

Introduction

Need to Study Economics

Preface

In this part of the subject, we will focus on how statisticians collect data and other information and how they organise and present the data to obtain a meaningful study. We will also learn about various statistical tools—from the basic ones such as mean, median, mode and correlation, to the more sophisticated ones such as mean deviation, standard deviation and various types of index numbers. The following is a list of the lessons we will go through during our study of statistics.

Chapter 1: Introduction to Statistics

Chapter 2: Collection of Data

Chapter 3: Organisation of Data

Chapter 4: Presentation of Data

Chapter 5: Measures of Central Tendency

Chapter 6: Measures of Dispersion

Chapter 7: Correlation

Chapter 8: Index Numbers

Lesson Objectives

Before we begin our journey to explore statistics, let us take a look at economics as a subject. This particular lesson will provide us with an overview of economics. The broad objectives of this lesson are as follows:

- Introduction to economics
- Scarcity of resources and choice
- Need to study economics
- Definitions of economics

Introduction

The word “economics” is derived from the Greek words *oikos* (meaning “house”) and *nomos* (meaning “manage”). Thus, the literal meaning of economics is “to manage the house”. Over the years, the meaning and horizon of economics have broadened. Let us understand what economics is all about and why there is a need to study it.

In the words of Alfred Marshall, economics is “the study of mankind in the ordinary business of life”. The phrase “ordinary business of life” is significant. To understand the significance, let us first clarify *certain terms and concepts*.

i. Consumer: This person consumes goods and services for the satisfaction of his wants. Every person engages in different consumption activities every day. We consume loads of small and big items in daily life, right from vegetables to cars. Thus,

we are all consumers.

ii. Seller: This person sells goods and services (which he produces himself or which are produced by somebody else) with the motive of earning a profit. We see many shops selling different goods and services. However, it must be noted that a seller may or may not be a producer. For example, a seller of grocery items is not the producer of the items he sells. He just purchases the goods produced by others and then resells them with the aim of earning a profit.

iii. Producer: This person produces various goods and services to sell in the market with the aim of earning a profit. For example, a manufacturer produces various items and then sells them in the market. An important observation in this regard is that all producers are sellers, but not all sellers are producers. This means that all producers sell the things that they produce, but a seller may or may not be the producer of the items he sells.

iv. Service holder: This person works for another person and gets paid for rendering his services. For example, a labourer is paid wages in return for rendering his labour services.

v. Service provider: This person provides services to others by employing people and gives payment in return. For example, a company or an employer provides internet services in an area by employing other people. Here, the company or the employer is considered as a service provider of internet services.

In all the above cases, a person is gainfully involved in some **economic activity**. Economic activities involve the use of scarce resources for carrying out production, consumption, saving, investment, etc. These are undertaken with the aim of monetary gain. These economic activities comprise the “*ordinary business of life*” referred to previously.

We read how economic activities involve the use of scarce resources. Let us understand what scarcity of resources means.

Scarcity of Resources and Need to Study Economics

We have different needs and wants. A unique feature of human behaviour is that human wants are unlimited. As one want gets fulfilled, another crops up in its place. However, the resources to satisfy these wants remain scarce. No amount of resources is enough to satisfy the never-ending wants.

For instance, a consumer faces a limited availability of money, while a producer faces a limited availability of resources required for production. In such a scenario, both the consumer and the producer have to make choices among their different needs. A student having Rs 50 must make a choice between buying a textbook and buying a novel. A producer with only a limited amount to invest must decide upon the product to manufacture. Similarly, a teacher must choose the school in which to render his

services.

To satisfy one want, a person would have to give up on some other want. An individual fulfils his wants according to his needs, satisfactions and priority attached to the different wants. Those wants which provide the highest satisfaction to the individual concerned and to which he has attached the topmost priority, will be fulfilled first.

This problem of choice arising from the scarce availability of resources is known as ***economic problem***. Like an individual, an economy also faces economic problems, that is, the problems of choice due to scarce availability of resources. This gives rise to the need for studying economics.



Introduction to Central Problems of an Economy

Scarcity is the root cause of all economic problems. The things that satisfy our wants are limited in availability. Similar to an individual, the resources of an economy always remain scarce in relation to the unlimited wants. Moreover, these scarce resources have alternative uses and can be allocated to the production of different goods and services. This gives rise to the problem of choice.

For example, a piece of land can be used for cultivation, for construction of buildings, as a park, etc. The economy must decide upon the top priority with respect to using a particular resource and make a choice among the different uses of the resource. The economy must make the choice of allocating resources in such a way that the allocations yield the maximum possible and optimum returns. This problem of choice leads us to the *three central problems* of an economy. These are:

i. What to produce and how much to produce?

- ii. How to produce?
- iii. For whom to produce?

By studying economics, we can understand how an economy solves these central problems. We can thus say that economics is the study of the mechanisms used by an economy or a society in making choices related to scarce resources and in allocating these resources in such a way as to obtain maximum possible and optimum returns.

Components of Economics

The study of economics has the following *four broad aspects*.

1. **Study of consumption:** This aspect deals with the study of the behaviour of consumers in different types of markets. The basic concern here is to understand how a rational consumer makes his preferences to get the maximum possible satisfaction, keeping in mind his fixed level of income, the prices of various goods and services, etc.
2. **Study of production:** This aspect deals with the production decisions of producers in different types of markets. It explores how a producer takes various production decisions. It highlights how a producer combines different inputs (given their prices) in order to minimise cost of production and maximise profits.
3. **Study of distribution:** This aspect explores how national income is distributed in a country. In other words, we analyse how the income arising from the total production of an economy is distributed in the form of wage, profit, rent and interest among the different factor owners (labour, entrepreneur, land and capital).
4. **Study of basic macroeconomic problems:** Economics is the most powerful tool to understand and analyse the root causes of the basic macroeconomic problems (such as poverty, unemployment and income disparity) faced by an economy. Not only does economics help us understand the interrelationship between these problems, but it also helps us take various corrective measures to counter these problems.

Having discussed economics in some detail, we will now take a look at its different definitions.



Definitions of Economics

Various economists have given various definitions of economics. Broadly, the definitions can be classified into the following four categories.

- i. Wealth definition
- ii. Welfare definition
- iii. Scarcity definition
- iv. Growth-oriented definition

Wealth definition

This category includes definitions given by classical economists such as Adam Smith and J.B. Say. Their definitions of economics focus on the production and expansion of wealth (material objects). Adam Smith's definition of economics is as follows: "Economics is an enquiry into the factors that determine the wealth of a country and its growth."

Welfare definition

This category comprises the definition given by Alfred Marshall. He assigned greater importance to human welfare than wealth. So, for him, wealth is not the end, but a means to enhance human welfare. Marshall defined economics as follows: "Economics is a study of mankind in the ordinary business of life. It examines that part of individual and social action which is most intimately connected with the attainment and use of material requisites of well-being."

Scarcity definition

This category comprises the definition given by Lord Robbins. It is one of the most popular definitions of economics. This definition refers to the unlimited human wants and the scarcity of resources. Robbins' definition of economics is as follows: "Economics is a

science which studies human behaviour as a relationship between ends and scarce means which have alternative uses.”

Growth-oriented definition

This category comprises the definition given by Samuelson. He combined features of Marshall's and Robbins' definition of economics. Samuelson's definition is as follows: “Economics is the study of how men and society choose, with or without use of money, to employ scarce productive resources which could have alternative uses, to produce various commodities overtime and distribute them for consumption now and in future among various people and groups of society.”

Having understood the meaning and the need of studying economics, in the subsequent lessons we will explore what statistics is all about and how it proves as an indispensable tool in the study of economics.

Study of Statistics- Important and Limitations

Lesson Objectives

- Significance of Statistics in Economics
- Meaning of Statistics: In Plural Sense and In Singular Sense
- Functions of Statistics
- Scope of Statistics
- Limitations of Statistics

Significance of Statistics in Economics

In the first part of this subject, we studied about the Indian economic development. We started by looking at the Indian economy at the time of independence. Then, we discussed how India moved towards the planning process and how it gradually undertook the economic reforms in 1991.

After that, we analysed the challenges confronting the Indian economy at present in the form of poverty, human capital formation, rural development, employment, infrastructure and environment. Finally, we compared the economic development and the growth experience of India with those of its neighbouring countries Pakistan and China.

You must have noticed how throughout our study of the Indian economic development we came across different numerical facts and figures. The performance of the Indian economy was assessed with the help of relevant data on agriculture, industry, trade, demographic conditions, occupational structure, etc. Similarly, the assessment of the economic problems of poverty, unemployment, rural development, etc. was done with the help of numerical data. In other words, our study of the Indian economic development was supplemented by numerical facts and data. Our study would have been rather incomplete if not supported by the numerical data. This should help you realise how and to what extent statistics as a subject is important. In fact, it would not be

wrong to regard statistics as the skeleton and economics as the flesh. Together they help us understand an economy and its various problems.

Definition: Statistics refers to the aggregates or averages that relate to certain enquiries or relationships. The meaning of statistics can be understood in two ways: in the plural sense and in the singular sense.

Meaning of Statistics: In Plural Sense and In Singular Sense

Statistics: In the plural sense

In the plural sense, statistics refers to the systematic collection of numerical facts. It indicates information in terms of numbers or numerical data such as employment statistics and population statistics.

However, it must be noted that mere numbers or figures do not make up statistics. Numerical values can be referred to as statistics only when they relate to some variable such as place, time and person. For example, consider the table given below.

School	Pass Percentage
A	80
B	70
C	50

Here, the numbers “80”, “70” and “50” cannot be referred to as statistics unless it is stated that they indicate the pass percentages in different schools.

Statistics in the plural sense

The meaning of statistics in the plural sense is summarised below.

1. Aggregate of facts: Statistics is an aggregate of numerical facts and figures. A single value does not represent statistics. For example, “marks of student A is 40” is not statistics. It is simply information. However, “marks of students A, B and C are 40, 45 and 42 respectively” can be termed as statistics.

2. Expressed numerically: Statistics expresses qualitative variables in numerical terms. For example, “poverty has declined” is not a statistical statement. However, “poverty has declined by 2% during 1995-96” can be termed as a statistical statement.

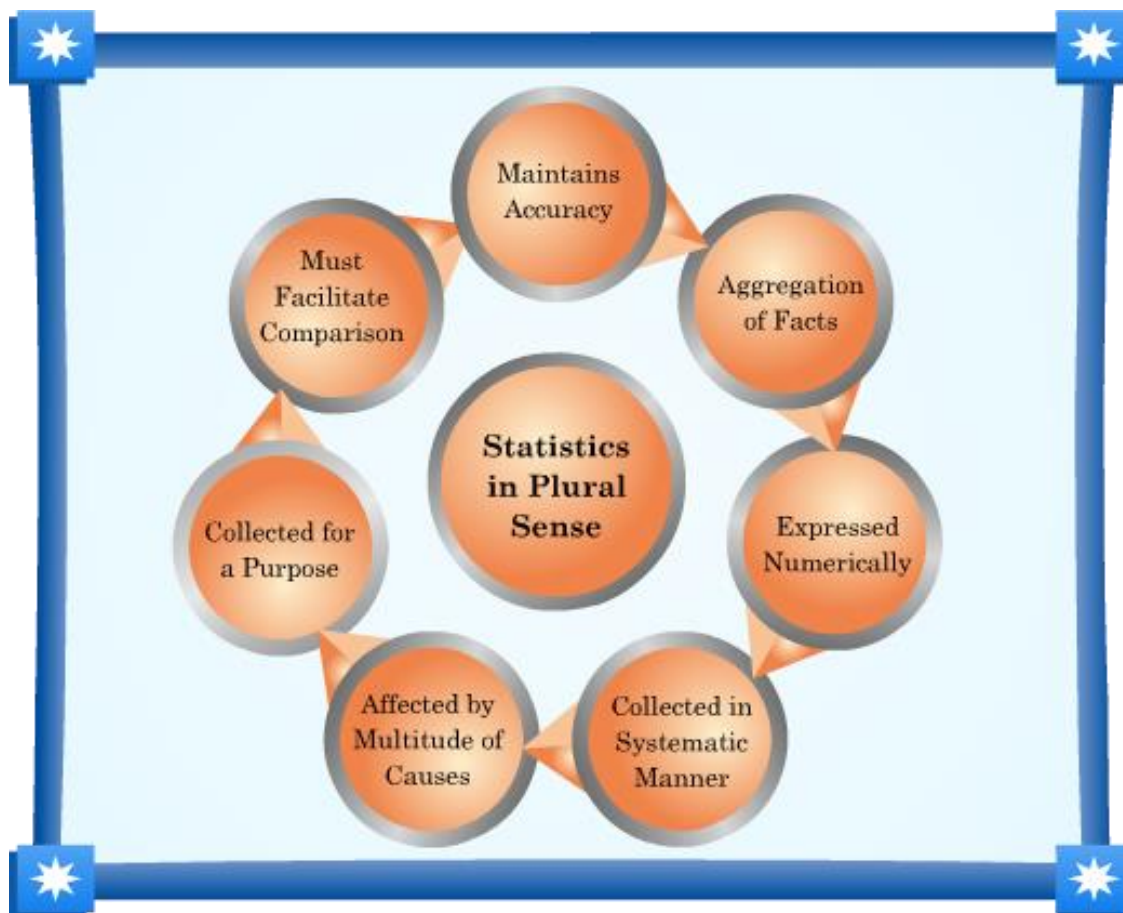
3. Collected in a systematic manner: Statistical data is collected in a systematic and planned manner. Data collected without any order or system is unreliable.

4. Affected by a multitude of causes: Statistical data is affected by a multitude of causes. For example, the data on the demand for a commodity is affected by a number of factors such as price, incomes of consumers, tastes and preferences.

5. Collected for a purpose: Statistical data is always collected with a purpose. A data collected without any purpose is useless. For example, for a study of crop production in the country, the region from where and the crops for which data needs to be collected must be pre-decided.

6. Must facilitate comparison: The collected data must be able to facilitate comparison on various grounds such as time and region.

7. Maintains a fair degree of accuracy in estimation: Often, estimations (approximations) are made in case of large and voluminous data. However, such estimations must have a fair degree of accuracy.



Statistics in the singular sense

In the singular sense, statistics refers to the science of studying statistical methods. It indicates the techniques or methods of collecting, organising, presenting, analysing and interpreting data. The meaning of statistics in the singular sense is summarised below.

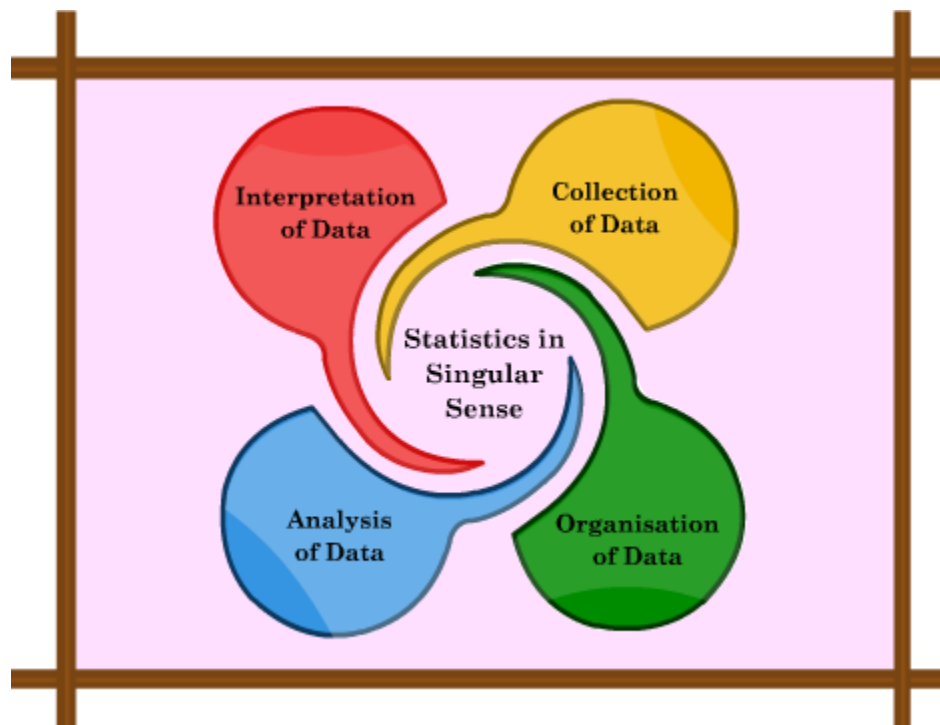
1. Collection of data: It is the first step in any research or study. Thus, utmost care must be taken during the collection of data. Data can be collected by the investigator herself or from reliable sources such as published and unpublished data.

2. Organising of data: The collected data must be organised properly by editing, classifying and tabulating the same.

3. Presentation of data: The organised data cannot be used for analysis unless it is presented in a proper and systematic manner. Data can be presented in the form of tables, graphs, charts, diagrams, etc.

4. Analysis of data: Various tools and methods can be used for data analysis. Examples include averages, dispersion, correlation and regression.

5. Interpretation of data: The last step in any research or study is data interpretation. A study is complete only when proper and meaningful conclusions or inferences are drawn from the data.



Functions of Statistics

The following are some of the important functions of statistics.

1. Presents data in a simplified form: With the help of statistical tools, a large and complex data can be presented in a simple and understandable form. For example, consider a data on the incomes of various families in a region. In itself, it is difficult to understand and interpret, but it becomes comprehensible when presented in the form of averages or some such measure.

2. Gives a definite form to the facts: Statistics allows the conclusions of a research or study to be presented in numerical form. This gives the conclusions a definite quality.

3. Facilitates comparison: Data can be easily compared using statistical tools such as averages, percentages and ratios. Comparison of data helps us in drawing important economic conclusions. For instance, a comparison of the average incomes in rural areas and in urban areas helps us in drawing conclusions relating to regional inequality in income.

4. Guides in the formulation of theories and policies: Policies on various economic matters such as wages and prices are formed on the basis of statistical data. Statistics forms the basis for the formulation and testing of theories. For example, policies for improvement in agricultural production can be formed with the help of statistical data relating to the production of various crops in different regions.

5. Helps in forecasting: Statistical techniques help in forecasting and predicting the future behaviour of various variables such as market situations.

Scope of Statistics

Statistical tools and methods have wide applicability across various fields. The following are the broad areas where statistics is applied.

1. Statistics and business: Business firms use statistics to study market fluctuations and various other relationships such as those between the price of a product and the demand for the same. Statistical methods are used to carry out market surveys on various matters. Statistical tools like analysis and interpretation of data are used for managing a business on various grounds such as production, quality and cost control.

2. Statistics and government: Statistics proves highly useful in the effective functioning of the state. Various policies and plans of the government are formed on the basis of statistical facts and figures. Plans and policies regarding matters such as poverty, unemployment and population cannot be formed without the availability of suitable statistical data.

3. Statistics and natural sciences: Statistical techniques play a vital role in the study of natural sciences such as medicine, biology and botany. For example, in medicine, the diagnosis of a disease depends on data such as pulse rate and blood pressure. Similarly, statistical tools are used to carry out a research on the success or failure of a drug.

4. Statistics and research: Statistical data is a significant input to conduct various researches. Researchers undertake researches for studying different relationships between different variables; for example, price and demand, poverty and health, etc.

5. Statistics and other fields: Statistics is also applied in other fields such as banking, insurance and trade. For example, the interest rate to be charged on loans is decided

on the basis of a survey on the probability of repayment of loans.

Limitations of Statistics

Though widely used, statistics suffers from certain limitations. Some of these are given below.

1. Describes only quantitative aspects: Statistics studies only variables that can be expressed as numerical values. It fails to take into account qualitative variables such as beauty and loyalty.

2. Studies only aggregates: Statistics deals only with aggregates of quantitative variables. Individual values have no significance in statistics.

3. Results hold true only as averages: Statistical laws hold true only on an average basis or approximation. They are not exact. For example, if per capita income in India is Rs 33000, then it does not necessarily mean that each and every person in the country earns Rs 33000.

4. Can only be used by experts: Only a person having a comprehensive and sophisticated knowledge of statistics can handle statistical data efficiently. Such data cannot be properly interpreted by a layman.

5. Data can be misused and manipulated: Statistical data can be manipulated and misused as per the user's discretion. Such manipulated data results in misleading conclusions.

6. Inapplicable to heterogeneous data: Statistical tools do not facilitate comparison in case of heterogeneous data. Data has to be homogeneous in order to be compared.

Despite the wide applicability of statistics, it should be noted that it is *not a substitute for common sense*. Numerical data should not be used without applying common sense. Statistical data should not be believed blindly as it can be misinterpreted or misused.

For instance, statistical data may be politically influenced or may involve personal bias. Moreover, statistical data and methods fail to reveal the errors committed by the investigator while surveying and collecting the data.

Interrelationship between Economics and Statistics

Lesson Objective

- Interrelationship between economics and statistics

Introduction

In the previous two lessons, we learned what economics and statistics are basically about. Do you think that either of the two can be studied without considering the other?

No. In fact, the two are interrelated. The study of economics depends heavily on statistical tools and methods. In this lesson, we will explore the interrelationship between economics and statistics.

Interrelationship between Economics and Statistics

Statistics is an indispensable tool for the understanding of various economic problems. It gives a quantitative aspect to qualitative statements. It is only when economic facts are expressed in statistical terms that they become more exact. A statistical statement holds more meaning and is more convincing than a simple statement without numerical facts and figures.

For example, the statistical statement “population increased by 2% during the last decade” is more meaningful than the simple statement “population increased considerably during the last few years”. Economic statements are incomplete if not backed by appropriate statistical data. Interrelations between various economic factors are studied with the help of statistics.

For example, the interrelation between price and demand can be understood more clearly with the help of statistical data and facts. Similarly, with the help of numerical facts and figures, we can analyse whether a relationship exists between the income of a consumer and her demand for goods and services.

It is on the basis of the study of such interrelationships that the laws and theories of economics are formulated. The laws of economics such as the law of demand and the law of supply hold more meaning if supported by numerical facts and figures. For example, the law of demand states that the demand for a commodity is inversely related to its price. This statement can be understood more clearly if supplemented with appropriate statistical data.

Besides the study of economics, statistics also plays an important role in the functioning of an economy. An assessment of the performance of an economy is not possible without the use of statistical tools. For example, we require relevant statistical data for national income of different years to find out if national income has increased or not. Similarly, we need relevant statistical data to judge the performance of a country on various grounds like contribution of different sectors to national income, analyses of poverty, unemployment, etc.

The government can formulate suitable plans and policies only on the basis of statistical data.

For example, the government requires data on various demographic indicators such as birth rate, fertility rate and death rate in order to formulate policies on population control. Similarly, statistical data relating to poverty proves helpful while formulating policies on poverty alleviation.

The interrelationship between economics and statistics is summarised in the following points.

1. Assessing the performance of an economy: Statistics provides the basis for analysing the performance of an economy and comparing it with other economies. For example, data on national income for different years can be used to assess the economic performance of the concerned economy over a period of time. Similarly, variables such as savings, investments, relative importance of different sectors to national income and contribution of each sector to national income can be assessed with the help of statistical data and facts.

2. Analysing economic problems: The magnitude of economic problems such as unemployment, poverty, illiteracy and population can be judged with the help of statistical data. It is only when the gravity of the problems is understood with the help of statistical data that suitable policies can be formulated to control and remove them.

3. Analysing the relationship between economic variables: Relationship between two or more economic variables can be assessed with the help of statistical data. Such an assessment is helpful in establishing a cause and effect relationship and, thereby, in taking suitable corrective measures. For example, if with the help of statistical data it is established that rise in prices aggravates poverty, appropriate measures can be taken to control rising prices.

4. Base for economic theories and models: No economic theory or model can be constructed without relevant statistical experiments. The various laws and theories of economics such as the law of demand and the law of supply are based on statistical data.

5. Formulation of policies: Statistics helps the government and the policy makers in formulating various policies for economic development. For example, if the government aims at encouraging the production level, then it formulates a policy based on the average production levels for the past few years. Similarly, policies on poverty and unemployment are based on relevant statistical data.

6. Facilitates research: Statistical data forms the base for research and studies. Various statistical tools and techniques are employed in research and studies such as analysing the effect of one variable on another.

7. Forecasting: Economic forecasting such as price trends and market situations has statistics as the base. This helps in the formulation of future plans and policies.

8. Relation with the four basic aspects of economics: Statistics is closely related to the four basic aspects of economics namely, consumption, production, distribution and exchange.

a. Statistics and consumption: An individual or the society consumes various goods and services. These things may be classified as things of necessity, comfort or luxury. The amount (or, the proportion) of income spent on various goods and services can be ascertained only with the help of statistics.

b. Statistics and production: Statistics supports the study of production. For example, with the help of statistical analysis, a producer can identify the actual demand for her product in quantitative terms.

c. Statistics and distribution: Equal distribution of income and wealth is a very important objective of the policy makers. The problem of distribution is tackled by using statistics in the calculation of national income.

d. Statistics and exchange: With the help of statistics, a producer can easily determine the exchange relationship, that is, the relationship between the price of her product and the quantity sold.



To conclude, we can say that statistics complements the study of economics, and the two go hand in hand.