Chapter 4

Research Methodology

The deliberation on the methodology has been made to understand to concept, methods and techniques which utilized to design the study, collection of information, analysis of the data and interpretation of the findings for revelation of truths and formulation of theories. This present chapter deals with the method and a procedure used in the study and consists of eight main parts.

1. Locale of research	2. Sampling techniques
3. Pilot study	4. Preparation of interview schedule
5. Pre-testing of schedule	6. Techniques of field data collection
7. Attributes and their measurement	8. Statistical tools used for data analysis

1. Locale of research

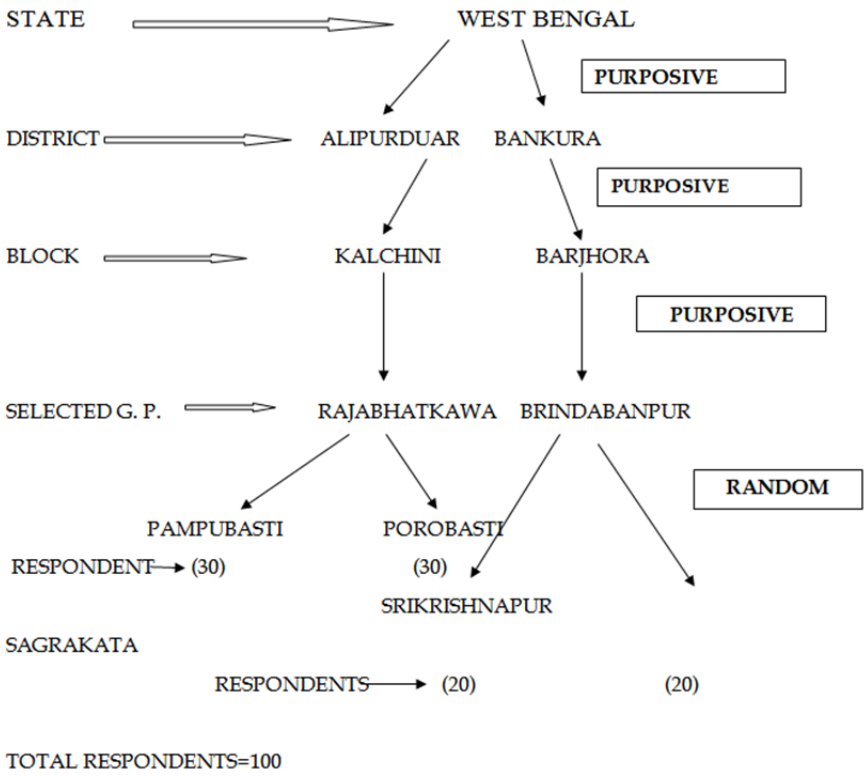
Four villages namely Pampubasti, Porobasti, Sagrakata and Srikrishnapur of the Alipurduar district and Bankura district in West Bengal was selected for the study. The area had been selected for the study because of (a) This are forest fringe area, (b) Acquaintance with the local people as well as the local language and (c) Provision of relevant information.

2. Sampling techniques

Purposive as well as simple random sampling techniques were adopted for the study. For selection of state and district purposive sampling techniques was adopted because the area was ideal with respect to the problem, convenient for researcher and having the infrastructural facilities and in case of selection of block, villages and farmers or respondents simple random sampling technique was taken up.

- **SAMPLING DESIGN**

Diagrammatic Representation of Sampling Technique and Sampling Design



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3. Pilot study

Before taking up actual study a pilot study was conducted to understand the areas, it people, institutions. Basis of situational and background information of respondents were collected during the period of pilot study.

4. Preparation of the Interview schedule

On the basis of findings of pilot study a preliminary interview schedule was formed with the help of literature, discussion by the assistance of Chairman of Advisory Committee. The interview schedule consisted of two major parts according to the specific objectives of the study.

5. Pre-testing of schedule

Before starting final data collection, entire schedule was pretested for elimination, addition and alternation with non-sample respondents of the study area.

6. Techniques of field data collection

The total 4 villages were personally interviewed during puja vacation and summer vacation. The items were asked in Bengali as well as English version in a simple term so that the members could understand easily. The entries were done in the schedule by student investigator himself at the time of interview.

7. Attributes and their measurement

After reviewing various literature related to the field of study and consultation with the respected chairman of Advisory Committee and other experts, a list of variables was prepared. On the basis of selected variables, a schedule was formed.

Independent Variables

1. **Age (X_1)**

Chronological age has been considered for the study.

2.Caste(X_2)

The attribute caste had been operationalised as the caste category of the social system that is scheduled caste, lower caste, artisan caste, agricultural caste, prestige caste and dominant caste according to the caste category,it had been weighed by giving the weightage as : Scheduled caste –(1), lower caste –(2), General caste –(3), Agriculture caste –(4), Brahmin caste – (5), Dominant caste –(6) for its measurement. The scale has been developed by Pareek and Trivedi (1964).

3. **Occupation(X_3)**

Structured schedule was developed to quantify the Primary occupation of the respondents. The Primary occupation had been further divided in to six categories of the social system that is labour, caste occupation, business, independent profession, cultivation and service. It had been measured with the help of development of Pareek and Trivedi (1964) scale is socio-economic status (rural) and the weightages had been given as Labour –(1), Caste occupation –(2), Business –(3), Independent profession –(4), Cultivation –(5) and Service –(6).

4. **Education(X_4)**

The attribute education had been operationalished as the formal education, taken by the respondent in a particular social system. The education had been divided into seven categories that is Illiterate, can read only, can read and write, primary, secondary, higher secondary, graduate and above. It had been measured with the help of scale developed by Pareek

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and Trivedi (1964) scale is socio-economic status (rural) and the weightages had been given as Illiterate –(0), Can read only –(1), Can read and write –(2), Primary –(3), Secondary –(4), Higher Secondary (5), Graduate and Above –(6).

5. Family Type(X_5)

The attribute family type had been operationalished as the family type of our rural system. The family type had been divided in to two categories of the social system that is Nuclear family and Joint family. It had been measured with the help of development of Pareek and Trivedi (1964) scale is socio-economic status (rural) and the weightages had been given as Nuclear family – (1) and Joint family – (2).

6. Family Size(X_6)

The attribute family size had been operationalished as the family size of our rural system. The family size had been divided in to two categories of the social system that is upto 5 members and above 5 members. It had been measured with the help of development of Pareek and Trivedi (1964) scale is socio-economic status (rural) and the weightages had been given as Upto 5 members – (1) and Above 5 members – (2).

7. Land Holding (X_7)

The attribute land holding had been operationalished as the land holding of the respondent in the social system. It had been measured with the scale developed by the Pareek and Trivedi (1964) and weightages as the no land, less than one acre, 1-5 acre, 5-10 acre, 10-15 acre, 15-20 acre, more than 20 acre. Socio-economic status (rural) and the weightages had been given as No land –(0), less than one acre –(1), 1-5 acre –(2), 5-10 acre –(3), 10-15 acre –(4), 15-20 acre –(5), more than 20 acre –(6).

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8. House Type (X_8)

The attribute house type had been operationalished as the house type of the respondent in the social system. It had been measured with the scale developed by the Pareek and Trivedi (1964) and weightages as the no house, hut, kutcha house, mixed house, pucca house, and mansion. Socio-economic status (rural) and the weightages had been given as No house –(0), Hut–(1), Kutcha house–(2), Mixed house –(3), Pucca house–(4), Mansion–(5).

9. Farm Power (X_9)

The attribute farm power had been operationalished as the farm power of the respondent in the social system. It had been measured with the scale developed by the Pareek and Trivedi (1964) and weightages as the no drought animal, 1-2 drought animal, 3-4 drought animal, 5-6 drought animal or tractor or power tiller. Socio-economic status (rural) and the weightages had been given as No drought animal –(0), 1-2 drought animal –(2), 3-4 drought animal –(4), 5-6 drought animal –(6), power tiller or tractor or–(8).

10. Sanitation

Sanitation status has been measured as availability of sanitation facility and un availability of sanitation facility of the farmer to know the healthy environmental condition of the respondent.

11. Asset Possession (X_{10})

The attribute Asset Possession had been operationalished as the material possession of the respondent in the social system. It had been measured with the scale developed by the Pareek and Trivedi (1964) and weightages as the radio, bicycle, Sprayer(1), Seed drill (1), Rice husking machine(2), mobile phone, T.V (6), Motor cycle (7). Socio-economic status (rural) and

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the weightages had been given as Radio – (1), Bicycle –(1), Sprayer -(1), Seed drill -(1), Rice husking machine -(2), mobile phone –(2), T.V -(6), Motor cycle -(7).

12. Outside Communication(X_{11})

The attribute Outside Communication had been operationalished as the Outside contact of our rural system. The Outside Communication had been divided in to five categories of the social system that is always, very often, sometimes, very few and never according to the access to City, District Headquarter. Sub divisional Town and Other Nearest City. It had been measured with the help of development of Pareek and Trivedi (1964) scale is socio-economic status (rural) and the weightages had been given as Always –(4), Very Often –(3), Sometimes –(2), Very few –(1) and Never –(0)

13. Planning orientation (X_{12})

Structured schedule was developed and score assigned to each respondent on the basis of 5 point scale to the statement strongly agree (5), agree (4), undecided (3), disagree (2) and strongly disagree (1). Summation of total score obtained by a respondent was taken into account.

14. Production orientation(X_{13})

Structured schedule was developed and score assigned to each respondent on the basis of 5 point scale to the statement strongly agree (5), agree (4), undecided (3), disagree (2) and strongly disagree (1). Summation of total score obtained by a respondent was taken into account.

15. Market orientation(X_{14})

Structured schedule was developed and score assigned to each respondent on the basis of 5 point scale to the statement strongly agree (5), agree (4),

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undecided (3), disagree (2) and strongly disagree (1). Summation of total score obtained by a respondent was taken into account.

DEPENDENT VARIABLES:

16. Income (Y_1)

Income of the respondents from all the sources has been considered. The unit of the income was expressed in terms of rupees.

17. Livelihood (Y2)

In this study only man days i.e. number of working days available in a year by the respondents in different activities have taken into account.

VII. **Analytical tools used:**

The data, after collection, were processed and analyzed in accordance with the outline laid down for the purpose at the time of developing the research plan. Processing implies editing, coding, classification and tabulation of collected data so that they are amenable to analysis. The term analysis refers to the computation of certain measures along with searching for patterns of relationship that exit among data groups.

8. Statistical tools used for data analysis:

The statistical methods used for analysis and interpretation of raw data were –

i. Mean
ii. Standard deviation
iii. Coefficient of variation
iv. Correlation of coefficient
v. Multiple Regression Analysis
vi. Paired t test
vii. Factor analysis

Mean

The mean is the arithmetic average and is the result obtained when the sum of the value of individual in the data is divided by the number of individuals

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in the data. Mean is simplest and relatively stable measure of central tendency. The mean reflects and is affected by every score in the distribution.

When the data are expressed in a frequency distribution (grouped), the mean calculated by the formula use was as follows –

$$X = \frac{\sum_{i=1}^{N} fixi}{N}$$

Where,

x = Mean of the observation

fi = Frequency of the class

xi = Mid value of the class

N = Total number of observation

Standard deviation

Standard deviation (SD) of a set of observation is the square root of the arithmetic mean of the squares of the deviations. The deviations being measured from the arithmetic mean of the distributions. It is commonly denoted by the symbol □ (Sigma). To measure the average deviation from the standard value of the data standard deviation is used. It is less affected by sampling errors and is a more stable measure of dispersion.

The standard deviation of the data grouped in the form of frequency distribution is computed by the formula use was as follows –

$$S.D. = \sqrt{\frac{\sum_{i=1}^{N} fixi^2}{N} - \left[\frac{\sum_{i=1}^{N} fixi}{N}\right]^2}$$

Where,

S.D. (□) = Standard deviation of the observation

fi = Frequency of the class

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xi = Mid value of the class

N = Total number of observation

Coefficient of variation

A measure of variation which is independent of the unit of measurement is proved by the coefficient of variation. Being unit free, this is useful for comparison of variability between different populations. The coefficient of variation is standard deviation expressed as percentage of the mean.

Coefficient of variation is measured by the formula use was as follows –

$$C.V. = \frac{S.D.}{Mean} \times 100$$

Correlation of coefficient

When an increase or decrease in one variety is accompanied by an increase or decrease in other variety, the two are said to be correlated and the phenomenon is known as correlation. Correlation coefficient (r) is a measure of the relationship between two variables, which are at the interval or ration level of measurement and are linearly related. A person product-moment "r" is computed by the formula.

$$r_{xy} = \frac{N\sum XY(\sum X)(\sum Y)}{\sqrt{[N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}}$$

Where,

X and Y	=	Original scares in variables X and Y
N	=	Number of paired scores
∑XY	=	Each X multiplied by its corresponding Y, then summed
∑X	=	Sum of X scores
∑X²	=	Each of X squared, then summed
(∑X) ²	=	Sum of X score squared
∑Y	=	Sum of Y scores

$\sum Y^2$ = Each of Y squared, than summed
$(\sum Y)^2$ = Sum of Y score squared

The range of correlation coefficient is between -1 to + 1. This means that -1 is perfect negative correlation, + 1 is perfect positive correlation. A perfect correlation is, however, seldom achieved. An idea of positive and negative correlation is given here. If the numbers of errors increase with increase in typing speed, it indicates positive correlation. If the numbers of correct words decrease with increase in typing speed, it is indicative of negative correlation. A correlation coefficient to be acceptable should be statistically significant. Otherwise, we say that no significant relationship exist between the variables.

Multiple Regression Analysis

Generally a number of antecedent variables simultaneously contribute or influence the consequent variable, as in the case under study. It is of immense practical value to know the extent to which the antecedent variables, individually or jointly, could predict or contribute towards the consequent variable. This was done by computing multiple regression. If Y is the consequent variable and X_1, X_2, X_3, …….. are the antecedent, the multiple regression equation is given by –

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 \ldots\ldots\ldots\ldots$$

or, $Y=a+\sum bx$

Where,

a = Intercept constant

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b = Regression coefficient

The significance of the b – values was judged by calculating their respective t – values and comparing them to the table values, given by Fisher and Yates (1963) with n – p – 1 degree of freedom (where, n = number of respondents and p = number of antecedent variables) at 5 per cent and 1 per cent levels of significance.

The square root of the ratio of the regression sum of squares to the total sum of squares is known as multiple correlation coefficient and is denoted by R. The square of the multiple corre1ation coefficient. R^2 is called the multiple coefficient of determination and represents the fraction of the variation of y accounted for by its joint association with the varieties X_1, X_2, X_3, Central to the application of multiple regression analysis is the interpretation of the final fitted mode. A significant F-value for R means that the fitted model is adequate. The significance of the F-value was judged by comparing it to the table value given by Fisher and Yates (1963) with p and n – p – 1 degrees of freedom (where, p = number of antecedent variables and n = number of respondents) at 5 per cent and 1 per cent levels.

The multiple regression analysis was done by following the procedure cited by Rangaswamy (1995).

Paired *t*- test

If there is any kind of correspondence between the individual values in the two samples, they should be paired and samples and differences taken and analysed as per formula,

$$t = \frac{\bar{d}}{S(\bar{d})}\ hhh$$ With n--1 df

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Where, $\bar{d}$ = mean of the differences in each pair

n = pairs of observation

$S\ (\bar{d})$ = standard error of $\bar{d}$

$= \sqrt{\frac{S^2}{n}}$

$$S^2 = \frac{1}{n-1} - \left[\sum d^2 - \frac{(\sum d)^2}{n}\right]$$

Factor Analysis

Factor analysis is a very useful and popular method of multivariate research technique, mostly used in social and behavioural sciences. According to Kothari (1996), factor analysis seeks to resolve a large set of measured variables in terms of relatively few categories, knows as factors. This technique allows the researcher to group variables into factors (based on correlation between variables), and the factors so derived may be treated as new variables (often termed as latent variables) and their value derived by summing the values of the original variables, which had been grouped into the factor. The meaning and name of such new variable is subjectively determined by the researcher. Since the factors happen to be linear combinations of data, the coordinates of each observation or variable is measured to obtain what are factor loadings. Such factor loading represent the correlation between the variable and the factor, and are usually placed in a matrix of correlations the variable and the factors. In the Factor Analysis the "Principle Component Method" was followed.

Concepts used in factor analysis

Some important concepts used in factor analysis are explained by Kothari (1996) as follows-

Factor-A factor is an underlying dimension that accounts for several observed variables. Factor is a hypothetical construct or classification. There may be one or more factors, depending upon the nature of the study and the number of variables involved in it.

Factor Loading – Factor loading are those values which explain how closely the variables are related to each one of the factor discovered. Factor loading work as key to understanding what the factor mean. It is the absolute size (rather the sign, plus or minus) of the loading that is important in the interpretation of a factor. Since the factors happen to be linier combination of data, the co-ordinates of each observation of variables is measured to obtain what are called factor loading. Such factor loading represent the correlation between the particular variable and the factor, and are usually placed in a matrix of correlation between the variables and the factor.

Analysis of data

The data of the present investigation with the help of the above mentioned statistical tools has been analyzed taking the support of the package SPSS (Var. 7.5).