

# MODULE - 3

## BASICS OF STATISTICS

### Meaning and Definition of statistics.

- (i) Plural sense - Word statistics refers to numerical facts and figures collected in systematic manner.
- (ii) Singular sense - Statistics refers to methods which are used for collection, analysis, interpretation and presentation of numerical facts.
- (iii) Statistic - Plural of the word 'statistic' refers to numerical quality like mean, median, mode, variance etc.

### Definition of statistics

Statistics are numerical statements of facts capable of analysis and interpretation and is the study of principles and methods applied in collecting, presenting and analysing and interpretation of numerical data.

## Characteristics of Statistics

- (i) Enumerated and estimated according to a reasonable standard of accuracy.
- (ii) They are affected by multiplicity of factors.
- (iii) They must be numerically expressed.
- (iv) They must be aggregate of facts.
- (v) Statistics are collected in a systematic manner.
- (vi) Data is collected for predetermined purpose.

## Functions of Statistics

- (i) Statistics helps in presenting complex data in a suitable tabular, graphic and diagrammatic form.
- (ii) Statistics helps in understanding the nature and pattern of variability.
- (iii) Statistics helps to condense mass of data into a few significant figures.
- (iv) It enables comparison.
- (v) Statistical tools helps in forecasting.
- (vi) It provides a better understanding and exact description of a phenomenon.

# SCOPE OF STATISTICS

- (i) Business : Statistics helps plan production, maintain quality of products. It also helps to take decisions about the location of business, market etc.
- (ii) In Economics : Statistical methods are used for preparation of national income accounts. In economics research statistical methods are used for collecting and analysis of data.
- (iii) In Mathematics : Statistics is branch of applied mathematics. Many statistical methods like probability, average, estimation is used in mathematics.
- (iv) In Banking : Bankers used statistical approaches based on probability to estimate the number of depositors and their claims.
- (v) In Astronomy : Astronomy is one of the oldest branch of statistical study, and deals with measurement of distance, size, mass etc.



## Planning the Enquiry:

For planning a survey the following matters should be considered.

- (i) Deciding the purpose of the enquiry:
- (ii) Decide the scope of the enquiry
- (iii) Nature and Type of Enquiry.
- (iv) Unit of Data Collection
- (v) Degree of accuracy.
- (vi) Source of and Types of data.

## Types of Data

(a) Primary data: It is first hand collected data and the original data for a statistical study.

(b) Secondary data: It is the data which has already been compiled and analysed by someone may be sorted.

(C) Quantitative Data: The data described by a quantitative variable such as ~~no.~~ number of births in a country, temperature, height, weight etc.

(d) Qualitative data: The data described by a qualitative variable such as beauty, educational status, marital status, sex etc.

## COLLECTION OF DATA.

Data is collected ~~by~~ mainly by these two methods:

(i) Census: Data is collected from each and every unit of population under study.

(ii) Sampling:- Data is collected from the representative part of the population called sample.

# SAMPLING

Sample: A sample is an representative part of population.

Sampling: The process or technique of selecting a sample or a representative part of population.

There may be errors during a statistical study due to

- (i) Sampling error: It comprises the difference between the sample and the population values. It may be due to  
(a) sampling bias, usually the result of poor sampling plan.
- (ii) Non-Sampling Error (Measurement Error)  
The errors occur at the time of calculation, tabulation and presentation are called non-sampling error.

## Steps in selecting the sample:

- (i) Define the population.
- (ii) Specify the sampling frame.
- (iii) Specify the sampling method.
- (iv) Determine the sample size.
- (v) Implement sampling plan
- (vi) Data collecting
- (vii) Review the sampling process.



# Limitations of Statistics

- (i) Statistical data are applicable only for quantitative data.
- (ii) Statistical methods cannot be applied on heterogeneous data.
- (iii) If sufficient care is not taken in collecting, analysing and interpretation then statistical results may mislead.  
lead to ~~to~~ false st
- (iv) Errors are very much possible in statistical results.
- (v) Expert knowledge of statistics is required for handling statistical data.

## Statistical Enquiries

### Steps in Statistical Enquiry