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Impact of agricultural credit and demographic factors on agricultural Productivity – A Special reference to Bangalore Rural district

Nagaraju J.[1] and Dr. Padmini. S. V[2]

Research Scholar[1], Department of Studies and Research in Economics, Tumkur University, Tumakuru

Research guide and Assistant Professor[2], Department of Economics, University college of Arts, Tumakuru

Abstract: The main objective of this paper is to find the impact of PACB credit to farmers on their agricultural Productivity. A field survey was conducted in selected Bangalore rural districts. Binary logistic regression is applied to find the impact of predictors variables education, age, income, and credit on agricultural credit. From the study, it was found that education, income, and credit had a significant impact on agricultural productivity, whereas the age factor was insignificant. The study also revealed that the time frame should be given to the farmers for repaying the loan. Statistical software SPSS version 20 was used for data analysis.

Keywords: Agricultural Productivity, Credit, PACB, Regression, India.

Introduction

India's agricultural history dates back to the Indus valley civilization era and even before that in some parts of southern India. The agricultural sector is the most critical sector for developing countries like india.60% of the Indian population works n this industry and contributes 18% to India's GDP. The share of the agricultural industry decreases every year ith development in other areas of the economy. The agricultural and allied sector has grown at an annual growth rate of 2.9% from 2014-15 to 2018-19.

India exports agricultural products worth Rs 2.7 lakh crore and imports Rs 1.37 lakh crore, but the total agrarian export is only 2.15 percent of world agricultural trade.

Therefore the problem due to agricultural Productivity is of at most importance because agriculture in India provides not only employment but also supplies raw material for the industrial sector. Growth in India's economy and productivity of the agricultural industry is positively correlated, the however agrarian industry is facing many inherent and apparent problems. Some of the difficulties faced by Indian agriculturists are irrigation, the inadequacy of credit, weak agricultural marketing, and ineffective cooperative structure.

With a population growth rate of 1.9 % per annum, it is essential to increase the pace of agricultural production, which increases productivity. In terms of global ranking, the richness of Indian crops is disappointing. To raise agrarian production, capital is required, but the majority of farmers are not able to practice agriculture due to a lack of money. The agricultural growth also depends on other factors such as infrastructure, enhanced irrigation facilities, proper land reforms, education, adequate credit facilities, agrarian subsidy, crop

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protection, agricultural marketing, price support, use of improved seeds and fertilizers, etc. Therefore agricultural credit plays a vital role in the strategy of agricultural growth in a country like India.

The credit facilities are need of the hour to adopt new technology in farming, seeds, and fertilizers which will increase farm production and growth rate. Therefore agricultural credit is an essential element in modern-day agriculture. In India, as far as agrarian credit is concerned, there are two classifications one for the short and medium-term and other long term credit. The short and medium-term loan follows a three-tier structure with primary agricultural credit societies at the provincial level. Since our study aims at Bangalore rural districts, the main source of credit is Primary Agricultural Credit Societies (PACS). PACS apart from providing credit distribute fertilizers, issue loan to purchase farm machinery and offer marketing facilities for the sale of agricultural produce.

As far as agricultural credit is concerned, there are two streams, one for a short and medium-term loan and another for long-term credit. The short and medium-term agricultural credit follows a three-tier structure with the primary agricultural credit societies (also multipurpose cooperative societies and farmer's services societies) at the village level

Literature Review

Literature Review helps the researcher to find the background knowledge about the area of research. It helps the researcher to move in the right direction. Some relevant studies conducted are reviewed in this section.

(**Das, Senapati,** & **John, 2009)** in their study, "Impact of Agricultural Credit on Agriculture Production: An Empirical Analysis in India," mentioned that agricultural credit is rising in recent years. According to the study reveals that direct agricultural credit has a positive and significant impact on agrarian Productivity. Even though there are several gaps in the credit delivery mechanism, it still is playing a critical role in agricultural production.

(Siriwardana & Jayawardena, 2014) the paper "Socio-Demographic Factors Contributing to the Productivity in Paddy Farming: A Case Study" found significant differences in farming practices about gender, but there was no significant difference in Productivity concerning gender. The study also revealed that farmer's experience, innovation, and use of technology contributed to Productivity in farming.

(Barot & Patel, 2015) their work revealed that even though the institutional credit in India is increasing in quantum, serious efforts are required to provide the credit facilities at the right time, right place and right quantity. There is serious attention required by the government on production processing, marketing, distribution, and value-added service.

(Rahman, Hussain, & Taqi, 2014) their study concluded that the size of family, education, age, and short term and long term loan has a significant impact on Productivity. The study revealed a positive correlation between credit and Productivity, which enables farmers to buy high-quality seeds, fertilizers, and pesticides. The study suggested that the farmer should be given time to repay the loan, which helps in the enhancement of Productivity.

(Yazdani & Gunjal, 1998) the study suggested that the use of credit is associated with a higher level of Productivity and income. The analysis revealed that agricultural bank issues

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credit for high income and educated farmers. Therefore there is a need to increase uptake of loans by the small size and low-income farmers, which helps to improve Productivity and also income equity.

Data collection And Methodology

The main aim of the study is to find the impact of agricultural production on Productivity with regard to demographic factors. The study is based on a field survey with a well-structured questionnaire. The questionnaire covers socio-economic characteristics of farmers and a five-point Likert scale, which includes questions on Productivity. Using simple random sampling, a sample size of 60 is chosen from selected Bangalore rural districts. SPSS 20 tool is used for analysis, and logit regression is applied to find the impact of a predictor variable on the outcome variable.

The present study considered some significant quantitative explanatory variables based on an extensive literature review. The variables considered for the study are

Table 1: List of Variables for Logit Model Analysis

Variables	Description
	Explained Variable
Productivity	Agricultural Productivity =1 if there is a rise in Productivity =0 No growth in Productivity
	Explanatory Variable
Education	Education of Farmer =1 If a farmer is Literate =0 If a farmer is not Literate
Age	Age of Farmer
Savings	Savings of Farmer
Loan Availed	Loan Availed From PACB =1 Availed =0 Not Availed

The dependent variable considered is the rise in agricultural Productivity. The agricultural product is the ratio of agrarian input to output. The logistic regression model is used for the analysis. The dependent variable productivity increase is a dichotomous categorical variable that is regressed on selected explanatory variables. The demographic factors education, age, and savings are considered as explanatory variables. The empirical analysis of the impact of explanatory variables, including credit on agricultural Productivity, is analyzed using logistic regression.

Analysis and Interpretation

The impact of agricultural credit and other demographic factors such as age, education, and income on Productivity is estimated by employing binary logistic regression by taking agrarian Productivity as a dummy variable with 1 if there is a rise in Productivity and 0 if there is no rise in Productivity.

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The linearity of the continuous variable age, income with respect to the logit of dependent variable agricultural Productivity was assessed using the Box-Tidwell procedure. The **Bonferroni correction** is used to test the linearity condition of all terms, including the intercept term. All the continuous independent variable is linearly related to logit of the dependent variable as P-values are greater than 0.0083 as there are six terms in the model. No significant outliers were found n the analysis.

The omnibus tests of model coefficients provide the overall significance of the model. The logistic regression model is statistically significant as p<.005.

Table 2: Model Fit

Omnibus Tests of Model Coefficients				
		Chi-square	df	Sig.
Step 1	Step	34.833	4	.000
	Block	34.833	4	.000
	Model	34.833	4	.000

Source: Author's calculations by using SPSS.

Adequacy of the model is tested using Hosmer and Lemeshow goodness of. Hosmer and Lemeshow test are not statistically significant (p = .882 >.005), indicating that the model is not a poor fit.

Table 3: Test of Adequacy

Hosmer and Lemeshow Test			
Step	Chi-square	df	Sig.
1	3.719	8	.882

Source: Author's calculations by using SPSS.

The model explained 60.7% (Nagelkerke R Square) of the variance in Agricultural Productivity and correctly classified 86.7% of cases.

Table 4: Model Summary

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	42.860[a]	.440	.607

Source: Author's calculations by using SPSS.

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Of the four predictor variables, only three variables are statistically significant, which are education, age, and credit. Availing credit has 7.66 times odd to exhibit an increase in Productivity than not availing loans. According to the analysis, education and income have a significant impact on the rise in Productivity, whereas the age of the farmer is insignificant with regard to Productivity.

Table 5: Estimates of the Logit Model Analysis

Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	EDUCATION(1)	-3.625	1.219	8.84	1	0.003	0.027
	AGE	0.288	0.091	10.101	1	0.001	1.333
	LOANAVAILED	2.036	0.931	4.779	1	0.029	7.663
	INCOME	0	0	0.496	1	0.481	1
	Constant	-11.27	3.728	9.142	1	0.002	0

Source: Author's calculations by using SPSS.

Conclusion

Education, income, and credit have a significant impact on agricultural Productivity. The age of the farmer is an insignificant impact on agricultural Productivity. The borrowing from the bank helps the farmers to buy high yield variety of seeds, fertilizers, and pesticides and also increase their market by marketing. The education of the farmers helps him to understand the changing environment, adopt new technology and techniques, which allows him to improve Productivity. The income of farmers helps him to invest in raw materials, machineries, technology, and modern marketing techniques. The rise in income increase productivity, which in turn results in a surge in agricultural production.

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