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Agricultural Credit, A Critical Input on Farmers Income: A Study From Nayagarh District of Odisha

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Authors' contributions

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

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ABSTRACT

In order to protect agriculture and other allied sectors, credit is indispensable for a farmer to expand and run his business more efficiently and properly which may not otherwise be possible on his savings. In this perspective, an investigation was made to show the weightage of farm credit on the farmers' income which was designed through a random sample survey of hundred credit availed farmers in the diverse agriculture terrains of Nayagarh block of Nayagarh district and analyzed by statistical tools like regression analysis and descriptive statistics. The statistical analysis indicated that the farm credit per household, land holding have positive and significant relationship with the household income while family size and farm expenditure are negatively related to the household income. The R^2 value is 0.74 that indicated 74 per cent of the variation in dependent variable is explained by the independent variables. There is decreasing returns to scale (0.766). The average per acre farm expenses and income from sale of the crop of a sample respondent of the pooled category was Rs 15753 and Rs 31606 respectively. The farmers efficiently utilized the agricultural credit, but at the same time there should be provision for procurement of perishable goods by the

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government or bank agencies that would secure the income of farm borrowers. In addition, a timely and need based support in creation of quality asset will lead to the overall economic growth of the block as well as the district and ramify business of the banks.

Keywords: Credit; household income; farm expenses; economic growth.

1. INTRODUCTION

Agriculture sector being one of the prime sources of Indian economy needs to be addressed in the cannons of national economic parameter. India has gravitated to join the global economic club as the seventh largest economy and its diverse economy embedded in primary, secondary and tertiary sectors encapsulates traditional village farming, modern agriculture, proliferation of modern industries, and multitude of services. It is well known that sixty eight per cent of country's population resides in rural areas. They directly or indirectly depend on agriculture. The ability of the farmers to save and invest is very low. It can lead to less use of input and hence low agricultural productivity. So to protect agriculture and other allied sectors, credit is indispensible for a farmer to expand and run his business more efficiently and properly which may not otherwise be possible on his savings only.

The outcome of agricultural credit for Indian farmers is immensely appraised as it has resulted in purchase of machineries (tractors, power tillers, threshers, sprayers etc.), ware housing facilities that eliminated distress sale, establishment of process units that prevented postharvest produce damage, enhancement of horticultural set up (mushroom, fruits and vegetables, floriculture etc.), enhancing irrigation area thereby boosting cropping intensity, emancipation from local money lenders and economic stability. It has also encouraged individual savings ability to invest for further enterprises, growth of productive resources of the individual and the country. Adhering to this, the living standard of the farmers though not spectacularly increased nevertheless had a slow and gradual effect in the level of income thereby it had a positive impact on Indian economy, similar to the rise in GDP of Nepal as reported by Sharma [1].

In this context, an investigation was made to show the influence of farm credit on the farmers' income in Nayagarh district of Odisha.

2. MATERIALS AND METHODS

Nayagarh district in the state of Odisha was purposively selected for the study. The sampling procedure followed here for the study was a multi staged random sampling method. On the first stage, Nayagarh block was randomly selected only.

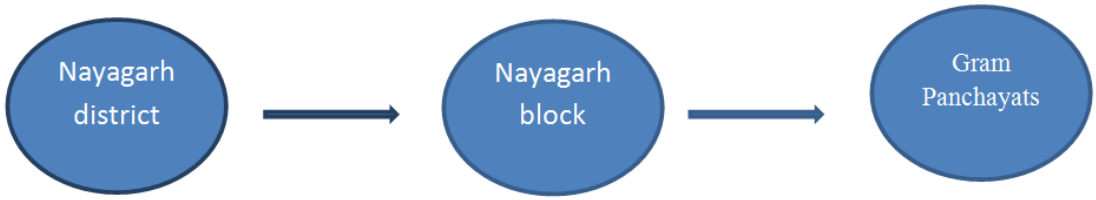
On the second stage out of the twenty nine gram panchayats in Nayagarh block, one third (ten) of them were selected randomly that would represent the entire block. Such panchayats were Balugaon, Champatipur, Badapandusar, Biruda, Bhattasahi, Lenkudipada, Kalikaprasad, Lathipada, Nabaghanapur, Sinduria. Here all possible institutional agencies had financed.

In the third stage, all the households of ten Gram Panchayats, availed loan from institutional agencies, were listed and ten households were taken from each GP randomly. Head of the household was the respondent. The farm holdings were classified in three size groups as:

Group-I: Marginal farmers (< 2.5 acres)
Group-II: Small farmers (2.5-5 acres)
Group-III: Large farmers (> 5 acres)

It was seen in all the Panchayats that nearly sixty per cents farmers belonged to Group-I category while thirty five percent from Group-II and rest from Group-III category. From each panchayat, ten households were take randomly that comprised of six marginal farmers, three small farmers, and one large farmer.

Selection of sample respondents:



Category GPs	Group-I	Group-II	Group-III	Total
Balugaon	6	3	1	10
Champatipur	6	3	1	10
Badapandusar	6	3	1	10
Biruda	6	3	1	10
Bhattasahi	6	3	1	10
Lenkudipada	6	3	1	10
Kalikaprasad	6	3	1	10
Lathipada	6	3	1	10
Nabaghanapur	6	3	1	10
Sinduria	6	3	1	10
Total	60	30	10	100

Thus in this way hundred households i.e. sixty from Group-I, thirty from Group-II and ten from Group-III were selected from the block for the present study.

Only primary data was collected for the study using a pre tested structured interview schedule. The finalised schedule sought detailed information on farm expenses, income, family size, land holding and quantum of credit availed from different sources. The information provided by the respondents related to input and output of the agriculture sector was related to the agricultural year 2018-19.

Descriptive data analysis and regression techniques were used to provide valuable information about the basic feature of the data in the study. With the descriptive technique, the estimates and summaries were arranged in tables, to meet the objective. To be very specific, the technique was used to describe what is and what the data shows.

The relationship between the independent and dependent variables were expressed as a function and analysis of the functional relationship between those variables is called as the regression analysis. In this study, income of the respondents was taken as the dependent variable and was predicted by the independent variables viz. farm credit, family size, land holding, and farm expenditure.

3. RESULTS AND DISCUSSION

The influence of the credit can be best inferred from the net income of the sample respondents. If the credit could be utilized in a productive manner, it is obvious that with the access to agricultural credit the farmers could adopt improved technology that would reduce the cost and add to the return. So to analyze whether there is a significant sway of the credit on the farmers, impact of the credit is well discussed on the following sub-heads:

1. Farm expenses
2. Net income
3. Regression analysis

3.1 Farm Expenses

The farm expenses of sample respondents in various inputs and operations like land improvement, seed, sowing, fertilisers, plant protection chemicals and irrigation, intercultural operation, harvesting and threshing are represented in Table 1. To sum up, in all these activities a Group-I respondent spends almost twenty nine thousand rupees while a Group-II respondent uses fifty six thousand rupees and a Group-III respondent uses one lakh seventeen thousand rupees. So on an average a sample respondent of pooled category spends forty six thousand rupees and per acre farm expenditure is fifteen thousand seven hundred fifty three rupees. Qualitatively it could be said that taking the factors like the area of land holding, access to mechanical implements, use of hired labours into consideration, there is uniform expenditure pattern of all categories of the respondents. The farm expenses are bit high due to more of manual operation rather than mechanical means that signal credit requirement for capital formation. Again, the per acre average farm expense of all the categories are almost same. However, per acre average farm expenses is bit more in group II and III categories due to the fact that the Group II respondents use more hired labour and Group III respondents incur more expenditure in application of fertilizers.

3.2 Net Income

The net income of the sample respondents from various activities like sale of crops, livestock and

its produce, income from earning assets, profession and wages and gifts received is depicted in Table 2. The major income is from sale of crops followed by from profession and wages. Group-III respondents are the highest earners with two and half lakh rupees followed by Group-II respondents with one lakh eighty thousand rupees and Group-I respondents with one lakh twenty thousand rupees. In the pooled category, net income from per acre sale of crop is thirty one thousand six hundred six rupees. An average respondent earns around one lakh rupees from agriculture and allied activities while his total income averages to one and half lakh.

The net income of sample respondents from various sources as given in Table 2 reveals that maximum amount is gained from sale of the crops. Per acre average income from sale of the crops is highest for the Group I respondents. It is owing to the difference in cropping intensity of different categories. Further Group III respondents give more time on non-agricultural activities though they profess it as their major profession. Next to sale of crop, the respondents earn something from their non-agriculture based profession. It is because in off season (rest period from agricultural activity) they concentrate on their professional activities. Not that only in off season, they also work during the cultivation period. But the situation is that in off periods of agriculture they devote more time for their allied activities. Gifts have been earned in the form of KALIA Yojana given by the Odisha Government. Out of the sixty Group-I respondents forty have got it. Similarly, nineteen from Group-II and five from Group-III have got the KALIA money. Moreover the net income of the respondents has been found to be satisfactory owing to the efficient use of the credit.

This is akin to the works conducted by and Akram et al. in [2] about rise in technical efficiency of farmers owing to farm credit in Sargodha district of the Punjab province, Ibrahim and Bauer in [3] with respect to effect of microcredit on profit of rural farmers in Dry land area of Sudan.

3.3 Regression Analysis

Table 3 gives an idea about the relationship between the independent variables viz. farm credit, family size, land holding, and farm expenditure and dependent variable net farm income. A negative sign in the coefficients of parameters of family size and farm expenditure implies negative association of these two with the income while the other two land holding and farm credit have a positive impact. In addition, the coefficient of determination (R^2), returns to scale, and F value have been indicated that comes around respectively 0.74, 0.766, and 27.954. Above all, the intercept value is 15.284.

The relationship between the independent variables viz. farm credit, family size, land holding, and farm expenditure and dependent variable net farm income can be expressed as a functional relationship as:

$$Y=15.284+0.405X_1-0.186X_2+1.45X_3-0.903X_4+e$$

This is called linear regression model with four predictor variables. The variables in the model are

Y (the response variable) = income
X_1 (the first predictor variable) = farm credit
X_2 (the second predictor variable) = family size
X_3 (the third predictor variable) = land holding
X_4 (the fourth predictor variable) = farm expenditure
e (the residual error) = an unmeasured variable

The parameters in the model are:

A (Y intercept) = 15.284
b_1 (first regression coefficient) = 0.405
b_2 (second regression coefficient) = -0.186
b_3 (third regression coefficient) = 1.45
b_4 (fourth regression coefficient) = -0.903

Interpreting the Intercept, it can be said that an average net income of 15.284 units is expected, if it is reasonable that all the predictor variables can be zero or very near to zero. The intercept has no real intercept if neither of the conditions is true.

Similarly the coefficients of predictor variables can be interpreted as since X_1 is a continuous variable, b_1 represents the difference in the predicted value in the income for each one unit difference in X_1, if the other three variables are held constant. Similarly, the coefficients of other predicted variable are determined.

Since the coefficient of determination is 0.74, fifty four per cent of the variance in the net income is from the independent variables like farm credit, family size, land holding, and farm expenditure, while twenty six per cent level of disagreement between the predictable and predictor variables.

Table 1. Farm expenses of the sample respondents (n=100) (in Rs)

Sl. no.	Particulars	Category			
		Group-I (n_1=60)	Group-II (n_2=30)	Group-III (n_3=10)	Pooled (n=100)
1	Land improvement	1058 (556)	1795 (505)	3520 (495)	1526 (524)
2	Seed and sowing	1660 (935)	3124 (879)	6235 (878)	2631 (903)
3	Fertilizer	3732 (1965)	6425 (1809)	23570 (3319)	6524 (2239)
4	PPC(Plant Protection Chemicals)	5110 (2690)	8900 (2507)	17775 (2503)	7514 (2579)
5	Intercultural operation	3175 (1671)	9291 (2617)	12525 (1764)	5945 (2040)
6	Harvesting	13133 (6912)	24966 (7032)	50300 (7084)	20400 (7003)
7	Threshing	2075 (1092)	3566 (1004)	7100 (1000)	3025 (1038)
8	Total expenses	**28943 (15233)**	**56076 (15796)**	**117030 (16483)**	**45891 (15753)**

Figures in the parenthesis indicate per acre average farm expenses

Table 2. Net income of the sample respondents (n=100) (in Rs)

Sl. no.	Particulars	Category			
		Group-I (n_1=60)	Group-II (n_2=30)	Group-III (n_3=10)	Pooled (n=100)
1	Sale of crop	71033 (37386)	111500 (31408)	160000 (22535)	92070 (31606)
2	Sale of live stock	916.6	666	1000	850
3	Sale of livestock produce	7833	11166	8000	8850
4	Total agriculture and allied income	7978	123333	169000	101770
5	Income from earning asset	2666	12000	18000	7000
6	Gifts	3333	3166	2500	3200
7	Profession/ wages	36000	46833	5200	40850
8	Total subsidiary income	42000	62000	72500	51050
9	Total income	**121783**	**185333**	**241500**	**152820**

Figures in the parenthesis indicate per acre average income

Table 3. Estimated Cobb- Douglas production function coefficients

Sl. no.	Particulars	Parameters	Coefficient
1	Intercept	A	15.284 (1.904)
2	Farm Credit	b_1	0.405 (0.155)
3	Family size	b_2	-0.186 (0.149)
4	Land Holding	b_3	1.450 (0.208)
5	Farm expenditure	b_4	-0.903 (0.129)
		R^2	0.740
		Returns to scale	0.766
		F value	27.954

Note: Figures in parenthesis indicate their respective standard error

Summation of slope coefficients gives return to scale. It comes around 0.766 indicating decreasing return to scale.

F value comes out to 27.954 signifying it as significant.

Thus it can be stated that credit has a significant impact on the farm income that arose for good productivity.

It is similar to the findings of Ayaz and Hussain in [4] in Faisalabad district of Pakistan regarding credit requirement to enhance resource use efficiency, Devi in [5] in enhancement of yield and income among the farmers of Andhra Pradesh, and Duy in [6] regarding effect of agricultural credit on farm productivity in Mekong delta region of Pakistan.

Thus it can be noted from the net income, farm expenses and regression analysis that the farm credit is obligatory requirement for agriculture production process and in the study area farmers by availing credit from various sources have put them to use efficiently.

This is akin to the findings of Khatun et al. [7] regarding credit utilisation in Kushtia district of Bangladesh.

4. CONCLUSION

It is clear from the study that the farm credit per household and land holding has positive and significant relationship with the household income while family size and farm expenditure are negatively related to the household income. With the positive impact of the credit on the farmers' income, it can be well stated that the farmers efficiently use the agricultural credit. Based on the findings of the study and discussions with the respondent farmers, the following policies are suggested in the study area to reduce the restrictions in credit lending and to enhance efficient utilization of farm credit.

- There should be provision for procurement of perishable goods by the government or bank agencies that would secure the income of farm borrowers that would help better repayment or alternatively a crop insurance scheme akin to Farm Income Insurance Scheme during 2003-04 need to be reintroduced.
- Post credit disbursement follows up by the bank officials in association with the Department of Agricultural officials need to be undertaken.
- Awareness camps in every village or Village Panchayats need to be organized by the NABARD officials or Lead Banks officials or any officials directed by them in frequent intervals to make them familiar about credit perspectives and their better utilization.
- A timely and need based support in creation of quality asset will lead to the overall economic growth of the block as well as the district and ramify business of the banks.

Farmers, in the study area, are undoubtedly the weaker sections of the society. If any part of the body gets an injury, the whole body suffers. Similarly, if a section of the society gets neglected the whole nation will suffer. It is therefore imperative for the government to recognize its duty to protect the legitimate interest of the farmers, especially the small and marginal farmers and there should be no compromise in safeguarding the interest of the farmers. In this way, we can assure for a strong and healthy nation of tomorrow with the prosperity of the farming community [8].

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX

Interview Schedule

Schedule No. _____ Village: _____ Contact No. _____

1. General Information of the Respondents:

(a) Name:_____ (b) Age: _____
(c) Caste: Gen/OBC/SC/ST/Minorities/Others (d) Edn: _____
(e) Association with social organisation: _____
(f) Family type: Single/Joint
(g) Family composition: Total _____ Male _____ Female _____
(h) Occupation: Main _____ Subsidiary _____
(i) Total annual income: Main _____ Subsidiary _____ Total _____
(j) House type: Pucca/Kacha

2. Operational Land Holding:

Particulars			Type of land in acre			
			Upland	medium land	Low land	Total
a)	Own land :					
	Irrigated :	Kharif				
		Rabi				
	Non-Irrigated:	Kharif				
		Rabi				
b)	Leased in land :					
	Irrigated :	Kharif				
		Rabi				
	Non-Irrigated:	Kharif				
		Rabi				

3. Farm Asset Base:

Farm implement	No.	Year of purchase	Purchase cost (Rs.)	Present value (Rs.)	Junk value (Rs.)	Life span (Year)
Bullock cart						
Tractor						
Power tiller						
Plough						
Cultivator						
Harrow						
Pumpset						
Intercultural implements						
Thresher						
Knapsack Sprayer						
Others						

4. Details of Farm Income:

SL no.	Source of income	Cash	Kind (Qtls)	Value(S)	Total receipt	Remarks
1.	Sale of crops-					
	(a) Sale of main product					
	(b) Sale of by product					
2.	Sale of livestock					
3.	Sale of livestock produce					
4.	Receipt from leased cut of land					
5.	Income from earning assets					
6.	Gifts					
7.	Profession					
8.	Wages					

5. Capital Expenses: (in rupees)

Items	Quantity	Value
Land Improvement		
Irrigation Structure		
Pump Sets		
Implements and Machineries		
Others if any		

Farm Expense:

Sl No.	Items	Rs.
1.	For Land Improvement	
2.	Sowing	
3.	Seeding	
4.	Inter cultural operations	
5.	Harvesting	
6.	Others	
Total		

Farm Credit:

Sl no.	Sources of credit	Amount of loan borrowed				
		ST	MT	LT	TOTAL	Interest
1.	Cooperatives					
2.	Commercial Banks					
3.	Regional Rural Banks					
4.	Money Lenders					
5.	Landlords					
6.	Relatives & Friends					

Use of Credit:

Sl no.	Sources of credit	Current farm exp.				Capital ex.			House hold exp.	
		Seed	Fertilizer	Pesticides	Implements	Land improvement	Irrigation	Purchase of pump sets	Food exp.	Non food exp.
1.	Cooperatives									
2.	Commercial Banks									
3.	Regional Rural Banks									
4.	Money Lenders									
5.	Landlords									
6.	Relatives & Friends									

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