0.274$                       Degrees of freedom = 47  
 The t - statistics are in the parentheses.

Late loan issue and inadequate loan supervision and technical advice are statistically significant and positively related to the proportion of loan funds diverted. This results tallies with our expectations. Inadequate loan supervision and advice is significant at 95% level of confidence while late loan issue is significant at 99.5% level of confidence. Thus late loan issue and inadequate loan supervision have some significant effect on loan diversion in the survey area, with the proportion of loan diverted being 0.158 and 0.188 higher for farmers who received their loan funds late and inadequate loan supervision and advice respectively.

The general education of the farmer, school expenses and farm dependants are positively related to proportion of loan funds diverted and are both significant at 80% level of confidence. This shows that their effect on proportion of loan funds diverted is statistically insignificant.

Sources of income from farming activities is negatively related to the proportion of loan funds diverted as was expected and is significant at 90% level of confidence. This inverse relationship indicates that farmers with more sources of income from farming activities may not divert loan funds as much as those with few sources. The reason could be that this sources provides a continuous flow of income to the farmers enabling them to meet most of their day-to-day expenses without resorting to diverting the loan funds.

The six explanatory variables in the equation explains only 27.4% of the variations in loan diversion. This implies that other important variables not included in the model account for 72.6% of the remaining variations in loan diversion. These variables may include conservativeness of the lending institutions which was mentioned in the literature review (Chapter 2) but could not be included in our model as a variable. This is because the sample farmers were drawn mainly from

three institutions which issue mainly agricultural credit - implying that the answers we could get concerning the conservativeness of the lending institutions would more or less be the same (i.e no variations). Other factors such as transport costs, hiring of farm labour (see table 4.13) can also explain part of the 72.6% variations in loan diversion.

From the equation above, one may suspect that there is a strong correlation between some of the variables. For example one could easily suspect that farm dependants (FD) and school expenses (SA) to be highly correlated. If such a correlation exists, then we would have a multicollinearity problem in our model. The existence of this problem imply that we cannot separate the independent influence of each of the variables on the dependent variable. However, such a strong correlation between the explanatory variables does not exist as can be seen from table 4.20 below.

Table 4.20 Correlation Matrix for the Variables Used in the Equation Above.

	LD	FE	TOLI	SFY	SA	FD	LM
LD	1	-0.213	0.390	-0.126	0.097	0.110	0.235
FE		1	0.223	-0.166	-0.235	0.050	0.066
TOLI			1	-0.059	-0.058	0.187	0.012
SFY				1	0.056	0.119	0.274
SA					1	-0.063	0.135
FD						1	0.014
LM							1

The second and last equation estimated in our model according to the sequence is as shown below:

$$LA_1 = b_0 + b_1LD_1 + b_2CP_1 + b_3FY_1 + b_4OY_1 + b_5FI_1 + b_6FE_1 + b_7FA_1 + b_8SFY_1 + b_9LM_1 + U_1$$

The symbols used in the equation are as defined in Chapter 3. This is a very crucial equation for our study for it enables us to relate the explanatory variable on the proportion of arrears on loans advanced to the farmers. Thus, it enables us to determine the relative importance of the factors that affect loan repayment performance by the smallholder farmers. The computer results to the equation are presented in equation form as shown below.

$$LA_i = 0.183 + 1.278 LD_i + 0.025 CP_i - 0.025 FY_i - 4.27 \times 10^{-6} OY_i - 0.0004 FI_i$$

(0.706) (2.778) (0.403) (-2.156) (-1.092) (-1.999)

$$+0.068 FE_i + 0.072 FA_i + 0.105 SFY_i - 0.174 LM_i$$

(0.7) (1.888) (1.991) (-1.458)

$R^2 = 0.509$       Degrees of freedom = 44      F - Statistics = 5.084  
t - statistics are in the parentheses      i - runs from 1 to 54

The ratio of farm income to credit advanced to the farmers is inversely related to the proportion of arrears on loans advanced to smallholder farmers and is statistically significant at 97.5% level of confidence. This shows that those farmers who received a high ratio of farm income to loan funds given have good loan repayment record than those farmers who received a low ratio of farm income to loan funds advanced. It also shows that an increase in the ratio of farm income to loan funds advanced to a farmer by unity may result into a decline in arrears on loan by 2.5%.

Use of purchased farm inputs is also inversely related to the proportion of arrears on loan funds advanced to the farmers and is significant at 95% level of confidence. This shows that farmers who use more of the purchased farm inputs on their farms have good loan repayment record than farmers who use less of the purchased farm inputs. The coefficients of purchased farm inputs is -0.0004 indicating that increased use of farm inputs equivalent to Kshs. 100 may result into

a decline in the proportion of arrears on loans by 4%. Care must be taken because excessive use of the inputs may result in diminishing marginal returns of the farm produce. This may explain a case where a farmer who uses a lot of these inputs harvests little.

Loan administration, in particular supervision and provision of extension services is inversely related to the proportion of arrears on loans advanced to farmers and is significant at 90% level of confidence. This negative relationship is contrary to our expectation. What the negative coefficient shows is that farmers who receive inadequate loan supervision and technical advice have some effects on loan repayment such that the proportion of arrears on loan is 0.174 lower for farmers who receive inadequate supervision and advice. However, the explanation to this inverse relationship could be deduced from the complains given by the farmers concerning the supervision and advice (see page 52). One possible explanation could be that, the farmers who had adequate visits by the extension officers and agents of the lending institutions might have received the supervision and advice at the time when it was not needed. Second, due to lack of practical advice, the farmers might have misapplied the information given or wasted time trying to implement techniques which are beyond their ability. Third, it is also possible that the farmers were not advised during the visits. These combined could have led to low productivity and hence poor loan repayment by the farmers who received adequate loan supervision and technical advice compared to those who received inadequate supervision and advice.

Off-farm income is inversely related to proportion of arrears on loans advanced to the farmers as was expected but is statistically insignificant. Its effects on proportion of arrears on loans advanced to farmers is very small as shown by its coefficient in the equation above. However, the smallness of this coefficient may be due to the fact that only ten of the 54 sample farmers received off-farm income.

The proportion of loan funds diverted to non-intended purpose is positively related to proportion of arrears on loans given to farmers. It is statistically significant at 99.5% level of confidence. It shows that the higher the proportion of funds diverted the higher the arrears on loan funds diverted. Its coefficient is 1.738 indicating that a 1% increase in diversion of loan funds may result in 1.7% increase in the proportion of arrears on loan funds.

Attitude of the farmers towards loan repayment is positively related to the proportion of arrears on loans advanced to farmers and is significant at 95% level of confidence. The positive relationship tallies with our expectations and is statistically significant. Its coefficient is 0.091, indicating that farmers who have the opinion that loans should not be repaid have got a significant effect on loan repayment performance with the proportion of arrears on loans given being 0.091 higher for the farmers.

Source of income from farming activities is positively related to proportion of arrears on loans advanced to farmers and is significant at 95% level of confidence. This shows that those farmers with many sources of income have poor loan repayment record than those with few sources. This positive relation is contrary to our expectation. There are two explanations to this positive coefficient. The most probable one is that, some of the farmers must have indicated sources of which make a minor contribution to income hence low income leading to poor loan repayment. This is not very surprising because we found out earlier in this chapter that most of the land cultivated is occupied by two major crops - maize and beans (see tables 4.4 and 4.7). It may also be as a result of using the small pieces of land for a number of activities. This may result in subdividing the land into uneconomic units which may result in continuous flow of farm income but the income may not be enough to repay the loan.



Crop performance is positively related to proportion of arrears on loans advanced to farmers and is significant at 60% level of confidence. This indicates that the effect of crop failure on loan repayment is statistically insignificant. This is in agreement with the views of Harmsworth (1974) that crop failure only occupies a subordinate position in explaining defaults. General education of the farmer is also positively related to the proportion of arrears on loans advanced to farmers and is significant at 80% level of confidence. This indicates that the effect of education of the farmers on loan repayment performance is statistically insignificant.

As a whole, the explanatory variables explain 50.9% of the variations in the proportion of arrears on loans advanced to the farmers. Since ours is a cross-sectional data, an  $R^2$  of 0.509 implies a good fit. This means that other factors not included in our model account for 49.1% of the variation in the proportion of arrears on loan advanced to farmers. These factors may include lack of a ready market for the farm produce and low price, high interest rates or double interest rate charges and confusion as to which institution to repay the loan to - mentioned by farmers as some of the problems which they faced in trying to repay their loans. The correlation matrix below indicates lack of existence of multicollinearity problem (see table 4.21):

Before we make any firm conclusion it is important to mention that the result of the model as presented above are based on all the 54 sample observations. One may argue that the fact that 25 of the sample farmers who had repaid all their loan may have influenced the results. Therefore we run another regression for those farmers who had not completed repaying the loan (i.e those in arrears only).

Table 4.21: Correlation Matrix for all the Variable Based on Computer Results of the Equation above.

	LA	LD	CP	FY	FI	FE	OY	LM	FA	SFY
LA	1	0.514	0.344	-0.391	-0.408	0.355	-0.064	-0.0002	0.229	-0.0002
LD		1	0.180	-0.345	-0.237	0.213	-0.133	0.450	0.084	-0.0002
CP			1	-0.496	-0.327	0.308	0.021	0.344	0.133	0.0002
FY				1	0.004	-0.260	0.037	-0.188	-0.044	0.0002
FI					1	-0.149	-0.061	-0.061	0.081	-0.0002
FE						1	0.114	-0.066	-0.235	0.0002
OY							1	-0.023	0.022	0.0002
LM								1	0.141	-0.0002
FA									1	-0.0002
SFY										1

The computer results presented below are those for our major equation the model and are presented in equation form as shown below:

$$\begin{aligned}
 LA_i = & 0.543 + 1.264 LD_i - 0.047 CP_i + 0.144 FE_i + 0.322 FA_i - 0.415 LM_i \\
 & (1.633) \quad (3.168) \quad (-0.66) \quad (1.590) \quad (3.009) \quad (-2.955) \\
 & + 0.007 FY_i - 6.3 \times 10^{-6} OY_i + 0.071 SFY_i - 0.0008 FI_i \\
 & (0.408) \quad (-1.253) \quad (1.213) \quad (-2.725)
 \end{aligned}$$

$$R^2 = 0.67 \quad \text{Degrees of freedom} = 19,$$

t-statistics is in the parentheses.  $i$  - runs from 1 to 29

If we compare the result of the above equation with the result of previous equation we can observe some outstanding changes. For example:

- (1) The constant remains positive in the above equation as in the previous equation

- (2) The coefficient of crop performance changes from positive to negative. This was not expected. We expected that the coefficient be positively related to the proportion of arrears on loans advanced to farmers. However, just as in the previous equation the effect of crop performance is statistically insignificant.
- (3) The coefficient of ratio of farm income to loans advanced to farmers changed from a negative and statistically significant coefficient in the previous equation to a positive statistically insignificant coefficient in the above equation. It was expected that farmers with a high ratio of farm income to loans advanced would have good loan repayment record than farmers with a low ratio of farm income to loans advanced. We suspect that this positive coefficient is as a result of the multicollinearity problem which is evident in the above regression but was absent in the previous regression. As can be seen from table 4.22 below, there seem to be a strong relationship between ratio of farm income to loan advanced and sources of farm income and between proportion of loans diverted and farm income.
- (4) The coefficient of loan administration is negatively related to the proportion of arrears on loans advanced to farmers in the equation above as in the previous one. It is significant at 99.5% level of confidence in the above equation while it was significant at 90% level of confidence in the previous equation.
- (5) Sources of income from farming activities is positive in the equation above as in the previous equation. It is not statistically significant in the above equation while it was significant at 0.05 level in the previous equation. This could be as a result of the multicollinearity problem in the above equation.
- (6) The general education of the farmer and the attitude of the farmer toward

loan repayment are positive in the two equations. This is as we expected.

- (7) Use of purchased farm inputs is negative in both equations and statistically significant.

On the whole there has been an improvement in the variations of the proportion of arrears on loans advanced to farmers explained by the explanatory variables i.e.  $R^2 = 67\%$ . The other 33% variation are not accounted for by the model. The table below shows that there are three explanatory variables which are correlated, namely, sources of farm income, ratio of farm income to loan advanced to the farmers and loan diversion. The relation creates multicollinearity problem.

Table 4.22: Correlation Matrix for all Variables Based on Computer Results on the Equation Above.

	LD	CP	FY	FI	FE	OY	LM	FA	SFY	
LA	1	0.265	0.165	-0.201	-0.530	0.240	-0.202	-0.223	0.386	-0.078
LD		1	0.127	-0.525	-0.370	0.018	-0.207	0.336	0.119	-0.031
CP			1	-0.329	-0.213	0.149	-0.070	-0.153	0.319	-0.246
FY				1	0.029	-0.186	0.047	0.086	-0.326	0.516
FI					1	-0.104	0.282	0.339	0.070	0.323
FE						1	0.231	-0.005	0.070	-0.050
OY							1	-0.071	0.078	0.036
LM								1	-0.297	0.322
FA									1	-0.349
SFY										1

Although this improvement has been realised, we must also acknowledge that the sample size has been reduced from 54 to 29 and hence degrees of freedom have been reduced drastically i.e. from forty four in the previous equation to nineteen in the equation above. This and the multicollinearity problem in the above regression weakens our interpretation of the results. Thus, the results of the previous equation in which all the 54 sample observation are used are superior owing to the fact that they are free of multicollinearity problem and with larger sample size.

## CHAPTER FIVE

## CONCLUSION AND POLICY IMPLICATIONS

## 5.1 Conclusion

The result of the analysis discussed in the previous chapter indicates several factors that can help to explain smallholder credit repayment performance. In particular, loan diversion, farm income (measured by the ratio of farm income to loans advanced to farmers), use of purchased farm inputs, sources of income from farming activities and attitude of the farmers towards loan repayment had a statistically significant effect on loan repayment performance.

We found the proportion of loan funds diverted to be positively related to the proportion of arrears on loans advanced to farmers and statistically significant at 99.5% level of confidence. Our analysis of the factors that influence loan diversion indicated that two factors, namely, inadequate loan supervision and advice and late loan issue were positively related to loan diversion and significant at 0.05 level and 0.005 level, respectively. Late loan issue results from late application for an approval of the loans. The study also found diversion of loans to be associated with early issuing of the loan e.g. when fertilizer meant for planting and top dressing given at the time of planting, most of the fertilizer meant for top dressing is resold.

Contrary to our expectation, farmers who received inadequate supervision and advice were found to have a better loan repayment record. But the complaints raised by the farmers who received supervision and advice, show that the quality of supervision and advice affected loan repayment adversely. The complaints imply that a change in the style and quality of supervision and advice can have a positive impact on loan repayment performance.

The ratio of farm income to loans was found to be inversely related to t

proportion of arrears on loans advanced to farmers and significant at 97.5% level of confidence. The main crops which occupied most of the cultivated land in the study area (indicated in chapter 4) are maize and beans. These two crops fetch low farm income which result in low ratio of farm income to loans advanced to farmers and hence poor loan repayment.

The study found sources of income from farming activities to be positively related to the proportion of arrears on loans advanced to farmers and significant at 95% level of confidence. This was contrary to our expectations. The positive relationship between the sources and proportion of arrears on loans indicates that farmers with few farming activities, probably which contribute highly towards income, are likely to have good loan repayment records than those farmers with many farming activities which do not contribute highly to income. It also shows that many farming activities on the small farms may result in uneconomic subdivision of land among the farming activities and lack of concentration by the farmer on farming activities which can contribute significantly to income leading to poor loan repayment.

Use of purchased farm inputs was found to be inversely related to the proportion of arrears on loans and significant at 95% level of confidence. Poor loan repayment was found to be pronounced among farmers who did not apply the right quantity of the purchased farm inputs. Stretching the use of the inputs and over application of the inputs leads to low farm productivity and hence poor loan repayment. Stretching the use of the inputs is due to inputs price which farmers complained of being too high.

Furthermore, the influence of farmers attitude towards loan repayment was found to be positively related to the proportion of arrears on loans and significant at 95% level of confidence implying that farmers who have the opinion that loans should not be repaid may have a higher proportion of arrears on the loans advanced

The reasons they gave for their opinion shows that they do not understand the need for loan repayment and the consequences of default. Special education to the farmers on the importance of repaying the loan funds in time could help change their attitude.

Finally, the study found the other factors considered - crop performance, off-farm income and general farmers education - to have statistically insignificant influence on the proportion of arrears on loans advanced to farmers. The insignificant influence indicates that arrears on loans advanced to smallholder farmers may be insensitive to small changes in the explanatory variables. The effect of these factors on loan repayment performance, however, should not be ignored. Probably, major changes in these explanatory variables such as radical changes in education system may have significant influence on loan repayment. Participation of farmers in non-farm employment and good crop performance could be a function of the farmers' education. The fact that the farmers' education on loan repayment is not important as a factor influencing loan repayment may indicate that it is special education for the farmers that could be more meaningful than just knowing how to read and write Swahili and English.

Incidentally, other factors such as availability of market for farm produce, interest rate and arrangement for loan recovery which were not incorporated in our model were considered to be important determinants of loan repayment by farmers in the area of study. Lack of a ready market for the farm produce immediately after harvest results in excess supply on the market and hence low price of the produce resulting in low income and poor loan repayment. If the market for the farm produce is available at the time when the farmers are faced with problems which according to them require quick financial attention then it may also result in diversion of revenue from sales of the farm produce to other uses. In some cases

where market for farm produce is made available by some of the institutions, farmers evade repaying the loan by selling the produce to other institutions or marketing agents. High interest rates make it impossible for the farmers to pay both the principle and interest payments.

## 5.2 Policy Implications

Several policy measures to deal with poor loan repayment by smallholder farmers are suggested by the findings of the study summarized above. We consider the policy measures in this section.

To improve smallholder loan repayment performance, we have to minimize diversion of loan funds. To minimize diversion of loan funds, loans should be issued in time and adequate supervision and advice should be provided. Late loan issue can be avoided if late application for and approval of loans can be discouraged. This can be achieved if the farmers are informed of the stipulated loan application time. Late applicants can be made to pay a fee or be denied application forms. The lending institutions can make the stipulated periods known to the farmers through extension officers, village barazas and by hanging posters at the various shopping centres. Late loan approval due to lack of enough staff to assess the application forms should be countered by increasing the staff especially at the time when the forms are many. Diversion of loan funds can also be reduced when the loan funds for specific farm activities are given at the time they are needed. For example, fertilizer meant for top dressing should be given at the time when it is to be used.

Supervision and advice to the farmers should be increased to reduce loan diversion and achieve good loan repayment record. The fact that technical advice and loan supervision are adequate may only be a necessary condition for achieving the above two. A sufficient condition entails adequate supervision and advice aimed



at (i) checking proper use of the loan funds (ii) offering advice on improved farming methods (iii) ensuring that the previous advice is being followed and (iv) establishing good relationship between the lending institutions and farmers. The first condition ensures minimization of loan funds diverted while the second, third and fourth ensure good loan repayment record by the farmers.

To achieve the above conditions, a schedule for visiting farmers who borrow agricultural loan funds should be worked out and strictly followed. This schedule should be detailed indicating which farmer is to be visited on a particular day and what advice is to be given. Getting information from the farmers themselves is the best way of ensuring that the type of advice they get is the most appropriate. Combined effort by both agricultural extension officers and agents of the lending institutions could be used to achieve this end. Each officer should be assigned to at least a manageable number of farmers that he can visit, supervise and advise adequately within a specified period of time. Since extension officers advise the farmers on behalf of loaning institutions, they should be given suitable monetary and other incentives to sustain their interests in carrying out the duty effectively. After all, if the institutions used their own officers to carry out this task they would pay them large sums of money.

Introduction of new high value crops could help increase the farm income and hence the ratio of farm income to loan funds advanced to farmers. Horticulture crops and coffee which are high value crops have a high potential in the study area. Only a few farmers have planted these crops in the area. Many farmers should be encouraged to grow coffee and horticulture crops on a portion of their land to help boost their farm income. Farmers who want to grow these crops should be provided with credit facilities and the necessary technical advice. However, concentration on a few of these farming activities which contribute highly to income by the farmers

can also improve loan repayment performance. This will take a long time to implement but it may have a good effect on loan repayment by smallholder farmers in the long run.

Lugari has a high potential for grade cattle but farmers do not keep them because they are not resistant to diseases and also lack grazing land. The introduction of grade cattle especially for milk production by practicing zero grazing can help increase farm income because the present price of milk is high. The demand for milk is also high given that it is consumed by primary school children countrywide. The success of keeping grade cattle depends on the availability, adequacy and reliability of the technical advice and veterinary services to the farmers. The number of qualified veterinary officers in the study area should be increased to ensure that these services are provided adequately and that the advice is reliable.

To improve loan repayment performance by smallholder farmers, there should be an increase in use of purchased farm inputs which include fertilizers, improved seeds and pesticides. High prices of these inputs discourages their application. Unfortunately, the recent decontrol of fertilizer prices has resulted in further increase in inputs price and there is little hope for the price to reduce in the near future since the suppliers of the inputs aim at profit maximization. There is need to control the inputs price again to encourage the farmers to make more use of the inputs. The prices can be lowered if inputs price are subsidized by the government. Farmers should also be educated on how to make proper use of the inputs. Extension officers have the task of carrying out this duty effectively.

Special education for the farmers could help improve loan repayment performance by smallholder farmers. The present 8.4.4 system which offers education in such fields as agriculture could contribute a lot in future towards loan repayment.

In the short run, there is need to make adult literacy programmes which were revived in early 1979 more useful and attractive to rural population who are predominantly small scale farmers by introducing teaching of agriculture as a subject. The programme should include teaching the farmers how to use purchased farm inputs, improved farming methods, use of credit, importance and consequences of credit repayment. This can be achieved if the government can provide qualified teachers for these subjects.

A ready market for the farm produce can avoid existence of a glut on the market and prevent a fall in the price of the farm produce immediately after harvest. The market can be readily available if the lending institutions themselves are responsible for the buying of farm produce from farmers. This arrangement is convenient for loan recovery and loan repayment administration. Loan repayment can be effected by lending institutions deducting installments from farmers revenue from the farm produce sales at the buying centres. This is already happening in cooperative societies but there is need to extend it to other lending institutions.

The lending institutions should liaise with one another and with marketing agents so as to minimize evasion of loan repayment that arises when farmers refuse to sell their farm produce to the institution they borrowed funds from. Effective tie-up arrangements for both market products and supply of inputs are necessary for improving loan repayment performance. Organized arrangements for marketing are necessary in all cases where surplus is realized. It may be worthwhile to try to integrate credit and marketing agencies in one body who will synchronize farmers credit needs and marketable surplus. This can only be achieved if alternative channels for buying the farm produce not known to the lending institutions can be scaled.

The buying centres should be established at every marketing centre in the

study area to reduce the transport cost that farmers incur in transporting their farm produce for sale. This can easily be done since there are spacious buildings at these market centres that can be rented cheaply for the purpose of being used as buying centres for the farm produce.

Interest rates should be levied according to the profitability of the project or activities financed by the loan funds because high interest rate affects the loan repayment performance of the farmers in that farmers are not able to repay the principle and the interest payment. Double interest charges should be avoided. This is possible if each of the lending institutions is responsible for lending and recovering of its loan funds directly.

### 5.1 Implications of the Study Findings to Kenyan Agriculture

The findings of the study are applicable in many of the agricultural areas in Kenya for a number of reasons .

First, the bulk of Kenya's arable land is occupied by small scale farms. The farmers who provided data for this study were small scale farmers. Second, the provision of agricultural credit is one of the strategies being used to speed up agricultural development in Kenya's small scale farm sector. One of the setbacks of smallholder credit programs has been poor loan repayment. This study is concerned with factors affecting the smallholder credit repayment performance, an issue which is very important for the success of many smallholder credit programs.

With this few remarks, we conclude that this study is relevant to Kenya's agricultural sector and it implies the following:

Use of agricultural credit for the intended purpose, attaining farm income such that the ratio of farm income to loan funds advanced to the farmers is high, provision of a ready market for the farm produce, proper use of purchased farm

inputs, concentration on a few farming activities which contribute highly towards farm income, changing the attitude of the farmers towards loan repayment so that they bear the feelings and opinion that loan should be repaid and adequate supervision and advice among other things can improve loan repayment performance by smallholder farmers. In addition to the above stated positive measures, timely issue of loan funds and adequate supervision and advise can help reduce the proportion of loan funds diverted to non intended uses.

## BIBLIOGRAPHY

- Agricultural Finance Corporation; Annual Reports and Accounts 1980-86.
- Allard R. J. (1974); *An Approach to Econometrics*. (London: IBM Press Roman)
- Boakye-Dankwa K. (1979); *A Review of Farm loan Repayment Problem in low Income countries*. (Columbus: Ohio State University).
- Cabrera G.S. (1967); "Recovery Problems in Phillipines" *International Cooperative Alliance Agricultural Cooperative in South East Asia*. (London: Asia Publishing House).
- Central Bank of Kenya (1988); "Economic Report for the Financial Year Ended 30th June 1988." (Nairobi: Central Bank of Kenya).
- Dhrymes P. J. (1974); *Econometrics: Statistical Foundations and Applications*. (New York: Harper and Row)
- Donald G. (1976); *Credit for Small Farmers in Developing Countries*. (Boulder, Colorado: Westview Press).
- Gachanja J.W. (1979); "Factors Determining Loan Repayment Performance Among the IADP Small Scale Farmers in Machakos and Kakamega Districts". Msc. Thesis, University of Nairobi.
- Gunatilleke G. ed (1973); "The Cooperative Systems of Small Farmers Credit in Sirilanka", *AID Spring Review of Small Farmer Credit Vol.X*. (Washington D.C.: Agency for International Development).
- Harmsworth J.W. (1973); "Social Economic Factors Inhibiting Loan" Working Paper No. 87, Nairobi: IDS, University of Nairobi.
- (1974); "Introduction to Problems of Loan Repayment on Settlement Schemes in Kenya." Working Paper no. 196. IDS, University of Nairobi.
- (1979); "Land on Loan: An Analysis of Factors that Affect Loan Repayment on Million Acre Schemes" Working Paper no.355. IDS, University of Nairobi.
- Heyer J. (1973); "Smallholder Credit in Kenya" Working Paper no. 85. Nairobi: IDS, University of Nairobi.
- Johnston J. (1984); *Econometrics Methods*. (Singapore: McGraw-Hill).
- Kosgei T. (1989); "Our Defaulters" In: *AFC Newsletter no. 36* Nairobi.
- Lele U. (1974); "Designing Rural Development Programmes: Past Experience in Africa. Discussion Paper no. 213, IDS, University of Nairobi.
- Miller L. (1975); *Present and Potential Use of Credit by Small Maize and Rice Farmers in Western and Kwara States*. (Lagos: University of Ibadan).

- Mosher A.T. (1966); *Getting Agriculture Moving: Essentials for Development and Modernization*. (New York: The Agricultural Development Council Inc.).
- Msambichaka D.A. and Mabele R.M.B. (1976); *Agricultural Credit and Development of Ujamaa Villages in Tanzania*. (Dar es Salaam: University of Dar es Salaam).
- Pindyck R.S. and Rubinfeld D.L. (1976); *Econometric Models and Economic Forecasts*. (Singapore: McGraw-Hill).
- Raikes P. (1989); "Savings and Credit in Rural Kenya: An Example From Kisii" Working Paper no. 466. IDS, University of Nairobi.
- Republic of Kenya (1984); *Agriculture and Livestock Development Plan 1984/88* (Nairobi: Government Printer)
- *Development Plans. Various Issues* (Nairobi: Government Printer).
- (1987); *Economic Survey* (Nairobi: Government Printer).
- (1980); *Integrated Rural Survey 1976-79*. (Nairobi: Government Printer).
- *Kakamega District development Plans. various issues* (Nairobi: Government printer).
- (1981); *Population Census 1979* (Nairobi: Government Printer)
- (1986); *Sessional Paper no. 1 on Economic Management for Renewed growth*. (Nairobi: Government Printer).
- Robert N.R. (1980); *A Proposal for the Agricultural Systems Support Project in Kenya* Washington D.C.
- Ross C.R. (1951); *An Introduction to Agricultural Economics*. (New York: McGraw-Hill).
- Vasthoff J. (1968); *Small Farm Credit and Development : Some Experiences in East Africa with Reference to Kenya*. (New York: Humanities Press Inc).
- Von Pische J.D.(1974); *Credit Use and Development on Nineteen Murang'a Farms 1969-73* IDS University of Nairobi.
- Von Pischke J.D. (1976); "A Critical Survey of Approaches of Role of Credit in Smallholder Development" Discussion paper no. 233. IDS. University of Nairobi.
- Von Pischke J.D. (1977); "The Political Economy of Farm Credit in Kenya; Ph.D Thesis" University of Glasgow.
- Walnaina S.N. (1977); "Some Aspects of Smallholder Credit in Githunguri." LLB Desertition: University of Nairobi.

Weisal P. (1973); "Loan Repayment a Second Look." Unpublished.

Weisal P. (1974); "Another Look at Small Farm Credit: A Case Study in Western Kenya". (Paris: OECD Development Centre).



APPENDIX 1

Location Of District



Source: Kakamega District Development Plan, 1989-93



## APPENDIX 2

## Questionnaire:

Greetings and Introduction.

Explain Purpose of the interview and ask for permission to conduct it

1.0 Personal Background.

1.1 The person interviewed. a) farmer-----, b) the wife-----  
c) son ----- d) daughter ----- e) other person  
(specify) -----.

1.2 Age of the farmer ----- sex -----,  
Marital status -----.

1.3 General education level of the farmer (a) farmer can read and  
write.-----, (b) cannot read and write -----.

1.4 For how many years have you been farming? -----,

1.5 Are you also engaged in off-farm employment? yes ---- no ---

1.6 If yes, specify whether; a) you run off-farm business-----,  
b) are wage employed -----, or  
c) both (a) and (b)-----.

1.7 If you run off-farm business, what activities and  
approximate annual (or monthly) income you draw from them.

<i>Activities</i>	<i>Approx. annual income</i>
-----	-----,
-----	-----,
-----	-----,
-----	-----,

1.8 For how long have you been running the business?---- years.

1.9 If you are wage employed specify type of job -----.

1.10 What is your approximate annual (monthly) income.

0 - 500  
501 - 1000  
1001 - 1500  
1501 - 2000  
2001 - 3000  
3001 - 4000  
4001 and over.

## 2.0 Agricultural Credit:

2.1 Have you got any agricultural credit in the last three years?  
 yes ----- no -----.

2.2 If yes what year did you get the loan? -----.

2.3 How much credit did you get? Kshs. -----.

2.4 From which institution?-----.

2.5 For what purpose was the credit granted?

a) Purchase of fertilizer-----.

b) purchase of improved seeds -----.

c) purchase of livestock -----.

d) purchase of insecticides -----.

e) others (specify) -----.

2.6 Was the loan given to you enough to cover the costs of the project?-----

2.7 On what items did you actually spend the loan funds?

<i>Item</i>	<i>Amount</i>
a) -----	-----
b) -----	-----
c) -----	-----
d) -----	-----
e) others (specify) -----	----- -----

2.8 What reasons did you have for spending the loan on items you specified in (2.7)?  
 -----  
 -----

## 3.0 Farm dependents.

3.1 How many people reside permanently in your home since the time of loan issue? no.-----.

3.2 How many are dependant on you? -----.

3.3 Amount of school expenses (i.e college fees, school fees, building funds and other expenses) incurred in the year of loan issue. Ksh.-----.

- 4.0 Farm Operation, Output and Farm Income:
- 4.1 How big is your farm? ----- acres.
- 4.2 How many acres do you have under cultivation?----- acres.
- 4.3 What size of your land was under each of the following activities in the year of loan acquisition?
- a) Maize ----- acres
- b) Beans ----- acres
- c) Millet ----- acres
- d) Sunflower ----- acres
- e) Pasture ----- acres
- f) Others (specify) ----- acres
- 4.4 How much did you harvest from each of the following crops in the year you acquired the loan?
- a) Maize ----- Kgs(or 90kg bags)
- b) Beans ----- Kg (or 90 Kg bags)
- c) Millet ----- "Korokoros"/debes.<sup>1</sup>
- d) Sunflower ----- kg
- e) Other (specify) -----.
- 4.5 How much of the above mentioned crops harvested in that year were sold?
- a) Maize ----- Kg (or 90Kg bags)
- b) Beans ----- Kg (or 90 Kg bags)
- c) Millet ----- "Korokoro" or debes
- d) Sunflower ----- Kg
- e) Others (specify)-----.
- 4.6 At what price did you sell?
- a) Maize ----- Kshs/Kg
- b) Beans ----- Kshs/Kg
- c) Millet ----- Kshs/"Korokoros"
- d) Sunflower ----- Kshs/kg.
- e) Others (specify) ----- Kshs.
- 4.7 Do you keep livestock on this farm? -----.

<sup>1</sup>One Korokoro of millet weigh about two kilograms while one Debe of millet weigh about sixteen kilograms.

4.8 If yes how many of the following did you have during the year of loan acquisition?

<i>Type of Livestock</i>	<i>Number</i>
Grade and Local cattle:	
bulls	-----
milk cows	-----
calves	-----
oxen	-----
sheep and goats	-----
others (specify)	-----

4.9 Approximately how much money do you make monthly from the sale of milk since you were issued with loan? Kshs.-----.

4.10 Livestock sales since loan issue?

<i>Item</i>	<i>No</i>	<i>Year of sale</i>	<i>Code of Origin</i>	<i>Price in Ksh</i>
cattle	-----	-----	-----	-----
	-----	-----	-----	-----
	-----	-----	-----	-----
Sheep	-----	-----	-----	-----
and Goats	-----	-----	-----	-----
	-----	-----	-----	-----
	-----	-----	-----	-----
Others	-----	-----	-----	-----
(specify)	-----	-----	-----	-----

Code of Origin : Born on Farm (b) Purchased by credit (c)  
Other origin (o)

4.11 Have you sold part of the land since the time you were issued with loan? ----- . If yes, specify (a) Year of sale ----- .  
 (b) Acres sold -----  
 (c) Total amount in Ksh. -----  
 (d) Reason for sale -----

5.0 Purchased farm inputs.

5.1 Approximately how much money did you spend on the items below in the year of loan acquisition?

- a) Fertilizer ----- Ksh. per acre per year.
- b) Improved seed ----- Ksh. per acre per year.
- c) Insecticides ----- Ksh. per acre per year.
- Others (specify) ----- Ksh. per acre per year.

6.0 loan repayment.

6.1 What was the loan repayment period? ----- yrs.

6.2 Was the loan to be repaid in lump-sum or in installments?  
-----.

6.3 How much have you repaid? Ksh. -----.

6.4 How much is overdue and has not been repaid? Ksh. -----.

6.5 For how long has it been overdue? ----- year.

6.6 Is the repayment done in cash or in kind? -----.

6.7 Approximately what is the distance between your home and the lenders' office or loan repayment point? ----- Km.

6.8 Before borrowing credit from the institutions you specified did you have any other overdue debt? yes ---- no -----.

6.9 If yes, specify; a) the source of the loan.-----.

b) amount given -----.

c) purpose for which it was given -----.

d) amount overdue -----.

6.10 What problems do you encounter in trying to repay the loan funds?  
-----.  
-----.  
-----.

7.0 Farmers Attitude Towards Loan Repayment.

7.1 From your experience of use of the loan what is your opinion and/or feelings about repaying the loan?

a) loan should be repaid. -----.

b) loan should not be repaid. -----,

7.2 What reasons do you have for your answer above  
-----,  
-----,  
-----.

7.3 (for those who have not completed repayment) Given enough money to enable you repay the loan, would you prefer :(a) repaying the loan right away or (b) investing the money in other profitable projects? -----,

8.0 Loan Administration

8.1 Do you receive any visits from extension officers? yes --- no -----, If yes on the average how many such visits do you receive in a year? -----,

8.2 Were you ever visited by officials from the lending institutions on the farm? ----- If yes, how many times did they visit you every year since loan was issued to you? -----,

8.3 Do you ever attend farmers training courses in the near by farmers training institute or on demonstration farms?-----, If yes how many such courses did you attend in the year when you acquired loan?----- and years after loan acquisition? No.----- (average).

8.4 Purpose of training attended -----,

8.5 Have you ever attended some local barazas where Extension Officers addressed you? -----, How many such barazas do you attend every year? -----,

8.6 Are you satisfied with the extension services and advice from officers of lending institution? yes ----- no -----,

8.7 If no, give reasons.  
-----,  
-----,



9.0 General

In your opinion what should be done to improve loan repayment by farmers?

- a) -----
- b) -----
- c) -----
- d) -----

THANK YOU

Personal comments -----  
-----  
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