CHAPTER IV
MATERIALS AND METHODS

NATURE AND SCOPE OF ENQUIRY:

The study was conducted in Karchana tehsil of Allahabad district. This tehsil was purposely selected. The multi-stage stratified random sampling technique were used to select the bank branches, villages, and respondent farmers. There are several farm financing institutions and other branches operating in the area under study viz. major banks are State Bank of India (5), Bank of India (1), Allahabad District Cooperative Bank (4), Land Development Bank (1), United Bank of India (1), Union Bank of India (1), Allahabad Krishi Gramin Bank (1), United Commercial Bank (1), and Punjab National Bank (1). The study was confined only to the Agricultural Development Branches of State Bank of India working in the area under study. The whole sampling designed at various stages were as follows:

Selection of Tehsil:

Allahabad district comprises of nine tehsils. Out of the nine tehsils Karchana tehsil of Allahabad district was selected purposely and on account of convenience involvement in the data collection because it is well within the reach of the researcher, available time and other resources at this command.
Selection of Bank

The Agricultural Development Branches of State Bank of India play an important role in providing short term loans to the needy farmers in the area under study. Consequently, a large number of farmers of this tehsil have obtained short term and long term loans through the Agricultural Development Branches of State Bank of India. The amount and account of short term loans advanced by Agricultural Development Branches of State Bank of India was highest in the area under study.

In Karchana tehsil, 5 branches of State Bank of India are functioning out of which three branches are supplying short term crop loans for agricultural development. The three branches (A.D.B.) of State Bank of India were selected for the study viz. (Karchana, Maini and Karma Branches).

Selection of Villages:

A list of the villages and farmers receiving short term loan advanced from the branches were obtained from the Field Officers of A.D.B. of State Bank of India. The villages were then arranged in the ascending order of magnitude of their farm intensive advance of credit in each branch. 20% villages were selected by stratified random sampling technique from each branch as per the time and convenience of the researcher. This worked out to be 10 villages of
the total number of villages in all the three A.D.B. of State Bank of India in Karchana tehsil. These 10 selected villages are as follows viz. Karchana village, Puchdeva, Dari, Amelia, Chisti, Karma, Balampur, Hathgani, Chilla and Champatpur.

**Selection of Farmers:**

A list of the farmers of these ten randomly selected villages was prepared separately. The farmers were then arranged in the ascending order of magnitude of their size of holdings and were divided into their size groups. Small, medium and large groups on the basis of holdings.

1. Small size - operational holding below 2 hectares.
2. Medium size - operational holding from 2 to 4 hectares and
3. Large size - operational holding above 4 hectares.

Three farmers from each size group were selected on random sampling basis in each village. From the 10 randomly selected villages, 30 small, 30 medium and 30 large size farmers were selected randomly. Thus 90 farmers were selected for the present study in all the three size groups. The study pertained to the agricultural year 1983-84. The data were pooled and arranged. A typical situation representing the average resource availability from each size group was selected for detailed study.
Three optimum farm plans were developed for each of the three typical representative farms using the budgeting technique. The optimum farm plans were developed under the following situations:

Plan - P1: This is the present plan followed by the farmers. The main aims of analysing this plan was to know whether the farmers of the different size groups have their own funds sufficient to meet the capital needed for the adoption of present as well as the new technology.

Plan - P2: This plan represents the optimum cropping plan at the existing level of technology when the capital restriction is relaxed. The credit requirement of this plan compared with the previous plan (P1) gives an estimate of additional credit which can be absorbed in the farm business by changing the crop mix so as to maximise the net return. This would reveal the impact of managerial input in forming on the farm credit needs.

Plan - P3: This plan represents the optimum plan at the improved level of technology with the provision of borrowing of necessary credit. This provides an estimate of optimum credit needs of the different size of class of farmers to adopt new technology. Plan P3 compared with P2 gives an estimate of additional credit required to switch over to new technology from the existing techno-
logy, whereas the comparison of Plan P3 with Plan P1 gives an estimate of credit requirement due to the change in both organization and technology.

Per hectare capital requirements of different enterprises of kharif and rabi seasons were worked out. The then included in capital requirements are seeds and manure (whether purchased or farm produced), fertilizers, irrigation (electricity charges, fuel and oil), labour (permanent, hired, casual labour and also the imputed value of family labour). Insecticides and pesticides and miscellaneous charges (custom charges cost of credit and the interest of the value of all the above cost except imputed value of family labour, for a crop season. The enterprises budgets were prepared separately at the existing level of technology includes the value of all inputs actually used by the farmers, whereas at the improved level of technology the inputs and their levels recommended by the department of agriculture for each crop of the area were considered.

While working out the credit requirements at the improved level of technology, present cash holding (subsequently referred as cash owned) of the farmers were subtracted from the total capital requirements for the farm. Per hectare capital and credit required were worked out by dividing the total per farm capital and credit requirement
by the size of holdings.

Collection of Data:

The enquiry pertains to A.D.B. of State Bank of India in agricultural finance programme in Karchana tehsil of Allahabad district of Uttar Pradesh.

The data to be used in the study was of two types:

1. Primary data: Survey method was used for the collection of primary data. The selected farmers were personally contacted by the researcher and the relevant data were obtained with the help of pre-tested family schedule and questionnaire. The schedule used for the purpose are obtained.

2. Secondary data: Secondary data were collected from A.D.B. of State Bank of India, Blocks, Districts Headquarters, Public report and Journal etc.

Method of Enquiry:

Survey method was used for collection of data from the selected farmers with the help of schedules and questionnaires of enquiry made for the purpose. Data collected with the help of schedules were through Direct Personal Investigation in November and April months in 1983-84.

Analytical Tools:

Suitable statistical and tools were used for the analysis. Interpretation of data. The farm planning and
budgeting techniques were used for the estimation of credit needs. Production function analysis was carried out to measure the efficiency. Different farm inputs including credit used in the process of agricultural production in the area. Besides the coefficient of correlation measures of dispersion and other statistical tools were used for the present study.

Budgeting technique were used to analyse the data. Credit requirement were estimated by developing an optimum plan (improved plan) through budgeting technique.

**Method of Analysis:**

Tabular method and the production function analysis are used for economic analysis of input-output relationship. In tabular analysis cost and production are critically examined. Cost A, Cost A₂, Cost B and cost C are calculated. The total of cultivation are distributed in fixed and variable cost and production. The output are proportionately distributed on the basis of main product and by product. The input and output ratio are tabulated from cost of production. The production function analysis are used to find out the exact contribution of different input factors to yield. The advantage of Production Function Analysis lies in the fact that it provided a clear exposition leading to a variety of general result of action of the farm. The
Production Function Analysis are one way of describing the decision taking activities of farm on simplified and approximate.

**Selection of Variables:**

After having selected the mathematical form of Production Function, next comes the problem of selection of variables.

In practice, it is not flexible to identify the group input and output into strict homogenous categories. Hence, isolating such aggregate, a primary knowledge of production relationship is needed and responses of a given aggregation may be tested on the basis of correlation analysis.

**Production of Input:**

The Cobb Douglas Production Function of the following form was used:

\[ y = \text{Ax}^b_1 \times \text{x}^b_2 \times \ldots \times \text{Xn}^b_n \]

Where \( y \) is the dependent variable and \( x_1 \) through \( Xn \) are explanatory variables 'a' is a constant and \( b \), through \( bn \) are the regression co-efficient for \( x_1 \) through \( Xn \) factor of production respectively.
The Cobb Douglas Production Function was conducted to the logarithmic forms, so that it was fitted by using least square method.

\[ \log y = \log a + b_1 \log x_1 + b_2 \log x_2 - \cdots - bn \log x_n \]

The gross value of the crop output (in rupees) was estimated at harvest price.

**Independent Variable:** (for all the three categories)

- \( X_1 = \) land (in hectares)
- \( X_2 = \) crop loam (in rupees)
- \( X_3 = \) imputed value of family labour (in rupees)
- \( X_4 = \) explicit cost (wages of hired human labour, value of bullocks, irrigation charges, miscellaneous charges and land revenue).
- \( X_5 = \) implicit cost (interest on working capital - 10\% and depreciation of fixed capital) value in rupees.
- \( X_6 = \) value of owned land and interest on owned fixed capital (excluding land).
- \( X_7 = \) family and hired labour (in man equivalent days)

**Estimating Models:**

Based on the selected variables a set of linear function model was fitted for each size group in the equal year 1983-84. The specification models was under models. For small, medium and large size groups.
1. \( y = a + b_1 x_1 \)
2. \( y = a + b_1 x_1 + b_2 x_2 \)
3. \( y = a + b_1 x_1 + b_2 x_2 + b_3 x_3 \)
4. \( y = a + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 \)
5. \( y = a + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 \)
6. \( y = a + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 + b_6 x_6 \)
7. \( y = a + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 + b_6 x_6 + b_7 x_7 \)

**Cost Concept and Measure of Farm Profit:**

**Cost Analysis:** The following cost concepts adopted in different Farm Management Studies have also been used in the present study.

**Cost A1:** This includes wages of hired human labour, bullock labour, cost of seed, manures and fertilizers, plant protection materials, irrigation charges, land revenue and depreciation on working expenses.
Cost A2: This includes Cost A1 + rent paid for the leased in land.

Cost B: This covers cost A2 and rental value of owned land + interest on fixed capital.

Cost C: Cost B + imputed value of family labour. Cost C is equivalent to total cost of cultivation.

Farm Income Analysis:

Besides the above cost concepts, four measures of farm returns have been estimated viz. net income, family labour income, farm business income and farm investment income.

Net Income: Gross income - Cost C.

Family labour income: Gross Income - Cost B.

or Net Income + Imputed value of family labour.

Farm Business Income: Gross Income - Cost A1

or Cost A2 in case of leased in land

or Net income + Imputed value of family labour + Interest on fixed capital + rental value of land.

Farm Investment Income:

Farm business income - imputed value of family labour. Other measures such as input - output ratios and cost benefit ratios are also calculated.
Economic feasibility tests: Economic feasibility tests are also applied to evaluate the three R's of credit:

1. **Returns:** This is the first test, to observe the soundness of any credit proposal. The purpose is to see whether the net returns from the farm enterprise would be adequate to repay the borrowed amount.

2. **Repaying Capacity:** It considers not only returns but also other commitments of the borrower. Repaying capacity = net farm income + non agricultural income - family expenditure + repayment of past loans

3. **Risk Bearing ability:** This is the third test of economic feasibility of a credit proposal. These variations, due to uncertainty of production and possible prices are to be essentially considered to minimize the error in expected repayment capacity, under a suggested new plan (Typical Plan). Thus risk bearing analysis is the pivot of this test in which a margin is to be left for these variations.