

## Incidence of Poverty in Andhra Pradesh Agriculture

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### Abstract:

*Andhra Pradesh Agriculture, the backbone of the livelihood for over 65% of the state population, But, the agricultural sector of the state, however, is confronted with serious problems such as the rising costs of production, declining farm profits, deteriorating quality of soil and water resources, and growing number of smallholders results in growing number of farmer suicides that highlight the urgent need to address the crisis in agricultural sector. In spite of huge investments in agriculture, income of the people living in agriculture are more unstable. The people depending on this sector are characterised by low income and higher poverty. Keeping this in view, it is proposed to estimate the levels of deprivation and poverty in Andhra Pradesh state of India. To acquire comprehensive understanding of the problems prevailing in agriculture, a Multistage Random Sampling Method is employed. The household survey was conducted to collect information on the socio-economic states. The standard of living of the sample household was analyzed using aggregated measure of social and economic indicators. The standard of living was computed for each household, combining the social and economic indicators using the scoring technique. The composite index of standard of living has been computed assessing score to economic social variables. The index of economic indicators and index of social indicators are also computed and analysed for each of farm size households. It is observed from data that there is a direct relation between average value of index of*

*standard of living and size of the farm, i.e., average value of standard of living is increasing with the farm size. The estimated composite index of standard of living reveals that the index value is lowest for marginal and small farms households which is 34, whereas it is high in medium and large farms followed by small and semi-medium farm households. That is, marginal and small farms are found to be most disadvantaged category in terms of standard of living. At the same time 70 per cent of semi-medium, 50 per cent of medium and large farm households are not in a better condition than that the marginal and small farm households are in both economic and social aspects. The index of deprivation (ID) computed using the scoring technique for identified variables. It reveals that the 78 per cent of farm households are in deprived state and only 2 per cent of farm households are in not deprived state and the remaining 20 per cent of farm households are in less deprived state. Nearly 47 per cent of the total farm households are found to be in most deprived state. The results of the specified logit model shows that the coefficient associations with the explanatory variables have registered an expected sign and most of them are found to be significant at probability levels ranging from 1 to 10 per cent. The coefficient of determination  $R^2$  is 0.85 which indicates that the model is a good fit. The result indicates that the literacy percentage, farm size, mandays of employment, percentage of adults in the household and income from agriculture are found to be negative and significant. The coefficient of the other variable, social status was positive and not significant. This indicates that the change in the social status of respondents would also increase the probability of households to be deprived. The results reveal that the social status of the farm households could not influence their probability of being deprived. Thus the results of analysis, imply that the probability of a household being deprived could be influenced by the variables considered in this model except that of social status.*

**Key words:** Agriculture, Poverty, livelihood, Composite index

## **Introduction**

Agriculture is a critical sector of the Indian economy. Though, its contribution to the overall Gross Domestic Product (GDP) of the country has fallen from about 30 per cent in 1990-91 to less

than 15 per cent in 2011-12, a trend that is expected in the development process of any economy, agriculture yet forms the backbone of development. An average Indian still spends almost half of his/her total expenditure on food, while more than half of India's work force is still engaged in agriculture for its livelihood. Being a source of livelihood and food security for a vast majority of low income, poor and vulnerable sections of society, its performance assumes greater significance (*Reddy AA 2010*).

Since the inception of planning process in India, researchers have identified three broad phases of agricultural growth. Until mid sixties increase in food production had occurred mainly through expansion of area under cultivation. In late sixties, Indian agriculture had experienced a technological breakthrough which heralded the economy into a more promising phase of Green Revolution from the point of view of boosting agriculture production. Despite concerted efforts made in past to improve the productivity by transferring improved technologies, gain in terms of higher yield and income have not been sustainable due to variety of reasons.

Recent economic studies expressed concern with the declining share of the agricultural sector's in GDP in which sixty five per cent of people depend on this sector for their livelihood. The dismal situation in which many farmers find themselves in India today is reflected in an alarming trend has been witnessed in recent years with rising rates of farmers committing suicide. Newspapers echoing the 'crisis in Indian agriculture' continue to report daily incidents of suicides in various parts of the country. Thus agriculture stagnation and agrarian distress is a subject of widespread discussion in recent years.

Several different reasons that have been put forward as the causes of distress is mounting debt of farmers, crop failures ,declining yields, unviable farm holdings, ,increasing cost of production and fluctuations in output prices, imbalances of international trade, and other social and economic factors.

Price of major crops have witnessed wild fluctuations in recent years after opening the Indian markets to international markets.. This has led to a high degree of instability in farm incomes. Reduction and wild fluctuation in agricultural incomes of the farmers has been manifested in form of farm suicides. The farmers are greatly, affected by income vulnerability and poverty. Thus people living in agriculture are on an average lag far behind the rest of the world in human well-being and development indicators. A large number of people depending on agriculture is characterised as most deprived lot . The Indian farmers are caught in a dilemma whether to continue in Agriculture or not. In the past 30 years, the noble profession of Agriculture has become less remunerative and farmers are looked down in their social circles. An unfortunate consequence of the pattern of hardships faced by farm families is the growing number of suicides among farmers in thousands, which is not prevalent in any other profession. Farmers in many regions in the countries are under the grip of economic shock. Though the economic shock have affected entire population depending on the agriculture, its intensity is very high in some agricultural regions. The intensity of economic crisis among farm families found to be varied with the socio economic settings of the people depending on agriculture. Andhra Pradesh is one of the few states where the intensity of economic crisis in agriculture is found to be reflecting in growing number of suicides among farm families.

Andhra Pradesh Agriculture, the backbone of the livelihood for over 65% of the state population, But, the agricultural sector of the state, however, is confronted with serious problems such as the rising costs of production, declining farm profits, deteriorating quality of soil and water resources, and growing number of smallholders results in growing number of farmer suicides that highlight the urgent need to address the crisis in agricultural sector (*Dev, Mahendra, S., 2007*). There is a sense of uneasiness regarding the future that holds for Andhra Pradesh. Policy makers,

politicians and researchers worried whether the future generation depending on agriculture will survive like their parents and grandparents once did. Will the heady days of the green revolution ever return to villages in Andhra Pradesh? Will the state be able to hold on to the impressive gains made on the socio – economic front?

To address the crisis in agriculture, the central and state governments have to come out with in functional follow up programs for mitigating the sufferings of the people in agriculture. It is therefore, important to understand the dimensions of crisis to explore the alternative options to improve the quality of life of the people living in agriculture. So, it is important to understand the regional dimensions of the Farm economic crisis which reflects in socio economic status of farm families.

### **Problem:**

In spite of the policies and programs that are being implemented over the year, the factors and processes underlying the agrarian distress among farm families found to be unaddressed. In spite of huge investments in agriculture, income of the people living in agriculture are more unstable. The people depending on this sector are characterised by low income and higher poverty.

### **Need for the Study:**

Andhra Pradesh is one of the major Agricultural states of India in terms of its position in Agricultural production in the country. The state accounting for 6.8 per cent of total net sown area in the country. The situation in agricultural sector is not different from other parts of the country. The living standard of the rural classes has been on the decline. This is evident from the dwindling share of agriculture in state gross domestic product. The magnitude of the problem is clear from the fact

that while the share of agricultural income has been declining drastically, the proportion of population dependent agriculture has not declined in an equal proportion. That is two thirds of state population has to share this dwindled income. A notable declaration in the rate of growth of agricultural production, area and productivity of crops is reported. This led to the dwindling in income of the farmers. Growing disparities between people living in agriculture sector and other sectors has become a matter of serious concern for the policy makers.

Agricultural growth is one of the key factor in accelerating the overall development process of the Andhra Pradesh Economy. In spite of spectacular growth in terms of production and productivity of agriculture during the last few decades of planned development, it is highly skewed in favour of certain crops and regions, it did not last long. A major part of the state population is suffering from stagnant or poor growth. Nearly 60 per cent of the net sown area in the state even today is without irrigation facilities. This growth of Andhra Pradesh agriculture depends to a large extent on the potential of agriculture which has not been effectively harnessed so far. This has resulted in high poverty among the people living in agricultural sector. In the emerging context of Indian agriculture the socio-economic states of the farmers in Andhra Pradesh assumes critical importance because of growing concern about the slow of growth and persistence of poverty and backwardness. There has been an overall concern that over all living standards of the farmers has been on decline when compared to the people depending on other sectors.

### **Objective:**

Keeping this in view, the study examines the situation among farm families of Andhra Pradesh. Hence, it is proposed to estimate the levels of deprivation and poverty among farm households.

## **Methodology:**

This section describes the design and methodology applied . The methods of sampling and way of determining the sampling size is described, along with the methods and techniques employed in the data collection.

## **Research design:**

Both quantitative and qualitative methods of research were applied in the study through the collection of data by household survey and in-depth interviews, site visits and field observations. The secondary data is collected from Directorate of Economic and Statistics, Government of Andhra Pradesh and from different reputed journals. Mandal and village level data is also collected from Mandal Revenue Offices in selected districts to select identify sample villages.

## **Selection of study area:**

Andhra Pradesh is a state with diversified regional dimensions where marked difference exists among the regions. Uneven distribution of rainfall, natural resources, irrigation infrastructure and agro-climatic conditions are the important characteristics of the agriculture in the study area which are critical to the performance of agriculture. To acquire comprehensive understanding of the problems prevailing in agriculture, a Multistage Random Sampling Method is employed. In the first step Andhra Pradesh is divided into three regions, namely Coastal Andhra, Telangana and Rayalaseema regions, two districts from each region is selected at random in first stage . In the second stage, one mandal from each district is selected at random. In the third stage, one village from each of the selected mandal is selected at random. Finally a sample of six villages are selected for the study. Finally farm households in each of the selected village is

listed. A sample of 100 farm households are selected randomly from the list of farm households whose main occupation is cultivation from each of the selected villages. The households are divided into five farming categories, namely, marginal farmers (less than 2.5 acres), small farmers (2.5 to 5 acres), semi-medium farmers (5 to 10 acres), medium farmers (10 to 25 acres) and large farmers (25 and above acres).

All the sample households were interviewed personally to collect the required primary data using structured questionnaire. The household survey was conducted to collect information on the socio-economic states which includes employment, income and consumption, expenditure and also access to basic amenities like safe drinking water sanitation, school, transport, market, communication facilities.

Further, the information regarding the households, demographic information, system of cropping pattern, farm income and expenditure, and off-farm income, input use, crop yield, cost and returns of different on-farm activities and availability of institutional credit and utilisation of Government schemes in the selected area. Perceptions of farmers on various issues relating to government schemes, programmes, loans and problems as well as measures for their upliftment are also included in the questionnaire.

### **Analytical techniques**

The data and the information collected were entered in SPSS version for analysing the quantitative data. Techniques used for data analysis is descriptive statistics, regression analysis and logistic regression analysis.

### **Models and Methods Used:**

The economic policies of the country for the last 65 years have though had positive effects on development of agricultural sector they are found to be not sustainable. The development



strategies that have been in force have shifted resources away from agriculture to other sectors as a result the resource environment in agriculture does not yield remunerative economic opportunities.

The farmers are greatly, affected by income vulnerability and poverty. Thus people living in agriculture on an average lag for behind the rest of the world in human well-being and development indicators. A large number of people depending on agriculture is characterised as most deprived lot. The households depending on agriculture found to be suffering from low standard of living. The poverty among the households depending on agriculture and living in rural area found to be not declining in reality.

Rural poverty in Andhra Pradesh is more among communities depending on agriculture. Agriculture in the state is characterized by wide variations in the productivity of crops due to uncertainty and high fluctuations in climatic conditions . The farm house holds suffer from low yield, fluctuating yield level, fluctuating prices ,low income and lack of other remunerative economic opportunities. The quality and availability of education and health care facilities are not within the reach of the majority of the people living in agriculture. The farm families are found to be in low standard of living due to low income from cultivation and lack of other economic opportunities in rural areas . The non-income dimension of standard of living of these families remains high. There is gender, caste, inter- region and farm size group disparities. The well being of farm families depends on both monetary and non-monetary variables. Income cannot be the sole indicator of standard of living and should be supplemented by other variables like housing, literacy, type of agricultural land in possession, and other infrastructural facilities and so on. The specific objective of this article is to estimate the indices of level of living of different size groups of farm households in sample villages and to identify the factors that influence the standard of living of the sample households.

### Composite index of standard of living

Composite index of standard of living was computed for each of the sample households. The composite index was computed by combination of social and economic indicators using the scoring technique (*Sing and Chand 2000, T.Ponnarasi, K.Sita Devi 2008*). Availability of electricity in the house, access to health care, access to education, access to transport and communication, markets, sanitation, and drinking water facilities are included in computing social index. The value of assets, income, consumption expenditure, saving and barrowing are included in computing economic index.

### Composite index of standard of living of h-th household (CISL<sub>h</sub>)

$$W_1 S_h + W_2 E_h$$

Where  $S_i$  and  $E_j$  represent i-th social and j-th economic indicators, respectively.  $S_{i(\max)}$  and  $E_{j(\max)}$  are the maximum scores for i-th social indicator and j-th economic indicator.

Weight  $w_1$  is given by  $\frac{\sum S_{i(\max)}}{(\sum S_{i(\max)} + \sum E_{j(\max)})}$  and  $w_2$  is  $(1-w_1)$ .

### Index of social indicators of the households

$$SK = \frac{\sum S_k}{(\sum S_k)^{mean}}$$

### Index of economic indicators of h-th household (E<sub>h</sub>)

$$\frac{\sum E_j}{\sum E_{j(\max)}}$$

### Estimation of the Logit Model:

For estimation purposes, equation is as follows:

$$L_i = \ln \left( \frac{P_i}{1 - P_i} \right) = \beta_1 + \beta_2 X_i + u_i \quad \dots (1)$$

To estimate the model, apart from  $X_i$ , the values of the logit  $L_i$  are needed but now one runs into some difficulties. If one has data on individual respondents,  $P_i=1$ , if the respondent is deprived and  $P_i=0$  if the respondent is non-poor. But, if these values are put directly into the logit  $L_i$ , it obtains:

$$L_i = 1 \ln \left( \frac{1}{0} \right) \text{ if the respondent is poor}$$

$$L_i = 1 \ln \left( \frac{0}{1} \right) \text{ if the respondent is non-poor}$$

Obviously, these expressions are meaningless. Therefore, if one has data at the micro or individual level, one cannot estimate (equation 6) by the standard OLS routine. In this situation, one may have to resort to the maximum likelihood method to estimate the parameters (*Uma Devi and Prasad, 2006*).

Within the logit framework discussed above, this study has postulated that the probability of an individual being deprived ( $L_i$ ) is dependent upon the attributes like family size, percentage of literates, category (land holding), social status, percentage of earners in the household, household income and man-days employed.

The index variable  $P_i$  indicating whether the respondent is deprived or non-deprived has been expressed as a linear function of the independent variables. Thus, the logit regression model has been specified as follows.

$$L_i = \alpha_i + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + u_i$$

Where,

- $X_1$  - Family size,
- $X_2$  - Percentage of literates in the household,
- $X_3$  - Category of the respondents, 1 if category-II; 0, otherwise,

$X_4$	-	Social status of the households; 1 if scheduled caste; 0, otherwise,
$X_5$	-	Percentage of earners in the household,
$X_6$	-	Annual income of the household in rupees,
$X_7$	-	Man-days of employment of the household,
$\beta_i$ 's	-	Parameters to be estimated,
$u_i$	-	Error term.

### **Data Analysis:**

The standard of living of the sample household was analyzed using aggregated measure of social and economic indicators. The standard of living was computed for each household, combining the social and economic indicators using the scoring technique and presented in table-1. The composite index of standard of living has been computed assessing score to economic social variables. The index of economic indicators and index of social indicators are also computed and analysed for each of farm size households. It could be observed from the table that there is a direct relation between average value of index of standard of living and size of the farm, i.e., average value of standard of living is increasing with the farm size.

It is higher in medium and large farm households and lower in marginal and small farm households. It was 34 and 42 in small and marginal farm households respectively. It was 53 and 54 in semi- medium and medium and large farm households. The average values of Index of social indicator show a similar trend. However the average value of economic indicator for semi-medium farm households was less than that of small farm households. While the average value of economic indicators is 40 for semi-medium size farm households, it is 42 for small size farm households; it is 29 for marginal farm households which is very low when compared to the average value of index of economic indicator of other farm households.

The distribution of households according to the value of composite index clearly reveals that there is nearly 66 per cent of the marginal farm households and 55 per cent of small farm households found to be distributed in the index value of below 40. Nearly 32 per cent of semi-medium farm households and 12 per cent of medium and large farm households found to have the index value of below 40 i.e., the standard of living of 12 per cent of medium and large farm households and 32 per cent of semi medium farm households is almost similar to that of the standard of living of small and marginal farm households.

**Table -1 The Distribution of Index of social, economical and Composite Index**

Range	Social Index				Economical Index				Composite Index			
	Marginal	Small	Semi-medium	Medium and large	Marginal	Small	Semi-medium	Medium and large	Marginal	Small	Semi-medium	Medium and large
Below 20	-	-	-	-	20	11	-	-	4	3.84	-	-
20-40	67.04	52	32	13	49	33	16	11	62	51	32	12
41-60	26.70	30	48	49	27	37	44	28	22	32	38	38
61-80	11.26	18	20	38	4	19	32	33	12	13.16	27	42
81-100	-	-	-	-	-	-	8	28	-	-	3	8
Total	100	100	100	100	100	100	100	100	100	100	100	100
Average Index	31	38	44	52	29	42	40	62	34	42	53	54

**Source:** Primary data.

Around 30 per cent of semi-medium farm households and 50 per cent medium and large farm households found to be distributed the index value of above 60. Nearly 12 per cent of marginal farm households and 13 per cent of small farm households found to be distributed in index value of above 60. Further it is found that 84 per cent of marginal farm

households and 83 per cent of small farm households, 70 per cent of semi-medium farm households and 50 per cent of the medium and large farm households are distributed in index range between 20-60. In case of economic indicator 69 per cent and 44 per cent of the marginal and small farm households have value of index below 40. Nearly 16 per cent of semi-medium and 11 per cent of medium and large farm households have been placed in the index below 40. The economic indicators for 96 per cent of marginal farm households, 81 per cent of the small farm households 60 per cent semi medium farm households and 39 per cent of medium and large farms are distributed in index below 60.

The small numbers of about 4 per cent of marginal farms households, 19 per cent of small farm households, 40 per cent of semi-medium have been placed in the economic index of above 60. From the analysis it could be concluded that though small and marginal farm households found to be disadvantaged category in terms of standard of living, nearly 70 per cent of semi-medium, 50 per cent of medium and large farm households are not in better condition than that of marginal and small farm households.

### **Index of Deprivation (ID)**

The indicators which show significant difference between poor and non-poor in their levels of living are used in computing deprivation index. The entire variables include computing deprivation index for giving equal weight and categorized as deprived and non-deprived. The score '1' is assigned to identify the socio economic variables if the household did not enjoy the social and economic benefit or status in the society. Otherwise zero score is assigned. A simple index of deprivation is computed by taking the sum of total of all such scores. The composite index of deprivation for the ten identified variables is computed for each individual household. The ID value ranges from 0 to 12. If the household sets a value '0', it indicates that the household has not been deprived in any of the ten aspects.

If the household get a value 12, then the household is considered to be deprived of in all aspects.

The index of deprivation for the identified variables has been computed for each of the individual households which is presented in table-2. ID value ranges between 0 to 12. The percentage distribution of households by the level of deprivation is categorized as not deprived (0-2), less deprived (3-5), and more deprived (6-8) and most deprived (9-12). It could be observed from the table, that 78 per cent of the dryland farm households are in deprived state and only 2 per cent of the households are in a not deprived state and the remaining 19 per cent of the farm households are in a less deprived state. The most deprived households whose ID value ranges between 9-12 account for 47 per cent of the total farm households. Nearly 32 per cent of the total farm households are under deprived status.

Among them 66 per cent of marginal farm households. 54 per cent of small farm households are in most deprived status and the remaining small and marginal farm households are in less deprived status. There is not even a single marginal and small farm household which is in not deprived status.

In case of semi medium, medium and large farm households, 69 per cent of semi-medium farm households and 50 per cent of medium and large farms are in deprived status, 12 per cent of the medium and large farms are in most deprived status. Similarly 32 per cent of the semi-medium farms are in most deprived status. A less number of semi-medium farms (3 per cent) and medium and large farms (9 per cent) are in not deprived status. So from the above analysis it can be inferred that a state of deprivation for the selected indicators is found among farm households irrespective of farm size. However the state of deprivation is found to be more among small and marginal farm household categories when compared to other corresponding farm categories.

**Table -2 Distribution of households by level of deprivation**

Sl. No	Range of ID	Marginal	Small	Semi-medium	Medium and large	Total
1	Not Deprived (0-2)	0 (0.00)	0 (0.00)	2 (3.04)	3 (8.82)	5 (1.67)
2	Less deprived (3-5)	8 (11.76)	18 (13.64)	18 (27.27)	14 (41.18)	58 (19.33)
3	Moderately deprived (6-8)	15 (22.06)	42 (31.82)	25 (27.88)	13 (38.24)	95 (31.67)
4	Most deprived (9-12)	45 (66.18)	72 (54.54)	21 (31.81)	4 (11.76)	142 (47.33)
5	Total	68 (100)	132 (100)	66 (100)	34 (100)	300 (100)

**Source: Primary data**

**Note:** Figures in parentheses represent percentages to respective total

The Logit model postulates that the probability of a household being deprived is dependent on the socio economic characteristics of the households. The maximum likelihood estimates of co-efficient of logit model for the respondent is presented in the Table-3. The results of the specified logit model shows that the coefficient associations with the explanatory variables have registered an expected sign and most of them are found to be significant at probability levels ranging from 1 to 10 per cent. The coefficient of determination  $R^2$  is 0.85 which indicates that the model is a good fit. The result indicates that the literacy percentage, farm size, mandays of employment, percentage of adults in the household and income from agriculture are found to be negative and significant. This indicates that one unit charge in the negative and significant slope of coefficient would decrease the probability of household being deprived by their appropriate percentages. The coefficient of the other explanatory variable, family size is positive and significant, which indicates that the change in the family size would increase the probability of respondent to be poor. The coefficient of the other variable, social status was positive and not significant. This indicates that the change in the social status of respondents would also increase the probability of households to be deprived. Thus the results of analysis, imply that the probability of a household



being deprived could be influenced by the variables considered in this model except that of social status.

**Table -3 MLE Coefficient for logit model**

Variables	Logit MLE Coefficient	Slandered error
Intercept	6.2521**	1.652
Family size	0.0021***	0.123
Percentages of literates	- 0.0785**	0.067
Farm size	-0.8231*	0.521
Social status	0.1958	0.421
Percentages of earners	-0.4123*	0.215
Income from agriculture	-0.0521**	0.031
Man days of employment	- 0.0032*	0.002
R <sup>2</sup>	0.85	
Number of observers	300	

**Source: Primary data**

**Note:** \*, \*\*, and \*\*\* show significant at 10 percent, 5 per cent and 1 per cent level respectively

### **Conclusion:**

To sum up the estimated composite index of standard of living reveals that the index value is lowest for marginal and small farms households which is 34, whereas it is high in medium and large farms followed by small and semi-medium farm households. That is, marginal and small farms are found to be most disadvantaged category in terms of standard of living. At the same time 70 per cent of semi-medium, 50 per cent of medium and large farm households are not in a better condition than that the marginal and small farm households are in both economic and social aspects. The index of deprivation (ID) computed using the scoring technique for identified variables. It reveals that the 78 per cent of farm households are in deprived state and only 2 per cent of farm households are in not deprived state and the remaining 20 per cent of farm households are in less deprived state. Nearly 47 per cent of the total farm households are found to be in most deprived state.

The results of the specified logit model shows that the coefficient associations with the explanatory variables have registered an expected sign and most of them are found to be significant at probability levels ranging from 1 to 10 per cent. The coefficient of determination  $R^2$  is 0.85 which indicates that the model is a good fit. The result indicates that the literacy percentage, farm size, mandays of employment, percentage of adults in the household and income from agriculture are found to be negative and significant. This indicates that one unit charge in the negative and significant slope of coefficient would decrease the probability of household being deprived by their appropriate percentages. The coefficient of the other explanatory variable, family size is positive and significant, which indicates that the change in the family size would increase the probability of respondent to be poor. The coefficient of the other variable, social status was positive and not significant. This indicates that the change in the social status of respondents would also increase the probability of households to be deprived. Hence the results reveal that the social status of the farm households could not influence their probability of being deprived. Thus the results of analysis, imply that the probability of a household being deprived could be influenced by the variables considered in this model except that of social status.

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