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Determinants of Farmers' indebtedness and Promptness of Repayment in Andhra Pradesh

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ABSTRACT: Now-a-days natural calamities like floods; other biological and management factors are having significant role in affecting the agriculture production prospects, thereby, making the farmers to end up in a debt trap. This led to some of the farmers to commit suicides in many states including agro-potential states like Andhra Pradesh. Several assessing have been taken up regarding the performance of different financial institutions. But, the economic analysis of farmers' indebtedness, factors responsible, impact of Loan waiver scheme etc., is of immediate concern.

North coastal districts (NCD) in Andhra Pradesh, were selected based on the highest debt ratio among the marginal and small farmers. The present study taken-up to explore the determinants of farmer-borrowers' indebtedness in three North Coastal Districts (NCD) of Andhra Pradesh *viz*., Srikakulam, Vizianagaram and Visakhapatnam. District Cooperative Central Bank (DCCB) and State Bank of India (SBI) were selected for cooperative and commercial banks categories. Two branches were selected from the respective institutions. From each branch ten farmer-borrowers each were selected for who is benefited and not benefited from Loan waiver scheme. In *toto* sample size was 240. Analytical tools like Multiple Linear Regression (MLR) with dummy variable and Response Priority Index (RPI) were employed.

Results revealed that significance of dummy variable for loan waiver scheme shows that there is significant difference between beneficiaries and non-beneficiaries. The 69 per cent (R^2 = 0.69) of variability in the indebtedness was explained by the independent variables taken into account viz., land holding, net returns, family expenditure, farming experience and education level. Land holding, Major constraint in repayment of loan was adverse climatic conditions for both beneficiaries and non-beneficiaries.

Keywords: Farmers' indebtedness, North Coastal Districts (NCD), Andhra Pradesh.

INTRODUCTION

There was one saying that "Indian farmer is born in credit, lives in credit and dies in credit". This situation is owing to resource poorness of the farmers. Farm finance plays a vital role in the agro-socio-economic development of the country both at micro-level and macro level. After independence in India a number of institutions have been promoted to provide farm finance. High interest rate for agriculture credit has caused serious exploitation resulting in farmers' indebtedness. However, the same credit may become catastrophic when it is employed for non-productive purposes other than for agricultural production. A critical examination by (Patel, 2009) revealed that, 76.1 per cent earners borrowed for non-productive purposes as against 23.9 per cent borrowing for productive purposes. Share of non-institutional borrowers was 68.4 per cent as against 31.6 per cent institutional borrowers at national level. It then gives rise to a situation known as indebtedness, which has become one of the dreaded tribulations in the life of households living in rural India.

The major reasons for the persistence of indebtedness among the rural farmers in India are excessive dependency of agriculture on vagaries of monsoons, continuous mounting of cost of cultivation, distress sale, involvement of large number of middle men, excessive dependency of farmers on non-institutional credit sources, diversion of crop loans and term loans towards unproductive purposes. A critical examination by (Radhakrishna, 2007) committee revealed that, about half of them were in debt and three-fifths of their debt was owned to institutions sources. A major share of farmer's debt (more than 60%) was for productive purposes. Debt trap is the main cause of committing suicides which tightened up because of the agrarian crisis and inaccessibility of institutional credit. Thus, the farmers have to depend on non-institutional credit even though the rate of interest is high (Vidyasagar and Chandra, 2004). NSSO (2012-13) survey results reveal that nearly 52% agricultural households are indebted in the country and the levels of debt are as high as 93% in Andhra Pradesh and 89% in Telangana (2012-13).

Borrowings and indebtedness are the two sides of the same coin, while borrowing is the cause, indebtedness is the result. It is important that, increase in borrowings need not increase the indebtedness on the part of farmers, unless persistent problems affect the agricultural prospects. Informal credit had certainly declined as a percentage of total debt and simultaneously the institutional credit flow of agriculture has increased over the years with the institutional agencies venturing into the rural areas (Thejeswini *et al*., 2014).

Indebtedness has various facets. As per NSSO (2005), out of 89.4 million farmer households at All India level, 48.6% were indebted. Among the states percentage of indebted farmer's households were highest in Andhra Pradesh (82%), followed by Tamil Nadu (74.5%), Punjab (65.4%), Kerala (64.4%), Karnataka (61.6%) and Maharashtra (54.8%) etc. States with very low proportion of indebted farmer households were Meghalaya, Arunachal Pradesh and Uttaranchal. So, debt is not problem itself, improper utilization of credit is the problem.

The aim of the study is "To identify the factors responsible for of farmers' indebtedness and constraints in repayment of loans".

The present investigation has been conducted to explore causes and possible remedies of farmers' indebtedness, with the following specific objectives;

1. To assess the socio-economic profile of debit-farmers
2. To analyse the factors responsible for indebtedness of farmers

3. To estimate the constraints faced by farmers in repayment of loans.

A. Socio-economic profile

To have a clear idea on the economic condition of household and to arrive at logical conclusions of results in social sciences, it is mandatory to analyze the socio-economic features of sample households like age, education, farm size, assets, experience in farming practice, *etc.,* as given below;

(i) Land holding pattern: A close perusal of data in Annexure-1, indicates that, the average size of land holding varied with 1.10 ha in debt waived, 2.96 ha in debt relieved and 6.53 ha in prompt paid borrowers with an overall average of 4.28 ha for the pooled farmers. The total operational holding varied from 66 ha of debt waived, 177 ha of debt relieved and 783.6 ha of prompt paid borrowers with an overall operational holding of 1027.2 ha. It shows that, size of land holding and promptness in repayment of loan are in tandem.

It is further observed that the average area under paddy crop had a direct relationship with the farm size as it was in the order of 0.51, 0.85 and 0.64 hectares for debt waived, debt relieved and prompt paid borrowers respectively. But, the average area under paddy to average operational farm holding area was more in debt waived (46.36%) followed by debt relieved (28.72%) and prompt paid (9.80%). It shows that as the share of paddy in operational holding is increasing, the promptness of the repayment of debt is decreasing owing to less net returns from the paddy cultivation.

In the study area, some farmers have taken the land as leased-in land. The average leased-in land was 0.02 ha for debt waived, 0.30 ha for debt relieved and 2.18 ha for prompt paid borrowers and 1.17 ha for the pooled farmers. In the study area none of the sample farmers has leased-out their land.

Annexure-1: Average size of land holding of sample farmers.

S.No.	Particulars	Debt waived	Debt relieved	Prompt paid	Pooled
1.	No. of farmers	60	60	120	240
2.	Average Owned land (ha.)	1.08	2.66	4.35	3.11
3.	Average Leased-in land (ha.)	0.02	0.30	2.18	1.17
4.	Average Leased-out land (ha.)	0	0	0	0
5.	Total operational holding (ha.)	66	177.6	783.6	1,027.2
6.	Total Paddy area (ha.)	30.4	51.2	77.0	158.7
7.	Average operational farm holding (ha.)	1.10	2.96	6.53	4.28
8.	Average area under paddy (ha.)	0.51	0.85	0.64	0.66
9.	Average area under paddy to average operational holding (%)	46.36	28.71	9.80	15.42

(ii) Family Size and Composition: Man power is the most important resource in agriculture; however larger family size demands more money for their livelihoods. The details pertaining to the average family size and its composition of the sample farmers were studied (Annexure-2). The average family size was 3.86 at pooled level. The informal discussion held with the sample farmers revealed that, both men and women farmers actively participate in performing agricultural operations.

In pooled borrowers, out of 928 members, children are 476 (51.30%), followed by men and women equally with 24.35%. In beneficiary farmers, children (51.52%) are more, followed by women (24.68%) and men (23.81%) with average family size of 3.84. Similarly, in non-beneficiary farmers also, children (51.07%) are more, followed by men (24.89%) and women (24.03%) with average family size of 3.88.

In case of debt waived borrowers out of 230 members, children (52.17%) occupy more in number, followed by men (24.35%) and women (23.48%) with average family size 3.82. In debt relieved borrowers, children (50.86%) are more, followed by women (25.86%) and men (23.28%) with average family size of 3.86 respectively.

It is inferred from above results that, whether beneficiary (51.52%) or non-beneficiary (51.07%), majority of persons in the farmers were children. Further, as the men or women in respective categories of sample farmers are less than the sample size infers that sample size constitute of both genders.

Annexure-2: Average family size and composition of sample farmers.

S.No.	Particulars	Beneficiaries (n=120)			Non-beneficiaries (Prompt paid borrowers) (n=120)	Pooled borrowers (n=240)
		Debt waived borrowers (n=60)	Debt relieved borrowers (n=60)	Total		
1.	Men	56 (24.35)	54 (23.28)	110 (23.81)	116 (24.89)	226 (24.35)
2.	Women	54 (23.48)	60 (25.86)	114 (24.68)	112 (24.03)	226 (24.35)
3.	Children	120 (52.17)	118 (50.86)	238 (51.52)	238 (51.07)	238 (51.30)
4.	Total	230 (100)	232 (100)	462 (100)	466 (100)	464 (100)
5.	Average family size	3.82	3.86	3.84	3.88	3.86

Note: Figures in parentheses indicate percentage to total

(iii) Literacy level: Based on the literacy level Sample farmers were categorized into four groups *viz.,* Illiterates, primary level of education, secondary level of education and higher education (Annexure-3). In pooled borrowers, majority of the sample farmers were educated only up to secondary level of education with 33%, followed by the higher per cent of illiterates (26.67%) in all the three categories of pooled farmers.

Beneficiary farmers account high in case of secondary level of education with 35 %, followed by illiterates (30%), primary level of education (21.67%) and higher education (13.33%). In Non-beneficiaries farmers, 31.67 % had secondary level of education, followed by primary level of education (25%), illiterates (23.33%) and higher education (20%).

Coming to beneficiary farmers, in case of debt waived borrowers, 50.00 per cent had secondary level of education, followed by illiterates (30%), primary level of education (10%) and higher education (10%). With regards to debt relieved borrowers, 33.33 per cent farmers had primary level of education, followed by illiterates (30%), secondary level of education (20.00%) and higher education (16.67%) respectively.

It is concluded that, whether beneficiary (35.00%) or non-beneficiary (31.67%), majority of the farmers were educated up to secondary level of education.

Annexure-3: Literacy level of the sample farmers.

S.No.	Level of education	Beneficiaries (n=120)			Non-beneficiaries (Prompt paid borrowers) (n=120)	Pooled borrowers (n=240)
		Debt waived borrowers (n=60)	Debt relieved borrowers (n=60)	Total		
1.	Illiterates	18 (30.00)	18 (30.00)	36 (30.00)	28 (23.33)	64 (26.67)
2.	Primary (0-5)	6 (10.00)	20 (33.33)	26 (21.67)	30 (25.00)	56 (23.33)
3.	Secondary (6-10)	30 (50.00)	12 (20.00)	42 (35.00)	38 (31.67)	80 (33.33)
4.	Higher (10+2)	6 (10.00)	10 (16.67)	16 (13.33)	24 (20.00)	40 (16.67)
	Total	60 (100)	60 (100)	120 (100)	120 (100)	240 (100)

Note: Figures in parentheses indicate percentage to total

(iv) Age of the sample Farmers: Sample farmers according to age wise are classified into three groups. They are up to 30 years, 30-45 years and above 45 years groups. The distribution of sample farmers according to age group was shown in Annexure-4. Among the sample farmers of pooled borrowers group, maximum were in the age group of 30-45 (40.83 %), followed by age group above 45 (40.00%) and below 30 (19.17 %).

In Beneficiary farmers; age group of 30-45 (40.67%) were maximum, followed by age group above 45(38.33%) and below 30 (15.00 %). In non-beneficiaries farmers, maximum were in the age group of above 45 (41.67%), followed by age group of 30- 45 (35%), and below 30 (23.33%).

Beneficiary farmers constitute debt waived and debt relieved borrowers. In case of debt waived borrowers, age group of 30-45 were maximum (53.33%), followed by above 45 (33.33%) and below 30 (13.33%). With reference to debt relieved borrowers, maximum were in the age group above 45 (43.33 %), followed by 30- 45 (40.00%) and below 30 (16.67 %) respectively.

Above results shows that more aged group farmers are in non-beneficiary category, which infers that as the farmers' age increases the promptness of the repayment of debt is increasing.

Annexure-4: Age of the sample farmers.

S.No.	Particulars	Beneficiaries (n=120)			Non-beneficiaries (Prompt paid borrowers) (n=120)	Pooled borrowers (n=240)
		Debt waived borrowers (n=60)	Debt relieved borrowers (n=60)	Total		
1.	Up to 30 years	8 (13.33)	10 (16.67)	18 (15.00)	28 (23.33)	46 (19.17)
2.	30 years - 45 years	32 (53.33)	24 (40.00)	56 (46.67)	42 (35.00)	98 (40.83)
3.	Above 45 years	20 (33.33)	26 (43.33)	46 (38.33)	50 (41.67)	96 (40.00)
4.	Total	60 (100)	60 (100)	120 (100)	120 (100)	240 (100)

Note: Figures in parentheses indicate percentage to total

(v) Farming experience: The process of gaining knowledge and skill is termed as experience. It is a measure of the time period an individual farmer-borrower was involved in cultivation. It is commonly known that the more the number of years in cultivation, the more knowledge and skills they gain. Farming experience influences individual perceptions and understanding of the management requirements and it is also an important factor determining the factors responsible for indebtedness. Farming experience was measured in terms of number of years in cultivation practices. They were grouped into three groups *viz.,* below 20 years, 20-30 years and above 30 years. Results were placed in Annexure-5. It is observed from table that, the distribution of sample farmers of pooled borrowers group, maximum were in the age group below 20 (39.17%), followed by above 30 (33.33%) and between 20- 30 (27.50 %).

In beneficiary farmers, highest borrowers were with farm experience age group below 20 years (41.67 %), followed by between 20-30 years (31.67%) and above 30 years (26.67%). Non-beneficiaries farmers, was maximum in the above 30 years of experience (40.00%), followed by below 20 years (36.67%) and between 20-30 years (23.33%).

Coming to constituents of beneficiary farmers, in case of debt waived borrowers, farming experience between 20-30 years (43.33%) were more, followed by below 20 years (33.33%) and above 30 years (23.33%). With reference to debt relieved borrowers, maximum in the farming experience below 20 years were (50.00%), followed by above 30 years (30.00%) and between 20-30 years (20.00%) respectively.

The above results reveal that beneficiaries in comparison with non-beneficiaries are in-experienced. In other words, experience person had promptness in repayment of debt. This may be owing to learned and seasoned accrual of more profits from crops.

Annexure-5: Average farming experience of sample farmers.

S.No.	Particulars	Beneficiaries (n=120)			Non-beneficiaries (Prompt paid borrowers) (n=120)	Pooled borrowers (n=240)
		Debt waived borrowers (n=60)	Debt relieved borrowers (n=60)	Total		
1.	Up to 20 years	20 (33.33)	30 (50.00)	50 (41.67)	44 (36.67)	94 (39.17)
2.	20 years -30years	26 (43.33)	12 (20.00)	38 (31.67)	28 (23.33)	66 (27.50)
3.	Above 30 years	14 (23.33)	18 (30.00)	32 (26.67)	48 (40.00)	80 (33.33)
4.	Total	60 (100)	60 (100)	120 (100)	120 (100)	240 (100)

Note: Figures in parentheses indicate percentage to total

MATERIAL AND METHODS

As the percentage of indebtedness among farmer's households were highest in Andhra Pradesh (82% of total indebted farmers) as reported in (NSSO, 2005). Hence present study taken up in Andhra Pradesh. In Andhra Pradesh, North Coastal Districts (NCD) are bestowed with different irrigation sources like tanks, canals, wells *etc*., for cultivating a wide range of crops under different agro-eco situations. However, erratic distribution of rainfall and sometimes prolonged droughts play major havoc with the farmers. This resulted in continuous failure of crops in the district, thereby, leading to mounting of debts to the farmers. On the other hand, the drastic increase in prices of inputs and services outweighs the price rise of output

for many agricultural crops, thereby making the agribusiness less remunerative. This further aggravated the problem of indebtedness in these districts. Considering the pathetic situation of the farmers in view of the mounting debts both in institutional and non- institutional sources, the Government has enacted Agricultural Debt Waiver and Debt Relief Scheme (ADWDRS) in the year 2008. The broad feature of the scheme includes marginal, small and other farmers. Marginal farmer, defined as cultivating agricultural land up to 1 hectare or 2.5 acres and small farmer is defined as cultivating between 1 hectare and 2 hectares *i.e.* less than 5 acres, will get full debt waiver of their short term crop loans as well as all the overdue instalments on the investment credit. The other farmers, *i.e.* owing more than 5 acres or more than 2 hectares, will get One Time Settlement (OTS) relief.

Andhra Pradesh was purposively selected for the study. Average land holding and Bank branches outreach were placed in Appendix 1 and 2 respectively. North coastal districts (NCD) were selected based on the highest debt ratio among the marginal and small farmers. NCD comprises of three districts *viz*., Srikakulam, Vizianagaram and Visakhapatnam. All districts were taken into account for primary data collection during 2017-18. Primary data were collected through personal interview method with the help of pretested schedule. From the farmer-borrowers, useful information pertaining to socio-economic aspects, sources of credit disbursement, magnitude of debt, reasons for indebtedness, benefits realized by the execution of ADWDRS (Agricultural Debt Waiver and Debt Relief Scheme) by the Government *etc*., were studied. A brief description of selected districts is given below:

Srikakulam : It is spread over 5.8 lakh ha with 3.21 lakh ha (55.5%) net cultivated area in which 2.05 lakh ha (63.8 %) was under paddy cultivation, rainfall was 825.3 mm and 48.9 per cent of cultivable area was under assured irrigation.

Vizianagaram : It is spread over 6.5 lakh ha with 3.01 lakh ha (46.5%) net cultivated area in which 1.31 lakh ha (43.19 %) was under paddy cultivation, rainfall was 906.8 mm and 43.6 per cent of cultivable area was under assured irrigation.

Visakhapatnam : It is spread over 11.2 lakh ha with 3.08 lakh ha (27.5%) net cultivated area in which 1.02 lakh ha (33.12 %) was under paddy cultivation, rainfall was 837.8 mm and 36.9 per cent of cultivable area was under assured irrigation.

Appendix–1: Distribution of Land Holding in Andhra Pradesh.

Classification of Holding	Holding		Area	
	Nos.	% of Total	ha.	% to Total
Marginal (<=1 ha)	5,904,045	69.26%	23,36,400	29.19%
Small (> 1 to <=2 ha)	16,46,252	19.31%	23,34,034	29.16%
Semi Medium (> 2 to <=4 ha)	7,69,825	9.03%	20,19,629	25.23%
Medium (> 4 to <= 10 ha)	1,89,068	2.22%	10,38,314	12.97%
Large (>10 ha)	14,763	0.17%	2,76,150	3.45%
Total	85,23,953	100%	80,04,527	100%

Appendix–2: Branch Network and Outreach (As on 31/03/2021).

Bank Type	No. of Banks	No. of Branches				No. of Non-Formal Agencies Associated			Per Branch Outreach	
		Total	Rural	Semi urban	Urban & Metro	RMGs/ JLGs	SHGs	BCs/ BFs	Population	Households ('000')
Public Sector Banks	18	4,573	1,490	1,471	1,612	94,606	5,41,888	5,732	10,820	2,780
Pvt Sector Banks	22	1,223	194	404	625	34	6	1,554	40,470	10,400
Regional Rural Banks	4	1,276	792	311	173	13,482	2,55,809	2,471	38,790	9,970
Others (AP Coperative &APSFC)	2	437	161	137	139	7,201	4,763	0	1,13,270	29,110
Grand Total	**46**	**7,509**	**2,637**	**2,323**	**2,549**	**1,15,323**	**8,02,466**	**9,757**	**6,590**	**1,690**

Major sources of institutional credit were cooperative and commercial banks. Hence, District Cooperative Central Bank (DCCB) and State Bank of India (SBI) were selected for respective categories. Based on the extent of indebtedness criteria, two branches were selected from the respective institutions. For the selection of indebted farmer-borrowers, list of borrowers who were indebted were selected from the financial institutions. From each branch ten farmer-borrowers were selected who benefited from ADWDRS; were named as Beneficiaries. Beneficiary farmers constitute debt waived (entire eligible amount was waived) and debt relieved (rebate of 25% of the eligible amount) borrowers. Ten farmer-borrowers who are not benefited from ADWDRS were selected; were named as Non-beneficiaries. *In toto* sample size was 240.

A. Tools and Techniques of Analysis

(a) Multiple Linear Regression (MLR) Model: The following MLR model was employed to analyse the major factors responsible for farmers' indebtedness.

$Y = a + b_1$ LWS + b_2 LANDHOLD + b_3 NR+b_4 FAMEXPEND + b_5 FARMEXPER+b_6 EDU+$\in$

Where,

a = intercept term

b_1, b_2, b_3, b_4, b_5 and b_6 are regression coefficients;

Specification of variables

Y = Magnitude of debt (Rupees)

LWS = Dummy for loans waiver scheme (1 for beneficiary, 0 otherwise)

LANDHOLD = Land holding (hectare)

NR = Net returns (Rupees)

FAMEXPEND = Family expenditure (Rupees)

FARMEXPER = Farming experience (years)

EDU = Education (Number of years of schooling)

$\in$ = Random Error term

(ii) Response Priority Index (RPI): In the quantification of constraints expressed by the farmer, Response Priority Index (RPI) was adopted, which was developed by (Rao, 2011) as given below;

$$(RPI)i = \frac{\Sigma^{K}_{j=1} f_{ij.} X_{[(k+1)-j]}}{\Sigma^{I}_{i=1} \Sigma^{k}_{j=1} f_{ij}}$$

where,

$(RPI)_i$ = Response priority index for i^{th} constraint.

$\Sigma^{K}_{j=1} f_{ij.}$ = Total number of responses for the i^{th} constraint.

f_{ij} = Number of responses for the j^{th} priority of i^{th} constraint (i=1, 2, 3,…...i ; j= 1, 2, 3,…..k).

$X_{[(k+1)-j]}$ = Scores for j^{th} priority.

$\Sigma^{I}_{i=1} \Sigma^{k}_{j=1} f_{ij}$ = Total number of responses to all constraints

k = Number of priorities.

$\Sigma^{n}_{i=1} \Sigma^{k}_{j=1} f_{ij}$ = Total number of responses to all constraints

The larger the RPI value, the higher the weightage for the particular constraint.

RESULTS AND DISCUSSION

A. Determinants of Farmers' Indebtedness

(i) Pooled Farmers: For pooled farmers (Table 1), the coefficient of multiple determination (R^2) was 0.69 which indicates that, 69 per cent of variability in the magnitude of debt was explained by the exploratory variables taken into account in the model *viz.,* land holding (X_2), net returns (X_3), family expenditure (X_4), farming experience (X_5) and educational level (X_6). Whereas, 31 per cent of variability was caused by the variables which are not taken into account. Significance of dummy variable for loan waiver scheme beneficiaries shows that beneficiaries of loan waiver scheme are significantly differ from non-beneficiaries.

Table 1: Factors responsible for extent of indebtedness of pooled farmers.

		(n=240)	
S.No.	**Particulars**	**Regression coefficients (b)**	**P Value**
1.	Intercept (a)	38435.07 (8016.01)	0.00**
2.	Dummy for loan waiver scheme beneficiary	-45829.36 (3131.05)	0.00**
3.	Land Holding (ha.)	8807.63 (3253.28)	0.01*
4.	Net Returns (Rs/ ha.)	0.03 (0.04)	0.40 NS
5.	Family Expenditure (Rs.)	0.37 (0.10)	0.00**
6.	Farming Experience (Years)	-385.97 (164.37)	0.02*
7.	Education Level (Number of years of schooling)	155.40 (341.98)	0.65 NS
Coefficient of multiple determination (R^2)		0.69	

Note: Figures in parenthesis indicate Standard errors
NS= Non- significant, * P ≤ 0.05, ** P ≤ 0.01

Among the other independent variables, land holding, family expenditure and farming experience were found significant and others found non-significant *viz.,* net returns and education level. Coming to individual variables which are significant *viz*., land holding, the regression coefficient was 8807.63 exerting significant influence on the magnitude of debt. In other words, an increase of 1 ha of land lead to increase in debt by Rs. 8807.63. It shows farmers are working at negative returns from land or investment motive. Every additional increase of one rupee spent on family expenditure resulting in increase of magnitude of debt by Rs. 0.37. With reference to farming experience, for every additional increase of one year experience in farming, magnitude of debt decrease by Rs. 385.97. That is why experienced farmers are prompt repayers of the debit.

In case of net returns, for every additional increase of one rupee would increase the debt by Rs. 0.03. This seems to be paradoxical. But, as inferred from land holding variable, the sample farmers can be said that out of their net returns they are spending more again on the land, which shows that they are investment motive. Net returns had no significant influence on magnitude of debt, hence null hypothesis was rejected.

(ii) Beneficiary farmers: The coefficient of multiple determination (R^2) was 0.64 for beneficiary farmers (Table 2), which indicates that 64 per cent of variability in the magnitude of debt was explained by the exploratory variables taken in to account *viz.,* land holding (X_1), net returns (X_2), family expenditure (X_3), farming experience (X_4) and education level (X_5). Whereas, 36 per cent of variability was caused by the variables which are not taken into account.

Table 2: Factors responsible for extent of indebtedness of beneficiary farmers.

		(n=120)	
S.No	**Particulars**	**Regression coefficients (b)**	**P Value**
1.	Intercept (a)	-47252.55 (12127.22)	0.00**
2.	Land Holding (ha.)	5954.48 (5546.77)	0.29 NS
3.	Net Returns (Rs/ ha.)	0.07 (0.08)	0.36 NS
4.	Family Expenditure (Rs.)	1.22 (0.23)	0.00**
5.	Farming Experience (Years)	-975.79 (253.35)	0.00**
6.	Education Level (Number of years of schooling)	341.85 (460.90)	0.46 NS
Coefficient of multiple determination (R^2)		0.64	

Note: Figures in parenthesis indicate Standard errors
NS= Non- significant, * P ≤ 0.05, ** P ≤ 0.01

Among the other independent variables, family expenditure and farming experience are found significant and land holding, net returns and education level are found non-significant. Coming to individual variable; which are significant regression coefficient for family expenditure was 1.22 indicating that, for every additional increase of one rupee spent on family expenditure, magnitude of debt increased by Rs. 1.22. That seems to debt taken for cultivation of crop is deviated to non-productive purposes was in conformity with the results at national level where 76.1% of farmers borrowed for non-productive purposes as against 23.9% for productive purposes (Patel, 2009). With reference to farming experience, the regression coefficient was 975.79 which indicate that for every additional increase of one year experience in farming, magnitude of debt decreased by Rs. 975.79.

Thus, from the above analysis it is clear that, coefficient of multiple determination varied from 0.64 on beneficiary farmers to 0.69 to overall farmers, which shows variables taken in to account in the model had marginally higher influence on both beneficiaries and non-beneficiaries than only on the beneficiaries. In both models, family expenditure and farming experience were found significant, showing that these variables are more important than other variables. Further, magnitude was higher in beneficiary farmers. Hence, policy makers should take into consideration of family expenditure and farming experience to formulate the policies to alleviate the debt.

Based on the above discussion, as the net returns found non-significant, the null hypothesis viz., net returns had significant influence on magnitude of debt, was rejected.

These findings were in non-conformity with the results obtained by (Sajjad and Chauhan, 2012; Sajjad *et al.,* 2016), their studies revealed that level of net returns was one of the significant causal factors of indebtedness. Non-significant of land holding in the beneficiaries shows that debt is not much influenced by the income side rather than expenditure side (Family expenditure is significant).

B. Constraints faced by Farmers in Repayment of Loans

(i) Pooled Farmers: For the Table 3, it is clear that for pooled farmers, adverse climatic conditions was the major constraint with a score of 0.97 followed by rising cost of cultivation (0.75), higher rate of interest (0.70), small land holdings (0.63), low net income (0.62), in adequacy of institutional loan amount (0.57), rising family expenditure (0.56), non-remunerative market prices (0.48), corrupt practices of agents and bank officials (0.38) and cumbersome procedures (0.27). Thus, environmental factors had major role followed by economic and institutional factors in repayment of debt.

Table 3: Response priority index of prioritization of constraints pertaining to repayment of loan by pooled farmers.

S.No.	Constraints	RPI	Rank
1.	Adverse climatic conditions	0.97	**I**
2.	Rising cost of cultivation	0.75	**II**
3.	High rate of interest	0.70	**III**
4.	Small land holdings	0.63	**IV**
5.	Low net income	0.62	**V**
6.	Inadequacy of institutional loan amount	0.57	**VI**
7.	Rising family expenditure	0.56	**VII**
8.	Non-remunerative market prices	0.48	**VIII**
9.	Corrupt practices of agents and bank officials	0.38	**IX**
10.	Cumbersome procedures	0.27	**X**

(ii) Beneficiary farmers: Among the beneficiary farmers (Table 4), adverse climatic conditions was the major constraint for repayment of loan with a score of 0.97, followed by higher rate of interest (0.77), rising cost of cultivation (0.75), rising family expenditure (0.62), small land holdings (0.59), inadequacy of institutional loan amount (0.52), non remunerative market prices (0.47), corrupt practices of agents and bank officials (0.37), inability to use all the borrowed credit in production (0.25) and non-proximity of lending institutions (0.19). It is inferred from above that both economic, environmental factors dominating apart from administrative in repayment of loan.

(iii) Non-Beneficiary farmers: Among the non-beneficiary farmers (Table 5); adverse climatic conditions was the major constraint (0.97), followed by rising cost of cultivation (0.74), small land holdings (0.66), low net income (0.62), inadequacy of institutional loan amount (0.61), rising family expenditure (0.51), non remunerative market prices (0.49), corrupt practices of agents and bank officials (0.40), cumbersome procedures, (0.30) and Non-proximity of lending institution (0.21) Thus, environment factors had played big role in non-repayment of the debt.

From above discussion, it was concluded that, whether beneficiary and non-beneficiary farmers the adverse climatic conditions was the major constraint for repayment of loan.

Table 4: Response priority index of prioritization of constraints pertaining to repayment of loan by Beneficiary farmers.

S.No.	Constraints	RPI	Rank
1.	Adverse climatic conditions	0.97	**I**
2.	High rate of interest	0.77	**II**
3.	Rising cost of cultivation	0.75	**III**
4.	Rising family expenditure	0.62	**IV**
5.	Small land holdings	0.59	**V**
6.	Inadequacy of institutional loan amount	0.52	**VI**
7.	Non-remunerative market prices	0.47	**VII**
8.	Corrupt practices of agents and bank officials	0.37	**VIII**
9.	Inability to use all the borrowed credit in production	0.25	**IX**
10.	Non- proximity of lending institutions	0.19	**X**

Table 5: Response priority index of prioritization of constraints pertaining to repayment of loan by Non-beneficiary farmers.

S.No.	Constraints	RPI	Rank
1.	Adverse climatic conditions	0.97	**I**
2.	Rising cost of cultivation	0.74	**II**
3.	Small land holdings	0.66	**III**
4.	Low net income	0.62	**IV**
5.	Inadequacy of institutional loan amount	0.61	**V**
6.	Rising family expenditure	0.51	**VI**
7.	Non-remunerative market prices	0.49	**VII**
8.	Corrupt practices of agents and bank officials	0.40	**VIII**
9.	Cumbersome procedures	0.30	**IX**
10.	Non- proximity of lending institution	0.21	**X**

These findings were in conformity with the results obtained by (Rao *et al.* 2005 and Sale *et al.,* 2005), where they revealed that crop failures due to natural calamities, low income, and non-remunerative prices are the major constraints for repayment of loan.

Further, present study results are in tune with the results obtained by (Kumar and Gambhir, 2012) that high rate of interest, lack of financial knowledge, cumbersome procedures, non- cooperative bank staff, lack of collateral security, fear factor about recovery process *etc*., were some common problems faced by the farmers in repayment of loan.

CONCLUSION AND POLICY IMPLICATIONS

— Educational level and farm experience had positive associations with repayment of debt; there is greater need to educate the farmers on skills of crop rising to improve the productivity.

— Family expenditure and farming experience were found significant; the policy makers should take into consideration of these factors to formulate the policies in alleviating the debt.

— Adverse climatic factor was the major factor in non-repayment of debt, government should make measure to speed-up the compensation mechanism, as all crop loanees are insured.

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