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Inter-relations among Debt, Investment, and Income in Rural Punjab

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Abstract

The study is based on primary data collected from 150 households in rural Punjab during 2021-22. Farm households were categorized by the incidence of indebtedness levels, revealing that over half of Punjab carry a substantial debt burden. Commercial banks emerge as crucial sources of credit, particularly for larger farmers. The analysis establishes a positive link between debt and investments in fixed capital assets, emphasizing that higher debt categories align with increased investments. Notably, financially stable farmers without debts allocate resources similarly to those with medium to high debt. Expenditure patterns in crop production underscore that rising debt levels prompt increased spending on essential aspects, even among farmers with no debts, showcasing their financial stability. Examining the relationship between income and indebtedness, the study found that higher debt levels correspond to increased farm and family income. The debt-to-income ratio is found to be inversely related to landholding size. This research provides insights into how factors such as agricultural debt, investment, and income are interconnected. The findings have implications not only for individual farming households but also for the broader agricultural community.

Keywords: Debt, Income, Investment, Rural, Punjab

JEL classification: Q10, Q14, R51

Introduction

Punjab, during the peak of the Green Revolution, was a leading agricultural region in India, experiencing an impressive 5.7 per cent annual growth in agricultural GDP from 1971–72 to 1985–86, significantly higher than the national average of 2.31 per cent (Gulati et al., 2021). This period saw substantial increases in farmers' incomes due to enhanced productivity of key crops. However, the subsequent decade witnessed stagnation in crop yields and farming profits (Singh, 2000). The stagnation, coupled with rising input costs, outdated technology, and weakening support systems, has rendered agriculture a risky and unremunerative venture (GOI, 2007).

The agricultural sector's decline in production, increased production costs, and inadequate minimum support prices have made farming economically challenging (Mahajan, 2015). Consequently, indebtedness has escalated among the farming community (Singh et al., 2014). Farmers increasingly depend on loans from both institutional and non-institutional sources to procure essential inputs like seeds, fertilizers, and machinery, and to make critical investments in irrigation infrastructure (Kaur, 2013).

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According to the NSSO (2019), over half of the rural farming households in Punjab have been burdened with debt, carrying an average annual debt of Rs 1.98 lakh per household. It is crucial to note that indebtedness alone may not necessarily lead to economic impoverishment; however, it becomes problematic when repayment becomes challenging, forcing households to resort to the sale of assets. Additionally, a decline in economic status can further intensify reliance on credit, consequently exacerbating the burden of debt (Mishra, 2007). In light of these considerations, this study aims to understand the inter-relations among debt, investment, and income of rural households in Punjab which is crucial for formulating effective policies that support sustainable agricultural development.

Data Sources and Methodology

This study is based on the primary data from the sample households which was collected on a specially structured schedule through the personal interview method under the research scheme "A study into the economics of farming and the pattern of income and expenditure distribution in the Punjab agriculture" by the Department of Economics & Sociology, PAU, Ludhiana. Punjab state is divided into three well-defined agro-climatic zones, namely, the sub-mountainous zone, central zone, and south-western zone

which occupy nine per cent, 65 per cent, and 26 per cent of the net sown area of the state, respectively. To fulfill the desired objectives of the study, six blocks were selected based on their representation of specific zones within the study area. Further, one village was selected to represent the characteristics and diversity of each selected block and 25 households were randomly selected from each village making up a total sample of 150 households. Based on the quartile distribution of the amount of loan, both institutional and non-institutional, taken by the households, they were categorized into four categories, viz, no debt, low, medium, and high debt as indicated in Table 1. The study employed simple descriptive statistics and correlation analysis to explore the inter-relationship among rural indebtedness, farm investment, and income. The data used in the study pertains to the agricultural year 2021-22.

Table 1. Categorization of households into debt category

Debt Category	Number (%)	Debt (Rs. lakh/hh/ annum)
No debt	51 (34)	Nil
Low (Rs. 0.4 to 2 lakh)	28 (18.7)	1.35
Medium (Rs. 2 to 7 lakh)	34 (22.7)	4.47
High (Rs. 7 to 49.8 lakh)	37 (24.7)	18.90
Overall	150 (100)	5.93

Results and Discussion

Table 2 presents key socio-economic parameters of the study area. The average age of household heads in the no-debt group is about 51 years, compared to 52 years in the indebted group. On average, the household size is approximately five members, with two dependents and around four educated family members. The number of family members engaged in agriculture as their main occupation is slightly higher in indebted households (1.76) compared to no-debt households (1.65). Additionally, no-debt farm households have smaller operational landholdings (3.88 ha) than indebted households (4.25 ha). These differences highlight the varying socio-economic conditions between with and without debt households.

Credit can be obtained from either institutional sources such as commercial banks and cooperative banks, or non-institutional sources like friends, relatives, landlords, and commission agents. Table 3 presents the distribution of credit obtained by different categories of farmers. The data reveals that farmers in Punjab rely more on institutional credit than on non-institutional credit. Among the institutional sources—commercial banks, cooperatives, and regional rural banks (RRBs)—the majority of loans are secured from commercial banks and cooperatives.

The amount of institutional credit varies proportionately according to the size of the landholding, with marginal farmers receiving approximately Rs. 1.65 lakhs annually, while large farmers obtain up to Rs. 11.55 lakhs per annum. Kumar (2021) also observed that households with larger landholdings tend to have higher debt burdens compared to those with smaller landholdings. This distribution pattern suggests that marginal farmers may have limited access to institutional loans, highlighting a potential need for increased financial inclusion and support for these farmers.

The table further indicated that the proportion of households accessing institutional credit ranges from 60 per cent in the semi-medium category to 75 per cent in the large category. Overall, around 65 per cent of households receive loans from institutional sources, and 19 per cent rely on non-institutional sources. In the total sample, 66 per cent of households are indebted, suggesting that some households obtain loans from both institutional and non-institutional sources.

The availability and accessibility of credit directly influence the funds that farmers can borrow and invest in their farming operations. The relationship between loan amounts and investments in fixed assets is significantly shaped by the investment opportunities available in rural areas. Farmers often seek loans to purchase or upgrade machinery, construct farm buildings, implement irrigation systems, or acquire additional land. Therefore, the connection between loan

Table 2. Socio-economic profile of the respondents

Variable	Measurement	Debt category		Overall
		No debt	Indebted	
Age of the household head	years	50.98 (12.32)	52.31 (12.82)	51.86 (12.63)
Household size	number	5.2 (1.81)	5.29 (1.71)	5.26 (1.74)
Dependents	number	2.33 (1.42)	2.43 (1.45)	2.4 (1.44)
Educated family members	number	4.49 (1.78)	4.44 (1.76)	4.46 (1.76)
Family members with agriculture as main occupation	number	1.65 (0.69)	1.76 (0.64)	1.72 (0.66)
Operational land holding	hectare	3.88 (2.37)	4.25 (3.52)	4.13 (3.18)

Table 3. Source-wise distribution of credit in Punjab

(Rs. lakh /farm/annum)

Land category	Institutional Sources				Non-intitutional sources	Total
	Commercial banks	Cooperative banks	RRB	Sub- total		
Marginal (<1 ha)	0.8 (20.83)	0.45 (50)	0.4 (12.5)	1.65 (66.67)	0.25 (20.83)	1.9 (70.83)
Small (1-2 ha)	2.07 (36 .67)	0.84 (60)	0.33 (10)	3.24 (70)	0.32 (20)	3.56 (73.33)
Semi medium (2-4 ha)	2.68 (26.19)	0.86 (47.62)	0.71 (9.52)	4.26 (59.52)	1.1 (23.81)	5.35 (59.52)
Medium (4-10 ha)	5.16 (40.48)	0.99 (38.1)	1.62 (11.9)	7.76 (61.9)	0.93 (14.29)	8.69 (61.9)
Large (> 10 ha)	8 (41.67)	3.13 (75)	0.42 (8.33)	11.55 (75)	0.67 (8.33)	12.22 (75)
Overall	3.38 (32.67)	1.01 (50)	0.82 (10.67)	5.2 (64.67)	0.72 (18.67)	5.93 (66)

Note: Figures in parenthesis indicate the percentage of households

amounts and investments in fixed assets for rural farmers is closely tied to their access to credit, the investment opportunities at their disposal, and the income they generate.

Table 4 illustrates the relationship between debt levels and investment in fixed capital assets, showing a positive correlation: as debt levels increase from low to high, investments in fixed capital assets also rise. Farmers in the high debt category allocate substantial funds to various assets, such as farm buildings (Rs. 1.36 lakh), irrigation structures (Rs. 0.66 lakh), machinery (Rs. 3.37 lakh), livestock (Rs. 1.5 lakh), and owned land (Rs. 206.2 lakh). Notably, investment in owned land remains substantial across all debt categories, indicating that farmers prioritize land ownership as a key capital asset. Investment in livestock shows minimal variation among debt categories, averaging around Rs. 1.6 lakh. It is worth noting that, farmers without any outstanding loans or debts have more financial freedom and flexibility, allowing them to allocate significant amounts towards investments in fixed capital assets. Consequently, their average investment in fixed capital assets is comparable to that of medium to high-debt category farmers.

Access to credit enables farmers to invest in fixed capital assets and increase their overall expenditure on various aspects of crop production. Table 5 presents the gross expenditure on crop production across different levels of indebtedness. The data indicates that as the level of debt rises, expenditures on crop production aspects such as farm machinery, casual labor wages, fertilizers, plant protection chemicals (PPC), and seed also increase. Farmers with relatively high debt spend more on all aspects of crop production, with the highest expenditures being on farm machinery (Rs. 121 thousand per farm per annum), casual labor wages (Rs. 56 thousand per farm per annum), fertilizers (Rs. 53 thousand per farm per annum), plant protection chemicals (PPC) (Rs. 36 thousand per farm per annum), and seed (Rs. 25 thousand per farm per annum). Farmers with no debt also exhibit significant spending across all aspects of crop production, indicating

Table 4. Investment in fixed capital assets across intensity of indebtedness

(Rs in '000/farm/annum)

Debt category	Farm buildings	Irrigation structure	Machinery	Livestock	Owned land	Total fixed capital assets
No debt	80.5	38.3	249.2	168.8	11764.7	12301.6
Low	64.4	41.1	112	151.4	6829.5	7198.3
Medium	86.1	49.2	253	180	13253.7	13822
High	136.2	66.2	337.5	150.5	20622.3	21312.8
Total	92.5	48.2	246.2	163.6	13365.8	13916.4

Table 5. Farm income of households across intensity of indebtedness

(Rs in '000/farm/annum)

Debt category	No debt	Low	Medium	High	Total
Income					
Crops	935.2	476.9	921.5	1209.4	914.2
Dairy	293.5	211.4	170.4	145.4	213.8
Total (A+B)	1228.7	688.4	1091.9	1354.8	1128.0
Income from hiring out machinery	2.7	0.0	1.9	6.5	3.0
Gross (C+D)	1231.5	688.4	1093.9	1361.3	1130.9
Expenditure					
Crops	201.4	105.1	222.3	290.7	210.2
Dairy	130.6	92.1	119.9	104.0	114.4
Gross expenditure (F+G)	332.1	197.2	342.2	394.7	324.6
Net income					
Crops (A-F)	733.8	371.9	699.2	918.6	704.0
Dairy (B-G)	162.9	119.3	50.5	41.5	99.3
Net income (I+J)	896.7	491.2	749.7	960.1	803.3
Net farm income (E-H)	899.4	491.2	751.6	966.6	806.3
Off-farm income	48.1	73.8	35.9	19.6	43.1
Adhoc-income	38.7	13.1	6	79.5	36.6
Farm family net income	986.2	578	793.6	1065.7	886

that financially stable farmers can afford these expenses without relying on debt.

Overall, Tables 4 and 5, revealed that farmers with higher debt levels are more committed to spending on both fixed capital assets and gross expenditure in crop production. This suggests that access to credit plays a crucial role in enabling farmers to invest heavily in their agricultural operations, enhancing their productivity and potentially their profitability.

The relationship between investment in fixed assets and expenditure and the level of indebtedness is positive, but whether this investment leads to increased income levels is an important question. Table 6 illustrates the relationship between farm income and the level of indebtedness. The data shows that both total and net income generally increase as debt levels rise, implying that farmers with high debt generate higher income from crop production and dairy. This indicates that despite investing more in fixed capital assets and incurring higher gross expenditures, they generate relatively high net income. Households with no debt also generate net income and total income on par with high-debt level households. This suggests that while high debt levels can facilitate greater investment and potentially higher returns, financially stable farmers without debt can also achieve comparable income levels.

Table 6. Gross expenditure in crops across intensity of indebtedness

(Rs '000 /farm/annum)

Debt category	Casual labour wages	Farm machinery	Seed	Fertilizer and FYM	PPC	Gross expenditure
No debt	35.8	84.8	20.5	35.5	24.9	201.4
Low	19.5	42.3	9.9	19.4	13.9	105.0
Medium	41.8	90.8	19.5	44.2	26.0	222.3
High	55.7	120.8	25.3	53.1	35.9	290.7
Total	39.0	87.1	19.5	38.8	25.8	210.2

Table 7. Land category-wise debt-income and debt-fixed capital investment ratios

Land category	Debt-Income_ratio	Debt-fixed capital investment ratio
Marginal	1.05	0.05
Small	0.97	0.05
Semi-medium	0.84	0.04
Medium	0.78	0.04
Large	0.52	0.04
Overall	0.86	0.05

Table 8. Correlation between debt and income measures

Particulars	Total debt	Net income from crops	Net income from dairy	Net farm income	Net family income
Total debt	1				
Net income from crops	0.37*	1			
Net income from dairy	-0.21	0.07	1		
Net farm income	0.28*	0.96*	0.35*	1	
Net family income	0.29*	0.92*	0.30*	0.95*	1

The debt-to-family net income ratio is a key measure of the well-being of rural households, indicating the proportion of debt relative to family income. Table 7 presents the values of this ratio across different landholding categories. The data shows that the debt-income ratio decreases as landholdings increase in size. Households in the large landholding category have a lower ratio of 0.52, suggesting a more sustainable balance between debt and family income. Conversely, households in the marginal category have a value of 1.05, indicating a relatively higher debt burden compared to their family income. Similar findings were reported by Singh et al. (2014) in a study conducted in rural Punjab. This pattern highlights the financial strain faced by smaller landholders and underscores the importance of tailored financial support for these farmers to improve their economic sustainability.

Additionally, the Table 7 reports the debt-to-fixed capital investment ratio, providing insights into how rural households use debt to finance capital assets like farm buildings, machinery, and irrigation structures. Interestingly, this ratio is 0.05 across all land categories, except for the semi-medium and medium categories, where it slightly decreases to 0.04. This consistency suggests that regardless of land size, rural households in Punjab adopt a similar approach to financing fixed capital investments. This uniformity across landholding sizes indicates a standardized strategy for leveraging debt to enhance agricultural infrastructure and productivity.

The correlation matrix explores the inter-relationships between the total amount of debt, net income from crop and dairy enterprises, and net farm and family income in rural Punjab (Table 8). A positive association between net income from crops and overall debt suggests that households with higher debt levels typically earn more from crop-related activities, indicating a possible deliberate investment strategy. Conversely, a negative relationship between net dairy revenue and total debt indicates that higher debt levels may be associated with lower returns from dairy farming.

Conclusion and Policy Implications

This study explores the complex relationships among debt, investment, and farm income in rural Punjab. The findings reveal that approximately 66 per cent of rural households are indebted, with a positive association between the intensity of indebtedness and investments in agriculture, crop expenditure, and net farm income. Institutional sources are the primary credit providers, with an average annual borrowing of Rs. 5.93 lakh. The loan amount generally increases as the land category size increases ranging between Rs.1.9 to Rs.12.22 lakhs, suggesting that larger farmers have better access to credit. Marginal farmers have limited access to loans from institutional sources, indicating a potential need for financial inclusion and support in this category. The debt-to-income ratio established the inverse relationship with landholding categories indicating that large farmers utilized their credit efficiently. The intensity of indebtedness positively associated with farm investments, gross expenditure on crops, and net farm income.

Efforts may be made to improve the availability and accessibility of credit for farmers, as it directly impacts their ability to invest in fixed capital assets. This might involve ensuring fair and easy access to credit for all farmers. Recognizing the positive impact of credit on gross expenditure in crop production, policies should aim to facilitate credit

access for farmers to enhance investment in aspects like farm machinery, labor wages, fertilizers, plant protection chemicals, and seeds. Given the varying debt-to-family net income ratios across different land categories, policies should focus on developing debt management strategies for households with higher debt burdens, especially in the marginal category.

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