Chapter

3

Research Methodology

The discussion on the methodology has been made to understand the concepts, methods and techniques, which are utilized to design the study, collect the information, analyze the data and interpret the findings for revelation of truth and formulation of theories. This chapter deals with the research methodology that had been adopted for the purpose of the present study. However, the entire discussion has been made under the following sub-themes:

i) Locale of study
ii) Sampling design
iii) Pilot study
iv) Variables and measurements
v) Method of data collection
vi) Statistical tools used for analysis and interpretation of data.

i) Locale of the study (research location):

Keeping in view the paucity of time, resources and current socio-political situation the present study was conducted at Villages 1Antulia,2 Babudanga,3

ISBN: 978-93-85822-50-6

Chapatala, 4Khaldharpara, 5Maheswarpur, 6Maniktala, 7Mollapara, 8Narpatipara, 9Santipalli, 10Sedordanga, 11Silinda, 12Tantulbere of Chakdaha Block. And Village 13Bahir Sonakhali of Haringhata Block. And Villages 14Baspur, 15Hardham, 16kaytetpara, 17Palit para, 18Rabonbor, 19Ushagram of Ranaghat-I Bblock. And 20Barbaria, 21Bholadanga, 22Borboria, 23Kanaipur of Ranaghat-II Block. And village 24Boyalia of Santipur Block. And villages 25Galakata, 26Ghurni, 27Gobrapota, 28Hijuli, 29Kulgachi, 30Pansepara, 31Sandhayapara of Krishnagar-I block of West Bengal. The district, block and village were selected purposively due to the following reasons:

a. The research's close familiarity with respect to area, people, their culture and local dialects.
b. The concerned areas are easily accessible to the researcher in term of transportation and place of residence.
c. The opportunity of getting good response from the respondents
d. The study will help the researcher in future for conducting various extension programme and activities if he serves the agricultural department of state in future.

ii) Sampling design

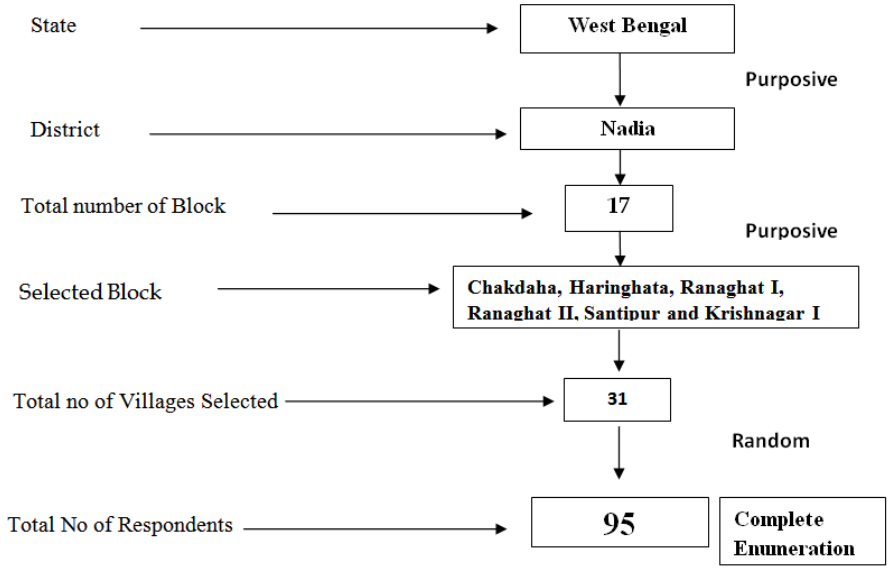
The purposive as well as simple random sampling techniques were adopted for the present study. It may be termed as multistage random sampling procedure. The districts, blocks and villages were purposively selected for the study. The Nadia district and the block Chakda, Haringhata, Ranaghat-I, Ranaghat-II, Santipur, Krishnagar-I were considered. Under the Chakda Block Antulia, Babudanga, Chapatala, Khaldharpara, Maheswarpur, Maniktala, Mollapara, Narpatipara, Santipalli, Sedordanga, Silinda, Tantulbere villages were selected. Under the Haringhata Block Bahir Sonakhali Village was selected. Under the Ranaghat-I block Baspur,

ISBN: 978-93-85822-50-6

Hardham, kaytetpara, Palit para, Rabonbor, Ushagram Villages were selected. Under the Ranaghat-II block Barbaria, Bholadanga, Borboria, Kanaipur villages were selected. Under Santipur block Boyalia village was selected. Under the Krishnagar-I block Galakata, Ghurni, Gobrapota, Hijuli, Kulgachi, Pansepara, Sandhayapara villages were selected From Nadia District. Out of those villages 95 respondent have been selected out of total populations of those villages. This was rather a disproportionate random selection of respondent.

FLOW CHART ON SAMPLING METHOD:

Diagrammatic Representation of Sampling Technique and Sampling Design
(Purposive as well as Random sampling)



iii) Pilot study

A pilot study was conducted in the selected villages before constructing the data collecting Schedule. In course of this survey informal discussion was carried out with some Gobinda Bhog growers and other resource persons of the localities. An outline of socio-economic background of the farmers of the

ISBN: 978-93-85822-50-6

concerned villages, their opinion towards different types of technology socialization process, adoption, discontinuance, rejection and re-invention were obtained that helped in the construction of reformative working tools.

iv) Variables and their measurement

Several researchers pointed out that the behaviour of an individual was understood more in depth if one has the knowledge of some variables, which comprised the constructed world of reality within which an individual received the stimuli and acts. The socio-personal, agro-economic, socio-psychological and communication variables are such type of variables, which determine the behaviour of an individual. Appropriate operationalisation and measurement of the variables help the researcher to land upon the accurate conclusion. Therefore, the selected variables for this study had been operationalised and measured in following manner:

Independent variables

Socio-personal variables

Education (X_1):

Education is the factor that has been conceived in terms of acquisition of knowledge and skill formality in school. The values ascribed the class in which he or she studied or studying.

Family size (X_2):

It denotes the total number of persons living in the respondents' house under a single household.

Agro-economic variables

Total Land holding (x_3):

It is defined in term of total holding area of the land in hector held under family ownership of Homestead + Cultivable land + leased in.

Area under Gobinda Bhog (x_4)

The mass of land area under Gobinda Bhog cultivation measured in term of hector.

ISBN: 978-93-85822-50-6

Ag-Income (x_5):
The grossed income is constituted by the total income generated from the farming activities. It is measured in tem of rounded of rupees/hector/annum.

Annual-income off farm (X_6):
The yearly income other than farm activity and it is measured in term of rupees.

Annual income (X_7):
The grossed income is constituted by the total income generated from the farming and off farming activities. It is measured in tem of rounded of rupees/annum.

Annual expenses (X_8):
The grossed expenses constituted by the total expenses generated by the family members in annum. It is measured in tem of rounded of rupees/hector/annum.

Loan amount (X_9):
The yearly generated loan by the family members for the farming and the off farming activity and it is measured in term of rupees/annum.

Save amount (X_{10}):
The yearly saved amount by the family members raised from expenses and it is measured in term of rupees/annum.

Economic status (X_{11}):
The economic status of farmer was measured with the help of some components of socio-economic status (Pareek and Trivedi, 1964). The 6 items are cattle, bull, calf, goat, bird, and duck. The score assigned as in the case mentioned in the interview scheduled.

Plant hill% (X_{12}): The plant hill of gobinda bhog rice plantation was measured with the help of some components of socio-physiological status. The score assigned as in the case mentioned in the interview scheduled.

ISBN: 978-93-85822-50-6

Seedling age (X_{13}):
The seedling age of gobinda bhog rice plantation was measured with the help of some components of socio-physiological status. The score assigned as in the case mentioned in the interview scheduled in terms of Days.

Nitrogen Dose (X_{14}):
The applied dose of nitrogen fertilizer in the gobinda bhog's field is measured subtract from the recommended dose=30, the score assigned as in the case mentioned in the interview schedule.

Phosphate Dose (X_{15}):
The applied dose of Phosphate fertilizer in the gobinda bhog's field is measured subtract from the recommended dose=15, the score assigned as in the case mentioned in the interview schedule.

M.O.P total (X_{16}):
The applied dose of M.O.P fertilizer in the gobinda bhog's field is measured subtract from the recommended dose=15, the score assigned as in the case mentioned in the interview schedule.

Expense wage (X_{17}):
In financial accounting, wage expense represents payments made to non-manufacturing employees, regardless of whether they are hourly or salaried. Depending on the presentation, this line item may also include payroll tax expenses and other benefits paid to employees. Wage expense is recorded as a line item in the expense portion of the income statement in terms of Rs .

Dependent variables
The appropriate operationalisation and measurement of the predicted variables help in concluding the study in a proper manner. This is a very interesting area of work in measuring the variables after conceptualizing them.

ISBN: 978-93-85822-50-6

Socialization Index-weed (Y_1):
A weed is a plant out of place not intentionally sown, whose undesirable qualities outweigh its good points. Some crop plants even can become weeds when they grow where they are not wanted. The effective socialization Index with face to the problem with 1st weed of gobinda bhog rice cultivation by the respondents. It is measured in terms of days mentioned in the interview schedule.

Socialization Index-Yield (Y_2):
Yield is the important significant socialization index to measure the re-socialization of Gobinda Bhog rice. The effective cultivated rice should bring the desire result through productivity called yield through which can measure the level of adoption, rejection, discontinuance.

Socialization Index- Irrigation (Y_3): irrigation is the artificial application of water to the land or soil. It is used to assist in the growing of gobinda bhog, and during periods of inadequate rainfall. Additionally, irrigation also has a few other uses in crop production, which include protecting plants against frost,[1] suppressing weed growing in grain fields[2] and helping in preventing soil consolidation.[3] In contrast, agriculture that relies only on direct rainfall is referred to as rain-fed or dryland farming. Irrigation systems are also used for dust suppression, disposal of sewage, and in mining. Irrigation is often studied together with drainage, which is the natural or artificial removal of surface and sub-surface water from a given area. The score assigned as in the case mentioned in the interview scheduled in terms of Rupees/annum.

Rate of Paddy (y4)
Rate of paddy here its mean that gobinda bhog rice in the market for selling. It should be in the local market or in the wholesale market, farmers are got to sale their produced rice or the produced and processed rice. Through the

ISBN: 978-93-85822-50-6

rate of paddy the socialization index should be effected by the Socialization of Gobinda bhog.

Marketing Surplus: Marketable surplus is the portion of a harvest that a farmer can sell on the market to earn a profit. With this profit she can reinvest into farming operations by purchasing more land or better farming equipment. He may also simply save this profit or use it to purchase personal items in terms of rupees.

Socialization Index (Y):

Socialization index actually it mean to the level of socialization, the ultimate consequent variable has been measured as follows:

$$\frac{Y_1+Y_2+Y_3+Y_4+Y_5}{5}$$

Techniques of data collection

The primary data in the present study were collected directly from the farmers with the help of structured schedule through personal interview methods. Only the functional head of the household were taken as respondents for the study.

Statistical tools used for analysis and interpretation of data.

After collection of data, data 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. The main Statistical techniques and tool used in the present study-

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 in the data. Mean is the simplest and relatively stable measure of central

ISBN: 978-93-85822-50-6

tendency. The mean reflects and is affected by every score in the distribution. Thus, extreme scores affect the mean.

Calculation of mean from grouped data

When the data are expressed in a frequency distribution (grouped), the mean calculated by the formula.

$$\bar{x} = \frac{\sum f x}{N}$$

Where,

$\bar{x}$ = mean of the distribution

f = frequency of the class

x = class value of midpoint of the class internal

N = number of observations

Standard deviation

Standard deviation is the square root of the arithmetic mean of the squares of the deviations, the deviations being measured from the arithmetic mean of distribution. It is commonly denoted by the symbol sigma. It is less affected by sampling errors and is more stables measure of dispersion. The Standard deviation of the data grouped in the form of frequency distribution is computed by the formula-

$$a = \sqrt{\frac{\sum f_i d^2}{N}}$$

Where,

I = frequency of the class

d = deviation of the mid-value of the class from the population mean

N = total number of observations.

Coefficient of variation

A measure of variation which is independent of the unit of measurement is provided by the Coefficient of variation. Being unit free, this is useful for

ISBN: 978-93-85822-50-6

comparison of variability between different populations. The Coefficient of variation is standard deviation expressed as per centage of the mean and is measured by the formula-

$$CV = \frac{\text{Standard deviation } (\sigma) \times 100}{\text{Mean}}$$

Correlation

When an increase or decrease in one variety is accompanied by an increase or decrease in the 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 ratio 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 scores in variables X and Y

N = number of paired scores

$\sum XY$ = each X multiplied by its corresponding Y, then summed

$\sum X$ = sum of X scores

$\sum X^2$ = each of X squared, then summed

$(\sum X)^2$ = sum of X scores squared

$\sum Y$ = sum Y scores

$\sum Y^2$ = each of Y squared, then summed

Regression

The correlation coefficient only expresses association and by itself tells us nothing about the causal relationships of the variables. Thus, purely from the knowledge that two variables x and y are correlated, we cannot say whether variation in x is the cause or the results from mutual dependence of

ISBN: 978-93-85822-50-6

the two varieties or form common causes affecting both of them. Similarly, the mere existence of a high value of correlation coefficient is not necessarily of an underlying relationship between the two variables.

The underlying relation between y and x in a bi variant population can be expressed in the form of a mathematical equation known as regression equation and is said to represent the regression of the variety y on the variety x.

If Y is the dependent variable and X is the independent variable, then the linear regression equation can be written as -

$$Y = a + bx$$

The values of a and b can be obtained by the method of least squares which consists of minimizing the expression.

$(\sum y_i - a - bx_i)^2$ with respect to a and b. The value of a and b are

$$b = \frac{\sum XY - \frac{(\sum x)(\sum Y)}{n}}{\sum X^2 - \frac{(\sum x)^2}{n}}$$

$$a = \bar{y} + \bar{bx}$$

The regression line can now be written as

$$Y = \bar{y} + b\bar{x} + bx \text{ or } y - \bar{y} = b(x - \bar{x})$$

Where, b is the regression coefficient.

Path analysis

The terms 'path analysis' was first introduced by the biologist Sewall Wright in 1934 in connection with decomposing the total correlation between two variables in the casual system. The technique of path analysis is based on a series of multiple regression analysis with the added assumption of causal relationship between independent and dependent variables. This technique lays relatively heavier emphasis on the heuristic use of visual diagram, technically described as a path diagram. An illustrative path diagram

ISBN: 978-93-85822-50-6

showing interrelationship between father's education, father's occupation, son's education, son's first and son's first and son's present occupation can be shown.

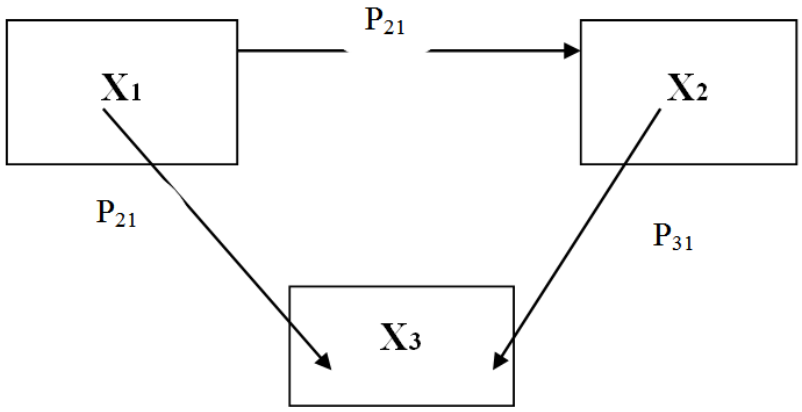
Path analysis makes use of standardized partial regression coefficients (known as beta weights) as effect coefficients. In linear additive effects are assumed, then through path analysis a simple set of equations can be build up showing how each variable depends on preceding variables. The main principle of path analysis is that any correlation coefficient between two variables, or a gross or overall measure of empirical relationship can be decomposed into a series a paths: separate path of influence leading through chronologically intermediate variable to which both the correlated variables have links.

The merit of path analysis in comparison to correlation analysis is that it makes possible the assessment of the relative influence of each antecedent of explanatory variable on the consequent or correlation variable by first making explicit assumptions underlying the causal connections and then by elucidating the indirect effect of the explanatory variables.

The use of the path analysis technique requires the assumption that there are linear additives, a symmetry relationship among a set of variables which can be measured at least on a quest interval scale. Each dependent variable is regarded as determined by the variable preceding it in the path diagram, and a residual variable defined as uncorrelated with other variables, is postulated to account for the unexplained portion of the variance in the dependent variable. The determining variables are summed for the analysis to be given (exogenous in the model).

ISBN: 978-93-85822-50-6

We may illustrate the path analysis technique in connection with a simple problem of testing a causal model with three explicit variables as shown in the following path diagram:



Path diagram (with three variables)

The structural equation from the previous can be written as:

$X_1 = e_1$

$X_2 = P_{21}X_1 + e_2 = px + e$

$X_3 = P_{53}X_2 + P_{32}X_2 + e_3$

X1 and X variable are measured as deviation from their respective means. P_{21} may be estimated from the simple regression of X_2 on X_1, i.e., $b_{21}X_1$ and P_{31}may be estimated from the regression of X on X_2 and X_1 as under:

$X = P_{31}X_1 + b_{21}x_2$

Where, $b_{21}x_2$ means the standardized partial regression coefficient for predicting variable 1 when the effect of variable 2 is held constant.

In path analysis the beta co-efficient indicates the direct of X1 (j=1, 2, 3,..p) on the dependent variable. Squaring the direct effect yields the proportion of variance on the dependent variable Y which is due each of the number of independent variable X_1 (j=1,2,3...p). After calculating the direct effect one may obtain a summary measure of the total indirect of X_1 on the

ISBN: 978-93-85822-50-6

dependent variable Y by subtracting from the correlation coefficient r_{yxj} the beta co-efficient b i.e.

Indirect effect X_1 on $y=Cjy=r_{yxj}-b_1$

For all j=1, 2, 3…p

ISBN: 978-93-85822-50-6