S Bharat
Teaching Associate,
Department of Agricultural
Economics, Agricultural College,
Naira, ANGRAU, Hyderabad,
Telangana, India

Y Radha
Associate Dean and University
Head (Agricultural Economics)
CFST, Bapatla, ANGRAU,
Hyderabad, Telangana, India

K Suseela
Associate Professor,
Department of Agricultural
Economics, Agricultural College,
Bapatla, ANGRAU, Hyderabad,
Telangana, India

PV Sathya Gopal
Professor and University Head
(ABM), S.V Agricultural College,
Tirupathi, ANGRAU,
Hyderabad, Telangana, India

V Srinivasa Rao
Associate Dean and University
Head (Statistics and Computer
Application), Agricultural
College, Bapatla, ANGRAU,
Hyderabad, Telangana, India

Corresponding Author:
S Bharat
Teaching Associate,
Department of Agricultural
Economics, Agricultural College,
Naira, ANGRAU, Hyderabad,
Telangana, India

Determinants of access to credit by the rural households of Andhra Pradesh, India

S Bharat, Y Radha, K Suseela, PV Sathya Gopal and V Srinivasa Rao

Abstract
Socio-economic development of rural households is directly linked with the extent of access and usage of financial services. The access to credit helps them in upliftment of their status by investing in the production processes. Despite possessing bank account by all rural households under study, access and usage of the financial services was found to be very low. The present study, to analyze the determinants of access to credit by the rural households in Andhra Pradesh state was conducted during 2019-20. A total of 410 rural households in Andhra Pradesh state were selected using multistage sampling procedure. The data on the determinants of access to credit were analysed through logistic regression using SPSS version 20.0 software. Explanatory variables like land holding, occupation and income level of the household were statistically significant and a one unit increase in these variables favours the odds ratio of their access to credit. The higher level of education did not significantly influenced the credit accessibility, but it influenced the choice of sources of borrowing by the rural households. So, to improve the accessibility and usage of formal financial services, by the rural households there is need to simplify the lending procedures and security norms of financial institutions. Financial literacy has to be increased by conducting periodical training programmes by the concerned banks in the area to strengthen the accessibility to financial services.

Keywords: Rural households, access to credit, logistic regression, financial literacy

Introduction

The access to financial institutions and usage of the banking services is necessary for the socio-economic upliftment of rural households, and financial inclusion is one such way. Financial inclusion refers to delivery of financial services, at affordable cost, to the lower segments of society [1]. A well-developed financial system includes three aspects: access to financial services, affordability of such services and the utilization of such services [2]. The Government of India has implemented various schemes and programmes and introduced several measures to bring the rural households into the folds of financial access.

Though the technological intervention has brought drastic change in the banking activity supplemented by ATMs, Debit / Credit cards, online money transactions, internet banking etc., the accessibility and usage of these services was not as expected. The share of debt from the institutional and non-institutional credit agencies was 66.1 and 33.8 per cent respectively at national level as against 35.8 per cent and 64.2 per cent respectively in Andhra Pradesh state, showing the lesser share of institutional credit in total credit. The huge dependency of households on informal credit sources reveals the difficulties faced by the households in accessing the financial services from institutional sources. The reasons for inefficient spread of financial services vary from lack of awareness, distance to bank, high interest rates, lack of assets, age, illiteracy and low income/savings etc [3]. Hence the research paper entitled "Determinants of access to credit by the rural households of Andhra Pradesh, India" is aimed at determining the underlying factors of access to credit and suggesting suitable policy implications.

2. Materials and Methods

2.1 Sample selection: Andhra Pradesh state was purposively selected for the present study. A multistage sampling technique was adopted to select the rural household respondents. Based on the CRISIL (Credit Rating Information Services of India Limited) Inclusix 2018 results, two districts each with the highest and lowest CRISIL Inclusix score from each of the three regions of Andhra Pradesh *viz.*, Srikakulam and Visakhapatnam from North Coastal region, Krishna and Nellore from South Coastal region and Kadapa and Kurnool from Rayalaseema region were selected. Two mandals from each of the selected district based on the maximum and minimum number of bank branches respectively, were selected. Further the top two villages with the highest rural population and at least one bank branch were selected from each of the selected twelve mandals. The total account holders of the banks in all the 24 selected villages were considered as the total population for final selection of the respondents. Sample size was derived using Cochran's formula. The final respondents were selected by simple random sampling, in proportion to the population size, from each of the selected village. Thus a total of 410 rural households were selected for collecting the relevant data on the determinants of access to credit.

2.2 Analytical tools

2.2.1 Logistic Regression Analysis: Logistic regression is useful when the prediction of the presence or absence of an outcome based on values of a set of explanatory variables is needed. Hence, the Binary logistic regression model was used to determine the factors that influence the access to formal credit, by rural households.

Identification of Determinants of Financial Access by the Rural Households: If $X_i.X_n$ are explanatory variables to be related to access to credit and Y_i is the dichotomous dependent varibale, then the logit model specifies that the conditional probability of event (*i.e.*, that Y=1/0) given the values of $X_i.X_n$ is as follows

$$P(Y_i) = 1/[1+\exp{-(\alpha - \sum \beta_i X_i)}]$$

In order to linearize the right-hand side, a logit transformation waas applied by taking the logarithm of both sides, as followed.

$$\text{Logit } P(Y_i) = \alpha + \sum \beta_i X_i$$

For this study, the logistic regression equation is expressed implicitly as

$Y_i = a + b_1X_1 + \ldots\ldots + b_n X_n + u_i$

Y_i = access to credit (1 if yes, 0 if no)

$X_1\ldots X_n$ independent variables (Socio-economic factors).

$b_1, b_2 \ldots b_n$ are parameters corresponding to estimated

coefficients of variables (log odds ratio).

u_i is the error term and consists of unobservable random variables.

a = constant

The explanatory variables specified in the model were X_1 = age of the respondent, X_2 = land holdings (acres), X_3 = SHG membership, X_4 = occupation of the households, X_5 = education level of the household head and X_6 = household monthly income (₹).

The occupation of the household head was classified into four categories (dummy; 1= farming, 2 = self-employed, 3 = employed (Govt. and Private) and 4= unemployed/labour (Reference category)). The education qualification of the household head was classified into three categories (dummy; 0= illiterate (Reference), 1= upto metric 2 = above metric). The household income was categorized into three categories (dummy; 1= <₹4500 (Reference), 2 = ₹4501- ₹9000 and 3= Above ₹ 9000) and SHG membership was classified into two (dummy; 0 = no, 1 = yes).

The primary data collected were tabulated, coded and analysed using SPSS version 20 software. The dependent variable (access to institutional credit) was regressed on selected explanatory variables to identify their influence on the households' access to credit. The logistic regression coefficients (β_i) can be used to estimate adjusted odds ratios for each of the independent variable in the model.

3. Results and Discussion

3.1 Socio-economic profile of the rural households: The results in Table 1 indicate that out of total rural households, 26.60 per cent of the respondents were under the age group of above 35 years, 34.60 per cent were under the age group of 36-44 years, 30 per cent were in the age group of 51-65 years and only 8.80 per cent of the respondents were in the age group of 60 years and above. This implied that majority of respondents were in the age group of 36-44 years representing their active age group. It is also evident from the analysis that 35.40 per cent of the respondents were unemployed/labour and 30 per cent of the respondents were self-employed followed by 29.30 per cents of the respondents engaged in farming as the major occupation. There were only 5.40 per cent employed respondents in the study group.

The study further depicts that out of the total 410 respondents, seventy per cent of respondents were without formal education, 15.60 per cent obtained metric level education, 14.40 per cent of the respondents attained above metric level qualification, indicating the low literacy rate among the respondents. About 22.20 per cent of the respondents were having annual income < ₹4500, 65.90 per cent of the respondents were having their annual income between ₹4501 to ₹9000 and only 12 per cent of the respondents were earning annual income of above ₹9000. About 90.25 per cent of the respondents were having SHG membership.

Table 1: Socio-economic profile of rural households, N=410

Socio-economic variable	Particulars	Frequency	Percentage
Age (years)	Upto 35	109	26.59
	36-44	142	34.63
	45-59	123	30.00
	60 and above	36	8.78
Educational qualification	Illiterate	287	70.00
	Upto metric	64	15.60
	Above metric	59	14.40
Occupation	Farming	120	29.27
	Self employed	123	30.00
	Employed (Govt. & Private)	22	5.36

	Labour/unemployed	145	35.37
Household monthly income (In ₹)	Less than ₹4500	91	22.20
	₹ 4501 to ₹ 9000	270	65.85
	above ₹9000	49	11.95
SHG Membership	No	40	9.75
	Yes	370	90.25

3.2 Determinants of access to credit by rural households:
It is observed from Table 2 that all the independent variables together were contributing significantly to the dependent variable, as the significant chi-square values were less than 0.05. The p-value of 0.764 (> 0.05) of Hosmer and Lemeshow Test indicates the goodness of fit of the model presented for analysis. Further it was also noted that 74.9% respondents were correctly classified in terms of the dependent variable i.e., access to credit.

Table 2: Model significance for access to credit by rural households, (i) Omnibus Tests of Model Coefficients

		Chi-square	DF	Sig.
Step 1	Step	150.088	10	.000
	Block	150.088	10	.000
	Model	150.088	10	.000

Source: SPSS Output

Table 2: Hosmer and Lemeshow Test

Step	Chi-square	DF	Sig.
1	4.943	8	.764

Source: SPSS Output

Table 2: Category prediction of access to credit

Observed			Predicted		
			Access		Percentage Correct
			No	Yes	
Step 1	Access	No	120	53	69.4
		Yes	50	187	78.9
	Overall Percentage				74.9
a. The cut value is .500					

Source: SPSS output

The results of the logistic analysis are provided in Table 3. Three measures like -2 log likelihood, Cox & Snell R- Square and Nagelkerke R Square explain the model fitness. The Cox & Snell R- Square and Nagelkerke R Square can be less than 1, which is a more reliable measure of relationship. Nagelkerke R Square will normally be higher than Cox & Snell R- Square. In the present research work, Nagelkerke R Square value (0.412) depicted that the model was a good fit explaining about 41.2% of the variability in the dependent variable *viz*., Access to credit. The pseudo R Square values suggested that the independent variable could create an impact of 30.7% to 41.2% on the dependent variable.

Table 3: Factors influencing access to credit by rural households, N=410

Variable	β	S.E.	Wald	DF	Sig.	Exp (β)	95% C.I. for Exp (β)	
							Lower	Upper
Age (years) (X1)	-0.014	0.014	1.114	1	0.291(NS)	0.986	0.959	1.012
Landholding (X2)	0.888	0.272	10.707	1	0.001***	2.431	1.428	4.140
SHG Membership (X3)	-0.208	0.429	0.235	1	0.628(NS)	0.812	0.351	1.883
Occupation (X4)								
Unemployed/labour			9.359	3	0.025**			
Farmer	1.152	0.547	4.436	1	0.035**	3.165	1.083	9.244
Self employed	0.838	0.310	7.327	1	0.007***	2.311	1.260	4.239
Employed	0.250	0.657	0.145	1	0.703(NS)	1.284	0.354	4.656
Education status (X5)								
Illiterate			3.722	2	0.155(NS)			
Upto metric	-0.537	0.355	2.288	1	0.130(NS)	0.585	0.292	1.172
Above metric	0.402	0.492	0.667	1	0.414(NS)	1.494	0.570	3.917
Income level of household ₹ (X6)								
<₹4500			12.264	2	0.002***			
₹4501-₹9000	1.020	0.338	9.125	1	0.003***	2.774	1.431	5.378
>₹9000	1.821	0.595	9.383	1	0.002***	6.180	1.927	19.820
Constant	-0.736	0.819	0.808	1	0.369	0.479		
-2 Log Likelihood ratio			408.262					
Cox and Snell R square			0.307					
Nagelkerke R square			0.412					
NS – Not Significant, *** 1% LOS, ** 5% LOS								

It can be observed from Table 3, that three explanatory variables i.e., land holding, occupation and income levels of the household were statistically significant at one per cent level. An implication of the above is that the variables increase the odds ratio of a household being access to credit. The variables age, education status and SHG membership could not reach the desired significance level statistically.

The income of household has a positive impact on access to credit at one per cent LOS. The results of logistic analysis unravelled that with the increase in the income of the household, access to credit increased gradually. As observed from the odds ratio, households with the income ₹4501-₹9000 and above ₹9000 were 2.774 and 6.180 times more likely to have access to credit respectively as compared to the households with the income less than ₹4500. This is because the households with higher level of income will have the confidence of repayment of borrowed money, which pushes them to avail the credit from the formal sources to meet their emergency needs. Similar results were observed from the study of Rashdan and Noura (2020) [4], who confirmed that an individual with high progressive income and high educational

level had a higher level of financial literacy and awareness and favoured access to financial services.

The occupation of household head had positive impact on access to credit at one per cent level of significance. The possibility or odds to access to credit increased with change in the occupation status by a factor of 3.165 in case of farmers and 2.311 in case of self-employed households when compared to the reference category labour/unemployed. The rural households with farming as an occupation, approach the bank for credit to carry out the farm activities *i.e.,* agricultural loans for cultivation purpose. The self-employed household in order to carry out the normal business activities requires credit and approaches the formal credit institutions. Kumar *et al*. (2010) [5] expressed the same result that major determinants of institutional source of finance for farmers included their major occupation. Studies across the world have found that the type of occupation was one of the important determinants of access to credit and savings (Peachy and Roe, 2006) [6]. The access to credit for employed respondents was not significantly influenced by occupation. The chances of access to credit were more likely for the respondents having the occupation as farming and self-employed as compared to the employed.

The land holding of household had significant positive impact on access to credit at one per cent level of significance. When the land holding was increased by one unit (one acre), the possibility or odds to access to credit increased by a factor of 2.431. Since, the formal credit institutions provide credit on mortgage basis, the households with some asset base like landholding can avail the credit during the times of emergency or as and when required. Arathi (2016) [7] also showed similar results i.e., landholding was an important factor which influenced households' access to credit. The result is also in agreement with the Dey and Majumder (2017) [8] indicating the increased land ownership of household allowing gradual increase in the access to banking services. Kumar *et al.* (2010) [5] also explained similar findings in their study i.e., the size of the land holding was the major determinant of institutional source of finance for farmers.

Further it was revealed that the education level of the household head has no significant impact on access to credit. Gautier *et al*. (2020) [9] found the similar results that the education did not significantly encourage access to credit. This result could be justified by the fact that, beyond the educational level of the borrowers, the selection rather takes into account the profession and socio-economic background of the individual.

4. Summary and Conclusions
The analysis on socio-economic profile of the respondents highlighted that, most of them belonged to the age group of 36-44 years who were considered to be most active group. It was concluded that most of the respondents were unemployed and seventy per cent of the respondents were not having any educational background. There were about 65.90 per cent of the respondents who were having their annual income between ₹4501 to ₹9000. The logistic regression analysis revealed that three explanatory variables i.e., land holding, occupation and income level of the household were statistically significant at the one per cent level to influence the access to credit. Households with the income level of ₹4501-₹9000 and above ₹9000 were 2.774 and 6.180 times more likely to have access to credit, respectively with reference to the households with income level less than ₹4500. The possibility or odds to access to credit increased

with change in the occupation status by a factor of 3.165 in case of farmers and 2.311 in case of self-employed households when compared to the reference category of labour/unemployed rural households. The possibility or odds to access to credit increased by a factor of 2.431, when the number of acres of land holding increased by one acre, since the landownership makes the households access to credit easier there by the associated banking services will be utilized by them regularly. The higher level of education did not significantly influence the credit accessibility, but it influenced the choice of sources of borrowing by the rural households.

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