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Agricultural Credit Flow in Bihar: An Economic Analysis

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INTRODUCTION

Capital requirement has increased manifold in agriculture due to increased use of purchased inputs like, high-yielding varieties (HYVs) of seeds, fertiliser, irrigation, pesticides and machineries in agricultural production. Moreover, agricultural production process is biological in nature and has larger transition period, resulting in a wide time-gap between investment and income. Although the farmers prefer to hold their savings to invest in physical productive assets on their own farms, they also rely on credit. In order to produce more, the farmers need to spend more on modern inputs which must be financed either out of saving or through borrowing. Hence, an increased institutional credit flow is essential for faster agricultural growth but the rural financing market development is a complex process because agriculture is small, widely dispersed, weather dependent, partially commercialised and deprived of basic socio-economic and institutional infrastructure (Desai and Mellor, 1993, p. 121). Moreover, agriculture has got a preferred status for financing through institutional sources in India, particularly during the post-bank nationalisation era.

Agricultural credit policy has been progressively institutionalised for providing timely and adequate credit to the farmers for increasing agricultural production and productivity (Government of India, 2000, p. 141). Our institutional agricultural credit system has made it possible for small and marginal farmers to have a share in the institutional credit flow which could be achieved by facilitating their access to institutional credit system.

During the last three decades, agricultural loans registered a spectacular increase at the national level but the corresponding growth has been lower in Bihar. There has been some spatial variation in the quantum of agricultural credit flow in the country in general and in Bihar in particular. There is a dearth of empirical studies dealing with agricultural credit flow in Bihar situation. Hence, the present study has been undertaken to analyse the agricultural credit flow in Bihar; however, the major emphasis is laid on identification of factors influencing agricultural credit flow in the state.

METHODOLOGY

The study is based on districtwise secondary data relating to the period 1980-81 to 1996-97. To make the conclusion of the study more precise and reliable, the

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techniques of deflation index, diversification index and infrastructure development index were constructed.

Deflated Loan

By deflation, we mean making allowances for the effect of changing price levels. During the last twenty years there has been an increase in agricultural credit flows through institutional lending agencies but the purchasing power of loans granted in the year 1996-97 did not have the same purchasing power of loans granted in the year 1980-81, mainly due to the inflation effect. Despite higher rate of increase in the quantum of loans in the late nineties, the quantity of purchased inputs and services like fertiliser, pumpset, tractor, power and human labour through these loans might not have increased by the same rate. Hence, the quantum of loan was deflated with the help of Agricultural Input Price Index[1] to obtain the credit flow in real terms. The following formula was used:

$$\text{Deflated loans} = \frac{\text{Quantum of loan disbursed in a particular year (in Rs. at current prices)}}{\text{Agricultural Input Price Index at 1980-81 prices}}$$

Regression Analysis

An effort has been made to identify the agro-economic, social and infrastructural variables affecting the agricultural credit flow in Bihar. Three-year average district-wise quantum of loans as dependent variable and seven independent variables were used for regression analysis. The regression analysis with the help of log linear type of model was carried out. The model used is given as under:

$$Y = ax_1b_1.\ x_2b_2.\ x_3b_3.\ x_4b_4.\ x_5b_5.\ x_6b_6.\ x_7b_7.\ e^u$$

where Y = Total credit disbursement (at current prices) (in lakh Rs.),
a = Intercept,
x_1 = Area under HYVs of seeds (in ha),
x_2 = Marginal and small holdings (number),
x_3 = Fertiliser consumption (in quintals),
x_4 = Dairy co-operatives (number),
x_5 = Bank branches (number),
x_6 = Diversification index,
x_7 = Infrastructure development index.

To know the importance of independent variables in increasing agricultural credit flow, the ranks of statistically significant variables were computed by using the following formula:

$$b_I\left(\frac{\text{Sd of } X_i}{\text{Sd of } Y_2}\right)$$

where b_1 is standardised regression coefficient, Sd is standard deviation, X_i is i-th independent variable, Y_2 is dependent variable (loan).

The regression analysis was done after transforming all dependent and independent variables into Index form. The main purpose of index construction was to make all data in one relative limit to minimise the disturbance in the analysis due to varied units. Simple index of dependent variables (loan) and independent variables namely, area under HYVs, marginal and small holdings, fertiliser consumption, number of dairy co-operatives and number of bank branches were constructed for all the districts. The formula used for this purpose was as under:

$$Y_{ij} = \frac{X_{ij}}{X_{iA}} \times 100$$

where Y_{ij} = The transformed value (index) of the i-th variable for j-th district,
X_{ij} = Value of i-th indicator for the j-th district and
X_{Ia} = The value of i-th indicator for Bihar.

Diversification Index

Crop diversification index was calculated for all the districts of the state. The following formula was used:

$$Y_{ij} = \frac{\sum X_i^2}{(\sum X_i)^2} \times 100$$

where X is the area under i-th crop. It may be noted that the higher the value of diversification index, the higher will be crop diversification in a particular district. The district with comparatively higher crop diversification (diversification index) is likely to cultivate non-foodgrain crops (cash crops) which may need higher credit flow for meeting the expenses on purchased inputs.

Infrastructure Development Index

Infrastructure development index is a weighted index. After constructing the index of individual infrastructure variables, the weighted index of individual infrastructure variables was constructed. The variables of infrastructure considered in the present investigation are road, electricity consumption, irrigation, education and health. Moreover, two important infrastructure variables, namely, bank branches and communication were not included in our infrastructure development index because the former (bank branches) was taken as a separate variable since it plays an important role in increasing agricultural credit flow whereas the latter was left out of analysis because there is a very weak communication system in rural Bihar. The weight to different infrastructure variables was assigned on the pattern of Centre for Monitoring Indian Economy (CMIE, 1998, pp. 5-10). However, the weight assigned to bank branch and communication system in CMIE study was reallocated to road,

electricity consumption, irrigation, education and health services in proportion of their importance as per weight assigned to them in CMIE study. The weights assigned to infrastructure variables are as follows:

Road - 32 per cent; Electric consumption - 29 per cent; Irrigation - 25 per cent; Education - 7 per cent and Health services - 7 per cent.

At first, the following model was used to construct simple infrastructure index for all the districts:

$$Y_{ij} = \frac{X_{ij}}{X_{iA}} \times 100$$

where Y_{ij} is the transformed value for the i-th indicator for the j-th district; X_{ij} is the value of i-th indicator for j-th district. X_{iA} is the value of the i-th indicator for Bihar.

Let W_I as weight of i-th indicator such that $\sum_i^5$, W_I Y_{ij}.

The infrastructure index for the j-th district is denoted by $I_j = \sum_i^5$, W_I Y_{ij}, where W_i is weight, Y_i is the transformed value for the i-th indicator.

FINDINGS AND DISCUSSION

The analysis of data revealed that the agricultural loans increased continuously in Bihar from Rs. 9,806 lakhs in 1980-81 to Rs. 44,646 lakhs in 1996-97, accounting for an annual growth on 22.21 per cent which was about half of the corresponding growth rate achieved at the national level (Table 1). During the last 17 years, the purchasing power of money has declined tremendously, hence the increase in the quantum of agricultural loans does not reflect a similar increase in the quantum of goods and services purchased through loans granted during the period under investigation. To neutralise the inflation effect, the quantum of agricultural loans was deflated at 1980-81 prices. The deflated quantum of loan has, no doubt, increased from Rs. 9,806 lakhs in 1980-81 to Rs. 10,739 lakhs in 1990-91 but declined to Rs. 10,155 lakhs in 1995-96, which again increased to Rs. 13,852 lakhs in 1996-97. Hence, it may be inferred that the index of agricultural loans at 1980-81 prices declined during the early nineties but it showed a significant increase in 1996-97.

TABLE 1. AGRICULTURAL LOANS GRANTED THROUGH INSTITUTIONAL LENDING AGENCIES IN BIHAR DURING STUDY PERIOD AT CURRENT AND 1980-81 PRICES

Year	Agricultural credit flow at current prices (Rs. lakhs)	Agricultural credit flow at 1980-81 prices (Rs. lakhs)	Agricultural credit flow indices (at 1980-81 prices)
(1)	(2)	(3)	(4)
1980-81	9,806	9,806	100
1985-86	13,847	11,042	112
1990-91	21,381	10,739	110
1995-96	29,287	10,155	104
1996-97	44,646	13,852	141
Annual growth rate	22.21	2.58	-

Per hectare institutional agricultural credit flow has also been examined at five points of time to know the adequacy of agricultural credit flow in Bihar. Per hectare agricultural loans at current prices increased continuously from Rs. 117.93 in 1980-81 to Rs. 581.25 in 1996-97 (Table 2). Per hectare agricultural loans at 1980-81 prices has also increased from Rs. 117.93 in 1980-81 to Rs. 143.43 in 1985-86 but declined to Rs. 114.30 in 1990-91, which again increased to Rs. 135.53 in 1995-96 and further increased to Rs. 180.34 in 1996-97. Moreover, the increase observed in per hectare agricultural loans at 1980-81 prices during the mid-nineties (1995-96) could not reach the level of loan disbursed in 1985-86. However, a spectacular increase in agricultural loans was noticed in the year 1996-97 which crossed the earlier record, mainly due to about 75 per cent increase in the quantum of agricultural loans granted through commercial and Regional Rural Banks (RRBs).

TABLE 2. PER HECTARE AGRICULTURAL LOANS GRANTED IN BIHAR

(Rs.)

Year (1)	Per hectare agricultural loan at current prices (2)	Per hectare agricultural loan at 1980-81 prices (3)
1980-81	117.93	117.93
1985-86	179.86	143.43
1990-91	227.57	114.30
1995-96	390.86	135.53
1996-97	581.25	180.34

The disbursement of agricultural loans has, no doubt, increased during the 17-year period but it could not achieve a continuous increase at 1980-81 prices. The decline in the quantum of agricultural credit accompanied with an increase in input price had made the quantum of agricultural credit inadequate in Bihar, particularly during the early 1990s.

Like other parts of the country, there is a multi-agency credit disbursement arrangement in Bihar. All the three leading institutions like, commercial banks, RRBs and co-operatives are operating in Bihar. An analysis has been undertaken for two groups of institutions, that is, co-operatives which included Land Development Banks and Primary Agricultural Credit Societies, and commercial banks which included RRBs also.

Agricultural loans granted through commercial banks showed an increasing trend during the study period, except in 1995-96 when it declined to Rs. 19,838 lakhs against Rs. 21,066 lakhs in 1990-91 (Table 3). On the other hand, agricultural loans granted through co-operatives showed a declining trend during the 1980s but followed by a spectacular increase during the early 1990s, that is, from Rs. 315 lakhs in 1990-91 to Rs. 9,449 lakhs in 1995-96 which further increased to Rs. 9,846 lakhs in 1996-97.

TABLE 3. SOURCEWISE AGRICULTURAL LOANS GRANTED IN BIHAR DURING 1980-81 TO 1996-97

(Rs. lakhs)

Year	All sources	Agricultural loan disbursement by RRBs and commercial banks	Agricultural loan disbursement by co-operative banks
(1)	(2)	(3)	(4)
1980-81	9,806	4,053.20	5,752.80
	(100.00)	(41.33)	(58.67)
1985-86	13,847	10,343.87	3,503.13
	(100.00)	(74.70)	(25.30)
1990-91	21,381	21,066.00	315.00
	(100.00)	(98.50)	(1.50)
1995-96	29,287	19,838.00	9,449.00
	(100.00)	(67.74)	(32.26)
1996-97	44,646	34,800.00	9,846.00
	(100.00)	(77.05)	(22.05)

Figures in parentheses indicate the percentage of total agricultural loans through all sources.

The co-operatives had an edge over commercial banks by granting about 58.67 per cent of agricultural loans in 1980-81 which declined to only 1.5 per cent in 1990-91 but again increased to 22.05 per cent in 1996-97. The lowest quantum of co-operative loan granted in Bihar in the year 1990-91 was mainly due to supersession of all the co-operative banks in 1989-90 which disrupted the functioning of the co-operative sector. Moreover, poor mobilisation of deposits by the co-operatives made the system totally dependent on the funds available from the apex organisations. The agricultural loans granted through commercial banks increased in the eighties but declined during the early nineties; however, it increased by almost two-fold during the period 1995-96 to 1996-97. The decline in agricultural loans granted through commercial banks in the early nineties was probably due to the changed attitude of bankers towards financing agriculture sector in the regime of liberalised economy. Moreover, the Report of Narasimham Committee on priority sector financing seems to have some influence on the disbursement of agricultural credit in Bihar.

An effort has been made to identify the variables influencing agricultural credit flow with the help of regression analysis. The analysis is based on districtwise three year-average data of agricultural credit flow as dependent variable (Y), and area under HYV seeds (X_1), fertiliser consumption (X_2), marginal and small holdings (X_3), dairy co-operatives (X_4), bank branches (X_5), crop diversification (X_6) and infrastructure development (X_7) as independent variables (Table 4).

The estimated multiple correlation coefficient (R) value was 0.907 which was significant at 1 per cent level of probability, indicating that the variables included in the analysis have significant influence on dependent variables (quantum of agricultural credit flow). The coefficient of multiple determination (R^2) was 0.823 which indicates that as much as 82 per cent of the variation in agricultural credit flow has been explained by independent variables included in the model. The unexplained portion of 18 per cent might be as a result of certain variables which have been left

TABLE 4. REGRESSION COEFFICIENTS OF DIFFERENT VARIABLES, THEIR STANDARD ERRORS, CALCULATED 't' VALUE AND RANK

Variables (1)	Regression co-efficient (2)	Standard error (3)	't' value (4)	Rank (5)
Area under HYV (X_1)	0.0324	0.1206	0.268	-
Fertiliser consumption (X_2)	0.7664*	0.1304	5.878	I
Marginal and small holdings (X_3)	0.0264	0.0897	0.294	-
Dairy co-operatives (X_4)	0.0445**	0.0189	2.346	II
Bank branches (X_5)	0.3321*	0.1002	3.315	III
Crop diversification (X_6)	0.4603	0.8034	0.573	-
Infrastructure development (X_7)	-0.0045	-0.0050	0.893	-

$R = 0.907$, R^2 value = 0.823, F value = 26.61

** and * Significant at 5 and 1 per cent level of probability.

out either due to unavailability of data or problem in quantification of qualitative variables like political influence, attitude of bankers, farmers' attitude towards institutional finance, etc. Almost all the variables considered in the analysis, except infrastructure develop-ment, had positive coefficients but the coefficients of fertiliser (0.7664), dairy co-operative (0.0445) and bank branch (0.3321) were found statistically significant. It clearly indicates that the increase in the consumption level of fertiliser, number of dairy co-operatives and bank branches would help in increasing agricultural credit flow in Bihar. These variables seem to have direct bearing on increasing agricultural credit flow. The bank branch is a necessary factor for the disbursement of loan. The level of fertiliser consumption is an indicator of agricultural development which needs higher credit flow, mainly due to increased use of purchased inputs in modern agriculture. Dairy co-operative is the only functional institution in rural Bihar which has made significant contribution in uplifting the socio-economic status of the farmers (Singh, 1996, p. 137). The efficient functioning of dairy co-operatives generates income and improves liquidity of the rural households. The surplus in the dairy enterprise is generally used in crop production which helps in improving the level of adoption of new technology in agriculture production. As soon as the farmers move from traditional agriculture to modern agriculture, their credit requirement increases which influences the total agricultural credit flow in the area. The area under HYVs is also an indicator of agricultural development and had positive co-efficient, indicating its influence on agricultural credit flow but the coefficient was not statistically significant. It was probably due to the fact that the official statistics on HYV seeds are not really area under HYVs because the majority of the farmers use home grown seeds in Bihar (Thakur *et al.*, 2000, p. 36) which are not quality seeds and the area cropped by these seeds does not deserve to be included under HYVs area. This may be the main reason for the non-significant coefficient of HYVs of seeds.

Crop diversification is a sign of agricultural development. The comparatively higher crop diversification in a particular district means higher proportion of non-food crops (commercial crops) in the cropping pattern. An agriculturally developed region may need higher quantum of agricultural loan to meet cash expenses for practising modern as well as commercial agriculture. In the present analysis, the co-efficient of diversification was, no doubt, positive (0.4603) but it was not found statistically significant. It may be due to the predominance of rice-wheat crops in the cropping pattern of many districts of Bihar (Ranjan and Singh, 1998).

Infrastructure may be one of the important variables for increasing agricultural credit flow in a particular area (Ghose and De, 1998, p. 3040). In the present investigation, infrastructure includes roads, electricity consumption, irrigation, education and health. The infrastructure index was constructed for all the districts, which has been considered as one of the independent variables in the present analysis. Bank branch is not only an important infrastructure but a necessary factor for the disbursement of agricultural credit flow. Hence, it was included in the analysis as a separate variable in the analysis.

It has further been observed that the estimated coefficient of infrastructure was negative (-0.0045) but it was not statistically significant, indicating that the infra-structure did not exert any significant influence on agricultural credit flow in Bihar. It was also expected that poorly maintained roads, ill-equipped hospitals, erratic and inadequate supply of electricity, distorted education system, faulty irrigation network may not have any significant influence on agricultural credit flow.

An effort has also been made to compute ranks of variables which contributed significantly to the increase in agricultural credit flow. Among the three significant variables, fertiliser consumption ranked first, whereas dairy co-operatives and bank branches ranked second and third respectively. On the basis of the above observations, it may be inferred that fertiliser consumption is the most important factor, followed by development of rural institutions, namely, dairy co-operatives and bank branches for increasing agricultural credit flow in Bihar. Hence, an increase in the consumption of fertiliser and expansion of the network of dairy co-operatives and bank branches may facilitate increased agricultural credit flow in Bihar.

CONCLUSIONS

It emerges from the analysis of data that the agricultural credit increased continuously in Bihar during the last two decades but it could not keep steady growth particularly in the early nineties at 1980-81 prices. Moreover, the agricultural credit flow (at 1980-81 prices) declined in the early nineties which might have adversely affected the private capital formation in the agricultural sector in Bihar (Chand, 2000). Commercial banks and co-operatives are two leading agricultural financing agencies but none of them could maintain the steady increasing flow of agricultural credit in Bihar up to the early eighties but it has been replaced by commercial banks

during the mid-1980s. On the basis of per hectare agricultural credit flow, it may be said that the agricultural credit flow has been inadequate in Bihar. It may further be inferred that the agricultural development (adoption of HYV seeds and fertiliser consumption) and functional rural institutions had positive influence on agricultural credit flow. Hence, it may be concluded that efforts to improve the adoption level of modern crop production technology and expansion of the network of rural institutions (bank branches and dairy co-operatives) will help in increasing agricultural credit flow in Bihar. A further increase in crop diversification may also facilitate the agricultural credit flow in the state.

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NOTE

1. Farm inputs index number of wholesale prices includes fertilisers, electricity (irrigation), pesticides, non-electrical machinery, tractors, lubricants, diesel oil (HSDO), diesel oil (LDO), fodder and cattle feed.

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