BBA Sem 1

Subject: Business Statistics Course Code:F010102T

Topic: Introduction to Statistics

Development of Statistics

The subject 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 olden days Statistics was regarded as the 'Science Statecraft' and was the by-product of the administrative activity of the state. 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 India, an efficient system of collecting official and administrative statistics existed even 2000 years ago, in particular, during the reign of Chandragupta Maurva (324-300 B.C.). Historical evidences about the prevalence of a very good system of collecting vital statistics and registration of births and deaths even before 300 B.C. are available in Kautilya's 'Arthashastra'.

The records of land, agriculture and wealth statistics were maintained by Todermal, the land and revenue minister in the reign of Akbar (1556-1605 A.D). A detailed account of the administrative and statistical surveys conducted during Akbar's reign is available in the book "Ain-e- Akbari" written by Abul Fazl (in 1596-97), one of the nine gems of Akbar.

Sixteen century saw the application of Statistics for the collection of the data relating to the movements of heavenly bodies—stars and planets—to know about their position and for the prediction of Eclipses. Seventeenth century witnessed the origin of Vital Statistics.

Pioneers in the field of Statistics

- Captain John Graunt of London (1620-1674), known as the Father of Vital Statistics, was the first man to make a systematic study of the birth and death statistics.
- **Francis Galton** (1822-1921) pioneered the study of 'Regression Analysis' in Biometry.
- **Karl Pearson** (1857-1936) founded the greatest statistical laboratory in England and pioneered the study of 'Correlation Analysis'.
- **W.S. Gosset** with his t-test ushered in an era of exact (small) sample tests
- Sir Ronald A.Fisher (1890-1962) known as *Father of Statistics* applied statistics to a variety of diversified fields such as genetics, biometry, psychology and education, agriculture, Estimation Theory (Point Estimation and Fiducial Inference); Exact (small) Sampling Distributions; Analysis of Variance and Design of Experiments.

Understanding Statistics:

Originally the word 'statistics' was used for the collection of data concerning states both historical and descriptive. In modern times it has acquired a much wider meaning and is used for all types of data and methods for the analysis of the data. It is used in two senses, namely, singular and plural.

Statistics as Statistical Methods (Singular Sense):

In this category of definitions Statistics is in singular sense. In singular sense statistics is used to describe the principles and methods which are employed in collection, presentation, analysis and interpretation of data. These devices help to simplify the complex data and make it possible for a common man to understand it without much difficulty.

Simple and comprehensive meaning of statistics, in singular sense, can be that a device which is employed for the purpose of collection, classification, presentation, comparison and interpretation of data. The purpose is to make the data simple, lucid and easy to understand.

Statistics as Numerical Facts (Plural Sense):

According to Prof. Horace Secrist Statistics are aggregate of facts affected to a marked extent by multiplicity of causes numerically expressed enumerated or estimated according to reasonable standards of accuracy collected in a systematic manner for a predetermined purpose and placed in relation to each other.

Statistics as numerical data should possess the following characteristics

•They should be aggregate of facts-

Single and unrelated figures are not statistics. Collective figures relating to births ,deaths, purchase sales can be called as statistics. Such figures can be studied in relation to each other and are capable of comparison.

•They should be affected to a marked extent by multiplicity of causes-

Usually statistical facts are affected by several causes. In statistical methods effects of various factors affecting a particular phenomenon are generally studied in a combined form. For example, sale of a product depends on a number of factors such as its price, quality, competition, the income of the consumers, and so on.

•<u>They should be numerically expressed-</u>

Qualitative expressions like bad, good, happy and young do not form part of statistical studies unless a numerical equivalent is assigned to such expressions.

•They should be enumerated or estimated according to reasonable standards of accuracy-

Numerical facts can either be enumerated in which case, they are supposed to be accurate and precise or they can be estimated by some expert observers.

•Collected in a systematic manner

It is essential that statistics must be collected in a systematic manner so that they may confirm to reasonable standards of accuracy.

•Should be collected for a predetermined purpose –

Statistical data should always be collected with a predetermined aim so as to ensure usefulness of the efforts of collecting facts and also the data.

•Should be placed in relation to each other

Statistics are usually collected for the purpose of comparison. If the collected figures are not capable of being compared with each other then the value is lost. Therefore it is important that the figures which are collected should be homogeneous so that comparison with another data set is possible.

Importance of statistics

><u>Importance in economics</u>

Important phenomenon in all branches of economics can be described compared and correlated with the help of statistics .

• *Time series analysis* is used for studying the behaviour of prices, production and consumption of commodities

Index numbers are used in economic planning as they indicate the changes over a specified period of time in a) price of commodities b) imports and exports c) industrial and agricultural production *Demand analysis* is used to study the relationship between price of a commodity and its output. *Forecasting techniques* are used for predicting inflation rate , unemployment rate and manufacturing capacity utilisation.

▶ Need in planning

Today economic activities are being more and more closely directed to the production of goods and services. Our future is largely being planned and for this planning to be successful it should be based on sound analysis of data. Even the governments requires data related to the state to plan for various kind of development activities.

Statistics in Business Management

According to Wallis and Roberts 'Statistics may be regarded as a body of method for making wise decisions in the face of uncertainty', this reflects the application of statistics in the development of general principles for dealing with uncertainty. Statistical reports provide summary of business activities which improve the capability of making more effective decisions in the area of marketing, production finance, and personnel.

Marketing

Before introducing a new product in the market the marketing research team makes use of various techniques of statistical analysis to study the habits of consumers, competitors, prices and other aspects related to the product. Such efforts help to understand the potential for the product in the market. Production

Statistical methods are used to carry out R&D programs for improving the quality of the current product and also setting quality control standards for new products.

Finance

A statistical study with the help of correlation analysis of profits and dividends can predict and decide probable dividends. Application of relevant statistical methods for analysis is also done for Financial forecast, break even analysis and investment decisions under uncertainty.

Personnel

Statistics finds its application in the process of manpower planning to study wage rates incentive plans, cost of living, labor turnover ,employment trends. Performance Appraisal employer employee relationship can also be studied by analysing various factors such as wages, grievance handling, welfare and delegation of authority using various statistical methods.

Statistics in physical sciences

There is an extensive use of statistical methods in areas of astronomical engineering, geology, metrology and certain branches of physics.

Statistics in social sciences

•Some specific areas of application of statistics in social sciences are regression and correlation analysis. Sampling techniques and estimation are extensively used in Social Sciences.

•In sociology Statistical methods are used to study mortality rates ,fertility trends population growth and other aspects related to the population.

Statistics in medical science

Knowledge of statistics is of great importance even in natural sciences like zoology, botany, metrology and medicine. An important application of statistics is the use of test of significance for testing the efficacy of various drugs developed to cure particular diseases.

Limitations of Statistics

•It does not study qualitative phenomena.

•Statistics can be applied only to those problems which can be expressed in quantitative terms.

•The subjective concept can however be related in an indirect fashion to numerical data and then various statistical techniques can be used.

•It does not reveal the detailed story since many problems are affected by such factors which are incapable of statistical analysis therefore it is not always possible to examine a problem in totality only by a statistical approach.

Statistical laws are true only on an average as it deals with phenomena which are affected by multiplicity of causes and it is not possible to study the effect of each of the factors separately.
Statistics as a science is not as accurate as many other sciences.

- Statistical methods do not have any place for individual items ,statistics deal with aggregates.
- It is liable to be misused by drawing any type of conclusion one wants.
- In real life statistical methods can be properly used only by trained people .