2. INTRODUCTION TO SAMPLING METHODS

2.1   Introduction:

Sampling is very often used in our daily life. For example while purchasing food grains from a shop we usually examine a handful from the bag to assess the quality of the commodity. A doctor examines a few drops of blood as sample and draws conclusion about the blood constitution of the whole body. Thus most of our investigations are based on samples.   In this chapter, let us see the importance of sampling and the various methods of sample selections from the population.

2.2   Population:

In a statistical enquiry, all the items, which fall within the purview of enquiry, are known as **Population** or **Universe**. In other words, the population is a complete set of all possible observations of the type which is to be investigated. Total number of students studying in a school or college, total number of books in a library, total number of houses in a village or town are some examples of population.

Sometimes it is possible and practical to examine every person or item in the population we wish to describe. We call this a **Complete enumeration,** or **census**. We use **sampling** when it is not possible to measure every item in the population. Statisticians use the word population to refer not only to people but to all items that have been chosen for study.

2.2.1   Finite population and infinite population:

A population is said to be finite if it consists of finite number of units. Number of workers in a factory, production of articles in a particular day for a company are examples of finite population. The total number of units in a population is called population size. A population is said to be infinite if it has infinite number of units. For example the number of stars in the sky, the number of people seeing the Television programmes etc.,

2.2.2 Census Method:

Information on population can be collected in two ways – census method and sample method. In census method every element of the population is included in the investigation. For example, if we study the average annual income of the families of a particular village or area, and if there are 1000 families in that area, we must study the income of all 1000 families. In this method no family is left out, as each family is a unit.

2.3 Sampling:

The theory of sampling has been developed recently but this is not new. In our everyday life we have been using sampling theory as we have discussed in introduction. In all those cases we believe that the samples give a correct idea about the population. Most of our decisions are based on the examination of a few items that is sample studies.

2.3.1 Sample:

Statisticians use the word **sample** to describe a portion chosen from the population. A finite subset of statistical individuals defined in a population is called a sample. The number of units in a sample is called the **sample size.**

Sampling unit:

The constituents of a population which are individuals to be sampled from the population and cannot be further subdivided for the purpose of the sampling at a time are called sampling units. For example, to know the average income per family, the head of the family is a sampling unit. To know the average yield of rice, each farm owner' s yield of rice is a sampling unit.

Sampling frame:

For adopting any sampling procedure it is essential to have a list identifying each sampling unit by a number. Such a list or map is called sampling frame. A list of voters, a list of house holders, a list of villages in a district, a list of farmers etc. are a few examples of sampling frame.

2.3.2 Reasons for selecting a sample:

Sampling is inevitable in the following situations:

1. Complete enumerations are practically impossible when the population is infinite.
2. When the results are required in a short time.
3. When the area of survey is wide.
4. When resources for survey are limited particularly in respect of money and trained persons.
5. When the item or unit is destroyed under investigation.

2.3.3 Parameters and statistics:

We can describe samples and populations by using measures such as the mean, median, mode and standard deviation. When these terms describe the characteristics of a population, they are called **parameters**. When they describe the characteristics of a sample, they are called **statistics**. A parameter is a characteristic of a population and a statistic is a characteristic of a sample. Since samples are subsets of population statistics provide estimates of the

parameters. That is, when the parameters are unknown, they are estimated from the values of the statistics.

In general, we use Greek or capital letters for population parameters and lower case Roman letters to denote sample statistics. [N, μ, σ, are the standard symbols for the size, mean,

S.D, of population. n , $\bar{x}$, s, are the standard symbol for the size, mean, s.d of sample respectively].