Chapter 3

Research Methodology

Introduction
The following research methodology was adopted to realize the predetermined objectives of the study:

Nature of the Study
The nature of present research is descriptive in nature and based on survey method. Further, all farmers of the country has constituted the universe of the study, while the sample unit of the study is a farmer. At the macro level, the analysis was carried out using secondary data which were taken from the various NSSO Rounds surveys, publications of the Reserve Bank of India (RBI), publication of Central Statistical Organization, and Ministry of Agriculture (GOI) reports. But, some new facts about the status of farmers in context of financial inclusion are not available in the above cited sources; therefore primary data was used to through light on some facts of the farmers’ financial inclusion, which were collected through a field survey with the help of structured questionnaire in the State of Haryana.

Sampling Method
The study used stratified method of sample selection and four stages sampling process (i.e., in first stage researcher have selected the districts on the bases of agriculture development index, in second stage researcher have selected blocks from the districts (two block from each district), in third stage researcher have selected the villages (one village from the blocks of the each districts) and finally selected a sample of three hundred farmers (one hundred from each blocks)). Out of three hundred farmers, one hundred and twenty were marginal, ninety were small, sixty were semi-medium and thirty were large farmers and the proportion of the farmers has 40:30:20:10 of each blocks.

Further, the categorizations of farmers were made on the basis of possession of land size. A farmer is assumed to be a marginal if possessing land size of below 1.00 acre; small if land
size is between 1.01 to 2.00 acres; semi-medium if land size is between 2.01 to 4.00 acres; and large if land size is more than 4.01 acres.

### Box 1.1
Location of the Samples and No (s)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Districts</th>
<th>Level</th>
<th>Blocks</th>
<th>Villages</th>
<th>Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>JHAIJAR</td>
<td>MD</td>
<td>JHAIJAR</td>
<td>KABLANA</td>
<td>40:30:20:10 M:S:ME:L</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>BAHADURGARH</td>
<td>DULHERA</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>JIND</td>
<td>HD</td>
<td>UCHANA</td>
<td>LODHAR</td>
<td>40:30:20:10 M:S:ME:L</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JULANA</td>
<td>RAJGARH</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>KANINA</td>
<td></td>
</tr>
</tbody>
</table>

Note: MD: Moderate Developed, HD: High Developed and LD: Less Development, Marginal, Small, Medium and Large Farmers.

### Data Analysis Methods
The study used CAGR method for calculating the growth, Regression (Macro Level) and Tobit Models (Micro Level) to study the determinants of financial inclusion of the farmers and a Financial Inclusion Index (FII) has also been constructed to find out the disparity of financial inclusion of farmers among States and Regions of the country. Further, to create the FII for farmers the ‘M-L’ Index methodology was adopted, descriptions of these statistical tools are given below:

#### Compound Average Growth Rate (CAGR)

The Compound Average Growth Rate has compounded by employing formula:

\[ Y = ab \]

By using logarithm, it may be written as:

\[ \log y = \log a + t \log b \]

\[ Y^* = a^* + t.b^* \]

(where \( \log y = y^* \), \( \log a = a^* \) and \( \log b = b^* \))

The value of \( b^* \) is computed by using OLS Method. Further, the value of ACGR can be calculated by followed method:

\[ ACGR = (\text{Antilog } b^* - 1) \times 100 \]

#### Regressions Model

The Regressions Equation represents a logical extension between two or more variables. Instead of one or more than one independent variables and one dependent variable is used to estimate the values of a dependent variable. The regression equation describes the averages
relationship between variables and this relationship is used to predict or control the dependent variables. The formula for calculating multiple regressions as follow:

The general form of the regression equation is

\[ Y = a_0 + a_1X_1 + a_2X_2 + \ldots + a_nX_n + \epsilon \]

Where

- \( X_1, X_2 \) etc are regressor variables,
- \( a_1, a_2 \) and so on are the parameters to be estimated from the data and \( \epsilon \) is the error term following classical OLS assumptions i.e., the deviations of \( \epsilon \) is assumed to be independent and normally distributed with mean 0 and standard deviation (\( \sigma \)).

Tobit Model

Tobit model is preferred when the dependent variable is censored so as to avoid the loss of information. Tobit model used in the study was of the form:

\[ Y_i = X_i \beta + \epsilon_i \]

Where,

- \( Y_i \) is the share of institutional credit in total borrowings of the farming households.

Thus, the value of the dependent variable ranges between 0 and 1 OR 0 to 100 Per cent. The vector \( X_i \) represents explanatory variables used in the regression analysis. The explanatory variables include in the model have: \( X_1 \) = Education (No. of Years of Schooling), \( X_2 \): Economic Status (as a BPL or APL), \( X_3 \): Income (In Rs.), \( X_4 \): Gender of Household Head (Female = 1, otherwise = 0), \( X_5 \): Age of the Head (In Years) and \( X_5 \): Size of Land (In Acre) and \( \epsilon_1 \) (Error- term).

Financial Inclusion Index (FII) of Farmers in India

The study used Composite Score Methodology to construct the Farmers Financial Inclusion Index (FII) and it used to measure the disparity among States and Region of the country. The Weighted Composite Score Method was proposed by the Morris and Liser (1977) here after know as 'M-L.' Method and used by Mukherjee (1980), Iyengar and Sudarshan (1982). Under this procedure i.e., M-L method one Composite Development Index (CDI) is computed as a weighted average of sectoral components from a multivariate data set were the
weights vary inversely to the variation of the sectoral components.\(^1\) The detail of methodology is given below:

Let \(X_{ij}\) represent the value of the \(i\)th infrastructural development indicator in \(j\)th State/Region \((i = 1, 2, 3, \ldots, 17; j = 1, 2, 3, 4, \ldots, 27)\). Let us write

\[
Y_{ij} = \frac{X_{ij} - \bar{X}_j}{\text{Min}_j - \bar{X}_j} \\
\text{............(1)}
\]

Where \(\text{Min}_j\) and \(\bar{X}_j\) are the minimum and maximum of \(X_{ij}\) respectively. However, if \(Y_{ij}\) is negatively associated with the status of development, equation (1) can be written as:

\[
Y_{ij} = \frac{\text{Min}_j - X_{ij}}{\text{Min}_j - \bar{X}_j} \\
\text{............(2)}
\]

Obviously, the scaled values, \(Y_{ij}\) vary from zero to one.\(^2\)

From these, scaled values, \(Y = \{Y_{ij}\}\), we may construct sectoral component indices. Equal weights have been assigned to the indicators within each sector. Accordingly four sectoral components, viz., Farmers Financial Inclusion Index (FFII).

Finally, the Composite Farmers Financial Inclusion Development Index (CFFIDI) has been computed for different states as:

\[
\text{CFFIDI} = W_1 \text{ Access} + W_2 \text{ Depth} + W_3 \text{ Uses} + W_4 \text{ Cost of Credit} + W_5 \text{ Insurance} \\
\text{............(3)}
\]

Where, the weights \(W_i\) vary inversely as the variation in the respective sectoral components of composite Development Index of the state subject to the condition.

\[0 < W_i < 1\text{ and } W_1 + W_2 + W_3 + W_4 + W_5 = 1\]

Such that,

\[
W_i = \left[\sum_{j=1}^{27} X_{ij}\right]^{-1} \\
\text{............(4)}
\]

Where,

\[
K = \left[\begin{array}{ccc}
X_{11} & \cdots & X_{17} \\
\vdots & \ddots & \vdots \\
X_{17} & \cdots & X_{27} \\
\end{array}\right]^{-1} \\
\text{............(5)}
\]

\(^1\) The principal component analysis assumes that the variable indicators are linearly related. When non-linearity is present method is more appropriate.

\(^2\) The transformation employed here has a meaning of development, which is always a relative concept.
Components of Financial Inclusion Index for Farmers

To constructing the FII for farmers, we have considered Total Nine Variables and further all the variables has been categorized into Five Sub-parts (i.e., Access, Depth, Use, Cost and Insurance (Proxy taken as a Health Insurance)).

1 **Access:** to study the farmers access we considered No. of bank branches per 100000 people in context of rural areas as a proxy of access.

2 **Depth:** to study the depth of farmers in context of financial inclusion we have considered farmers access to bank account only in banks (either commercial, cooperative and RRBs), institutional credit, farmers access to KCC, and farmers’ access to JLGs.

3 **Uses:** to study the uses of financial services by the farmers we have taken C-D-Ratio of commercial banks in rural areas, average amount taken per KCC and JLGs Scheme in the State.

4 **Cost of Credit:** to study the cost we have consider average cost of institutional and non-institutional sources of credit in the State.

5 **Insurance:** in this context we have considered health insurance as a proxy of access to insurance.

**Scope of the Study**

The study is useful for the policy makers to making the effective financial inclusion policy in general and farm households in particular and it also highlights the effectiveness of the current policy of financial inclusion and it will suggest possible amendments in the current policies of the country in the same context.

**Chapter Scheme of the Study**

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Append References