

An econometric analysis of farmer's credit issues in Andhra Pradesh, India (with reference to south coastal Andhra – a multinomial logit regression model)

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Abstract

Background/ Objectives: In India, the private organizations play exploitive role in farmer's credit. Farmers approach credit not only for cultivation but also for their family maintenance. In this context, this study makes objectives as to analyse the credit availability from different sources to the farm households and examine which factors influence more the farmers to borrow from moneylenders or commission agents or Input dealers (Non-institutional) alone.

Method/ Statistical Analysis: For collecting the primary data, we employed the stratified multi-stage random sampling. Fifty samples are collected from each village and totally 100 sample respondents for intensive study. Multinomial logistic regression model is employed for analysing the factors influence farmer's approach to money lenders for their credit in the study area.

Findings: Overall, the study reveals that most of the farmers depend on non-institutional sources rather than the institutional sources. Gross Agriculture Income, Type of ownership, income from other than agriculture and farm size influence the farmers to borrow from non-institutional sources i.e. Money lender.

Application: We recommend for the setup of farmer's friendly financial institutions like, SHGs, Agri co-operative societies etc. Also to create the awareness on insurance of crop and insurance of farmer as a unit through advertisement campaign at village level and encourage low cost farming viz., Subhash Palekar's zero budget farming, organic farming etc.

Keywords: Marginal, Small, Medium farmers, Multinomial logit, Relative Risk Ratio, STATA

JEL Codes: A13, C01, C19, C87, Q15, Q19.

1. Introduction

In India, agriculture still accounts for a substantial part of GDP (16%) and employment (49%). Backwardness of agriculture can lead to inflation, farmer distress and unrest and all political and social disaffection all of which can hold back the economy [1]. In view of this, Government of India constituted "National Farmers Commission" in 2004. After that, on the basis of the commission's recommendations, the National Policy for farmers was approved in this country. It aims at improving the economic condition of agricultural sector as well as the net income of the farmers [2]. Finance in agriculture is an important as other inputs being used in agriculture production. The government of India realizes the importance of agricultural credit in fostering agricultural growth and development. Then institutional framework for agricultural credit is being emphasized since starting of planned development era in India. Then onwards the Institutional credit agencies play a vital role in reducing the farmer's burden of heavy interest rate. But unfortunately, their dominance appears to be least among those who probably need their service most. Adequate, cheap and easy credit is necessary to the farmers to carry out their smooth agricultural operations. This situation leads to borrowing from an easy and comfortable source i.e. money lender, land lords, input dealers etc. So, the private organizations play exploitive role in farmer's credit. Farmers borrow money not only for cultivation but also for their live sustenance. To break the stagnation in agriculture, credit should be made available to all farmers through institutional channels [3], [4].

The lender has several guises, which reflect what anthropologists call the multiplex nature of rural life. The same individual may lend to cultivators and labourers. If he/she has land and cultivates part of it, those of his/her tenants and labourers who borrow from him/her will think of him/her as a landlord, while other owner-cultivators will think of him/her as a cultivator who pursues money lending on the side. In certain areas of India, some of the borrowers (though almost certainly not those who are labourers) may be his/her relatives and regard themselves as such in their dealings with him/her. Similarly, the village shopkeeper often lends to his/her customers in the lean season and may engage in commodity trading on a small scale at harvest time. As we shall see, traders and commission agents (who operate as brokers between farmers and both private traders and state purchasing agencies) are often heavily involved in financing cultivation, with the provision that their clients sell their crops to, or through them, respectively. Thus the lender's guise is very much in the eye of his clients, and though the categories look tidy and mutually exclusive, they must have seemed elastic and slippery to the respondents whose replies are reported therein [5], [6].

2. Need for the study

Despite of governmental efforts, huge investment and many reimbursement programmes, the farmer's suicides remains alarming high in many states in India. Most of the farmers lost their lives due to heavy debt. This situation is not except for Andhra Pradesh. In this context, it is only the provision that agriculture comes under the market mechanism with no intermediaries and under an educated farmer. The prevalence of agriculture distress due to debits varying significantly among different farming category in Andhra Pradesh. Therefore there is a need to examine which factors is more influence on farmer's credit to non-institutional sources rather than institutional sources. This article is addressed to the current scenarios of which factors influence credit in the study area.

3. Objectives of the study

1. To examine the credit availability from different sources to the farm households in the study area.
2. To analyze which factors are influencing farmer's credit towards approaching money lender (non-institutional sources) alone.
3. To suggest the some policy measures for policy makers.

4. Review of related studies

The study revealed that finance in agriculture is as important as other inputs being used in agricultural production [7]. Agriculture credit need in fostering the growth and development especially in agriculture. Since institutional framework for agricultural credit is being emphasised from beginning of the planning in India. There are two major sources of finance in agriculture are institutional and non-institutional. Over the years, it is observed that a sharp declining in the percentage of agricultural credit financed by non-institutionalized sources like money-lenders from 90.9% to 20.9%. The Scheduled Commercial Banks noted the highest loans issued (32.05%) agency and lowest was in the case of co-operatives (13.57%) in short term credit. In case of long term credit, the highest loans outstanding were in the case of Scheduled Commercial Banks with CGR of 22.74 while the lowest was here also in the case of co-operatives with CGR of - 2.81%.

The share of agricultural credit as a proportion of agricultural GDP has been rising continuously since the 1950s, and even as a proportion of total GDP until the 1980s, after which it is stagnant. This paper stressed that need for a training to borrowers regarding procedural formalities of financial institutions, which helps them in increasing their access to institutional credit. The option of microfinance and Kisan Credit Card (KCC) should be adopted and streamlined to alleviate the plight of the marginal, small, tribal farmers. They should be linked effectively to the Self Help Groups (SHGs). In [8] Farmers' indebtedness in the state of Haryana emerged as a central issue. The conducted survey on asses the status of farmers' indebtedness in the state detail.

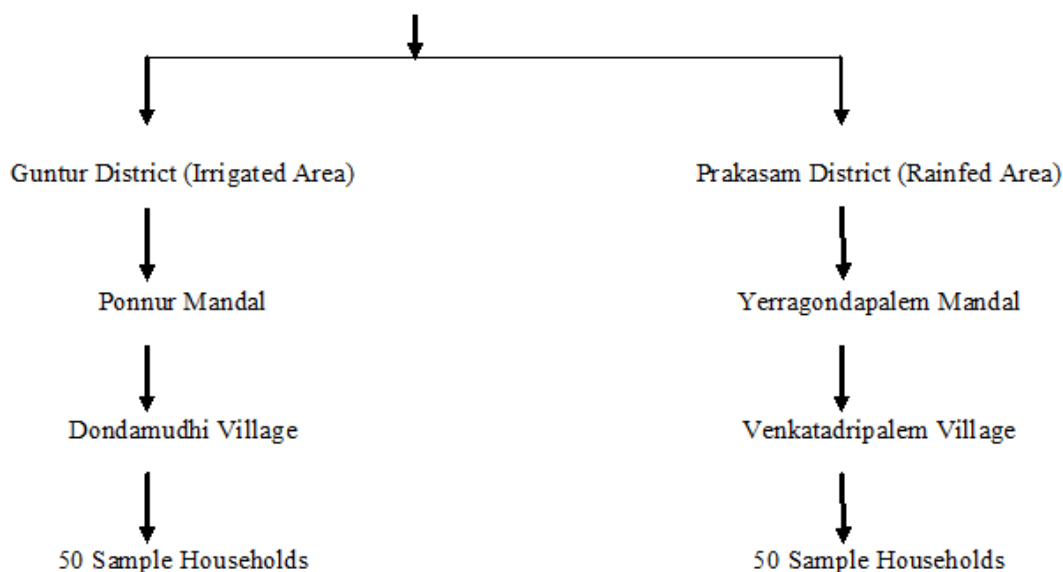
The results of the study indicate that informal mechanism of credit delivery is playing an important role for marginal and small farmers in meeting their credit activities in Haryana. The rituals like marriages and other ceremonies were major unproductive expenses, which were higher as compared to aggregate India and it is more in SC and BC community in the state. In addition that maximum indebtedness was found to be ₹25,289 on the 615-775 monthly percapita expenditure class farm households in the State. The size of land holdings and informal borrowing is negatively associated. The study suggests that state should maintain the formal mechanism of credit, increase the awareness among farmers in general and marginal and small in particular about the disadvantage of utilization of loan in unproductive activities and strengthen the co-operative movement in the state. The study analyses that Bulgarian government has made rapid progress in implementing a wide ranging reform programme in agriculture, the financial sector and in the economy in general. The highest priority has been given to actions that result in a market driven restructuring, rather than to financial support that would reproduce existing inefficient structures. The banking sector restructuring has been accompanied by the banks cautious approach to lending in general and particularly to agriculture. Some sector-specific lending programme had been introduced but they could barely compensate for lost of these programmes are undergoing continuous change consistent with development in the agricultural and banking sectors. With continuing recovery of public trust in banks and with more than 70% of banks assets controlled by foreign private banks; the sector is expected to overcome conservative lending.

5. Methodology

1. Sampling design

Primary data collected were used for stratified multi-stage random sampling (Figure 1). As first stage, two districts from the South Coastal Region of Andhra Pradesh are selected. One district i.e. Guntur district is highly irrigated area and another district i.e. Prakasam is highly rainfed area. In the next stage one mandal i.e. Ponnur mandal from Guntur district and Yerragondapalem mandal from Prakasam district is selected at random. In the final stage one village from each of the selected mandal is selected at random. Thus a sample of 50 farm households' are selected from each villages. The data was collected from March 2015 to June, 2016 [9, 10].

Figure 1. Sampling design in the study area
Andhra Pradesh



2. Specification of the multinomial logit model

The dependent variable of the model is the households' choice of approaches for borrowing from different sources. The polychotomous dependent variables are the determinants of farm households' choice of borrowing from different sources. If the choice of borrowing of the farm household lies in:

Y=0, NIS (Non-institutional Sources i.e. Money lender or Commission Agents or Input Dealers)

Y=1, IS (Institutional Sources i.e. Banks, Co-op Societies, Self-Help Groups (SHGs), NGOs etc...)

Y=2, NIS+IS (Both Non-institutional Sources and Institutional Sources)

Y=3, Friends and Relatives

$$\ln \left(\frac{\Pr(Y_i = j)}{\Pr(Y_i = 0)} \right) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + u_i$$

Where the outcome

j = 1 i.e. Institutional Sources

j = 2 i.e. Both Institutional and Non-institutional Sources

j = 3 i.e. Friend and Relatives

i = 0 i.e. Borrowing from money lender (Non-institutional Sources) alone

X₁ = Age of the head of the household

X₂ = Sex as binary (Male-1, Female-0)

X₃ = Literacy status as binary (Illiterate-1, literate-0)

X₄ = Type of Ownership as binary (Tenancy-1, Own-0)

X₅ = Income from other than Agriculture

X₆ = Gross Agriculture Income

X₇ = Farm size

X₈ = Family Size

U_i = the error term or random component

Different explanatory variables are expected to affect the sources of borrowing of sample households in the study area. Thus, in order to address the issues of how household approaches for borrowing and levels of well-being are determined within the heterogeneous study area, the analytical procedure by clustering the sample household borrowing strategies on basic sources controlled by the household and household's borrowing choice can be explained based on a set of pre-determined asset-based variables [5].

6. Relative Risk Ratio (RRR)

The estimates from multinomial logit regression have been reported in terms of Relative Risk (also known as Odds) Ratio. By construction, odds ratio will be positive. However, odds ratio with a value less than one implies a negative impact of requisite explanatory variable on the dependent variable *ceteris paribus*. Similarly, odds ratio is greater than one, shows that a positive impact of the requisite explanatory variable on the dependent variable *ceteris paribus*.

7. Analysis and Discussions

1. Demographic and socio-economic conditions of the selected respondents in the study area

Dondamudi village is located in Ponnur Mandal of Guntur district which is major gram panchayat. The total geographical area of the village is 635 hectares with 885 households. According to 2011 census, the total population of the village is 3,337. Out of this, 1675 are male and 1662 are female. The total literacy rate of the village is 58.07%. Out of this, male literacy is 54.46% and female literacy is 45.53%. Among the selected respondents, 58% farmers are illiterates.

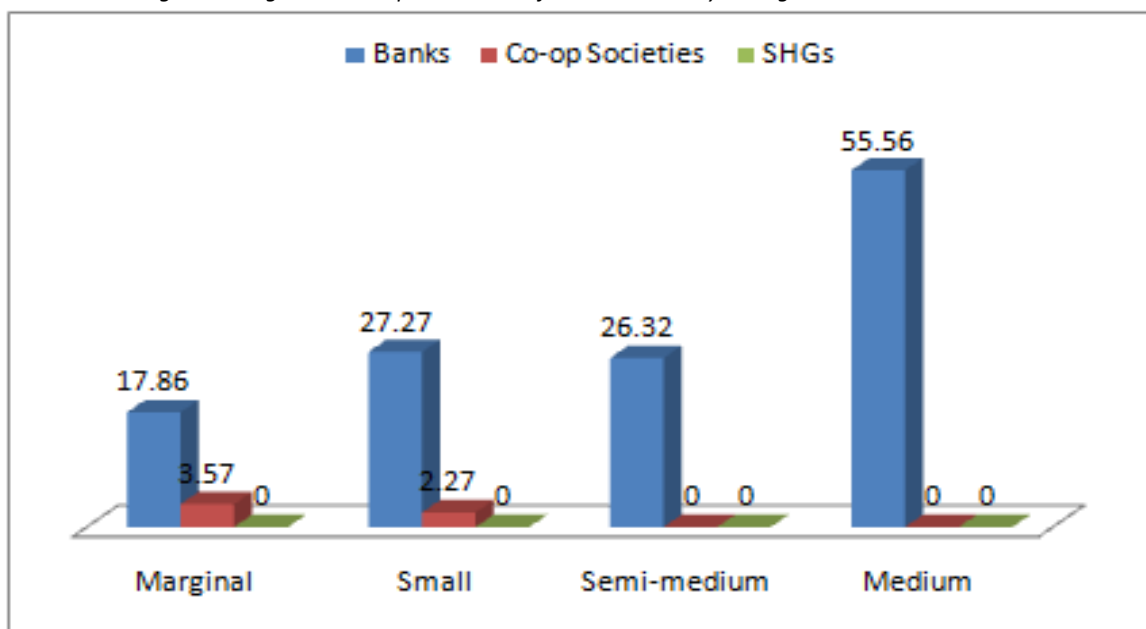
In the study area, average agriculture income, expenditure per acre and debt per household are ₹51,066, ₹38,905 and ₹55,080 respectively. Out of total farmers, 36% are marginal, 48% are small, 12% are semi-medium and 4% are medium farmers in the study area. The average debt per farm household in marginal, small, semi-medium and medium farmer's is ₹73,361, ₹49,628, ₹25,874 and ₹43,575 respectively. Venkatadripalem is a small village in Yerragondapalem Mandal in Prakasam district. It has a population of about 7,674 living in 2,041 houses. The total male population of the village is 3,924 whereas the female population is 3,750. The total literates in the village are 2,887. Out of this, 1,936 males are literates and 951 female literates. Out of the total population 4,836 are total workers and main workers are 4,191. Among main workers cultivators are 1,259 and 2,739 are agricultural labour.

Among the selected respondents, only 30% farmers are literates. In the study area, average agriculture income, expenditure per acre and debt per household are ₹38,905, ₹58,139 and ₹38,423 respectively. Out of total farmers, 20% are marginal, 40% are small, 26% are semi-medium and 14% are medium farmers in the study area. The average income per acre in the study area for marginal, small, semi-medium and medium farmers is ₹16,080, ₹35,162, ₹39,358 and ₹81,360 respectively. Similarly the average expenditure per acre in the study area for marginal, small, semi-medium and medium farmers is ₹31,742, ₹65,061, ₹54,776 and ₹82,320 respectively. The average debt per farm household in marginal, small, semi-medium and medium farmer's is ₹39,045, ₹42,305 ₹38,114 and ₹27,015 respectively.

2. Credit availability from different sources to the farm households

The credit requirements of farmers are met by institutional and non-institutional sources. The institutional sources which provide credit to the farmers are commercial banks, co-operative societies, regional rural banks, Self Help Groups (SHG) and the non-institutional sources are money lenders, input dealers, commercial agents or big farmers etc. Source wise distribution of debt of farm households is presented in Figure 2 and 3.

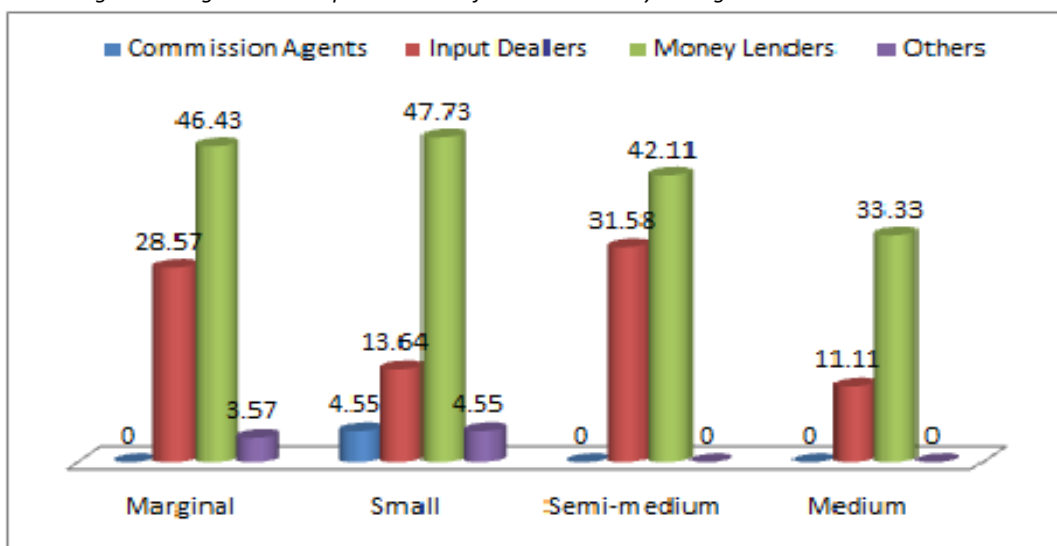
Figure 2. Diagrammatic representation of credit availability through institutional sources



Source: Field data, compiled by author

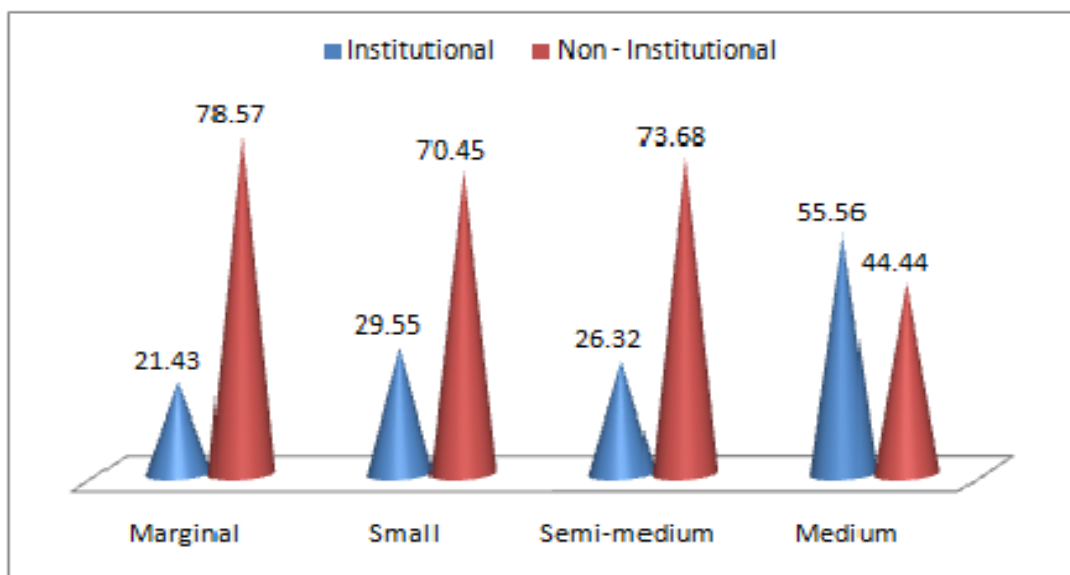
From the Figure 4 it can be observed that among the different institutional sources, banks are providing more loans than other. Similarly among the different non-institutional sources farmers depend more on money lenders and next on input dealers. In case of institutional and non-institutional sources, all types of farmers highly depend on non-institutional sources rather than institutional sources in the study area.

Figure 3. Diagrammatic representation of credit availability through non-institutional sources



Source: Field data, compiled by author

Figure 4. Diagrammatic representation of credit availability between institutional and non-institutional sources



Source: Field data, compiled by author

8. Results of multinomial logit model

1. Outcome: Institutional Sources (Y = 1)

It can be observed from the Table 1 eight independent variables are considered, to carry out the analysis for the outcome Institutional Source alone (Y=1). Among 8 independent variables, the variable Gross agricultural income (X₆) and Farm size (X₇) are statistically significant. The variable Gross agricultural income (X₆) is statistically significant at 5% level of chi square value with negative sign. The odds ratio or relative risk ratio associated with gross agricultural income variable shows that a 10,000 rupees decrease of farmer’s income leads to there may be 27% higher the likelihood of chance to approach Institutional sources when compared to their counter parts (the farmer approach to moneylender alone for credit) and vice-versa. The variable Farm size is statistically significant at 5 probability level of significance. The odds ratio associated with farm size shows that a household having greater farm size leads to there may be 1.42 times higher the likelihood of chance to approach Institutional sources when compared to their counter parts (the farmer approach to moneylender alone for credit) and vice-versa.

Table 1. Factors influencing the sources of borrowing with outcome of institutional sources

Independent Variable	Coefficient	S.E	$P > Z $	95% Confidence Interval		RRR
Outcome (Y=1) = Institutional Sources like Banks, Co-operative, SHGs etc						
Constant	13.8943	3274.229	0.997	-6403.477	6431.266	-
Age of the head of the household (X_1)	0.0480	0.0342	0.161	-0.0191	0.1152	1.0492
Sex (X_2)	-17.4856	3274.229	0.99	-6434.856	6399.885	2.55e-08
Literacy status (X_3)	-1.4849	0.9911	0.134	-3.4275	0.4576	0.2265
Type of Ownership (X_4)	-0.8071	1.0129	0.426	-2.7924	1.1781	0.4461
Income from other than Agriculture (X_5)	-0.0000134	0.0000168	0.427	-0.0000463	0.0000196	0.9999
Gross Agriculture Income (X_6)	-0.000027*	9.58 e-06	0.005	-0.0000458	-8.22 e-06	0.9999
Farm Size (X_7)	1.4177*	0.4900	0.004	0.4572	2.3783	4.1279
Family Size (X_8)	0.3084	0.4147	0.457	-0.5044	1.1214	1.3613

Number of obs = 100
 LR chi2 (24) = 83.77
 Prob> chi2 = 0.0000
 Psedo R² = 0.3373
 Log Likelihood = -82.2961

2. Outcome: Institutional Sources and Non-Institutional Sources (Y = 2)

It can be observed from the Table 2 that independent variables eight in number, to carry out the analysis for the outcome institutional and non-institutional source for borrowing (Y=2). Among 8 independent variables – the coefficients of type of ownership(X_4), Income from other than agriculture (X_5), Gross agricultural income (X_6) and farm size (X_7) are statistically significant at different probability levels. The variable type of ownership is statistically significant at 5% level of chi-square value with negative sign. The odds ratio indicates that a household is tenant leads to there may be 2.06 times lower the likelihood of chance to approach both Institutional and non-institutional sources for borrowing rather than their counter parts (the farmer approach to moneylender alone for credit) and vice-versa. The variable income from other than agriculture is significant at 5% probability level with negative sign.

Table 2. Factors influencing the sources of borrowing with outcome of institutional and non-institutional sources and relatives and friends

Independent Variable	Coefficient	S.E	$P > Z $	95% Confidence Interval		RRR
Outcome (Y=2) = Institutional Sources and Non-institutional Sources						
Constant	0.3307	3831.607	1.000	-7509.482	7510.143	-
Age of the head of the household (X_1)	0.0043	0.0287	0.879	-0.0520	0.0607	1.0043
Sex (X_2)	1.8119	3831.607	1.000	-7508	7511.62	6.1223
Literacy status (X_3)	-1.0620	0.8080	0.189	-2.6457	0.5217	0.3457
Type of Ownership (X_4)	-2.0646*	0.9349	0.027	-3.8971	-0.2321	0.1268
Income from other than Agriculture (X_5)	-0.0000318*	0.0000154	0.039	-0.000062	-1.61e-06	0.9999
Gross Agriculture Income (X_6)	-0.0000369*	9.30 e-06	0.000	-0.0000551	-0.0000187	0.9999
Farm Size (X_7)	1.9088*	0.4758	0.000	0.9762	2.8414	6.7452
Family Size (X_8)	-0.1355	0.3811	0.722	-0.8826	0.6115	0.8732

The odds ratio of the variable gross agricultural income indicates that a ten thousand rupees decrease in gross agricultural income leads to there may be 31.8% higher the likelihood of chance to approach both institutional sources and non-institutional sources for borrowing rather than their counter parts (the farmer approach to moneylender alone for credit) and vice-versa. The variable gross agricultural Income is significant at 1% probability level with negative sign. The odds ratio of the variable gross agricultural income indicates that a ten thousand rupees decrease in gross agricultural income leads to there may be 36.9% higher the likelihood of chance to approach both institutional sources and non-institutional sources for borrowing rather than their counter parts (the farmer approach to moneylender alone for credit) and vice-versa. The variable farm size is statistically significant at 5% level of chi-square value with positive sign. The odd ratio indicates that a household having more land leads to there may be 1.91 times higher the likelihood of chance to approach both institutional sources and non-institutional sources for borrowing rather than their counter parts (the farmer approach to moneylender alone for credit) and vice-versa.

3. Outcome: Friends and Relatives (Y = 3)

It can be observed from the Table 3 that the Independent variables selected are nine in number, to carry out the analysis for the outcome friends or relative source for borrowing (Y=3). Among 8 independent variables, income from other than agriculture (X₄), Gross agriculture income (X₆) and Farm size (X₇) are statistically significant even at different probability levels.

The variable income from other than agriculture is significant at 10% probability level with negative sign. The odds ratio of the variable gross agricultural income indicates that a ten thousand rupees decrease in gross agricultural income leads to there may be 37.8% higher the likelihood of chance to approach Friends or Relatives for borrowing rather than their counter parts (the farmer approach to moneylender alone for credit) and vice-versa. The variable gross agricultural income is significant at 1% probability level with negative sign. The odds ratio of the variable gross agricultural income indicates that a ten thousand rupees decrease in gross agricultural income leads to there may be 28.2% higher the likelihood of chance to approach Relatives for borrowing rather than their counter parts (the farmer approach to moneylender alone for credit) and vice-versa. The variable farm size is statistically significant at 1% level of chi-square value with positive sign. The odd ratio indicates that a household having more land leads to there may be 1.38 times higher the likelihood of chance to approach both institutional sources and non-institutional sources for borrowing rather than their counter parts (the farmer approach to moneylender alone for credit) and vice-versa.

Table 3. Factors influencing the sources of borrowing with outcome of relatives and friends

Independent Variable	Coefficient	S.E	P > Z	95% Confidence. Interval		RRR
Outcome (Y=3) = Friends and Relatives						
Constant	13.1586	3274.22	0.997	-6404.212	6430.53	-
Age of the head of the household (X ₁)	0.0266	0.0293	0.363	-0.0308	0.0842	1.0270
Sex (X ₂)	-16.7940	3274.228	0.996	-6434.164	6400.576	5.09s-08
Literacy status (X ₃)	-0.5693	0.8344	0.495	-2.2048	1.0660	0.5658
Type of Ownership (X ₄)	0.3896	1.0043	0.698	-1.5787	2.3580	1.4764
Income from other than Agriculture (X ₅)	-0.0000378**	0.0000201	0.060	-0.0000773	1.57 e-06	0.9999
Gross Agriculture Income (X ₆)	-0.0000282*	9.19e-06	0.002	-0.0000462	-0.0000102	0.9999
Farm Size (X ₇)	1.3806*	0.4679	0.003	0.4635	2.2977	3.9775
Family Size (X ₈)	0.4954	0.3641	0.174	-0.2182	1.2091	1.6412
Source: Field data						
Note: *indicates one percent level of significance ** indicates five percent level of significance *** indicates ten percent level of significance						

9. Summary and Conclusion

The Indian history and literature have quoted that the farmer acquiring mythic status: innocent, unblemished, hard-working, in harmony with nature; and yet poor, vulnerable, and the victim, first of the imperial masters and then of native landlords and middlemen. The institutional credit agencies play a vital role in reducing the farmer's burden of heavy interest rate. But unfortunately, their dominance appears to be least among those who probably need their service most. Adequate cheap credit is necessary to the farmers to carry out their smooth agricultural operations. The incomes of farmers are marginal and they cannot save money for future investment. They need credit for various purposes and for different time periods. The private organizations play exploitive role in farmer's credit. Farmers borrow money not only for cultivation but also for their live sustenance. In the South Coastal Andhra Region of Andhra Pradesh, India, marginal (78.57%), small (70.45%) and semi-medium (73.68%) farmers are highly depend on non-institutional sources for their credit. More than 70% of marginal and small farmers are depend on the non-institutional sources for their credit. From the multinomial logit regression model, to carry out the analysis for the outcome of institutional & non-institutional sources for borrowing, Odds ratio or relative risk ratio associated with gross agricultural income variable shows that a 10,000 rupees decrease of farmer's income leads to there may be 27% higher the likelihood of chance to approach Institutional sources when compared to their counter parts (the farmer approach to moneylender alone for credit) and vice-versa. The odds ratio associated with farm size shows that a household having greater farm size leads to there may be 1.42 times higher the likelihood of chance to approach Institutional sources when compared to their counter parts (the farmer approach to moneylender alone for credit) and vice-versa. To carry out the analysis for the outcome institutional and non-institutional source for borrowing, the odds ratio of the variable gross agricultural income indicates that a ten thousand rupees decrease in gross agricultural income leads to there may be 31.8 percent higher the likelihood of chance to approach both institutional sources and non-institutional sources for borrowing rather than their counter parts (the farmer approach to moneylender alone for credit) and vice-versa. The odds ratio of the variable gross agricultural income indicates that a ten thousand rupees decrease in gross agricultural income leads to there may be 36.9% higher the likelihood of chance to approach both institutional sources and non-institutional sources for borrowing rather than their counter parts (the farmer approach to moneylender alone for credit) and vice-versa. The odd ratio indicates that a household having more land leads to there may be 1.91 times higher the likelihood of chance to approach both institutional sources and non-institutional sources for borrowing rather than their counter parts (the farmer approach to moneylender alone for credit) and vice-versa.

From the multinomial logit regression model, to carry out the analysis for the outcome of relatives, the odds ratio of the variable gross agricultural income indicates that a ten thousand rupees decrease in gross agricultural income leads to there may be 37.8% higher the likelihood of chance to approach friends or relatives for borrowing rather than their counter parts (the farmer approach to moneylender alone for credit) and vice-versa. The odds ratio of the variable gross agricultural income indicates that a ten thousand rupees decrease in gross agricultural income leads to there may be 28.2% higher the likelihood of chance to approach relatives for borrowing rather than their counter parts (the farmer approach to moneylender alone for credit) and vice-versa. The odd ratio indicates that a household having more land leads to there may be 1.38 times higher the likelihood of chance to approach both institutional sources and non-institutional sources for borrowing rather than their counter parts (the farmer approach to moneylender alone for credit) and vice-versa. Policy makers both the state and central level may consider the possibilities through the findings.

1. Strengthen Self Help Groups (SHGs) as like financial institutions.
2. Create an awareness of crop and farmers insurance through advertisement campaign at village level.
3. Encourage the farmers to low cost of cultivation like, organic farming; Subhas Palekhar's zero budget farming etc and encourage the well-educator will do farming.
4. Free access between farmers and agriculture scientists.

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11. References

1. R. Datta, K.P.M. Sundharan. Indian economy. S. Chand and Company. Ltd., New Delhi. 2009.
2. S. Singh. Magnitude and determinants of indebtedness among farmers in Punjab. *Indian Journal of Agricultural Economics*. 2014; 69(2), 1-14.
3. D.C. Talule. Agricultural debt waivers and debt relief scheme–2008: what impacts does the package have on rural transformation and beneficiary farm households 'economy? (A farm household level study of Andhra Pradesh and Maharashtra). *Asian Journal of Science and Technology*. 2015; 6(04), 1248-1263.
4. K. Shivaji. Agricultural finance by commercial banks. APH Publishing Corporation. 2007
5. C. Bell. Interactions between institutional and informal credit agencies in rural India. *The World Bank Economic Review*. 1990; 4(3), 297-327.
6. A study on farmer's perception towards agricultural finance provided by various sectors of banks in Tirunelveli district Tamil Nadu. http://shodhganga.inflibnet.ac.in/bitstream/10603/15715/1/01_title.pdf. Date accessed: 11/2011.
7. A.K. Mishra, U. Mohapatra. Agricultural finance in India- an overview. *International Journal of Engineering Sciences & Research Technology*. 2017; 6(8), 411-417.
8. K.S. Chhikara, A.S. Kodan. Farmers' indebtedness in Haryana: a study. *Journal of Rural Development*. 2014; 32(4), 347-365.
9. Y. Venu Gopal Reddy. A note on regionalisation and regional development with reference to multi-level plan process in India. *Indian Journal of Regional Science*. 1974; 6(1), 57-72.
10. S. Long. Regression models for categorical and limited dependent variables. *Sage Publications*, New Delhi. 1997; 7, 1-328.

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