An Empirical Analysis of Extent, Magnitude and Determinants of Indebtedness Among Farmers in India

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ABSTRACT

Amidst the scenario of distress among the agrarian community, it is imperative to discuss farmer's indebtedness. Most of India's studies revealed that farm households' indebtedness is a crucial factor responsible for the crisis. This paper analyses the extent, magnitude and determinants of farmer's indebtedness. he study is based on data extracted from a comprehensive survey on Agriculture across India in 2013, carried out under the 70th Round of the National Sampling Survey Office (NSSO). The incidence and determinants of indebtedness were assessed using various econometric models. It was found that the incidence of debt varies across sources and nature of the loan, landholding sizes and type, expenses and income and socio-demographic characteristics among agricultural households. The regression analysis results indicate that household characteristics, farm characteristics, expenses, income, sources, and nature of loans determine the extent of indebtedness among the agrarian community.

Keywords: Indebtedness; Agriculture households; Credit; Outstanding loans; Multiple Regression; Logit Regression; Probit Regression

1. INTRODUCTION

Indian populace is largely rural-based and dependent on agrarian activities for a living. Stable and enhanced growth of the agricultural sector is vital for the Indian economy as it contributes immensely to the Gross Domestic Product (GDP) of the country. Agriculture is a significant source of livelihood for 58 per cent population in India, yet the condition of most farmers in India is terrible. Indebtedness is one of the significant challenges encountered by Indian farmers. Even after the growth of institutional credit to agriculture and new agricultural technology, indebtedness among farmers persists. About 80% of India's farmers occupy less than 1 hectare of land (marginal farmers) or 1–2 hectares of Land (small farmers). Decades back in 1925, Darling, while studying the Punjabi peasants, had commented that "the Indian peasant is born in debt, lives in debt and dies in debt". However, the problem of farmer's indebtedness in India continues even today. The prime reasons for agrarian debt are the non-assurance of crop cultivation since agricultural activities are seasonal and rainfed, ultimately affecting the farmers' repaying capacity. Secondly, despite the increase of institutional credit distribution for agriculture, some farmers

still rely on non-institutional sources. The interest rate of the loan is high, with exploitative terms and conditions. Thirdly, intermediaries' ascendancy in farm produce markets restricts the farmer community to get the ideal prices for their products. Hence, it affects their repaying capacity and is a significant reason for debt amongst the farmers. Indebtedness has been one of the primary reasons for farmer's suicide in India. According to 2019 statistics, 5,563 male and 394 female farmers have committed suicide.

Similarly, 3,749 males and 575 female agricultural labours committed suicide. The debt burden created by moneylenders and intermediaries has only increased the number of farmer suicides in India. Therefore, rural agricultural farmers need to have a rural agricultural credit system to rely on. Numerous studies have been conducted which focused on agricultural credit, including the indebtedness of the farmers' and rural households in India. Though credit is essential for rural development, the 'hidden' side effect of credit is indebtedness. Accessibility to credit is vital for the well-being of rural households across developing nations, including India. By and large, India continues to be a rural agrarian society; the shift towards other sectors of the economy has been steady but slow. The productivity of agriculture in India is still very low. Post-independence, the Governments have prioritised the inclusiveness of farmers in overall growth. However, this segment's financial condition has yet not reached the desirable standards, which might be perhaps due to the long history of exploitation and neglect in the pre-independence era.

Recent Situation Assessment Survey of Agricultural Households by the National Sample Survey Office (NSSO) on India provides insight into how farmers borrow, produce and earn. The survey reveals that about 52 per-cent of the country's agricultural households were estimated to be in debt. The average amount of outstanding loan per rural household was approximately Rs. 50,000/-. This article aims to understand the factors determining the extent and magnitude of indebtedness among agricultural households in rural India.

2. LITERATURE REVIEW

The Economic well-being of an Indian agricultural farmer, resource availability, indebtedness, information of technological developments, and reach to modern technology has drawn pressing attention from researchers and policy-makers in the past, leading to extensive literature on the topic. Being inspired by several researchers, we became keenly interested in analysing and assessing agricultural farmers' situation in India, particularly the impact of various factors on farmers' indebtedness.

Mukhopadhyay and Mukherjee (2020) recommended a universal crop insurance scheme to increase output production, support farm income, and lead to a turn-around of Indian agriculture as crop insurance is the exclusive mechanism available to mitigate production risk in agrarian activities. Sundaram, Natarajan. (2019) shed light on the agricultural crisis and farmer's suicides in India and suggested provision of irrigation facilities, minimum support prices of products and long term

institutional credit to reduce farmers distress. Padmaja and Ali (2019) found a notable difference in India's social, economic and farm characteristics of indebted and non-indebted households. Pabalkar and Moray (2019) found a relationship between farming technology and economic growth and stressed the vital role of technology in rural households' social and economic development. Subash Surendran Padmaja and Jabir Ali (2018) highlighted the variation in social, economic and farm characteristics of indebted and non-indebted households and recommended that while designing the rural farm credit policies, the government and policy-makers must weigh the long-term implications of loan-waiver schemes. Pradhan and Mukherjee (2017) estimated that agricultural production's technical efficiency in India revealed that mostly Indian agriculture is still labour intensive. They concluded that with an increase in the cropped area, the output growth declines; however, the crop output increases with the irrigated area's proportionate increase. They further noted that the government's expenditures on agricultural programs positively influence the productivity of the farmers.

Panda (2015) emphasises the importance of farmers' literacy and awareness to improve agricultural incomes and productivity in rural Indian households. Hebous and Klonner (2014) analysed the origins of the extreme economic crisis in rural India. They recommended the need for rural development policies to protect against multiple risk sources vis-a-vis mere aggregate growth. Rajeev, Meenakshi, Vani, B P and Bhattacharjee, Manojit (2012) examined the data of rice cultivating farmers in India and found that the productivity of small farmers is greater than that of the medium farmers. They also found that with access to credit, productivity increases manifold. However, farmers with lower landholdings were far more deprived of the formal sources of credit vis-à-vis the more prosperous ones. Mahul and Verma (2010) highlighted the need for a well-designed and widely adopted agriculture insurance program in India for risk mitigation due to high dependence on rain-fed cultivation by a large section of small and marginal farmers with low landholdings.

Abhiman Das, Manjusha Senapati and Joice John (2009) evaluated the role of direct and indirect farm credit and highlighted numerous gaps in the existing institutional credit delivery system. They concluded that agriculture credit remains to play a significant role in boosting farm production in India. Sharma and Bhaduri (2009) suggested a U-shape relation between farm size and withdrawal readiness. Their study indicated that younger farmers were relatively more occupationally mobile. They also found that smallholder agriculture's low viability as a possible reason for the poor and modest farmers to quit farming. Mishra (2007) opined that the surge in farmers' suicides results from many farmers' insufficient income through agriculture. The inadequate income is due to crop losses, market uncertainties, additional expenditures required to cater to education, health requirements and marriage. Policy interventions and social safety measures are needed to address all possible risks and enhance the rural agrarian society's livelihood. Sidhu, Gill (2006) suggested autonomy, accountability, and self-regulation of the financial markets and

institutions to tackle rural indebtedness. A. Narayanamoorthy and S.S. Kalamkar (2005) researched agrarian indebtedness in different states of India. They concluded the extent of debt is relatively greater in states developed in agricultural terms. They highlighted that the debt in ranges from 18 to 82 per cent in Assam and Andhra Pradesh, respectively.

The study was conducted to understand the factors determining agricultural households' indebtedness in rural India using the data gathered under the 70th Round of the National Sample Survey Organization, Ministry of Statistics and Programme Implementation (MOSPI), Government of India on Situation Assessment Survey of Agricultural Households during 2013. A total of 35,200 households were surveyed across the country. The survey extracted various information related to farming such as farming practices, preferences, resource availability, crop loss and other socio-economic factors such as income, expenditure, productive assets, indebtedness, along with additional information such as awareness and access to modern technology, crop insurance, Minimum Support Price (MSP). The study first analyses the effects of the 12 chosen independent variables on the total amount outstanding or total debt of the farmers or the agricultural households. It then narrows it down to the dependent variables on the amount due greater than Rs. 50,000.

3. METHODOLOGY

In this paper, the effect of independent variables like General education, Land total possessed, loan characteristics such as nature of loan and source of the loan, input expenses, sale value, household size, the full value of the product, total net receipts, type of structure of house and type of Land have attempted to study the impact on the outstanding loans amongst the farm households in rural India. The degree of debt measured as the amount due would provide us insights into farmers' characteristics with higher indebtedness. The models used in the study are Multiple Regression, Logistic Regression, Probit Regression, Logit Regression, and studying the marginal effects of these models. Stata has been used to carry out statistical analysis.

Table 1: Variables used in the Study

Sl. No.	Name in Stata tables	Full form of the variable
1	amt_outstanding	Amount Outstanding
2	amt_high	Amount higher than Rs.50,000
3	land_total	Total Land Possessed
4	gen_edu	General Education
5	sale_val	Total Sale value of harvest
6	input_exp	Input Expenses
7	total_net_receipts	Total Net Receipts
8	nat_loan	Nature of Loan
9	source_loan	Source of loan
10	total_expenditure	Total Expenditure

11	Total_prodval	Total Value of Produce
12	hhld_size	Household Size
13	typ_struc	Type of Structure
14	typ_land	Type of Land

Source: "the 70th Round of the National Sampling Survey Office (NSSO) on Agriculture across India in 2013"

4. RESULTS AND DISCUSSION

The three models, i.e., the Regression, the Logit and the Probit models, were constructed in STATA with the dependent variable (amt_high) the amount outstanding or indebtedness equal to or greater than Rs. 50,000 with the 12 independent variables of the study (total Land possessed, general education, all sale value, inputs expenses, total expenses, nature of the loan, source of the loan, total expenditure, the full value of the product, household size, type of structure of the house, and kind of Land).

Based on the models computed, Binary Outcome Model Coefficients was constructed and analysed in Table 2. Farmers or agricultural households with a total land, general education, all goods sold (sale value), total expenses, total expenditure, the full value of the product, household size, type of structure of the house, kind of Land, all excepting the second value of the binary values accepted are more likely to have an amount outstanding (or suffer from indebtedness) of greater than equal to or the amount of Rs. 50,000. In contrast, the farmers or agricultural households with input expenses, nature of costs, and loan source are less likely to have an amount outstanding (or suffer from indebtedness) of greater than equal to or the amount of Rs. 50,000. The regression, logit, and probit coefficients differ by a scale factor or less than a scale factor with no significant difference in most of the study's dependent variables. Ergo, not much can be commented about the magnitude of the coefficients of the three analysed models.

Table 2: Binary Outcome Model Coefficients

Amount outstanding greater than Rs. 50,000	**Regression Coefficients**	**Logit Coefficients**	**Probit Coefficients**
Total land possessed	.033	.238	.120
General Education	.007	.029	.018
All sale value	4.66	.000	6.82
Input expenses	-2.76	2.57	1.17
Total expenses	1.58	1.00	5.72
Nature of loan	-.122	-.703	-.410
Source of loan	-.039	-.184	-.115
Total expenditure	1.01	4.05	2.02
Total Value Of Product	1.60	1.11	5.83
Household size	.004	.018	.0131
Type of structure of house	.108	.549	.329

Type of land	.013	.050	.031
Constant	.350	-.691	-.391
R-Square	.151	.137	.132

Source: Author's own calculation based on "the 70th Round of the National Sampling Survey Office (NSSO) on Agriculture across India in 2013"

Therefore, the data was further studied to construct Binary Outcome Model Marginal Effects in Table 3, upon its analysis we found,

1. Farmers or agricultural household with a *land in possession* are 3% *more likely* to be dealing with indebtedness or having an amount outstanding equal to or greater than Rs. 50,000.
2. Farmers or agricultural household having *general education* are .7% *more likely* to be dealing with indebtedness or having an amount outstanding equal to or greater than Rs. 50,000.
3. Farmers or agricultural household with sale value are 466% *more likely* to be dealing with indebtedness or having an amount outstanding equal to or greater than Rs. 50,000.
4. Farmers or agricultural household with Input expenses are 276% *less likely* to be dealing with indebtedness or having an amount outstanding equal to or greater than Rs. 50,000.
5. Farmers or agricultural household with Total expenses are 158% *more likely* to be dealing with indebtedness or having an amount outstanding equal to or greater than Rs. 50,000.
6. Farmers or agricultural household with Nature of loan are 12% *more likely* to be dealing with indebtedness or having an amount outstanding equal to or greater than Rs. 50,000.
7. Farmers or agricultural household with Source of loan are 3% *less likely* to be dealing with indebtedness or having an amount outstanding equal to or greater than Rs. 50,000.
8. Farmers or agricultural household with Total expenditure are 101% *less likely* to be dealing with indebtedness or having an amount outstanding equal to or greater than Rs. 50,000.
9. Farmers or agricultural household with Total Value Of Product are 160% *more likely* to be dealing with indebtedness or having an amount outstanding equal to or greater than Rs. 50,000.
10. Farmers or agricultural household with Household size are .4% *more likely* to be

dealing with indebtedness or having an amount outstanding equal to or greater than Rs. 50,000.

11. Farmers or agricultural household with Type of structure of house *possession* are 10% *more likely* to be dealing with indebtedness or having an amount outstanding equal to or greater than Rs. 50,000.

12. Farmers or agricultural household with Type of land are 1% *more likely* to be dealing with indebtedness or having an amount outstanding equal to or greater than Rs. 50,000.

Interestingly, the marginal effects are almost identical unlike the coefficients which are different in the three models. The results of marginal effects at the mean and the average marginal effects are by and large alike with no significant difference. The coefficients and marginal effects for the logit and probit models are entirely identical except for the coefficients of Input expenses.

Table 3: Binary Outcome Model Marginal Effects

Amount outstanding greater than Rs. 50,000	**Regression**		**Logit**		**Probit**	
	marginal effects at the mean	**average marginal effects**	**marginal effects at the mean**	**average marginal effects**	**marginal effects at the mean**	**average marginal effects**
Total land possessed	.033	.033	.057	.048	.047	.040
General Education	.007	.007	.007	.006	.007	.006
All sale value	4.66	4.66	3.44	2.86	2.65	2.13
Input expenses	-2.76	-2,76	6.23	5.18	4.55	3.96
Total expenses	1.58	1.58	2.43	2.02	2.23	1.94
Nature of loan	-.122	-.122	-.170	-.141	-.159	-.138
Source of loan	-.039	-.039	-.044	-.037	-.044	-.039
Total expenditure	1.01	1.01	9.82	8.17	7.86	6.83
Total Value Of Product	1.60	1.60	2.69	2.24	2.27	1.97
Household size	.004	.004	.004	.003	.005	.004
Type of structure of house	.108	.108	.133	.110	.128	.111
Type of land	.013	.013	.012	.010	.012	.010

Source: Author's own calculation based on "the 70th Round of the National Sampling Survey Office (NSSO) on Agriculture across India in 2013"

5. RECOMMENDATIONS

The following are a few recommendations to curb the issue.

1. Enhance efforts to improve credit intensity as loan quantity could hardly grow in real terms.

2. Institutional agencies should develop loan products and link them with savings products targeting the landless, tiny and marginal holders whose needs are distinct from large farmers. Available products may not suit them.
3. Farmers borrowing for shorter tenures may require term loans. Innovation in Kissan Credit Card may be needed to allow investment through the card.
4. Farmers' incomes are low though incomes outpaced consumption growth which needs to be augmented with well-paid non-farm sector jobs.
5. Promote cost-cutting and income augmenting technologies and practices to improve the economics of farming. Once adopted on a large scale, soil health cards may help reduce higher use of fertilisers, which has a higher share in the cost of cultivation, and correct nutrient imbalances.

6. CONCLUSION

Agricultural debts have always been a significant socio-economic issue in India. India has progressively pursued a supply leading approach to extend rural credit to the farmers. The intent has been to achieve higher agricultural credit levels, investment and agricultural output, replace moneylenders, and relieve indebtedness farmers. There has been a notable increase in the access of rural cultivators to institutional credit over the years, and concurrently, informal agencies' role, including moneylenders, as a source of credit has dipped. There is no denying that agricultural credit has been rising in recent years as a share of both input and output values. Due to smallholders' dominance in agriculture, effective and efficient provisioning of agricultural credit at a reasonable interest rate is vital for its growth and development. However, rural banking's sustainability primarily depends on the deposits and timely repayment of loans for further credit formation.

The indebtedness level among agricultural households varies across the sources of loan, landholding size, and the other variables discussed. The analysis shows a decrease in the amount outstanding for every one-point increase in the variables, i.e. nature of loan and loan source. However, there is an increase in the amount overdue for every one-point increase in the remaining ten variables other than nature and loan source. Further, the households drenched in debt higher than rupees 50000 were mostly due to the rise in the sale value, input expenses incurred and the full value of the product as explained by the cross model analysis of Probit, logit and regression model.

Considering the seriousness of the indebtedness issue, it would be prudent that the policy-makers and the government consider the long-term implications of loan-waiver schemes while designing agricultural credit policies and other policies of the issue at hand.

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