➢ Introduction:

The subject of Statistics, as it seems, is not a new discipline but it is as old as the human society itself. It has been used right from the existence of life on this earth, although the sphere of its utility was very much restricted. In the old days, Statistics was regarded as the 'Science of Statecraft'. The word Statistics seems to have been derived from the Latin word '*status*' or the Italian word '*statista*' or the German word '*statistik*' or the French word '*statistique*', each of which means a political state. In the ancient times the scope of Statistics was primarily limited to the collection of the following data by the governments for the purpose of taxation, framing military and fiscal policies. Nowadays application of Statistics is broad in every sphere of life in the world.

➢ Meaning of Statistics:

The world Statistics is used in three different senses-

1) Statistics as a singular
2) Statistics as a plural
3) Statistics is a plural of statistic.

Definition of Statistics in the singular sense:

It is difficult to define statistics in a few words; since its dimension, scope, function, use and importance are constantly changing over time. No formal definition thus has emerged so far and no definition is perhaps beyond controversy.

According to Fisher (1947), the science of statistics is essentially a branch of applied mathematics and may be regarded as mathematics, applied to observational data.

Croston and Cowden (1948) defined statistics as the subject of collection, presentation and analysis of numerical data.

According to W.I King, "Statistics is the science of decision making in the field of uncertainty"

According to Seligman, "Statistics is the science which deals with the method of collecting, organizing, classifying, presenting, comparing, summarizing, analysis and interpretation of numerical data in any field of inquiry."

Definition of Statistics in the plural sense:

"Statistics are numerical statements of facts in any department of enquiry placed in relation to each other."— Bowley

"Statistics may be defined as the aggregate of facts affected to a marked extent by multiplicity of causes, numerically expressed, enumerated or estimated according to a reasonable standard of accuracy, collected in a systematic manner, for a predetermined purpose and placed in relation to each other."—Prof. Horace Secrist.

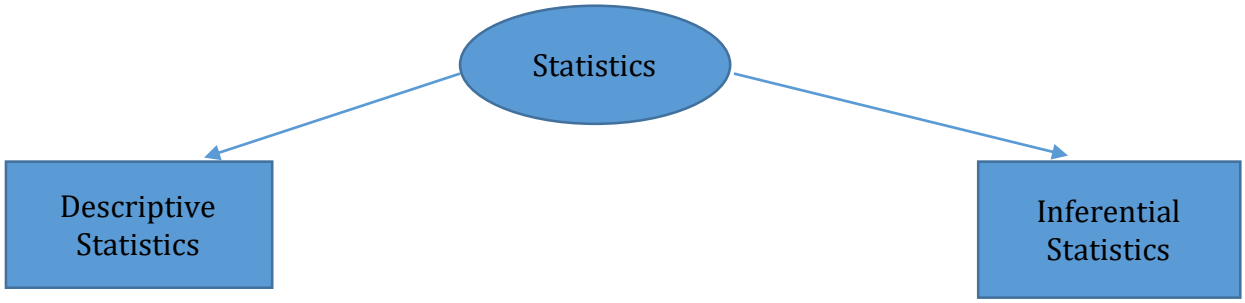
Characteristics of Statistics: Number-based information requires some characteristics for the status of statistics. These are given below:

1) Statistics are numerically expressed
2) Statistics must be aggregated of interrelated facts or information.
3) Statistics are affected by a multiplicity of causes i.e, statistics are affected by various causes.
4) Statistics may be related to some field of inquiry
5) Statistics are collected in a systematic manner.
6) Statistics are collected for a pre-determined purpose
7) Statistics should be placed in relation to each other.
8) Statistics are estimated according to a reasonable standard of accuracy.
9) Statistics are comparable and homogeneous.

Functions of Statistics:

1) Statistics present facts in a definite form
2) It simplifies the mass of the figures
3) It facilitates comparison
4) It helps in formulating and testing hypothesis
5) It helps in the prediction
6) It helps in the formulation of suitable policies

Types of Statistical Applications: The field of statistics consists of two branches –



Descriptive statistics focuses on collection, summarization, presentation and analysis of the data using suitable numerical and graphical methods to look for patterns in a data set.
Inferential statistics utilizes sample data to make estimates, decisions, predictions, or other generalizations about a larger set of data (population).

Uses and importance of Statistics and Statisticians:

The scope and uses of statistics are so wide and universal that they can't be enumerated instantly in a few words. Statistics has now been recognized as a separate discipline of human knowledge in its own right. Statistics has its extensive application in the following various fields:

1) **Surveys:**
   - o Determine which political candidate is more popular.
   - o Discover what foods teenagers prefer for breakfast.
   - o Estimate the number of children living in a given school district
2) **Government Operation:** Government often conducts experiments to aid in the development of public policy and social programs. Such experiments include:
   o Consumer price o Fluctuations in the economy o Employment patterns

o Population trends o Opinion polls.

3) **Scientific research:** Statistical sciences are used to enhance the validity of inference in all the fields of science, medical science, etc. Such as:
   - o Radio carbon dating to estimate the risk of earthquakes.
   - o Clinical trials to investigate the effectiveness of new treatments.
   - o Field experiments to evaluate the irrigation methods.
   - o Measurements of water quality

4) **Statistics in Industry:** Statisticians using statistical tools quantify the unknowns in order to optimize resources. They:
   o Predict the demand for product and services.
   o Check the quality of items manufactured in a facility
   o Manage investment portfolios. And so on.
5) **Statistics in the Business World:** In the business world, statistics has four important applications:
   - To summarize business data
   - To draw conclusions from that data
   - To make reliable forecasts about business activities
   - To improve business process.
6) **Statistics in agriculture:**
   - To find out efficient fertilizer by analyzing quality of the soil
   - Finding a scientific method of irrigation
   - To choose a new variety of seed
   - Analyzing climate condition
   - Design of experiment in cultivated land
7) **Bank and insurance:**
   - Investigation of default loan
   - Risk management
   - Analyze the trend of transaction
   - Money flow in the currency market
   - To analyze the volatility or fluctuation in the stock market
   - Credit card fraud detection
   - Remittance flow of the country
   - Foreign reserve management

Besides the above uses, statistics are extensively used in various fields like geography, demography, geology, biology, psychology, and so on.

Limitations or drawbacks of Statistics:

1) Statistics does not deal with isolated measurement
2) Statistics deals only with quantitative characteristics
3) Statistical laws are not exact
4) Statistical methods are not applicable in the non-homogeneous matter
5) Statistics can be misused

1. Fill in the blanks :

(*i*) The word Statistics has been derived from the Latin word …… or the German word …… .
(*ii*) The word Statistics is used to convey different meanings in …… and …… sense.

(*iii*) Statistics is an …… and also a …… .
(*iv*) …… defined statistics as 'numerical statement of facts'.
(*v*) In singular sense, Statistics means …… .
(*vi*) In plural sense, Statistics means …… .

Ans. (*i*) status, statistik; (*ii*) singular, plural; (*iii*) art, science; (*iv*) A.L. Bowley; (*v*) statistical methods used for collecting analysing and drawing inferences from the numerical data; (*vi*) numerical set of data;

2. Indicate if the following statements are true (T) or false (F).

(*i*) The word statistics seems to have been derived from Latin word status.
(*ii*) Statistics is of no use to humanity.
(*iii*) 'To a very striking degree, our culture has become a statistical culture'.
(i*v*) Statistics can prove anything.
Ans. (*i*) T; (*ii*) F; (*iii*) T; (i*v*) F.

Some Basic concepts of Statistics

Population: A set of all values or elements defined on some common characteristics is called a population.

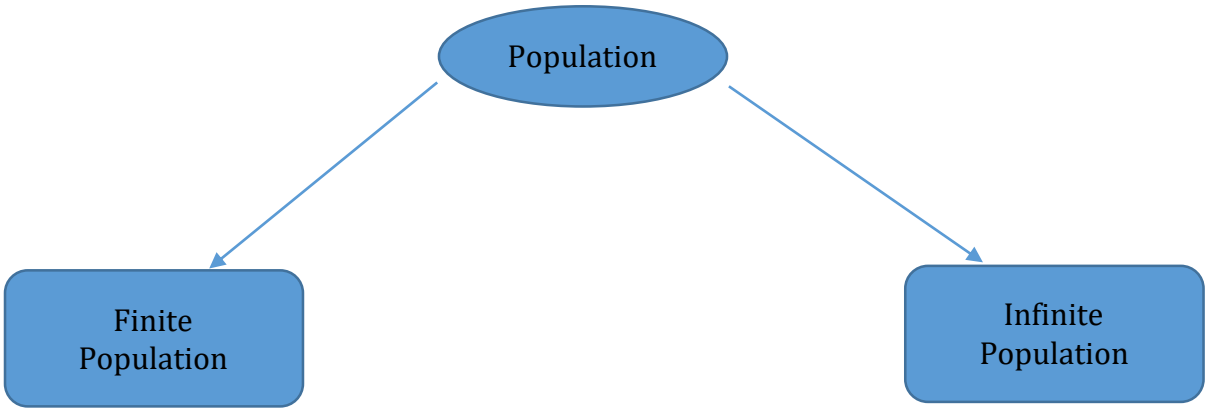
Totality or collection of all objects, items, or individuals on which observations are taken on the basis of some characteristics of the objects in any field of inquiry is called population and each object or items are called experimental units.

Thus population means an aggregate of elements possessing certain characteristics of interest in any particular investigation or enquiry.

A population consists of all the items or individual about which researcher want to draw a conclusion is known as target population.

'N' denotes the size of population.

Example: If we want to study the average weight of the student of 1st semester BBA then the set that consists of all the weights of the student of 1st semester BBA will be the population in this case.



Parameter: A parameter is a numerical measure that describes a characteristic of a population.
Census: Any investigation based on every element of a population is called census.

Sample: A small and representative (desirably) part of population is known as sample.

In many particular situations it is impossible or even impractical to study the whole population, in such case only a small and representative part of population is taken under consideration to draw inferences about the population by analyzing that part of population. Such a part of population is known as sample.

Sample size is denoted by 'n'.

Statistic: A statistic is a numerical measure that describes a characteristic of sample.

Survey: The technique of collecting information from a portion of the population or sample is called survey.