

## FACTORS AFFECTING REPAYMENT PERFORMANCE ON SMALL FARMS: A SOUTH KOREAN CASE\*

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### I. Introduction

Agricultural credit programs in most of the developing countries are increasingly suffering from high rates of delinquency. It is quite possible that the increasing trend of delinquency may freeze the continuation of the credit supply if the problem is not tackled by a realistic remedy. The effectiveness of the remedy would largely depend upon the proper diagnosis of causes responsible for the farmers' repayment performance. The identification of factors influencing the farmers' repayment performance on the basis of empirical study at farm level is, thus, of great importance.

Many factors are considered to be responsible for poor repayment performance. They are, among others, low rates of return, diversion of credit to unproductive purposes, high propensity to consume, and lack of proper loan supervision. Theoretically the return to investment may affect the farmers' repayment capacity as higher rates of return may bring in more income which will facilitate prompt repayment. It is often alleged that the diversion of credit to unproductive purposes results in a delinquency problem (6, Reserve Bank of India). This assumes that a large part of credit is used for consumption purpose mainly due to high propensity to consume and hence does not contribute to improve farm productivity through which the loan has to be repaid (9, Sisodia). On the other hand it is also argued that the loan repayment is a kind of moral problem (3, Millard). This argument insists that the farmers' repayment performance may be enhanced by introduction of adequate loan supervision.

The causes for poor repayment are not simple. They vary from one type of farm to another as the farm situation changes. The purpose of this study is to measure farmers' repayment performance and to examine factors affecting repayment performance on small farms in Korea.<sup>1</sup>

\*The views expressed in this paper are those of the author and do not necessarily represent the views of National Agricultural Cooperative Federation.

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<sup>1</sup>Most of Korean farms belong to small farms mainly due to "Land Reform Regulation 1953", in which maximum ceiling of 3 hectares per farm was enforced.

## **II. Methodology**

Data used in this study are based on a survey of 207 sample farms in Korea. The sample was drawn from four adjacent villages purposely chosen from the south-western part of the Korean peninsula. The area is one of the important agricultural areas in the country. Approximately half of the farms in the sample villages are randomly selected and investigated with the help of a pre-designed questionnaire on the basis of farmers' recall during the survey period of 1975–1976.

Two classification criteria, i.e., (1) size of the farm and (2) type of farm, are employed for the entire analysis of this study. Regarding the size of holding only two size groups are introduced. They are (1) Less-than-One-hectare farm (LO farm) and (2) More-Than-One-hectare farm (MO farm). The sample farms are further classified into two types, i.e., (1) subsistence farm and (2) non-subsistence farm. Identification of subsistence or non-subsistence is based on the degree of market orientation since it reflects, in general, the nature of changing agriculture in Korea.<sup>2</sup> The subsistence farm is defined as one where the proportion of marketed farm produce constitutes less than 60 per cent of total farm produce,<sup>3</sup> whereas non-subsistence, as more than 60 per cent. An immediate consequence of this classification is that all the more-than-one-hectare farms (MO farm) fall into the category of “non-subsistence farm”. On the other hand it is also found that there are two sub-groups in the less-than-one-hectare farms (LO farm), namely, (1) less-than-one-hectare-subsistence farms and (2) less-than-one-hectare-non-subsistence farms. Thus the entire sample farms are finally classified into three groups, namely,

- (1) Less-than-One-hectare Subsistence farm (LOS farm)
- (2) Less-than-One-hectare-Non-subsistence farm (LON farm)
- (3) More-than-One-hectare-Non-Subsistence farm (MON farm).

It is also noteworthy that all the so-called progressive farms or vinyl farms with less-than-one hectare come under “LON” farm group. Evidently the reason why the vinyl farm of LO farms falls in this category is not the size of the farm holding but the certain amount of marketed surplus on the farm.

## **III. Measurement of Repayment Performance**

The repayment performance is measured against a repayment requirement. The repayment requirement is computed on the basis of the amount that a farmer has to repay during the survey year.

<sup>2</sup>Although theoretically this should be judged from the view point of farmers' motivation, it is too often conflicted with farming results.

<sup>3</sup>Marketed farm product includes farm products sold, government purchase, tax and public charges paid and percentage share was computed on the basis of all the products produced on the farm.

A repayment in any period must be related to the loan amount that the farmer should repay during the period in relation to his debt and borrowing. The mere size of repayment does not indicate any degree of the farmers' repayment performance. Therefore, the repayment in the survey year would be actually seen against the debt outstanding at the beginning of the survey year and the borrowings made during the survey year. However all the outstanding debt and borrowings need not necessarily be paid back during the year since some of them belong to the medium-and long-term credit. Some of the short-term borrowings whose date of maturity falls beyond the date of reference (i.e., the date of enquiry) also have to be excluded from the computation of repayment requirement. An amount of interest to be paid by the end of the survey year in relation to debt and borrowing should be included from the repayment requirement. According to this definition, the repayment is computed by summing up the following three components, namely:

- (1) The debt outstanding for more than one year at the beginning of the survey year,
- (2) The borrowings which fall due during the survey year,
- (3) The amount of interest to be paid by the end of the survey year.

Item one is included since this amount becomes due during the year. Item two covers about 40 per cent of the current borrowings contracted during the year of investigation. About 60 per cent of the current borrowings were contracted just 3 months prior to the reference period and the date of their maturity falls beyond the date of reference. Hence those amounts are excluded from the computation of repayment requirement. The borrowings related to the medium-and long-term credit are also excluded from the computation of repayment requirement as mentioned earlier. Item three covers the amount of interest to be paid by the end of the survey year.

It must be noted that the loan maturity for the purpose of this study is based on the agreement between lender and borrower with respect to its period for which the money is loaned and the renewal of the loan is considered as a fresh loan in this study. It must be also noticed that in the case of non-institutional credit the repayment requirement may be neither explicitly formulated nor rigidly enforced by the private credit agencies. However this is also based on their original agreement whether written or oral. It is also possible that farmers may repay their loan before its due date under certain circumstances. However this is not considered in this study since it is very rare and exceptional.

The repayment performance is accordingly measured as a proportion of repaid amount to total repayment requirement. Table 1 shows the farmers repayment performance by different farm types in all loans. Tables 2 and 3 represent the repayment performances of institutional and non-institutional credit respectively.

The actual repayment performance works out to about 72 per cent of repayment requirement. It varies, However, according to the types of farm.

The LON farm shows the highest performance and the MON farm the lowest.

In the case of LON farm 86 per cent is repaid during the year whereas only 69 per cent and 62 per cent are paid back by LOS and MON farms respectively. The LOS farm performs better than the MON farm in respect of repayment performance. In the case of MON farm the repayment performance appears to be relatively low because of the larger amount of debt outstanding at the beginning of the year, as compared with the other two types of farm.

There is hardly any evidence that farmers' repayment performance is better in the case of non-institutional credit. As shown in Tables 2 and 3 the repayment performance according to credit sources does not show much difference. They are more or less the same, showing around 72 per cent in both the cases. It is also observed that there is not much difference in the repayment performance between the institutional credit and the non-institutional credit according to farm types. In all the three types of farms, the repayment performance of the non-institutional credit is little better than that of the institutional credit but the difference is only marginal as shown in Tables 2 and 3. It is interesting to note that the LON farm represents the highest among them, both in respect of institutional and non-institutional credit, showing approximately 85 per cent and 86 per cent respectively. In the case of LOS farm, the repayment performance of institutional credit is 67 per cent and that of non-institutional credit shows about 69 per cent. The repayment performance of the MON farm is the lowest among the three farm types both in the case of institutional as well

**Table 1** Repayment Requirement and Repayment Performance by Farm Type—All Loans—Korea, 1976

Item	Unit	Overall	LOS farm	LON farm	MON farm
① Debt outstanding for more than one year at the beginning of the survey year	100 Won	1585.24	934.76	1816.01	2133.38
② Borrowings which fall due by the end of the survey year	100 Won	771.10	438.74	997.28	948.71
③ Amount of interest to be paid by the end of the survey year	100 Won	318.81	202.87	350.82	424.17
④ Repayment requirement (① + ② + ③)	100 Won	2675.15	1576.37	3164.11	3506.26
⑤ Repayment made during the survey year	100 Won	1928.00	1093.00	2704.00	2183.00
⑥ Repayment performance (⑤/④)	%	72.02	69.33	65.45	62.26

**Table 2** Repayment Requirement and Repayment Performance—  
Institutional Credit—Korea, 1976.

Item	Unit	Overall	LOS farm	LON farm	MON farm
① Debt outstanding for more than one year at the beginning of the survey year	100 Won	486.52	253.30	684.65	579.07
② Borrowings which fall due before the end of the survey year	100 Won	114.10	47.73	159.52	142.25
③ Amount of interest to be paid at the end of the survey year	100 Won	69.72	39.23	99.03	77.41
④ Repayment requirement (① + ② + ③)	100 Won	670.34	340.26	943.20	798.73
⑤ Repayment during the survey year	100 Won	484.37	228.66	800.41	489.62
⑥ Repayment performance (⑤ / ④)	%	72.26	67.20	84.86	61.30

**Table 3** Repayment Requirement and Repayment Performance NON-  
Institutional Credit—Korea, 1976.

Item	Unit	Overall	LOS farm	LON farm	MON farm
① Debt outstanding for more than one year at the beginning of the survey year	100 Won	1098.72	681.46	1131.36	1554.31
② Borrowings which fall due before the end of the survey year	100 Won	657.00	391.01	837.76	806.46
③ Amount of interest which should be paid at the end of the survey year	100 Won	249.09	163.64	251.79	346.76
④ Repayment requirement (① + ② + ③)	100 Won	2004.81	1236.11	2220.91	2707.53
⑤ Repayment made during the year	100 Won	1460.73	864.34	1903.59	1693.38
⑥ Repayment performance (⑤/④)	%	72.86	69.92	85.71	62.54

as non-institutional credit.

#### **IV. Factors Affecting Farmers' Repayment Performance**

Factors which are considered to affect the farmers' repayment performance may be broadly classified into four categories as (1) ability of the farmer to repay (2) availability of cash (or degree of monetization) (3) cost of credit and (4) other socio-institutional factors which influence the farmers' willingness to repay.

The ability to repay would depend to a large extent on the farm economic activity. It is, for a large part, the use of borrowed funds that has resulted in productivity improvement, unless there is a considerable amount of non-farm earning. It is quite possible for farmers that productivity gain as an end result of productive use of credit would tend to cover the loan repayment, thereby resulting in better repayment performance (10, Tinnermeier). However as monetization or commercialization of farm economy takes place, the farmers' repayment performance may be favourably affected by the magnitude of farm cash income. In an economy where farm transactions are mostly monetized, the size of cash income will influence the repayment since the repayment should be made out of cash on hand.

Some of the farm credit may be diverted to unproductive purposes, affecting adversely the repayment (6, Reserve Bank of India). The credit which has not contributed to farm production may result in repayment delinquency. Even when credit is used for profitable investment, the additional farm receipts generated may be consumed away either because of low level of farm income or because of preference for extravagant expenditure (8, Shah and Singh).

Cost of credit or rate of interest is another factor which may influence the farmer's repayment performance. It is theoretically possible that farmers repay the high cost loan more promptly than the cheap loan to take advantage of differential interest rates if the rate of return on farm investment is low. However the data presented here did not bear out this possibility.

Part of low performance in farmers' repayment may be due to socio-institutional factors such as loan supervision, social and political power, etc. These factors are closely related to farmers' willingness to repay. Farmers sometimes do not consider the repayment of loans, particularly in the case of institutional credit, a compelling obligation (3 Millard). But this inertia on the part of farmers to repay may be lessened by adequate and proper loan supervision.

Natural calamities such as floods, drought and cyclone, etc, can also result in a repayment problem. Especially it is true in the absence of immediate relief programs. However the poor repayment caused by natural disasters is a special or exceptional case which can occur only in the

presence of this vulnerability.

It is often observed in many developing countries that small farms are in general better in their repayment performance than larger farms (5, Mohanan). The better repayment of small farms can be partly explained by substantial improvement of their income resulting from adoption of new technology made possible by credit. It is also possible that small farmers are prompted to repay because of their weak economic and political power (4, Miracle).

However there are very few studies bearing on this issue. The type of data required for an analysis of delinquency in repayment is hard to come by. The few studies which have focussed attention on the repayment problem have at best indicated the association of factors in a very general manner (7, Reserve Bank of India). No rigorous analysis leading to clear identification of factors was made. An attempt is made to test the significance of different factors which are considered relevant to the farmer's repayment performance. A linear regression model is fitted to the data collected from a sample of 207 farmers in South Korea.

The model used for the analysis is as follows:

$$Y = A + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + b_7 X_7 + b_8 X_8 + b_9 X_9$$

where

$Y$  = The proportion of repaid amount to total repayment requirement

$X_1$  = Size of holding (hectare)

$X_2$  = Rate of interest paid (percentage per annum)

$X_3$  = Loan supervision (index)

$X_4$  = Proportion of loan used for productive purposes

$X_5$  = Gross Farm receipt per hectare (100 Won)

$X_6$  = Sale of farm products (100 Won)

$X_7$  = Non-farm receipt (100 Won)

$X_8$  = Proportion of farm produce consumed

$X_9$  = Farm household cash expenditure (100 Won)

$A$  = Constant

$b_i$  = Parameters to be estimated

The dependent variable is the farmer's repayment performance which is measured as the proportion of the requirement. It is measured in terms of percentage on the basis of per farm.

Size of holding,  $X_1$ , is used as the independent variable in the regression analysis since the farm land is closely correlated with the gross farm income which represents the ability of the borrower to repay during the year. The size of holding is measured in physical terms (i.e. hectares of crop area). This is a concept of actually cultivated area which coincides almost with the area owned by farmers since actual land-leasing is found almost negligible in the sample because of the "Land Reform Regulation 1953" in Korea

Rate of interest,  $X_2$ , is expected to influence farmers repayment per-

formance. Implicit is the assumption that the higher the rate of interest the greater will be the repayment performance of the farmer. Nominal rate of interest computed from the actual amount of interest paid is used.

A positive correlation is hypothesised between loan supervision and repayment performance. Supervision is measured as an index. A weighted index method rating each repayment from one to four according to the nature of the repayment demand is employed for computing the loan supervision index. Repayment demand is classified into four categories, namely, (1) the first case which the borrower does not receive any kind of pressure for the repayment of the loan, (2) the second case in which the borrower has received an information note regarding the due date and the amount to be repaid, etc. This is a common practice of the institutional credit. In the case of non-institutional credit, the case in which the indebted farms are orally informed by the creditor of the due date is treated as the same as the information note in the institutional loan, (3) the third case in which the borrower has received the demand note in the case of institutional credit or two or three oral demands for repayment from the non-institutional lenders (4) the fourth case in which officials had visited the debtor's house to urge the repayment sometime after receipt of the demand note or more than 3 oral demands from the non-institutional lenders for the repayment of the loan. The first case is given weight of one, the second, two, the third three and the fourth four respectively. The Laspayres' method is applied to produce the final index number of loan supervision for all the sample farms on the basis of the loan repayment weighted.  $X$  is the proportion of the amount of loan used for productive purpose. A positive relationship between the productive use of the loan and the repayment performance is expected. Of course this postulated positive relationship operates via increase in income.

$X_5$  and  $X_6$  represent gross farm receipt per hectare, and value of the sale of farm products, respectively. It is assumed that they are correlated with the farmer's repayment performance as the farmer indicates the land productivity and the latter the extent of farm cash income. Both variables are measured in value terms. Non-farm receipt per farm,  $X_7$ , is thought to influence the farmers' repayment performance as it is supplementary to the farm income in most cases.

Both farm family consumption  $X_8$ , and farm household cash expenditure  $X_9$ , are included in the regression since the more the family consumption and the more the farm household cash expenditure, the less may be the leftover for repayment purpose. These variables are also measured in value terms.

## **V. Results of the Regression Analysis and Their Interpretation**

Four separate equations are fitted; one overall function for all the 207



sample farms, and three separate equations for the three different farm types. Multiple linear regression models are used to specify functional relationship and least squares method is adopted to estimate the regression coefficients of the independent variables.

Various factors influencing the farmer's repayment performance are analysed for the overall function as well as three different farm types by examining their statistical significance levels. Analysis and interpretation of the regression results for the overall function is followed by those for each farm type.

## VI. Overall Function-All Farms

The estimated regression equation for all the 207 sample farms is as follows:

$$\begin{aligned}
 Y = & -671.818 - 830.2039 X_1 + 6.3404 X_2 + 208.1339 X_3 \\
 & (306.4219) \quad (344.9913) \quad (4.7116) \quad (41.0842) \\
 & + 5.1151 X_4 + 0.1917 X_5 + 0.0692 X_6 \\
 & (3.9264) \quad (0.0362) \quad (0.0206) \\
 & + 0.0840 X_7 + 0.8782 X_8 - 0.2114 X_9 \\
 & (0.2602) \quad (1.0646) \quad (0.2640)
 \end{aligned}$$

$$R^2 = 0.4445$$

$$F - \text{value} = 17.5376$$

$$d.f = 197$$

(Figures in brackets indicate their standard errors)

In the above equation, the coefficient of multiple determination ( $R^2$ ) is not high but high  $F$  - value suggests that it is significant. The set of explanatory variables in the equation explains about 44 per cent of the variation in repayment performance. Low level of  $R^2$  is not unexpected since some of the important variables such as farmers' social and political power and degree of guaranteeing new credit after repayment, etc., are not included in the equation.

It is quite possible for some farmers that they have to repay their loan promptly because of weak social and political power with them. Some may be able to make arrangements to postpone repayment mainly through their influence with the creditor. Besides some farmers may hesitate to repay the loan because there is no assurance from the creditor that he will get another loan when he needs it.

The reason for the exclusion of the above factors is mainly due to the difficulty in getting reliable information on them. Further, difficulties in quantifying these variables may also lead to a misclassification error in the regression analysis.

The independent variables are not highly correlated with each other

and Klein's test also reveals that there is no serious multi—Collinearity problem in the function (1, Klein and 2, Koutsoyiannis). Accordingly all the estimates in the equation are considered unbiased.

The above estimated equation shows that the four explanatory variables, namely, the size of holding,  $X_1$ , the loan supervision,  $X_2$ , the gross farm receipt,  $X_3$ , and the sale of farm product,  $X_4$ , turn out to be significant factors in explaining farmer's repayment performance.

The regression coefficient associated with the size of the holding is significant at the probability level of about 5 percent. It is negatively associated with the dependent variable, the repayment performance. This may explain why smaller farms perform better in their repayment.

The regression coefficient regarding loan supervision is also significant at the probability level of 1 per cent. The relationship between loan supervision and repayment performance is positive in the equation. This explains the importance of loan supervision in farmer's repayment performance. The more intensive the loan supervision, the better repayment performance is expected.

The regression coefficients relating to gross farm receipt per hectare,  $X_5$ , and sale of farm product,  $X_6$ , turned out to be significant at the probability level of about 1 per cent. Their relation with the repayment performance is positive. The variables  $X_5$  and  $X_6$  represent nothing but land productivity and farm cash income respectively. Accordingly significance of these factors in the equation may explain the fact that the higher the farm productivity and the more the sale of farm products, the better is the farm repayment performance. About 95 per cent of repayment is made in cash rather than in kind. It is the farm cash receipt that is directly associated with farmer's ability to repay. The higher farm productivity does not necessarily mean more cash income on farm.

It is interesting to note that the non-farm receipt is not a significant factor in the equation. The non-farm receipt is generally in the form of cash receipt and supplementary to the farm income. Nevertheless this variable is not significant at any probability level. This may be because the farmers' dependency on the non-farm receipt is minor.

It is also noteworthy that none of the consumption variables, i.e., proportion of farm produce consumed,  $X_8$ , and the farm household cash expenditure,  $X_9$ , is a significant factor in repayment.

## VI. LOS Farm Function

The estimated regression equation regarding factors affecting repayment performance for 78 LOS farms is as follows:

$$\begin{aligned}
 Y = & -310.0496 - 487.837 X_1 + 12.6651 X_2 \\
 & (120.4596) \quad (805.9660) \quad (2.3773) \\
 & + 253.9062 X_3 + 2.7436 X_4 + 0.1013 X_5 \\
 & (133.7505) \quad (2.8302) \quad (0.1034)
 \end{aligned}$$

$$+ 0.7447 X_6 + 0.0584 X_7 - 1.0398 X_8 - 0.1533 X_9$$

$$(0.3878) \quad (0.0650) \quad (0.1915) \quad (0.0807)$$

$$R^2 = 0.5358$$

$$F - \text{Value} = 6.9259$$

$$d.f = 64$$

(Figures in brackets represent respective standard errors)

In the above equation the coefficient of multiple determination ( $R^2$ ) indicates that the explanatory variables explain about 54 per cent of total variation in the dependent variable, i.e., repayment performance. The high value of overall F-value also suggests the statistical significance of  $R$ . serious multicollinearity problem is observed among the independent variables and hence the estimates are considered unbiased. The regression coefficient relating to the rate of interest,  $X_1$ , is significant at the probability level of 1 per cent with a positive sign. This means that the interest rate is positively associated with repayment performance on LOS farms. The higher the interest rate the more prompt is the loan repayment. This indicates the sensitive nature of loan repayment to the loan cost in the case of LOS farms. It may be recalled that LOS farms borrow a relatively higher proportion of total credit from moneylenders either due to the exorbitant rate of interest or moneylender's pressure for repayment. LOS farms may have a tendency to repay the costly private credit more promptly than other credit.

The regression coefficient of sale of farm products,  $X_6$ , is also significant at the probability level of about 5 per cent. This means that the better repayment performance is associated with the sale of more farm product.

Both the regression coefficients related to farm consumption i.e., the proportion of farm produce consumed,  $X_8$ , and the farm household cash expenditure,  $X_9$ , are significant at the probability level of about 5 per cent and above with negative signs for both. This relationship indicates that the consumption pattern on LOS farms is one of the important factors which affects the repayment performance. Both the farm family consumption and farm household cash expenditure are inversely related to the repayment performance on the LOS farm. It means that the more the farm consumption, either the farm family consumption or farm household cash expenditure, the lower is the farm repayment performance. However it may be plausible that the farm household cash expenditure is a relatively more important factor than the farm family consumption because of the inelastic nature of the latter in a subsistence economy.

The loan supervision,  $X_3$ , also turns out to be a significant factor. It is also statistically significant at the probability level of about 5 per cent with a positive sign. The significant positive relation of this factor with the loan repayment suggests the effectiveness of such measures in the loan recoveries.

It is interesting to note that the farm productivity and proportion of loan used for productive purposes are not at all significant factors in the LOS farm equation.

## VII. LON Farm Function

The regression equation relating to farmers' repayment performance fitted to the 62 LON farms is shown as follows:

$$\begin{aligned}
 Y = & -3012.5642 + 1253.5093 X_1 + 0.9148 X_2 + 145.4011 X_3 \\
 & (995.4619) \quad (1356.2526) \quad (2.6628) \quad (54.1534) \\
 & + 8.1196 X_4 + 0.2421 X_5 + 0.3586 X_6 + 0.3478 X_7 \\
 & (7.8167) \quad (0.0740) \quad (0.0867) \quad (0.3501) \\
 & + 0.1089 X_8 - 0.2428 X_9 \\
 & (0.8414) \quad (0.5902)
 \end{aligned}$$

$$R^2 = 0.5796$$

$$F - \text{Value} = 7.5077$$

$$d.f = 49$$

(Figures in brackets indicate their standard errors)

The coefficient of multiple determination ( $R^2$ ) in the equation shows that about 58 per cent of the total variation of LON farms' repayment performance is explained by the estimated regression plain. The statistical test (Klein's test) also shows that there is no problem of multicollinearity among the variables in the equation. Hence the estimates are considered unbiased.

The above estimated equation indicates that the three explanatory variables, i.e., the loan supervision,  $X_3$ , the gross farm receipt per hectare,  $X_5$ , and the sale of farm product,  $X_6$ , are significant factors in the equation

The repayment performance is not significantly related to the interest rate, nor with any of the consumption factors. However, repayment is positively and significantly associated with the farm receipts per hectare. As in the case of LOS farm, the value of farm products sold is also a significant factor. It is significant at the probability level of 1 per cent.

The relatively high cash income due to the higher land productivity and the more commercialisation in terms of monetization is probably the main reason for the lack of relationship between consumption pattern and repayment, and between interest rate and repayment. The LON farms are above the subsistence level and the proportion of the farm products is relatively low as compared with the LOS farm. The greater availability of cash income after the deduction of cash income of consumption expenditure may be the reason for the insignificance of the consumption variables in the regression model.

Loan supervision is also a significant factor and it is positively related to the repayment performance. It may be expected that the more intensive

the loan supervision, the better will be the repayment performance of the farmer.

Summarizing the results of the LON farms regression analysis, three factors appear to be mainly relevant for the repayment performance they are:

- (a) loan supervision
- (b) land productivity
- (c) size of cash income

Of these three factors, loan supervision could be separated from this discussion on the basis that there is no evidence which suggests that the degree of loan supervision was different between farm types.

This makes the "high-productivity-and-high-repayment-performance argument" rather strong though a definite conclusion cannot be drawn without further research. However, it seems most likely that land productivity becomes one of the important factors influencing the farmers' repayment performance. The high productivity linked with greater sale of farm products of high cash income may enable the farmer to repay the loan better.

## VIII. MON Farm Function

The estimated linear regression equation for farm repayment performance on 67 MON farms is as follows:

$$\begin{aligned}
 Y = & -2164.8770 - 376.8052 X_1 + 1.2506 X_2 + 310.6868 X_3 \\
 & (963.1831) \quad (558.9840) \quad (0.4397) \quad (92.6470) \\
 & - 0.0210 X_4 + 0.4600 X_5 + 0.1008 X_6 + 0.0864 X_7 \\
 & (7.0550) \quad (0.5985) \quad (0.0438) \quad (0.0646) \\
 & + 0.5348 X_8 + 0.7961 X_9 \\
 & (0.7366) \quad (0.7171)
 \end{aligned}$$

$$R^2 = 0.5676$$

$$F - \text{value} = 7.5848$$

$$d.f - 52$$

(Figures in brackets represent the respective standard errors)

In the above equation, about 57 per cent of the total variation of the dependent variable, i.e., the farmers' repayment performance, is explained by the explanatory variables included in the function. No multicollinearity problem is observed among the independent variables and hence the estimates in the equation are considered unbiased.

In the equation the estimated regression coefficient relating to the rate of interest,  $X_2$ , is significant at the probability level of 1 per cent. It is positively associated with the repayment performance as the sign shows in the equation. This may explain the sensitive nature of loan repayment to the

cost of the loan in the case of MON farms. It means that the higher the rate of interest, the more prompt is the loan repayment. This may be the same reason as in the case of LOS farms.

The regression coefficient related to the loan supervision,  $X_3$ , is also significant at the probability level of 1 per cent with a positive sign. The significant relationship between loan supervision and repayment performance indicates the effectiveness of such measure in the loan recovery. The more intensive the loan supervision, the better repayment performance can be expected.

The regression coefficient associated with the sale of farm produce turned out to be significant. It is significant at the probability level of 5 per cent with a positive sign. Most repayment is made in cash. Accordingly it is not difficult to expect a positive relationship between a farmers' ability to repay and the farm cash receipt. Significance of the farm product sale in the equation may explain the above relation since the sale of farm products is nothing but farm cash receipt. The more the sale of farm products, the better is the repayment performance on MON farms.

None of the consumption factors is significant on MON farms. This may be due to the relatively large income on MON farms accruing from the large holding. The income on MON farms may be enough to meet the farm consumption and hence this turns out as no significant relationship between farm consumption and repayment performance on MON farms.

## **IX. Summary and Conclusion**

1. An attempt is made to examine the farmers' repayment performance in different farm situations. The repayment performance is measured as a proportion of repaid amount to total repayment requirement during the year. The amount which falls due during the year is taken as the repayment requirement based on this concept, the LON farm shows the best performance (86 per cent) followed by the LOS farm (69 per cent). It is also observed that the higher repayment performance of institutional credit is found on those farms where the repayment of non-institutional credit is also better. The LON farm fares best in both cases and the MON farm the least in both respects.
2. Results of multiple regression analysis also reveal that factors influencing farmers' repayment performance are not uniform on all the farm types. However, irrespective of the farm type, loan supervision and value of farm product sale are found to be generally significant factors, indicating that more intensive loan supervision and more cash income are associated with better repayment performance.
3. It is interesting to note that in all the equations the regression coefficient associated with the proportion of the loan used for productive

purposes is not significant at any probability level. There is also no significant relationship between non-farm income and repayment performance. The insignificant relationship between the non-farm income and repayment performance may be due to the fact that the non-farm income does not constitute a considerable proportion of the total income.

4. The regression coefficient relating to the consumption factor, i.e., both farm family consumption and farm household cash expenditure, turns out to be significant only in the case of LOS farms. Both the consumption factors are inversely associated with the repayment. It means that the more the consumption expenditure, the less is the farmers' repayment performance. The significant relationship between the consumption factor and the repayment performance may stem from the low productivity combined with small holding on LOS farms. It appears plausible that the small amount of income is not enough to meet farm family consumption needs. This explains that the limited ability to repay is one of the important factors in loan repayment on LOS farms.
5. The regression coefficient relating to the rate of interest turns out to be significant both on LOS and MON farms. But it is not significant at any probability level in the case of LON farm. It may be recalled that LOS and MON farms borrow a relatively higher proportion of their total credit from money lenders than the LON farms. Either because moneylender credit is more expensive or because moneylenders press for repayment, farmers will have a tendency to give priority for clearing their dues with moneylenders over other dues.
6. The regression coefficient associated with the farm receipt per hectare (or land productivity) is significant only in the case of LON farms. It is positively related with the repayment performance. The higher the land productivity, the better is the repayment performance. It appears that the high land productivity, linked with the large sale of farm products on LON farms makes their repayment performance better.
7. Thus the above analysis shows that the repayment performance varies from one type of farm to another and also the factors affecting repayment performance are not uniform for all farm types.

In the case of LOS farms, consumption factor, i.e., both farm consumption and farm household cash expenditure, may be one of the important factors in explaining the low repayment performance. This may be due to low productivity combined with small holdings on LOS farms. However farm household cash expenditure appears to be a more influential factor for the repayment because of its elastic nature in the farm economy.

In the case of LON farms, "the high productivity-and-high-repayment" argument turns out rather strong. The high land productivity on LON

farms appears to be one of the important factors in their loan repayment.

With regard to MON farms, evidence leads one to suspect either their poor willingness to repay or other socio-political factors to cause their poor repayment performance. Consumption factors are no more significant probably due to their large income accruing from large holdings. The value of farm product sales which is a significant factor can not explain the low repayment performance on MON farms since their cash income is considerably higher.

## Reference

- Klein, L.R., "*An Introduction to Econometrics*", New Delhi, Prentice-Hall of India, 1973, p. 101.
- Koutsoyiannis, A., "*Theory of Econometrics*", London, Macmillan, 1973, pp. 225-245.
- Millard, Long., "Interest Rates and The Structure of Agricultural Credit Markets", *Oxford Economic Paper*, (New Series), Vol. 20, No.2, July 1968, pp. 275-88.
- Miracle, Marvin P., "Regional Similarities and Differences in Small Farm Credit", *Analytical papers A.I.D Spring Review of Small Farm Credit*, vol. XIX, June 1973, p.11.
- Reserve Bank of India, "*Report of the Studies of Cooperative Credit Institutions*", Bombay (India), Reserve Bank of India, 1974, pp. 222-6.
- , "*Report of the All-India Rural Credit Review committee*", Bombay, (India), 1969.
- Shah, S.L., and L.R. Singh., "Capital Formation in Agriculture of Tarai Region of Uttar Pradesh", *Indian Journal of Agricultural Economics*, vol. 24, No. 4, October-December 1969, pp. 87-92.
- Sisodia, J.S., "Institutional Credit for Agriculture in Lndore District", *Indian Journal of Agricultural Economics*, vol. 26, No. 4, October-December 1971, p.568.
- Tinnermeier, Ronald and Chris Dowsell, "Small Farm Credit" A/D/C Research and Training Network Workshop Report No.1, March 1973, pp. 7-8.