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Impact of Rural Credit on Economics of Paddy Cultivation in Varanasi District of Eastern Uttar Pradesh, India

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Authors' contributions

This work was carried out in collaboration among all authors. Author BKP designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors HPSC, Supriya, GPS and PKS managed the analyses of the study. Author PKS managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Keeping in view the importance of finance in farming a study was conducted in Varanasi district of eastern U.P. One hundred twenty sample farmers including 60 borrowers and 60 non borrowers were surveyed and data were analyzed. The result shows that marginal farms were well managed as compared to small sample farms. And borrower farmers certainly did more profitable paddy cultivation than the non-borrower sample farms. Thus it is suggested that financial support to the farmers always be continued.

Keywords: Finance; borrower; non borrower; cost; income; output-input ratio.

1. INTRODUCTION

Agriculture is a dominant sector of our economy and credit play an important role in increasing agriculture production. During the period of extensive farming, the resource poor farmer use to take financial help from non institution sources i.e. Traders and Commission Agents, Landlords,

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money lender. But with the start of green-revolution inputs requirement increases with adoption improved scientific technology [1-3]. Simultaneously financial demand in agriculture were also increased the government felt to help the farming. Community financially through financial institution and also offering relief to them from grip of money lenders. (P. S. Badal 2005)

Availability and access to adequate, timely and low cost credit from institutional sources is of great importance especially to small and marginal farmers [4-6]. Credit is also essential for establishing sustainable and profitable farming systems. Most of the farmers are small producers engaged in agricultural activities in areas of widely varying potential. Experience has shown that easy access to financial services at affordable cost positively affects the productivity, asset formation, income and food security of the rural poor [7-9]. The major concern of the Government is therefore, to bring all the farmer households within the banking fold and promote complete financial support. (Saravanan 2016).

Indian agriculture has been always in need for credit and dependent on traditional credit with high interest rates. This norm of high interest rate for agriculture credit has caused serious exploitation resulting in rural in debtness causing serious concern over a century. This problem of providing cheap and institutionalized credit has called attention of the British government in early 1870s. As a first step towards rural institutionalized credit Reserve Bank of India has conducted different studies in 1936 and 1937 and found that major share of the credit required by the rural community was financed by the non institutional and share of institutional credit was negligible [10-12]. Until 1950 the Reserve bank has taken several steps to strengthen the cooperative societies to provide institutionalized credit to the rural community, a new structure was evolved to provide two types of time bound credits namely short term and long term credit. The green revolution has called for high credit requirement for the purchase of required inputs and farm structure development. (N. T. Krishna Kishore 2012).

Thus to study the role of agricultural cooperative credit on agricultural inputs, land improvement, production and marketing of different holding groups is important for the assessment of credit utilization. If the credit is utilized properly for the purpose for it was sanctioned, its impact that is, flow of benefits to the beneficiaries will help in improving their economic status. Food is a prime necessity of life, is an agricultural product and that the world is still so poor that it must devote a great part of its resources to the production of necessity.

Seeing the importance of rural credit, it seems necessary to study the Impact of rural credit in economics of paddy cultivation in Varanasi district of Uttar Pradesh with following objectives:

- To study the role of credit on different type of costs involve in paddy cultivation at borrower and non borrower sample farms.
- To study the role of credit in various income measures received from paddy cultivation at borrower and non borrower sample farms.

2. METHODOLOGY

2.1 Sampling Technique

Purposive cum random sampling technique was used to select the 60 borrower and 60 non-borrower from 5 villages of block Pindra of Varanasi district for the further study all selected sample farmers were grouped in two categories of marginal and small. To justify the representation of all category of farmers proportionate random sampling technique was applied. A sum of 59 marginal and 01 small of borrower and 58 marginal and 02 small of non borrower sample farms were studied. Details of sampling are presented in Table 1, which accounted for 98.33 and 1.67 per cent in marginal and small categories of holding on borrower farm and 97.50 and 2.50 per cent on non-borrower farms in respective size of holding.

Table 1. Category wise distribution of sample farmers

Sl. No.	Size groups of farms	Borrower sample farmers		Non-borrower sample farmers		Total	
		No.	Per cent	No.	Per cent	No.	Per cent
1	Marginal	59	98.33	58	96.67	117	97.50
2	Small	01	1.67	02	3.33	03	2.50
Total		60	100	60	100	120	100

2.2 Analytical Tools

The data collected from the sample farms through personal interview with the help of pre-structured schedule were analysed and estimated with certain statistical technique like:

(i) Average ($\bar{X}$)

The average was calculated by adding the total score obtained by the respondents and divided it by the total number of respondent. The following formula was used to calculate the average:

$$\bar{X} = \frac{\sum x}{N}$$

Where,

$\bar{X}$ = Average or Mean
$\sum x$ = Total number of scores obtained by the respondents
N = Total number of respondents

(ii) Weighted average

The simplest and important measures of average which have been used into statistical analysis of the collected data are the weighted average, the formula used to estimate the weighted average is;

$$W.A. = \frac{\sum wixi}{\sum wi}$$

Where,

W. A. = Weighted average
X_i = Variable's mean
W_i = Weights of X_i

Income Concepts:

a) Gross income (GI)

The gross income was estimated by multiplying the production (main and by-product) with its price at the time of harvest.

Gross income = (Main product x price) + (By product x price)

b) Net income (NI)

The net income was estimated by deducting the cost from gross income. Net income = Gross income – Total cost

c) Family labour income (FLI)

The family labour income was estimated by adding the value of unpaid family labour with net income.

Family labour income = Value of unpaid family labour + Net income

d) Farm business income (FBI)

The farm business income was estimated by adding the interest on owned fixed capital with family labour income.

Farm business income = Interest on owned fixed capital + FLI

e) Farm investment income (FII)

The farm investment income was estimated by adding net income with rental value of owned land and interest on owned fixed capital.

Family investment income = Net income + Rental value of Owned + Interest on owned fixed capital.

Input-output ratio:

The input-output ratio is estimated by dividing gross income from total cost.

$$\text{Input} - \text{Output ratio} = \frac{\text{Gross income}}{\text{Total cost}}$$

3. RESULTS AND DISCUSSION

Impact of credit on economics of paddy cultivation was studied and presented in Table 2a & 2b and Table 3a & 3b for borrower and non-borrower sample farmers respectively.

3.1 Economics of Paddy Cultivation on Borrowers Sample Farms

Per hectare costs and returns of paddy grown at the borrower's farms are presented in Table 2a. It is revealed from the table that the total per ha. Cost of cultivation on overall farm came to Rs. 56666.01. Which was maximum on small size of farms i.e. Rs. 60532.82 followed by marginal size of sample farms Rs. 56600.48 respectively. The main input items which cause comparatively higher costs on small farm were seed, manure fertilizer and irrigation. As far as per cent share of different input items in total costs are concerned, it was found that expenditure an manure and fertilizer was highest i.e. 33.95 per cent followed by rental value of land, irrigation charges and

tractor power which accounted for 15.88, 8.89 and 8.22 per cent respectively.

Different income measures received by the sample borrowers are also presented in the Table 2b. It is revealed from the data that per hectare gross income on overall farm came to Rs. 94559.67, which was maximum on marginal size of sample farms i.e. 94680.00 followed by small size group of farms corresponded Rs. 87460.00, respectively. It shows that the gross income per hectare had the indirect relationship with size of farms. The overall farms, net income family labour per hectare income, farm business income and farm investment income were recorded to Rs. 37893.66, 48340.81, 57946.47 and Rs. 52650.76 respectively. These incomes were also found higher on marginal sample farms as compared to small size of farms. Costs of production per quintal on overall farm came to Rs.1249.59 which was highest Rs.1260.21 on small farms followed by marginal size group of farms, corresponded to Rs. 1046.86 respectively. The input: output ratio on overall farm was found to 1:1.66 which was higher 1:1.67 on marginal as compared to 1:1.44 on small size of farms.

3.2 Economics of Paddy Cultivation on Non-borrower Sample Farms

Economics of paddy cultivation on non-borrower sample farm is presented in Table 3a. It is depicted from the table the total costs of cultivation on overall farm was Rs. 46797.69 which was highest on small size of farms i.e. Rs. 49410.19 followed by marginal Rs.46707.62 respectively.

The highest value of per hectare costs of cultivation in small category was occurred due to comparatively more expenditure on all the variable inputs than the marginal farms. It is also revealed from the table that the overall costs of cultivation per hectare was mainly constituted with maximum expenditure on rental value of owned land of which per cent share was maximum i.e. 19.23 per cent followed by expenditure on manure & fertilizer, tractor charges, costs of seed, irrigation corresponded to 31.88, 10.22, 2.62 and 10.43 per cent respectively.

The study further revealed that the per hectare gross income of paddy on non-borrowers sample farms was Rs. 81878.75 on overall farm. It was highest (Rs. 40811.50) on marginal farm followed by small size of farms which accounted for Rs. 79450.00 respectively. The overall net income per hectare was found to Rs. 28994.61. It was also highest on marginal size of farm i.e. Rs.29239.42 followed by small size of farms corresponded to Rs. 21895.00 respectively. The costs of production per quintal was found to Rs. 1129.75 on overall farms, which was highest on small farms i.e. Rs. 1125.00 followed by Rs. 1267.73 marginal size of farm respectively. The input: output ratio on overall farm i.e. 1:1.54 and it was highest on marginal farms i.e. 1:1.55 followed by small 1:1.38 respectively.

Table 2(a). Per hectare costs of cultivation of paddy in the study area on borrower sample farms (Rs/ha)

S. No	Particulars	Size group of farms		
		Marginal	Small	Overall average
1.	Human Labour	9122.86 (16.11)	10233.71 (16.90)	9141.37 (16.13)
a.	Family Labour	5312.02 (9.38)	4333.31 (7.15)	5295.70 (9.34)
b.	Hired Labour	3810.84 (6.73)	5900.40 (9.74)	3845.66 (6.78)
2.	Machinery Charges	4651.38 (8.21)	5066.66 (8.37)	4658.30 (8.22)
3.	Seed	1213.68 (2.14)	1333.33 (2.20)	1215.67 (2.14)
4.	Manure and fertilizer	19213.09 (33.94)	20733.33 (34.25)	19238.42 (33.95)
5.	Irrigation	5041.59 (8.90)	5120.00 (8.45)	5042.89 (8.89)
6.	Plant Protection	1201.84 (2.12)	1333.33 (2.20)	1204.03 (2.48)
7.	Total working capital	35132.42 (62.07)	39487.05 (65.23)	35204.99 (62.12)
8.	Interest on working capital	1405.30 (2.48)	1579.48 (2.60)	1408.20 (2.48)
9.	Rental value of land	9000.00 (15.90)	9000.00 (14.86)	9000 (15.88)
10.	Interest on fixed capital	605.24 (1.06)	630.00 (1.040)	605.65 (1.06)
11.	Sub total	51454.98 (90.90)	55029.84 (90.90)	51514.56 (90.90)
12.	Managerial Cost @10% of sub-total	5145.50 (9.090)	5502.98 (9.09)	5151.45 (9.090)
Grand Total		**56600.48 (100)**	**60532.82 (100)**	**56666.01 (100)**

Figures in parentheses indicate the per cent to total

Table 2(b). Per hectare costs and income measures of paddy on the borrower (Rs/ha)

Sl. No	Particular	Size group of farms		
		Marginal	Small	Overall average
1.	Total cost (Cost C_3)	56600.48	60532.82	56666.01
2.	Gross income	94680.00	87460.00	94559.67
3.	Net income	38079.52	26928.00	37893.66
4.	Family labour income	48537.04	36763.47	48340.81
5.	Farm business income	58142.28	46393.47	57946.47
6.	Farm investment income	52830.26	42060.16	52650.76
7.	Yield (q/ha)	45.63	42.15	45.57
8.	Cost of production (Rs/qtl)	1046.86	1260.21	1249.59
9.	Output-Input ratio	1:1.67	1:1.44	1:1.66

Table 3(a). Per hectare costs and return of paddy in the study area on non-borrower sample farms (Rs/ha)

Sl. No	Particulars	Size group of farms		
		Marginal	Small	Overall average
1.	Human Labour	10679.46 (22.86)	13145.16 (26.60)	10761.65 (22.99)
a.	Family Labour	6015.46 (12.87)	8145.16 (16.48)	6086.45 (13.00)
b.	Hired Labour	4664.00 (9.98)	5215.00 (10.55)	4682.36 (10.00)
2.	Machinery Charges	4781.15 (1023)	4838.70 (9.79)	4783.06 (10.22)
3.	Seed	1225.00 (2.62)	1350.00 (2.93)	1229.16 (2.62)
4.	Manure and fertilizer	14880.00 (31.85)	16120.96 (32.62)	14921.36 (31.88)
5.	Irrigation	4877.00 (10.44)	5032.25 (10.18)	4882.17 (10.43)
6.	Plant Protection	1235.00 (2.64)	1451.61 (2.93)	1242.22 (2.65)
7.	Total working capital	31662.15 (67.78)	34008.52 (68.82)	31740.36 (67.82)
8.	Interest on working capital	1266.48 (2.71)	1360.34 (2.75)	1269.61 (2.71)
9.	Rental value of land	9000 (19.26)	9000 (18.21)	9000 (19.23)
10.	Interest on fixed capital	532.85 (1.14)	549.50 (1.11)	533.40 (1.13)
11.	Sub total	42461.48 (90.90)	44918.36 (90.90)	42543.37 (90.90)
12.	Managerial Cost @10% of sub-total	4246.14 (9.09)	4491.83 (9.09)	4254.32 (9.09)
Grand Total		**46707.62 (100)**	**49410.19 (100)**	**46797.69 (100)**

Table 3(b). Per hectare costs and income measures of paddy on non-borrower (Rs/ha)

Sl. No.	Particular	Size group of farms		
		Marginal	Small	Overall average
1.	Total Cost (Cost C_3)	52723.08	57555.35	52884.16
2.	Gross income	81962.50	79450.00	81878.75
3.	Net income	29239.42	21895.00	28994.61
4.	Family labour income	39501.02	34531.64	39335.37
5.	Farm business income	49033.87	44081.14	48868.78
6.	Farm investment income	43018.41	35935.98	42782.33
7.	Yield (q/ha)	39.50	38.29	39.45
8.	Cost of production (Rs/q)	1125.00	1267.73	1129.75
9.	Output-Input Ratio	1:1.55	1:1.38	1:1.54

Figures in parentheses indicate the per cent to total

Table 3(c). Comparative economics of paddy cultivation on borrower and non-borrower sample farms

Sl.No.	Particulars	Value of overall average (Rs.)		
		Borrowers	Per cent increase	Non-borrowers
1.	Working capital	35204.99	90.15	31740.36
2.	Gross income	94559.67	86.58	81878.75
3.	Net income	37893.66	76.51	28994.61
4.	Cost of Cultivation (Rs./ha)	56666.01	82.59	46797.69
5.	Costs of production Rs./qtl.	1249.59	90.45	1129.75
6.	Input : output ratio	1:1.66	92.77	1:1.54

The comparative study of paddy cultivation on borrowers and non-borrowers farms o show the impact of credit was also done including some specific variables and the data is presented in Table 3c. Sample farmers mainly spent their crop loan on purchase of variable inputs like, seed, manure & fertilizer, plant protection chemical and payment of irrigation and tractor charges. The value of working capital, gross income, net income, costs of production (Rs/qt) and output:input ratio were considered for comparative study. It is depicted from the table that the borrower farmers could receive 92.77 per cent higher output: input ratio, 86.58 per cent gross income and 76.51 per cent of net incomes were also higher on borrower farms which was occurred due to more expenditure on variable inputs supported with financial assistance. Singh *et al.* (2002) also found the same result in his study as he reported that higher level of income received due to high intensity of cropping and high investment on inputs as compared to the non-borrower farms. He also reported that borrowing for different purposes had directly or indirectly resulted in significant increase in agricultural development Mishra and Maurya (2005) also found that costs of cultivation and income of borrowers were higher than the non-borrowers.

4. CONCLUSION

Overall per hectare costs of cultivation of paddy on borrower farms came to Rs. 56666.01 on overall farm, which was maximum of Rs. 60532.82 on small farms due to more expenditure on seed, manure & fertilizer and irrigation. The cost of cultivation was found of indirect relation with size of holding. Per hectare gross income on overall farm was Rs. 94559.67 and net income was Rs. 37893.66. Per hectare gross income had the indirect relation with farm size. Cost of production per quintal was Rs. 1249.59 and input: output ratio was 1:1.66 on overall farms. On the non-borrower sample farms the per hectare costs of cultivation came to Rs. 46797.69 on overall farms and gross income and net income were found to Rs. 81878.75 and Rs. 28994.61 respectively. The costs of production per quintal were found to Rs. 1129.75 and input: output ratio 1:1.54. Costs and income measures on borrowers and non-borrower sample farms were compared and found that sample borrower farmers could received higher input: output ratio, gross income and net income than the non-borrower sample farms which accounted for 92.77, 86.58 and 76.51 per cent respectively. Comparatively higher income measures received at borrower farms were caused by higher expenditure on purchase of variable input by borrower farmers with the financial assistance through agricultural credit. Thus it may concluded that credit facility is quite helpful for the resource poor farmers for profitable crop production.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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