FUNCTIONS OF STATISTICS

"The fundamental gospel of statistics is to push back the domain of ignorance, prejudice, rule of thumb, arbitrary and premature decisions, tradition and dogmatism and to increase the domain in which decisions, are made and principles are formulated on the basis of analysed quantitative facts." (*Robert W. Buges*) For this reason, we find today that there is hardly a phase of human activity which does not find statistical devices useful. The ever-growing usefulness of statistics is due to the functions it performs. The science of statistics performs the following functions :

1. **To Simplify Complex Facts :** The purpose of statistical methods is to simplify great bodies of numerical data. The complex mass of data are made simple and understandable with the help of statistical methods. *Dr. A. L. Bowley* states that, "The object of a statistical estimate of complex groups is to present an outline to enable the mind to comprehend with a single effort the significance of the whole". Human mind is unable to remember huge facts and figures. Statistical methods make these data easy to grasp. Figures are boring. A man is bound to be confused and lost in figures. Statistical techniques like average, variation, graph, diagram, etc.,

1 W. Edwards Deming : On a Classification of the Problems of Statistical Inference. in A. S. A., Vol. 37, pp. 178-85.

make these figures intelligible and understandable. With the help of statistical methods it is possible to understand the whole thing in a short time and in a better way. In the words of *W. I. King,* "It is for the purpose of simplifying these unwieldy masses of facts that statistical science is useful. It reduces them to numerical totals or averages which may be abstractly handled like any other mere numbers. It draws pictures and diagrams to illustrate general tendencies and thus in many ways adapts these groups of ideas to the capacity of our intellects."

2. **To Provide Comparative Study :** The science of statistics does not merely mean counting but also comparison. Comparison in quantitative terms is easy. *Boddington* states that, "The object of statistics is to enable comparison to be made between past and present results with a view to ascertaining the reasons for changes which have taken place and the effect of such changes in the future." *Dr. A. L. Bowley* observes, "A chief practical use of statistics is to show relative importance, the very thing which an individual is likely to misjudge. Statistics are almost always comparative." Hence the chief function of statistics is comparison. Statistical devices like averages, ratios, percentages, rates, coefficients, standard error, etc., offers the best way of comparison between two phenomena.

3. **To Study Relationship Between Different Facts :** Another function performed by statistics is to investigate relationship between two or more phenomena. The relationship existing between demand and supply, money-supply and price-level, rainfall and agricultural production can best be measured with the help of statistical methods. Statistics also helps in finding out the association between two or more attributes.

4. **To Enlarge Individual Knowledge and Experience :** In the words of *Whipple,* "Statistics enables one to enlarge his horizon." *Dr. A. L. Bowley* also observes that, "The proper function of statistics, indeed, is to enlarge individual, experience." Knowledge becomes precise and easy to understand with the help of statistical techniques. Statistics is such a master key that it solves problems of mankind in every field. Many fields of knowledge would have ever remained closed to mankind, but for the efficient and useful technique and methodology of the science of statistics. Statistics sharpens the faculty of rational thinking and reasoning and helps in propounding new theories and concepts; because, "a statistical estimate may be good or bad, accurate or reverse, but in almost all cases it is likely to be more accurate than a casual observer's impression, and in the nature of things, can only be disproved by statistical methods." (*A. L. Bowley*)

5. **To Formulate Policies in Different Fields :** Statistics helps in formulating policies in different fields, specially in social, economic and business fields. Various laws have also been developed on the basis of statistics; for example, Malthus' Theory of Population and Engels' Law of Family Expenditure are due to the statistics collected by these two noted economists.

IMPORTANCE OF STATISTICS

The application of statistical techniques is so widespread, and the influence of statistics on our lives and habits so great that the importance of statistics can hardly be over-emphasised. In fact, the age of statistics is upon use and the present culture has become statistical culture. Without statistics much of the machinery of modern life will grind slowly. *M. J. Moroney* writes, "Whoever you are, if your work calls for interpretation of data, you may be able to do without statistics, but you wont's do so well." Without understanding the meaning of various statistical methods like average, dispersion, correlation, charting etc., it is impossible to understand Psychology, Sociology, Economics, Finance and Physical Sciences even at their elementary states. Even those persons who have knowledge of statistics employ statistical methods in day-to-day decisions. When a person wishes to purchase a radio or a machine, he studies the price lists of various companies for making a choice. What he really aims at is to have an idea about the range within which the prices vary. When a farmer wishes to have a particular quantity of rains in a particular season for good harvest, he has an idea of the correlation that exists between rainfall and crop yield. A labourer may not know any thing about index numbers but he can tell the fluctuations in the prices in terms of percentages or proportions.

How far the science of statistics has affected our culture, is apparent from the fact that at every stage our actions are guided by it. The parents of a newborn baby enquire whether their child is growing at the 'normal' rate or not. Think from where the concept of normal has come

to their minds. How the normal has been determined. The data collected with the help of statistical methods determine the level of normal growth of a child. People expect to be able to buy clothing and shoes accurately sized for children of various ages. But how could a manufacturer get the information which makes such sizing possible, unless measurements had been made and statistically analysed for large numbers of children at each age level. People take insurance policies. The whole business of insurance rests on statistical facts. That is why it has been remarked that, "Statistics affects everybody and touches life at many points." (*Tippett*). *W. M. Harper* observes, "Increasingly, figures have become the basis of rational decisions, and events are proving that these decisions based on figures give better results." It is due to statistics, that many fields have progressed in the past and are still progressing. With the help of statistical methods human activities in the field of Economics, Sociology and Politics can be studied.

IMPORTANCE OF STATISTICS IN ECONOMICS

Statistical data are a powerful aid in economic analysis. *Prof. A. Marshall,* the renowned economist, observed that, "Statistics are the straw out of which I, like every other economist, have to make bricks." The study of every economic problem requires the use of statistical methods. Statistical methods are the tools and appliances of an economist's laboratory. Statistical methods constitute 'tools' which are taken out of the tool-box and used, just as a doctor uses stethoscope for diagnosis of a patient. Economists have been examining economic behaviour in new relations and contexts in an effort to throw added light on the complexities of modern economic organisation and to test hypothesis derived from theory. Statistical data and methods of statistical analysis render valuable assistance in the proper understanding of the economic problems and formulation of economic policies. Economic problems almost always involve facts that are capable of being expressed numerically. In every branch of economics, statistics is indispensable. Statistics of consumption enable us to find out the way in which people of the different classes of society spend their incomes. Such statistics are very helpful for knowing the standard of living and the taxable capacity of the people. The Law of Demand and the Elasticity of Demand are based on inductive reasoning. Under inductive reasoning, general laws are propounded by studying data about a particular phenomenon. It is the function of a statistician to collect data and from those data laws are derived by economists.

Statistics of production help us to adjust the supply according to demand. Such statistics are the measures of productivity of a country. Productivity of different facts of production can be gauged and compared. We can measure our progress year after year. Census of production has become an outstanding feature of every nation. Such statistics are a store-house of valuable information. In the field of exchange we study markets, laws of prices based on supply and demand, cost of production, etc. A systematic study of all these facts cannot be made without statistics. What price should a monopolist charge in order to reap the maximum profit ? What shall be the price of a particular commodity if its supply is increased or decreased ? All such questions can best be answered with the help of statistics. Statistics are the foundation stone of the theory of exchange. In distribution too, statistics play a vital role. With the help of statistics, the national wealth of the country is estimated and its distribution among the people of the country is found out. Equitable distribution of national income and wealth is another serious problem to be best studied statistically. Thus, we find that there is a kinship between Economics and Statistics.

Since the publication of the *General Theory of Employment, Interest and Money* by *J. M. Keynes* in 1936 and the preparation of the national income accounts, there has been a sharp revival of interest in attempt to give numerical magnitude to certain critical problems referred to in theory such as the investment multiplier, to test, by statistical means some of the hypothesis in theory and by the use of numerical data to discover, the context of the newer theory, relations in the economy not previously examined. There has become a new trend of bringing together economic theory, mathematics and applied statistics to solve various economic problems of the day. Modern economists are trying to make economics as an exact science. In this effort, use of statistics and statistical methods is inevitable. *W. A. Spurr* and *C. P. Bonini* observe, "Economists today are no longer content to theorize in abstract term, citing statistics

only as needed to buttress their arguments. Instead, they utilise the excellent data now available to build a sound factual foundation for their reasoning." The improvements in statistical methods about the close of nineteenth century mark the real inception of statistics in economics. Since then economics is being recognised as the Science of Human Welfare and Statistics as Arithmetic of Human Welfare. Development of Economic- Statistical methods like econometric models, input-output analysis, social accounting, cost-benefit analysis, etc., have brought a fundamental change in the place of statistics in economics.

A statistical approach to an economic problem not only leads to its correct description but also indicates lines along which it is to be tackled. Hence, in all types of economic problems statistical approach is essential and statistical analysis is useful. To quote *Dr. Bowley*, "No student of Political Economy can pretend to know complete equipment unless he is master of the methods of statistics, knows its difficulties, can see where accurate figures are possible, can criticise the statistical evidence and has an almost instinctive perception of the reliance that he may place on the estimates given to him." And, "No economist would attempt to arrive at a conclusion concerning the production or distribution of wealth without an exhaustive study of statistical data." (*C. E. Engeberg*). Not only for economists, but for a common man also *Justice Oliver Vendell Holmes* remarked that, "The black letter man may be the man of the present, but the man of the future is the man of Statistics and the master of Economics."

IMPORTANCE OF STATISTICS IN PLANNING

Whenever we think of an economic plan for a country, we have to think of statistics. Planning cannot be imagined without statistics. Statistics is the base upon which structure of planning is based. In drawing plans, in executing them and evaluating the achievement of plans, at every step, dependence on statistics is inevitable. Economic planning is now regarded essential for the proper and systematic development of a country. Economic planning has assumed a special importance in the under-developed countries. Economic planning aims at proper exploitation of the national resources, both men and material, so as to raise the standard of living of the people. Before framing a plan we have to know—what is our present production capacity ? What are our requirements ? What are the resources that can be exploited ? What is the trend of our population ? These questions can not be answered without proper statistics. If planning is adopted for solving some special problems, then we too have to know the extent of the problem. Without statistics, economic planning will be a planning in the dark. In India, while planning for the economic development of the country, plan-framers have made use of the statistical material available in the country. Lack and inaccuracy of statistical data are responsible for many drawbacks and inaccuracies in our plans. Statistics are used in economic planning for the following purposes :

(1) To know the stage of economic development in our country as compared to other countries, statistics are of great help. The problems like over-population, unemployment, lack of industrialisation, low rate of capital formation, etc., which are the characteristics of undeveloped and under-developed countries can be fully understood only with the help of statistical facts.

(2) Statistical language is essential to understand the effect of determining factors of economic development in the past, what psychological and sociological factors need to be developed for economic progress, how far we have progressed in the technical field, what is the level of productivity and such other questions.

(3) It is necessary to determine priorities in different sectors for development. This can be done by examining the structure and importance of production, consumption, exchange and distribution sectors of the economy. For determining priorities, statistical methodology is essential.

(4) Economic planning is done to achieve pre-determined objectives and targets. They have to be expressed in quantitative terms. Financial planning is a part of economic planning. Financial resoures are mobilised through taxation, public savings, deficit financing, debt-issues, etc. Planning and budgeting are integrated. All these functions can be done successfully with the help of statistics.

(5) Evaluation of the success of a plan is also done with statistics.