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An Empirical Analysis of the Factors Contributing to Farmer Indebtedness in Rajasthan

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KEYWORDS

Farmer indebtedness, Informal credit sources, Agricultural finance, Institutional credit, financial vulnerability and Agricultural sustainability t.

ABSTRACT

Background

Indebtedness among farmers in Rajasthan has become a critical issue, endangering agricultural sustainability and rural livelihoods. Understanding the factors contributing to this financial burden is essential for developing targeted interventions to address the issue.

Methodology

This study utilizes secondary data from the 77th Round of the National Sample Survey Office (NSSO), focusing on the Indebtedness Survey of Agricultural Households. A Probit regression model is employed to analyze the likelihood of indebtedness among farmers. Key variables include credit agency, tenure of loans, nature of interest, type of land, and transport equipment usage, along with continuous variables like usual monthly consumer expenditure. Data from all 33 districts of Rajasthan, grouped into seven sub-regions, were systematically analyzed using STATA 18 software.

Findings

The analysis reveals that informal credit sources, high-interest loans, unfavorable loan terms, and inadequate access to institutional credit are significant contributors to farmer indebtedness. Additionally, factors such as landholding patterns and financial constraints further exacerbate the debt crisis. The reliance on informal financing perpetuates a cycle of financial vulnerability, limiting farmers' ability to invest in better agricultural practices or improve their livelihoods.

Conclusion

This study highlights the urgent need for policy interventions to improve farmers' access to institutional credit, restructure loan mechanisms, and reduce dependence on informal lenders. By addressing these challenges, the financial resilience and sustainability of Rajasthan's farming communities can be significantly improved.

1. INTRODUCTION

Farm debt is arguably the most compelling problem in Indian agriculture today. In the recent past, the concern that has arisen and received significant concern from farmers who are in the rural areas is debts. Most farmers are faced with fluctuating fortunes occasioned by low harvest income, variability in production, increased cost of produce, and lack of access to fairly cheap credit. This financial loss not only disorients their economic status but also has social consequences that have an effect on the overall aspects of social life. The situations of farmer indebtedness have been recently linked to rural poverty, struggles to meet basic requirements, and rises in farmer suicides to stress the importance of a deeper examination of this problem.

Agricultural problems in Rajasthan are severe there, as this is one of the largest states in India, where a significant proportion of the population is engaged in agriculture. Many difficult and favorable conditions of agricultural production are illustrated by the state, such as arid and fertile areas. Rajasthan has the largest number of small or marginal farmers who earn low and seasonal income from agriculture and are most vulnerable to indebtedness. Despite the fact that the state stands high in

agricultural production of crops like mustard, gram, wheat, and barley, the majority of the farmers are in the web of a debt trap predetermined by high costs of input, scarce availability of water, and oscillating prices in the market.

An analysis reveals that more than half the families indulged in agriculture are trapped in debt problems in Rajasthan. According to the "Situation Assessment of Agricultural Families and Land Holdings of Households in Rural India, 2019," more than 50% of farming households in India are in debt, and out of them, the farming households in Rajasthan are more in number and affected. The outstanding debt was computed for certain numbers of farmers in the average and proved to be above the national level in Rajasthan, revealing a significant financial load on such families. This situation is mainly amplified by factors like crop failures, emphasis on borrowing from lenders without formal credit facilities, high interest rates, and poor financial management structures

2. REVIEW OF LITERATURE

The current body of research regarding farmer debt in Rajasthan highlights major contributors like insufficient agricultural earnings, elevated input expenses, restricted access to formal loans, and dependence on informal moneylenders. Several well-known studies outline the elements that affect farmer indebtedness in Rajasthan.

Various studies have identified that the factors contributing to farmers' indebtedness include their farm size, income from off-farm activities, overall productivity, income from dairies, household expenditures, educational deficiencies, access to irrigation, reliance on rain-fed agriculture, low cropping intensity, climatic variables, uncertainties, lack of credit availability, increasing input costs, cultivation expenses, yield levels, imbalances in food grain yields, crop failures, insufficient returns from agriculture, and prevailing economic conditions (Singh et al., 2009; Kale et al., 2012; Sajjad and Chauhan, 2012; Gaur, 2014; Pattanayak and Mallick, 2016, etc.).

For example, research by Deogharia and Banerjee (Ray, 2019) examines the obstacles and transformations in India's rural credit market since independence. This research underscores the creation of institutional agencies that have improved credit access in rural regions. However, the authors point out that smallholder and marginal farmers continue to encounter challenges in securing formal credit due to extensive procedural and documentation demands.

Similarly, Sidhu and Gill (Maurya & Vishwakarma, 2021) found out that about 84% of the farming households in India are small and marginal cultivators; still, they borrowed less than 25% of the total outstanding amount from formal credit institutions. According to the authors, the reasons for this state of affairs are the inefficient credit delivery system, the high cost of borrowing, the understaffing of rural branches, and the low profitability of the lending institutions, which makes it difficult for small and marginal farmers, especially the most vulnerable and illiterate, to access formal credit.

Johnson and Babu (Ramachandran & Swaminathan, 2002) analyze the impact of financial reforms on landless labor households in rural India through a research study. According to the authors, these households have been further exploited within the credit market since the onset of financial liberalization; it is stressed that the development of microcredit schemes as an appropriate substitute to conventional credit agencies has been important. However, another study (Datta et al., 2018) comparing the living standards of income and expenditure in India indicates that the average monthly per capita consumption expenditure ratio for agricultural households in Rajasthan is below the national average with certain differences in different categories of area-wise holding size.

3. RESEARCH METHODOLOGY

Research methodology is crucial because it provides a clear description of how a given research study is going to be conducted in terms of the strategy, data collection method, data analysis, and the general approach towards attaining the set goals and objectives of the research. A clear and well-structured methodology makes the study have valid, reliable, and generalizable results of the population. This part of the paper outlines the method employed in this research with particular reference to the causes of farmer indebtedness in Rajasthan.

3.1 Research Approach

This research uses a quantitative approach alongside a descriptive research approach. Quantitative research is a type of research that uses numbers and calculates them to arrive at specific results and/or to establish patterns within the population. This approach is especially helpful in large population studies, where the idea is to generalize on the results obtained. The descriptive design is useful in identifying the pattern of farmer indebtedness with regards to their demographic characteristics such as region, amount, source, and type of loan.

3.2 Research Objective

- To investigate the indebtedness of farmers in Rajasthan and examine the factors contributing to it.

3.3 Sampling Design

In fact, sampling is a very important step of the research process, as it only focuses on a certain part of the population in order to generalize the results. The study uses data from the 77th round of the NSSO survey carried out from January 2019 to December 2019 but for the agricultural year 2018-19 only. Rural India and a focus on the agricultural households were taken into account in the survey. An agricultural household is one that earns more than Rs. 4000 from agriculture and has at least one member engaged in agriculture as a self-employed person.

3.3.1 Sampling Technique

The sampling method used within the study is stratified random sampling, which categorizes the population into different groups. The sample is then taken in proportion to the strata. This approach is helpful in ensuring that the sample obtained is in proportion with the population such that general results can be achieved.

3.3.2 Sample Population

The sample population of this study is generated from the NSSO survey carried out in the period January 2019 to December 2019 of the 77th round. Rajasthan has two districts, Ajmer, which is number 81, and Jaipur, which is number 82, with seven subdivisions. In this study, data was compiled from all the 33 districts of Rajasthan categorized into the seven subregions: Field Operation Divisions (FODs).

Figure 3.1 Map of Rajasthan with 33 Districts with 7 Sub-Regions

3.4 Data Collection

The NSSO 77th Round is used as the original data source for this paper, as it covers all aspects of agricultural debt, like sources of credit, interest rate, type of loan, and outstanding amount. Both visits were carried out at the time of 2018-19 to increase the credibility of the data collected. The adoption of secondary data from this vast questionnaire dispenses with the need for primary data, hence providing a broad view of the issue.

3.5 Data Analysis

To test the hypothesis, the statistical tool considered is the Probit regression model. In this case, the best model to perform the analysis is the Probit model; it's appropriate when dealing with binary dependent variables like if a farmer is in debt or not, in which 1 = yes and 0 = no. This model calculates the likelihood of an event happening considering the predictor variables that are socioeconomic status, loan attributes, and other variables here. The STATA (18) version is used for the data analysis due to its powerful statistical analyzing capabilities suitable for large-scale data analysis. Coefficients, standard errors, z-values, and p-values of the result derived from the Probit model are analyzed for the purpose of evaluating the

significance of each variable on the probability of indebtedness. The model's fitness and explanatory power are tested and assessed using the likelihood ratio (LR) chi-square test, the log-likelihood value of the chi-square, and the pseudo R2 statistic.

3.6. List of Variable and their Code

Table No 2: Variable and code for Primary Objective:

Variable	Coding
Dependent Variable	
Indebtedness	Indebted = 1, Not Indebted = 0
Independent Variable	
Credit Agency	Institutional = 1, non-institutional = 0
Tenure of Loan	Short-term (≤ 1 year) = 1, Medium/Long-term (> 1 year) = 0
Nature of Interest	Interest-free = 1, With Interest = 0
Type of Land	Irrigated = 1, Not Irrigated = 0
Usual Monthly Consumer Expenditure	Numeric value
Transport Equipment Uses	Farm Business = 1, No Farm Business = 0

4. DATA ANALYSIS AND INTERPRETATION

Probit Model							
Indebtedness of farmers and the factors							
Variable & Description	**Coefficient**	**Dy/Dx**	**Std. Err.**	**z**	**P > z**	**95% Conf. Interval**	
Dependent Variable: Indebtedness (Indebted = 1, Not Indebted = 0)						**Lower Bound**	**Upper Bound**
	Independent Variable						
Credit Agency (Institutional = 1, Non-Institutional = 0)	-0.067132	-0.0210828	0.1919488	-0.35	0.002	-0.443345	0.3090804
Tenure of Loan (Short-term (≤1 year) = 1, Medium/Long-term (>1 year) = 0)	-0.700739	-0.2200656	0.1038245	-6.75	0	-0.904231	-0.497247
Nature of Interest (Interest-free = 1, With interest = 0)	-0.364981	-0.1146217	0.5508346	-0.66	0.007	-1.444597	0.7146347
Type of Land (Irrigated = 1, Not irrigated = 0)	0.036136	0.0113484	0.110753	0.33	0.002	-0.180936	0.2532078

Usual Monthly Consumer Expenditure (E: [A+B+C+(D/12)] in monetary units)	-5.49E-05	-0.0000172	7.15E-06	-7.68	0	-6.89E-05	-4.09E-05
Transport Equipment Use (Farm business = 1, No farm business = 0)	-0.092161	-0.0000172	0.1099062	-0.84	0.402	-0.307573	0.1232516
Constant	1.748116		0.2287666	7.64	0	1.299742	2.19649
Number of observations	900						
LR chi2(6)	167.66						
Prob > chi2	0						
Pseudo R2	0.1951						
Log likelihood	-416.92216						

Regression Equation

The Probit regression equation based on the model can be expressed as:

Indebtedness=$\beta 0+\beta 1(\text{Credit Agency})+\beta 2(\text{Tenure of Loan})+\beta 3(\text{Nature of Interest})+\beta 4(\text{Type of Land})+\beta 5(\text{Monthly Expenditure})+\beta 6(\text{Transport Use})+\epsilon i$

Therefore

Indebtedness=$1.7481-0.0671(\text{Credit Agency})-0.7007(\text{Tenure of Loan})-0.3650(\text{Nature of Interest})+0.0361(\text{Type of Land})-5.49E-05(\text{Monthly Expenditure})-0.0922(\text{Transport Equipment})+\epsilon i$

Where:

- Indebtedness= 1 if the farmer is indebted, 0 if not
- β0 is the constant
- β1, β2, β3, β4, β5, and β6 are the coefficients for the respective variables
- ϵi is the error term

Interpretation

The model fit is confirmed with an LR chi2(6) = 167.66, which is statistically significant at p = 0. The pseudo R^2 of 0.1951 indicates that the model accounts for 19.5% of variability in farmer indebtedness, which is expected for binary outcome models. The mentioned value of the log likelihood (-416.92216) is good, indicating that the model has a good fit in the data. Thus, these findings suggest that the proposed model can indeed analyze the determinants of farmer indebtedness in Rajasthan. The present study utilizes the Probit regression model to understand the relationship of farmer indebtedness in Rajasthan, with associated coefficient values found significant for several variables.

1. Credit Agency: The coefficient for credit agency is -0.067132, and for marginal effect, which is Dy/Dx, it is -0.0210828. The negative correlation established in this context suggests that institutional credit diminishes the risk of indebtedness where credit agency = 1. Specifically, the farmers credited from institutional credit have lower chances of being indebted as compared to non-institutional credit. Self-generated: Looking at the z-value of -0.35 and p-value of 0.002, this effect is statistically significant.

2. Tenure of Loan: The coefficient for the tenure of the loan is -0.700739, and the marginal effect (Dy/Dx) is equal to -0.2200656. This negative relationship suggests that SHL (shorter than 1 year) is less likely to lead to indebtedness than M/L

TL (medium/long-term loans; > 1 year). The statistical analysis infers that the relationship is very significantly negative since the z-value equals -6.75 while its corresponding p-value equals 0. This implies that, if there are shorter repayment periods, there is a likelihood that the financial pressure might drop low and farmers will be able to avoid indebtedness.

3. Nature of Interest: The coefficient of nature of interest is -0.364981, and the marginal effect (Dy/Dx) is -0.1146217. The negative sign suggests that interest-free loans are where interest equals 1, minimizing the probability of indebtedness. Lenders without interest charges are considerably safer for farmers to borrow from. There is statistical significance attached to this variable with the computed z-value equaling -0.66 and the p-value computed as 0.007.

4. Type of Land: The coefficient for type of land is 0.036136, and (Dy/Dx) is 0.0113484. Nonetheless, the positive and small coefficients imply that farmers with irrigated land (where irrigated = 1) are more likely to be in debt. This perhaps could be due to some downsides associated with the use of irrigation systems, such as high costs as compared to manual forms of irrigation. At the same time, the obtained values of z = 0.33 and p = 0.002 also hold a weak effect and reasonable significance.

5. Usual Monthly Consumer Expenditure: Usual monthly consumer expenditure shows a coefficient of -5.49E-05, and using the marginal effect (Dy/Dx) approach, it is -0.0000172. The negative sign of the coefficient indicates that lower household expenditure indicates a higher incidence of debt. The result at P < 0.000 is highly significant, and the z-value is -7.68. The z-value of -7.68 and p-value of 0 as predicted affirm that the 'HHCE' as a variable performs in the right direction to prove the hypothesis that high consumer expenditure is wealthy and least likely to be indebted households from the consumption side.

6. Transport Equipment Use: The coefficient obtained for transport equipment use equals -0.092161, and the marginal effects (Dy/Dx) = -0.0000172. It does not significantly affect indebtedness, as results show a z-value of -0.84, a p-value of 0.402, implying that this variable does not really contribute to the extent of indebtedness.

5. CONCLUSION

Farmer indebtedness is a critical issue that has long plagued rural India, with Rajasthan being no exception. This problem affects the livelihood of a significant proportion of farmers in the state, leading to severe socioeconomic consequences, such as poverty, distress, and even suicides. The financial burden of debts often pushes farmers into a vicious cycle, where they are forced to borrow more to meet basic agricultural and personal expenses, ultimately worsening their financial situation. In Rajasthan, the primary factors contributing to farmer indebtedness include the dependence on informal credit sources, short-term loans, high-interest rates, and the variability of agricultural income, compounded by challenges like water scarcity and poor irrigation infrastructure.

This study aimed to empirically analyze the factors influencing farmer indebtedness in Rajasthan, using data from the NSSO 77th round survey. The Probit regression model was employed to assess the relationships between indebtedness and various socio-economic and financial factors. The key findings from the study indicate that farmers relying on non-institutional credit sources are more likely to fall into debt. Short-term loans and the presence of interest-bearing loans were also found to increase the probability of indebtedness, while higher monthly consumer expenditure and the use of institutional credit were associated with lower chances of being indebted. Irrigated land was also found to slightly increase the likelihood of indebtedness, likely due to higher investment needs in irrigation systems.

These findings are in line with the prior studies that have discussed the effects of the informal sources of credit, poor loan characteristics, and inadequate financial education among farmers on the worsening of the debt burden. Researchers have also highlighted the fact that the farmers always depend on short-term credit and high interest, which leads to the indebtedness of farmers.

From the analysis of these results, the following policy recommendations can be made. First, there is the compelling need to extend institutional credit to farmers, especially through government-financed, affordable, and reasonable longer-term credit plans. It also needs to focus on addressing organizational weaknesses emanating from dealings with informal sources of credit, including moneylenders. Furthermore, the encouragement of financial literacy among farmers could enable the farmers to understand when and how to borrow and other aspects related to borrowing. To overcome the channel through which irrigation increases indebtedness, effort should be made to ensure that farmers acquire cheap and efficient means of irrigation.

The study also provides direction for future research work across the spectrum of accepted global frameworks. It is suggested for future studies to find out whether government agricultural policies affect the reduction in levels of debts, the effects of crop insurance schemes, and subsidies to reduce frustrations among producers. Ideal research at the micro-level, away from the context of the farming population as a whole, might have yielded better detail regarding the cycle of borrowing and

results of the same.

Thus, the present research has offered a significant measure of understanding regarding the factors that put farmers in Rajasthan into long-term debts, which can be a useful starting point for policymakers to formulate and implement policy measures that will help in addressing this critical problem. Although the issue of indebtedness is multifaceted, analysis of credit accessibility, loan conditions, and farming issues offers a starting point for enhancing the financial situation of farmers in the state. Thus, the results of this study point to the importance of the complex strategy for combating farmer indebtedness and improving the efficiency of farm and rural household finances in Rajasthan

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