Chapter-4

Research Methodology

The deliberation on the methodology has been made to understand the 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.

I. Locale of research	II. Pilot study
III. Methods of sampling	IV. Variables and their
V. Preparation of interview	VI. Pre-testing of schedule
VII. Techniques of field data collection	VIII. Statistical tools used for data analysis

I. Locale of Research

The town namely Jalpaiguri sadar of the Jalpaiguri district in West Bengal was purposively selected for the study. The area had been selected for the study because of (a) the availability of appropriate respondents who are seeing waste disposed or collected from their household by the municipal agents. (b) Acquaintance with the local people as well as the local language (c) The concern area was easily accessible to the researcher in terms of place of residence and (d) the closure familiarities of the student researcher with the area, people, officials and local dialects.

II. 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 respondents simple random sampling technique was taken up.

III. Pilot study

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

IV. Preparation of the Interview schedule

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

V. Pre-testing of schedule

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

VI. Techniques of field data collection

This was 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.

VII. 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.

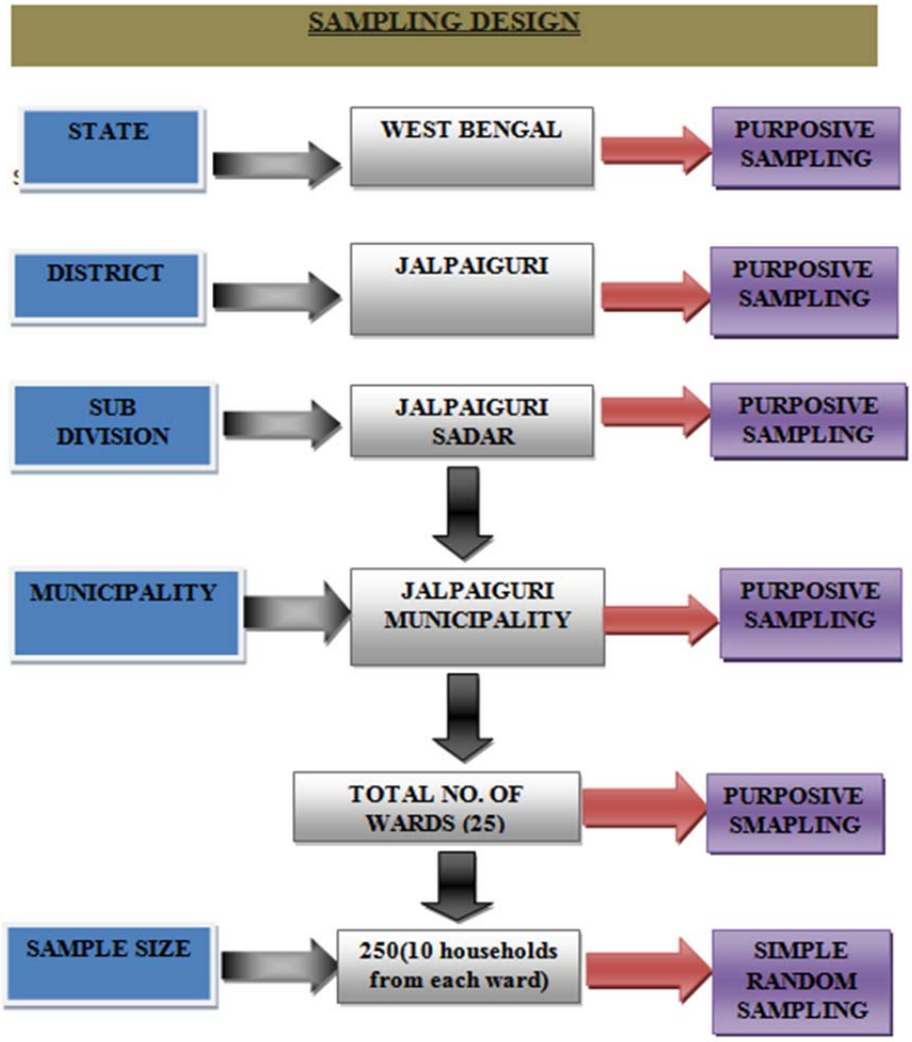

Fig-3 Diagrammatic Representation of Sampling Technique and Sampling

PROPER DESCRIPTION OF VARIABLES

1. Age

In all societies, age is one of the most important determinants of social status and social role of the individual. In the present study, age of the respondent was measured on the basis of their chronological age at the time of investigation. According to age it has been classified into three categories viz. Old age, Middle age, Young age. Based on scores obtained the respondents were grouped in to three categories using mean and standard deviation.

Category	Criteria
Young age	≤ (mean- ½ SD)
Middle age	(mean ± ½ SD)
Old age	(mean + ½ SD)

2. Occupation

Structural schedule was developed to quantify the primary occupation of the respondents. The primary occupation had been further divided in to three categories of the social system that is service, business and pensioner. It had been measured with the help of development of Pareek and Trivedi (1964) scale is socio-economic status and weightages had been given as Service-(3), Business (2), and Pensioner (1).

3. Education

Education is instrumental in building personality structure and helps in charging one's behavior in social life. Education may be operationalised as the amount of formal schooling attained/ literacy acquired by the responded at the time of interview. The education had been divided into seven categories that is Secondary, Higher Secondary, and Graduate and above. It had been measured with the help of scale developed by Pareek and Trivedi (1964) scale is socio-economic status and the weightages had been given as Secondary-(4), Higher Secondary- (5), and Graduate and above- (6).

4. Family Type

The attribute family type had been operationalized 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 and the weightages had been given as Nuclear or single family – (1) and Joint family – (2).

5. Family Size

The attribute family size had been operationalised as the family size of our rural system. The family size had been divided in to two categories of the social system that is up to 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 Up to 5 members – (1) and Above 5 members – (2).

6. Income

The Monthly Income a person is an important parameter to assess the economic status of the person in the society. The attribute Monthly Income had been operationalised as the land holding of the respondent in the social system. Income had been classified three different categories that are High, Medium, and Low. This categories based on the scores obtained the respondents were grouped in to three categories using mean and standard deviation.

Category	Criteria
Low	≤(mean – ½ SD)
Medium	(mean ± ½ SD)
High	≥ (mean + ½ SD)

7. No. of Rooms per Household

No of rooms per household is an important parameter to assess the concentration of a family in the society. It is an important attributes to estimate the quantity of waste generate per household because it is proportionally related with the member of family in the society. It had been classified in to three categories that are Double rooms, Triple rooms, More than Triple rooms.

8. No. of Latrines per Household

No of Latrines per household is an important parameter to assess the sanitation measure of a family in the household. House with no sanitation

facilities can be describes as Unsanitary. Proper sanitation facility helps to reduce health hazards and also reduce disease or illness. This attributes had been classified in to three categories that is 1 Latrine, 2 Latrines and More than 2 Latrines.

OTHER VARIABLES

People's satisfaction with the present system of municipality waste disposal

People's satisfaction is an important parameter regarding waste disposal. This attributes had been categorized in to two types that is yes and no. if they satisfied with the present disposal system of municipality they will say yes and if they do not satisfied they will say no.

People's satisfaction with the present system of municipality waste disposal	Yes	No

Container used by people for household waste

Container for waste is a parameter regarding waste disposal. People use this container to dispose their waste or to store their waste in house. This attribute is categorized in to six categories that are Plastic Bag, Card Board Box, Open Container, Close Container, Basket, and Open Pile.

Container for waste people used	Plastic bag	Card board box	Open container	Close container	bas ket	Open pile

House holding Responsibility of waste

Waste house holding responsibility is a parameter regarding Waste Management. In a house one should take responsibility to dispose waste in to waste collector Bin. This attributes have been classified in to three categories that is Everybody, Parents, Paid workers.

Waste house holding responsibility	everybody	parents	Paid workers

People's Perception on Waste Management

People's perception is an important parameter regarding waste management. What people think on present municipal activity or on present municipal waste management and what types of problem they face due to improper waste disposal is an important concern. This attribute has been

classified in to four categories that are No problem, Slight problem, Problem and Major problem.

People's perception on waste management	No problem	Slight problem	problem	Major problem

Household wastes Type

Household waste type is a parameter to calculate the total waste generation from household. Different types of waste generate from households. This waste can be toxic or can be harmful or can be bio degradable. Household waste type have been classified in to eight categories that is Plastic Packets, Plastic Bags, Garden or Yard Wastes, Food Wastes, Paper Wastes, Glass Wastes, Metal Wastes and others.

Household waste type	Plastic packets	Plastic bags	Garden or yard wastes	Food wastes	Paper wastes	Glass wastes	Metal wastes	others

People's knowledge on Recycling of Waste

Knowledge of recycling of waste is an important parameter to reduce waste generation. Recycling of waste helps to reuse of some product or helps to convert some waste product in to composting for use in agriculture. This attribute has been classified in to three categories that is Fully Known, Known little, and not at all.

People's knowledge on recycling	Fully known	Known little	Not at all

Knowledge of Composting

Knowledge of Composting is an important parameter to reuse waste material. It is an important parameter to reduce waste generation and helps to convert these wastes to compost or very compost which can be used in agricultural purpose. This attribute has been classified in to three categories that is Nothing, Known Little, Known Much.

Knowledge of composting	Nothing	Known much	Known little

People's Eagerness to Learn Composting

People's eagerness to learn composting is an important factor to re use waste material. If people show their eagerness to learn compost that can help to reduce waste generation and also can improve agricultural production. This attribute has been classified in to five categories that is Very much Eager, Eager, Slightly Eager, Not Eager, and Not eager at all.

People's eagerness to learn composting	Very much eager	eager	Slightly eager	Not eager	Not eager at all

People's Opinion on Importance of Waste Management

People's opinion on importance of waste management is an important parameter on waste recycling. This opinion helps to take attention of the municipal authority to reduce improper waste disposal and also be able to understand the authority on necessity of waste recycling. This attribute has been classified in to three categories that is It is Important, Not Important, and Do not Know.

Peoples opinion on importance of waste management	It is important	Not important	Do not know

Types of Disease or Illness

Types of Disease or Illness are a parameter regarding improper waste management. Improper waste disposal or improper waste management can cause serious health hazard to human being. This attribute can be classified in to three categories that are Malaria, Diarrhea, Typhoid, and others.

Types of disease or illness	malaria	diarrhea	typhoid	others

People's opinion on disease or illness due to improper waste management	Cause a disease	Do not cause a disease	Not known

Disease or Illness related to Improper Waste Management

People's opinion on disease or illness due to improper waste management is a parameter to improve the waste management practices by the municipal authority. This attribute has been classified in to three categories that is Cause a Disease, Do not Cause a Disease, Not Known.

Medium or Source of Information Regarding Waste Management

Medium or source of information regarding waste management is an important factor for generating awareness. People can gather knowledge through different medium and that can help people to generate awareness and can help to take proper method of waste management. This attribute has been classified in to five categories that are Radio, Television, Newspaper, Family or Friends, and Others

Medium or source of information regarding waste management	Radio	Television	Newspaper	Family or Friends	Others

Impact of Improper Waste Management on Health, Environment and Economy

Impact of improper waste management on health, environment and economy is an important parameter regarding waste management. Improper waste management can cause serious damage to health. It can cause toxic substances that can create serious health diseases or illness to human being. Improper waste management can cause serious damage to environment. It can break the ozone layer by producing ultra violet rays and green house

gases. Improper waste management also damages the economic status of a country or town. It can slow down the economy's growth rate. This attributes has been classified into four categories that is Unaware, Slightly Aware, Aware, and Not Aware.

Impact of improper waste management on Health	Unaware	Slightly Aware	Aware	Not Aware

Impact of improper waste management on Environment	Unaware	Slightly Aware	Aware	Not Aware

Impact of improper waste management on Economy	Unaware	Slightly Aware	Aware	Not Aware

Statistical Tools Used for Data Analysis

- Frequency
- Percentage

- Mean
- Standard deviation
- Coefficient of variation
- Probit Analysis
- Chi-Square Test

1. Frequency

The term Frequency (f) is used to denote how frequently a response appears in a class or category.

2. Percentage

Percentage was used for making simple comparisons. For calculating percentage, the frequency of a particular cell was divided by the total number of respondents in that particular category and multiplied by 100.

3. 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 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-

$$\textbf{\textit{Mean (X)}} = \frac{\sum_{i=1}^{N} f_i x_i}{N}$$

Where, X= Mean of the observation

f_i= Frequency of the Class

x_i= Mid value of the Class

N= Total number of Observation

4. 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 a (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 –

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

Where, S.D.= Standard deviation of the Observation

f_i= Frequency of the Class

x_i= Mid value of the Class

N= Total number of Observation

5. 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 -

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

6. Probit Analysis

Probit Analysis is a specialized regression model of binomial response variables. Remember that regression is a method of fitting a line to binomial data to compare the relationship of the response variable or dependent variable (Y) to the independent variable (X). Probit analysis is used to analyze many kinds of dose-response or binomial response experiments in a variety of fields. Here, Probit Analysis has been used in waste management to determine the relative people's perception on waste management to. This is done by testing the response of the people under various concentrations of each of the responses in question and then comparing the concentrations at which one encounters a response. As discussed above, the response is always binomial and the relationship between the response and the various concentrations is always sigmoid. Probit analysis acts as a transformation from sigmoid to linear and then runs a regression on the relationship.

$$\mathbf{Y = a + b\,X + e}$$

Where,

- a = y-intercept
- b = the slope of the line
- e = error term

Also remember that a binomial response variable refers to a response variable with only two outcomes.

7. Chi- Square Test

A chi-squared test, also referred to as test (or chi-square test), is any statistical hypothesis test in which the sampling distribution of the test statistic is a chi-square distribution when the null hypothesis is true. Chi-squared tests are often constructed from a sum of squared errors, or through the sample variance. Test statistics that follow a chi-squared distribution arise from an assumption of independent normally distributed data, which is valid in many cases due to the central limit theorem. A chi-squared test can be used to [attempt rejection of] the null hypothesis that the data are independent.

$$\text{Chi- Square } (\chi^2) = \frac{\sum(O-E)^2}{E}$$

Where,

∑= Sum of total observation

O= Observed frequencies and E= Expected frequencies

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)