Chapter VII

DETERMINANTS OF POVERTY AMONG FEMALE AGRICULTURAL LABOUR
Rural poverty is concentrated among those who live with agriculture in rural area. The poor among the rural community suffer from lack of remunerative economic opportunities. Thus the most of households in rural areas found to be in low standard of living. Women agricultural labour are highly represented poor. The female agricultural labour lie at the lowest rung of the socio-economic ladder. They slog alongside their men in the field the whole day and then look after the house and children too, with no help forthcoming from the male members of the family. They work for wages because of the economic necessity to supplement the family income. They desperately need some work and earn for family needs. They do not hesitate to work at lower wages under harsh conditions. This is certainly due to their weak assets base and depending on agricultural wage labour. Scheduled Castes, Scheduled Tribes and Backward Castes women are highly represented poor among agricultural labour who suffer from low income and poverty.

There are another important challenges in the non-income poverty dimensions like gender, caste, inter regional, inter-districts, rural-urban disparities. The standard of living is a measure of well-being and hence depends on both monetary and non-monetary variables. Income though is a sole indicator of standard of living is possessed inappropriate and it supplemented by other variables like housing, literacy, type of assets processed and so on. Hence this chapter attempts to study the socio-economic status of female agricultural labour to estimate the indices of
levels of living of different types of female labour’ households and to identify the factors influencing the households being poor.

The socio-economic status of the female labour’ households is estimated basing on income, employment level, consumption pattern and accesses to basic amenities like drinking water, sanitation, school, transport, market facilities, communication and recreation facilities. The ‘Z-test’ analysis is undertaken to find the homogeneity of the sample. Since there are high variations within the sample, households are stratified into four categories of households, namely, category I, whose households belong to upper castes in social hierarchy, category II, whose households belong to Backward classes, category III, whose households belong to Scheduled Castes and category IV, whose households belong to Scheduled Tribes. A comparative study of the households basing on the standard of living was analyzed using “Composite Index of Standard of Living”. Considering the important aspects of levels of livings of the population, an “Index of Deprivation (ID)” was also developed. To analyze the determinants of poverty among labour logistic regression model is used.

**7.1 Composite Index of standard of living**

The Composite Index of Standard of living is estimated for each household combining the social and economic indicators using the scoring techniques. The social indicators considered for the estimation is access of electricity, access to medical facilities, access to communication, access to drinking water and access to proper sanitation. The economic indicators
used for estimating the Composite Index of Standards of living are value of assets, income, consumption expenditure, savings and borrowings.

**Composite index of standard of living of h-th household (CISL\textsubscript{h})**

\[ W_1S_h + w_2E_h \]

Where, \( S_i \) and \( E_j \) represent i-th social and j-th economic indicators, respectively. \( S_i^{(\text{max})} \) and \( E_j^{(\text{max})} \) are the maximum scores for i-th social indicator and j-th economic indicator. Weight \( W_1 \) is given by \( \sum S_i^{(\text{max})} / \left[ \sum S_i^{(\text{max})} + \sum E_j^{(\text{max})} \right] \) and \( w_2 \) is \((1-w_1)\).

**Index of social indicators of h-th household**

\[ S_h = \frac{\sum S_i}{\sum S_i^{(\text{max})}} \]

**Index of economic indicators of h-th household**

\[ E_h = \frac{\sum S_j}{\sum S_j^{(\text{max})}} \]

**7.2 Factors influencing the households being poor**

The logit model in this study postulates that \( P_i \), the probability that a respondent i is poor, is a function of index variable \( Z_i \) summarizing a set of the individual attributes. Hence, let us consider the following representation of a household being poor.

\[ P_i = \text{E}(Y=1 \mid X_i) = \frac{1}{1 + e^{-(\beta_1 + \beta_2x_1)}} \quad \ldots(1) \]

Where, \( e \) is the familiar base of the natural logarithm. Now, let equation (1) be rewritten as
\[ P_i = \frac{1}{1+e^{z_i}} \]  \hspace{1cm} \text{...(2)}

Where \( Z_i = \beta_1 + \beta_2 X_i \)

Equation (2) represents the (cumulative) logistic distribution functions.

It could be verified that as \( Z_i \) ranges from \(-\infty\) to \(+\infty\), \( P_i \) ranges between 0 and 1 and that \( P_i \) is non-linearly related to \( Z_i \) (i.e., \( X_i \)). However, we would encounter an estimation problem because \( P_i \) is not only non-linear in \( X \) but in the \( \beta \)'s as well, as can be seen clearly from (1). This means that the familiar OLS procedure could not be made to estimate the parameters. But this problem is more apparent than real because (1) is intrinsically linear, which can be shown as follows:

If \( P_i \), the probability of a household being poor is as given by (2), then, \( (1-P_i) \), the probability of non-poor is

\[ 1-P_i = \frac{1}{1+e^{-z_i}} \]  \hspace{1cm} \text{...(3)}

Therefore, we can write

\[ \frac{P_i}{1-P_i} = \frac{1+e^{z_i}}{1+e^{-z_i}} = e^{z_i} \]  \hspace{1cm} \text{...(4)}

Now \( \frac{P_i}{1-P_i} \) is simply the odds ratio in favor of poor-the ratio of the
probability of poor to the probability of non-poor. Thus, if $P_i = 0.8$, it means that odds are 4 to 1 in favor of poor.

Now, by taking the natural log of (4), we would obtain:

$$L_i = \ln \left( \frac{P_i}{1 - P_i} \right)$$

$$Z_i = \beta_1 + \beta_2 X_i \quad \text{...(5)}$$

That is, $L$, the log of the odds ratio, is not only linear in $X$, but (from the estimation viewpoint) linear in the parameters also. It might be noted that the linearity assumption of OLS does not require that the $X$ variable be necessarily linear. So we can have $X^2$, $X^3$, etc., as regressors in the model. For our purpose, it is the linearity in the parameters that is crucial. $L$ is called the logit, and hence the name logit model for (5).

**Features of the Logit Model**

1. As $P$ goes from 0 to 1 (i.e., as $Z$ varies from $-\infty$ to $+\infty$), the logit $L$ goes from $-\infty$ to $+\infty$. That is, although the probabilities (of necessity) lie between 0 and 1, the logits are not so bounded.

2. Although $L$ is linear in $X$, the probabilities themselves are not.

3. The interpretation of the logit model is as follows: $2$, the slope, measure the change in $L$ for a unit change in $X$. 

252
Estimation of the Logit Model

For estimation purposes, equation (5) can be written as follows:

\[ L_i = \ln \left( \frac{P_i}{1 - P_i} \right) = \beta_1 + \beta_2 X_i + u_i \quad \ldots (6) \]

To estimate the model, we need, apart from \( X_i \), the values of the logit \( L_i \). But now we run into some difficulties. If we have data on individual respondents, \( P_i = 1 \), if the respondents is poor and \( P_i = 0 \), if the respondents is non-poor. But, if we put these values directly into the logit \( L_i \), we obtain:

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

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

Obviously, these expressions are meaningless. Therefore, if we have data at the micro or individual level, we 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.

Within the logit framework discussed above, this study has postulated that the probability of an individual being poor (\( L_i \)) is dependent upon the attributes like age, percentage of literates, category (land holding), social status, percentage of earners in the household, household income, mandays employed.
The index variable \( P_i \), indicating whether the respondent is poor or non-poor has been expressed as a linear function of the independent variables. Thus, the logit regression model has been specified as follows.

\[
L_i = \alpha_i + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + u_i
\]

where,
\( X_1 \)= Age of the respondents, in years,
\( X_2 \)= Percentage of literates in the household,
\( X_3 \)= Social status of the households, 1 if scheduled caste, 0, otherwise,
\( X_4 \)= Annual income of the household, in rupees,
\( X_5 \)= man-days of employment of the household,
\( \beta_i \)'s= Parameters to be estimated,
\( U_i \)= error term.

The standard of living of sample women households was analyzed using an aggregate measure which includes social and economic aspects. The Composite Index of Standard of living is computed and assign of scores to the selected economic and social variables. Index of economic indicators and Index of social indicators also calculated and analyzed separately for each of the poor women household group.

It was observed from the Table-7.1 that the estimated average value of Index of Standard of living lowest for Scheduled Tribe women households which is 32 percent, whereas it is 58 per cent for women household belonging to forward caste labour households. The Estimated Index of Standard of living for women households belonging to backward caste
Table-7.1

COMPOSITE INDEX OF STANDARD OF LIVING FOR THE SAMPLE HOUSEHOLDS

(In percentages)

<table>
<thead>
<tr>
<th>Index</th>
<th>Social Index</th>
<th>Economic Index</th>
<th>Composite Index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OC  SC  ST  BC</td>
<td>OC  SC  ST  BC</td>
<td>OC  SC  ST  BC</td>
</tr>
<tr>
<td>Upto 20</td>
<td>-    16.26 35.40 12.61</td>
<td>-    18.22 28.61 20.61</td>
<td>-    16.42 32.54 20.26</td>
</tr>
<tr>
<td>21-40</td>
<td>33.80 44.20 42.80 30.49</td>
<td>29.39 45.82 57.65 55.87</td>
<td>26.80 40.7 50.56 49.32</td>
</tr>
<tr>
<td>41-60</td>
<td>41.06 25.22 14.00 34.45</td>
<td>54.68 27.22 11.42 18.32</td>
<td>48.29 28.26 12.20 20.22</td>
</tr>
<tr>
<td>61-80</td>
<td>25.14 14.32 7.8 22.45</td>
<td>15.93 8.74 2.32 5.20</td>
<td>24.91 14.62 4.7 10.2</td>
</tr>
<tr>
<td>81-100</td>
<td>-   -    -   -</td>
<td>-   -    -   -</td>
<td>-   -    -   -</td>
</tr>
<tr>
<td>Total</td>
<td>100 100 100 100</td>
<td>100 100 100 100</td>
<td>100 100 100 100</td>
</tr>
<tr>
<td>Average</td>
<td>48 42 38 45</td>
<td>46 42 33 38</td>
<td>58 46 32 38</td>
</tr>
</tbody>
</table>

Source: Primary data
labour households is 38 per cent and where as it is 46 per cent for women household belonging to Scheduled Caste Communities. The Standard of living Index of women households higher for forward caste communities followed by Scheduled Caste communities, backward caste communities and lowest for Scheduled Tribe communities. It is further observed that the average value of economic Index reveals the similar trend. But the average value of Social Index is high for women households belonging to 48 per cent of the forward caste community, 45 per cent of the backward caste community households, 42 per cent of the Scheduled Caste women households and 38 per cent of the Scheduled Tribe women households. The distribution of households according to the value of Composite Index clearly indicate that in the forward caste household, 48.29 per cent were found to be distributed in the index value ranging between 41-60. Nearly, 50 per cent of Scheduled Tribe and Backward Caste communities' are in the index value ranging between 21-40. The Scheduled Caste Communities are more deprived than the Backward Caste Communities index value ranging between 21-40. The Standard of Living Index very low for majority of scheduled tribes, backward classes. Nearly 80 per cent of the scheduled tribe, 70 per cent of the backward caste classes have lowest standard of living. The scheduled caste women labour are placed greater than backward caste women in terms of standard of living.
7.3 Index of Deprivation

The Index of Deprivation has been computed for each of the women household (Table-7.2). The deprivation index is computed for selected social variables. The value of deprivation index ranges between 0 and 15. The households are categorized as most deprived, moderately deprived, less deprived and not deprived. If Index of deprivation value is between 8 and 12 they are as categorized as moderately deprived, if the value is 4 to 7 they are categorized as less deprived of the value is 0 and 3 as categorized as not deprived. The data reveals that around 43 per cent of the total sample female labour households are most deprived state for the selected social indicators and 38 per cent are moderately deprived state, 12 per cent are in less deprived state where as only 7 per cent of the total sample households were not deprived state. The level of deprivation across the social groups reveals that 61 per cent of the women labour households belongs to forward caste category were in not deprived state and there were no female households for this category in most deprived state. In case of women labour belongs to backward caste category 46 per cent were in most deprived state and 37 per cent were in most deprived state and 37 per cent were in moderately deprived state. In non deprived female households
Table-7.2

DISTRIBUTION OF HOUSEHOLDS BY LEVEL OF DEPRIVATION

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>ID</th>
<th>Forward Caste</th>
<th>Backward Caste</th>
<th>Scheduled Caste</th>
<th>Scheduled Tribe</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Most Deprived (12-15)</td>
<td>-</td>
<td>59 (46.00)</td>
<td>67 (48.00)</td>
<td>3 (75.00)</td>
<td>129 (43.00)</td>
</tr>
<tr>
<td>2.</td>
<td>Less Deprived (4-7)</td>
<td>9 (32.00)</td>
<td>17 (13.00)</td>
<td>11 (8.00)</td>
<td>-</td>
<td>37 (12.00)</td>
</tr>
<tr>
<td>3.</td>
<td>Moderately Deprived (8-11)</td>
<td>2 (7.00)</td>
<td>50 (37.00)</td>
<td>61 (44.00)</td>
<td>1 (25.00)</td>
<td>114 (38.00)</td>
</tr>
<tr>
<td>4.</td>
<td>Not deprived (0-3)</td>
<td>17 (61.00)</td>
<td>3 (2.00)</td>
<td>-</td>
<td>-</td>
<td>20 (7.00)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>28 (100.00)</td>
<td>129 (100.00)</td>
<td>139 (100.00)</td>
<td>4 (100.00)</td>
<td>300 (100.00)</td>
</tr>
</tbody>
</table>

Note: figures in parentheses present percentages to respective total

Source: Primary data
belonging to backward caste are 2 percent. The female labour households belonging to Scheduled Castes and Scheduled Tribe category were not found in not deprived state. It is also found that 75 per cent of the Scheduled Tribe female labour households and 48 per cent of the Scheduled Caste female labour households are found to be in most deprived state. Also, around 44 per cent of female labour households and 25 per cent Scheduled Tribe female labour households are found to be moderately deprived. Thus, the analysis reveals that a state of deprivation for the selected social indicators persists among all social group categories. However, a state of deprivation is found to be highest among Scheduled Tribe women households followed by Scheduled Caste and Backward Caste.

7.4 Factors influencing the households being poor

The logit model postulates that the probability of household being poor is dependent on socio-economic characteristics of the households. The Maximum-Likelihood Estimate of the model is presented in Table-7.3. The results show that the specified logit regression model is a good fit and significant. The co-efficient of determination $R^2$ is 0.75 indicate that the model is a good fit. The estimated co-efficient of the independent variables have yielded expected signs. The results indicate that literacy percentage, income and man-day of employment of households’ shows negative significant that it is one unit change in the negative and significant slope of co-efficient would decrease the probability of the respondents being poor for their appropriate percentages. The co-efficient of the independent variable age is positive and significant indicate that the change in the age decrease of
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Variables</th>
<th>Logit MLE Co-efficient</th>
<th>Standard error</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Intercept</td>
<td>5.023***</td>
<td>0.923</td>
</tr>
<tr>
<td>2.</td>
<td>Age</td>
<td>0.001**</td>
<td>0</td>
</tr>
<tr>
<td>3.</td>
<td>Literacy</td>
<td>-0.102</td>
<td>0.382</td>
</tr>
<tr>
<td>4.</td>
<td>Social status</td>
<td>0.282</td>
<td>0.281</td>
</tr>
<tr>
<td>5.</td>
<td>Income</td>
<td>0.321**</td>
<td>0.002</td>
</tr>
<tr>
<td>6.</td>
<td>Man-days of employment</td>
<td>0.141</td>
<td>0.215</td>
</tr>
</tbody>
</table>

Count $R^2$ 0.75

Number of observations 300

**Note:** * *, **, *** shows significant at 10 per cent, 5 per cent and 1 per cent level respectively

**Source:** Primary data
the probability of the respondents being poor. Similarly the co-efficient of the independent variable social-status was positive indicate that the probability of household belonging to Scheduled Castes and Scheduled Tribe Categories to be poor and non Scheduled Castes and Scheduled Tribe categories respondents were non-poor. However the relationships are not significant indicate that social status of the respondents could not influence their probabilities of being poor. This implies that the probability of a respondent being poor would be influence by the variables considered in the model except that of social status of the respondent.

To sum up, Composite Index of standard of living reveals that the Index levels were lowest in Scheduled Tribe category households which are 32 per cent and it was higher in forward caste category household followed by Schedule Caste category and Backward Caste category. Nearly 80 per cent of the scheduled tribe and 70 per cent of the backward caste classes have low standard of living both economic and social aspects. The standard of living was lower in Scheduled Tribe household category as compared to other categories of sample households both economic and social activities. The Index of deprivation computed using the scoring technique reveals that around 43 per cent of the total sample female labour households are most deprived state. It is also found that 75 per cent of the Scheduled Tribe female labour households and 48 per cent of the Scheduled Caste female labour households are found to be in most deprived state. However Scheduled Tribe households are found to be more deprived. The co-efficient of determination $R^2$ is 0.75 indicate that the model is a good fit. The logistic
regression model reveals that estimated co-efficient found to be a good fit. The estimated co-efficient implies that the probability of respondents being poor influenced by the variables considered by the model.