PERIYAR UNIVERSITY

(NAAC 'A++' Grade - State University - NIRF Rank 56
State Public University Rank 25)

SALEM - 636 011

CENTRE FOR DISTANCE AND ONLINE EDUCATION (CDOE)

M.A. SOCIOLOGY

SEMESTER - I

ELECTIVE - II:
SOCIAL DEMOGRAPHY

(Candidates admitted from 2025-26 onwards)

PERIYAR UNIVERSITY

CENTRE FOR DISTANCE AND ONLINE EDUCATION (CDOE)

M.A Sociology 2025 admission onwards

ELECTIVE - II

Social Demography

Prepared by:

Dr.C.Gobalakrishnan
Professor
Department of Sociology
Periyar University
Salem - 636011

Scrutinized & Verified by:

BOS Members,
Centre for Distance and Online Education (CDOE)
Periyar University
Salem - 636011

TABLE OF CONTENTS

Unit – I

INTRODUCTION

Structure

Objectives

This unit is discussed about various facets of Social Demography and after going through this unit the students must able to

1. Comprehend the meaning and definitions of Social Demography
2. Understand the origin and development of Social Demography
3. Describe the nature and scope of Social Demography
4. Apprehend the importance of Social Demography
5. Know the concepts of Demography and Population Studies
6. Realize the relationship between Demography and Sociology
7. Discuss the sources of Demographic Data like Population Census, Civil Registration System, National Sample Survey Organization and National Family and Health Survey

1.1 Introduction

Study of demography is assuming increasingly more importance significance not only in India but all over the world. It is primarily because ever-growing population in developing and under-developing countries in particular and developed countries in general, is straining social, economic and even political systems of the nations.

Significance of population studies was realised even in the ancient past. History is a witness that both in India and abroad, in one form or the other some account of population and its expansion and spread was kept, so that state remained aware of growing population. Of course, during those days population explosion did not become a matter of concern because needs of growing population were very limited and available resources adequate which enough to meet even increasing needs of ever growing population. But present scenario the population explosion is one of the serious problems so everyone must understand the basic concepts, theories, measures and controlling mechanisms of the population.

Origin and Development

It is very difficult to specifically mention and pin-point when demographic studies began in the world. From all accounts it, however, becomes clear that these studies are as old as human society itself. Traditionally, all over the world there has been a tendency to keep an account of human population. It can safely be said that demography started when human beings joined civil society. As the time passed, every nation realised need and necessity of maintaining proper records of human population for smooth running of administration and for solving many social as well as economic problems. It appears that population records were maintained during the times when Egyptian, Chinese, Greek and ancient Indian civilisations flourished in the world. It also appears that population was counted in Jeddah in 2030 B.C. Greek historian Herodotus makes us believe that in about 480 B.C. Zerxes had the counting of his soldiers before invading Greece. From the records it also appears that among Romans counting of their population for the first time was done in 435 B.C. and thereafter in 470 years population was counted as many as 69 times.

In so far as ancient India is concerned, from our religious books it appears that population was counted during Ramayan and Mahabharata times as well. We come across frequent references about population counting, particularly those who laid their lives during Mahabharata war. Similarly we also find references about population counting in Arthasastra of Kautilyaand more recently in Ain-i-Akbari.

Coming to recent times we find that Henry VIII of England got the records of the dead's prepared, who were the victims of plague of 1535. He also got weekly bills of mortality prepared in which information was provided about those who died during the course of the week. For this purpose even a press was set up in London. But it may be clearly understood that during that period population counting was not considered as end in itself, but was only means to an end; end being either to know the strength of armed forces or making an estimate of available man power of invading the enemy etc. Another important reason and consideration which weighed with them was that they wanted to know how many more persons had been added to pay revenue. Even some religions maintained an account of deaths and births of their followers and those who performed marriages according to their religious traditions.

Demography in Modern Times

As already pointed out that demography subject in its real sense has started along with emergence of the human society. It has rightly been said that, "Registration has a long story; its need was recognised as early as in 1250 B.C. in Egypt, when in the reign of King Rameses II an elaborate system was set up. Different countries began registration of vital events in different periods and for variety of reasons. Realising the importance, the churches started keeping records of bapticons, marriages and death of their members in some countries from the beginning of 15th century". But credit goes to John Graunt (1620 – 74) for starting demographic studies during modern times, in the real sense. He brought out his famous volume entitled, "Natural and Political Observations Upon the Bills of Mortality". It came out in 1662 and made him the real founder of demographic studies. In this volume he has analysed the number and causes of death of certain places. He also discussed the need and necessity of such analysis and approach followed by him and also discussed the need and necessity of such analysis and

approach followed by him and also some details were given about births, migrations, family growth and similar other problems of some places. He has also analysed the population which was capable of serving in the army. He has suggested that the population should be studied on the basis of sex, religion, age, occupation, status and state.

John Graunt believed that fertility, mortality and migration were interrelated processes and that these were based on definite postulates. According to him birth rate which was related to male sex was always greater than the one which related to female sex, if in a given society number of both the sexes was the same. Then his finding was that mortality rate was higher in urban as compared with rural areas and also that it was higher at the beginning of life than at any after stage. He also had knowledge of simple survey, because where the records were not available, he compiled them on the basis of such surveys. Credit also goes to him for the preparation of life tables.

Graunt studies are important in several ways. He critically examined data on mortality and fertility and pointed out their weaknesses, biases and in adequacies. He started an important tradition of evaluating any population data. He also made several important observations based on his data. He estimated the size and growth of the population in London in absolute members. He avoided such speculations which were not supported by empirical data. He thus laid the foundation of a new science. While discussing the contribution of Captain Graunt, Peter, R. Cox has said, “Graunt’s work covers so wide on area of interest that it may be said that a large part of demography was born all at once. The developments that occurred subsequently were in the nature of consolidation”.

The work was continued by his contemporary William Patty (1623 – 87). In 1690 came out his famous treatise entitled, “Easy on Political Arithmetic”. In this he has given his views about population growth, urbanisation, unemployment of labourers and national income, etc. He has also stressed need and necessity of a central statistical office. He also prepared life tables.

After William Patty came Edmund Halley (1656 – 1742). He worked in Germany and attempted to prepare life tables on the assumption that life and death rate will always remain the same. But subsequently he came to the conclusion then

it was difficult to maintain static population growth rate. But he could establish that there was close relationship between population studies and other social sciences. He constructed the first empirical life-table on the data of life and death.

Then another scholar who contributed to this subject was Geogory King (1645 – 1712). He was an English scholar who estimated the population of England and Wales; which was by then only the first estimated one of its kind.

Then Richard Price prepared life table and rate of death and birth growth rate of people in Sweden. But his more important work appeared in 1783 in Northamptom Table. It was based on the death rate of Northamptom area. In this it was assumed that the population would remain static, with the result that in this table also undue stress was laid on death rate.

In Germany, in 1761 – 62 Sussmilch collected figures about population and analysed these, he also collected information about age at marriage, tendency towards growth, causes of death on various occasions, etc. He combined Swedish, German and French data in a massive volume consisting of about 1200 pages with 68 tables. He tried to prepare mortality tables of universal applicability. He based his findings on large number of observations. Today he is considered to be the first person who laid stress on the law of large numbers. He believed that the value of findings increases along with number of cases on which findings are based.

But all these studies broke no new grounds and continued to work on the lines given by Captain Graunt. 'New grounds and studies' about population started only with Malthus. But it will have to be admitted that they had desire to know in quantitative terms relationship in the processes of life and death.

Phase of History of Demography

Whole history of demography can broadly be divided into four phases. First and important phase of the history starts with Thomas Robert Malthus (1766 – 1834).

First Phase: (Malthu's Approach). Credit of seriously and scientifically studying population problems goes to Thomas Robert Malthus, who brought out his famous volume entitled. "An essay on the Principles of Population, as it Affects the Future Improvement of Society". He brought this out without disclosing his name.

Four years later he again brought out the volume supported by figures and data collected from different countries. He came to the conclusion that population growth is on the basis of geometrical progression whereas food products grow on the basis of arithmetical progression. This creates serious imbalances and a situation of dismay and disappointment in the near future as well. Since human beings do not make deliberate attempts to checks become unavoidable. Whether this philosophy or approach is reasonable or not, but one thing is certain that Malthus drew the attention of the world to the serious problems which population growth could pose. Similarly, Malthus also stressed the need for the study of demography in a very serious manner. The impact and influence of this study of Malthus was, that population problems began to be studied, analysed and critically approached in all parts of the world. In this way to can be said that Malthus's study was first phase of population study.

Before, however, proceeding further, it is essential to point out that Malthus's approach to the study of population had some serious shortcomings as well. It has been said by Thompson and Lewis in their 'Population Problems' that, "Malthus never made completely clear whether he really meant that population was limited by food or by subsistence, nor die he express exactly what he considered the difference between them". It has also been said that Malthus's continued use of the arithmetical and geometric ratio was unfortunate, Malthus, while discussing preventive checks in the Scandinavian countries and France, did not make any mention about contraceptive practices, though that was an important factor in the study of population. Thompson and Lewis while discussing the contribution to the study of population study have said, "Malthus's primary contribution to the study of population, and the one which in our opinion makes him the real father of modern population study, was his use of facts for the support of his general doctrine regarding the dynamics of population growth and change in their relation to man's welfare.

When Malthus was expounding his ideas about population, almost at the same time a Chinese philosopher Hungliange Chi also studies population problems. It is a matter of chance that he also came to the same conclusions to which Malthus had reached. He also concluded that moral restraints were most essential for checking population growth. He also agreed with Malthus, that increase in

population was an important cause of poverty. This idea was, however, subsequently challenged by Karl Marx who came to the conclusion that poverty could not be brought to an end by checking population growth but that could be done only by bringing a powerful social revolution.

Second Phase: Second phase of population studies started with the beginning of 19th century. Malthus had set the ball rolling but main difficulty with these studies was that there was considerable difficulty in finding out some uniformity in these studies. During this phase Joshia Milne started improving the studied related to figures. This work was also undertaken by William Farr (1807 – 83) in England. He prepared reports about population of Victorian era, so that it was possible to undertake some sort of social legislation. It was also during this period that an attempt was made to establish a sort of relationship between actuaries and demography. He was appointed in General Registrar Office in England in 1839. He significantly contributed to the methodology of population analysis by constructing life tables and study of occupational mortality. In 1837, John Finlayson came to the conclusion that for having realistic estimation there must be proper must be proper registration of figures about birth, death and marriage, with the result that for every study about social progress help of death and birth registration office began to be sought. Effect of the efforts of these demographers was that study of population problems became a matter of serious concern in Britain, France, Germany and England. But real contribution in he filed during this period was made in England. It has been said that, “Thoroughness and capacity for systematic analysis of a large volume of information were desirable qualities in dealing with the new masses of figures relating to complex matters. Among those who possessed these and other qualities and successfully pioneered in this field was William Farr, who was responsible for preparing census and registration reports who drew attention of the general public gto the high morality in certain district”.

It was during this period that relationship of mortality with fertility was studied. Demography was now also begun to be internationally accepted as an aspect of life to be studied. It was recognised by International Congress of Hygiene and Demography. It was then recognised as a science which dealt with deaths, migrations and marriages of people. It was also during this period that Achille Guillard brought out ‘Elements de Statistique Humanie on Demographic Comparee’.

Third Phase: Third phase about population studies started in the beginning of 20th century. In 1922, Carr Saunders brought out his famous volume entitled, 'The Population Problem: A Study in Human Evolution". It was in this volume that he tried to develop demography as a new branch of knowledge. He also developed optimum theory of population. He attempted to make demography as a subject of study with a view that it could get a place in the family of social sciences. He believed that population problems related to human behaviour and control. He tried to make a systematic statement of the problems of population size and growth and raised discussion on genetic question. In the words of Thompson and Lewis, In brief, Carr Saunders may be said to sponsor the theory that man's growth in number has been largely determined by his denotations of the economically desirable numbers under his conditions of life…. But since Carr Saunders regards man growth as wholly within his control and as conditioned by the attitudes of mind that he has developed under his institutions and particular physical conditions of his life, his theory stands in sharp contrast to those who were based on natural law".

It was during this period that Arsene Dumout (1849 – 1902) came forward and he developed 'Theory of Social Capillarity' which was based on study of population of France. He was of the view that, "The development of numbers in a nation is in inverse ratio to the development of individuals". About the Indian situation and conditions he said, "In countries like India, where social capillarity is relatively inactive because of a rigid caste system, there is no tendency for the birth rate to decline and for population to die out. A rigid social structure may prevent upward movement in society, and thus help to keep individual development from becoming so engrossing that individual has no time for rearing a family". It was also during this phase of development that Euler, Dudwig Moser and Alfred Lotka developed what is commonly known as Quantitative Theories of Population. Lotka considerably influenced demographic studies in 1930's.

In 1916, National Birth Rate Commission was appointed. In 1930, Professor Lamcelot Hogben who was interested in the study of population problems was appointed to the chair of Social Biology. In 1938, R.R. Kueznski was appointed as Reader in Demography in London School of Economics. In 1936, a population Investigation Commission was appointed in England to study the problem of

declining birth rate. In 1943, a Royal Commission was set up to enquire into reasons for the falling birth rate in England.

In the USA Walter Willcox, in 1891, published his statistical study of divorce. In 1925, Louis I Dubblin along with A.J. Lotka published a treatise on stable population model, which is even now considered an important landmark in population studies. In 1922, in the U.S.A. Scripps Foundation for Research in Population Problems was established with Warren Thompson, an important demographer as its Director. In 1937, at Princeton University Population Association of America was brought into existence.

During this period considerable progress and development in this regard was made in the U.S.A. Attempts were made to collect figures and facts about population and attempts were made for their classification. Similarly figures were collected about unbridled gaps and predictions made on the basis of these figures about future growth. Help of mathematics and mathematicians was also sought and used. It is also known as Mathematical Approach. Verhulst developed Logistic Curve theory of population studies, which tried to establish that after sometime population growth will become zero and static. In the field British Royal Commission, League of Nations and U.N.O. did and are doing considerable work. Among the individuals who carried out population studies mention may be made about Cannan, Bowley, Pearl and Whelpton. Among international organisations which developed word, mention may be made about 'The International Union for the Scientific Study of Population' which enrolled leading demographers from many parts of the world. It sponsored Congresses about demographic studies in 1927, 1953 and 1965. Other important organisations which prompted demography included 'The Institute National D' Etudes Demographiques' in Paris: Population Council, U.S.A. and Population Investigation Committee, London. U.N.O. also appointed a Population Commission, which is loaded with the responsibility of collecting population figures from different parts of the world and to suggest methods for the improvement of population studies. The commission has all along felt that there is dire need for improving population studies in the developing countries and to a considerable extent this Commission has also succeeded in conducting scientific population studies.

Population studies have received considerable attention after World War II, particularly in third world countries. One reason for this being rapid decline in the mortality of low income countries and second being political freedom of several Africa-Asian countries which had now high hopes for removal of poverty and better quality of life. These nations favoured planned development. The planners in these countries realised that their developmental activities were being hampered because whereas death rate had been controlled birth rare had remained unaffected. These nations therefore paid much attention to population studies. Not only developing but after World War II developed nations too paid considerable attention to these studies. Another dimension to population studies was added with the western world's increasing awareness of deterioration in environment and rapid population growth because of industrialisation.

The efforts of these individuals and national as well as international organisation have resulted in making demography an independent subject. It has now been brought very close to social sciences. Thus, on the one hand, it has the essentials of physical, whereas on the other those of social sciences. In the words of Dr. B.N. Ganguli, "It is a field where biologists and sociologists have joined hands to correct the follies of a civilisation caught up in the bold advances of modern science towards specialisation of nature and the eventual exhaustion of natural resources. Economists, demographers and sociologists can no longer afford to ignore the ecological dimensions of both population and development".

Before proceeding further it may be mentioned that after Second World War U.N.O. and other international bodies have made significant contribution in the field of population studies. Mention has briefly been made earlier to some of its activities. U.N.O. sponsored first world Population Conference in Rome in 1954, followed by Belgrade in 1965 and Bucharest in 1974. The year 1974 was also celebrated as U.N. World Population year in which several population activities were undertaken. In 1956, U.N.O. in collaboration with the Government of India set up Demographic and Research Centre at Bombay. It is now known as International Institute for Population Studies. U.N.O. has also set up five such other centres, since then; one each at Chlile, Cairo, Araca, Yaounde and Bucharest.

The Economic and Social Commission for Asia and the Pacific at Bankok is actively promoting regional population studies. World body has published several manuals which have proved very useful for those engaged in population studies. U.N. Demographic Year Book is a good source material for researchers in any area of population studies. Both W.H.O., F.A.Q. and U.N.E.S.C.O. are keenly interested in the study of world population problems. International Statistical Institute, Netherland and International Union for the Study of Population are other bodies which are keenly studying international population problems.

Communist Population Doctrine (Fourth Phase): It was during fourth phase that communist population doctrine developed. During 20th century Communism became a fully well-established philosophy and that was accepted by the working population as creed and religion. This philosophy had mass appeal in many parts of the world. Karl Marx who was founder of this philosophy discussed, among other things, population problems as well. Earlier to him Malthus had come to the conclusion that most important cause of human poverty was population growth. Karl Marx, however, did not agree with this. According to him problem of over-population was that of the creation of capitalist society. He was convinced that under Communism there could be no question of human poverty regardless of rate of growth. He himself said, “It is the working population which, while effecting the accumulation of capital, also produces the means whereby it is itself rendered so to an ever increasing extent. Thus a law of population peculiar to the capitalists’ methods of production; and, in fact, every method of production that arises in the course of history has its own peculiar, historically valid, law of population. It is only for plants and animals that there is law of population in the abstract and that only in so far as man does not interfere with them”. Thompson and Lewis while discussing the views of Marx on the subject have held. “Marx held that poverty was entirely a consequence of unemployment of under-employment conditions due to the inability of capitalist system to provide jobs for all regardless of how fast new jobs were needed that is to say, regardless of the speed with which population increased”.

The views held by Marx that capitalist system and not population growth is responsible for poverty is up held even today by Communists almost all over the world. In 1942, while addressing the United Nations Population Commission Soviet delegate said, “We consider any population policy formulated by this Commission in

favour of limiting marriages of births in wed locks" as barbarous. Over population is only fruit of capitalism, an adequate social regime can meet any increase of population? It is the economy which should be adapted to the population and not vice versa". At the World Congress of Population held in Rome in 1954, Soviet delegate again said, "There cannot be any surplus population under a socialist regime, in spite of rapid demographic growth".

Though Communist world holds this view, yet in other parts of the world, it is fully well believed that population growth and poverty go hand-in-hand, particularly in the countries where natural resources are very limited or are so meagre that even after their full exploitation, the needs of existing population cannot be met. Even those nations which possess abundant economic and natural resources must reach a stage and at a point of saturation beyond which population growth will be unwelcome for them even.

Demography which was comparatively an insignificant subject about a century back has become very wide subject of study today. Not only this, its importance and significant for studying social economic and political problems is being increasingly realised and appreciated. Demography is today an important key to the solution of many problems of great magnanimity and policy formatters are viewing demographic results with keen interest. As the time is passing with that the importance of population studies is increasing because there is realisation that population explosion in hindering economic development.

Check your Progress

1. Who is considered as Father of Social Demography/Population Studies?
   a. Adam Smith
   b. John Graunt
   c. Robert Malthus
   d. Geogory King
2. Who prepared a Life Table for Sweden?
   a. Richard Price
   b. Arsene Dumout
   c. Walter Willcox
   d. A.J. Lotka

3. When was First World Population Conference held in Rome?
   a. 1952
   b. 1953
   c. 1954
   d. 1955
4. Where is International Institute for Population Studies located?
   a. New Delhi
   b. Chennai
   c. Kolkatta
   d. Mumbai
5. Who has developed the 'Theory of Social Capillarity'?
   a. R.R. Kueznski
   b. Arsene Dumout
   c. Walter Willcox
   d. Louis I Dubblin
6. Explain the views of Karl Marx on Capitalism and Population Growth.

   ……

   ……

   ……

   ……..
7. Trace the factors which are responsible for the origin of Social Demography.

   ……

   ……

   ……

   ……..
8. Elaborate the various phases of development of Social Demography.

   ……

   ……

   ……

   ……

   ……

   ……..

1.3 Meaning and Definitions of Demography

Demography has become a serious subject of study during our own times. There are still differences of opinion about the scope of study of the subject and universally accepted definition of this subject is still wanting. This incidentally also indicates wide scope and coverage of this subject. Demography today can neither be ignored by the planners, nor policy-makers, nor administrators, nor by academicians and politicians. Population studies are being increasingly made from different viewpoints and with different objectives in view and these have today become an integral part of our socio-economic and political systems, on the one hand and planned economic development on the others.

Demography has been derived from Latin word 'demos' meaning people and another Latin word 'Grapho' means to draw. Hence it is the science of people. It was used in a scientific way in 1855 by Achille Guillard and since then the term has been gaining currency. As regard definition of this term, the economists, geographers, social scientists and others have defined it in their own way as that suits their convenience and view point. Obviously some definitions have made its scope very wide, whereas the others have very much narrowed that down. Some of the important definition which have been given in this regard are discussed below, but it is worth remembering that Spengler, Vance, Ryder Lorimer and Moore have made the scope of the study of the subject very wide, whereas Philip M. Hauser and Otis Dudler Duncan have made its scope considerably narrow. Somewhat balanced scope has been given by Irene Taeuber and John V. Grauman.

Definitions of Demography

Some important definitions are given below:

Frank Lorimer. "In broad sense demography includes both demographic analysis and population studies. A broad study of demography studies both qualitative and quantitative aspects of population.

Donald:, J. Bogue "Demography is the mathematical and statistical study of the size, composition, and spatial distribution of human population and of changes over time in these aspects through the operations of the five processes of fertility, mortality, marriage, migration and social mobility. Although it maintains a continuous

descriptive and comparative analysis of trends, in each of these processes and in their net result, its long run goal is to develop theories to explain the events that it charts and compares".

W.G. Barckley: "Demography does not deal with the behaviour of individuals but only with the aggregates of people or even part thereof. The numerical portrayal of human population is known as demography".

H. Stenford: "In this most formal sense demography is a very technical and highly mathematical study of the vital statistics of human population (especially birth, death and migration) as well as of the characteristics of population structure (including age, sex and marital status) as they contribute to an understanding of population change".

Peter R.Cox: "Demography is the study of statistical methods of human population involving primarily the measurement of the size, growth and diminution of the numbers of the people, the proportions of living beingborn or dying within the same area or region and the related functions of fertility, mortality and marriage".

Benard Benjamin: "The demographer is concerned with the measuring past and forecasting future population change. To do so he must isolate and quantify not only the principal elements of fertility, mortality and migration but also the underlying factors concerned in these elements for example social and economic influences at work".

Thompson and Lewis: "The population student is interested in a population size, composition and distribution; and in changes in these aspects through time, and the cause of these changes. Ultimately he is interested in these changes because they are related to human welfare".

Irene Tanker: "With improved data, new techniques and precise measurement of the demographic transition that is occurring demography has become science rather than literature".

G.A.Harrison and A.J.Boyce: "Populations are not merely conglomerations of individuals but rather, although to different degrees, ordered coherent systems, which have an entity greater than that of the sum of the individuals of which they are composed".

Check Your Progress

1. Who has coined the term ‘Demography’?
   a. Karl Marx
   b. Achille Guillard
   c. John Graunt
   d. William Cox
2. What is the meaning of the word ‘Demos’?
   a. Population
   b. Group
   c. Association
   d. Crowd
3. The term ‘Grapho’ borrowed from _____ language.
   a. Latin
   b. French
   c. Greek
   d. Spanish
4. Define the concept ‘Demography’.

   ……..……

   ……

   ……..……

   ……....
5. What do you mean ‘Demography’?

   ……..…….....

   .....

   ……..……

   …….

1.4.1 Scope of Social Demography

From some of the definitions of demography given above, it becomes amply clear that some writers have made scope of its study very wide, whereas others have made it considerably narrow.

Broader View: As already said those who feel that the scope of the study is wide believe that under demography can be studied causes about slow or rapid

growth of birth rate, causes for changes in death rate, population growth, sex ratio and health conditions, etc. According to them in demography many economic problems e.g. employment and income conditions of the masses; position regarding high and low living standard, labour conditions and their living standard information about production and consumption, saving habits of the population belonging to all sections of the society, rate of growth, working efficiency of the masses and the relationship of economic development and food growth with the growing population.

Coming to social problems these thinkers believe that demography helps in the study of many problems such as marital status, composition of the family and growing trends about caste, religion and education, etc. Geography can also be studied with the help of demography e.g. trends in urbanisation and problems of migration from villages to the cities, etc. In fact, UNO in one of its publications has said that under demography we study all determinants and consequences of population.

These thinkers also believe that demography is collective study of human life. It deals with individual ancestries, hereditary nature of the population and collects physical, social and vital facts. It registers facts, from birth to death including family marriage, divorce and sickness, human growth structure and strength. It also studies at some length disease and their relation with human body.

In this connection it may be pointed out that there is close relationship between population, and demography. Population data becomes socially useful only when demographers draw their inferences from that. As all raw material whether hidden underneath the earth or above it has no meaning unless labour and capital makes that socially useful, similarly population statistics would have meaning only when demographers has put labour in that.

But by and large, it is believed that difference between the two is artificial and many scholars do not make any such distinction.

Narrower View: As against broader view there is also a narrower view about the nature and scope of the study of the subject. This view, among other is represented by Philip M. Hauser and Otis Dudley Duncan. According to them the scope of demography is not as wide as we have been made to believe by some

thinkers. It is argued by them that demography deals with all subjects but does not it mean that in the study of demography all subjects can be studied? Urbanisation e.g., is one subject of study under demography. It includes transportation, communication, rehabilitation, banking, administrative system, electrification, entertainment, etc. All these subjects, however, cannot be included under demography and obviously cannot be studied with the help of this subject. Therefore, scope of demography will have to be defined and restricted. Any unnecessary widening will do more harm than good to it. If were are studying births, etc. and if we go on covering everything under demography, then whole study will become just unmanageable. They believe that, "Demography has got to be limited to one discipline".

Balanced View: There is third school of thought which claims to have presented balance view of the nature and scope of demography. According to Lewis and Thompson, under demography we can study death, birth and actual rates of growth, information about female population, their education, health conditions and marital status, distribution of population according to village and their classification according to their occupations, and also to study and collect information about social and economic conditions.

In fact, today it is accepted that demography is the study of human society and has very little to do with individualistic human problems. While dealing with groups it takes the help of figures and arithmetic. Though human society and groups can be studied from social, economic and political angels, yet demography has been confined to the study of organisation and distribution of groups only.

Check Your Progress

1. How many views are available about Scope of Social Demography?
   a. Two
   b. Three
   c. Four
   d. Five
2. Explain the Scope of Social Demography.

   ……..

   ……..

……..

……..

3. Compare and contrast broader and narrower views of Social Demography.

……..……

……

……..……

……..

4. Who is supporter of balanced view of Social Demography?
   a. Lewis and Thompson
   b. Hauser and Duncan
   c. Phillip and Otis
   d. Thomas Ford and Gordon DeJong
5. Which school view that Social Demography has limited scope?
   a. Broader View
   b. Narrower View
   c. Balanced View
   d. Mixed View

1.4.2 Nature of Social Demography

Under Social Demography three main aspects are covered namely, size composition and distribution of population:

1. **Size**. In size that aspect of the study is taken which deals with such problems as to how many people live in a given population group, what changes are taking place in the size of the group and how these changes are affected. It also aims at finding out how many people live in a given place at a given point of time. But this can be accurately found out by clearly defining the terms ‘place’, ‘person’ and ‘time’. In any demographic or population study the concern is not only in finding out how many people live in a particulars area at a given point of time but also to have a comparative approach, namely, whether the number is larger than what it was and what is the future likely number, etc. Such facts are needed by industrialists, those concerned with providing social utility services like education, medical aid, legislators, planners, policy makes and social

scientists. It is with the help of these figures that the government and planners can develop their future plan strategies and expansion activities. It is again after getting this actual and estimated data that production for consumer goods can be increased and arrangement for providing basic facilities to the society can be made. Not only this that a demographer should find out the extent of changes, but he is also required to tell death and birth or on account of increased migration, etc. These can also be both due to lack of medical facilities or consciousness among the masses about their health or availability of health facilities.

2. **Composition.** After size composition, in population study. In it are covered all the measurable characteristics of the people who form a given population. The composition of two groups can differ when one of the groups has larger or smaller proportion of persons with a given characteristic. The composition of two groups differs in a number of ways. There are, however, usually two major considerations while selecting characteristics. The characteristics must be relevant to his effectively related to demographic processes and that these must be relevant to his attempt to understand certain specific aspects of national or community life. Age and sex are most widely used characteristics of population study. In the words of Thompson and Lewis, relationship between the composition of a population and its mortality, fertility and net migration is a reciprocal one; i.e. composition affects the demographic processes in turn affect the composition by determining the age and sex structure of a population.

3. **Distribution.** After size and composition then comes distribution of population. Population distribution study is concerned with such matters as to how are the people distributed and what is the nature of changes in population distribution. In a population study one would be interested of find out world population living in advanced urban industrial areas, newly developing out growing urban industrial areas and pre-urban industrial areas and the way in which changes are taking place in each category. The distribution can also be studied by dividing population and finding out ratio of people living in rural, urban, farm, non-farm areas, etc. Basically

changes in population distribution are caused by the cumulative effect of differences in mortality birth and net migration rates. In the words of Thompson and Lewis, if a person asks, "How the world people are distributed among and within continents, world regions and countries and how their number and proportion change and he wants to know the political, economic and social causes and the result of these changes to answer these questions, he must learn what the demographer means by the sizes, composition, and distribution; he must understand nationality, mortality and migration; and finally, he must search for social significance of statistics he has studied under these headings".

Categories of Demography: Demographic studies can be placed broadly under four categories, namely *Descriptive Demography* under which are studied census and registration statistics. *Analytical Demography* which deals with analysis and rates and ratios or the data collected. *Comparative Demography* is covered study of different aspects at two different places and at two different points of time. Demography under which time series rates studied is called *Historical Demography*.

Check Your Progress

1. What is the technical term used to measure a number of people live in a particular area?
   a. Population Growth
   b. Population Size
   c. Population Progress
   d. Population Development
2. What is mean by Population Distribution? Is it important aspect to study the population? Why?

   ……

   ……

   ……

   ……..
3. What do you mean Population Composition? Discuss various aspects of Population Composition.

……

.....

……

……

4. Describe the Nature and Scope of Social Demography.

……

.....

……

……

5. What are the different categories of Demography? Elaborate each category with suitable examples.

……

.....

……

.....

1.5 Importance of Social Demography

After nature and scope of the study of population we now come to need and necessity or advantages of the study of population and its problems. Not only in India, but all over the world population has been rapidly increasing. But mere saying that it has been increasing does not serve much purpose. It is with the help of serious study of population problems that one would come to know about the extent of increase in population and also about the responsibility of the state and citizens in respect of social, economic and political problems of people as well as the state and their possible solution as well. Important advantages of the study of population may briefly be discussed as under:

(a) **Political.** In the political field on the basis of demographic studies concerned political leadership and authorities come to know about the rate at which number of voters, male and female, is increasing, how the generation gap is gradually influencing national and international politics, which are the pockets of new concentration where more stress should be laid, what types of arrangements will be needed for conducting elections, which are the areas from where population is migrating and constituencies

delimited accordingly so that there are no dummy or semi dummy constituencies.

(b) **Economic.** The importance of study of population in the economic field is immense. It is with the help of social demography that the nation comes to know how far the rate of population growth is keeping pace with that of economic development and in case both are not keeping pace with each-other, howto adjust these so that economic problems do not seriously threat the nation. Obviously if the population growth rate is father than economic growth rate then there will be economic crisis, poverty and shortages. The problem will have to be solved either by checking population growth-rate or by speeding up economic development plans. It is again population study which provides information about per capita income of the people their consumption habits, per capita production and consumption rate, etc., etc. It is desirable that population growth and economic standard of the people keep pace with each other. If there is serious gap between the two that is bound to create social and economic disorder.

(c) **Planning**. Most of the advanced countries are now accepting the concept of planned development. Thus planning of resources had become an unavoidable process. It is accepted that limited human and natural resources must be utilised in a planned manner in the best interest of the society. But no planning can be a success unless the planners in the best interest of the society. But no planning can be a success unless the planners are aware of the population growth rates and the areas in which population is much more rapidly growing than the others. It is with the help of population studies that the planners can allocate resources to avoid regional imbalances and also provide for more mouths to be fed in the coming years. Needless to say that without proper population studies, whole plan will collapse.

Again it is with the help of population data that it becomes possible for the planners to provide for more educational institutions, hospitals, transport and essential services and to ensure that the people, whether

the number is increasing or decreasing get what is essentially needed by them.

(d) Social. Population study is very much advantageous in the social field as well. It is here that the society comes to know what basic social needs are unavoidable for the growing population. It is population study which can help in finding out extra electricity, roads, water, housing, schools, hospital and other similar needs of the society on the one hand and shopping centres, hygienic facilities, etc. on the other. Again it is with the help of these studies that the state can come to know about the magnitude of law and order problems which growing population will create and how to solve these problems so that the citizens feel secure. Since every state is taking more and more responsibilities upon itself, therefore, its dependence on population statistics is one the increase. In the social field many world states have given 'Right to work' and 'Right to leisure to its people'. Unless they are aware of extent of burden which they are taking upon themselves, they cannot take heavy responsibilities. Even developed countries are trying to provide social security to the population by providing old age pension, health insurance, child care and maternity centres and so on. These steps can effectively be taken with the help of population studies alone.

(e) **Advantages of administrators.** Administrators find population studies immensely useful. It is with the help of these studies that they are in a position to understand where there should be more and where less stress on administration. In fact, whole administrative machinery moves keeping in view growth of population. An administrator, whether in the social, economic in view for smooth running of administration.

(f) **Essential for Checking Regional Imbalance.** Population study is essential for finding out population migration trends which result in creating regional imbalances, particularly when due to one reason of the other there is mass migration. This trend is quite visible these days because the educated people and landless about is migrating from rural to the urban areas from one region to the other. Many serious law and order problems

arise because of it and even some regions become more advanced industrially than the other, thus creating industrial backwardness in some parts of the country. It is because of regional imbalances that demand for more autonomy is made and in the process agitation approach is adopted by some aggressive leaders who try to exploit regional sentiments of the people.

Check your Progress

1. Discuss the importance of studying Social Demography in the modern days.

   ……..

   .....

   ……..

   ……..

2. To whom it is useful for studying social demography?
   a. Policy Makers
   b. Planners
   c. Politicians
   d. All the above
3. How far politicians used the demographic data for their political purpose?

   ……..

   ……..

   ……..

   ……..

4. Bring the relationship between the administrators and demographic data.

   ……..

   ……..

   ……..

   ……..

1.6 Concepts of Social Demography and Population Studies

Although studying populations is a common task for both social demography and population studies, social demography concentrates on the social and economic elements that impact population dynamics, whereas population studies is a more comprehensive field that covers demographic analysis as well as social, economic, and political factors.

The key breakdowns between social demography and population studies are given below:

Social Demography:
Focus: Investigates the links between demographic patterns and social, economic, cultural, and political aspects.

Scope: Investigates how social structures, disparities, and processes shape population features and changes.

Examples: Include researching the effect of urbanization on fertility rates, examining the relationship between education and mortality, and evaluating how social class influences migratory patterns.

Methodologies: Analyzes data using both quantitative and qualitative methodologies to better understand the social dynamics that influence the population.

Population Studies:
Focus: A more comprehensive area that covers social, economic, and political elements in addition to demographic studies (births, deaths, and migration).

Scope: Examines population dynamics, size, distribution, and structure as well as the variables affecting these attributes.

Examples: Examining the effects of migration on various locations, analyzing patterns in population growth, and researching the effects of aging on communities.

Methodologies: To comprehend population trends and patterns, statistical analysis, census data, and surveys are the main quantitative tools used.

Differences between Social Demography and Population Studies

Feature	Social Demography	Population Studies
Focus	Social and economic factors influencing population dynamics	All aspects of population, including demographic, social, economic, and political factors
Scope	Social structures, inequalities, and processes	Size, structure, distribution, and dynamics of populations
Methods	Both quantitative and qualitative	Primarily quantitative

Check Your Progress

1. The study of qualitative aspect of population is called _____.
2. The study of population includes both qualitative and quantitative aspects are called Social Demography. True/False

3. When a study covers all aspects of populations is called Population Studies. True/False
4. The scope of Social Demography is _____ in nature
5. Explain the concepts of Social Demography and Population Studies.
   ……
   ……
   ……
   ……

Relationship between Social Demography and Sociology

Kingsley Davis proposed this scientific relationship, which has since grown in scope. In fact, the questions presented in demography are often related to sociology. The topics covered include fertility, socio-economic developments, workforce, family, and social structure are common both for social demography and sociology.

Sociology and demography share issues such as reproductive behavior and population dynamics. Demography contributes new knowledge to sociology. Using the demographer's data can help the sociologist strengthen their logic and explain their point more effectively. Demography informs sociology and vice versa. By utilizing the demographer's data, the sociologist can gain a firmer foundation for their argument. As a result, demography always attempts to feed sociology, while sociology contributes to analyze and explain demographic information. Societies with a strong emphasis on the humanities and social sciences have a stronger relationship between these two fields of study. Sociologists have recently become more interested in demographic statistics. Demographics determine fertility levels and establish policies to regulate them. Sociologists typically monitor and assess demographic and fertility data to create a more organized society with predictable patterns under which economic and social transformation occurs in society. Although it affects people and families, it falls under the category of demography and is measured by sociologists studying future populations. This science examines population in relation to economic and social factors. Population studies examine aspects including births, death, and migration, making it a crucial aspect of sociological analysis. The link between demography and sociology is proven.

1.8 Sources of Demographic Data

A demographer is expected to collect figures which are of great interest to policy formulators. But it is not easy to collect data, for which different methods are used these days. The figures must be related to some aspect. In demography a figure is known as universe. A universe of population may be defined as an aggregate of items possessing a common trait or traits. The universe is always to be defined because it can be a state, city or village. Thus, it can be both definite as well as infinite.

Broadly speaking, the figures about a universe can be collected by three methods, namely census method, sample method and registration method.

Census method

A census of population may be defined, "As the total process of collecting, compiling and publishing demographic, economic and social data pertaining, at a specified time or times, to all persons in a country or delimited territory". In other words, it can be said that census in the collection of information about birth, death, occupational, social and economic conditions of the people of the country at a given point of time. According to V.M.Dandkar "A census of population is the total process of collecting, compiling, evaluating, analysing and publishing demographic, economic and social data pertaining at a specific time, to all persons in a country or in a well delimited part of the country". Census has become a very popular method of collecting information about the people. It helps not only in the collecting figures but is also much more informative beyond that. It provides information about the economy of the nation, rate of birth and death, rural-urban migration, living standard of the people, family size, educational achievements, etc.

Significant Features of Census: Census has certain very important and significant features:

1. Census is a national stock taking process in which nation gets information about migration of the people, about their age, sex, occupation, etc., about people living in a country at a given point of time, etc. Nation also gets information about social and economic condition of the people.
2. Census is almost always organised and conducted by the government because it is such a gigantic task that it is impossible to get the whole

world completed by any private agency, more so when the country is wide and vast and also thickly populated.

3. Census is almost carried out once in a decade in every country and as such considerably dependable figures can be obtained.

   Every country makes an attempt that census operations should be completed within limited and specified period time and that too without involvement of huge man power and economic resources, but not at the cost of efficiency or work.

4. While collecting information it is to be seen that it is national use and willingness and ability of the respondent to give information should also be taken into consideration before proceeding with the work. All those questions which are likely to arouse fear and prejudices and are difficult for the respondents to answer should avoid.

5. During census operations every effort is made to collect first-hand information about every person. While collecting information either individual or a family is considered as a unit.

6. Before census data collection it is essential that all concepts should be made very clear because in the absence of clarity many mistakes are likely to occur which can frustrate the very purpose of census operation.

7. Census data is published, after data collected has been authentically verified and properly analysed.

8. Before census operations are actually carried out some preliminary steps are always taken. These include identification of area, collection of information of houses, etc., in the area, the form in which information is to be collected, to make arrangements for getting the forms filled in and to collect and analyse the data. The questions to be asked are pretested on a sample population and if necessary these are modified as well. The process is called pre-testing of questions.

9. During census operation information is collected with personal contacts. The enumerator reaches the house-holders and collects on the spot information. In 1991, census in India questionnaires was mailed to certain

categories of persons like the professionals and highly qualified persons etc.

Census method can be both de jure as well as de facto. In de facto census the person is counted at a place where he is found whereas in de jure census he is counted at the place of his real residence. Census data can also be collected by direct as well as indirect means. Where enumerator personally collects data that is called direct method but where information is collected by means of a schedule that is called indirect method of data collection.

Census data can be correct if every double counting is avoided and no person is left outside counting. Information should be collected for every unit and that too within a limited time. In it there is no place for sample data.

Census and Registration: Sometimes by mistake census and registration are confused with each other and figures collected by way of registration are treated as population figures. But this mistake can be avoided. During census direct contacts are established, whereas in registration only names are registered and as such no direct contact is established. Then another difference is that whereas registration process continues throughout the year, census operations are carried out at a specific time and are completed within limited period. Similarly census operations are repeated after regular interval which is usually of 10 years. But for registration there is no such interval and as already printed out it is a continuous process. Barclay in his 'Techniques of Population Analysis' has however pointed out, that census operations have their own problems. According to him "In practice, some people are always missing. It is impracticable to include all cases which belong to the universe. By definition no statistical system functions perfectly. Some cases which ought to be covered according to rules are always omitted. On the other hand, some any be recorded more than once". But these days with the help of statistical errors some of the omissions are rectified.

Advantages of Census: Of course census has its own problems but it has its advantages as well. It is an important source of basic national population data which is very much required for administrative purposes. It can be put to use for studying and researching economic and social problems on the one hand and their planning on the other. It also provides authentic trends in population growth, changes in the

age and sex structure of the population, the extent of mortality as well as fertility. It was provides useful data about migration and urbanisation. It is in census operation that data on current and mortality is collected which is always useful for analytical purposes particularly in countries where vital registration statistics are both inaccurate and inadequate.

It is again census which helps us in knowing the changes which are coming in national, occupational and industrial composition, in the level of literacy, changes coming in levels of living, religion and language. It also provides base for various kinds of surveys. It makes computation of birth and death rate easy. Census data is very much used for preparation of life tables for analysing economic development.

Then an idea about estimated future population and its age sex structure is very useful for estimating future military and economic man power needs and in planning future growth in metropolitan cities on the one hand and in estimating future health, water, educational institutions, housing, etc., need on the other.

Census Techniques: There are two important census techniques namely (a) De Facto Method (b) De Jure Method. Each method is being quite extensively used and has merits as well as demerits.

1. **De Facto Method.** It is one of the census techniques. Under this system a date is fixed for taking census for the whole country. Usually such an operation is conducted at night because it is felt that after day long work the people will come back to their homes at night. Such a night is called census night. This night is very carefully selected. Usually it is a moonlit night and an appeal is made to the people that they should stay at home and to the extent possible avoid travelling as well. All the field workers are fully well prepared for this night work and given proper training. It is seen that on this night there is no likelihood of either piercing cold or that of the heat wave. At this night all those who are found any-where are counted. When the people actually present are counted at same moment in a census technically that is called ‘de facto population’. Since the census is completed on a particular date, it is also called ‘Date System’ or ‘One Night Enumeration System’. Both in India as well as in England this was the only system which was followed upto 1931. But after this, for quite

some time in many parts of the world both de facto and de jure methods were adopted. During 1971 census in India de facto method was not adopted.

Merits and Demerits of the System: De facto method of census has its own advantages as well as disadvantage. One important advantage of the system is that it is quite simple and clear. It is also easy for international comparisons and time consumed for the whole operation is very little. The information collected is almost realistic and dependable.

But the system has its own disadvantages as well. Some of the important disadvantages are:

(a) Under this system usually floating population is not counted and such these people are ignored and data collected becomes inaccurate.

(b) This system needs a large number of well qualified and trained field workers, but these are usually not available and data is collected by incompetent workers. That is likely to be inaccurate.

(c) Since the time limit is very short, therefore efforts are made to put as few questions as possible. But since census is conducted once in a decade, it is desirable that maximum information collected which is not possible under this system.

(d) Since everybody is in a hurry to complete its work, therefore, inaccuracy and mistakes very much increase.

(e) The system does not provide for counter checks. In this way in-accuracies and mistakes cannot be rectified. Not only is this but extent of mistakes i.e. percentage of errors not known.

(f) Night time is a time when people want to take rest. They are tired after day long work and as such not enumerator is welcome at this time. In many cases the respondent is in a mood to provide accurate information but in a mood to give good rebuff to every-one who approaches him for collecting information. In fact, this

time is not a welcome time even for enumerators and supervisory staff, who cannot do any justice work after day long hard work.

2. **De Jure Method**: As against de facto method, is de jure method. Under this system every person in an area is personally counted and information obtained from him. An effort is made that a temporary resident is not included in it, who is enumerated at his permanent place of residence, for census a period is fixed, after taking into consideration area to be covered and people to be dealt with etc. Usually census work is completed within a period of two to three weeks. This period is, therefore, called a period enumeration.

Merits and Demerits of the Method: Like De facto method, this method too has its own advantages as well as disadvantages. One important advantage of the system is that since the period given for completion of work is quite sufficient, therefore, chances of inaccuracy, which are due to shortage of time are reduced to the minimum. Similarly, many questions about sex, age, social conditions of the people can be asked. Even if the number of trained and sincere workers is less, then also work can be the completed without much difficulty, because that can be spread over a span of time.

Since the work is completed without haste, therefore, data collected is dependable and can be used and depended upon for such purposes as transfer of property, dispute about succession, formulation of government policies about the spread of education, for providing better health and similar other facilities. Similarly these figures can also be used for removing many regional imbalances.

Then another advantage is that the figures can be re-checked the supervisory staff. It is also possible to find out percentage of inaccuracies and at the time of analysis, etc. that fact can be taken proper care.

But the system has its own disadvantages as well. Some such disadvantages are:

(a) Under this system such terms as permanent residence, household, etc., are to be defined. Usually it is difficult to uniformally define these terms.

(b) The period of completion of work is rather too long. Once an area has been visited, there are no provisions for knowing the dead and those who have taken birth or migrated to other places during the intervening period i.e. the period when the census was taken an when it was completed.

(c) It becomes difficult to collect information in respect of those who have no permanent residence and usually such persons are left out.

(d) It also becomes equally difficult to have correct and accurate information in respect of these who have more than one residence and continue to shift from one place to the other.

Since both the systems have their own advantages as well disadvantages, therefore, there is no single system which is being adopted all over the world. Each country adopts the system as suits its convenience. Hence we cannot say there is any perfect or correct scheme for counting the population. The selection of either one of these standards or more commonly, some mixture of the two has an effect which is present in very figure of the census. Obviously more people in the questionable categories, the greater the effect of choosing one standard or the other.

Check Your Progress

1. How many years once census operation usually conducted?
   a. Once in 5 years
   b. Once in 7 years
   c. Once in 10 years
   d. Once in 12 years
2. The census operation conducted during night then it is called as _____.
   a. De Facto
   b. De Jure
   c. De Zurich
   d. De Seasick

3. Under De Jure census operation, the census usually conducted during _____.
   a. Mostly Day time
   b. Evening time
   c. Morning time
   d. Night time
4. Explain the significant features of Census method.

   ……..

   ……..

   ……..

   ……..
5. Narrate the two types of Census methods with their merits and demerits.

   ……..

   ……..

   ……..

   ……..

National Sample Survey Organization

In India population surveys are comparatively new. In 1949, Registrar Central of India was appointed who was made responsible for collecting information about deaths and births in the country and also he was required to bring national population register up-to-date. He was also made responsible to complete data gaps and to verify authenticity of already available data's. Accordingly, system of collecting inter-census period information started and with that National Sample Surveys bean to be conducted. From National Sample Surveys of 1952 – 53 and 1954 – 54 it was gathered that fertility between the ages of 15 – 19 was much less as compared with fertility between the ages of 20 -24 years. This, however, remains high between the ages of 25 – 29, but considerably goes down between the ages of 45 – 49. Whereas in many European countries women give birth to children even at the age of 50, in India the instances of birth of children at this age are not very many. In India the instances of birth of children at this age are not very many. In India on the whole fertility is higher than in many other countries of the world.

Sample Survey of 1952 – 53 brought out many interesting facts to light. It was during this survey that it was found that in India on an average, during her fertility period, a woman gives birth to 6 – 7 children whereas in Japan average, was 5.8, in the U.S.A. it was 3.3 whereas in UK it was only 2.6. It was also found that in India 22 to 33% children died before the deaths of their mother, whereas this ratio was very low in many other countries. In India, it was found, that the family in proportionately increased after the birth of third child. The pressure on mother increased by 40.50% in India where as in Japan it was 33.9% in the USA it was 14.33% in UK 19.2% in France 19.7% and in Germany it was only 12.3%. The Sample Survey revealed that death rate of children in the age group of 10 years was very high. In fact, 50% of the total children who died belonged to age group of 1-10 years. In UK this percentage was only 5.3%. In India children constitute 26.1% of the total population, whereas in the U.S.A. this percentage was only 19.6 and in UK 14.7. Then it was also found that death rate of woman of productive age group was always higher, as compared with men, in every section of our society.

In India with the use of sample survey method several surveys have been conducted. As early as in 1952 surveys were conducted by Institute of Politics and Economics Poona and in 1970 Operational Research Group (ORG) conducted family planning survey. In 1953, United Nations Jointly conducted a sample survey in the erstwhile Mysore State in which information was collected about birth and death rates, growth rate of the population and is social and economic characteristics, age at marriage, fertility of married couples, migrations, labour force, employment, etc. It made valuable contribution to our knowledge about sample surveys.

A survey of about 5400 married women of Patna city was carried in 1955 in which fertility from two different aspects was studied. ORG family planning survey about which a mention has been made earlier covered the entire country except J & K, NEFA and off shore islands. The information was collected from currently married women in the reproductive age group. It covered such terms as awareness about family planning programme and willingness to adopt that and space out children, use of family planning devices being made and their effects on the target couples.

National Sample Survey Organization: During the last two decade the National Sample Survey Organisation (NSSO) of India have been conducting quintal surveys on employment and unemployment primarily with a view to measuring

extent of employment and unemployment in quantitative terms. Fourth such survey was carried out July 1987 – June 1988.

NSSO has defined work of gainful activity as the activity pursued for pay, profit or family gain or in other words the activity which adds value to the national product. Normally it is an activity which results in production of goods and services for exchange. It has defined work as any market activity and any non-market activity relating to agricultural sector. Beggars and prostitutes, etc., are not considered as workers even though they may have some earnings.

NSSO has adopted three different approaches to measure employment and unemployment. These are approach with reference period of 365, days and each day preceding the date of survey.

A person's principal usual status is considered working or employed if he or she was engaged during the reference period of 365 days, in any one or more of the work activities. A person is considered as seeking or available for work or unemployed if he or she was not working but was either seeking or was available for a relatively longer time of specified reference period. A person is considered not in labour force if he or she was engaged for a relatively longer period in any one of the non-gainful activities. A non-worker who pursued some gainful activity in a subsidiary capacity is referred to as subsidiary status worker. Principal status workers together with subsidiary status workers constitute all workers.

Check Your Progress

1. What is the expansion of NSSO?
   a. National Service Society Organization
   b. National Sample Service Organization
   c. National Sample Survey Organization
   d. National Service Survey Organization
2. When was NSSO established in India?
   a. 1948
   b. 1950
   c. 1951
   d. 1953
3. When was the Registrar General of India appointed for the first time in India?

a. 1947
b. 1948
c. 1949
d. 1950

4. Discuss the historical background of the National Sample Survey Organization.

……..

……..

……..

……..

5. Explain major topics covered by National Sample Survey Organization and write down its importance.

……..

……..

……..

……..

Civil Registration Method

It is third method for the collection of population data. The method of registration started during 19th century under which every death, birth and marriage is required to be registered. Ecclesiastical authorities used to register information about the person who converted themselves to their faith. They also kept information about the deaths of their followers. Though the information kept was quite crude, yet it proved very useful for the purpose of analysis of those days. Civil Registration was proposed in England and Wales in 1836 and in Scotland in 1854. It was in 1874 that both in England as well as Wales non-registration of births was made a punitive offence, but registration of death was made compulsory only in 1926. But in matters of registration of births and death England cannot be termed and characterised as leader. It was as early as in 1848 that some sort of registration of births started in Sweden. For births some tables were prepared and information was kept about sex, marriage age, at death and marital status, etc. These tables once maintained were annually reviewed. Some of the tables reviewed show that the information then maintained was in no way insignificant, as compared with the

information now kept and maintained. On the other hand, in the USA whole process about registration was very slow. In fact, national registration office in that country started only in 1946.

Usually under registration are covered such events as birth, death, marriage, divorce, separation, etc. For registration there is no specific time schedule and it is almost compulsory for all the family members that they should get the events registered as quickly as possible. Sometimes, therefore, such a data is called as registered statistics. Since the whole work continues throughout the year, as such shortage of enumerators, etc., is never felt. The registration has legal importance as well because with its help it is easy to find out information about citizenship, marital status of the persons, succession rights and settlement of disputes about death and birth, etc.

Registration as Secondary Data Source: Sometimes demographers use secondary data for their work and registration is one such source. This data is available from three important sources namely: (a) Vital Registration, (b) Population Register and (c) Government Records.

(a) **Vital Registration.** Vital Registration is an important source for getting information about births, etc. Census gives information only about the population of that time. But under registration system every important event about population is registered. In every country of the world today it is almost compulsory that every death birth, marriage, etc., should be registered. Such population figure makes it possible to compare data at given point of time. It is known as comparative static analysis. It is with the help of such analysis that information can also be collected about fertility and mortality. It is, however, not easy to expand registration system and collect information out of that. In fact, it took decades to make the data obtained through registration as useful. Even upto 1933, in USA registration system did not become popular to the desired extent. In Asia, where a considerable population of the world lives, there is no popular system of registration. Even today in most of the Asian countries the people started doing registration about deaths and births very presently but, still they do not get marriages, separation and divorces registered,

which is no less a serious problem even now, for those who are concerned with population studies.

Under the system of registration every person is required to fill up certain forms: There are:

Birth certificate

Name
Father's name
Age of mother
Age of father
Legitimacy
Order of birth
Occupation of husband
Place of birth
Place of residence
No. of children, already alive
Whether male or female
Name, if any
Date of Birth
Name of the reporting person

Death Certificate:

Name of the deceased
Sex
Race / Caste
Age of the deceased
Place of birth
Cause of death
If foetal or still birth
Place of residence

Marriage Certificate:

Name of the bride
Father's name
Name of the bridegroom
Name of husband/wife

Race of bride
Race of bridegroom
Residence of bride/bridegroom
Age of the bride
Place of birth of bride/bridegroom
Occupation of bridegroom

Obviously accuracy of information very much depends on the accuracy of information which is supplied to the Registrar office: Usually the information given is correct because it is simple and non-confidence nature. Moreover, it is a type of information what is known to every person in the family. Difficulty can however, arise only in cases where one person like chowkidar, etc., is required to supply information for the whole village and he does not realise its importance or significance. He, therefore, either omits some of the cases or reports cases with incomplete information. In advanced countries like the USA people compulsorily register themselves simply because registration certificates are needed for obtaining citizenship rights, employment and social securities, etc.

(b) **Population Register.** It is another important secondary source of data collection. In many European countries maintenance of permanent population register, for certain administrative and legal reasons, is considered absolutely necessary. The figures, collected at the time of census are verified but it and gaps filled in where necessary. These also clarify population trends. This type of register is most perfectly maintained in Sweden. This register is prepared annually and on its basis itself matters regarding franchise, settlement and employment, etc., are settled. There is, however, no such register in the USA.

(c) **Other Administrative Records.** Secondary data about population is also collected from other records. In some countries such bodies as Life Insurance Companies and Corporations keep records about population trends and birth and death rates. Similarly almost all civilised countries of the world in one form or the other keep population figures to meet such social responsibilities as unemployment, insurance scheme, employment statistics and the people to be provided employment, old age pension

scheme, etc. Similarly these figures are essentially needed for providing ration to the people, maintaining electoral lists, income-tax list, list of telephone subscribers, information about people who are associated with various social and other organisations, etc. While discussing significance and importance of administrative records it has been said that, "Even when the data provided by administrative operations are limited, they provide an ideal sampling frame for carrying out special surveys. For example, it is very costly to find by routine interviewing of randomly selected households, representative samples of migrants, divorced person, members of particular ethnic or religious or couples with two children. The records kept for administrative purposes may provide a comparatively complete or representative set of homes and addresses, which can then be samples for intensive interviewing".

Population Registers

In countries like Israle, Belgium, Korea, etc., population registers are important source of information. In this system population registers are continuously maintained. In these name of every person in the country is entered along with some migratory movements of persons. The aim is to establish identity of the individuals and exercise control over them. These help in knowing current information on such demographic problems as population size, vital events and internal migration.

Today it has been accepted beyond all doubts all over the world; including India that registration of birth and death is absolutely necessary and unavoidable. It is perhaps the reason that in many countries highly developed and efficient machinery is kept for the purpose. In India system of registration of deaths and births is very old, but still it is quite defective, if viewed scientifically. To begin with Sanitary Commissioner of the Government used to collect information of this type. At that time main aim was to collect information and data about health conditions of the people. With the figures available steps were taken for checking diseases and famines. It was in 1873 that Bengal Birth and Death Registration Act was passed. After sometime this Act was also extended to Bihar and Orissa. In 1880, Indian Famine Commission laid particular stress on the correctness of these figures. In

1886, Death, Birth Registration Act was passed for the whole of India. But quite some time no special attention was paid to the implementation of this Act.

After independence, however, for planning purposes, population figures became very important. It was very important to have upto date figures in order to have correct idea about manpower needs for development purposes and the responsibilities which growing population would fall on the government. For knowing exact population figures, the planners could not wait for ten long years and as such it was felt essential to have information at least annually about growth rate of population. Accordingly Registrar General of India was held responsible for collecting death and birth figures on regular basis. Municipal Corporations, Committees, Notified Area Committees and Town Area Committees were authorised to arrange for the registration of deaths and births all over the country. In the villages this type of work is done by the village panchayat. Usually the work involved is not so heavy; therefore, whole time workers are not employed for the purpose.

Historical Background of Vital Statistics: Registration of vital events or collection of vital statistics has its own background. As said earlier, in the past the registration of birth and death in most European countries was done by church and other religious bodies. In the middles ages the registration of vital events was the responsibility of religious authorities because at that time baptisms, weddings and burials were always within the jurisdictions of the Christian church. In 1608, the first systematic parish register was established in Sweden. But the records maintained so far were defective as these covered only particular religious groups and did not cover the whole population. Qualitatively also these records were defective.

The credit of introducing system of registration of deaths, births, marriages etc. under civil authorities independent of church goes to Incas peru. It was thereafter that the process of secularisation of vital registration started. This trend received support when in 1804 Napolenic Code was adopted in France. Under the Code civil rights could be granted by the state and proof of one's claim to such rights was dependent on official registration. This was an important landmark in the history of vital registration. It was later in the 19th century that vital registration system was introduced in Western Europe and South American countries.

The responsibility of such registration however was made that of the central government.

It may, however, be mentioned that till 1662 no use was officially made by the government of vital statistics. It was in that year that John Grant thought of using that. In his famous book entitled, "Natural and Political Observation Made upon the Bill of Morality" that he made use of available information for studying mortality, fertility and migration. Dr. William Carr spent years of his active life for the development of national system of vital statistics and conducted several studies on health and mortality conditions. The system developed by him was followed many countries of Europe. Today almost every country is collecting vital statistics. Providing information about deaths, births, etc., is now a legal obligation.

Individual and Registration of Vital Statistics: Registration of vital statistics is of considerable use to the individual. Certificate of registration issued by the authorities to the individual can be produced as an evidence even in courts of law and any-where else and also for establishing one's identity in society and for getting rights of nationality and citizenship. It is significant record for providing the fact, the time and place of occurrence of event. The individual's date of birth as recorded on the birth certificate is the best proof of his age and for obtaining a passport. It is also a legal proof for establishing family relationship and for settling questions of inheritance and insurance claims. A death certificate is today required for the disposal of dead bodies whereas a marriage certificate is very useful for establishing marital status of the person on the one hand and legitimacy of children born of the marriage on the other.

Nation and Registration of Vital Statistics: Not only individual but nation as a whole is benefited by registration of vital statistics. It provides data on births, deaths, marriages and divorces which can be used for providing medical, education and other social services and also for estimation and population projections. In the population field many analytical studies can be undertaken. It also helps in evaluating the effectiveness of an on-going family planning programme and birth fertility differentials can be studied. On the basis of death certificates causes of death can be analysed and thus health conditions of a society can be analysed and assessed. The information can be useful in planning and evaluation of public health programmes. The data's can also help in knowing social, economic and health

conditions of the people of the country. Thus vital statistics is important for the individual as well as the society. It is because of usefulness of the system that many European and Asian countries have made it legal offence not to register vital events.

Defects of the System: There are some serious defects in sofar as working of vital registration system in India is concerned. First important defect or shortcoming is that for this work there are no whole-time employees. The work is expected to be done by regular employees to do this work in addition to their normal duties and responsibilities and as such they feel this work in addition to their normal duties and responsibilities and such as they feel this work is an additional burden on them. Therefore, instead of attending to it properly they just attend to it casually with the result that many discrepancies creep in and data becomes incorrect and undependable.

The another defect is that many states there is no separate department to deal with population data. The result is that even when the figures pour in, the records are not properly maintained and it takes a very long time before these are published. In fact, when these are available to the society, these have become quite outdated and nobody takes interest in these.

Those who do not get registered are not punished and as such the people. Particularly in the rural areas, do not bother about getting registration formalities completed.

Still another difficulty is that the data's collected are usually not correct. Registration work is done by those employees who are not directly responsible for this work. Similarly those who supply information are many a time not directly linked with the person about whom information is being supplied. Thus, whatsoever, occurs to him at the spur of the moment he gets that recorded. Even after some time, if he comes to know that the information supplied by him was incorrect, he does not bother to get that corrected.

The scope of registration is even now very limited. Even today stress is laid on deaths and births and not on marriages, divorces and separation, etc. Therefore, whatsoever, information is collected that too has very limited scope and cannot be put to much use in the long run.

Check Your Progress

1. Registration of civil status of an individual to the competent authority is known as civil registration system. True/False
2. England was the first country in the world introduced the Civil Registration System. True/False
3. Chief Registrar General is the chief of the Civil Registration of India. True/False
4. Explain the salient features of the Civil Registration system.

   ……

   ……

   ……

   ……

   ……..

Let's Sum Up

Social Demography is a sub discipline of Sociology which emerged during early 1960s. The term 'Social Demography' was introduced by American Sociologist Kingsley Davis in 1963. The prime aim of the Social Demography is to study human population with the help of social and economic factors and how these two factors are influencing the population dynamics of fertility, mortality and migration. Human population serves the very basic for every society and it means that any country's planning depends on availability of the total human population in the given country. For this purpose, every country in the world is used to collect the details of its human population through population census, sample survey organization, vital or civil registration system and nation health and family survey.

Glossary

Demography: The Demography coined with the help of two Latin words 'Demos' and 'Graphos'. The word 'Demos' means 'People' and the word 'Graphos' means 'draw' or 'study'. Thus the term 'Demography' means scientific study of human population.

Social Demography: Scientific study of human population which is primarily focusing on how far social and economic factors influencing the population dynamics of fertility, mortality and migration.

Population Studies: Scientific study of human population which is focusing on apart from social and economic factors like political, educational, religious, philosophical factors influencing the population dynamics of fertility, mortality and migration.

Sociology: Scientific study of society

Census Survey: Complete enumeration of total population of the given area

Sample Survey: Selecting few persons from the total population by ensuring equal chances.

Population Census: Collection of necessary details from the total population of the particular area once in ten years by the Government agencies.

NSSO: National Sample Survey Organization

Unit - II

THEORIES OF POPULATION

Structure

Objectives

This unit is discussed about various theories of Social Demography and after going through this unit the students must able to

1. Understand the Mercantilist and related theories.
2. Comprehend various facets of the Malthusian perspective on population.
3. Grasp the details, assumptions and usages of Optimum population theory.
4. Apprehend various aspects and usages of Demographic Transition theory.
5. Know the background of Spencer's perspective over population.
6. Describe the biological theory of population which is proposed by Ester Boserup.
7. Discuss the economic theory of population which is propounded by Julian Simon.

Introduction

Since the very initial stage in the development of demographic studies attention of the society and demographers have been drawn towards population theories. Even Confucious and Chinese thinkers at the very initial stages of development, realised that population explosion could dislocate economic system of a nation. The old writers and thinkers, however, could not clarify how death or birth rates influenced and disturbed economic system. Both Plato and Aristotle believed that a state should have only such population as was essential for economic self-sufficiency and national defence. If less population made a nation dependent on other than more population was likely to become a burden on society. 17th and 18th century economists also paid attention to this problem. According to them increase in population as such was not had. According to them increased population was bound to result in increased wages and labour and also in increased production. But Quemoy believed that instead of increase in population there should be increased population. In our own times Smith linked wages with population.

Greek Thought on Population. Historically both Plato and Aristotle believed that limited population was essential for happy life of a society. Low population will make the society poor. According to them the laws of succession and inheritance should be such that in that there were no sharp variances wither in family or property structure. If someone had no child he should be permitted to adopt someone as his child. Both of them believed that in order to check abnormal population growth it was essential that the men should practice celibacy. They also laid stress on the establishment of new colonies. They have also said that in order to increase population, the people should be given suitable rewards as well; if growth rate was very low, so that population growth continued.

Both of them believed that there was direct relationship between population and poverty. Plato also believed that population equilibriums were necessary for maintaining social equilibrium. Other Greek thinkers who discussed population problems included Herodotus, Thucidides and Xenophone. The last mentioned one who is believed to have lived between 440 – 335 B.C. believed that for division of labour it was essential that there should be more population. He wanted that all restrictions on immigration and emigration should be removed.

Many thinkers in the past believed that in case poverty was to be removed, it was essential that the state should take steps for increasing income of the people. One of the methods which state could follow was that all restrictions on the coming of the foreigners in the country should be removed. They should be provided all facilities so that international trade could increase. This will result in increased profit, trade and peace between the two countries. Obviously it is in peace that income can increase and not in war situation in any way.

Roman Thinkers on Population. Romans did not favour city states and instead they believed in the idea of having big states and empires. On the whole they did not bother about the growth of population and Roman economists did not spend much time on this problem as well. In the words of Prof. Haney, "Athenians were thinkers keen and analytical. The Romans were men of action, warriors and statesmen. The former left a philosophy which influenced the ethics and economics of later thinkers, the latter built institution which as profoundly affected law and politics". They on the whole wanted to have more population because then alone the state could have soldiers to fight and help in the expansion of empire. Cicero, an important Roman thinker bitterly opposed the idea of Communism of wives as a means for checking population. He also did not favour the idea of using artificial means and method for checking population growth.

Population Philosophy during Middle Ages. As regards population ideas of the people of middle Europe, the whole period can be divided into two parts; namely the period from 400 – 1200 A.D. and 1200 – 1500 A.D. But on the whole population control philosophy was not favoured. Christian thinkers, during this period took a moral view of the population problem. On the one hand they opposed divorce, killing of children, abortion, etc., whereas on the other hand they laid stress on controlling of passions and leading a bachelor's life. These people believed that Nature and natural calamities could reduce population to a considerable extent and as such they pleaded that in order to save population to a considerable extent and as such they pleaded that in order to save population and to keep that at a particular level, birth rate should always be high. During this period the Muslims and the Mercantilists believed that there should be growth in population because manpower will be available to produce more and more and demands for finished goods for consumption will go up. They wanted to have more births, no matter what the living

standard of the people was. According to these people, population could be controlled by the spread of diseases, abortions, late marriages etc. Many thinkers believed as well that birth and death rates were predestined and that nothing could be done to check these. Many also believed that growth of population should not be checked because people were real strength of a country. In the words of Samuel Forrey, "People and plenty are commonly the begetters, the one of the other, if rightly ordered". Prof. Child pleaded that increasing population alone could make the people happy and prosperous.

In France M. DelaRivere L. said, "The social order is not the work of man but is on the contrary instituted by the author of all nature himself as all the branches of physical order". Similarly Dr.Quesmay also said that, "Nature order is merely the physical constitution which God himself has given to the universe". They believed that whatever nature has made for man that is completed and perfect. They however, also believed that, "As it is in the physical order that men thus united in society multiply promptly, by natural and necessary parallel to the multiplication they are reduced to lack of means of subsistence if they do not, at the same time, multiply those means of cultivation". According to them any attempt to check population was only a hindrance on the way of will of God and as such population growth was in the interest of society as a whole. There were some thinkers, however, who believed that if population growth gave strength to the nation then such a growth also created many problems for the country as a whole. On the whole, however, in the past population growth was not condemned in any society as that did not create any problem.

Mercantilist and related Theories:

The Mercantilists. Somewhere during 16th century Mercantilists came to the front and continued to preach their philosophy for about two centuries. These people were primarily in favour of increased population.

B.Colbest, Charles Devant and John Locke were among many who can be mentioned in this regard. According to them real happiness came with trade, because then alone people could earn wealth. Increase in population can help in the development of trade and industry. More the number of people in a state, more power will be available, therefore, people will be available on fewer wages and there

will be more profits and production. Both the society and individual shall have automatically checked that and as such there was no need to use artificial means and methods for checking population. More population was also favoured because that was essential for the defence of country and nation could have any number of soldiers, if need be.

The Physiocrates. These scholars mostly belonged to France. Among other mention may be made of the names of F.Quesmay, Robert Turgot, Marquis Reviere, etc., by and large, they did not believe that population growth in any way should be checked. They were of the view that population of a state was always a source of strength as well as cause of misery and thus double edged sword. But still they did not favour the unnatural means for checking population growth.

Check your Progress

1. Who said that the population explosion could dislocate economic system of a nation?
   a. Magasthenes
   b. Kautilyar
   c. Confucius
   d. Sandilyan
2. Who said that the limited population was essential for happy life of a society?
   a. Plato and Aristotle
   b. Saocrates
   c. Epicurus
   d. Pythagoras
3. Who support increase in population can help in the development of trade and industry?
   a. Neo-mercantilist
   b. Mercantilist
   c. Non-commercial
   d. Communism
4. Mostly the Physiocrates belong to _____ country.
   a. Japan
   b. England
   c. France

d. Spain

5. Who among the following is supporter of Mercantilist theory?
   a. John Locke
   b. JJ Rousseau
   c. T Hobbes
   d. Plato
6. Bring out the salient features of the ancient population theory.
7. Put forth the objectives of the Mercantilist perspective of population.
8. Compare and contrast the Greek, Roman and Chinese perspectives of population.

The Malthusian Perspective

Thomas Robert Malthus was born on 14th February, 1766 and lived upto 1834. His parents had liberal views and gave him good education. It was after completing his studies at Cambridge that he studied religion. He had quite happy married life. He gave his ideas in his 'Economics of Geography' in 1978, when he was working as a priest. His views came to be widely known to the society in "An Essay on the Principles of Population – As it Affects the Future Improvement of Society, with Remarks on the Speculations of Mr.Godwin". He gave his ideas as a reaction to the views of Ricardo and Smith. They had come to the conclusion that the poor was responsible for this poverty. In 1805 he wrote his famous essay entitled, "An Essay on the Principle of Population or a View of its Past and Present Effects on Human Happiness". Unlike the previous essay, in this Essay he also gave his name.

Background of Malthus Theory. Malthus in his young age was a priest and thereafter he became Professor of History and Economics in Hailbury, where officers of East India Company used to get their training. It was a time when it was believed that the pressure of population on earth was increasing. The society was sharply being divided between the rich and the poor and the later were being ruthlessly exploited by the former. In Europe both wars and diseased had created many horrors. Though the population was increasing there was no increase in production, I was also a time when Industrial Revolution took place and with that many new problems confronted society. Prof. Malthus saw with his own eyes that Industrial

Revolution was making rich richer but the poor were becoming poorer. Prof.Green at that time said about English society that, “Poverty was added to the cause of mis-government and deepened with rapid growth of the native population till famine turned the country into a hell”.

While situation on the economic field was such, Malthus was influenced by the thinkers of his times. William Godwin wrote his “political Justice” in which he tried to establish that population growth could benefit society and in no way harmed that. He felt that government alone was responsible for the poverty of the people. In France this view was supported by Condorcet who believed that it was a fallacy to think that population growth in any way could harm any society. He said that, “Man doubtless will never become immortal, but it is possible that span of human life may be indefinitely prolonged”. In France Buffon and Montesquieu also supported this view that growth in no way could harm the society.

Malthus however analytically viewed the whole problem. According to him both the government as well as propertied class was supporting population growth because both had their own interests in that. The government gets soldiers for the army whereas the propertied class labourers at cheap rate. He felt that growing population was alone responsible for growing poverty, unemployment and weak health of the people resulting in the spread of diseases. He, therefore, decided to find a theory of population.

He found nearness in his views in the ideas of Sir Walter Releigh, Sir Mathew Hale, Robert Wallace and Joseph Townsend. Sir Walter Releigh believed that, “The surplus population died not of old age, or went out of the world, by the ordinary ways of nature; but famines and contagious distempers the sword, they halter and a thousand mischiefs have consumed them”. Sir Mathew Hales also pointed out that at that rate population could very quickly double itself, provide that was not checked by natural calamities and diseases. Both Townsend and Robert Wallace also contributed to this idea. Malthus was very much influenced in his ideas by Hume, Smith and Price. According to some thinkers Malthus’s ‘Essay on Population’ was not original. Prof. Gide is rightly of the view that, “Even after the lapse of a century, the echo of the controversy which it aroused has not altogether passed away. The Essay might be, considered as a reply to Adam Smith”.

Some Basic Assumptions. Before giving his ideas Malthus toured some western countries and collected population data. After this he developed certain basic assumptions namely:

(1) Human beings have great potentialities to produce children.

(2) In agriculture Law of Diminishing Returns operates.

(3) Human beings will need food to eat.

(4) Passion between sexes is necessary and unavoidable.

He discussed each of these assumptions in considerable detail in his "Essay on Population".

Rate of Population Growth. Malthus believed that male and female will continue to attract each other. It is almost difficult to control the birth of children when the couple meets. He believed that population could be expected to double itself in 25 years. According to him it was growing by geometrical ratio, i.e., in the ratio of 1 : 2 : 4 : 8 : 16 : 32: 64 and so on and by this ratio one will not know of world population after 2000 years. According to him this was really a serious problem because "Prosperity was not depends on population but population was to depend on prosperity".

Rate of Increase of Food. Population must live on food. But growth and increase in food is much less than the growth in population. He came to the conclusion that whereas population was growing by geometrical ratio food, was growing only by arithmetical ratio, i,e, in the ratio of 1 : 2 : 3 : 4 : 5: 6 : and so on. He came to the conclusion that, "It may be fairly pronounced, therefore, considering the present average state of the earth, the means of subsistence under circumstances the most favourable to human industry could not possible be made to increase faster is an arithmetical ratio". In case fast increasing population was not checked, there was bound to be shortage of food. He made it clear that, "The Table of Nature is laid for a limited number of guests and those who come un-invited must starve". He also said that, "It must be evident to those who have the slightest acquaintance with agricultural subjects that in proportion as cultivation is extended, the additions that could year be made to the former average produce must be gradually and regularly diminishing".

According to him present rates of growth are bound to create disequilibrium between food and population and standard of living of the people is sure to come down. This trend is surely harmful for the society as a whole. He also believed that food production could not be increased all of a sudden, as and when people liked that. In fact, continued disequilibrium could disturb the whole world order and the universe could be forced with many miseries and continued physical restraints and constraints. He believed that population was necessarily limited by the means of subsistence.

Checks on Population. As already said Malthus believed that the Nature had very limited table. He was, therefore, fully convinced that and unless until growing population was checked, a day would come when population would exceed food availability. Accordingly from time to time Nature imposes and applies certain checks to also checks growing population. These checks are in the form of diseases, starvations, floods, etc. He was convinced that Nature itself adjusted population according to availability of food. He has named these checks as positive ones. He said that, "A man who is born into a world already possessed if he cannot get subsistence from his parents on whom he was a just demand, and if the society do not want his labour, has no claim or right to the smallest portion of food, and infact, has no business to be where he is. At Nature's mighty feast there is no vacant cover for him. She tells him to be gone". Malthus stressed that since restrictions imposed by Nature to check population were horrifying, it was desirable that the people should themselves try to impose restraints so that Nature was not forced to impose itself. He said that the people must realise that they themselves were the cause of their poverty by not checking population growth. He, therefore, suggested that the people should always prefer preventive or positive checks over Nature's horrifying checks.

Coming to preventive checks, Malthus said that there were all such self-imposed checks by which population growth could be effectively checked. According to him, "By normal restraint I would be understood to mean a restraint from marriage, from providential motives with a conduct strictly normal during the period of this restraint". Morally he did not like that any person, should in any way indulge in immoral acts which do not result in production of children. Accordingly one such check which he suggested was 'Self-restraint'.

Then another check which he proposed was that the people should use contraceptives and go in for abortions. But he always preferred self-restraints over the use of contraceptives, etc. Malthus believed that the people should marry late, preferably after attaining the age of 27 – 28 and that they should be made to realise the importance of self-restraint even at the time of marriage.

Malthus has given his ideas about some other aspects of population as well. According to him migration of population was likely to solve, at least temporarily, food problem of a country. Emigration of population is to the advantage of poor nations on food front. He also believed that specialisation in agriculture and production of finished goods can be useful for a nation, but at the same time it need not be forgotten that those nations which are industrially and commercially advanced can purchase food from agriculturally advanced nations to the extent these need.

Criticism of Malthus's Theory. Malthus has been criticised on various accounts. In fact, his history raised a big controversy not during his own times but he still remains open to criticism. Among prominent supporters of his theory were prof. Marshal, Taussing, Cossa, Ely, Pattern and Carver, whereas he has been criticised among others by Oppenheim and Graham. Prof. Gray is of the view that his theory raised such a big controversy that almost every important thinker paid attention to what he said. It was however unfortunate that he was too much vilified. In his own words, "It is safe to say that no respectable citizen has ever been so vilified and abused as Malthus, no writer of the first magnitude has been so often refuted". Some of the important points of criticism raised against him are as under:

(1) According to many of his critics it is wrong to believe that population increases by geometrical proportion. According to them he has tried to justify this simply to show is frustration. According to them he has tried to justify this simply to show his frustration. According to these critics, these days, people are themselves quite conscious and do not unnecessarily wish to increase their family size. Such an awakening has come simply because of spread of education and many on-going researches in scientific field about checking population explosion. It is evident from the fact that Malthus's philosophy that population will double itself within next 25 years has not come true.

(2) Malthus tried to prove that everybody is interested in increasingly family size and that all the children born in a family will survive. But that is not true. Usually it is observed that in communities where birth rate is high, there usually death rate is also very high. In the words of Prof. Gide, "Germs are extraordinarily profolic but their undue multiplication is pitilessly retarded by a law which demands always remains at a mean level, the terrible gaps made by death being replenished by a new flow".

(3) Malthus is of the view that food products increase by arithmetical ratio and as such it shall not be possible to meet needs of population which is increasing by geometrical ratio. But his prophecy about food increase is not proving very true because nation is trying and using new scientific means and methods to ensure that maximum food output is available to the society. In many societies it has proved true as well and food supplies have very considerably increased. Today new irrigation systems and facilities have brought green revolution all over the world. Gide and Rist say that, "Malthus was a pioneer in pre-historic society only".

(4) Prof. Cannan has also criticised Malthus in his own way. According to him it is wrong to believe that there is always a direct link between population growth and food increase, as Malthus has tried to establish. Quoting example of England he has said that the country produces only for 1/6 of its total population but the people in every walk of life have sufficient to eat. This applies to many other colonial powers as well which are in a position to export finished goods for the import of food stuff from surplus food producing countries. According to him in this regard also Malthus's theory falls down.

(5) No doubt, as Malthus believes that the child begins to produce after some age but he forgets that the same child when begins to produce does not produce for himself alone but he produces for the whole society and feeds a vast population by the dint of his labour. Thus, the child is not a burden in the long run as Malthus has put it.

(6) Malthus has also been criticised for his creating confusion between the desire to produce a child and the mating of married couples. Whereas

mating is natural desire and many a time uncontrollable, desire to produce a child is always not there and many a time couple meets but not with the desire to produce children.

Check your Progress

1. Which year Robert Thomas Malthus published 'An Essay on the Principles of Population'?
   a. 1802
   b. 1805
   c. 1807
   d. 1810
2. According to Malthus, the rate of population growth _____ ratio.
   a. Arithmetical
   b. Mathematical
   c. Geometrical
   d. Algebraic
3. As per Malthus, the rate of increase of food _____ ratio.
   a. Algebraic
   b. Arithmetical
   c. Geometrical
   d. Mathematical
4. According to Malthus, the positive checks increase _____ rates.
   a. Marriage
   b. Death
   c. Birth
   d. Divorce
5. As per Malthus, the preventive checks decrease _____ rates.
   a. Death
   b. Migration
   c. Birth
   d. Divorce
6. According to Malthus, using of contraceptives are called _____ restraints.
   a. Moral
   b. Artificial

c. Immoral
d. Natural

7. The Malthusian theory of population states the relationship between population and _____.
   a. Economic condition
   b. Food production
   c. Scientific temper
   d. Infrastructure
8. Describe Malthusian Theory of Population.
9. Put forth Malthusian views on population growth.
10. Discuss Malthusian opinion on food production.
11. Explain various checks proposed by Malthus to control the population.
12. Discuss major criticisms on Malthusian Theory of Population.

Optimum Population Theory

Theory of optimum population is comparatively a new theory in so far as population theories are concerned. It is in fact difficult to say when and in which form this theory first developed. It appears that in about 1815 A.D. Professor Edward West discussed about it in his famous treatise “Essay on Application of Capital to Land”. According to him with the growth of population, production also increases because with that specialisation in many fields also increases. But it can be said that that entire professor West said was only a hint in a new direction. Prof. Sidgwick, however, put the idea on very sound footing. In this book “The Principles of Political Economy” he has deeply studied the whole problem and came to the conclusion that in production point of maximum return reaches at some stage. This point reaches when all available means are properly and most carefully utilised on which maximum return in possible. This principles as good in the field of national income, as it is in the field of individual income. Though he did not specially mention the term ‘optimum’ yet what he really meant was that.

Sir Edwin Cannan, however, used the term ‘Optimum’ and presented his ideas about population in his ‘Optimum Theory of Population’. He also gave its scientific explanation at some length. In our modern times, Prof. Dalton and Prof. Robbins have discussed this theory at some length.

Basis of the Theory. For every urban / rural area it is essential to have some minimum population with which it can run its minimum and most essential services. As regards maximum population, the idea originates separately for each section of society. In it death rate equals birth rate and the former remains high due to various reasons. But where death rate equals birth rate the situation can be termed as satisfactory. It has been said that, "A population that reaches its maximum for this reason would be forced into a temporary (or, if the situation persisted, a permanent stability in size, a stability clearly less favourable than one attained by population planning". It is today everywhere accepted that every country must think of optimum population and should not allow that to go beyond that. It is wrong to think that growth of population is always bad. Such a growth can be welcome if natural and other resources permit that. This idea was accepted until World War I when subsequently many economists basically accepted this.

The theory of optimum utilisation is based on the Law of Diminishing Returns. This law provides that for maximum production, all these sources of production should be combined together in an ideal ratio. In case some of these are not combined in that proper ratio then it shall not be possible to have maximum production. They believe that there is close relationship between size of population and economic development. They also believe that from national point of view population can be considered as labour and in case labour is not available in requisite quantity then maximum production may not be possible because it shall then not be possible to exploit fully either natural resources, or productive techniques or even the available to the desired extent, their growth of population will not only be useful but welcome as well because that will help in maximum production. It will then be possible to use all available resources in proportionate ratio. This situation when arrived at will be called as the situation of 'Optimum Population'. In case the population continues to increase beyond that the proportionate balance of source of production will be disturbed because then the labour will be available in much more quantity than what it is ideally needed.

Optimum theory is based on the following to principles:

(a) When there is an increase in population then the ratio between the total population and the working population remains almost constant. In other

words, the theory believes that when there is change in production per labourer with that the income of the individual will also vary.

(b) When at a point of time, the population of a country increases with that natural resources, capital and technical know-how do not change with the result that after some time Law of Diminishing Returns beings to operate.

Optimum Population Defined

How to define optimum population is another problem. It is primarily because every economist has tried to give definition in his own way. Some of the important definitions may briefly be discussed as follows:

Prof. Carr Saunders. "The optimum population is that population which produces maximum economic welfare. Maximum economic welfare is not necessarily the same as maximum real income per head but for practical purposes, they may be taken as equivalent".

Boulding K.E. "The population at which the standard of life is a maximum is called the optimum population".

Prof. Cannan. "At any given time (in a country) there is what may be called a point of maximum return, when the amount of labour is such that both an increase or decrease in it would diminish proportionate returns. If population is not large enough to bring all industry up to this point, returns will be less than they might be and remedy is increase of population; if on the other hand, population is so great that the point has been passed, returns are again less than they might be and remedy is decrease in population".

Dr. Dalton. "Optimum population is that which gives the minimum income per head".

Prof. Robbins. "The population which just makes the maximum return possible is the optimum or the best possible population".

Finding out of Optimum Population. As already pointed out optimum population of a country is that population which gives maximum return to the nation with the help of natural resources, and capital and technical know-how. As long as that point in population does not reach, the nation shall not be in a position to exploit natural resources. On the other hand, when population crosses the point then alone

the nation will not get maximum return because burden on other resources will be very heavy and becomes, disproportionate. The following Table will explain the position.

Total Population of a country (in crores)	Total real income in the form of services and material	Real income per head
15	450	30
16	512	32
17	578	34
18	630	35
19	606	34

From the above Table it will be seen that maximum per capital income reached when population reached the figure of 18 crores. Before that there was no maximum exploitation of resources and as such income per capita was less than 35. On the other hand, when population crossed that figure from 18 to 19 crores per capita income again went down and from Rs. 35, it came down to Rs.34. in fact, it will go on decreasing with every further increase in population.

This very fact can also be illustrated with the help of a curve as well, which also shows that with the increase in population, income per capita also increased and when the population reaches its optimum stage then the per capita income begins to come down.

Comparison between the views of Dalton and Robbins. Prof.Dalton has linked theory of optimum population with that of per capita income. According to him optimum population is that which gives maximum income per head. He has given great importance to income. In other words, Prof. Dalton believed that optimum population will reach only when the nation, with the help of natural resources, technical know-how, capital and manpower is in a position to get maximum income. If income is less obviously the nations other resources have not been fully used or exploited. On the other hand, if the population crosses optimum size, then also per capita income begins to come down. Similarly if population is less than what society needs, it may not be possible to have maximum national or per capita income.

Prof. Robins, however, holds somewhat different views about optimum size of population. According to him population which just makes maximum returns possible is optimum or best possible population. In other words, Prof. Robins has laid more and more stress on maximum to total income. He has collective or national outlook because he discusses national and not per capita income. According to him increase in population is desirable to the extent to which there is increase is production. In such a situation it is just possible hat per capita income may not be the maximum. According to him optimum population will be one under which everybody will get enough to meet his day-to-day requirements and needs. In other words, he felt that it was in the interest of a country to go on adding to its population as long as national income was not equivalent to the living needs and necessities of the people. He was of the view that as long as people in a country were engaged in some productive work there was no harm, if population in a society went on increasing.

If both viewpoints are compared then it becomes clear that Prof. Robbins point of optimum population is somewhat different that of Prof. Dalton. Prof. Robbins has national outlook as compared with Prof. Dalton who has individualistic outlook. Prof. Robbins has linked population growth with production, distribution as well as consumption. From both these approaches it also becomes clear that Prof. Robbins's definition is more subjective and less objective. On the other hand, Prof. Dalton's approach is very objective and can be put into practice without any difficulty.

Then another difference between the two is that while discussing his optimum population theory Dalton has laid stress on individual whereas Robbins stress is on society. Then whereas Robins has correlated it with consumption, Dalton has separated it from economic factors.

Is Optimum Point Static? Next problem which needs consideration is whether optimum point is static or not. In other words, question need be asked is whether in a country a population which has maximum income will remain so far ever. As said earlier optimum population is that population which is responsible for best utilisation of national resources, capital and technical know-how. In case there is no change in resources, then that population will remain static. But in practice national resources very rapidly and quickly change. These changes can come due to new inventions, wars, political ideologies, efficiency of labour, new discovery of

some national resources or exhaustion of already known resources, etc. Obviously when resources change with that population which is expected to use these resources must also accordingly change. It thus becomes clear that in a country an optimum population at one time cannot be so for all times to come. In presentation form this may be explained as follows:

At a given point of time optimum population of a country was OM and that continues to be so afar quite some time. But after some time due to new scientific inventions, etc., it becomes possible to exploit more natural resources and also utilise more capital with the result that optimum population will move from M to M_2. But if it so happens that the country's trade receives set back and due to internal or external factors it becomes difficult to exploit natural resources, then optimum population will not even remain M but will become M1. In this way it will be seen that optimum population will never remain static but on the other hand will go on changing from time to time depending upon other factors such as natural resources, technical know-how and capital.

Prof. Clark's view about Optimum Population. Professor Clark was of the view that it was difficult to think that optimum population could be a static concept because there were change in certain respects which must take place in the world. Such changes include increase in population, increase in capital changes in industrial set up, system and pattern and changes in necessities and requirements of consumers. These changes are inevitable and must always take place in every section of the society. Since these changes very rapidly take place, therefore, it becomes really difficult to simultaneously find out what should be optimum population at a given point of time. Thus optimum population will always continue to change. It has rather rightly been said that, "In the actual dynamic world of abrupt Kabidoscopic changes the quest for the optimum population is likely to prove to be a fruitless search after a will of the wisp that always eludes our grasp".

Prof. Dalton's Formula. Prof. Dalton is also of the view that optimum population can in no way be static. It must always change with changing times and circumstances. Whether population is optimum or not for measuring this he has also given a formula which says:

$$M = \frac{A - 0}{0}$$

M = under / over population

A = Actual Population.

O = Optimum Population.

If 'M' is positive then it means that the total population is above optimum population. On the other hand, if it is negative, than it is safe to believe that population is less than the optimum population. When, however, 'M' is zero then, it means that total population is equal to optimum population. Since resources, etc., always go on changing, therefore, it is difficult to apply and use this formula in actual practice.

Optimum Theory and Malthusian Theory

A question which now needs consideration is how far theory of optimum population is an improvement over Malthusian theory of population, which has said that the population grows by geometrical proportion whereas food only by arithmetical proportion. So far both the theories have been discussed and it the studies. Prof. Malthus had come out with the idea that unless some checks are applied, there is every tendency that population will outnumber the resources of consumption and food supplies. He also believed, that there must be a balance between population and sources of consumption and in case that is not maintained by the human beings themselves, then nature will try to come out to maintain such a balance, which obviously will not be very happy but always pains giving. Viewing theory of optimum population from this basic approach of Malthus, one finds that the former theory is better in following respects than the latter.

1. Prof. Malthus, while expounding his theory, has linked population growth with availability of food or food supplies whereas the expounders of theory of optimum population have linked population growth with natural resources, capital and production techniques. Obviously approach of Malthus in this regard is very narrow whereas that of the exponents of theory of optimum population very wide and more acceptable. It appears that fear and ghost of population exceeding food supplies always haunted Malthus whereas there is no such hunting in so far as exponents of optimum population theory are concerned. For them it is only problem of adjustment in reasonable ratio between population and other national

productive resources. If viewed from wider perspective it will be observed that it is not necessary for any nation to decide and formulate its population taking into consideration only its food supplies. If the nation has other resources, it can fully well import food from other countries, for meeting food needs for its growing population. We know that many powers have been exploiting their colonies and importing food to feed their population. In our modern times trade agreements are singed for import and export of food supplies in exchange for many consumption and capital goods, including heavy machineries, etc. In this way present theory is an improvement over Malthusian Theory of Population.

2. Then there is another difference, Prof. Gide has pointed out that in this approach Malthus was negative and pessimist. He was fully well convinced that growing population was always cause of pains and opposed to national interests. Prof. Kannan has also disapproved this approach of Malthus when he says that every child who is born brings with him also hands to earn and to produce. But this outlook is not very healthy. We know that availability of manpower helps in the division of labour which is essential for production. In this way also, present theory is much important because it makes us believe that growth of population in no society is harmful as such but it should be welcome so long as its production also goes on increasing. In fact, it has rightly been said that Malthus could not go beyond fodder economy and remained pessimistic, with low melancholy outlook. Present theory on the other hand is refreshingly optimistic with a bright vision. Whereas growing population for Malthus was bringing hell on earth, under optimum theory it is a coming paradise.

3. Malthus in his theory has said that when there are natural calamities like floods, fires, earthquakes, etc., it should be safely presumed that the nation has crossed the limit of optimum population and as such the Nature has started operating its own checks. It should also be presumed that food supplies have not kept pace with the population and also that human beings have failed to adopt much needed preventive checks. On the other hand, under optimum theory approach is very realistic. In this it is believed

that optimum population will be one at which income of the people will be to come down. Till such state reaches, it can safety be presumed that the nation is not having optimum population no matter whether the country is thinly or thickly populated. They are many countries of the world with high density of population but still these are not considered over populated on account of their natural resources, technical know-how and capital.

4. Prof. Malthus has tried to prove, in this theory that over population is main cause of poverty and that goes on increasing because the population rapidly increases with the poor. On the other hand, under the theory of optimum population it is believed that main cause of poverty of the masses in the present world is not growth of population, particularly among the poor, but something much more and beyond that, i.e., defective system of production and distribution as well as concentration of economic resources in the hands of very few people. Similarly poverty also increases because only few persons are allowed to exploit natural resources. It will thus be seen that the modern theory is much more appealing than the theory expounded by Malthus.

5. Malthus has all along stressed need and necessity of population control. According to him such a control can be possible only if certain rules like less mating, marrying at late stage, etc., are observed. According to him though observance of these and similar other rules result in certain strains and stresses, yet these ought to be observed. He was of the view that if such rules were not observed then the nature would take its own course. But under theory of optimum population it is believed that it is always better to avoid situation of overpopulation rather than to bring out situation and then to take steps for their reduction. According to this theory it is not difficult to find out whether situation of over-population has reached or not, because that can be linked with income. In case with increase in population, if production is increasing and method of distribution is also not defective then, we can say that over-population or even stage of 'Optimum Population' has not reached. In case production is to increase, for that it is essential that productive capacity should also simultaneously increase which can only increase when with the help of the latest scientific

techniques, un-exploited natural resources are exploited and more capital is created. They, therefore, believe that as long as nation a goes on exploiting natural resources and these are useful in raising the income of the society, question of optimum or over-population does not arise. This approach appears to be more convincing, as compared with Malthus approach.

6. Approach about population as suggested by Malthus is more or less static and as such it is not healthy for a dynamic society. On the other hand, approach in optimum population theory is dynamic because it is linked with natural resources.

Criticism of the Theory. Though the theory of optimum population is definitely an improvement on the theory expounded by Malthus, yet the critics have pointed out certain important defects of the theory. Some of the main points of criticism put forth against this theory are:

1. Optimum theory of population can help in finding out what was population of a country at a given point of time or that population is optimum, below or above that. But the theory does not tell us as to why and how the population of the country increases or decreased. Every important theory of population must deal with this aspect of the problem. According to some critics, it was therefore not desirable to call this theory, even population theory.

2. In this theory maximum stress has been laid on production but the theory has almost ignored distribution, which is equally important. Who does not know that for collective welfare of society, distribution is no less important than production and that any defective system of distribution is bound to result in concentration of wealth in the hands of only few persons? If wealth is concentrated in the hands of few persons, then it is possible that per capita income might show an increase but the people still might be miserable. The critics, therefore, point out that the theory shouldhave discussed about distribution along with production.

3. The theory of optimum population proceeds on the presumption that whereas population grows slowly and steadily there is very little change in

the habits of the people, tastes and technical know-how. But it is not true. We all know that economic position and situation continues to change and is never stable. Technical know-how, etc. continuously changes and with that people of different skills and calibre become in demand at different times. Prof. Clark has in fact very rightly pointed out that few changes always occur in the society. In other words, it is not in fact sound to call any population as optimum or ideal. Every technical discovery or invention is bound t change and disturb the whole population pattern of the society. Labour saving device might change the whole system of capital investment. In our society technological changes are continuously taking place and as such under-estimation of this reality has very much lowered the value of the theory.

4. Then another defect is that this theory has adopted a very materialistic outlook. In this capital or wealth has been given high place and position. It is believed in this theory, that per capita income should remain the highest and that maximum income is the only indication of progress of society. But again this theory has faltered. All do not want maximum wealth but certainly happiness. Wealth is not an end in itself but only means to an end. Wealth is needed for happiness and not for sorrows and miseries. These people should have realised, as Prof. Wipple has pointed out, “A nation’s true wealth likes not in land and water, not in its forests ad mines, not in its flocks and herds, not in its dollars, but in its healthy and happy men, women and children”. Unfortunately the supporters of theory of optimum population have ignored place and importance of healthy men and women in the society.

5. Again, it has been pointed out by the critics that this theory has not touched social and political aspects of life in a society and role which they play in the national life. These are situations which economically might appear favourable, but politically these might not be accepted or vice versa. During war maximum manpower is needed and political bosses will certainly cherish regular supply of manpower to win the war, no matter whether living standard of the people goes up or not. It would have been

rather very much desirable had these critics viewed the whole problem not only from economic but also from national viewpoint.

6. The critics point out that it is pity that optimum theory of population has not touched such important aspects of population as nature and role of sole distributors, pertinent to the determination of population size. It also does not deal with fields of action that can conceivably pertain to the process of demographic economic changes. The theory has failed to discuss role of values in the determination of population size on the one hand and behaviour equations that lead to different population sizes on the other. In fact, the theory has been badly criticised by some leading social scientists. Hauser and Duncan are of the view that the theory is static and volatile. Hicks is of the opinion that it is a notion of extremely little practical use. B.K. Sarkar while commenting on this theory has said that it is essentially unscientific. Paul Mombert says that whole theory is of abstract value. G.E.B. Reuter has gone still a step forward by saying that it is one of the most sterile idea that ever grew out of our science. Sir William Beveridge opines that it is a speculative construction of little importance for actual situation and is not really entitled to a place in the corpus of theoretical economics. Brinley Thomas is of the view that the whole concept is shadowy and elusive.

Thus, optimum theory of population has contributed in its own way to the discussion of population problems in our own times. Of course, the theory suffers from some serious defects but at the same time there is not denial that it was definitely an improvement and a step forward in so far as theorising population studies is concerned.

Check your Progress

1. Optimum Theory of Population states the relationship between population and _____.
   a. Economic condition
   b. Agricultural production
   c. Infrastructure facilities
   d. Scientific development

2. Who proposed a formula to find out the optimum population level?
   a. Edwin Cannan
   b. Carr Sounders
   c. Dalton
   d. Clark
3. When the value of 'M' is positive in the Dalton's formula, then what is the meaning of 'M'?
   a. Under population
   b. Over population
   c. Optimum population
   d. Less population
4. Who proposed the idea of optimum population for the first time in the field of Demography?
   a. Carr Sounders
   b. Dalton
   c. Robbins
   d. Edward West
5. Who introduced the concept "Optimum Population' for the first time in the field of Demography?
   a. K.E.Boulding
   b. Carr Sounders
   c. Edwin Cannan
   d. Dlaton
6. Elaborate the Optimum Population theory.
7. Define the concept 'Optimum Population'.
8. Discuss the salient features of Prof. Dalton's formula.
9. Put forth the criticisms of Optimum Population theory.
10. Compare and contrast Malthusian and Optimum Population theory.

Demographic Transition Theory

Demographic Transition theory is comparatively recent one and has been accepted by many nations and scholars of the world as reasonable one about population growth. It has been propounded on the basis of statistics collected in

many European countries. It appears to be scientific as well as rational theory. Almost all sociologists agree that population process in every state passes through many stages. Each stage has its own peculiarity. If some countries are in the first stage, then there are many which have crossed that and reached second or third stage. The scholars on the scholars on the subject are, however, divided about classification and grouping of these stages. According to Thompson and Prof. Bogue there are only three stages, while some scholars believe that there are as many as five stages.

Prof. O.P.Walker's Views about Classification. Prof. Walker has classified stages into five.

First Stage. It is high stationary stage. During this stage birth as well as death rate is very high, but the former exceeds the latter and as such population does not very much increase. Before 1920, China and India were at this stage. This stage is usually found in countries which depend on agriculture which is main source of income of their people. Countries like Nigeria, Ethiopia, Tanzania, Angola, etc., fall under this category.

Second Stage. It is early expanding stage. During this stage birth rate does not come down but death rate very much declines and population very rapidly increases. This happens because it becomes possible for the nation to provide better public health service, though at a slow rate.

Third Stage. It is called late expanding stage. During it both birth as well as death rates decrease. But birth rate does not exceed to the extent of death rate. This happens when the country has attained certain level of agricultural development and is stepping towards urbanisation. There is also some sort of industrialisation, Japan, Chile, Canada, and erstwhile USSR, etc., fall under this category.

Fourth Stage. It is low stationary stage. During this stage death rate is at the lowest stage at the same time birth rate also slowly decreases. There is no growth rate in population and both fertility and mortality rates are low. In such a society per capita income is high and there is higher industrial growth rate. In the economy there is no unemployment and the masses have considerably high real income. The people now being more educated very much care for the education and good quality

food for their children. The countries like the U.S.A., Germany, Britain and Australia fall under this category.

Fifth Stage. It is declining stage, when death rate, as compared with birth rate, is high. France is at this stage. In some cases such a stage reaches when there are unforeseen calamities.

Views of Thompson and Notestein. Thompson and Notestein have given their own views about these stages. According to them first and fifth stages are unusual. Neither the population is at high stationary stage not it is at declining stage. According to him rapid growth of population during the past three centuries was mainly due to decline in death rate, because of modernisation. Throughout modern west birth rate reached very low levels by the middle of 1930's because of wide spread use of contraceptives and desire to have small family size. According to them there are as such only three intermediary stages namely when:

(a) Birth rate is high but on account of reduction in death rate, population rapidly increases.
(b) Both the death and birth rates are decreasing but death rate has decreased more as compare with birth rate and population increases but slowly and steadily.
(c) Both birth and death rates have equally come down and population remains almost unchanged.

Thus, according to them stages are: (a) Pre-transition stage, (b) Transition stage and (c) Post-Transition stage. In the first stage, there is little control over mortality and fertility rates and fertility is stationary. In the second stage, both birth and death rates decline but birth rate falls slowly. In the third stage, both mortality and fertility rates are at a very low level. At this stage living standard of the people is also very high. The people like quality and small family sizes. There is optimum utilisation of resources.

Views of Donaldolen and Cowgill. They have given five stages of population as growth cycle. According to them:

First Stage. At this stage birth rate is high and to begin with death rate is also high and thereafter it begins to reduce itself. After some time it again begins to increase and this way due to increase and decrease in death rate, there are

fluctuations in population. When there are good food crops death rate comes down and when there are famines, pressure of death rate beings to increase. This type of cycle is found in agrarian societies and is dependent on food supplies. It is even today found in such societies which are industrially backward and have agricultural economy.

Second Stage. At this stage there is reduction both in death and birth rates but death rate, as compared with birth rate, comes down very quickly. But gradually both death and birth rates try to come at equal level. The people now start getting employment and there are visible changes both in food habits as well as in family size. Per capita income now begins to increase and diseases are brought under control. Traditional views start yielding to new values and there is more use of conceptive. There is stability in population.

Third Stage. During this stage death rate is very low but birth rate is very high and there is Baby Boom.

Fourth Stage. It is a stage during which both the birth and death rates are on the increase but as compared with death rate, birth rate increases more rapidly. The results is that there is higher growth rate of population, but this, it is believed very rarely happens.

Fifth Stage. This is a stage during which there is high fertility and low mortality. During this stage growth rate of population is very slow because of low fall in mortality rate in the beginning. There are increases in social health services due to which birth rate declines and growth rate becomes slower.

Laudry's View. This view is based on Cantillan's views about population. He establishes relationships between food and population. According to this view point there are three regimes in the development of a country. First is Primitive Regime during which availability of food very much depends on the population growth rate. In other words, food supply and population are directly linked with each other. Then comes Intermediate stage. During this stage role of food in population somewhat gets reduced and now economics beings to play its role. The people now wish to maintain their living standard. Economy beings to move upward and population control methods become popular. The people now start marrying at late stage. Then last stage which is also known as modern epoch, in which population growth

rate has no link with food. There is definite fall in birth rate. There is maximum development in nation's economy and the people are least interested in having big family size.

Ausley J. Coale and Edgert M. Hiiver's views about demographic Transition. According to them everywhere in agrarian economy there is high birth and death rate which varies in harvests and incidents of epidemics. The reasons for high death and birth rates are poor diet, poor sanitary conditions, lack of preventive and curative medical and public health programmes, etc. As the agricultural economy becomes inter-dependent on other economies nation gradually becomes highly industrialised with, marked oriented urbanised economy. When this happens death rate considerably comes down because of supply of adequate food and medical facilities.

After sometime, they believe, even birth rate also begins to fall and in the urban areas because of socio-economic conditions, small family size becomes popular. This then passes on to rural areas. Whereas decline in death rate comes first, birth rate follows subsequently. After sometime both birth and death rates follow parallel down ward trend. The result is that population growth rate becomes very slow; but whereas death rate does not fluctuate, birth rate continues to fluctuate from year to year.

Karl Sax views about Demographic Transition. Karl Sax is of the view that population growth comes in stages. First stage is found in societies where development is yet to start and in these societies both mortality and birth rates are bound to be high. In the second stage, there is higher mortality rate, whereas there is no change in the fertility rate. Thus, there is increase in population. There is slow economic development in the society. In the third stage, death rate reaches minimum level, whereas birth rate starts declining. Then comes last stage of equilibrium. Whereas second and third stages are known as those of population explosion, the remaining two stages are called those of stationary population.

U.N. views about Demographic Transition. On the basis of population U.N. has classified societies as follows:

(a) Societies which have high birth and death rates.

(b) Societies which have high death rates but there is declining high death rate.

(c) Societies which have high birth rate but fairly low death rate.

(d) Societies which have declining birth rate but low death rate.

(e) Societies with fluctuating birth and death rates.

Analysis of views. Of course, these thinkers have given their own view point about population growth, but one thing is clear that every country must pass through different stages. First stage is applicable to backward countries where both death and birth rates are high. In these countries agriculture is the main source of income. The people live in the rural areas and either there is no industrialisation and if there is any that is very insignificant. Per capita income is very low and the children are considered more a source of income rather than anything else. The children of all ages find world in agriculture and thus even a small child becomes source of income. In fact, not much attention is paid to the health and education of the children and as such bringing up of children is considered no problem at all for the parents.

During the second stage, economy beings to proceed towards development. Along with agriculture, industry also beings to play its own role. In other words industrialisation takes place. Along with industrialisation, urbanisation starts and many support facilities are provided to the society. Education, food health and similar other facilities take place. In social life, hold of orthodoxy beings to relax itself. At this stage there is almost population explosion.

At the third stage, living standard improves and along with that there is improvement in the physical standard of the people. The women also being to get educated and so also employment. These wish to have less number of children and find time to play their role in other walks of life. On the other hand, aspirations in the economic field go very high. The parents wish to give very high education to their children. There is definite trend towards urbanisation and industrialisation and birth rate definitely falls down.

According to this theory all the countries of the world are passing through these stages. Broadly speaking, some African countries are in the first stage. Asian in the second and European in the third stage. But there is no country in the world

which does not pass through all the three stages. Thus, these three stages are unavoidable for the country as a whole.

Criticism of Theory of Demographic Transition. There is no doubt that this theory is quite useful in describing demographic history. But at the same time it has its own limitations. It has been said that it is not a theory in the strict sense of the term because it is only abroad generalisation and does not encompass the experience of even all the western countries. It even does not fully explain to experience of even all the western countries. It even does not fully explain the phenomenon of 'Baby Boom' which came in western countries after economic recovery and Second World War. It is also pointed out by the critics that the theory does not provide a theoretical explanation of fertility which is so necessary for any demographic study. It is not a theory in the sense that it does not extract fundamental processes from a phenomenon and identify crucial variables. Because of this it does not have any predictive value. A serious limitation of this theory is that is cannot be applied with confidence in the developing countries. In brief, it can be said that though this theory provides good frame work for wider empirical generalisations, yet it cannot really be considered a theory.

Check your Progress

1. The Demographic Transition theory states the relationship between _____ and _____.
   a. Fertility and Migration
   b. Fertility and Marriage
   c. Fertility and Mortality
   d. Mortality and Migration
2. The Demographic Transition theory based on the collection of data from _____ countries.
   a. Asian
   b. European
   c. African
   d. Australia and New Zealand
3. In Demographic Transition theory, the first stage is also called as _____ stage.
   a. High Stationary

b. Low Stationary
c. Early Expanding
d. Late Expanding

4. Which stage is considered as declining stage in the Demographic Transition theory?
   a. First stage
   b. Third stage
   c. Fourth stage
   d. Fifth stage
5. What is another term for third stage in the Demographic Transition theory?
   a. Low Stationary Stage
   b. Early Expanding Stage
   c. Late Expanding Stage
   d. High Stationary Stage
6. Discuss Demographic Transition theory of population.
7. Describe Donaldolen and Cowgill views on Demographic Transition theory of population.
8. Explain Karl Sax's views on Demographic Transition theory of population.
9. Put forth criticisms of Demographic Transition theory of population.
10. Compare and contrast Demographic and Optimum population theories.

Herbert Spencer's Perspective

Herbert Spencer, a notable English philosopher and sociologist, proposed the biological theory of population in his book The Principles of Biology. Spencer suggested that as life becomes more complicated, fertility falls. According to him, natural changes in humans' reproductive potential cause fluctuations in population increase. As a result, his idea has been referred to as a natural population theory, comparable to Sadler and Doubleday's theory.

Spencer believed that "there exists antagonism between individuation (survival) and genesis (reproduction)". When an individual works hard for his own development at work, his desire for reproduction lowers. This is demonstrated by the fact that fertility is higher in rural areas where life is simpler, whereas fertility is lower in industrialized

societies where life is more complex, there is more educational pressure, and the brain is overtaxed.

Spencer proposes four conditions that explain the relationship between individuation and genesis:

(i) when there is a lot of genesis, the individuation goes down. This is the scenario we find among the poor.

(ii) When there is a high level of individuation, genesis is reduced. Such a condition exists among the wealthy.

(iii) Individualization improves when genesis is low.

(iv) High genesis occurs when individuation is low. Poor persons exhibit less individuation and greater genesis.

According to him, persons can be categorized into three groups:

(i) Poor people who live simple lives and have high fertility;

(ii) People in the middle class have low fertility.

(iii) People who lead evolved or complex lives and have a very low reproductive rate compare to middle class people.

According to Spencer, in civilizations where people, particularly women, are educated and come from wealthy families, their reproductive power is limited, in contrast to the women who are uneducated and come from poor family, their reproductive power is high.

Check your Progress

1. According to Herbert Spencer, _____ people who live simple lives and have high fertility.
   a. Middle class
   b. Poor class
   c. High class
   d. Richest class
2. As per Herbert Spencer idea, _____ class people have low fertility.
   a. Poor
   b. Middle

c. High
d. Richest

3. According to Herbert Spencer, _____ people led simple life and have _____ fertility rate.
   a. Urban and high
   b. Rural and high
   c. Rural and low
   d. Urban and low
4. According to Herbert Spencer, _____ people have complex life and have _____ fertility rate.
   a. Rural and high
   b. Rural and less
   c. Urban and high
   d. Urban and less
5. Discuss Herbert Spencer's views on population.

Biological Theory of Population

Ester Boserup

Esther Boserup was a Danish economist. She studied economic and agricultural development at Copenhagen University. She wrote pioneering works on agrarian reform and women's roles in development while working at various international organizations, including the United Nations. Boserup is noted for her ideas on agricultural intensification. Her most well-known book, 'The Conditions of Agricultural Growth', offers a comprehensive account of early agriculture. Her work emphasizes the idea that "necessity is the mother of invention".

In this book she maintained that population growth is the primary source of agricultural change, with land intensification leading to increasing cropping frequency. She maintained that intensification requires population expansion, which diminishes labor output. However, this controversial claim is unverified. She maintained that collective action is important to address demographic pressures. Intensification leads to technological advancements, including the adoption of new fallowing systems that require new equipment and skills. These changes influence

institutions, land tenure systems, and settlement patterns. The hypothesis contradicts Malthusian and neo-Malthusian views that view technological change as a self-sustaining process, independent of population growth.

Boserup's theory holds that population change determines the intensity of agricultural production. Her argument challenged the Malthusian theory that agricultural systems limit population growth due to food supply constraints. According to Boserup, population growth is independent of food supply and is the source of agricultural changes.

Check your Progress

1. Ester Boserup is _____ economist.
   a. French
   b. Spanish
   c. Danish
   d. American
2. Ester Boserup's theory is also called _____ theory of population.
   a. Economic
   b. Political
   c. Religious
   d. Biological
3. Ester Boserup's theory of population deals about the relationship between population and _____.
   a. Agricultural production
   b. Infrastructure development
   c. Economic development
   d. Hospital improvement
4. Ester Boserup suggest that population growth always _____ impact for the society.
   a. Positive
   b. Negative
   c. Zero
   d. No
5. Discuss Ester Boserup's ideas of biological theory of population.

Economic Theory of Population

Julian Simon

Julian Simon argues in his book "The Ultimate Resource" that population growth is a solution rather than a problem. He thought that a larger population encourages more creativity, technological improvements, and resourcefulness, leading in a more

wealthy and sustainable planet. This viewpoint contrasts with the Malthusian theory, which predicts that population expansion would always outrun resource output, resulting in starvation and social collapse.

Key Aspects of Simon's Theory:

1. Humans as the Ultimate Resource:
Simon considered human ingenuity and the collective knowledge of a people to be the most valuable resource. This "ultimate resource" fuels creativity, resource discovery, and the creation of new technology.

2. Population Growth and Innovation:
He believed that greater populations lead to more diverse knowledge, ideas, and innovation, resulting in better solutions to difficulties such as resource shortages.

3. Technological Advancement and Resource Management:
Simon felt that increased innovation might overcome resource restrictions and improve living standards.

4. The Simon-Ehrlich Wager:
Simon and ecologist Paul Ehrlich bet that the prices of five metals (copper, chromium, nickel, tin, and tungsten) would fall over 10 years. Simon won the bet, demonstrating how technical innovation may boost resource supply while lowering prices.

5. Freedom and Economic Progress:
Simon emphasized the value of freedom, democratic institutions, and market freedoms, arguing that these conditions are essential for generating creativity and economic success.

Contrast with Malthusian Theory:

Thomas Malthus proposed this theory, which states that population increases will always outpace resource supply, resulting in famine, illness, and conflict. Simon's

counter-argument was that human creativity and technology progress could overcome restrictions, and that a greater population would promote innovation and resource discovery.

Check your Progress

1. Julian Simon opinion that population growth encourages technological _____.
   a. Development/improvement
   b. Under development
   c. Less development
   d. Medium development
2. Julian Simon's theory deals about population growth in which aspect?
   a. Biological
   b. Economic
   c. Political
   d. Religious
3. Explain Julian Simon's idea of Economic theory of population.
4. Compare and contrast Julian Simon and Malthusian theory of population.

Let's Sum Up

Theories of population deals about the population dynamics like population growth, distribution and change and these theories also traces to analysis about the changes in the population dynamics in connection with positive and negative aspects. The Malthusian theory of population deals about population growth and agricultural production, the optimum theory of population analysis about population growth in the context of economic development. While demographic transition theory of population deals about the relationship between fertility and mortality and the changes take place in these two variables with regard to economic development. Similarly this unit also dealt about biological theory of population which is propounded by Ester Boserup and economic theory of population which is propounded by Julian Simon.

Glossary

Population Theory: Opinion about changes in the population dynamics with regard to agricultural production, per capita income, economic development and development of technological know-how.

Malthusian Theory of Population: A theory was propounded by Thomas Robert Malthus and this theory states that population growth invariably affect the agricultural production.

Positive Checks: The nature imposes certain checks like famine, disease, war etc. to control the population growth through increasing of death rate.

Preventive Checks: The individuals come forward to impose certain checks like maintaining celibacy, practising chastity, postponement of marriage in order to reduce birth rate.

Optimum Theory of Population: This theory suggest an ideal size of population for any country and this ideal size of population measured with a population size which gives maximum income per head in the country.

Demographic Transition Theory of Population: This theory describes the change in the birth rate and death rate through different stages of economic development.

Biological Theory of Population: This theory propounded by Ester Boserup and she mentioned that the population growth pressurizes technological development and such technological advancement improves the agricultural production.

Economic Theory of Population: This theory propounded by Julian Simon and he suggested that the population growth is not a problem for any country but it is a solution. Because larger population leads to greater knowledge and this greater knowledge leads to economic development.

Unit - III

POPULATION DYNAMICS

Structure

Objectives

This unit is discussed about population dynamics and after going through this unit the students must able to

1. Discuss about fertility including its measurement, determinant factors and fertility in India
2. Understand the concept of mortality, infant mortality, child mortality and maternal mortality.
3. Comprehend the measurements of mortality and mortality in India
4. Describe measurement and types of migration.

5. Know various theories of migration and the consequences of migration.

FERTILITY

In every society it is very essential to find out birth and death rates and the factors which influence these. In fact, birth or death of a child in a family effects and influences the whole family structure on the one hand and the society as a whole on the other. It also effects the health of the parents an also their psychology and attitude towards family life. It is of course always true that the impact is always more on the parents than on the society, where entrance and exit is always continuous. Hauser and Duncan in "A Study of Population" have said, "A disturbance of the rate of production of new members pretends for the population successive modifications in the number of consumers in each higher age group, the demands imposed on the educational structure, the flow of young adults into the labour force, the housing requirements of newly-weds and so on throughout the life span to the ages beyond retirement when the old seekto derive financial if not psychological security from their savings, their progeny and their government". In fact, today fertility and population problems and fertility rate is being studied by the policy makers, both in the government and outside. There is no aspect of human life which is notinfluenced by fertility today. In the words of Thompson and Lewis, "There fertility of women has always been a matter of vital concern to the all people".

Need for Fertility

Need and necessity of fertility has been felt from the very beginning of social life. There are sufficient evidences to show that in the past, with the help of prayers, in many societies, an effort was made to have fertility of barren women. It was always believed that a woman who had no fertility was unfortunate because she could not keep the family going on. As the time passed it was realised that prayers were not keep the family going on. As the time passed it was realised that prayers were not effective or scientific method of changing barrenness into fertility and as such scientific means and methods began to be adopted. Along with this, in order to keep the family going and to take advantage of fertility the systems of widow remarriage and polygamy, etc., were encouraged. There was no period of human history in the past when a deliberate attempt was made to check human fertility,

maintain fertility so that tribe continued. It is, however, in the 20th century that there is a growing feeling not to take full advantage of fertility and this is being done through different ways, i.e. by late marriage, by avoiding children for long time, by way of limiting family size by the use of contraceptives and in some societies even by following practice of infanticide, particularly that of the girls.

But it cannot be denied that every society replenishes itself only with the help of fertility. It is thus a positive force. But excessive replenishing of human number can create many social, economic and political problems for the country. Therefore, it is not a simple but a complicated affair. Need for the study of fertility in broader perspective was felt after 'baby born' which came after Great Depression of 1930's. It was thereafter that more and more interest began to be taken by social scientists and demographics in the study of fertility. Not only this but policy maker's administrators, medical doctors and others concerned with population studies began to show interest in it. Interest in fertility study also increased because of methodological developments, which made to study of fertility easier.

Definition of Fertility

In the words of Lewis and Thompson, "Fertility is generally used to indicate the actual reproductive performance of a woman or groups of women. The crude birth rate (number of births per 1000 population per year) is only one measure of fertility".

Barnard Benjamin defines fertility by saying, "Fertility measures the rate of which a population adds to itself by births and is normally assessed by relating the number of births to the size of some section of population, such as the number of married couples to the number of women of child bearing age, i.e. an appropriate yard stock of potential fertility".

Barclay has discussed at some length difficulties involved in the study of fertility. He has also defined fertility by saying that. "The fundamental notion of fertility is an actual level of performance in a population, based on the number of live births that occur… fertility can be ascertained from statistics of births. The study of fertility does not indicate the level of fecundity for which there is no direct measurement".

Factors Affecting Fertility

In vast majority of cases both the men and women have fertility and capacity to produce children. There are, however, many factors which affect and influence fertility. In the past there was not check or control in so far as child producing was concerned. But today fertility is being checked in the sense that most of the people in the urban areas or the elite sections of the society checking the size of the family wish to have very limited family size. They are following family planning devices and with the help of or by such means as abortion. A family of two children is today considered a normal family, though some people still like to have a smaller family. There are people also who do not at all like to have a child, though they are leading a married life and have capacity to produce children. In fact, whole programme of limiting the size of the family has become more necessary from social point of view rather than any other viewpoint. In the words of Prof. Burten Bendict, "If there is one thing which experience with family planning has shown, it is that people are not motivated to limit their families by population statistics or even by the ease or availability of contraceptives, but by a whole set of social factors impinging on their personal lives and changing over their life cycles. In the vast majority of the society of the world these factors serve to promote human fertility. In a few societies or parts of societies they serve to limit fertility". Some of the important factors which effect fertility may be discussed as under:

	Indirect Social Factors	Direct Factors Influencing Fertility	Other Social Factors
a)	Age of Marriage	Oral Pills	Food Supply
b)	Polygamy	Loops	Economic Conditions
c)	Separation and Divorce	Condom	Family system
d)	Widowhood	Abortion	Social status of Women
e)	Post Partum Abstinence	Infanticide	Political system
f)	Abstinence and Menstruation		Attitude towards children
g)	Celibacy		Death rate
h)	Frequency of Coitus		Intellectual Freedom

i)	Role of Science
j)	Dire to maintain Status

Biological Factors

In fertility biological factors play a very leading role. In biological factors most important is the health and related factors are diseases, food habits, etc., etc. As health conditions and standards go on improving with that fecundity also increased and death rate comes down. During the last few years, death rate has considerably decreased because health facilities have been sufficiently provided and utilised by the people, more particularly in developing and under-developed countries. Though there are biological limits for human reproduction but a number of social, cultural and psychological factors influence the levels of fertility in every biological aspects of fertility only but also effects of various social norms and customs which are linked with the process involved in child bearing. Biological limits imposed on child bearing because of age and sex can be easily recognised menstruation and her capacity to bear children comes to an end with the onset of menopause. The reproductive period of a woman, on an average is between 30 – 35 years whereas that of a man is considerably longer.

In many, however, be pointed out that fecundity of females is not uniform throughout this span of 30 – 35 years. It is at the low level during early puberty stage. A woman's capacity to bear children reaches the highest level at 20 – 25 years, after which it starts declining gradually and reaches zero level at about 50 years.

Physiological Factors Affecting Fertility

It has been found that when the age of cohabitation is lower, the interval between consummation of the marriage and the birth of the child is large and that is the reason that early female marriages in India do not necessarily result in large families. During the reproductive span of women, there are certain periods of sterility. After the birth of a child the woman is generally sterile, during which the possibility of occurrence of conception is very rare. The period of temporary sterility is known as post-partum sterile period. The natural fertility of every population is affected by the extent of primary and secondary sterility among women or couples.

The average number of children even born per woman depends upon the percentage of women or couple who suffer from primary sterility - that is couple who have never had a child. The extent of primary sterility, however, varies with the female age at marriage. Another physiologically factor which affects fertility of any population is magnitude of secondary fertility i.e. fecundity impairment. It is inability of women who do not practice contraception to participate in reproduction after getting one or more children. Secondary sterility can be due to certain pathological conditions or infection or due to accident during child birth. Its study is essential for estimating future growth of families.

In physiological factors affecting fertility mention may be made about foetal wastage i.e abortion and still births which carries not only from country to country but also from place to place. It has been estimated that 30% of conceptions result in foetal deaths and if these are taken into account reproduction age may increase by 15%.

Because of social and other restraining factor there is always a gap between biologically maximum fertility and actual level of fertility. It has been found that in India in spite of the fact that there is lower female age at marriage and hardly any use of contraception, fertility is lower than what it is in many Eastern and Western societies. The main reasons for this being social customs, adolescent sterility and longer sterile period between two births because of breast feeding of the child for a longer duration.

Indirect Social Factors

These are the factors which are influenced by social customs and in turn affect fertility. Usually these factors instead of directly influencing fertility indirectly influence them. Important factors being

(a) Age at Marriage,

(b) Polygamy,

(c) Separation and Divorce,

(d) Widowhood,

(e) Post-Partum Abstinence,

(f) Abstinence and Menstruation,

(g) Celebacy and

(h) Frequency of coitus.

Since each such factor is important, it will be useful to study these in some detail.

(i) **Age at Marriage.** It appears that fertility goes down when marriage takes place at a late stage. In Europe many people marry at a very late stage and in many more cases the people even do not marry at all. It is well known fact that fertility rate is higher in countries where marriages take place at comparatively early ages, as compared with the people who marry at late stage. In India marriages take place at very young age, but in West Indies these take place at last stage but the boys and the girls permitted to have sex relations and even produce children before marriage. Thus it is not universally correct that fertility will be low, if the marriages take place at late stage. Since in India in spite of the fact that marriages take place at young age but sexual relationship is socially permitted when the girl has reached puberty, therefore, early marriage does not influence fertility.

As regard marriage some other factors which both effects as well as influence fertility include nature of relationship of marriage to age group, caste, customs, rituals and economic status of the spouse etc. Then the factors are as to what is actual span of happy married life, favourable or unfavourable social, economic and cultural conditions, marriage and divorce laws, age of husband and wife at the time of marriage and the way with which both accept each other after marriage. It is usually believed that those females who conceive at an early age experience more miscarriages and still births than those who conceive at matrix age. In the words of Dandekar, “Our study found that the fertility of wives of migrant workers who were absent for a large part of theyear, was not adversely affected, in fact in the younger age group it was enhanced”.

As regards marriage and fertility there are two factors which must be borne in mind. Firstly, as compared with animal, birth to only one child at one and the same time. The child which thus takes birth is very tender

and needs care and consideration. In families where that care is not possible, death rate goes up. When marriage takes place at an early age indirect advantage is that the couple can produce more children and in spite of the fact that some children may die, even then there can be some surviving children and thus ancestral family traditions continue.

Then another fact which ought to be borne in mind is that in birth matters social and cultural conditions play a very big role. Cultural conditions and social customs directly influence biological needs and their satisfaction. These also influence age at marriage. Caste, family, etc., are many such factors which influence marriage, child birth, age at marriage, etc., etc, and thus importance and significance can in no way be under-estimated.

(ii) **Polygamy.** Another indirect social factor which influences fertility is polygamy. It is a system under which a husband can have more than one wife. This system is not very popular these days. It Polygamy is compared with a system where the husband has only one wife, then some thinkers have tried to establish that there is possibility that fertility per woman maybe very less. But the facts have not supported this belief. When an husband begins to maintain more than one wife, then their first wives get more opportunities of meeting the husband and thus produce more children has compared with the wives, who are married at late stage and due to old age of the husband the sexual meetings between the husband and the wife are very less. As such, chances of such wives producing children are considerably reduced. Since the husband himself is old and the wife is not permitted to have sexual exposures with other young men, the result is that birth of children considerably goes down.

(iii) **Separation and Divorce.** It is not certain that after marriage, both the husband and the wife will always have cordial relations. There can be and in many cases are unhealthy and strained relations between the two as well, which results either in separation, or divorce. But divorce or separation always does not mean low fertility. I is related to many factors e.g. how frequent is the separation, what is separation period, the age of the children when the parents opt for separation, age of the parents

themselves at the time of separation or divorce, the interval between the separation and remarriage, etc. Obviously these are so clear factors that there is no need to explain each. A study conducted in Jamaica in 1954, showed that those couples which have a tendency to always live closer and nearer to each other have more fertility as compared with the couples which remain away, quite separate from each other.

Some holds true of divorce also. In case divorce takes place when the couple is young and still in reproductive age group then divorce may affect fertility, but not otherwise. In addition, it also depends on the health of the couple and their desire to produce children.

(iv) **Widowhood.** Widowhood quite obviously influences fertility. It is because without her husband she cannot have legal children. But the effect of widowhood on fertility depends on how soon she decided to remarry and at what age she becomes widow. If a widow decides to remarry immediately then fertility will not be effected, but if she decides to remarry at a very late stage or not to remarry at all, obviously fertility will be effected, whether widow remarriage system is good or bad or it should or should not be encouraged, very much depends on social conditions and attitude of the people and differs from country to country. In India for a long time widow remarriage was discouraged, though the situation has changed now. In Burma widow remarriage is still not encouraged. It is also affected by the economic conditions of the family as well. In many Asian countries including India and China, those widows who belong to rich families are usually not encouraged to remarry, as compared with the widows belonging to poor families.

(v) **Post Partum Abstinence.** Fertility is also affected by restrictions imposed by society or otherwise on reunion or sexual exposure of husband and wife, after the birth of a child. Obviously when this period is long, fertility will be less, but when the period is short, husband and wife will get opportunity to meet and chances of fertility are bright and more.

(vi) **Abstinence and Menstruation.** Almost all over the world it is accepted that husband and wife should remain separate from each other, during

menstruation period of the wife. In some societies it is very strictly observed and women during menstruation period are not permitted to attend many social functions and religious ceremonies, while in other societies, this practice is not observed with great rigidity. Since the period of menstruation is practically that of separation, therefore, fertility is affected. It is, however, difficult to ascertain the extent of effect, because during this short period, it is even not possible to find out how many times husband and wife even otherwise would have met for the purposes of producing children.

(vii) **Celibacy.** Fertility is also affected and influenced by social and self-imposed controls about marriages. In many societies, including our own society, it is believed that ideal age of marriage is 25 years for the boy and 20 years for the girl, i.e. upto this age boy and girl should not marry. Similarly there are legal provisions about the marriageable age of boys and girls in India and many other countries. In European countries priests and nuns are expected to lead self-controlled lives in so far as fertility is concerned. Similarly for quite some time girls who joined IAS or IFS were not permitted to marry. Thus when self or socially imposed restrictions are effective, fertility is bound to be effected, because during the period of such a control the boy and girl will have no opportunity to meet and thus no children will be produced.

(viii) **Frequency of Coitus.** What is the frequency of coitus is an influencing factor in fertility. It is very difficult to find out and assess how frequently husband and wife meet together, but usually it is believed that such meetings should be less frequent because more frequent meetings adversely affect health of both the sexes. In the words of Harrison and Boyce, “The evidence of frequency of coitus variable is so poor that no conclusion can be drawn. One can only guess that it is unlikely to be as low in a vast majority of societies as to effect fertility significantly”. But one interesting fact with has been noticed is that whereas in India husband and wife meet less frequently, as compared with their counterparts in the USA, yet fertility among Indian woman is more as compared with her American counterpart.

Direct Factors Affecting Fertility

Along with indirect factors there are direct factors as well which affect fertility. These include use of contraceptives, oral pills, other unnatural measures, abortions, infanticide, etc. All these factors are so important that these need careful study. In every society, these days there is a tendency that family size should be small and population explosion should be checked, otherwise many economic, social and political problems are bound to arise. Thus, the most important direct factor which affects fertility is family planning drive in every society. There are different methods for achieving this object and each objective obviously affects fertility. Today there is no advanced country of the world which is not interested in checking fertility. Every attempt is made to educate as well as to convince the people about checking fertility. For quite sometimes it was believed that young boys and girls studying in schools should not be given population education. But these days this idea is not very much accepted. Population education is now being given at school level, so that from young age they become aware of the need and necessity of small family size. Some such methods which are used these days are as follows:

(a) **Oral Pills.** It is believed that a fertile woman, if she uses these pills for 20 days in a month, then in her case the chances of pregnancy are reduced to the minimum. In some cases when these are used without medical advice there can be complications, but when used with medical advice that can solve many such problems as headache, fatness, etc. which such tablets can create. Since the pills have been found most effective against pregnancy these is in common use in the USA. Thus, the use of these pills checks fertility.

(b) **Loop.** It is another device for checking fertility. It is used by women and the success of avoiding birth of children is about 96%. Loop can be removed at any time. It is most useful in checking period of birth between the two children. In India when it was introduced in 1970, it was quite popular but subsequently due to many complications the women avoided using it. But use of loop very effectively checks fertility.

(c) **Condom.** It is used by men and is the easiest way of checking the fertility and child birth. It can be used without help of any doctor. In India it is

being supplied to the married couples at very concessional rates. These are now being commonly used and is proving very useful method for controlling family size.

In addition to this there are many other artificial methods for checking population growth and fertility. These end in getting the wife operated so that she is not in a position to produce children.

(d) **Abortion.** Quite often a woman becomes pregnant at a time when she does not wish to have any child. In many societies, it is quite permissible that she should be allowed to have abortion, though in many societies it is not so allowed. How far abortions influence fertility is difficult to assess because in many cases the people are not willing to supply information due to legal or social reasons and in many other cases, it is difficult to distinguish between voluntarily abortion and mis-carriage. In many other cases, it is difficult to distinguish between voluntarily abortion and there is nothing unusual in that. Devereux, 1955 study about Formosa has shown that there are women who had as many as 16 abortions. Whether abortion should legally be allowed or not, is a problem on which opinions can differ, but the fact remains that today in many advanced societies of the world, there is no hesitation in following it and as such it is a method which is used for checking fertility and it influences and effects birth rate of children.

(e) **Infanticide.** Another factor which directly affects fertility is practice of infanticide. It is a practice which had quite well been followed in Arab countries in the past. In some society's children born blind, handicapped, or those who are born at ill time, etc., are killed from their very birth and so is the notion about the children born, at the time of whose birth some death takes place. In Eskimo society children are killed because there is shortage of food. Balikci, Firth and Fei in their studies have also come to the conclusion that food shortage is responsible for infanticide in many societies. Even in such societies daughters are killed because they cannot go for hunting or are not economically self-sufficient. Not only this, but when they grow up even then much are to be spent on their marriage and dowry. In such societies obviously ratio of men is always higher as

compared with those of the women. In such societies where girls are killed attitude adopted is that work of women is merely to fill the water bottles, and when one or two girls have born that should be enough. But men are needed because they go out for catching the fish and doing other work. Fei in his study carried in some parts of China came to the conclusion that people disliked more children because it was felt that more children meant reducing size of holdings. In such societies, therefore, girls are quite frequently killed and abortion is nothing unusual. In China one factor which has always been responsible for girl infanticide is that she is always considered a liability. Prof. Lang in his study carried out in 1946 came to the conclusion that "Female infants may not be killed outright, but in families where food is short sons are better fed. Everywhere girls do not actually starve, epidemics will be much likely to carry them off than their better nourished brothers".

From the study of all factors which directly or indirectly affect fertility, it will be seen that some are really effective, whereas others only very marginally affect birth rate or fertility. In the words of Harrison and Boyce, "The brief survey of direct and indirect factors affecting fertility has shown that for the vast majority of societies there are few social mechanism for controlling fertility and that those that exist except in a very few societies, do not appear to be very effective. The fact is that in most societies people do not wish to restrict fertility. On the contrary, they desire to produce the maximum number of children". It is however, difficult to agree with the learned authors that even today the people are not interested in restricting fertility or are in any way interested in having maximum number of children. Today in many societies, people are quite keen to have limited families and are adopting many measures to check fertility.

Other Social Factors

So far, some direct and indirect factors which affect fertility have been discussed. There are other social factors as well which affect fertility. Some such important factors are:

Food Supply. It is usually believed that in societies where there is shortage of food supply, there is less fertility. Mathus, for the first time in his theory, tried to

establish that nature maintains a balance between food supplies and growth of population and that there is a link between the two. But it is difficult to logically and scientifically establish this relationship in actual practice. In fact, it is difficult to link that shortage of food supplies checks fertility in any society. Prof. Wynne and Edwards are of the view that in non-human animal society's growth rate is much higher than food supplies, but still animals are not seen dying of starvation. They are of the opinion that what is true of animal society, should be true of human society as well. Stot in a study conducted in 1962 has also supported the viewpoint of Wynne and Edwards. Prof. Douglas has, however, not contributed to this viewpoint, because unlike animal population human population is effected by many cultural factors, Human population is not effected by shortage of food supplies but by local customs, social prestige, etc. Harrison and Boyce say, "The Chinese killed girl babies not because there was shortage of food but because the status and prestige of the family is manifested in the dowry given to a daughter on marriage and because the lineage can only be perpetuated by males". It, however, cannot be denied that food supplies if not directly, to a considerable extent indirectly, check fertility. We know that in many countries where there is shortage of food supplies, young couples are advised to restrict family size so that is becomes easy to solve food problem of the country.

Urbanisation. Though in a country like France in rural areas there is less fertility as compared with urban areas, yet on the whole urbanisation is not conducive for fertility. It is said that fertility and size of the town are very closely linked with each other. It is because in the cities there is high cost of living, which family with a big size cannot afford. Then there are social classes in which big family is not a welcome. By and large people with big income in the cities do not favour big families and the women are both educated and employed and thus psychological and otherwise not prepared to accept big family and fragment fertility.

Economic Conditions. Then another factor which affects fertility is economic conditions of the people. Economic conditions are directly linked with fertility. Usually in agricultural settings and zamindar families fertility is very high because they follow joint family system and husband and wife always live together. Moreover agriculturists so much produce for them that everyone is economically sound. It is one reason that in village's fertility is very high, particularly among the

zamindars. One the other hand, in cities people is mostly salaried ones and they have their own limitations. They have shortage of accommodation and with their limited income they find it difficult to bear expenses of bringing up the children. It is primary reason that mong salaried people an attempt is made to keep fertility low. Prof. Seppilli is of the view that if in Italy birth rate came down to 50% for that main reason was that country became industrialised from an agricultural country. The people in urban areas then think in terms of giving higher education to their children, providing them high living standard and more facilities and amenities of life and as such they do not like to have more children.

In some societies, however, reverse is the case. In these countries poor sections of society, no matter whether they belong to agriculture or industry, have high fertility. It is primarily because husband and wife always live together and have other source of entertainment except that of sexual exposure. Moreover, it is believed that every child who is born, will after some time start earning something even ata very young age by doing menial jobs. They feel that whereas cost of their bringing up is very less, that of their giving return is very high. About the western society Harrison and Boyce say, “The very poor in industrial societies can often see no advantage in limiting their children. At the lowest level, ten children are more of a handicap than nine… If a man does not have dependents, on whom will he depend when he is old and ill”.

Role of Religion. Fertility is also affected and influenced by the preaching of religious. Those religious who do not put any bar on the number of marriage and children are likely to have more fertility than the others. Because more the number of wives normally there are, more, the number of children.

Family system. Family system also affects fertility. In a joint family system where the elders always have an eye on the activities of the youngsters and accommodation is short, the chances of husband and wife meeting together are reduced to a considerable extent. Hence, fertility is low. On the other hand, where there is single family system and the couple live alone, both have ample opportunities and fertility goes up. But these days it is not exactly the case. Usually husband and wife both are employed and they have no elder lady at home to look after children, the result is that they avoid producing these. On the other hand, in the joint family system there is no such problem, because even if both the husband and

wife are employed, there are many elder ladies who can look after the children and as such the couple does not wish to check fertility.

Occupation and Fertility. Then another important factor which influences fertility is the occupation of the couple. It is usually seen that those engaged in mental work have less number of children, as compared with those who do some work of physical labour. Similarly those whose business is such that takes them to clubs and other places of interest and recreation have less number of children. So is the case with people who are engaged in religious institutions and where both husband and wife are employed on white-collar jobs.

Social Status of the Woman. Fertility also depends on social status of the women. In societies where women are confined only to household jobs, these are considered suitable only for producing children and as such those women who can produce good number of children are held in high esteem. Obviously in such societies fertility is very high compared with the societies were the women are expected to participate in all walks of life, along with men. Obviously in such societies the women want to limit their children. Similarly educated and employed women also avoid having big families.

Political Factors Influencing Fertility. In a country like India where there is population explosion, every political party, in power, gives incentives for checking population. Each government then provides both incentives as well as disincentives to check fertility and birth rate. Facilities are then provided to those who go in for sterilisation or similar other measures to check family size.

Attitude towards Children. In many societies it is believed that children are real possession of family and society. They are source of strength power and can stand with parents at the time of difficulty. Similarly it is with the help of male children alone that family can pull on and parental love can be given. In such societies every effort is made to have male children and when there are girls only, the couple continues to go on giving birth to children till a boy is born. When attitude towards children in thus positive, family size goes on increasing and then there is no check on fertility.

Economic Security. The couple which has economic security and good house to live and over whose head unemployment does not hover has chances of

producing more children that their counterparts who are always in the danger of becoming unemployed.

Death Rate. Then another factor which influences fertility is death rate. In the past the rate of child mortality was very high. It used to be almost sure and certain that at least one or two children will die. Accordingly the fertility was high so that a cushion was provided for the children who would die at some later stage. Today society has controlled many diseases which used to kill children and no longer show their fatal strength. Accordingly parents now wish to have only as many number of children, as they wish to have. This has considerably influenced fertility.

Intellectual Freedom. In fact there are many factors which influence fertility and it will difficult to enumerate each one. These can be political, economic social and religious factors. Income, education, caste, occupation, nationality and community to which a person belongs can be some other causes which affect fertility. According to Thompson and Lewis growth of intellectual freedom in other fields of life during 19th and 20th centuries has also considerably influenced fertility. According to them, "We believe, however, that this gradual emancipation of the human mind from the fetters, tradition and dogma was very important factor in changing the attitudes of many towards western people towards reproduction in the 18th and 19th centuries. To ignore the change in the general intellectual atmosphere which made women demand right as person is to overlook one of the underlying casual factors in the decline in the birth rate".

Education among Women. Education and fertility have started showing close relationship. It because of the following reasons:

(a) Educated women are quite conscious of having a limited family size.

(b) At an age when there are very bright chances of having good fertility, the girls are in the colleges and university and thus do not get children which during this period uneducated girls get.

(c) In many cases educated women get employed and with employment they cannot afford to have more children.

(d) Span of child producing time in the case of educated women in much less, as compared with illiterate women.

Role of Science. In influencing fertility science has played its own role. Thompson and Lewis make us believe that without proper appreciation of value of science, use of contraception would not have developed as quickly as it has developed today. In their own words, "Had there not been a rapidly growing appreciation of the value of science in making good health possible and of the importance of economic minimum for maintaining a healthy family, the voluntary control of the size of the family by the use of contraception almost certainly could not have developed as rapidly as it did from about 1850 to the present time".

Desire to Maintain Status. In every society there is keen desire that social status once attained should not only be maintained but also improved. Not only this, but there is also a desire that children should have still more better and improved status, so that the family can go ahead in the eyes of the world. In the words of Thompson and Lewis. "Therefore, in a society where there is strong competition to maintain and or improve social status and where safe and simple means of preventing conception are widely known, the restriction of the size of family is likely to spread rather rapidly".

Measurement of Fertility Rate

Every modern society is quite keen that fertility rate should not only be checked but be most appropriately assessed so that administrators and planners become quite conscious of the magnitude of the problem. While finding out fertility rate, child-women ratio, general fertility rate, total fertility rate, gross production rate, cumulative rate, etc., are taken into consideration.

Need for Fertility Rate

Fertility rate of a nation has all along been a matter of interest for the demographers all over the world. It is, however, unfortunate that whereas the people in the past studied animal, bird populations, events leading to wars, peace, marriages among the elite of the society, etc., they failed to pay due attention to this important aspect of human life, which so vitally influenced and effected both administrators and planners. It was primarily because in the past growth of human population did not very much strain economic resources of the nations on the one hand and administration and administrators on the other. But as the time passed

and problem of population growth became serious, with that it was realised that the whole issue should be seriously studied. It was realised that unless nation knew of the birth rate, it could not fully plan its needs and requirements and might be taken unawares at any time.

There are there important types of measures of fertility. First is a period measure, which of related to a particular period and it is based on the data which refers to that specific period. The second type of measure is linked with reproductive performance of women upto a certain point of time; whereas third type of measure of fertility aims to indirectly measure fertility on the basis of age and sex distribution.

Information about fertility rate can help in finding out child-woman ratio, the ratio of male and female born in a particular year, etc. Usually, while finding out fertility rate, figures registered with the authorities responsible for registering birth of children are depended upon but demographers also take the aid and assistance of figures collected at the time of census as well. Some of the important methods for calculating fertility rate are as follows:

Features of Birth Statistics

Fertility is closely related to birth. Before actually discussing various methods of finding out fertility rates, it is necessary to discuss as to what are peculiar features of birth statistics. First such peculiarity is that whereas death of a person occurs once is life time, there can several births to a couple. The couple can give birth to any number of children as long as it has potentiality to give birth. Then another feature is that more the children are born in a family less shall be the affection for each child and less shall be desire of the parents to have children. Desire for children increases only when the couple finds it difficult to have children then another feature is that child birth is linked with couple; though in calculating age specific birth rate either male or female population is taken into account.

Still it's another characteristic is that child birth can take place only during a limited period, i.e., during the age when the couple has reproduction capacity. After that stage there can be no child birth, since there will be no fertility. Though still births are an important factor in birth statistics, yet by and large such calculations ar made on the basis of children born alive.

Child-Woman Ratio

Child-woman ratio is a ratio which a population has between the women and the children. A child is considered to be a baby between the age of 1 t0 5 years whereas under this only those women are covered which are under reproduction age group, which means women between the age group of 15 – 50. While finding out the ratio the formula usually adopted is:

Child Women Ratio

$$= \frac{children\ of\ the\ age\ of\ less\ than\ 5\ years}{women\ of\ reproduction\ age\ group} \times 1000$$

Barclay has suggested that this ratio can conveniently be computed by the following formula:

$$\frac{Po-4}{f15-44}K$$

Where

Po-4 = Number of children, both sexes under 5 years of age.

f 15-44 = Number of females between the 15 – 44 years age group (sometimes

it is 15 – 49)

K = 1000

It is used to measure incidence of child bearing in the population of adult women, specifically it is the number of children under 5 years of age per 1,000 women of child bearing age. While finding out ratio, figures from census as well as registration office are taken. In fact, registration figures play a very vital role in this regard because with the help of these figures it becomes easy to find out ratio without any bias. Though it is easy method of finding out ratio, yet it has its own problems. It has rather rightly been said that, “Therefore, though useful, the child-woman ratio is not very precise as an index of fertility. Its evidence is indirectly derived from this group of survivors, rather than from the number of actual births, and thus it is affected by several other factors besides fertility alone”.

Methods of Finding Fertility Ratio. There are seven important methods of finding out fertility ratio on the basis of information available through registration. These are:

(1) Crude Birth Rate (CBR).

(2) General Fertility Rate (GFR).

(3) Age Specific Fertility Rate (ASFR).

(4) Total Fertility Rate (TFR).

(5) Gross Reproduction Rate (GRR).

(6) Cumulative Fertility Rate (CFR).

(7) Standardised Fertility Rate (SFR).

1. **Crude Birth Rate.** In fertility rate, crude birth rate plays an important role. According to Barclay, "The Crude Birth Rate is a ratio of total registered live birth to the total population, also in some specific year, also multiplied by 1,000". For crude birth rate the formula applied is:

$$CBR = \frac{Total\ number\ of\ children\ who\ took\ birth\ in\ a\ year}{Mid-year\ total\ population} \times 1000$$

Barclay has given his formula by saying:

$$CBR = \frac{B}{P} K$$

where CBR = Crude Birth Rate.

B = Total number of births registered during the calendar year.

P = Total Population at the middle of the year.

K = 1,000.

Thompson and Lewis have defined Crude Birth Rate by saying that "The crude birth rate for any specified population is obtained by dividing the number of births recorded in that population during a specified year by its total numbers, which gives a fraction of birth per person. This rate is called crude because all differences in composition between populations are ignored in calculating it".

Crude Birth Rate is just opposed to Refined Birth Rate. The latter has been defined as the difference between populations wherein a certain characteristics have been taken into account in making refinement. For quite sometimes in the USA crude rate was distinguished from a corrected birth rate by increasing the number of births to allow for the fact that not all births are recorded.

It is easy to find crude rate because figures which are needed for finding out in area easily available and these are also extensively used. Crude birth rate, however, has its own limitations. According to Thompson and Lewis, "However, the crude birth rate carries to implication as to why the birth rates are different in different years and between different populations at the same date". Then another limitation is that it is not safe to find out fertility rate on the basis of whole population because whole population in no country can always be fertile. There can be no fertility among the children and the aged. Accordingly in finding out fertility rationally such population should be taken into consideration which is in the reproduction age group.

Then another fact which ought to be taken into consideration is that reproduction activity is related to women and as such only such population and not the whole population should be the basis for calculation.

This rate can only be true and effective when the ratio between total population in the reproductive age group is stable, but such a ratio is always changing.

The position can be clarified with the help of following example. If in a specific area there are 180 live birth in a particular period and total population in the mid of that year is 1000 and K = 1000 then the crude birth rate will be

$$\frac{B}{P} \times 1000 = \frac{180}{1800} \times 1000 = 180$$

which means that crude birth rate in that area during that specific period was 180.

Crude birth rate is important in measuring fertility because is directly points to the contribution of fertility to the growth rate of population. It also

requires minimum of data for computation and indicates level of fertility of society.

2. **General Fertility Rate.** After crude birth rate comes general fertility rate. This rate is the number of birth per 1,000 women of reproductive ages and uses of number of women of child bearing age in a population as a base for the calculation of a birth rate rather than the total population. It is an improvement over crude birth rate because in it only population of reproductive age group is taken into consideration. Not only this, but general fertility rate does not take whole population of the country into consideration but female population of reproductive age group only becomes its basis. In the words of Bogue, "The General Fertility Rate is the number of births that occur in a year per 1,000 women of child bearing age". Thompson and Lewis have said that "General Fertility Rate is obtained by expressing the live births as a rate per thousand of women of child bearing are taken as either 15 – 44 or 15 – 49". Prof. Barclay is of the view that, "General Fertility Rate or General Fertility Ratio is a ratio of total yearly registered births to the population of woman of childbearing excluding all men and large groups of women not exposed to the risk of child bearing by reason of age". Such a rate could be found out with the help of following formula:

$$\text{GFR} = \frac{Total\ number\ of\ live\ births\ in\ a\ year}{Mid\text{–}year\ population\ of\ the\ women\ in\ reproduction\ age\ group} \times 1000$$

This is also calculates with the help of following formula:

$$GFR = \frac{B}{P\ 15-49} \times 1000$$

B = Represents the total registered live births in year

P 15 – 49 = Represents the mid-year female population in the age group 15 to 49 years in that year.

K = Represents constant, i.e. 1,000.

This becomes easy to understand with the help of following Table:

Age group (1)	No. of women (2)	No. of Births (3)	Age specified Birth Rate (Col.

			3/2)
15 – 19	40	1000	25
20 – 24	36	7200	200
25 – 29	32	8000	250
30 – 34	28	4200	150
35 – 39	24	2400	100
40 – 44	20	1600	80
45 – 49	16	1120	70
Total	196	25,520	875

$$GFR = \frac{B}{P\ 15-49} \times K$$

B = 25, 520

P 15 – 49 = 1,96,000

K = 1000

$$GFR = \frac{25{,}520}{1{,}96{,}000} \times 1000$$

i.e., about 400 per thousand women.

While discussing the importance of this, Thompson and Lewis have said, “This rate is somewhat more refined than the crude rate because in that in addition to eliminating the influence of differences in size between populations it also eliminates the effect of certain compositional differences which might exist in the populations being compared”. It is with the help of this rate that it becomes possible to eliminate the influence of any differences in the proportions of males and females in the population. Again it is this rate which eliminates the effect of differences in the proportion of all women who are between the ages of 15 – 44 or 15 – 49. Thompson and Lewis are also of the view that, “The general fertility rate is usually four to five times as high as the crude rate in the same population because the women of these ages normally constitute from one-fifth to one-fourth of the total population”. Any significant change in the proportion of women population can take place when there are such violent events as war, spread of epidemics, fires or flood, etc. Such a significant change can also come when there is rapid trend for urbanisation and the people begin to migrate from villages to cities or when due to certain peculiar circumstances people begin to migrate from one part of the country to another part of the same country or some other country. Then its other advantage is that it can be calculated in the absence of live births.

This rate can give very good results when people regularly register deaths and births and enumeration of population process is very satisfactory. But when at the time of registration of birth information about age of the parents is not collected then there can be many defects in the system. In some cases in this system women of the age group of 15 – 44 are taken into consideration, while in other cases age group 15 – 49 is taken into consideration and as such the figures cannot be comparable. Then another difficulty with this system is that in it all women of age group of 15 – 44 are accounted for but in actual practice there are windows, barren women or unmarried girls, who are not in the productive age group and as such these should be excluded. In general Fertility Rate it is usually believed that all women in fertility age group give birth to children every year, but that is not so in actual practice. There are only few women in fertility age group who give birth to children in a particular year and not all. In fact, in fertility age group there are certain groups which vary in fertility e.g. age group 15 – 49 is likely to have different fertility as compared with the age group 19 - 30 or 31 – 44.

3. **Age of Specific Fertility Rate.** It is important basic refinement in the measurement of nationality without which other refinements in many cases cannot be made. In the words of Thompson and Lewis. “Age Specific Birth Rates for any year are obtained by dividing the number of births to the mothers of each age in that year by the number of women of this age in the population at that date and multiplying this figure by 1,000. In age specific birth rate, then, is the number of births per 1,000 women of a given age per year”. Under this system women of reproductive sub-age groups are divided and rate for each sub-group is separately found out. It is essential because fertility rate among men and women of different sub-age groups is always different and this must be taken into consideration while finding out fertility rate. If the rate is found out on basis of fathers, it is called paternity rate, whereas if the basis is mother it is called maternity rate.

Usually the basis of the rate, however, is the mother. Prof. Barclay has given the following formula for the calculation of this rate:

$$A.S.F.R = \frac{bi}{Pi}K$$

Where = indicate the number of births registered during the year to women in the interval, usually such an interval being of five years.

Pi = Indicates the mid-year population of women in the same age group.

K = 1,000.

Prof. Bogue has said that "The Age Specific Fertility Rate is the number of births per year to 1,000 women of a particular age. In other words, it is general fertility age group". We can say that,

$$A.S.F.R. = \frac{Specified\ age\ group\ of\ women}{Mid-year\ population\ of\ women\ of\ that\ group} \times 1{,}000$$

While using this method certain basic things need be remembered. In this method each child born to a mother giving reproductive age group should be taken into consideration. In the case of children whose ages are not known, it is better that their number is equally divided among all age groups of women. Then it is always safe to calculate this rate on the basis of mid-year population. For this purpose usually interval is of 5 years. In the words of Thompson and Lewis, "In any event, this total fertility rate is hypothetical rate for the women if there were no change in any of the age specific birth rate during a generation.

Why is this Rate Preferred? This rate is preferred over other rates because:

(i) In this system it is accepted that all the women in all the groups do not have the same reproductive capacity and that changes with the age.

(ii) It is possible to study actual cohorts of women e.g. whether the reproductive capacity of women decreased or increased with the growth of age and wisdom.

(iii) With its help it is possible to calculate Total Fertility Rate and Cumulative Fertility Rate.

(iv) It helps in formulating policies while determining marriage age and causes about sex crimes and knowing distributional patterns of child bearing in the country.

According to Prof. Barclay, this system is good and ought to be preferred because:

(a) It reveals the distribution of frequencies of births among women according to age.

(b) It helps in analysis of the fertility performance of a calendar year.

(c) It is difficult to distort them by variation of age composition.

(d) This rate identifies a few stages in the reproductive careers of the different age groups of women.

(e) These rates are utilised in calculating other important measurements.

4. **Total Fertility Rate.** Boguehas defined Total Fertility Rate by saying that, "It is an estimate of the number of children a cohort of 1000 women would bear if they all went through their reproductive years exposed to the age specific fertility rates in effect at a particular time". It is total or age specific birth rate and can be obtained by summing up of birth rates at each age group throughout the child bearing age. This method also takes into consideration age of the father as well. This method also takes into consideration age of the father as well. This method is better than some other methods because it does not concern itself only to the women who are in fertility age group and is not influenced by the age groups. Prof. Barclay has given the following formula for finding out Total Fertility Rae. It is:

$$\text{i} = 49$$

$$TSR = s\left(\frac{bi}{pi}\right)K$$

$$\text{i} = 15$$

bi = Number of live births registered during the year to mother of age (i) where (i) is an interval of one year.

Pi is he mid-year population of women of the same age.

K is sometimes 1000, sometimes I

S = Summation.

It is hypothetical rate that indicate the total number of children that would ever be born to a group of women, if the group passed through its reproductive span of life with these birth rates each year of age. It is based on the assumption that women in this hypothetical group would survive till they reach the end of reproductive period.

In actual practice however, bi/pi means the same things as was the case while finding out Age Specific Fertility Rate, with the only difference that in ASFR rate is found out for a gap of 5 years whereas interval in this case is only of one year of birth. In other words, "The total fertility Rate is also the same as the total number of children that would ever be born to a hypothetical group of women, if the group passed through its reproductive span of life with these birth rates at each year of age".

5. **Gross Reproduction Rate.** After Total Fertility Rate comes Gross Reproduction Rate. It is restricted to the number of female children. The value of the gross reproduction is about ½ of the total fertility rate. It indicates the number of daughters each woman can bear by the time her reproductive period is over, if she continues to have children according to a particular schedule of age specific fertility rates, throughout her reproductive period. According to Thompson and Lewis "Whereas Total Fertility includes all births both male and female, the gross reproduction rate shows how many girl babies – potential future mothers – would be born to 1000 women passing through their child bearing years, if the age specific birth rates of a given year remained constant and if no women, entering the child bearing period died before reaching menopause". In this all the girls are included no matter what is their year of birth with the presumption that all with enter reproductive age and will also become mothers and as well complete the whole of reproduction.

This rate can be found out by multiplying total fertility by the percentage of all births that are female births. If the product is 1000 or more, it means that 1000 or more daughters are being born by each 1000 women of child bearing age when no account is taken of the deaths of the women during their reproductive period.

It is an important measure in the study of replacement, which is concerned with the extents to which a group replaces its own numbers by the mutual process of fertility and mortality.

But this method of finding out rate also suffers from its own defects. It believes that both fertility as well death rates are stable and will not change. But in practice that is not so. The number of children who take birth in a decade can vary in another decade and so is the case with deaths. Both death as well as birth rate can increase as well as decrease, both on accountof spread of literacy, more knowledge about bringing up of the children or on account of increased opportunities of employment for the women and so on. Death rate can be influenced on account of availability of more medical facilities nourishing food and so on. In the words of Thompson and Lewis, "The chief defect in net reproduction lies in its assumption that the age specific birth rates and death rates of a particular year will remain constant during a generation. This is very serious defect and these rates should not be used in making prognosis of probable future growth of population".

6. **Cumulative Fertility Rate**. It is just like Total Fertility Rate with the only difference that this rate indicates the number of children produced by 1000 women during whole fertility period. It is found out by first finding out Age Specific Fertility Rate and then the rates are multiplied by age groups and then these are cumulated and the final result in the result of all. In the words of the women Thompson and Lewis, "A cumulative cohort birth rate shows the actual number of births per thousand women in a particular cohort when they have a specific age".

7. **Standardised Fertility Rate.** In it differences between population in a given characteristics e.g. demographic, social or economic ate taken into consideration. Each such characteristic is believed to have same effect on natality. If one is interested in finding into the effect of differences in age composition of two populations on their fertility, then the age distribution of the women in some population either actual or hypothetical, is chosen as a standard distribution. In the words of Thompson "When we are standardising for age, the question to which we are seeking an answer is: if the women in

populations ABC, were distributed by age in exactly the same populations as the women in the standard population, would their natality rates bear the same relation to one another and do their crude rates or their general fertility rates or their total fertility rates. This question is answered by multiplying the age specific birth rates of each of the populations A, B, C, etc., by the number of women in age group of the standard population and summing these births for each population to secure the total number of births a standard would have if its women had the different age specific rates of population A,B,C, etc.". While calculating a standard million is fixed which implies a population of one million persons having the age composition of same population. In it women belonging to different age groups are represented. Total number of births which this stand million would have in a specific year is obtained by multiplying age specific birth rates of these populations, by number of women of each age in standard population, which is then divided by one million and multiplied by one thousand to secure an age standardised birth rate per 1000 for each of the population being studied.

Completed Fertility Rate. Completed fertility is a measure showing total number of live births per woman or per 1000 women, who have passed through the child bearing period. In the olden days when medical facilities were not available and there was no clear distinction between live birth and a still birth at that time actual number of live births per 1000 women of completed fertility aged 65 or over at the time of census was probably somewhat higher than the census figures.

This is based on ratio of total birth legal or illegal and total mothers of any age, below 15 years or above 50 years. It may be mentioned that there is no consideration whether the woman is separated or divorced or widowed. Similarly there is no consideration whether the child born was legal or illegal. This can be found out with the help of following formula:

$$CFR = \frac{B}{M} \times K$$

Where B = Total Births

M = Total mothers of all ages.

K = Constant, i.e. 1000.

Cohort Fertility. This includes all the cohort women born in a given year and follows the reproductive experience of the same women through their child bearing years, generally the years 15 – 49 or such of those years as they may have attained at a specified date. The minimum data needed for calculating cohort birth rates are the same as those needed to calculate the age specific birth rates. Once minimum data is collected two types of cohort birth rates can be, namely age specific cohort rates and cumulative cohort rates. Age specific cohort rates are calculated in the same manner as age specific rates but which are applied to a cohort on January 1 of a specified year. On the other hand, cumulative cohort rates are obtained by adding the appropriate age specific cohort rates up to a given point in time, i.e. until the woman of a given cohort have attained specific age on January 1 of a specified year. This cumulative cohort rate becomes a measure of the completed fertility of a cohort when in that cohort have reached menopause at about the age of 45. Given below is an illustration of procedures for computing six basic measures of fertility, which clarify the position:

Illustration of Procedures for Computing Six Basic Measures of Fertility

Age of Women	No. of Women of specified Age	No. of Births to Women of specified Age	Age Specific Birth rates per thousand Women	Standard Population	Expected Birth	Cumulative Fertility Rate
1	2	3	4	5	6	7
15 – 19	6,588,602	586,966	89	195,827	17,429	445
20 – 24	6,519,937	1,426,816	258	174,139	44,928	1,735
25 – 29	5,537,104	1,092,816	197	153,807	30,299	2,770
30 – 34	6,111,422	687,722	112	139,763	15,653	3,280
35 – 39	6,418,536	359,908	56	125,761	7,043	3,560
40 – 44	5,917,805	91,563	15	111,878	1,678	3,635
45 – 49	5,553,943	5,812	1	198,231	98	3,640
Total	**41,647,349**	**4,251,070**	**102**	**1,000,000**	**117,128**	**3,640**

*Source and Authority: Principles of Demography by Donald J. Bogue, p.628.

(1) $Crude\ Birth\ Rate\ \frac{Total\ Birth\ Rate}{Total\ Population} = \frac{42,51,070}{179,323,798} \times 1000 = 23.6$

(2) $General\ Fertility\ Rate: \frac{No.of\ Births}{No.of\ Women\ of\ specified\ age} \times 1000$

$$= \frac{42,51,070}{41,647,349} \times 1000$$

(3) $Age\ \text{Specific Fertility}: \frac{No.\ of\ women\ of\ specified\ age}{Age\ of\ women} \times 1000\ for\ each\ age.$

(4) Total Fertility Rate : Sum of ASFR x Time Intervals = 728 x 5 = 3640.

(5) Cumulative Fertility Rate = ASFR Times 5, cumulated by age: Col 6.

(6) Standardised General Fertility Rate = Sum of Col.6 divided by sum of Col. 5 x 1000.

$= \frac{117,128}{1,000,000} \times 1000 = 117.$

Fertility in India

A global demographic analysis undertaken by the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2021 reveals a dramatic drop in fertility rates worldwide, including in India. According to the analysis, India's Total Fertility Rate (TFR) has dropped dramatically, from 6.18 in the 1950s to 1.9 in 2021, which is the below the replacement norm of 2.1. Projections indicate that this rate could fall to 1.04 by 2100, which lead to significant socioeconomic effects.

Reasons for Declining Fertility Rate in India

a. **Increased Female Literacy and Workforce Participation**:

Women's empowerment and higher educational attainment have contributed significantly to the decline in fertility rates.

b. **Changing Social Attitudes**:

Late marriages and the decision not to marry are becoming increasingly popular as women prioritize their jobs and financial independence over conventional duties.

c. **Infertility and abortion**:

Rising male and female infertility rates, as well as higher abortion rates, are all signifi cant reasons.

d. Migration:

Many young people migrate abroad for higher education and work, often staying and raising families outside of India.

e. Urbanisation and Modern Aspirations:

With urbanization, families are choosing to have fewer children in order to meet their economic and social goals.

Check your Progress

1. The term is generally used to indicate the actual reproductive performance of a woman or groups of women.
   a. Fertility
   b. Mortality
   c. Migration
   d. Marriage
2. Which age group is referred as child bearing age for women?
   a. 18 – 54 years
   b. 15 – 49 years
   c. 21 – 55 years
   d. 15 – 60 years
3. Define Fertility.
4. Discuss direct factors which are determining fertility.
5. Examine indirect factors which are influencing fertility
6. Describe various measurements of fertility.
7. Explain the reasons for the declining fertility in India.

MORTALITY

Introduction

Mortality effects and influences both fertility as well as birth rate. It is one, factor which is responsible for influencing the health of the mothers and puts a strain on the national medical and sanitary resources. There are in in turn, many factors which influence mortality rate. But how to find out mortality rate is one problem. For this there are many methods of analysis. Like fertility rate, there are different methods of finding out mortality rate as well. In every society, it is always interesting to find out the causes of death, which of course cannot be the same all over the world.

In the past mortality rate used to be very high because the people were not much conscious about their health and secondly, medical aid was readily available. Moreover, medical science had not much advanced. These days situation has already much changed and even in developing countries medical facilities have much increased and there is sufficient control over mortality. Even many fatal diseases are today under control. This has much increased birth rate in our modern times.

Brief Historical Background

In the beginning when, the practice of collecting data about deaths started, nothing could be said with certainty about the accuracy of data and extent of its reliability. But it is almost certain that the practice is very old. To begin with, the purpose of collecting such information partly would have been religious and partly economic. It appears that the Romans used to collect such information in third century. In ancient Italy this type of practice also prevailed as early as in the fourth century. Such information was collected by church fathers in the past. Gradually the practice became quite common in whole of Europe. In England in 1558, Thomas Cromwell, under Henry VIII ordered collection of data about deaths. When diseases spread, then also information was provided about the deceased and, therefore that was invariably collected and sometimes published as well. J. Graunt can be called as pioneer in the field. He began to collect, analyse as well as classify information and data about deaths. He brought out a book in 1662, entitled, “Natural and Political Observation Mentioned in the Following Index and Made upon the Bills of

Mortality". In 1755 – 57, on the basis of death information, in Sweden, life tables began to be prepared. Such a Table was prepared on the basis of information collected throughout the country and information was also included about age and sex. In Sweden law was passed in 1748, under which it was made obligatory for the people to register all cases of deaths and thus she became the first country in the world in this regard.

But other countries of the world did not make much progress in this regard. Gradually and slowly, however, more and more attention began to be paid in this regard, when figures began to be collected about rate, commerce, diseases, living standard of the people and so on and census operation started from time to time. In 1837, in England, William Farr was made responsible for the collection of vital statistics. He began collecting information about the causes of deaths. Commenting on the contribution of his work Hauser and Duncan have said that, "Most of our knowledge of differential mortality by occupation and social class has been obtained from this series of studies initiated by William Farr". In so far as the USA is concerned the work in this field rather started somewhat late. By the beginning of 20th century of the 48 states, the work regarding registration of death had started in 14 states only. It was in 1902 that in the USA Census Bureau was made a permanent organisation. It was however only in 1933 that information about deaths and births for the whole country bean to be collected in that country.

What is Mortality?

Usually it is believed that end of life is death. But what is live birth is another problem. In some countries including Spain and Cuba, a child who expires within 24 hours of his birth is not considered a live birth but is included in abortion. In other words, he is not included in the category of death either. In some countries only such children are considered as live ones who are alive on the day of their registration and not others and in these countries registration of children is permissible even many days after the birth of the child. According to World Health Organisation live birth may conveniently be defined by saying that, "Liver birth is the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the

umbilical cord has been cut or the placenta is attached; each product of such a birth is considered live born". Based on this the World Health Organisation has defined death by saying, "All live born infants should be registered and counted as such irrespective of the period of gestation and if they die at any time following birth they should also be registered and counted as deaths". But all the countries of the world have not accepted this definition of death, due to one reason or the other. Hauser and Duncan have defined death by saying, "Death prior to complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy; the death is indicated by the fact that after such separation the foetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles". World Health Organisation is of the view that all such deaths where the child has remained in the womb of mother for 28 weeks should also be registered.

All deaths prior to a live birth are not considered as death. Thus abortions and deaths prior to a live birth are not considered as death. Thus, abortions and still births are not referred to as deaths but as foetal deaths.

Sources of Data

Deaths occur in every society and registration of deaths everywhere is considered important. In developing countries death data is incomplete because all deaths events are not registered and as such it cannot be used for any meaningful analysis of mortality. National Censuses and Demographic Sample Surveys provide useful data about mortality. A very important source of data is Demographic Year Book of UNO which gives reliable statistics about the number of deaths, death rates, death by age and sex, infant deaths, infact mortality rates, cause of death, etc., of various countries of the world. Useful information about mortality is also provided by Statistical Reports of WHO.

In some areas, particularly in the rural areas, there are no arrangements for registering deaths on the spot and the near ones or the deceased do not take the trouble of going to some distant place for getting the death registered, unless death certificate is needed for settlement of property or any other dispute.

Still another difficulty is that many people do not at all know that registration of death is their legal obligation. Thus, even if they have a desire, they take the things easy and sometime even forget it.

Another limitation is that since those who do not get deaths registered are not punished in any way and thus the others also do not take the trouble of going to the registration centre and complete formalities about registration of death.

Why Mortality Data? A very pertinent question which arises is as to why at all mortality data should be collected? UNO observed as early as in 1954 that, "With 20% or more of all fertilisation lost before birth and 15 to 20% of the live births dying by the fifth year of age, it appears on a conservative estimate that 113 or more of each generation is wasted in the initial stages of its formation". This in itself indicates the need and necessity of collecting mortality data. Mortality data is today collected due to many reasons which affect our economic, social and political life. Some of the important causes responsible for this are as follows:

(1) It is with the help of this data that it becomes possible to study the problems of widowhood and orphans and the extent to which such problems need the attention of the society.

(2) These figures help in finding out how far the society is healthy and the causes of mortality reveal the direction in which society is moving e.g., how far social evils, economic strains, negligence, providing of adequate facilities, etc., been responsible for the occurrence of death.

(3) Available data helps in finding out the extent to which medical facilities need geared up and the nature of diseases which take the lives of the people.

(4) The data helps in projecting future population of the country, which is very important these days.

(5) It is with the help of available data that it becomes possible to have comparisons with past and vision for the future.

(6) In the words of Barclay, "the most successful efforts of demographic measurement have been made in the study of mortality". This was the first

subject brought under rigorous analysis and has found commercial applications in the field of insurance".

(7) In countries where death rates are high, the people on the whole care more for their present rather than the future. They then do not wish to invest in saving schemes and for them investing in the education of their children, insurance policies, etc., have no attraction. Thus, national economy is very much effected by this indifferent attitude.

(8) In countries which have high mortality rate attitude towards such social institutions as marriage, etc., changes. In such countries, it is usually observed that the people prefer arranged over love marriages, because it is believed that the sorrow for arranged marriages after death is much less, as compared with the love marriage.

(9) Then another social influence is that in societies where death rate is high respect for elders and parents is usually high because it is believed that any curse from the parents as well as the elders can result in death.

(10) When mortality rate is high then the parents do not pin high hopes in their children. They neither themselves become ambitious, not are their children very ambitious. The result is that a negative rather than a positive attitude prevails in the whole society.

(11) It has also been observed that in societies where death rate is high usually joint family system is allowed to exist. On the other hand, societies with low birth rate, prefer to have single family system.

(12) Any death event can shake the very confidence and faith of person concerned, particularly when the death of a near relative occurs. In case frequent deaths occur then he even begins to hate many worldly things. He adopts very indifferent attitude towards life. He begins to feel that Nature is very strong and that he is a very insignificant creature before mighty Nature. In many cases he even becomes shaky in his faith in God. Thus, his values and approaches towards social, economic and political problems very rapidly and drastically changes.

(13) This data very much helps planners because in the absence of mortality data either they shall give over or under estimated plan, as they shall not have broad idea about population for which they are to plan.

(14) Again this data is useful for known the types of diseases which take human life in a society and how to combat these and type of drugs should be manufactured, what type of doctors should be appointed and the way in which these should be trained and so on.

Analysis of Mortality Statistics

In the every country it is fully well realised that there is dire need and necessity for the analysis of mortality statistics, which are collected with great labour. It is considered essential that all data should be classified keeping in view sex, age and place of death. W.H.O. has collected mortality data in respect of many countries of the world and has also classified that according to causes of death. The organisation has also tried to lay down broad principles for classification of the data. The demographers have also prepared both life and death tables to analyse data collected about deaths. It is with the help of this data that it becomes possible to find out with some expected death rate in the near future and what can be possible number of widows and orphans. There are different methods of finding out death rates. Some such rates are:

(1) Crude Death Rate.
(2) Age Specific Death Rate.
(3) Standard or Adjusted Death Rate.
(4) Infant Death Rate.

All mortality rates are, however, measured to find out the pressure of death on population. These rates are found out to the pressure of death on two situations namely two areas, or cities or countries or times. Each method of finding out death rate is briefly discussed below:

1. **Crude Death Rate**. David-M-Heer in his “Society and Population” has said that, “Crude Death Rate may be defined as he ratio of the number of deaths which occur within a given population during a specified year, to the size of death population at mid-year”. According to Thompson and

Lewis "This is calculated in exactly the same manner as the crude birth rate". The formula is:

$$\frac{Deaths\ (300)}{Population\ (1200)} = 0.025\ death\ person;$$

$$0.025\ \times\ 1000 = 25\ deaths\ per\ thousand$$

Or the simple formula is

$$\frac{D}{P} \times K$$

Where D = Deaths registered in a year.

P = Population of an area in that year.

K = Constant 1000.

Obviously it is the simplest method of finding out death rate because what is required to be known is only the total population and number of deaths which occur in a particular period. This method of calculating death rate has its own advantages namely:

(1) It becomes possible to reduce the death rate into one figure only.

(2) It is very easy and as such can be understood easily even by a common man.

(3) In calculating it not many figures or details are needed.

(4) The figures can be used both for the calculation and verification of conclusions.

(5) This can help in knowing life expectancy approximately.

(6) In this least amount of vital statistics is needed.

(7) It provides one of the bases for computing the rate of natural increase of population. It is also most widely available index of level of mortality.

But this method has its disadvantages as well. These are:

(a) In it many population groups which have varied death rates are combined together and thus the results obtained are undependable.

(b) In it extreme cases are very adversely effected and influenced.

(c) Death figures, for this data are collected from registration authorities whereas population figures are collected from census authorities, therefore, it is unscientific to use data in same equation collected from two different sources.

(8) Barclay is of the view that, "Crude Death Rates do not indicate merely the rates of occurrence of events, but mix them up together with changes in population size".

(9) In it while taking one year as a unit no distinction is maintained whether the person died just in the beginning or end of the year. This makes the whole data effective. As a remedy many demographers use the figure arrived at mid-year population. Such population can be calculated by the following formula:

$$P1 + \frac{1}{2}(P2 - P1)$$

P1 = People recorded at the beginning.

P2 = People recorded at the end or beginning of the next year.

2. **Age Specific Death Rate.** This is another method of finding out death rate. Mortality rate among the children is usually high. Thereafter pressure of death gradually decreases. But when old age comes then the pressure of death again increases. In other words, in order to find out death rate correctly the people should be classified under different categories according to their age groups. Thereafter Age Specific Death Rate is found with the help of following formula:

$$\frac{No.of\ deaths\ in\ a\ specificsection\ of\ population\ of\ an\ area\ in\ a\ given\ period}{Total\ Population\ of\ that\ specific\ area\ in\ the\ same\ period} \times 1000$$

Usually for the purpose of age specific death rate place of a population is decided in the five year age group, though sometime it is more while at other times it is less. Following Table will help in clear understanding the issue:

Age Group	Total Population	Total Death	Death Rate (3) – (2) 1000
(1)	(2)	(3)	(4)
0 – 1	10,000	4,000	400
1 – 5	20,000	6,000	300
6 – 10	35,000	10,000	285
11 – 15	30,000	10,000	333
16 – 20	28,000	7,000	250
21 – 25	32,000	6,000	188
26 – 30	34,000	8,000	235
31 – 40	35,000	5,000	143
41 – 50	40,000	6,000	150
51 – 60	38,000	8,000	210
61 – 70	37,000	8,000	216
71 & above	35,000	10,000	286
Total	3,74,000	88,000	241.5

According to U.N. Demographic Year Book 1989 Age specific death rate for some specific deaths rates for some selected countries in respect of both males and females was as follows:

Name of the Country	Year		All Ages	1 – 4	5 – 9	10 – 14	15 – 19
U.S.A.	1986	M	9.4	0.6	0.3	0.4	1.2
		F	8.1	0.5	0.2	0.2	0.5
Japan	1988	M	7.1	0.5	0.2	0.2	0.6
		F	5.8	0.4	0.1	0.1	0.2
U.K.	1988	M	11.5	0.4	0.2	0.3	0.7
		F	11.3	0.4	0.1	0.2	0.3
India	1988	M	-	3.0	1.4	1.8	2.3
		F	-	3.4	1.7	2.8	3.2

With the help of specific death rate, it is also possible to find out crude death rate as well. On the same basis it is also possible to find out Sex Specific Death Rate; Occupation Specific Death Rate; Cause Specific

Death Rate and son. But the difficulty with this method also is that in this case also deaths which occur during a particular year are taken into consideration. Here again there is no consideration whether the death occurred at the beginning or at the end of the year. In other words, there is no consideration about the number of days or months for which a child or person lived.

3. **Standard or Adjusted Death Rate**. Every death rate must relate to either two places or times and this it is always a comparative study. As regards standard or adjusted death rate Barclay while comparing it with Crude Death Rate has said that, "An age standardised death rate fills either of the two needs. One is simply to summarise a set of age specific rates independently of the age composition of the population. The other is to show the probable influence of a population's age, composition on its crude death rate when its actual age specific death rates are not known". In the words of Thompson and Lewis, "The standardised death rate, based on age specific death rates, supplies a simple and accurate basis for comparing the death rates of different populations".

   Standardisation can be of two types, namely:

   (a) Direct Standardisation.

   (b) Indirect Standardisation.

   In Direct Standardisation Different Age Specific Rates are applied to standard population, whereas in the other, a standard set of rates to different populations by age are applied. This can be obtained by finding out five yearly age specific death rates of a population which is independent of age structure of population. These rates are multiplied by standard population of each age group. In this population or town or place is supposed to be standard. Barclay has said that, "Thus there are two common types of procedures for computing standard rates. One consists of applying different age specific rates to standard population. This is called in English and American usage as direct standardisation. The other consists of applying a standard set of rates to different populations by age. This is called indirect standardisation".

Under direct standardisation distribution pattern of population of an area or country is taken as standard one and thereafter standardised death rate is found out on the basis of following formula:

$$\text{Standardised Death Rate} = \frac{P_s \times D_1}{\sum E\ P}$$

Where P_s = Standard population of the age group.

D_1 = Age specific death rate of local population of the same group.

As against direct standardisation method, there is also indirect Standardisation method. In this statistics of actual population by age (mid-year population) is collected. Then information is also collected about total number of deaths at all ages of actual population during the year, the complete schedule of age specific death rates of a standard population and the crude rate of standard population. The actual population multiplied by age specific death rate will give expected deaths.

Sex Differences in Mortality. Usually it is observed that mortality among both the sexes is not the same. It is higher among the men as compared with the women. In other words, death pressure among the men is higher among the men as compared with the women. In other words, death pressure among the men is higher than the women, though there are some countries of the world where pressure on women is higher.

The gap between the average expectation of life for females and males is wide in developed than in developing countries. In most countries of the world the crude death rate as well as age specific death rates are higher for males than for females. It has also been found that biological factor play main role in the differential mortality of males and females. In several countries including U.S.A., U.K. Japan, Sri Lanka, etc., infant, mortality rates have been lower for females than males. Sex differentials in average expectation of life at birth for some selected countries is given below:

Table showing Sex Differentials in average expectation of life at birth

Name of the Country	Period	Male	Female	Difference
India	1981 – 86	55.6	56.4	0.80
Republic of Korea	1989	66.92	74.96	8.04
Sri Lanka	1981	67.78	71.66	3.88
U.S.A.,	1986	71.30	78.30	7.00
Japan	1988	75.54	81.30	5.76
France	1987	72.03	80.27	8.24
Denmark	1986 – 87	71.80	77.60	5.80
U.K.	1985 – 87	71.90	77.64	5.74
Australia	1987	73.03	79.46	6.43
U.S.S.R.	1986 – 87	65.04	73.78	8.74

Where pressure on women is higher, it is primarily because women in those countries do not enjoy a very high social status, but are treated with contempt. According to some demographers nature has also made women in such a way that these can live a comparatively longer age as compared with men. Bogue has said that, “Under current conditions the typical female in industrialised countries may look forward to several year of widowhood even if she marries a husband of her own age. Some demographers have pointed out that American girls marrying at the age of 18 would be forced to marry a boy only 12 year old in order to assure that she would not spend time as a widow”. In fact, so far there are no solid reasons to prove as to why the women are to live a higher life as compared with men. It has also been seen that the women can more successfully resist the pangs of diseases than the men. Since by and large women stay at home, therefore, these are less exposed to dangers than men.

4. **Infant Death Rate.** In every society infants are the most victim of death, due to several reasons. In case accidents information can be collected about their death rate that will go a long way in finding out mortality rate of society. This can be found out with the help of following formula:

$$\frac{D_{0-1}}{B} \times K$$

Where, $D_{0\text{-}1}$ = Deaths in the age group 0 -1 .

B = Total registered births.

K = Constant (1000).

The following example will clarify the position:

Total number of registered deaths among infants during a particular year = 7000

Total number of registered live births in that year = 84000

Infant mortality rate for the year $=\frac{7000}{84000} \times 1000 = 83.3$

Thus infant mortality rate of 83.3 per one thousand live births during that particular year denotes that in that particular area infant per 1000 live born babies died during first year of their life.

But in this method there are several problems. Usually the people do not come forward for reporting still births, abortion and infant deaths. Then another limitation is that the child who had been born in the earlier year might have died in that particular year. In this formula such deaths are not calculated. Thus, this calculation is only possible when there is annual classification of birth and death rates.

Causes Specific Death Rate. Deaths can occur due to any reason e.g. on account of prolonged illness, brief illness, accident, malnutrition, food poisoning etc. Every society is quite keen that it should know the cause of death so that it can apply necessary checks. When shown by age and sex, the cause becomes still more important. This enables the society to find out at what age the deaths take place and what are the causes of death for male and female population. It also becomes possible to have comparative figures of causes of deaths of two areas, societies and even countries. This can be found out with the help of following formula:

$$CSDR = \frac{D_i}{P} \times K$$

Where,

CSDR = Causes Specific Death Rate.

D_i = Number of deaths due to a particular cause in a year.

P = Mid year population in that year.

K = Constant, i.e. 1000.

But this type of death rate has its own problems. Death can occur due to more than one specific reason. Then another problem is that the apparent cause of death may not be real cause of death e.g. person driving a scooter may have heart attack and in the process his scooter may meet an accident and he may die. Prima facie it may be said that death occurred due to accident,whereas actual cause of death was heart attack.

Cause of Death

Every individual is interested to live as long as he or she can, but still deaths occur in every family and the people die. Some deaths are very premature and tragic and shake the family from the very foundations. But even these cannot be avoided. The deaths which occur can broadly be placed under two categories namely, indirect and direct causes of death. In every society, however, here are certain important causes of death and usually the people attribute that important or prevalent cause of death, to every case of death which might occur, which in fact might not be there, thus, making the data defective. In some cases a patient is not attended by the doctor before this death and then it becomes difficult to find out the cause of death. In country like India where the people are illiterate it becomes difficult to know the exact cause of death even from those who had been regularly attending on him. In many cases even qualified doctors also do not know the exact cause of death. In case a patient is suffering from many diseases it becomes difficult to find out as to which disease actually proved the cause of death of the patient. Not only this, but in every society there are certain cause of death which are condemned and though the people might know, yet they try death to conceal so that their social prestige does not go own. Due to these reasons it becomes very difficult to find out direct cause of death. Usually what is reported is only indirect cause of death. Thus, even in most advanced countries of the world, the data about deaths, on the basis of cause of death is very defective and undependable.

WHO and Causes of Death: World Health Organisation has tried to make an attempt to find out the causes of death. It has suggested that these causes may broadly be put under five different categories, namely:

(1) Infectious, parasitic and respiratory diseases.

(2) Diseases if circulatory system.

(3) Cancer.

(4) Death from violence.

(5) Others including gastro, intestinal diseases, diabetes, melitius, birth, injuries and diseases peculiar to the first few weeks of life.

In all the countries of the world many deaths take place due to diseases specified under category. 1. Prof. Bogue is of the view that, "The rapid decline in morality being witnessed around the world today in most of the developing countries is due to the fall in group I diseases". We also find that in developed countries the pressure of deaths due to cancer is less, as compared with developing countries. As regards diseases falling in the third category, it is now realised that their influence can only be reduced or deferred for some time but these can't be absolutely wiped out. Now coming to causes of deaths as enumerated in the fourth category their influence is being reduced because surgery is developing, crimes are being checked and efforts are being made to as much reduce the chances of accidents as possibly these can be. Due to advancement of medical science, number of deaths on account of diseases mentioned in fifth category have considerably come down. But in spite of all medicinal advancement surgery control and awakening, etc., death rate in many countries of the world is still very high and data available about real and direct causes of deaths very defective and undependable.

Differential Mortality

Death rate in all the countries of the world is not the same. In some countries, it is low, while in others it is medium; and still in others it is very high. Not only this, but in a country itself death rates among different sections of society are not the same. It is because some sections of society can enjoy better medical facilities as compared with the others, some of the mortality differences are those discriminating between (a) the times of peace and war; (b) different social classes within a nation; (c) developed and less developed nations; and (d) current national levels compared to previous levels compared to previous levels in those nations. In the words of David M. Heer, "Nations usually exhibit important differences in mortality according to social class…. Mortality differences among nations are still substantial despite the fact that range in morality level among the nations is considerably less now that it

was prior to World War II". The same authority is of the view that in the very recent past, mortality rates have apparently stabilised in many countries.

Differences in mortality rates also occur due to socio-economic reasons, those nations which are socio-economically advanced, there death rate is bound to be low, because the people in such societies are economically so well off that they can get proper and timely medical aid and treatment. Death rate also varies in respect of people engaged in different professions. Those who are engaged in vocations where no risks are involved, usually the chances of death are less as compared with other people who are exposed to risk involving vocations. The demographers have also observed that marital status, also influences death rate. Those who live as widowers, unmarried or scheduled life are more proven to deaths than those who lead a happy married life. It is because the people of former category are likely to remain more depressed and without any involvement for family or love or affection for their children. The difference is found not only in one age group but among the people of all the groups. One argument which can be advanced in this regard is that the married people can take better and more care of their health than the unmarried ones. In fact, there are many environmental influences on the death rate and it is interesting to study each.

Environmental Influences on Death Rates

There are environmental influences which create mortality differential. Some brief reference has already been made about these but these need some detailed discussions. Some such influences are:

1. **Community or Residence.** Death rate is considerably influenced by urban or rural residence. If rural areas lack medical facilities, these have the advantage of natural air, open and wide accommodation, good and nutritive diet and so on. If the cities have medical care, and facilities and the people know about health care rules, there is problem of air and water pollution, congestion, road accidents, etc. While discussing city conditions Thompson and Lewis say, "The almost complete lack of sanitary measures in nearly all cities until near the end of the 19th century and the crowding of great majority of city dwellers in hovels with no windows, bordering on streets where one could almost touch the structures on both

sides by stretching out his arms and where the sewages and drinking water ran down the same open gutters, ensured contagion and infection almost perfectly". But in spite of all this death rate in the village almost everywhere has always been higher as compared with the urban areas because in the rural areas there are superstitions and almost non-existent medical facilities.

2. Marital Status and Mortality. As pointed out above marital status very much effects death rates and in it both men and women are equally involved. It has been observed that married couples live a longer life as compared with widow women, widowers, those who decide to life a scheduled or isolated life. Thompson and Lewis have given many reasons for this differential rate. According to them, "Marriage is selective as regards both physical constitution and social adaptability". According to them those who are either physically or mentally or otherwise unhealthy are bound to avoid marriage and as such being sickly they are sure to live a shorter life. Then another reason which they have pointed out is that, "In addition, persons both, male and female, which for various reasons has low to remain single". In this way also they are likely to live shorter life. Another reason which they have pointed out is that married couples have greater regularity of living. As regards relative, high death rates of widowed and divorced persons. Thompson and Lewis feel that in this group are such persons who made initial mistakes in the selection of mates from the standpoint of both health and temperament. According to them, "The divorced very obviously have been unable to make a satisfactory adjustment in marriage and inability thus indicated may possibly be associated, both as cause and effect, with physical weakness".
3. **Occupation and Mortality.** In a country or region the people belonging to different occupations do not have same but different mortality rates. This is because:
   (a) Type of an occupation may be detrimental to health e.g. underground mining work;
   (b) Physical surrounding may not be good, e.g. there may be areas which are marshy and breed mosquitoes, spreading malaria.

(c) Occupation determines family income; there can be occupations which involve a lot of hard work but low wages e.g. a labourer involved in construction work does really hard work but with less wages, thereby effecting his family standard.

(d) Occupation may not suit taste, temperament, etc., of the persons engaged in it, particularly in countries where there is no occupational mobility.

How the occupation influences mortality rate is evident from a study carried out by Lewis and Thompson about the USA in which persons from different occupations of the age group 25 to 59 years were covered.

Cleanliness and Mortality. Cleanliness also results in differential mortality. For quite some it was not realised that unhygienic conditions in any way effect mortality buy today effect of cleanliness is fully well realised and appreciated. Thus those, who live in neat and clean environments and atmosphere, are less prone to death as compared with those who habitually live in dirty atmosphere. Several surveys conducted have established that those living in juggins and shanties under unhygienic conditions die-earlier than their counter-parts in cleaner environments. In the words of Thompson and Lewis, “This whole matter of cleanliness of person and home in all manners of public service is today very closely related to the level of any population”.

Indirect Standardisation

Above mentioned is direct standardisation of adjusted or standardised death rate. Then there are also indirect standardisation death rates. For this first of all standardised death rate is decided and population of a particular territory and also death rate is accepted and thereafter index death rate for the local population is calculated with the help of following formula:

$$Index\ death\ rate\ of\ local\ population = E\ \frac{PL\ \times DS}{\sum PL}$$

PL = Local Population for various age groups.

DS = Age Specific death rates taken as standard.

In this it is essential to find out crude death rate of standard population; which is done with the help of following formula:

$$\frac{\sum D}{\sum P} \times 1000$$

This also needs correction factor.

$$Correction\ Factor = \frac{CDR\ of\ Standard\ Population}{Index\ death\ rate\ of\ local\ people}$$

(or)

$$F = \frac{\sum(P_s \times D_s)}{\sum P_s} - \frac{\sum(PL \times DS)}{\sum PL}$$

SDRL = CDRL x Correction Factor.

$$CDR = \frac{\sum(P_s \times D_s)}{\sum P_s}$$

Infant Mortality

One of the serious problems of our society is the problem of infant mortality, about which a mention has already been made. How much the society is advanced very much depends on the extent to which infant mortality has been checked and controlled. In some societies rate of infant mortality is very high whereas in others it is low, but there is no society which is free from this. In fact, the pressure of death is maximum on the infants. It decreases thereafter but again becomes very strong on the persons who attain age of 55 or above. Not much attention is paid to old age deaths because that is considered natural but infant mortality draws the attention of the society as a whole. This rate can be found out with the help of the following formula:

$$IMR = \frac{do}{Births} \times 1000$$

Do = Number of children who die before completing early years of their life.

Birth = Number of live children in the same year.

In spite of the fact all efforts are being made to check infant mortality yet it is persisting. It is estimated that in developed countries this rate varies between 10 and 33 per thousand whereas in developing countries the rate goes up to 14 to 135.

There are several factors responsible for infant mortality, both biological and socio-economic. It has been found that low level of infant mortality is associated with low level of general mortality. The level of mortality is always high in the first few hours, days and weeks. There are infants who do not even complete four weeks of life whereas there are others who complete about a year of life. The former is called neo-natal mortality whereas the latter as post neo-natal mortality.

The factors which affect neonatal mortality are mostly endogenous. These are related to the formation of foetus in the women and are biological in nature. These include age of the mother, birth order, period of spacing between births, pre-maturity, weight of the child at the time of birth, etc. It has been found that infant mortality rates are higher at the younger ages of the mother and that the weight of the baby at the time of birth is also an important factor affecting neonatal and post-neonatal deaths. It has also been found that the still birth rate and neonatal mortality rate both are very high in the case of multiple births.

Socio-economic and cultural factors also are responsible for mortality rate especially during post-neonatal period. These include epidemics caused by diseases, faulty feeding system, poor hygiene, crowding and congestion, lack of sunshine, dearth of fresh air, etc. Illegitimacy is an important contributory factor in so far as infant mortality rates are very low, a higher proportion of infant deaths occur during the neonatal stage, because being developed they have successfully eliminated environmental factors responsible for such deaths.

Phase of Death. Medically deaths can be divided into two phases namely, (i) Neo-Natal Phase and (ii) Post Neo-Natal Phase. In the first phase only such deaths are covered which take place from the birth of the child till he has reached the age of 4 months. In the second phase period of 4 – 12 months is covered. It is this second phase which is more critical in the life of child. It is because during the first phase every care is taken to save the child from environmental pollution and the baby is depend on breast feeding which is very healthy. The chances of catching diseases by the children are very remote. In the second phase the child enters actual environmental surroundings and is effected air, food and similar other pollutions. This increases chanced of death of child. All attempts are being made, both in the developed and developing countries, to check post neo-natal deaths. The chances of death in neo-natal period, however, increase when there is pre-mature or

defective or similar other type of birth. Neo-natal death rate in almost every country has remained the same. If there have been any changes these have taken place in respect of neo-natal deaths.

But as already pointed out data about infant mortality in respect of both the phases is incomplete. It is because:

(a) In some societies it is considered undesirable to register the death of a child who has died soon after, or even after some time of the birth.

(b) In some societies there is no system of registering birth of a child till the baby has reached a particular age. If the child dies during this period, there is no question of registration.

(c) Cases of abortion, particularly illegal abortions, are not registered in almost all societies.

(d) In some societies registration of death is not possible due to religious taboos.

(e) In some cases there are no on the spot faculties to register infant deaths and thus the people, particularly in the rural areas, do not take the trouble of registering death of child.

Causes for High Infant Mortality. All over the world infant mortality is very high. Obviously a question which arises is as to why this rate remains so high. Some of the important reasons can be:

(i) The cause can be related to birth, which includes lack of medical facilities; incompetence of nurses attending on the child/mother; congenital; mal-transformation; immature birth, etc.

(ii) The cause can also be related to outside factors, etc., exposure to cold or heat; illiteracy of patients resulting in the negligence of children; air or pollution; poverty and ill-nourishment and nutrition, etc.

(iii) The mothers can be ignorant and may not realise the need of after medical care, after the birth of child.

(iv) In some families where the number of children, particularly of the same sex, may be quite high and an additional child may not be much cared.

There were several causes responsible for high mortality rate in the past. These being:

(i) There were frequent famines which resulted in serious food shortages. There were also no adequate storage facilities and even if food in one region was available it could not be timely transported to regions where there was food shortage. There used to be conditions of serious malnutrition and one could easily fall a prey to any infection.

(ii) Epidemics and spread of communicable diseases used to take a heavy toll of life.

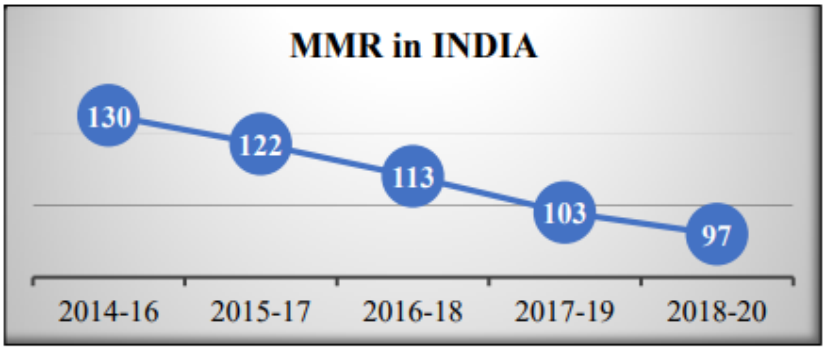
(iii) One more cause responsible for high infant mortality in the past used to be recurrent wars, which were responsible for high mortality rate in the past.

(iv) The cause responsible for high mortality rate in the past was poor sanitation facilities. The houses were not properly well ventilated, environments were filthy, personal hygiene was very poor and there was serious lack of medical facilities.

(v) Large population lived in overcrowded and dark houses. Nasty odour was taken for granted.

Maternal Mortality Rate

Before proceeding further, it is worthwhile to discuss in brief about maternal mortality rate. Many women die prematurely. This death rate differs according to age group. The rate of maternal mortality in so far as after the birth of the child is concerned can be found out by first finding out the number of deaths which occur among the females of childbearing age from child birth during a given year and pertaining to a given area and dividing that by the number of live births occurring among the female population of that area during the same period. Maternal mortality is defined as the death of a woman while pregnant or within 42 days of the end of her pregnancy, from any cause connected to or exacerbated by the pregnancy.



Source: Sample Registration System, 2022

Maternal mortality rate is bound to be high in the countries where:

(i) The women are illiterate;

(ii) The orthodoxy has deep roots;

(iii) The death of the women is not very much cared for;

(iv) Interval between the birth of two children is rather less;

(v) There are no medical facilities or if at all these are there, these are quite inadequate;

(vi) The system of child marriage prevails.

Since in some of the societies every death case is required to be reported to the local authorities, therefore, data available about deaths in this regard is quite dependable. But again it is difficult to find out the real cause of death, though prima facie the death might have occurred due to the birth of the child.

Mortality is a stage at which person ceases to live but in mortality the person is actually alive but this state of mind is such that he is not in a position to perform any solid mental or physical work. If health is understood as state of complete physical, mental and social well-being, morbidity is a situation in which one of the above conditions must be essentially missing. In a state of morbidity person can be deformed, deficient, mentally depressed and so on. Since in some cases the disease or trouble can be diagnosed after a very long time, therefore, the whole affair becomes complex and complicated.

Morbidity has far reaching effects. A morbid person cannot contribute anything either to the nation or to the family to which he belongs. Efficiency is

adversely affected at all stages, due to him. He creates a sense of depression among his friends and relatives. In fact, he becomes a burden both on the family as well as on the society.

Child Mortality

Child mortality refers to the death of children under the age of five. According to UNICEF, Child mortality also known as the under-5 mortality, it is a new born will die before reaching the age of five, expressed per 1,000 live births.

Trends in India:

According to the Sample Registration System (SRS) Statistical Report 2020, which was released in September 2022, India's Under-5 Mortality Rate was 32, with Infant and Neonatal Mortality Rates of 28 and 20, respectively.

There are eleven states and union territories have already attained SDGs target of Under-5 Mortality Rate (<=25 by 2030). There are Kerala (8), Tamil Nadu (13), Delhi (14), Maharashtra (18), Jammu and Kashmir (17), Karnataka (21), Punjab (22), West Bengal (22), Telangana (23), Gujarat (24) and Himachal Pradesh (24).

INDICATOR	SRS 2014	SRS 2019	SRS 2020
Crude Birth Rate (CBR)	21.0	19.7	19.5
Total Fertility Rate	2.3	2.1	2.0
Early Neonatal Mortality Rate (ENMR) – 0- 7 days	20	16	15
Neonatal Mortality Rate (NMR)	26	22	20
Infant Mortality Rate (IMR)	39	30	28
Under 5 Mortality Rate (U5MR)	45	35	32

Source: Economic Times

Reasons for High Child Mortality in India

Poor Infrastructure: High infant mortality rates are caused by structural problems such as inadequate facilities at primary healthcare facilities, delays in patient referrals [to specialists], and a lack of transportation, particularly in rural and isolated locations.

Lack of nutrition: A sizable section of the populace is impoverished. Pregnant women in low-income households do not have access to enough food, which leads to pregnancy and delivery problems. A child's nutritional deficiencies are also caused by inadequate nutrition during pregnancy.

Lack of Skilled Workers: Particularly in rural areas, there is a scarcity of physicians, nurses, and other staff members. This makes it more difficult to provide routine observation and to promptly refer women to emergency obstetric treatment when difficulties are identified.

Premature Births: A kid born before 37 weeks of pregnancy is considered premature. Compared to babies born after 37 weeks of gestation, premature or "preterm" babies have a two to four times higher chance of dying after birth.

Lack of Education and Awareness: Women in low-income households are not well-informed about the need of proper nutrition. Additionally, they might not be aware of additional safety measures needed both before and after labor. Compared to contemporary healthcare, they depend more on traditional midwives.

Child Marriage: In certain regions of India, child marriage is still common. It causes pregnancies to occur more frequently and at a younger age. Pregnant women who give birth early are more likely to die young.

Measures taken by the Govt. to control Under-5 Child Mortality Rate

Mission of the National Rural Health: Newborn Stabilization Units at First Referral Units (Community Health Centers), Special Newborn Care Units at District Hospitals nationwide, and Newborn Baby Care Corners at every stage of childbirth have all been established as a result of the National Rural Health Mission's introduction of facility-based newborn care.

Integrated Child Development Services (ICDS): Children between the ages of 0 and 6 as well as expectant and nursing mothers are the beneficiaries of the program.

Its many goals include lowering the rates of death, illness, malnutrition, and school dropout as well as improving the nutritional and health status of children in the 0–6 age range.

Building Health Care Providers' Capacity: Under the National Rural Health Mission (NRHM), a number of trainings are being held to prepare physicians, nurses, and ANMs for the early diagnosis and case treatment of common pediatric illnesses. The Integrated Management of Neonatal and Child Illness, Navjat Shishu Suraksha Karyakram (NSSK), etc., is the umbrella organization for these trainings. Under NHM, the Government of India gives the States financial and technical assistance to carry out these trainings.

Handling Malnutrition: Malnutrition increases both children's mortality and morbidity by lowering their resistance which responsible for various infections. In order to lower child mortality, National Health Management is placing a strong emphasis on managing malnutrition. (a) To treat severe acute malnutrition, Nutritional Rehabilitation Centers (NRCs) have been set up; (b) In coordination with the Ministry of Woman & Child Development, appropriate newborn and young child feeding practices are being promoted, along with exclusive breastfeeding for the first six months; (c) The "MAA-Mothers' Absolute Affection" program was introduced by the Ministry of Health & Family Welfare in August 2016 with the goal of enhancing breastfeeding practices (initial breastfeeding within an hour, exclusive breastfeeding for up to six months, and complementary breastfeeding for up to two years) through the use of mass media and the development of health care providers' capacity in both communities and healthcare facilities; (d) The National Nutrition Mission is the government's main initiative to enhance the nutritional status of infants, expectant mothers, and nursing mothers. It seeks to decrease anemia in children, teenage girls, pregnant women, and nursing mothers by 3% annually (total 9% until 2022) and stunting and wasting in children by 2% annually (total 6% until 2022); (e) The National Iron Plus Initiative (NIPI), which was founded on the life-cycle concept and encompasses all age groups, was introduced to manage anemia in children.

Home Based Newborn Care (HBNC): ASHA (Accredited Social Health Activist) provides home-based newborn care because 57 per cent of infant fatalities occur

within the first 28 days of life. Improving newborn practices at the community level as well as the early identification and referral of ill newborns are the goals of home-based newborn care. In the event of an institutional delivery, the ASHA Home Based Newborn Care schedule consists of six visits.

Universal Immunization Programme (UIP): In 1985, it made its debut. One of the main focuses of the National Health Mission (NHM) is immunization. UIP offers free vaccinations against 12 diseases that can be prevented by vaccination; sub-nationally against three diseases: rotavirus diarrhea, pneumococcal pneumonia, and Japanese encephalitis; nationally against nine diseases: diphtheria, pertussis, tetanus, polio, measles, rubella, hepatitis B, and meningitis and pneumonia. The goal of Mission Indradhanush (2014) and Intensified Mission Indradhanush (IMI)-2017 (the most recent version 4.0) is to quickly reach 100% immunization coverage for all children and pregnant women while also strengthening and revitalizing the program.

Mortality in India

India's mortality rates, notably maternal and newborn mortality, have fallen significantly. The maternal mortality ratio (MMR) fell from 130 per 100,000 live births in 2014-16 to 97 in 2018-20. The Infant Mortality Rate (IMR) significantly decreased, from 39 per 1,000 live births in 2014 to 28 in 2020. A Press Information Bureau's report attributes the drop to government measures, greater healthcare access, and better medical solutions. India achieved an 83% drop in MMR from 1990 to 2020, surpassing the global reduction of 42%.

Other mortality indicators:

Under-five mortality rate: The Under-5 Mortality Rate (U5MR) has significantly fallen, from 45 per 1,000 live births in 2014 to 32 by 2020.

Neonatal mortality: The Neonatal Mortality Rate (NMR) fell from 26 to 20 per 1,000 live births between 2014 and 2020.

Adolescent mortality: Adolescent mortality rates remain low, with rates of approximately 2.1 and 1.7 for females and men aged 15-19, respectively, and 2.8 and 2.3 for those aged 20-24 in 2022.

Adult mortality: In 2022, the adult mortality rate for women was 176.79 per 1,000 female adults, compared to 242.88 per 1,000 male people.

Check your Progress

1. The term 'Mortality' refers to _____.
   a. Studying of birth and birth rates
   b. Studying of death and death rates
   c. Studying of migration
   d. Studying of marriage
2. Infant mortality means _____.
   a. Death of a child within one year
   b. Death of a child within two years
   c. Death of a child within three years
   d. Death of a child within four years
3. When an infant died within 28 days from the date birth, then it is called _____.
   a. Non-neo mortality
   b. Post neo natal mortality
   c. Neo-natal mortality
   d. Neo post natal mortality
4. When a woman died during pregnancy or within _____ days after child birth is called maternal mortality.
   a. 32 days
   b. 38 days
   c. 42 days
   d. 49 days
5. Which state has lowest Under Five Child Mortality in India as per Sample Registration System, 2020?

a. Tamil Nadu
b. Kerala
c. Andhra Pradesh
d. Maharashtra

6. What is the Infant Mortality Rate in India in 2020?
   a. 20 per 1000 live births
   b. 24 per 1000 live births
   c. 28 per 1000 live births
   d. 32 per 1000 live births
7. Explain causes of deaths as discussed by World Health Organization.
8. Suggest appropriate measures to control Infant Mortality in India.
9. Discuss various measurement of Mortality with suitable formula.
10. Elucidate the trends of various types of Mortality in India.

MIGRATION

Migration of population is an international phenomenon. The people used to migrate in the past as well but these days there is an increasing trend of migration of people from under-developed to developed countries resulting in brain drainage. Usually qualified, competent and healthy people migrate in search of jobs and for improving their life career. The age of migration is usually youth when there is over zealousness to work hard. Male migrates are always more in numbers than the females.

There are, however, certain factors which encourage migration, while many others do not. In migration social, economic and political factors combined together put a lot of pressure. In every country there are laws which deal with migration, because large scale migration very much effects in several ways both the countries from which population migrates and to which it is migrated.

Meaning of Migration

The term migration comes from the Latin word 'migrare', which meaning 'to move or settle/shift'. Migration is defined as a change in regular place of residence for a specific period of time due to various reasons. People travel from one geographic region to another for short or long periods of time for a variety of reasons. Similarly,

migration refers to moving from one administrative boundary to another for a short or long period of time, or permanently changing one's place of residence.

Measurement of Migration

Measurement of migration is not an easy problem because it involves definition and clear understanding of such terms as 'usual place of residence' e.g. what can it is for college student, members of institutes or members of armed forces. 'The place of origin' which again is not easy to define, and so is the case with the term 'place of destination', because these can be anything from a house to a continent. Then there can be internal as well external. Then another consideration is that while measuring migration total number of movers during a given time period should be measured or merely the change in the place of residence, if any, from the beginning till the end of the period, should be measured. Then what amount of stress should be laid in finding out from which place they are likely to go and also the nature and character of internal and international migrants are some other problems,. In view of these difficulties usually it is difficult to measure migration.

Direct Measurement. Measurements of population can be both direct as well as direct. Direct measurement relates to all measures which help in keeping an account of those who migrate. These can be both Transit Statistics as well as Census Statistics. Both these can be found out with the help of following measures.

1. **Territorial Scope.** A person can become migrant when he leaves territorial jurisdictions of a state. District or even a village. In other words, migration is related to some boundary. Migration can be both within the country as well as out of it. It is, however, not essential that internal migration involves less whereas international migration involves more distance. It can be vice versa also. In other words, distance is not a deciding factor whether migration in internal or international.
2. **Gross and Net Numbers of Migrants.** Transit data is closely linked with time which tells about immigrants and emigrants. The difference between the two gives information about net migration. Correct information must be closely linked with point or moment of time. According to Barclay, "The effects of mortality are always deducted in advance; the migrants recorded

by the census are people who both entered the area and survived to the census data".

3. **Duration of Stay.** All those people who cross the border cannot be called migrants but only those persons can be called migrants who remain there for quite some time. So far, however, no period has been fixed in this regard but all that is believed is that the duration should be very long.
4. **Single Move Migration**. When a person leaves his place for some destination and reaches there at one stage it is called single move migration. But sometimes the people do not settle at single stage. It is then called migration by stages. When census operations are conducted at that time usually there is no consideration whether it was single move migration or not.

Indirect Measurement. As against direct measurement, there is indirect measurement also. It is done with the help of following formula:

$M = (P^2 – P^1) – (B – D)$.

Where

M = Migration.

P^2 = Population of the year, after expected year.

P^1 = Population of the year before expected year.

B = Births in the expected year.

D = Deaths in the expected year.

There is another method of measuring migration as well. Under this Age Specific birth and death rates are found out and then population is calculated. Then actual population in that year is also found out and difference is calculated. This difference is called Migration Effect.

Types of Migration

There are various types of migration that occur within and outside of the country. Some of the most important types of migration are discussed below in depth.

Intrastate Migration: This type of migration occurs when an individual or group moves between two parts of the same state. For example, farmers from Tirunelveli (South Tamil Nadu) migrate to Chennai (North Tamil Nadu) to live and work on construction sites for daily salaries, which is referred to as intrastate migration.

Interstate Migration: This type of migration takes place between two states within a country, i.e. along a state's boundary. For example, construction workers from Andhra Pradesh who migrate to Tamil Nadu for work are examples of interstate migration.

Internal migrants are often grouped into the following four migration streams:

(a) rural to rural.
(b) rural to urban.
(c) urban to urban.
(d) urban to rural.

From the aforementioned streams, the most significant pattern that has been a source of concern in India is individuals shifting from rural to urban areas for a variety of reasons, including failure in agricultural activity and increased debt. Such causes push people to relocate to urban regions, which offer appealing prospects such as work, higher living standards, and are directly related to forced migration.

Inter-country Migration: It is the term for migration that takes place between two nations in addition to within one. These two terms are frequently used in relation to inter-country migration. They are immigration and emigration. Immigration simply refers to a person moving from a state or country to which they do not originally belong in order to settle there either permanently or temporarily, while emigration is the opposite, where a person moves to a new state or country and is referred to as an emigrant.

Push Factors of Migration

a. Poverty
b. Political Fear of Persecution
c. Poor medical care.
d. Loss of Wealth
e. Natural Calamities.

f. Death Threats
g. Desire for increased political or religious freedom
h. Pollution
i. Poor housing
j. Bullying
k. Discrimination
l. Contamination
m. War Sickness

Pull factors of Migration

a. Job Opportunities.
b. Higher advantages
c. Better living conditions.
d. Increased political or religious freedom
e. Enjoyment and Education
f. Better medical treatment.
g. Attractive Climates
h. Security
i. Family links
j. Better places for youngsters

Theories of Migration

Everett Lee's Theory of Migration

Introduction: Everett S. Lee created the well-known theoretical framework known as the Lee Migration Theory, which explains the trends and mechanisms of migration both within and between societies. In order to comprehend the elements driving migration decisions and the effects of migration on both the sending and receiving communities, Lee's theory was put forth in the middle of the 1960s. The three primary parts of the idea are push factors, pull factors and intervening obstacles.

Push Factors: Push factors are the conditions and circumstances in the migrants' home or sending location that force or "push" people to leave. Economic challenges, a lack of job possibilities, poverty, natural disasters, political instability, violence, prejudice, and social or religious persecution are all common factors. Push factors are the motivations that drive individuals or groups to seek greater opportunity or safety in other regions.

Pull Factors: Pull factors are the characteristics and possibilities in a destination or receiving place that entice or "pull" migrants to relocate there. These benefits may include greater career chances, higher earnings, better housing conditions, educational opportunities, political stability, social networks (for example, the presence of family or friends), and perceived quality of life. Pull influences attract people or groups to migrate to a specific location.

Intervening Obstacles: Intervening Obstacles are hurdles or challenges that migrants may experience on their way from the sending location to the receiving area. These hurdles could be physical (for example, natural barriers such as mountains or bodies of water), legal (for example, immigration regulations and restrictions), economic (for example, the cost of migration), cultural (for example, language barriers), or social (for example, discrimination against migrants in the receiving area). Intervening impediments can influence migrants' decision-making and change their final destination.

The Lee migration hypothesis emphasizes the interaction of push factors, pull factors, and intervening obstacles in generating movement patterns. It implies that migration is a complicated process driven by a variety of circumstances at the individual, household, and society levels. Furthermore, the theory emphasizes the dynamic aspect of migration, highlighting how changes in push and pull forces, as well as the removal of intervening obstacles, can affect migratory patterns over time.

Raventein's Theory of Migration

Ravenstein proposed numerous migration regulations based on his research of migratory patterns and birthplace data. These rules offer a broad explanation of the reasons and patterns of migration. These laws apply to the following factors.

1. Migration and Distance: First, he claims that the amount of migration is subject to Distance Decay. It signifies that the overall number of migrants traveling between two locations decreases as distance increases. As a result, people migrate more to adjacent locations and vice versa, as shown in the Gravity Model of Migration.

   Second, people choose larger cities when migrating great distances. It means that, while individuals travel less to remote regions, when they do, they tend to go to larger cities.
2. Migration by Stages: Ravenstein hypothesized that individuals migrate in stages. People do not move directly from villages to cities. Rather, they move from village to small town, then to city, and then to metropolis. Hence, migrants travel the huge distance in steps and stages.
3. Streams and Counter-Steams: Every stream of migration has a counter-stream of migration. This law suggests that the flow of migration between two places is never unidirectional. If the people emigrate from one place to another, some of those people return. For example, many Indians go to the U.S.A. and Canada but many of them come back to India and establish their own business.
4. Differences in Migration between Rural and Urban Areas: Rural individuals are more likely to migrate than urban dwellers. According to this law, villagers are more likely to migrate than city dwellers. This is because cities provide better health care, education, and employment possibilities than rural places.
5. Females make up the majority of short-distance migrants: Women migrate more than men over short distances. During Europe's industrial revolution, women would go from neighboring rural areas to factories and wealthy neighborhoods for temporary work. They migrated faster than men across short distances. Similarly, in India, following marriage, women move from their maternal houses in villages to their in-laws' homes in other villages. As a result, they account for the majority of short-distance migration in India.
6. Technology and Migration: The amount of migration and technical advancement are positively correlated. This indicates that migration rises when more accurate information about employment and educational

prospects becomes available. Additionally, improvements in transportation speed up the movement of migrants from one location to another.

7. Economic Motives are Primary: The primary motivation for migration is an increase in economic welfare. This suggests that the primary motivation for any type of migration is to make money. If a country is economically poor but socially advanced, a migrant from a socially backward country will not move there due to a lack of economic incentives. Kenya, for example, has a diverse social and cultural landscape. However, low-caste workers from India will not go to Kenya since there is no economic incentive.
8. Larger Towns, Greater Immigration: Larger towns receive a greater number of migrants. As a result, immigration has emerged as the primary driver of large metropolitan city growth. For example, all of the world's big cities, including London, New York, Mumbai, Delhi, Chennai and Kolkata have grown as a result of immigration.

Gunnar Myrdal's Backwash Current Theory of Migration

According to Gunnar Myrdal's circular causation hypothesis, development in one area, such as a rising metropolis, can result in a "backwash effect" in which resources, including labor, are sucked away from less developed regions, worsening regional imbalances. This "backwash" can involve individuals migrating to better opportunities, capital outflows, and the movement of commodities and services from the periphery to the core.

Backwash Effect: According to Myrdal's idea, the development of a core location (such as a city) can have a negative impact on surrounding, underdeveloped areas by diverting resources and manpower. This "backwash" may include:

a. Labor Migration: People from less developed areas may migrate to the center in search of better job prospects, reducing the local workforce in the periphery.

b. Capital outflow: Businesses and investments may be drawn to the core region, reducing the cash available in less developed areas.

c. Resource depletion: The core region may rely on the periphery for resources such as raw materials, resulting in depletion and potential environmental damage.

Circular Causation: Myrdal's theory stresses how the backwash effect, when combined with other causes, generates a vicious cycle of inequity. The more developed a region is, the more it attracts resources and future growth, while the less developed parts lag behind.

Contrast with Spread Effects: Myrdal also explored "spread effects," which are good consequences of growth in one place that help other regions. However, he maintained that the backwash effects are frequently bigger than the spread effects, resulting in a growing disparity between locations.

Conclusion: Myrdal's thesis has significant implications for analyzing regional disparities and development initiatives. It argues that policies should be designed to address the backwash effect and promote more equitable development across regions.

Consequences of Migration

Each migration takes place with some expectations. In some cases these might not materialise while in others these may fully or partially materialise. When there is frustration in expectation, the result can be either moving back to te place of origin or migration to some other place. Usually migrants will find it difficult to adjust themselves to their new environments. They are likely to cause pressure on population of the area and their coming may also result in rise in prices. It may also effect area's mortality and fertility rates. The value of land and real estate can go up. The receiving region will be benefited by gaining labour and wisdom of migrants during their productive year without spending much on them. The regions from which the people migrate will lose their best educated and intellectual person on the one hand and physically sound on the other.

If the areas to which the people are migrated is under-populated then net in-migration can help the area in achieving economies of trade, i.e. reduction in the cost of goods obtainable by increasing the scale of production and that of marketing. This will in turn help in raising living standard of the people.

David M. Heer, is of the view that, “Gradually, areas of net in migration will have a rather high proportion of young adults. They will many times also have a rather heterogeneous and nonconforming population, since in migrants of ten come from diverse cultural back-grounds. For all these reasons and more areas of net in migration often are more tolerant of new ideas than any other types of areas”.

Migration of population thus poses serious problems both for the migrants as well as the areas to settle down. Of course, there is desire to have better economic gains but the problems of adjustment, particularly in a new culture, without kins and friends are no less serious.

Check your Progress

1. The movement of people from one geographical location to another geographical location is called as _____.
   a. Mortality
   b. Migration
   c. Fertility
   d. Population Distribution
2. What are the two types of measurement of migration?
   Direct and in-direct measurement of migration
3. If a person migrates from urban to rural area, then it is called as _____.
   a. Rural to urban migration
   b. Rural to rural migration
   c. Urban to rural migration
   d. Urban to urban migration
4. Identify which one of the following is considered as push factor of migration?
   a. Education Facility
   b. War

c. Health Facility
d. Transport Facility

5. Who said that 'the overall number of migrants traveling between two locations decreases as distance increases'?
   a. Ravenstein
   b. Gunnar Myrdal
   c. Everett Lee
   d. Adam Smith
6. Who mentioned that 'migrants travel the huge distance in steps and stages?
   a. Ravenstein
   b. Gunnar Myrdal
   c. Everett Lee
   d. Adam Smith
7. Who said that intervening obstacles play its role while involving in migration?
   a. Ravenstein
   b. Gunnar Myrdal
   c. Everett Lee
   d. Adam Smith
8. Discuss the push and pull factors of migration.
9. Explain Ravensteins theory of migration.
10. Elucidate Gunnar Myrdal's model of migration.
11. Explicate Everett Lee's theory of migration.

Let's Sum Up

Population is ever changing phenomenon and it is never constant and static. It is always dynamic in nature. There are three variables responsible for population change in any area and they are fertility, mortality and migration and that's why these three variables are called as population dynamics. The fertility, mortality and migration are determined by various factors and it means that some of the factors are responsible for the increase of the fertility, mortality and migration and at the same time some other factors are responsible for decrease of the fertility, mortality and migration. In particular, the social, economic, cultural, political, psychological, biological and environmental factors are determining the fertility, mortality and migration. Similarly, these three population variables, i.e. fertility, mortality and

migration are measured sometime by directly and some other time measured by indirectly.

Glossary

Population Dynamics: The variables namely fertility, mortality and migration are responsible for the change of size, growth and distribution of population in any place.

Fertility: Actual reproductive performance of a woman or group of women.

Fecundity: Potential of reproductive capacity of an individual or individuals.

Mortality: The state of being mortal or death.

Morbidity: The state of ill or diseased or unhealthy.

Infant Mortality: Death of an infant that take place between the time it is born and till the one year of age.

Maternal Mortality: Death of a woman during pregnancy or within 42 days after the end of pregnancy.

Migration: The process of individuals moving from one geographical location to another geographical location.

Push Factors of Migration: Factors responsible to push the individuals to migrate from their present geographical location.

Pull Factors of Migration: Factors responsible to attract the individuals to settle in a new geographical location.

Unit – IV

POPULATION SIZE, COMPOSITION AND DISTRIBUTIONS

Structure

Objectives

This unit is discussed about various aspects of population related variables and after going through this unit the students must able to

1. Understand the causative factors of the population size and population growth.
2. Comprehend the influencing aspects of population change.
3. Discuss different features of the population composition.
4. Describe the dispersal of the population in India.
5. Know the bases of density of population in India.
6. Grasp various determinant factors of population growth in India.

Population Size

Population size refers to the number of people in a given group or location. It's an important term in demography, since it helps us understand population health and dynamics. Demography is the study of populations, and birth rate, death rate, and migration all have an impact on population size. Population size is often determined by counting individuals in a specific area or group.

Importance of Studying Population Size

1. **Planning and Policy-Making:** To prepare for the future, particularly with relation to infrastructure like roads, schools, and hospitals, governments require demographic data. More effective policymaking in sectors like social services, healthcare, and education is made possible by an understanding of demographic shifts. Economic planning requires population size statistics to ensure effective resource allocation.
2. **Understanding Population Trends and Impacts:** Researching population size aids in our comprehension of the reasons for and effects of population shifts, such as migration trends, birth rates, and death rates. Addressing problems like unemployment, poverty, and environmental deterioration need this information. Long-term planning depends on our ability to forecast future population shifts, which is made possible by demographic research.
3. **Environmental Considerations:** Population studies provide insight into how humans affect natural resources and the environment. Understanding population changes allows us to build ways to reduce negative environmental consequences and encourage sustainable practices.
4. **Understanding Population dispersion:** Analyzing population dispersion, rather than just size, can provide insight into how individuals interact with one another and their surroundings. This information can be used to plan and manage resources and services.
5. **Public Health and Social Sciences:** Population size and demography are crucial for analyzing health trends and patterns. Social scientists use demographic statistics to investigate society changes, cultural trends, and the effectiveness of social policy.
6. **Research and Development:** Population studies are crucial for research in fields such as epidemiology, sociology, and economics. Understanding population size enables researchers to find trends and patterns that can guide future research and development activities.

India's Census 2011:

The India's census 2011 was conducted from February 9 to 28 and provisional figures of India's 15th census were released in New Delhi on 31st March 2011.

India accounts for 17.5% of the world's population.

India's Population as on March: 1, 2011: 1,210,193,422

Males: 623,724,248

Females: 586,469,174

Sex Ratio (females per 1,000 males): 940

Population Density (persons per sq km): 382

Decadal (Period of ten years) growth rate of population between 2001-2011: 17.64

Most Populous State: Uttar Pradesh

Least Populous State: Sikkim

Among states Kerala has the highest sex ratio (1084) and among Union Territories (UTs), Daman the lowest (618).

Least Populous UT: Lakshadweep

Literacy Rate: 74.04 per cent (82.14 for males and 65.46 for females)

The Highest Literacy Rate: Kerala with 93.91 per cent literacy rate

The Lowest Literacy Rate: Bihar with 63.82 per cent literacy rate

State with highest Density of population — Bihar

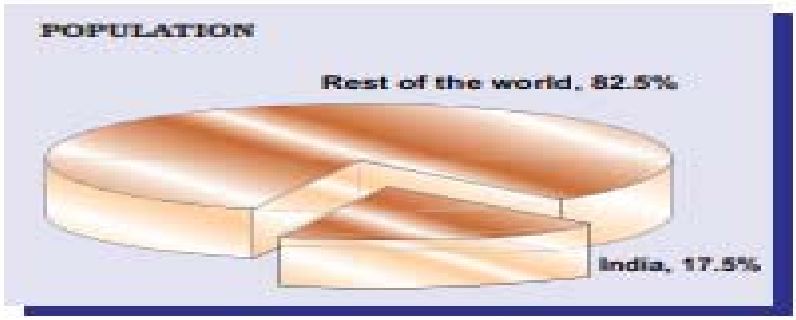
State with lowest Density of population — Arunachal Pradesh

Maximum Density among Union Territories — Delhi – National Capital Territory (NCT). It is also most thickly populated city in India

Lowest Density among Union Territories — Andaman-Nicobar

Biggest State as per area — Rajasthan

Smallest State as per area — Goa



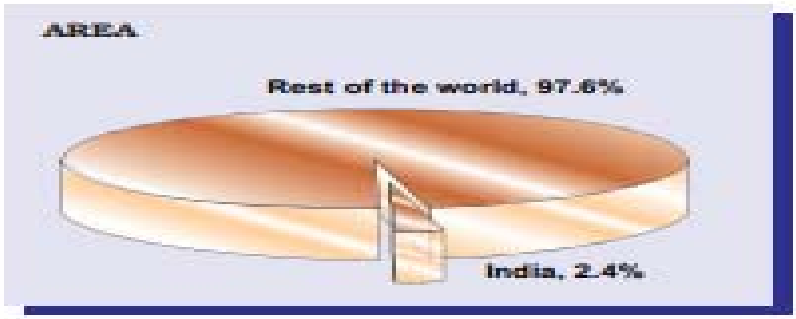


Fig : India's Share of World's Area and Population

Check your Progress

1. When did the last population census conducted in India?
   a. 2001
   b. 2006
   c. 2011
   d. 2021
2. What was the total population of India as per 2011 census?
   a. 1.11 Billion
   b. 1.21 Billion
   c. 1.31 Billion
   d. 1.41 Billion
3. Which was the most Populace State in India as per 2011 census?
   a. Madhya Pradesh
   b. Uttar Pradesh
   c. Bihar
   d. Rajasthan
4. Which was the least Populace State in India as per 2011 census?
   a. Tripura
   b. Arunachal Pradesh
   c. Goa

d. Sikkim

5. What is mean by population size? Discuss the importance of studying population size.
6. Describe the salient features of population of India with reference to census 2011.
7. Analyze the various determinant factors of population size of an area.

4.2 Population Growth

The gradual increase in the number of people within a population is known as population growth. It is influenced by things like migration trends, birth rates, and mortality rates. Positive growth, or an increase in population, and negative growth, or a drop in population, is two possible outcomes.

Population Growth Rate: The pace at which the size of a population fluctuates over a given time frame, such as a year. It is determined by subtracting the difference between immigrants and emigrants from the difference between births and deaths.

Elements Affecting Growth:

Birth Rate: The number of babies born annually per 1,000 people.

Death Rate: The annual number of fatalities per 1,000 persons.

Migration is the movement of people into a certain area (immigration) or out of that place (emigration).

Factors affecting population growth:

Resource availability, including food, water, and shelter, can effect population increase. Improving healthcare and sanitation can reduce mortality rates and promote population growth. Social and economic factors, including education and access to contraception, can impact birth rates and family size. Climate change and environmental deterioration can affect population growth, especially in locations with limited resources.

Consequences of Population Growth

Environmental Concerns: Rapid population expansion can cause resource depletion, deforestation, pollution, and other environmental issues.

Social and Economic Challenges: Rapid population growth can put a burden on infrastructure, increase competition for resources, and lead to poverty and inequality.

Disease Transmission: Increased population density might raise the danger of disease transmission.

Statistics on Population Growth in India since 1901

These significant turning points are the census years 1921, 1951 and 1981. Thus the demographic history' of India during the twentieth century can be charted and classified into following four distinct phases.

1. Period of Stagnant Population (1901-1921)
2. Period of Steady Growth (1921-1951)
3. Period of Rapid High Growth (1951-1981)
4. Period of High Growth with Definite Signs of Slowing Down (1981-2001)

1. Period of Stagnant Population (1901-1921):

During most of the 19th century India witnessed sporadic, irregular and slow growth of population which drifted into twentieth century until 1921. Thus the population growth during this period can be termed more or less stagnant when compared to the growth rates observed during the consequent periods. The high birth rate was counterbalanced by high death rate.

The progressive growth rate in 1921 over 1901 was only 5.42 per cent. In fact, the census year 1921 registered a negative growth rate of-0.31 per cent which happened only once throughout the demographic history of India. It is because of this decline in place of rise in population that the year 1921 is called the 'demographic divide' in the demographic history of India.

The high mortality during this period was the product of large scale abnormal deaths due to epidemics of influenza, plague, small pox, cholera, etc. Influenza alone claimed 12 million lives in 1918. Food shortages caused by severe droughts in 1911,1913,1915,1918 and 1920 claimed their own toll. In addition, thousands of Indian soldiers lost their lives during the World War I (1914-18).

2. Period of Steady Growth (1921-51):

During 1921-51, the population of India increased from 251 million to 361 million. This duration of 30 years has thus registered a growth of 47.3 per cent. Therefore, this period is called the period of steady growth rate. The mortality rate started showing downward trend as a result of improvement in general health and sanitation conditions after 1921.

These developments helped in controlling epidemics like plague, cholera and malaria. The crude death rate which stood at a high of 47 per thousand in 1921 declined to 27 per thousand in 1951. On the contrary, the crude birth rate continued to stay at an abnormally high level and decline only to 40 per thousand in 1951 as against 48 per thousand in 1921.

Decline in death rate was also achieved partly through the improvement in the distribution system as a result of improved transportation so that timely supplies of food could be made available to drought and famine stricken areas.

The combined effect of these factors was that the population started increasing steadily. Since crude death rate declined considerably and crude birth rate remained very high, the population growth during this period is called mortality induced growth.

3. Period of Rapid High Growth (1951-81):

After 1951, there was a steep fall in the mortality rate but the fertility remained stubbornly high. Therefore, this period experienced very high rate of population growth and is often referred to as the period of population explosion.

As a matter of fact, the birth rate increased from 40 per thousand in 1951 to 42 per thousand in 61 and stayed at 34 per thousand in 1981. However, it fell to 26 per thousand in 2001. In contrast, death rate fell rapidly from 27 per thousand in 1951 to 9 per thousand in 2001.

Consequently the natural rate of growth, which fell slightly from 14.0 per thousand in 1941 to 13 per thousand in 1951 rose steeply to 22 per thousand in 1971 and remained at the same level in 1981 also. The total population of the country increased from 361.09 million in 1951 to 683.3 million in 1981 recording an increase of 89.36 per cent in a short span of thirty years.

This unprecedented growth rate was due to the accelerated developmental activities and further improvement in health facilities. The living conditions of the people improved enormously. Death rates declined much faster than the birth rates (Table 10.3). This situation resulted in high natural increase. Thus, it was fertility induced growth.

4. Period of High Growth Rate with Definite Signs of Slowing Down (1981-2011):

The last phase of 20th century, i.e., the period between census years 1981 and 2011 is known as the period of high growth with definite signs of slowing down. Although the rate of growth was still very high, it started declining after 1981.

The highest ever growth rate of 2.22 per cent was recorded in 1971 which continued in 1981 also. It declined to 2.14 per cent in 1991 and further to 1.64 per cent in 2011.

This declining trend marks the beginning of the new era in the countries demographic history. During this period, birth rate declined rapidly, from 34 per thousand in 1981 to 22 per thousand in 2011. The declining trend of death rate continued but at a slower rate.

India: Changing Births Rates, Death Rates and Natural Increase, 1911-2011

Year	Crude Birth rate per thousand	Crude Deat rate per thousand	Natural rate of increase per thousand
1911	49	43	6
1921	48	47	1
1931	46	36	10

1941	45	31	14
1951	40	27	13
1961	42	23	19
1971	37	15	22
1981	34	12	22
1991	31	11	20
2001	26	9	17
2011	22	7	15

The difference between birth and death rates narrowed to 15. This declining trend is a positive indicator of the official efforts of birth control and people's own inclination to opt for smaller families. It seems that the country has now reached a take-off stage in its demographic evolution.

India's annual growth rate 1.95 per cent (during 1991-2011) was much higher than the world population growth rate 1.4 per cent as estimated by the United Nations. In contrast, China registered a much lower annual growth of about one per cent during 1900-2000. In fact, the growth rate of China is now very much comparable to that of the USA (0.9 per cent).

Among the ten most populated countries of the world only Pakistan and Nigeria have population growth rate higher than that of India. Even some neighbouring Muslim countries like Indonesia and Bangladesh recorded population growth rates lower than India. On the other extreme and of the scale, Russian Federation recorded negative population growth rate.

Causes of rapid growth of population in India

There are various causes responsible for the rapid growth of population in India. Generally all the causes can be divided into three categories like – (I) High birth rate, (II) Low birth rate, (III) Migration.

I. High Birth Rate (Fertility):

Birth rate refers to the number of children taking birth per thousand people. In 1991the birth rate was 29.9 per thousand. In 2000 the birth rate was 25.8 per thousand which is very compound to other counties of the world. Birth rate is high due to the following reasons.

Early Marriage System:

Early marriages are commonly seen in our country. It is generally in the case of women. Maximum number of girls are married between 16 to 18 years. Early marriage prolongs the childbearing period and this leads to a high rate of growth of population.

Universal Marriage:

Marriage is universal practice and regarded as a sacred obligation in India. Presently in India about 76 per cent of the women are married at their reproductive age. By attaining the age of 50 only 5 out of 100 Indian women remain unmarried. As marriage is universal in our country, the birth rate becomes higher which raise the growth rate pf population.

Joint Family System:

Thought the importance of jointly family system has considerably declined in our country the system has no disappeared till now. In a joint family system the children are looked after by all the earning members of the family. The system acts a protection against economic hardship. A member may not be in a position to earn something but when he gets married he gets more children.

Poverty:

Poverty is another factor which is mostly responsible for the rapid growth of population. India houses are the museum of poverty. According to 2001 census, nearly 37 per cent of people live below the poverty line. Small children in poor families are put to work and this helps to increase the family income. Children in poor families are considered as assets.

Illiteracy, ignorance and superstitions:

A majority of population in our country are illiterates. When illiteracy is combined with poverty it leads to firm belief a superstition. Children are considered as the gifts of God. They know nothing about the birth control measures. All those account of a higher birth rate in India's population.

Attitude towards male child:

Every Indians wants to have a male child. A male child is considered as an asset for the poor, a dowry earner for the greedy, and liberator for the God fearing, a life insurance for the middle man and a matter of pride for the mother.

II. Low Death Rate: (Mortality rate why low in India):

Death rate refers to the number of death taking place in thousand people. According to the 1991 census, the death rate was 10 per thousand. It decreased to 8.5 per thousand in 2001. Following are the causes responsible for the low death rate in India.

Control of epidemic and other deadly disease:

Epidemic like cholera, smallpox, plague, malaria etc. which too away lakhs of lives has been successfully controlled an even completely eliminated. The number of people dying in diseases has fallen.

Development of medical science:

Due to the development of medical science and invention of life saving drugs the death rate has sharply declined. Spread of health care facilities and hospitals in rural areas has created consciousness among the people about their health. The drinking water facilities food and other sanitation measure has helped to people to escape from death. This reduces the death rate to a marked extent in India.

Decline of infant mortality rate :

The infant mortality rate has declined due to mass immunization programmes and proper medical treatment to the children. In 1994, the infant mortality rate was 74 per thousand which declined to 70 per thousand in 2006.

hen infant mortality rate decreases death rate also increases leading to heavy population growth.

III. Migration:

Migration is another important point which is responsible for the higher growth rate of population. It is seen that large number of people migrate from foreign counties to India and permanently stay here. Although this factor is not very crucial yet has increased the population of our country. These are the most important factors responsible for the population explosion in our county.

Lack of Entertainment Facilities:

It has been observed that people especially in the rural areas, have been forced to find entertainment in the sex-play in the absence of proper entertainment facilities. This has further aggravated the problem.

Peaceful Conditions:

For nearly a century [1860-1960] India enjoyed comparative peace without involving herself in major inter-conflicts or wars especially after the establishment of British rule. Peaceful conditions provided an impetus for over-population.

Consequences of Overpopulation:

Over population leads to number of not only national but also individuals family problems. Some of them are described below.

1. Problem of Investment Requirement:

Indian population is growing at a rate of 1.8 percent per annum. In order to achieve a given rate of increase in per capita income, larger investment is needed. This adversely affects the growth rate of the economy. In India, annual growth rate of population is 1.8 percent and capital output ratio is 4:1. It means that in order to stabilize the existing economic growth rate (4 X 1.8) = 7.2 percent of national income must be invested.

2. Problem of Capital Formation:

Composition of population in India hampers the increase in capital formation. High birth rate and low expectancy of life means large number of

dependents in the total population. In India 35 percent of population is composed of persons less than 14 years of age. Most of these people depend on others for subsistence. They are unproductive consumers. The burden of dependents reduces the capacity of the people to save. So the rate of capital formation falls.

3. Effect on per Capita Income:

Large size of population in India and its rapid rate of growth results into low per capita availability of capital. From 1950-51 to 1980-81. India's national income grew at an average annual rate of 3.6 percent per annum. But per capita income had risen around one percent. It is due the fact that population growth has increased by 2.5 percent.

4. Effect on Food Problem:

Rapid rate of growth of population has been the root cause of food problem.

Shortage of food grains hampers economic development in two ways:

(a) People do not get sufficient quantity of food due low availability of food which affects their health and productivity. Low productivity causes low per capita income and thus poverty.

(b) Shortage of food-grains obliges the under-developed countries to import food grains from abroad. So a large part of foreign exchange is spent on it. So development work suffers. So rise in population causes food problem.

5. Problem of Unemployment:

Large size of population results in large army of labour force. But due to shortage of capital resources it becomes difficult to provide gainful employment to the entire working population. Disguised unemployment in rural areas and open unemployment in urban areas are the normal features of an under developed country like India.

6. Low Standard of Living:

Rapid growth of population accounts for low standard of living in India. Even the bare necessities of life are not available adequately. According to Dr. Chander Shekhar population in India increases by about 1.60 crore. It requires 121 lakh tonnes of food grains, 1.9 lakh metres of cloth and 2.6 lakh houses and 52 lakh additional jobs.

7. Poverty:

Rising population increases poverty in India. People have to spend a large portion of their resources for bringing up of their wards. It results into less saving and low rate of capital formation. Hence improvement in production technique becomes impossible. It means low productivity of labour.

8. Burden of Unproductive Consumers:

In India, a large number of children are dependent. Old persons above the age of 60 and many more in the age group of 15-59 do not find employment. In 2001, working population was 39.2 percent while 60.8 percent are unproductive workers. This high degree of dependency is due to high rate of dependent children. This dependency adversely affects effective saving.

9. Population and Social Problems:

Population explosion gives rise to a number of social problems. It leads to migration of people from rural areas to the urban areas causing the growth of slum areas. People live in most unhygienic and insanitary conditions.

Unemployment and poverty lead to frustration and anger among the educated youth. This leads to robbery, beggary, prostitution and murder etc. The terrorist activities that we find today in various parts of the country are the reflection of frustration among educated unemployed youth. Overcrowding, traffic congestions, frequent accidents and pollution in big cities are the direct result of over-population.

10. More Pressure on Land:

Rising rate of population growth exerts pressure on land. On the one hand, per capita availability of land goes on diminishing and on the other, the

problem of sub-division and fragmentation of holdings goes on increasing. It adversely affects the economic development of the country.

11. Impact on Maternity Welfare:

In India, population explosion is the result of high birth rate. High birth rate reduces health and welfare of women. Frequent pregnancy without having a gap is hazardous to the health of the mother and the child. This leads to high death rate among women in the reproductive age due to early marriage. Hence to improve the welfare and status of women in our society, we have to reduce the birth rate.

12. Pressure on Environment:

Population explosion leads to environmental degradation. Higher birth rate brings more pollution, more toxic wastes and damage to biosphere. Briefly speaking, population explosion hinders the economic development. It should be controlled effectively.

Methods to Control Overpopulation

The important methods to control overpopulation are:

1. Education
2. Age of marriage should be raised and
3. Family planning methods

1. Education:

People, particularly those in reproductive age group, should be educated about the advantages of a small family and ill-effects of large families and overpopulation. In this, mass media like radio, television, newspapers, magazines, posters etc. and educational institutions can play important role.

Government should provide free and compulsory primary education to the children below the age of 14 years. In China, there is a legislation making “basic primary education free, compulsory and universal.”

2. **Age of marriage should be raised:**

Demographers explain that postponement of female marriage age from 18 years to 20 or 22 years would bring down the birth rate by 20 to 30 per cent. Even a year's postponement in each age group will decrease total fertility rate much less than the present 2.68 per cent for the country. But according to an ICMR report, about 49 per cent women in India are married before the legal age of 18 years.

3. **Family planning methods:**

India was the first country to adopt family planning (in 1951) as the government sponsored programme. But after the efforts of Indian government for about 50 years, birth rate in India has come down only slightly (only from 41.7 in 1951 to 28.3 in 1997 per 1,000 per year). This showed that voluntary family planning programme was not very successful.

In 1976, Indian government thought of introducing a programme of compulsory sterilization which required one parent to undergo sterilization after a couple had produced two children. But due to public resistance, this programme was again changed to voluntary programme.

Process of Population Change

Population change occurs through three major processes: birth rates, death rates, and migration. The difference between birth and mortality rates represents natural population growth.

(a) ***Birth rate***: The difference between birth and death rates represents the population's natural increase. The birth rate is the number of live births per thousand people each year. Birth rates have historically been higher than death rates, making it a significant component of population growth change in India.

(b) ***Death rate***: This is the number of deaths per thousand people each year. The dramatic drop in death rates is the primary reason of India's population expansion. Prior to 1980, there was a significant disparity between birth and mortality rates, resulting in faster population expansion. Since 1981, birth rates have steadily decreased, slowing population expansion.

(c) ***Migration***: The third component of population growth is migration, which refers to the movement of people between regions and territories. It might be internal (inside a country) or international (between countries). Migration has a substantial impact on the composition and dispersion of populations.

(d) ***Internal migration***: It has little effect on population number, but it does impact population distribution within a nation. Migration has a tremendous impact on modifying the composition and distribution of population.

In India, the majority of migrations occur from rural to urban regions due to the "push" effect. Rural poverty and unemployment, as well as the "pull" of cities for better living circumstances and work prospects attract the rural people to migrate nearby cities. Migration is a significant factor influencing population change. This affects both the number and character of urban and rural populations, including age and gender distribution. India's rural-urban migration has led to a constant growth in the proportion of the population living in cities and towns. The urban population grew from 17.29% in 1951 to 31.80% in 2011. Between 2001 and 2011, the number of ‘million plus cities' grew from 35 to 53. In 2023, India had more than 59 million cities.

Check Your Progress

1. Which period was considered as stagnant growth of population in India?
    a. 1901-1921
    b. 1921-1951
    c. 1951-1981
    d. 1981-2011
2. Which census year was called as ‘Great Divide’ in India?
    a. 1901
    b. 1921
    c. 1931
    d. 1951
3. Which period was considered as period of high growth with definite signs of slowing down of population in India?
    a. 1901-1921
    b. 1921-1951

c. 1951-1981
d. 1981-2011

4. What was the actual rate of population growth in India as per 2011 census?
   a. 1.64 per cent
   b. 1.84 per cent
   c. 2.04 per cent
   d. 2.54 per cent
5. Narrate the historical background of population growth in India based on 1901-2011 censuses.
6. Discuss the causes of over population growth in India.
7. Analyze the consequences of over population growth in India.
8. Suggest the effective measures to control over population in India.
9. Describe the process of population change in India.

Population Composition

Demographers examine the statistical makeup and features of a population, which is referred to as population composition. To learn more about the demographics, they investigate several aspects of the population composition. A population's composition is important to understand in a number of ways. Governments use this data to evaluate population distribution according to certain criteria such as age, sex, education, language, religion, and other socioeconomic status.

a. Age Composition

The age composition of a population refers to the distribution of individuals based on age group. The proportion of the population that is classed as kid, working-age, or old has a substantial impact on the population's social and economic structure.

There are three broad categories for classifying the population: Children (under the age of fifteen): They're economically inactive.

They are the working-age population (15-60 years old). This age group is particularly significant for the social, economic, and political advancement of a

country.

Aged (more than 60 years): They may labor on a voluntary basis, but are not available for recruitment.

Children and the elderly have an impact on the reliance ratio because they do not create.

Age Composition in India

India is the second most populous country in terms of proportion of young people. Over the past 60 years, India's population has increased slowly, unaffected by major disasters such as wars, plague, famine, or international migration. Consequently, its age structure has no aberrations. In 2011, 37% of India's population was under 15 years old, while only 6.8% were over 60. Despite a youth bulge, India's senior population is growing faster than any other age group, while the 0-14 age group has suffered negative growth in the last two censuses.

Table Distribution of total population of India by age

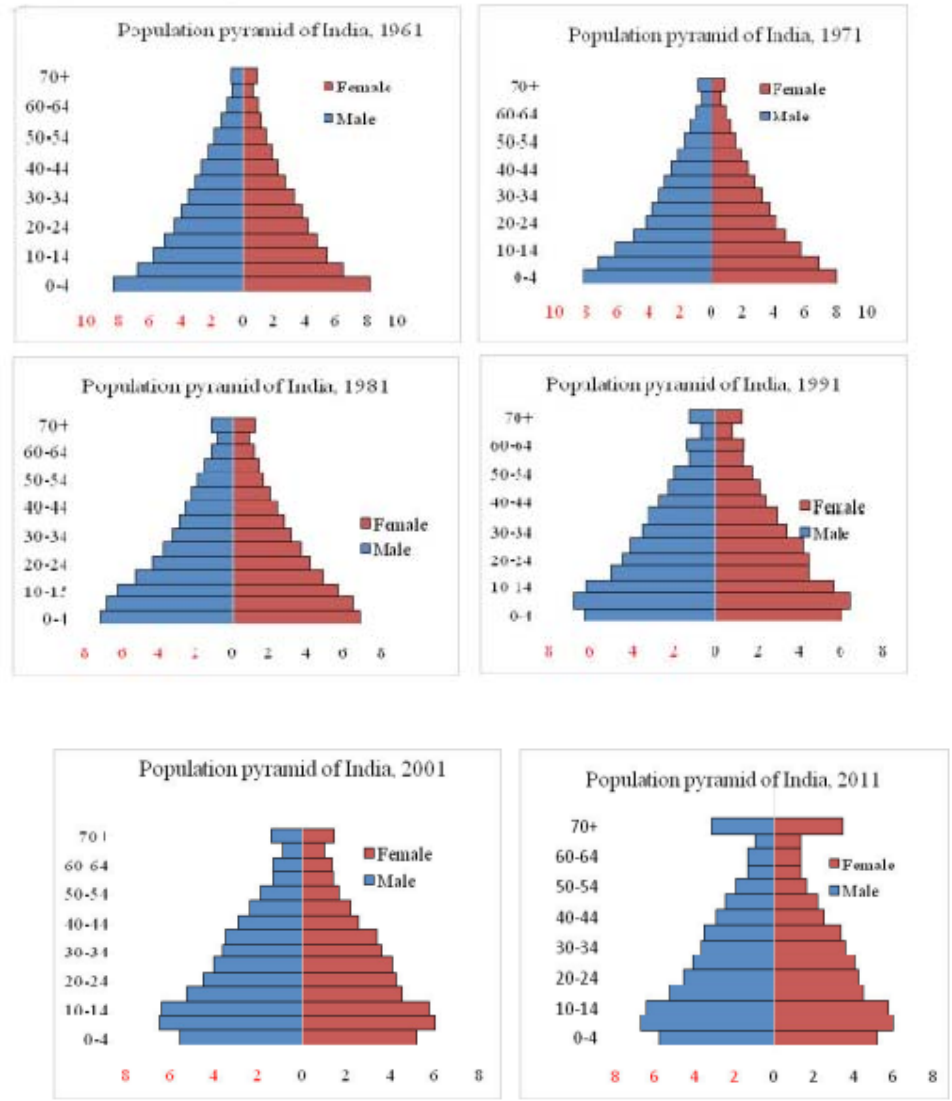
Age group	Census 1991	Census 2001	Census 2011	% Changes (1991-2001)	% Changes (2001-2011)
Total Population	838.6	1028.6	1210	22.66	17.64
0-14	312.4 (37.2)	363.5 (35.34)	372.4 (30.78)	16.36	2.45
15-59	464.8 (55.42)	585.6 (56.9)	730.1 (60.34)	25.99	24.68
60+	56.7 (6.76)	76.6 (7.45)	103.8 (8.58)	35.10	35.51
Index of ageing	18.15	21.07	27.87	16.11	32.27
Age not stated	4.7 (0.56)	2.7 (0.26)	4.5 (0.37)	-42.55	66.67

Source: Compiled from Census of India of different years. Population in Million. Figures in the parenthesis are proportions to Total

The ageing index is defined as the ratio of people above the age of 60 to those under the age of 14. The ageing index reflects the trends and patterns in the dependent population over time. Japan has the world's highest ageing index, followed by Germany and Sweden, while Mexico and Zambia have the lowest ageing index. In India, the index of ageing was 18.15 percent in 1991, 21.07 percent in 2001, and 27.87 percent in 2011.

After independence, India saw a broad base of high birth rates and a tapering peak with poor life expectancy at birth. The shape of the pyramid changes along with each census. With increased longevity and less fertility, the base began to taper while the top became broader. As the population of young children decreases, the proportion of working-age individuals grows, resulting in a 'youth bulge'. These countries' governments will be able to put them to good use economically. A government that fails to capitalize on demographic dividends may face youth unemployment and unrest.

Fig. Changing Age Structure of India, 1961-2011



b. Sex Composition

The ratio of males to females in a population is called the sex composition, or sex ratio. The number of females per 1000 males is a common way to express it. In demographics, knowing the sex composition is essential since it provides information about social and economic trends and is utilized for a variety of planning and analysis purposes.

Importance of Studying Sex Composition

Demographic Analysis: Analyzing the distribution of sexes help in determining patterns in migration, death, and fertility as well as population structure.

Social Justice: The number of females per 1000 males is known as the sex ratio, and it can be used to identify potential inequalities and gender differences in a culture.

Allocation of Resources: Decisions about the distribution of resources, including infrastructure development, healthcare services, and educational facilities, can be influenced by knowledge of sex composition.

Policy and Planning: Data on sex composition is essential for planning and policy formation in a number of fields, such as social services, healthcare, and education.

Projection of Population: Population predictions, which are used to foresee future requirements and issues, heavily depend on the sex composition of the population.

Health and Welfare: Examining sex composition can assist in determining health inequalities and addressing particular gender-related issues.

Education and Gender Equality: By knowing the sex distribution of students, educational activities and resources can be better adapted to meet the requirements of different genders.

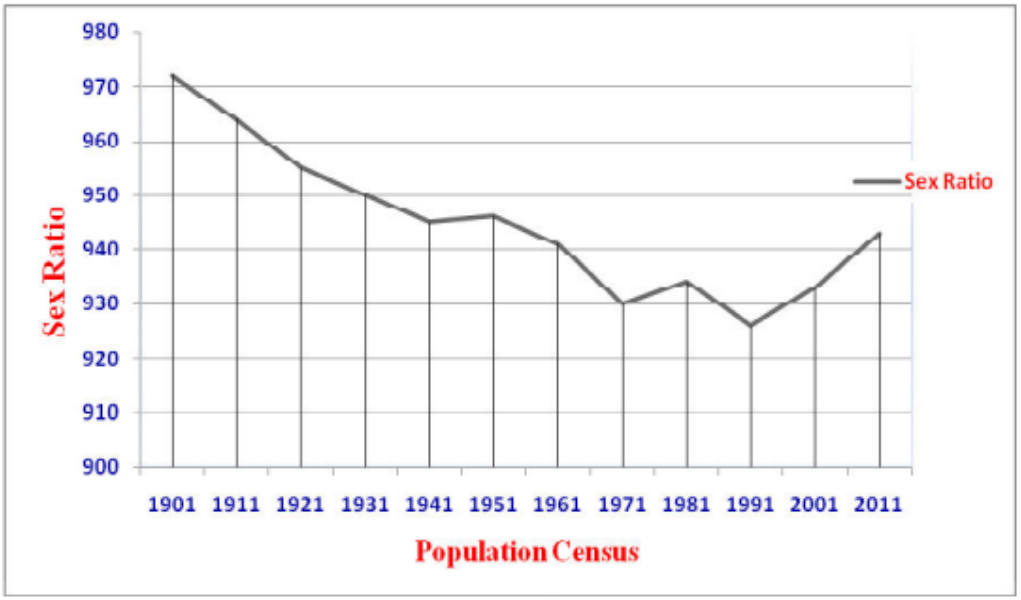
Sex Ratio in India

India has a female shortage for almost a century, in contrast to other developed nations. The sex ratio since 1901 is shown here. Up until the most recent census in 2011, India's sex ratio remained significantly lower than the 972 recorded in 1901. Even more concerning is the fact that the sex ratio decreased nearly continuously following independence until 1971. The lowest sex ratio, 926, was observed in 1991. There has been some improvement in the sex ratio since 1991. We must examine the kid sex ratio and the senior sex ratio independently in order to comprehend the gender dynamics in the total sex ratio. This will make it easier for us to comprehend how susceptible the female population is to discrimination.

Table Trends in Sex Ratio in India

Year	Overall Sex Ratio	Child Sex Ratio (0-6 years)	Elderly Sex Ratio
1961	941	976	992
1971	930	964	946
1981	934	962	964
1991	926	945	931
2001	933	927	1029
2011	943	918	1033

Figure Trends in sex ratio, India



Reasons for Low Sex Ratio in India

1. Son Preference:

   Social and Cultural Norms: In certain regions of India, there is a general desire for sons, motivated by ideas about inheritance, ancestry, and the perceived social and economic worth of boys.

   Economic Factors: In many societies, females are perceived as a financial burden because of dowry expectations, whereas sons are seen as providers and a source of security for parents in old age.

2. Sex-Selective Abortion and Female Feticide:

   Access to Technology: Since the availability of ultrasound technology has made it simpler to identify the sex of the fetus then sex-selective abortions are performed in some places.

   Problems with Enforcement: Despite the existence of legislation such as the Pre-Conception and Pre-Natal Diagnostic Techniques (Prohibition of Sex Selection) Act, the practice still continues in remote areas.

3. Neglect of Female Children:

Health and nourishment: Compared to boys, girls frequently receive less care, attention, and nourishment, which raise their mortality rates.

Education: Girls are less likely to go to school and get an education, which will limit their options in the future and prolong cycles of inequality and poverty.

4. Dowry System:

Economic Cost: A major financial hardship, especially for low-income households, is the dowry system, in which the bride's family is required to pay the groom's family presents or cash.

Preference for Sons: In order to escape the potential social shame attached to having daughters as well as the financial strain of a dowry, families frequently choose to have sons.

5. Poverty and Lack of Education:

Women's Status: The factors like poverty and lack of education restrict women's options and lower their social standing, which supports the preference for boys.

Limited Agency: Women frequently lack the ability to make decisions regarding their own reproductive health, which leads to female infanticide and sex-selective abortion.

Consequences of Low Sex Ratio in India

Increased Discrimination and Violence: Research indicates that asymmetrical sex ratios are associated with increased incidences of violence against women, such as domestic abuse, dowry-related violence, and even bride kidnapping.

Son Preference and Female Neglect: The desire for sons can result in sex-selective abortions, female infanticide, and neglect of female offspring, all of which have a negative impact on health and survival rates.

Difficult in Ensuring Girls' Safety: It can be challenging to ensure the safety of girls when there are fewer of them, particularly in places where there are severe sex ratio imbalances.

Marriage Squeeze and Trafficking: When men are having difficulty finding spouses due to a lack of women, it might result in a "marriage squeeze," which may increase the number of women who are trafficked and exploited.

Decreased Economic and Social Participation: As the number of women in the workforce declines, this can have an effect on economic growth and impede ad vancement across a range of industries.

Men's Ability to Work: Men may suffer from heightened competition for partners as a result of a skewed sex ratio, which can cause stress and make it harder for them to locate compatible companions.

Increased Violence and Conflict: According to some experts, severe sex ratio disparities may be a factor in both domestic and global conflict.

Addressing the Issue

Campaigns for Education and Awareness: Changing cultural perceptions can be facilitated by advocating equal gender rights and increasing knowledge of the negative effects of son preference.

Law enforcement: It is essential that rules against female infanticide and sex-selective abortion be strictly enforced.

Empowering Women: Giving women access to healthcare, education, and economic opportunities can help them become less vulnerable and elevate their standing in society.

Increasing Social Safety Nets' Stability: It is crucial to guarantee that every child irrespective of gender, has access to healthcare and basic necessities.

c. Literacy Composition

The term "literacy composition" describes the capacity to produce creative, thoughtfully structured written works, such as stories, poems, essays, or novels. It is the process of expressing ideas and thoughts in a meaningful and cogent way through language. A critical ability for success in both the personal and professional spheres is literacy composition.

Meaning of Literacy: It is the capacity to read and write and which is essential for both societal and personal advancement. It gives people the ability to study, access information, and take advantage of a wide range of opportunities, from work and education to civic involvement and personal development.

Significance of Literacy:

i. Personal Advantages:

a. **Access to Knowledge and Information**: Being literate promotes learning and personal growth by allowing people to obtain information from books, newspapers, internet sources, and other written items.
b. **Better Educational and Career Opportunities**: Academic achievement and career preparation depend on having strong literacy abilities. For career growth, workplace communication, and job applications, literacy is an essential ability.
c. **Health and Well-Being**: People who are literate are better able to comprehend and use health information, which improves their ability to make decisions regarding their health and wellbeing.
d. **Personal Empowerment**: Being literate enables people to express themselves, communicate clearly, and engage more completely in their communities.

ii. Societal Advantages:

a. **Economic Development:** A literate population contributes to a stronger economy by fostering innovation, entrepreneurship, and a skilled workforce.
b. **Social Progress and Equity:** Literacy helps reduce inequalities based on gender, race, or social status by providing access to opportunities and resources.
c. **Democracy and Civic Engagement:** Literacy enables citizens to participate more actively in democratic processes, understand complex issues, and hold their leaders accountable.
d. **Sustainable Development:** Literacy promotes understanding of environmental issues and empowers individuals to contribute to sustainable practices.

Literary Composition: It is the creation of creative written works, including stories, poetry, essays, and novels. It involves the capacity to organize thoughts, articulate them creatively, and deliver them in an interesting and relevant manner.

Literacy Rate: The percentage of people who are seven years of age or older and who can read and write in any language with understanding is known as the literacy rate.

Literacy Rate in India

Literacy Rates in Post Independent India

Year	Rural			Urban			Combined		
	Female	Male	Total	Female	Male	Total	Female	Male	Total
1951	4.87	19.02	12.1	22.33	45.6	34.59	8.86	27.15	18.32
1961	10.1	34.3	22.5	40.5	66	54.4	15.35	40.4	28.31
1971	15.5	48.6	27.9	48.8	69.8	60.2	21.97	45.96	34.45
1981	21.7	49.6	36	56.3	76.7	67.2	29.76	56.38	43.57
1991	30.17	56.96	36	64.05	81.09	67.2	39.29	64.13	52.21
2001	46.7	71.4	59.4	73.2	86.7	80.3	53.67	75.26	64.83
2011	58.75	78.57	67.8	79.92	89.67	84.1	65.46	82.14	74.04
% Increase in 2011 over 2001	**26%**	**10%**	**14%**	**9%**	**3%**	**5%**	**22%**	**9%**	**14%**

Source: Census of India, Office of Registrar General, India.

For 1951, the population male , female and persons refers to effective literacy rates and the break up of Rural, Urban and male- female components are crude literacy rates.

Notes: 1. Literacy rates for 1951, 1961 and 1971 relate to population aged 5 years and above whereas literacy rates for 1981, 1991, 2001 and 2011 relate to the population aged 7 years and above.

2. The 1981 literacy rates exclude Assam where the 1981 Census could not be conducted.

3. The 1991 literacy rates exclude Jammu & Kashmir where the 1991 Census could not be conducted due to disturbed conditions.

4. The 2001 and 2011 literacy rates exclude Mao Maram, Paomata and Purul Sub-divisions of Senapat district of Manipur.

When British rule ended in India in 1947, the literacy rate stood at 12%. India's social, economic, and global landscape has evolved over time. Following the 2011 census, India's literacy rate was reported to be 74.04%. In comparison to the adult literacy rate, the youth literacy rate is around 9% higher. The country's literacy rate has increased, according to the 2011 census findings. The country's literacy rate is 74.04 percent, with a male literacy rate of 82.14 and a female literacy rate of 65.46. Kerala maintained its lead with a literacy rate of 93.91 percent, closely followed by Mizoram (91.58 percent) and Lakshadweep (92.28 percent). Bihar is the least literate state in the nation with a literacy rate of 63.82 per cent, followed by Arunachal Pradesh (66.95 percent) and Rajasthan (67.06 percent). Though this appears to be a significant success, the fact that so many people in India are still unable to read and write is cause for concern. The number of children who do not receive an education, particularly in rural areas, remains significant. Despite the government has passed legislation requiring all children under the age of 14 to get free education, the problem of illiteracy remains widespread.

The female literacy rate in India is lower than the male literacy rate because many parents do not allow their female children to attend school. They get married at an early age instead. Though child marriage has been reduced to a very low level, it still occurs. Many families, particularly in rural regions, believe that having a male kid is preferable to having a baby girl. So the male child reaps all the benefits. According to the Literacy Rate 2011 census, female literacy levels are currently 65.46%, whereas male literacy rates exceed 80%. The literacy rate in India has long been a source of concern.

d. Occupational Composition

The distribution of workers across different industries and occupations within an economy is referred to as occupational composition, or occupational structure. It sheds light on the distribution of work in a community and the general economic activity that takes place. This idea is essential for comprehending workforce trends, skill requirements, and labor market dynamics—all of which are critical for economic planning and policymaking.

The distribution of a country's working population across various occupational sectors is known as its occupational composition. It shows how many people are employed in the primary, secondary, and tertiary sectors.

(1) Primary sector: It has to do with things like land, soil, and climate. It is directly related to nature such as farming, fishing, dairying, and forestry. These employees are referred to as red-collar workers. Compared to established nations like Canada, the employment proportion of this industry is higher in developing nations like Bangladesh, Pakistan, India, and others.

(2) Secondary sector: These include manufacturing, processing, and production. This is a characteristic of industrial activity. These employees are referred to as blue-collar laborers.

(3) Tertiary sector: These comprise a range of services, including health, education, transportation, and communication. The primary and secondary sectors are connected by this sector. These employees are referred to as pink-collar workers.

Sector Wise Workforce (%) in India

Census Year	Primary	Secondary	Tertiary
1951	72.1	10.6	17.3
1961	71.8	12.2	16.0
1971	72.1	11.2	16.0
1981	68.8	13.5	17.7
1991	66.8	12.7	20.5
2001	56.7	17.5	25.8
2011	47.4	24.8	28.8

Source: Census of India

Examining occupational composition is vital because it provides vital information about the workforce, economy, and socioeconomic circumstances of a certain area. Addressing labor market issues, advancing economic development, and guaranteeing inclusive growth are all made easier with an understanding of how individuals are employed across various sectors and industries.

Importance of Studying Occupational Composition

Labor Market Insights: Researching occupational structure yields data on workforce makeup, skill requirements, and employment trends. This aids companies and

policymakers in determining which industries require investment, skill development, or retraining.

Economic Development: Examining occupational structure provides insight into the composition and evolution of a region's economy. This can assist in pinpointing opportunities for infrastructural and educational investment, job development, and economic diversification.

Social and Demographic Understanding: Patterns pertaining to gender, age, race, and social class can be found in occupational structure, offering information on inequality and possible areas for social programs and policies.

Classification of Occupational Structure:

The population can be divided into two major groups based on economic characteristics: Workers or Active Population, Non-workers or Non-active population.

Active Population: People who are economically active are considered to be part of the active population. It speaks of the percentage of the population that is economically active. It also describes the proportion of the population that is able to work. It is the workforce made up of only those individuals who are capable of engaging in activities that yield financial advantage.

Active Population: The term "active population" refers to both employed and jobless people, as unemployed people may be able to perform or earn money. Employees' job time is crucial in classifying them. Based on work length in a year, the active population can be categorized into two sub-classes:

➢ Main workers are those who engage in economic activity for more than six months of the year.

➢ Marginal workers are those who work for lesser than six months of the year.

Census Year	2001	2011
Main Workers	77.8	22.8

Marginal Workers	75.2	24.8

Source: Census of India

Non-active Population: Individuals who cannot engage in any economic activity. It refers to the proportion of the entire populations who are not involved in earning an income and are mostly dependent on others for survival. These people are referred to as the Dependent population, or Gray population. This class primarily includes people aged 0 to 15 and over 60. The age may differ from one country to another. It is measured using the dependence ratio. There are two sorts of dependency ratios. 1) Young Dependency Ratio: the fraction of the dependent population aged between 0 and 15. The nation's sociocultural and economic backwardness is indicated by the higher percentage of young people who are dependent on others. 2) Old Dependency Ratio: This is the percentage of the population that is 60 years of age or older. greater life expectancy, better healthcare, supportive government policies for the elderly, and other factors are all indicated by a greater old-age dependence ratio.

Workers Participation Rate in Selected States in India

States/UT	1991	2001	2011
Himachal Pradesh	42.8	49.2	51.9
Sikkim	41.5	48.6	50.5
Nagaland	42.7	42.6	49.2
Assam	36.1	35.8	38.4
West Bengal	32.2	36.8	38.4
Tamil Nadu	43.3	44.7	45.6
Bihar	30.1	33.7	33.6
Utter Pradesh	31.8	32.5	32.9
Lakshadweep	26.4	25.3	29.1

Source: Census of India

The distribution of work participation rates in a few chosen Indian states is displayed in the above table. According to the data, India's highest work-face rate in 2001 and 2011 was 51.85% in Himachal Pradesh. The workforce rates in India are greater in states like Sikkim, Nagaland, Assam, and Tamil Nadu. On the other hand, records

show lower workforce rates in Bihar, Uttar Pradesh, and Lakshadweep. The provided data also shows that, since 1991, the workforce rate has been rising in the majority of states.

e. Religious Composition

The term "religious composition" describes the distribution of various religious groups within a certain region or civilization by breaking down the people according to their affiliations. It draws attention to the variety of religious practices and beliefs found within a certain population, be it a country, a region, or even a smaller community.

Importance of Studying Religious Composition

Understanding Religious Diversity: By indicating whether one religion predominates or whether different religious groups are represented in sizable numbers, religious composition aids in our understanding of the degree of religious diversity in a community.

Examining Social and Cultural Dynamics: A society's social and cultural dynamics, such as possible conflicts or areas of collaboration between various religious communities, can be inferred from the distribution of religious groupings.

Monitoring community Changes: Information on religious composition can be used to monitor how religious affiliations have changed over time, showing how various religious groupings are expanding or contracting within a community.

Contextual Analysis: Knowing the background of religious composition is essential. The religious makeup of a district, for instance, may be very different from the national average, highlighting the need of examining religious diversity in a specific setting.

Religious Composition in India

Religion in India is marked by a wide range of religious beliefs and practices. Religion has always been an important part of Indian culture, and the Indian subcontinent is the birthplace of four of the world's major religions: Buddhism, Hinduism, Jainism, and Sikhism, which are collectively known as native Indian

religions or Dharmic religions and account for approximately 83% of India's total population.

India has the highest number of followers of Hinduism, Sikhism, Zoroastrianism, Jainism, and the Bahá'í Faith worldwide. It also has the third largest Muslim population, after only Indonesia and Pakistan, as well as the ninth largest Buddhist population.

According to the 2011 census, Hindus make up 79.8% (966.3 million) of the population, whereas Sikhs make up 20.8 million (1.72%), Muslims 14.23% (172.2 million), and Christians 2.30% (28.7 million). According to the 2011 census, India has 57,264 Parsis. The "No religion" category was added for the first time in the 2011 census, with 2.87 million persons classed as belonging to "No religion" in India, accounting for 0.24% of the country's population of 1.21 billion.

India is home to several religions, including Hinduism, Islam, Christianity, Buddhism, Sikhism, and Jainism, as well as several indigenous faiths and tribal religions that have coexisted with major religions for hundreds of years. According to the 2011 census, India's total number of households is 248.8 million. There are 202.4 million Hindus, 31.2 million Muslims, 6.3 million Christians, 4.1 million Sikhs, and 1.9 million Jains. According to the 2011 census, there are around 3.01 million places of worship in India.

Religious Composition of Indian Population from 1881 to 2011

Census	Hindus	Muslims	Christians	Sikhs	Buddhists	Jains	Other Religions
1881*	75.1	19.97	0.71	0.74	0.07	0.49	2.92
1891*	74.2	20.41	0.77	0.68	0.09	0.51	3.34
1901*	72.9	21.88	0.98	0.77	0.1	0.47	2.9
1911*	71.7	22.39	1.21	1	0.11	0.41	3.18
1921*	70.7	23.23	1.47	1.06	0.12	0.39	3.03
1931*	70.7	23.49	1.77	1.28	0.23	0.37	2.16
1941*	69.5	24.28	1.91	1.4	0.12	0.37	2.42
1951*	**84.99**	**9.93**	**2.3**	**1.74**	**0.45**	**0.36**	**0.23**
1961**	83.4	10.7	2.4	1.8	0.7	0.5	0.3
1971**	82.7	11.2	2.6	1.9	0.7	0.5	0.4
1981**	82.3	11.8	2.4	1.9	0.7	0.5	0.4
1991**	81.5	12.6	2.3	1.9	0.8	0.4	0.4
2001**	80.5	13.4	2.3	1.9	0.8	0.4	0.6
2011***	79.8	14.2	2.3	1.7	0.7	0.4	0.9

Source: Census of India, 2011

f. Rural Urban Composition

Rural-urban composition refers to how a population is divided into rural and urban areas, as well as the characteristics associated with each, such as occupation and level of development. Rural areas, which are defined by primary activities such as agriculture, tend to have lower levels of development than metropolitan areas, which have a more diverse economic environment.

Concept of Urban areas in India

In India, "urban areas" are often divided into two categories: Statutory Towns and Census Towns. Statutory towns are those designated by state governments as having local bodies such as municipalities or corporations. Census Towns, on the other hand, are regions with specified demographic characteristics (population size, density, and share of non-agricultural workers).

Statutory towns are those that have been officially designated as such by the government via legislation. They usually have local governing entities, such as municipal corporations, municipalities, or notified area committees.

Census towns are urban regions that fulfill the following criteria:

a. A population of at least 5,000.

b. At least 75% of the male working population was involved in non-agricultural activities.
c. A population density of at least 400 people per square kilometer.

Concept of Rural area in India

The "rural area" refers to any place that fits the following characteristics,

a. The population is fewer than 5,000,
b. The population density is less than 400 per square kilometer,
c. More than "25 percent of the male working population" is involved in agricultural pursuits.

Importance of Studying Rural Urban Composition

Understanding India's diversity: The Indian population is diverse, and there are notable distinctions between rural and urban areas with regard to their social circumstances, cultural customs, and means of subsistence needs to be understood by studying this composition.

Regarding policymaking: Understanding the distribution of rural and urban areas enables policymakers to better adapt economic initiatives, social programs, and infrastructure investments to the unique requirements of various geographic areas and demographic groupings.

Development strategies are to be informed: The rural-urban composition, which sheds light on issues including the necessity for infrastructure in rural areas, the effects of urbanization on livelihoods, and the possibility of balanced development in rural and urban areas.

Analyzing migration trends: The rural-urban composition aids in understanding the causes of migration, including pull factors such as better living conditions and employment possibilities in urban regions and push factors such as poverty and lack of opportunity in rural areas.

Encouraging inclusive growth: Policymakers can encourage more equitable and inclusive development by having a better grasp of the various demands and circumstances of various rural and urban populations.

Research and planning: Rural-urban composition offers a starting point for studies and plans pertaining to a range of facets of Indian society, such as economic development, education, and health.

Tracking urban growth and its effects: Researching urban growth and its effects on rural regions aids in comprehending the opportunities and problems brought about by urbanization, such as the necessity of sustainable urban development and the possibility of urban-rural connections.

Recognizing the significance of agriculture: In a nation where a sizable portion of the population works in agriculture, the data of rural-urban composition offers valuable perspectives on the opportunities and problems related to rural lives and agricultural growth.

Trends of Urbanization in India

India, a developing country, is rapidly urbanizing. However, our country now has the lowest amount of urbanization when compared to other developing countries. The total urban population is large. By the turn of the 2000, approximately 300 million Indians lived in 3700 urban areas across the country. This constituted approximately 30% of the total population, in stark contrast to the 60 million (15%) who resided in metropolitan areas in 1947, the year of our independence. According to the 2011 Census of India, India's overall population was 1.21 billion, with 833.46 million (or approximately 69%) living in rural regions and 377.1 million (31% of the total) living in urban areas. According to the 2011 Census of India, India's urban population stands at 377 million, accounting for around 31% of the total population of 1,210 million. In comparison to 2001, its share of the entire population has increased by around 4 percentage points. The urban population in 2001 was 286 million, accounting for approximately 28% of the overall population of the country.

Trends of Urbanization in India (1951 – 2011)

Census Year	No. of Towns	Urban Population (in Million)	Urban percentage Population
1951	2,843	62.44	17.3
1961	2,365	78.94	18.0
1971	2,590	109.11	19.9
1981	3,378	159.46	23.3
1991	3,768	217.55	25.7
2001	4,368	285.35	27.8
2011	7,935	**377.10**	31.2

Source: Census of India, 2011

Half of India's urban population lives in just five states. The five states are: Maharashtra, Uttar Pradesh, Tamil Nadu, West Bengal, and Andhra Pradesh. Gujarat, Karnataka, Madhya Pradesh, Bihar, Rajasthan, and the Union Territory of Delhi account for around 32 percent of the country's urban population. The remaining urban population (approximately 18%) is dispersed among the remaining states and Union Territories.

According to the 2011 census, 53 cities each have a population of above 1000000 people. They are referred to as metropolitan, or million-plus, cities. These 53 metropolitan cities account for 37.8% of the total population. This rapid rise of metropolitan centers will cause a number of issues, including the availability of housing, energy, water, schools, dispensaries, ration shops, and so on.

Percentage of Rural-Urban Population in India (1901 -2011)

Census year	Percentage of total Population	
	Rural	Urban
1901	89.2	10.8
1911	89.7	10.3
1921	88.8	11.2
1931	88.0	12.0
1941	86.1	13.9
1951	82.7	17.3
1961	82.0	18.0
1971	80.1	19.9
1981	76.7	23.3
1991	74.3	25.7
2001	72.2	27.8
2011	68.8	31.2

Source Census of India, 2011I

In India, about 70% of the population lives in villages, and the total population growth rate has decreased for the first time since independence in 1947. According to the 2011 census, India has a population of 121 crore, with 83.3 crore living in rural areas and 37.7 crore in urban areas. This is the first time since independence that urban regions have experienced a greater absolute population rise than rural areas. According to the Registrar General of India, the population distribution is 68.8% rural and 31.2% urban.

Check your Progress

1. What is meant by population composition? Explain the importance of studying population composition.
2. What was the child sex ratio (0-6 years) in India in 2011 census?
   a. 904

b. 914
c. 924
d. 934

3. Which age group constitutes the majority of India's population as per 2011 census?
   a. 0-14 years
   b. 15-59 years
   c. 60 years and above
   d. 20-60 years
4. As per 2011 census, the number of women per 1000 men in India.
   a. 932
   b. 940
   c. 950
   d. 965
5. What is the literacy rate of India as per 2011 census?
   a. 71.04
   b. 72.04
   c. 74.04
   d. 77.04
6. Which is the most populous city in India according to 2011 census?
   a. New Delhi
   b. Kolkata
   c. Bangalore
   d. Mumbai
7. What is the percent of rural population in India as per 2011 census?
   a. 65.66
   b. 68.66
   c. 70.66
   d. 72.66
8. Which is the largest religious minority group in India as per 2011 census?
   a. Christians
   b. Muslims
   c. Jains
   d. Sikhs

9. According 2011 census, which sector employs the largest proportion of India's working population?
   a. Primary Sector
   b. Secondary Sector
   c. Tertiary Sector
   d. Quaternary Sector
10. Analyze the causes and consequences of declining sex ratio in India. Suggest its suitable measures.
11. Describe the trends of change in occupational composition of India.
12. Is India becoming greying country? Why? How?

Distribution of Population in India

Population distribution describes the spatial distribution patterns depicted on it. It is apparent that India's population distribution is exceedingly uneven. India is composed of 29 states and seven union territories. According to the 2011 census, India's population was 1.2 billion. India accounts for 2.4% of the world's land surface area and is home to 17.5% of the world's people. Uttar Pradesh has the greatest population share in the country, followed by Maharashtra, Bihar, and West Bengal.

According to the table below, the states of Uttar Pradesh, Maharashtra, Bihar, West Bengal, Andhra Pradesh, Tamil Nadu, Madhya Pradesh, Rajasthan, Karnataka, and Gujarat make up around 76% of the country's total population. Inspite of these states having a sizable geographic area, the population proportion is extremely low in states like Jammu & Kashmir (1.04%), Arunachal Pradesh (0.11%), and Uttarakhand (0.84%).

State/non Territory	Total Population	% of Total Population of India
1. Uttar Pradesh	19,98,12,341	16.50
2. Maharashtra	11,23,74,333	9.28
3. Bihar	10,40,99,452	8.60
4. West Bengal	9,12,76,115	4.54
5. Andhra Pradesh	8,45,80,777	6.99
6. Madhya Pradesh	7,26,26,809	6.00
7. Tamil Nadu	7,24,47,030	5.96
8. Rajasthan	6,85,48,473	5.05

9. Karnataka	6,10,95,297	4.99
10. Gujarat	6,04,39,692	3.47
11. Odisha	4,19,74,218	2.76
12. Kerala	3,34,06,061	2.72
13. Jharkhand	3,29,88,134	2.58
14. Assam	3,12,05,576	2.29
15. Punjab	2,77,43,338	2.11
16. Chhattisgarh	2,55,45,198	2.09
17. Haryana	2,53,51,462	1.39
18. NCT of Delhi	1,67,87,941	1.04
19. Jammu & Kashmir	1,25,41,302	1.04
20. Uttrakhand	1,00,86,292	0.83
21. Himachal Pradesh	68,64,602	0.57
22. Tripura	36,73,917	0.30
23. Meghalaya	29,66,889	0.25
24. Manipur	27,27,749	0.23
25. Nagaland	19,78,502	0.16
26. Goa	14,58,545	0.12
27. Arunachal Pradesh	13,83,727	0.11
28. Puducherry	12,47,953	0.10
29. Mizoram	10,97,206	0.09
30. Chandigarh	10,55,450	0.09
31. Sikkim	6,10,577	0.05
32. Andaman & Nicobar Island	3,80,581	0.03
33. Dadra & Nagar Haveli	3,43,709	0.03
34. Daman & Diu	2,43,247	0.02
35. Lakshadweep	64,473	0.01

Source: Census of India, 2011

India's uneven population distribution points to a strong correlation between physical, socioeconomic, and historical factors. Climate, geography, and water availability strongly influence population dispersion. The North Indian Plains, deltas, and Coastal Plains have a higher proportion of population compared to the interior districts of southern and central Indian States, Himalayas, and some northeastern and western states. Developments in irrigation (Rajasthan), mineral and energy resources (Jharkhand), and transportation (Peninsular States) have led to moderate to high population concentrations in historically sparsely populated regions.

Population distribution is influenced by socio-economic and historical factors such as agricultural development, human settlement patterns, transportation infrastructure, industrialization, and urbanization. India's river lowlands and coastal areas continue to have higher population concentrations. Natural resources have been used

throughout history, including for human habitation and transportation networks. Urban areas such as Delhi, Mumbai, Kolkata, Bengaluru, Pune, Ahmedabad, Chennai, and Jaipur have a high population density due to industrial development and urbanization, attracting many rural-urban migrants.

Check Your Progress

1. What is the share of Indian population in the world?
   a. 15.5 per cent
   b. 16.5 per cent
   c. 17.5 per cent
   d. 18.5 per cent
2. Which is the second Populace State in India as per 2011 census?
   a. Rajasthan
   b. Maharashtra
   c. Madhya Pradesh
   d. Karnataka
3. Discuss the important features of distribution of India's population with reference to 2011 census.

Density of Population in India

The number of people per unit area is the measure of population density. It facilitates a deeper comprehension of the population's geographical distribution with respect to land. India's population density, according to the 2011 census, is 382 people per square kilometer. Over the past 50 years, the population density has steadily climbed from 117 people per square kilometer in 1951 to 382 people per square kilometer in 2011, representing a rise of more than 200 people per square kilometer. The information in the table illustrates the spatial variety in population densities across the nation, which range from 11,297 people in the National Capital Territory of Delhi to as low as 17 people per square kilometer in Arunachal Pradesh.

Northern Indian states with higher densities include Bihar (1102), West Bengal (1029), and Uttar Pradesh (828), while Kerala (859) and Tamil Nadu (555) have

higher densities in the peninsular region. States with moderate concentrations include Assam, Gujarat, Andhra Pradesh, Haryana, Jharkhand, and Odisha. The hill states in the Himalayan region and North Eastern states of India (excluding Assam) have lower population densities, while the Union Territories (excluding Andaman and Nicobar islands) have higher population densities.

Rank	**State**	**Area Sq. Km**	**Density 2011**	**Density 2001**
	India (Average)	32,87,240	382	324
1	Delhi	1,483	11,320	9,340
2	Chandigarh	114	9,258	7,900
3	Puducherry	490	2,547	2,034
4	Daman and Diu	111	2,191	1,413
5	Lakshadweep	30	2,149	1,895
6	Bihar	94,163	1,106	881
7	West Bengal	88,752	1,028	903
8	Goa	3,702	394	364
9	Maharashtra	3,07,713	365	315
10	Tripura	10,486	350	305
11	Karnataka	1,91,791	319	276
12	Andhra Pradesh	2,75,045	308	277
13	Gujarat	1,96,244	308	258
14	Orissa	1,55,707	270	236
15	Madhya Pradesh	3,08,252	236	196
16	Rajasthan	3,42,239	200	165
17	Uttarakhand	53,483	189	159
18	Kerala	38,852	860	819
19	Uttar Pradesh	2,40,928	829	690
20	Dadra and Nagar Haveli	491	700	449
21	Haryana	44,212	573	478
22	Tamil Nadu	1,30,060	555	480
23	Punjab	50,362	551	484
24	Jharkhand	79,716	414	338
25	Assam	78,438	398	340
26	Chhattisgarh	1,35,192	189	154
27	Meghalaya	22,429	132	103
28	Manipur	22,327	128	103
29	Himachal Pradesh	55,673	123	109
30	Nagaland	16,579	119	120
31	Sikkim	7,096	86	76
32	Jammu and Kashmir	2,22,236	56	46

33	Mizoram	21,081	52	42
34	Andaman and Nicobar Islands	8,249	46	43
35	Arunachal Pradesh	83,743	17	13

Source: Census of India, 2011

Determinants of Population Growth in India

Since the first Indian Census in 1871, India's population has increased dramatically. India is currently the world's second most populous country, with 121 crore inhabitants. This high population expansion in India was accompanied by significant urbanization and a fall in the average age of the general population, making India one of the world's youngest countries. Fertility, mortality, and migration are the three major elements that affect a country's population change. Migration is not a significant determinant of population change in the Indian setting. As a result, a thorough understanding of mortality and fertility is important in the context of India.

i. Fertility

The following are the basic determinants of fertility

1. Demographic Determinants
   a. Age Composition: A country with a younger population is more likely to contribute significantly to global population growth. Many Asian, African, and Latin American countries fall within this category.

   b. Marriage Duration: Fertility and the duration of an effective marriage are positively correlated. For example, in India, early marriage is widespread, and hence the fertility rate is higher.

   c. Balanced Sex Composition: A balanced sex composition is a significant demographic predictor of fertility. For example, male-dominated metropolitan centres have a lower birth rate than rural places.

   d. Degree of Urbanization: Typically, urban areas have lower birth rates than rural areas. It has been discovered in metropolitan settings that a variety of socioeconomic factors contribute to reduced fertility rates.

e. Women's Participation in Economically Gainful Activities: Research has shown that working women contribute much less to human reproduction than non-working females. Exposure to the outside world has made working women more socially and economically aware, which effects their fertility behaviour.

2. Socio-cultural Determinants

a. Religious Background: With the exception of Buddhism, almost every religion in the world opposes deliberate control over human fertility. However, the degree of regulation differs per faith. For example, in his study, Kingsley Davis discovered that Muslim birth rates in India are much higher than Hindu birth rates in identical contexts.

b. Educational Level: The level of education, particularly among girls, has been shown to have a significant impact on reproductive patterns. In fact, education in general helps to reduce the birth rate.

c. Age at Marriage: It has been commonly recognized that there is an inverse relationship between birth rate and age at marriage. In India, it is anticipated that if all females marry after the age of 19, the birth rate will be reduced by at least one-third.

d. Traditions and Customs: Studies have shown that communities that allow polygamy, polyandry, loose marriage bonds, and permissive sexual behavior have lower reproduction rates due to a higher occurrence of venereal illnesses.

e. Individuals take precedence. The status of the father, woman, and child is a significant factor of family size. In India, women's low socioeconomic level is a major contributor to high fertility.

f. Government Policies: The population policies implemented by various governments have a direct impact on the fertility rates in those countries.

China, for example, has been able to reduce its birth rate thanks to its effective population control.

3. Economic Determinants
   a. Family Income Level: Research has shown that there is a negative relationship between a family's income level and its size. Middle-income people appear to have the most stringent control over the size of their families. On the other hand, among lower-income families where children are viewed as a possible source of more revenue, family size is restricted to a minimum.

   b. Standard of Living: The birth rate is generally high among the world's poor populations. In a similar vein, low birth rates are typically seen among the wealthy.

   c. Dietary Practices: Research on animals indicates that consuming more protein tends to lower fertility.
4. Other causes
   a. Family System Type: People who live in joint families typically have more kids. Young couples in the joint family system are assisted and supported by the family's elders in raising their kids.

5. Other Factors contributing to Indian women's high fertility rates

   a. Universality of the institution: Marriage is regarded as essential for women in India.

   b. Lower Marriage Age: Girls are customarily married off at a fairly young age in India. Because of this, Indian women are physiologically able to have more children.

   c. Desire for Sons: Indian society has a strong tradition of favoring male offspring. The birth of a boy is seen as crucial for maintaining the family line and caring for the parents as they age.

d. High IMR and CMR: High infant and child mortality rates are an essential factor in determining family size. Women have more children in the hopes that at least a few will survive to adulthood.

e. Environmental Factors: Those live in warmer climates have higher fertility rates than those live in cold climates. As a result, India's hot temperature leads to high fertility rates.

f. Illiteracy: It has been discovered that there is a direct relationship between female education and family planning. According to the 2011 Census, the female literacy rate in India is just 65.46 percent.

ii. Mortality

The following are the major determinants of mortality:

a. Age Structure: One important demographic element influencing the incidence of death is thought to be age structure. As children get older, mortality rates tend to decrease, and when people reach middle age, they tend to rise. As a result, nations with high rates of middle-aged and older populations tend to have high death rates.

b. Sex Composition: Because the two sexes have distinct resistance powers, it has been discovered that the mortality rates for males and females differ. Malnutrition, a high maternal death rate, women's poor status, neglect of female offspring, and other factors contribute to the higher mortality rates among females.

c. Degree of Urban Development: Historically, it has been noted that urban regions have a greater death rate than rural ones. However, at the moment, this disparity is closing more and more, and in certain instances, the roles have even been switched. The urban mortality rate is lower than the rural one in the least developed nations. However, the opposite is truer for industrialized nations. In general, the mortality rate in metropolitan regions has decreased due to variables including high per capita income, high literacy, and increased awareness of diseases.

iii. Social Factors

a. Infanticide prevalence: A society's death rate rises when infanticide is common.

b. Access to healthcare facilities: The number of patients per physician is positively correlated with the mortality rate.

c. General housing, sanitation, and nutrition conditions,

d. Population literacy: The mortality rate and literacy levels have an inverse relationship.

e. Convictions toward religion.

iv. Economic Development

a. Standard of living: Wealthy people can afford medical care and typically eat a balanced diet. After universal access to healthcare is established, disparities in mortality rates will decline.

Check Your Progress

1. What is the density of population of India as per 2011 census?
   a. 352 persons per sq. km.
   b. 382 persons per sq. km.
   c. 402 persons per sq. km.
   d. 432 persons per sq. km.
2. Which of the following State has the most population density in India according to 2011 census?
   a. Gujarat
   b. Maharashtra
   c. Bihar
   d. Tamil Nadu
3. Which of the following State has the least population density in India according to 2011 census?
   a. Mizoram
   b. Assam
   c. Tripura

d. Arunachal Pradesh

4. Discuss the importance of studying population density and distribution of an area.
5. Enumerate the salient features of population density of India with reference to census of India 2011.
6. Describe the important aspects of population distribution of India with regard to 2011 population census.

Let's Sum Up

Population size, population density and population distribution are important factors for understanding and managing the human population of any area and for understanding their importance every government in the world used to collect these data at regular intervals. Because the governments need these data for enacting and implementing various policies, programmes and schemes. The population size, population density and distribution of population are determined by the three population variables viz., fertility, mortality and migration and any change in these variables automatically that will bring change in the size, density and distribution of population.

Glossary

Population Size: The total number of individuals lives in given area at a particular period of time.

Population Growth: Increase in the number of population at a particular point of time.

Population Density: Average number of individuals lives in per square kilo meter.

Population Distribution: The number of individuals spread out across in the given area.

Age Composition: Age structure of the given population.

Sex Composition: It is a proportion of females to males in the given population.

Population Pyramid: It is a graphical representation of human population on the basis of age and sex composition.