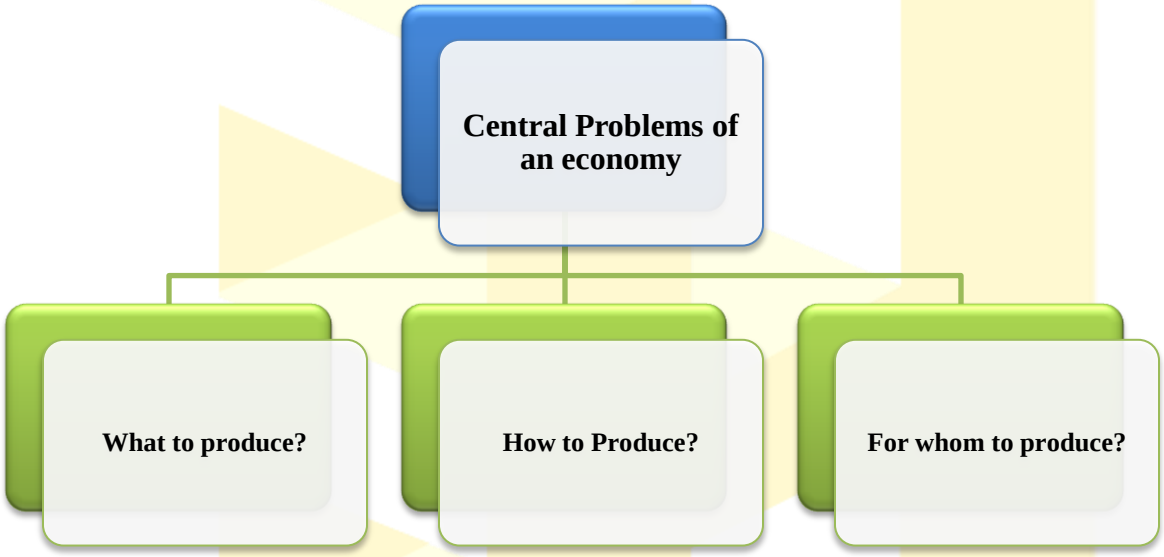
CHAPTER 1: Concept of Economics and Significance of Statistics in Economics

What is Economics?

Alfred Marshall defines economics as "the study of mankind/man's action in the ordinary business of life". His choices and decision making in a world with limited resources is studied in this field of social science.

Robbins defined economics as "a science that studies human behavior as a relationship between ends and scarce means which have alternate uses."

Components of Economic Activity



Consumption: The consumer/buyer of a product consumes different goods and services to satisfy their wants. As the resources are scarce and wants are unlimited; to utilize those scarce resources in purchasing/consuming goods/services so as to maximize their satisfaction, we deal with the study of consumer/consumer behaviour. Using an equation:

$$C=f(Y)$$

Where C= Consumer; Y= Income

In this, **Income** is the **scarce** resource and consumer represents their wants.

Production: **Production** is the process of conversion of raw materials into useful goods. The decision of allocating various kinds of inputs in the production process, so as to minimize the

cost of production and maximize their profits, is the subject matter of the study of production. Thus,

$$\mathbf{P = f(L, N, E, K)}$$

Where P= Production; L=Labour; N=Land; E= Entrepreneur; K= Capital

The producers need to combine/use these resources in such a way that minimizes their costs and maximizes their profits.

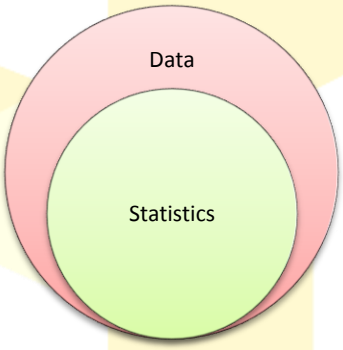
Distribution: The economic principles on the basis of which the income (Y) generated in the production process are distributed amongst the factor of productions, i.e., land, labour, capital and entrepreneurship; is called the study of distribution.

Incomes earned by factors of agents are as follows:

- **Land: Rent**
- **Labour: Wages**
- **Capital: Interest**
- **Entrepreneur: Profits**

Statistics

Statistics means quantitative information or quantification of the facts and findings. Facts and figures pertaining to population, national income, profits and sales of a firm, literacy level, etc will all constitute statistics. It also deals with the methods or techniques relating to the collection, classification, presentation, analysis, as well as the interpretation of data.
However, any numerical information is not Statistics To summarize, all Statistics are data, but all data are not Statistics.



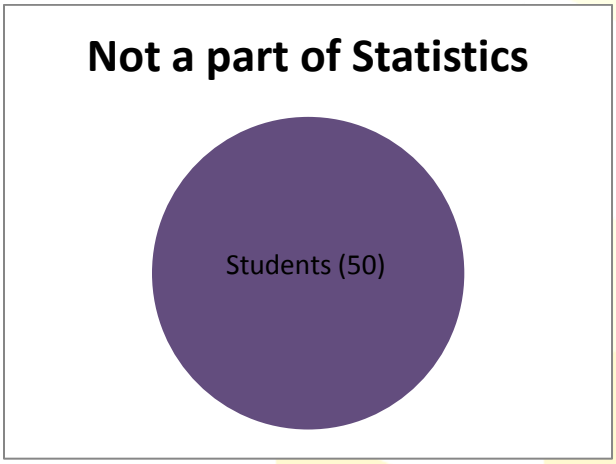
The word 'Statistics' is referred in two distinct senses. In its first reference as a **plural noun**, we define statistics as an aggregate or collection of numerical/quantitative expressions of facts, i.e., 'numerical/simple data'. Therefore:-

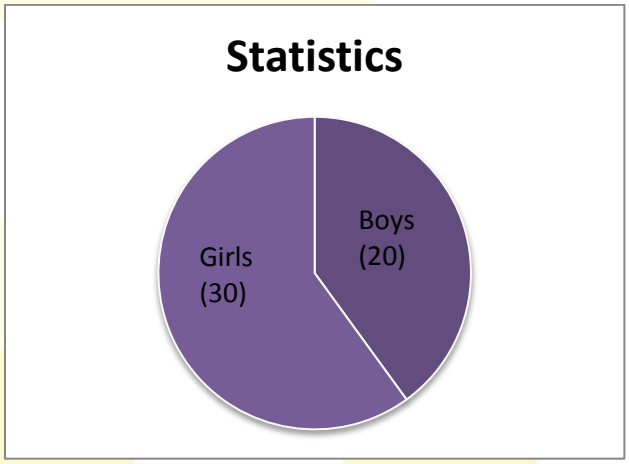
- "Statistics are numerical statements of facts in any department of enquiry placed in relation to each other" – ***Bowley***

- "By Statistics we mean quantitative data affected to a market extent by multiplicity of causes" – ***Yule and Kendell***

Characteristics of Statistics (plural noun)

1. **Aggregate of facts:** - Statistics implies aggregate number of facts which provide exact information to the user of that data. A single/isolated number is not a part of statistics as no conclusion can be drawn from it.





2. **Numerically expressed**: Statistics is expressed in terms of numbers, and thus should be expressed numerically.
3. **Affected by multiplicity of causes**: Statistics does not depend on one factor alone, but on many factors simultaneously.
4. **Reasonable accuracy**: Accuracy is in terms of objective for collecting data, its nature, etc.
5. **Placed in relation to each other**: If the data cannot be compared, it will not be called statistics. Only when the data is comparable, it will be considered as a part of the subject.
6. **Pre-determined purpose**: The collection of statistical data should be defined by a pre-determined objective. Any information collected without any objective will only be a numerical value as the explanation of the data would turn out to be very vague.
7. **Enumerated or estimated**: Statistics may be collected by enumeration or the same be estimated. If the data taken into consideration is large, then estimation is an appropriate method. Otherwise, enumeration should be considered.
8. **Collected in a systematic manner**: A systemized manner should be adopted for the collection of data. Without any plan, the data collection done is a haphazard manner would only lead to misleading outcomes.

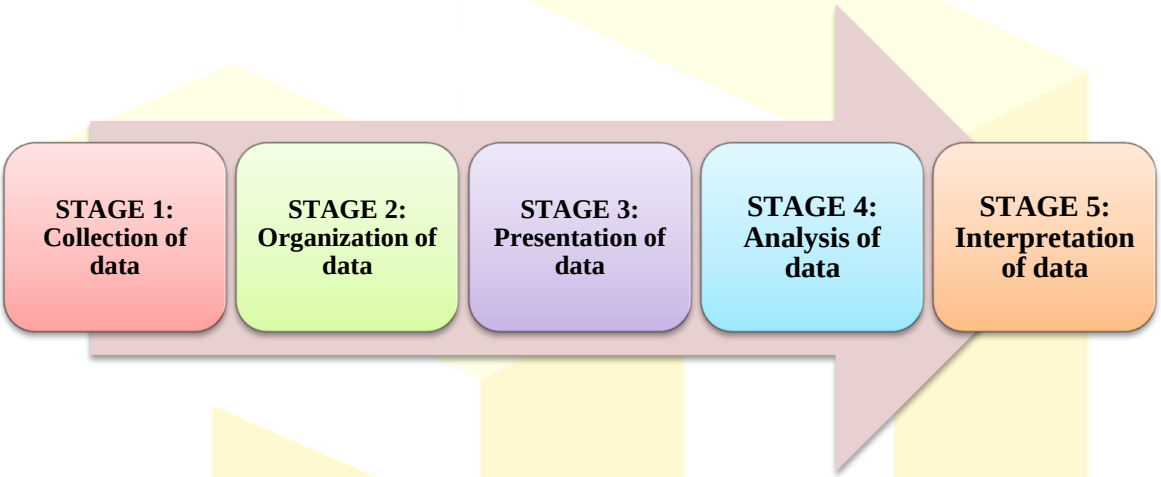
Statistics in singular noun/sense

"Statistics may be defined as the collection, presentation, analysis and interpretation of numerical data." – ***Croxton and Cowden***

"Statistics is the science which deals with the collection, classification and tabulation of numerical facts as a basis for the explanation, description and comparison of phenomena" – ***Lovitt***

Stages of Statistical Study and Statistical Tools (according to the reference of Statistics as a singular noun)

The study on statistical data is undertaken through various stages which can be diagrammatically presented as:



The stages are discussed below:-

1) **Collection of data:** It is the first step in a statistical investigation. The data may be primary or secondary in nature. Primary data is originated by the investigator for a specific purpose. Obtaining such a data can be time-consuming and expensive. Secondary data on the other hand has already been collected and is readily available to the users. This type of data is comparatively cheaper, less time-consuming and would save the user from committing errors.

2) **Organization of data**: Although secondary data is in an organized form, primary data needs to be arranged in a systematic manner. Editing is done to omit irrelevant and inconsistent data. Data is further classified based on specific characteristics. Tabulation is then done by arranging the data in rows and columns for absolute clarity.

3) **Presentation of data**: Tabulated data is then presented in the form of graphs, pie charts, etc., to facilitate statistical analysis.

4) **Analysis of data**: A very important stage for the investigator is the analysis of data, because the outcome of the investigation is based not only on the data collected but also the technique used to analyze it.

5) **Interpretation of data**: This stage requires a great degree of skill and experience of the investigator. If data is not interpreted correctly, it might lead to flawed conclusions, hence adversely affecting the decision-making strategy for the primary objective.

Therefore each stage involves the use of certain standard techniques or methods which are known as statistical tools.

STAGES	STATISTICAL STUDY	STATISTICAL TOOLS
Stage 1	Collection of Data	Census or Sample technique
Stage 2	Organization of Data	Array of Data and Tally Bars
Stage 3	Presentation of Data	Tables, Graphs, Diagrams
Stage 4	Analysis of Data	Percentage, Averages, Correlation, Regression
Stage 5	Interpretation of Data	Magnitude of percentages, averages and the degree of relationship between different economic variables

Scope of Statistics

Due to increasing competition and advancement in technology, the scope of Statistics is continuously rising. No field of study is complete without the supporting quantitative information about that field. A few important fields where Statistics is used:

1) **Statistics and the Government**: Statistical methods help in promoting human welfare, bringing stability in the economy and promoting growth in the country. It helps in appropriate policy formulation and monitoring its effective implementation by the government.
2) **Statistics and Business**: Earning profit is the aim of every business organization. Profit is governed by costs incurred in production of goods/services, price of factor inputs used (capital, labour), number of competitors in the market, etc. All these details are accessible to the producer with the help of statistical tools.
3) **Statistics and Economics**: Every problem requires extensive use to statistical data in the field of Economics. Maximum laws in Economics are based on the study of large number of units and their analysis is enabled by statistical data and methods.

Importance of Statistics in Economics

1) **Simplifies complex data**: Statistics helps to condense huge and complex data, thus stating the significant figures which convey definite meaning.
2) **Quantitative expression of economic problem**: Statistics presents facts in a precise and definite form and are conveyed in exact quantitative terms; hence it helps the objectives to be achieved.
3) **Inter-sectoral and inter-temporal comparisons**: Quantitative numbers make no sense in isolation, but statistics helps in the comparison of like terms and provides magnitude across various categories taken into consideration.
4) **Working out cause and effect relationship**: Economists are required to analyze the cause and effect relationship between different variables to suggest an appropriate diagnosis

regarding the problem. Thus the relationship can be diagnosed only by the data provided by statistics.

5) **Construction of economic theories and economic models**: The inverse relationship between demand and supply prices is due to a well known statistical relationship, and therefore is a part of economic theory.
6) **Economic forecasting**: Record of past and the present data helps to predict the future trend. Economists do forecasting/assess the future course of action using the statistical studies which help them in future planning.
7) **Formulation of policies**: Statistical data helps the Government to formulate various economic policies.
8) **Economic equilibrium**: Usage of statistical methods helps economists to form some economic fundamentals regarding the level at which the satisfaction of an economic unit is maximized.

Limitations of Statistics

1) **Study of numerical facts only**: Statistics studies only quantitative data, thus ignoring qualitative phenomenon.
2) **Study of aggregates only**: Statistics does not deal with isolated numbers as the individual facts lead to fallacious thought regarding the individual unit.
3) **Homogeneity of data, and essential requirement**: Statistics is rigid regarding the data taken into consideration. It fails to compare heterogeneous data.
4) **Results are true only on an average**: Statistical data is not always valid under all conditions. They just express the tendencies of the variable under consideration rather than the actual numbers.
5) **Without reference, results may prove to be wrong**: The basic flaw of statistical data is that if the circumstances/conditions are not studied and the conclusions have been drawn, these conclusions might become fallacious.
6) **Can be used only by experts**: Only those people who are qualified in statistics can understand the data and make use of it.
7) **Prone to misuse**: The data which is not true can be made true with the use of statistics, hence making its application unethical.