

Adoption of Innovative Agro-Techniques and Availability of Credit*

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The study on the regression coefficient of extent of credit met by commercial bank was found to be highly significant at one per cent level. This indicates that an increase in the extent of credit met by commercial bank by one unit would lead to an increase in the extent of adoption of improved farm practices by 1.71 units, other things being equal. The autonomous level of adoption was to be 1.0654.

Indian Agriculture, by and large, rests on the efficiency of small and marginal farmers. Naturally adoption of improved agricultural technology depends on the extent to which these categories of farmers are able to obtain the inputs in time, which in turn mostly depends on the availability of credit for these requirements.

Non-adoption of improved practices has been attributed due to paucity of fund (Sinha and Bhasin, 1968; Sharma and Nair, 1974) and lack of credit to meet the greater capital requirement (Singh and Haque, 1970). Ensminger (1969) recognised that commercial banks could act as powerful change agents in Indian agriculture on account of their capability to respond to changing needs of the cultivators by providing for additional capital needed to take advantage of the advancing technology. The present study envisages evaluation of such influence by a nationalised bank (State Bank of India) on the adoption of selected agro-techniques.

MATERIAL AND METHODS

The State Bank of India in Coimbatore district constituted the subject of study since Dubhasi (1970) had stated that State Bank of India takes the lead among commercial banks in providing a spectrum of farm credit. An agricultural development branch located at Sathiamangalam was chosen for this study and 100 beneficiaries of this branch were interviewed. Rapport was developed with the respondents and interviews were conducted by the researcher himself, in their farms and homes. Data were collected on different variables that are related to adoption of farm practices, such as (1) credit availability; (2) farm size; (3) contact with extension agency; (4) cosmopolitaness; (5) income; (6) Farming experience and (7) income and liabilities.

Simple correlation coefficients were worked out between the extent of adoption (dependent variable) and each of the other factors (independent variables) using the following formula :

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$$r_{xy} = \frac{\sum x_1 y - \frac{\sum x_1 \sum y}{n}}{\sqrt{\frac{\sum x^2 - \frac{(\sum x_1)^2}{n}}{n} \frac{\sum y^2 - \frac{(\sum y)^2}{n}}{n}}}$$

where,

- $\sum x_1 y$ = Summation of the products x_1 and y
- $\sum x_1$ = Summation of the 'x' values
- $\sum y$ = Summation of the 'y'
- $\sum x_1^2$ = Summation of the square of 'x' values
- $\sum y^2$ = Summation of the square of 'y' values
- $(\sum x_1)^2$ = Square of the total 'x' values
- $(\sum y)^2$ = Square of the total 'y' values
- x_1 = Independent variable
- y = Dependent variable
- n = Number of respondents

Then linear regression coefficients were worked out for each of the independent variables, using the formula:

$$b_{yx_1} = \frac{\sum x_1 y - \frac{\sum x_1 \sum y}{n}}{\sum x_1^2 - \frac{(\sum x_1)^2}{n}}$$

where,

b_{yx_1} = Linear regression coefficient.

The linear regression coefficients were multiplied with a ratio of correction to arrive at the final values

$$\text{Ratio of correction} = \frac{b_i \sqrt{SS x_1}}{SS y}$$

Based on the final values of the above said ratio the independent varia-

ble were graded ignoring the sign and considered for inclusion in the multiple regression analysis. The following three variables were finally selected for the study on account of their relative importance. They were (i) credit availability, (ii) farm size and (iii) contact with extension agency.

The dependent and independent variables used for the analysis were allotted the following symbols

- Y = Extent of adoption (dependent variable)
- X_1 = Credit availability (Independent variable)
- X_2 = Farm size (Independent variable)
- X_3 = Contact with extension agency (Independent variable)

The multiple regression model adopted in this study could be represented as follows :

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_i X_i \dots \dots \sum_i$$

Where,

- Y = Estimated value
- a = Intercept or slope of the equation
- β_i = partial regression coefficients
- X_i = The independent variables
- \sum_i = Error term with a unit variance and '0' mean distributed normally.

The partial regression coefficients were calculated by inverting the variance covariance matrix by the Doolittle's method.

RESULTS AND DISCUSSION

The results have brought out the significant influence of credit provided by the commercial banks on the extension of adoption of improved farming practices. The strong positive correlation between the extent of credit met, with adoption indicates, that the adequacy of credit is a prime component in transformation of farm technology. Further, a consideration of the other two significant factors viz., farm size and contact with extension agency becomes necessary in maximizing the extent of adoption (Table). The estimated linear function for these factors is as follows:

$$Y = 1.0653 + 1.7122^{**}x_1 + 2.5210^{**}x_2 + 0.0874^{**}x_3$$

(0.0224) (0.0236) (0.0187)

$$r^2 = 0.56$$

Where,

Y = Extent of adoption of improved farm practices

X₁ = Extent of credit met by commercial bank

X₂ = Farm size

X₃ = Contact with extension agency

X = Coefficient of multiple determination

From the estimated function it could be noted that the coefficient of multiple determination (R₂) is +0.56 which implies that 56 per cent variation in the extent of adoption of improved farm practices is indicated by the independent variables included in the function.

The regression coefficient of extent of credit met by commercial bank was found to be highly significant at one per cent level. This indicates that an increase in the extent of credit by commercial bank by one unit would lead to an increase in the extent of adoption of improved farm practices by 1.71 units, other things being equal. The autonomous level of adoption was found to be 1.0654.

This study thus reflects upon the crucial role that commercial banks can and do play in the transformation of our farming system. No doubt, adequate

TABLE. Characteristics of variables included in the function

Variables	b values	Mean values	Sb	t' value
Y = Extent of adoption of farm practices	—	1.704	—	—
Q = Intercept	1.0653	—	—	—
X ₁ = Extent of credit met by commercial bank	1.7122 ^{**}	1.711	0.0224	76.4710
X ₂ = Farm size	2.5210 ^{**}	1.314	0.0236	106.9590
X ₃ = Contact with extension agency	0.0874 ^{**}	1.645	0.0187	46.3530

n = 100

** Significant at 1% level

care must also be taken to build up efficient extension agency to enable these beneficiaries adopt all the practices advocated. It is heartening that such efforts are made by the State Bank of India through their agricultural development branches where a separate band of technical officers are engaged to guide and advise their beneficiaries besides field officers whose function, essentially is to process the requirements. Farm size, nevertheless, is also seen to be a complementary factor, whose contribution can be availed of by appropriate legislative and/or social methods.

REFERENCES

- ENSMINGER DOUGLAS. 1969. The Bank a change Agent. *Financing Agriculture* 1 : pp. 10-11.
- SHARMA, S.K. and G.T. NAIR. 1974. A multivariable study of adoption of High yielding varieties. *Ind. J. Extn. Edn.* 10 : pp. 30-35.
- SINGH, K.N. and S.M.S. HAQUE. 1970. Small Farmers Problems and Programmes. *Financing Agriculture*. 2 : pp. 18-20.
- SINHA, P. R. R. and H. S. BHASIN. 1968. Factors influencing low Adoption of some improved farm practices. *Ind. J. Extn. Edn.* 4 :