

### ~~1.3~~ Meaning of Statistics:

Statistics is concerned with scientific methods for collecting, organising, summarising, presenting and analysing data as well as deriving valid conclusions and making reasonable decisions on the basis of this analysis. Statistics is concerned with the systematic collection of numerical data and its interpretation. The word 'statistic' is used to refer to

1. Numerical facts, such as the number of people living in particular area.
2. The study of ways of collecting, analysing and interpreting the facts.

## ✓ 1.6 Scope of Statistics: / Importance

Statistics is not a mere device for collecting numerical data, but as a means of developing sound techniques for their handling, analysing and drawing valid inferences from them. Statistics is applied in every sphere of human activity – social as well as physical – like Biology, Commerce, Education, Planning, Business Management, Information Technology, etc. It is almost impossible to find a single department of human activity where statistics cannot be applied. We now discuss briefly the applications of statistics in other disciplines.



## 1.7 Limitations of statistics:

Statistics with all its wide application in every sphere of human activity has its own limitations. Some of them are given below.

1. **Statistics is not suitable to the study of qualitative phenomenon:** Since statistics is basically a science and deals with a set of numerical data, it is applicable to the study of only those subjects of enquiry, which can be expressed in terms of quantitative measurements. As a matter of fact, qualitative phenomenon like honesty, poverty, beauty, intelligence etc, cannot be expressed numerically and any statistical analysis cannot be directly applied on these qualitative phenomena. Nevertheless, statistical techniques may be applied indirectly by first reducing the qualitative expressions to accurate quantitative terms. For example, the intelligence of a group of students can be studied on the basis of their marks in a particular examination.
2. **Statistics does not study individuals:** Statistics does not give any specific importance to the individual items, in fact it deals with an aggregate of objects. Individual items, when they are taken individually do not constitute any statistical data and do not serve any purpose for any statistical enquiry.
3. **Statistical laws are not exact:** It is well known that mathematical and physical sciences are exact. But statistical laws are not exact and statistical laws are only approximations. Statistical conclusions are not universally true. They are true only on an average.
4. **Statistics table may be misused:** Statistics must be used only by experts; otherwise, statistical methods are the most dangerous tools on the hands of the inexperienced. The use of statistical tools by the inexperienced and untrained persons might lead to wrong conclusions. Statistics can be easily misused by quoting wrong figures of data. As King says



### ~~3.3.1~~ Primary data:

Primary data is the one, which is collected by the investigator himself for the purpose of a specific inquiry or study. Such data is original in character and is generated by survey conducted by individuals or research institution or any organisation.

### 3.3.2 Secondary Data:

Secondary data are those data which have been already collected and analysed by some earlier agency for its own use; and later the same data are used by a different agency. According to W.A. Neiswanger, 'A primary source is a publication in which the data are published by the same authority which gathered and analysed them. A secondary source is a publication, reporting the data which have been gathered by other authorities and for which others are responsible'.



## 22 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.



### 2.3.1 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**.

# 1. Simple random sampling: ➤

A simple random sample from finite population is a sample selected such that each possible sample combination has equal probability of being chosen. It is also called unrestricted random sampling.



### 2.5.2 Stratified Random Sampling:—

Of all the methods of sampling the procedure commonly used in surveys is stratified sampling. This technique is mainly used to reduce the population heterogeneity and to increase the efficiency of the estimates. Stratification means division into groups. In this method the population is divided into a number of subgroups or strata. The strata should be so formed that each stratum is homogeneous as far as possible. Then from each stratum a simple random sample may be selected and these are combined together to form the required sample from the population.

#### Types of Stratified Sampling:

There are two types of stratified sampling. They are proportional and non-proportional. In the proportional sampling