Lesson – 1

Meaning and Development of Demography

Structure

1.0 Introduction

Demography is the systematic study of population. The term is of Greek origin and is composed of the two words, demos (people) and graphein (describe), implying the description of people. Demography studies the trends and processes associated with population including – changes in population size; patterns of births, deaths, and migration; and the structure and composition of the population, such as the relative proportions of women, men and different age groups. There are different varieties of demography, including formal demography which is a largely quantitative field, and social demography which focuses on the social, economic or political aspects of populations. All demographic studies are based on processes of counting or enumeration – such as the census or the survey – which involve the systematic collection of data on the people residing within a specified territory.

Demography is a field that is of special importance to sociology – in fact, the emergence of sociology and its successful establishment as an academic discipline owed a lot to demography. Two different processes happened to take place at roughly the same time in Europe during the latter half of the eighteenth century – the formation of nation-states as the principal form of political organisation, and the beginnings of the modern science of statistics. The modern state had begun to expand its role and functions. It had, for instance, begun to take an active interest in the development of early forms of public health management, policing and maintenance of law and order,

economic policies relating to agriculture and industry, taxation and revenue generation and the governance of cities.

This new and constantly expanding sphere of state activity required the systematic and regular collection of social statistics – or quantitative data on various aspects of the population and economy. The practice of the collection of social statistics by the state is in itself much older, but it acquired its modern form towards the end of the eighteenth century. The American census of 1790 was probably the first modern census, and the practice was soon taken up in Europe as well in the early 1800s. In India, censuses began to be conducted by the British Indian government between1867-72, and regular ten yearly (or decennial) censuses have been conducted since 1881. Independent India continued the practice, and seven decennial censuses have been conducted since 1951, the most recent being in 2011. The Indian census is the largest such exercise in the world (since China, which has a slightly larger population, does not conduct regular censuses).

Demographic data are important for the planning and implementation of state policies, specially, those for economic development and general public welfare. But when they first emerged, social statistics also provided a strong justification for the new discipline of sociology. Aggregate statistics – or the numerical characteristics that refer to a large collectivity consisting of millions of people – offer a concrete and strong argument for the existence of social phenomena. Even though country-level or state-level statistics like the number of deaths per 1,000 population – or the death rate – are made up by aggregating (or adding up) individual deaths, the death rate itself is a social phenomenon and must be explained at the social level. Emile Durkheim's famous study explaining the variation in suicide rates across different countries was a good example of this. Durkheim argued that the rate of suicide (i.e., number of suicides per 100,000 population) had to be explained by social causes even though each particular instance of suicide may have involved reasons specific to that individual or her/his circumstances.

Sometimes a distinction is made between formal demography and a broader field of population studies. Formal demography is primarily concerned with the measurement and analysis of the components of population change. Its focus is on quantitative analysis for which it has a highly developed mathematical methodology suitable for forecasting population growth and changes in the composition of population. Population studies or social demography, on the other hand, enquires into the wider causes and consequences of population structures and change. Social demographers believe that social processes and structures regulate demographic processes; like sociologists, they seek to trace the social reasons that account for population trends.

1.1 Objectives

In this lesson, the focus of our discussion will be on the concept, nature and development of demography. We will also highlight the important concepts in demography. After going through this unit, it is expected that you should be able to:

- define the concept of demography
- explain the nature of demography
- describe the development of demography

1.2 Meaning of Demography

Demography, in fact, originated when human beings started forming civilized society. As the time passed, every society and nation realized the 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 associated with growth of population. Different countries began registration of vital events in different periods and for variety of reasons. Thus, demography has assumed much more significance in modern times. Realizing the importance, the churches started keeping records of captions', marriages and death of their members in some countries from the beginning of 15th century. In fact, credit goes to John Graunt (1620-74) for starting demographic studies during modem times. He brought out his famous volume entitled, "Natural and Political Observations upon the Bills of Mortality" (1662) which made him the real founder of demographic studies. In this volume he analyzed and discussed the number and causes of death of certain places and the need and necessity of such analysis, the births, migrations, family growth and similar other problems of some places in sonic details. He analysed the population which was capable of serving in the army, amongst others. He suggested that the population should be studied on the basis of sex, religion, age, occupation, status and state.

John Graunt (1662) believed that fertility, mortality and migration were interrelated processes and that these were based on definite postulates. According to him male birth rate was always greater than that of females, if in a given society the number of both the sexes was the same. Then,his another finding was that mortality rate was higher in urban as compared to rural areas and also it was higher, at the beginning of life, than at any after-stage. He also had knowledge of sample 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. While discussing the contribution of John Graunt, Peter. R. Cox said (quoted in Hans Raj, 1986, pp.2-3): "Graunt's work covers so wide an 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 consolidations".

The word 'demography' comes from the Greek words, 'demos ' which means population, and graphy ' which means to describe or draw (Luczkovich, See http://www.grin.com/en/e-book/60766/demography). Though the term 'demography' had been casually used by many persons, it was first used in a rational or scientific way in 1855 by Guillard, and since then the term has been gaining currency.

The economists, geographers, social scientists and others have defined it in different ways suiting to their convenience and viewpoints. According to Frank Lorimer(1959) In broad sense, demography includes both demographic analysis and population studies. Demography studies both qualitative and quantitative aspects of population.

Stenford (Quoted in Hansraj, 1986) views it as follows: "In its 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." In the words of Irene Tanker: "With improved data, new techniques and measurement of the demographic transition that is occurring, demography has become science rather than literature" (Hansraj, 1986). Demography is the statistical study of human population. It can be a very general science that can be applied to any kind of dynamic human population, that is, orit: that changes over time or space (population dynamics). It encompasses the study of the size, structure and distribution of these populations, and spatial andlor temporal changes in them in response to birth, migration, aging and death. (http:Nen.wikipedia. orglwikil Demography). These definitions raise the status of demography from studies to a science of population.

Demography is the systematic study of population. Demography studies the trends and processes associated with population including - changes in population size; patterns of births, deaths, and migration; and the structure and composition of the population, such as the relative proportions of women, men and different age groups. Demographic data are important for the planning and implementation of state policies, especially those for economic development and general public welfare.

Social Demography or Population studies, on the other hand, enquire into the wider causes and consequences of population structures and change. Social demographers

believe that social processes and structures regulate demographic processes; like sociologists, they seek to trace the social reasons that account for population trends.

A field of study concerned with the analysis of how social and cultural factors are related to population characteristics. Its major focus is the impact of social and cultural factors on demographic features of society, such as patterns of marriage and childbearing, the age-structure of the population, life-expectancy, and so forth. In addition, however, social demography also encompasses examination of the social consequences of demographic change. Since the demographic characteristics of a society or social group are themselves social phenomena, and the immediate product of the social (but also biological) events of birth and death, in one sense the demographic study of any human population is a form of social demography. However, whereas demography itself is primarily concerned with determining and measuring population characteristics and the interrelationship between demographic variables, social demographers seek to understand and explain these demographic patterns. In so doing they draw on the expertise of sociology as well as of demography.

The three main variables underlying population change are fertility, mortality, and migration, variables themselves associated with factors such as age at marriage, the proportions marrying, contraceptive use, levels and types of morbidity, rural-urban migration, and so forth. All receive attention from social demographers, who seek to understand these processes in terms of a range of standard social factors such as the levels and distribution of income, levels of education, the position of women, religion, and economic development. The possible linkages between variables are usually studied by means of social survey and correlational techniques. Regrettably, theorization in the field tends to be underdeveloped and restricted to simple models, and there is relatively little attention to meaning. The way in which culture may shape individuals' ideas and beliefs receives, with some significant exceptions, rather little attention. Ethnographic techniques are little utilized. The result of this narrowness of approach is that social demography, like demography itself, remains relatively isolated from the mainstream of sociology.

There are two types of demography -

1. Formal Demography:

Statistical analysis of population i.e., total population, number of males, number of females, number of youth, working population, rural urban (quantitative data

2. Social Demography:

Birth rate, death rate and migration that happens in a particular society.Consists of four processes-

(i) DemographicStructure: number of people in an area,
(ii) Demographic Processes: birth rate, death rate, migration,
(iii) Social structure: composition of an area,
(iv) Social processes: Processes by which individuals learn to live together in peace and harmony in society e.g. Cooperation, accommodation, mediation etc.

- Formal demography is to do with statistics, numbers, aggregates. The memorial quantification of data
- Social demography is concurred with changes or the consequences of the population of a society and how it affects us.

1.3Definitions of Demography:

The term demography has been defined both in a narrow and broad sense.

The Oxford Dictionary of Economics defines demography as **"**The study of the characteristics of human populations." According to the UN Multilingual Demographic Dictionary, "Demography is the scientific study of human populations, primarily with respect to their size, their structure and their development."

To Barckley, "The numerical portrayal of human population is known as demography." Similarly, according to Thomson and Lewis, "The population student is interested in population's size, composition and distribution; and in changes in these aspects through time and causes of these changes."

All these definitions take a narrow view because they emphasise only the quantitative aspects of demography. Some other writers have defined demography in wide sense by taking the quantitative and qualitative aspects of population studies.

In this context, according to Hauser and Duncan, "Demography is the study of size, territorial distribution and composition of population, changes therein, and the components of such changes, which may be identified as natality, mortality, territorial movement (migration), and social mobility (change of status)."

According to Cox, P.R. ”Demography is the study of statistical methods of human populations involving primarily the measurement of the size, growth and diminution of the numbers of the people, the proportions of living beings, born or dying within the same area or region and the related functions of fertility, mortality and marriage.”

According to 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.”

Thus, according to Donald J. Bougue, “Demography is a statistical and mathematical study of the size, composition, spatial distribution of human population, and of changes overtime in these aspects through the operation 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 its net result, its long run goal is to develop a body of theory to explain the events that it charts and compares. ”

These broad definitions take into view not only the size, composition and distribution of population and changes in them in the long run but also imply human migration and change in the status of population through education, employment, social status, etc.

1.4 Important concepts in Demography

- **Crude Birth Rate:** The annual number of live births per 1,000 people.
- **General Fertility Rate**: The annual number of live births per 1,000 women of childbearing age (often taken to be from 15 to 49 years, but sometimes from 15 to 44).
- **Age-Specific Fertility Rates**: The annual number of live births per 1,000 women in particular age groups (usually 15-19, 20-24 and so on).
- **Crude Death Rate**: The annual number of deaths per 1,000 people.
- Infant Mortality Rate: The annual number of deaths of children less than 1 year-old per 1,000 live births.
- **Life Expectancy:** The number of years which an individual at a given age can expect to live at present mortality levels.
- **Total Fertility Rate:** The number of live births per woman completing her reproductive life, if her childbearing at each age reflected the current age-specific fertility rates.

- **Gross Reproduction Rate**: The number of daughters who would be born to a woman completing her reproductive life at current age-specific fertility rates.
- **Net Reproduction Rate**: The number of daughters who would be born to a woman according to current age-specific fertility and mortality rates.

1.5 Nature of Demography

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

Accordingly, there are broader, narrower and balanced views about its nature

i) Broader view: According to this view, the scope of demography is wide and it studies the causes of slow or rapid change in birth rate, death rate, population growth, sex ratio, health conditions, etc. According to holders of this view, in demography many economic problems such as those related to employment and income conditions of the masses; 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 of population, working efficiency of the masses and the relationship of economic development, population change and overall quality of life, could be understood and analysed.

Demographic studies can be placed broadly under our categories, namely,

a) Descriptive Demography, under which are studied census and registration statistics,

b) Analytical Demography, which deals with analysis of the data collected, and rates and ratios of population change,

c) Comparative demography, which covers study of different aspects of population and their determinants at two different places and at two different points of time,

and d) Historical Demography, under which time series, and study of rates and ratios of population change are studied.

Reflecting on social problems, Hans Raj (1986, p. 11) believed that demography helps in the study of many problems such as marital status, composition of the family and growing trends about caste, religion, 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. These thinkers also believe that demography is collective or comprehensive, or interdisciplinary 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, the diseases and their relation with human body. In this sense it can be considered as population studies. UNO (Hans Raj, op.cit) has said that under demography we study the determinants and consequences of population change.

In this connection it may be pointed out that there is close relationship between demography and population data. But, population data becomes socially useful only when demographers draw their inferences from it. It means when demographers study population, demography emerges itself into population studies. In other words, the population studies include demography.

ii) Narrower view: As against the broader view, there is also a narrower view about the nature and scope of demography. This view, among others, is represented by Phillip and Otis (1959, p.2). 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 it mean that in the study of demography all subjects can be studied? Urbanization, for example, 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 we are studying urbanization under demography we can and should cover the effects of births, death, migration, 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."

iii) Balanced view: There is a third school of thought which claims to have presented balanced view of the nature and scope of demography. According to Warren, S. and Thompson (1 953), under demography, we can study death, birth and actual rates of growth of population, information about female population, their education, health conditions, marital status, distribution of population and their classification according to their occupations, their socio-economic conditions, etc. 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.

1.6 Development of Demography

Demographic thoughts traced back to antiquity, and were present in many civilizations and cultures, like Ancient Greece, Ancient Rome, China and India. Demography is made up of two word Demos and Graphy. The term Demography refers to the overall study of population.

In ancient Greece, this can be found in the writings of Herodotus, Thucidides, Hippocrates, Epicurus, Protagoras, Polus, Plato and Aristotle. In Rome, writers and philosophers like Cicero, Seneca, Pliny the elder, Marcus Aurelius, Epictetus, Cato, and Columella also expressed important ideas on this ground.

In the Middle ages, Christian thinkers devoted much time in refuting the Classical ideas on demography. Important contributors to the field were William of Conches, Bartholomew of Lucca, William of Auvergne, William of Pagula, and Muslim sociologists like IbnKhaldun.

One of the earliest demographic studies in the modern period was *Natural and Political Observations Made upon the Bills of Mortality* (1662) by John Graunt, which contains a primitive form of life table. Among the study's findings were that one-third of the children in London died before their sixteenth birthday. Mathematicians, such as Edmond Halley, developed the life table as the basis for life insurance mathematics. Richard Price was credited with the first textbook on life contingencies published in 1771, followed later by Augustus de Morgan, 'On the Application of Probabilities to Life Contingencies' (1838).

In 1755, Benjamin Franklin published his essay *Observations Concerning the Increase of Mankind, Peopling of Countries, etc.*, projecting exponential growth in British colonies. His work influenced Thomas Robert Malthus, who, writing at the end of the 18th century, feared that, if unchecked, population growth would tend to outstrip growth in food production, leading to ever-increasing famine and poverty (see Malthusian catastrophe). Malthus is seen as the intellectual father of ideas of overpopulation and the limits to growth. Later, more sophisticated and realistic models were presented by Benjamin Gompertz and Verhulst.

In 1855, a Belgian scholar AchilleGuillard defined demography as the natural and social history of human species or the mathematical knowledge of populations, of their general changes, and of their physical, civil, intellectual, and moral condition.

The period 1860-1910 can be characterized as a period of transition where in demography emerged from statistics as a separate field of interest. This period included a panoply of international 'great demographers' like AdolpheQuételet (1796–1874), William Farr (1807–1883), Louis-Adolphe Bertillon (1821–1883) and his son Jacques (1851–1922), Joseph Körösi (1844–1906), Anders Nicolas Kaier (1838–

1919), RichardBöckh (1824–1907), Émile Durkheim (1858-1917), Wilhelm Lexis (1837–1914), and Luigi Bodio (1840–1920) contributed to the development of demography and to the toolkit of methods and techniques of demographic analysis.

1.7 Self- Check Questions

(1) Meaning of demography.

(2) Define demography.

(3) Explain the nature of demography.

(4) Discuss the development of demography.

1.8 Summary

In this lesson, we discussed the concept of demography in detail. Firstly, we discussed the meaning and definition of demography. Secondly, we talk about the nature of demography. Thirdly, we discussed later the history and development of demography. We also understood the important concepts of demography in this lesson. This lesson gives lot of help to understand the concept of demography.

1.9 Glossary

- **Fertility -** The word "fertility" can mean a few things. It has to do with life, or being able to create life. For example, soil can be fertile. Plants grow better in soil that is fertile. ... In this case, fertility means the number of kids that are born.

- **Mortality -** Mortality, in demographic usage, the frequency of death in a population. In general, the risk of death at any given age is less for females than for males, except during the childbearing years (in economically developed societies females have a lower mortality even during those years).

- **Migration -** The movement of people from one place to the other to stay on for a considerable period of time for various reasons is known as migration. It is one of the three components of the population change the other two being mortality and fertility.

1.10Self-Check Answers

Ans. 1 See section 1.2

Ans. 2 See section 1.3

Ans. 3 See section 1.5

Ans. 4 See section 1.6

1.11Suggested Readings

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1.12 Terminal Questions

1) What is demography? Explain.
2) Define demography as discussed by various thinkers.
3) Discuss the nature of demography.
4) Explain the development of demography.

Lesson – 2

Scope & Importance of Demography

Structure

2.0 Introduction

We have discussed the concept of demography in previous lesson. The study of demography assumes greater significance all over the world. It is primarily because ever-growing population in developing and under-developed countries in particular and developed countries in general strains social, economic and political systems, amongst others, due to concomitant dynamics within and across the nations.

Demography, statistical study of human populations, especially with reference to size and density, distribution, and vital statistics (births, marriages, deaths, etc.). Contemporary demographic concerns include the “population explosion,” the interplay between population and economic development, the effects of birth control, urban congestion, illegal immigration, and labour force statistics. For a discussion of the objects of demographic study, *see* population (in biology and physical anthropology).

Demographic analysis can cover whole societies or groups defined by criteria such as education, nationality, religion, and ethnicity. Educational institutions usually treat demography as a field of sociology, though there are a number of independent demography departments. Formal demography limits its object of study to the measurement of population processes, while the broader field of social demography or population studies also analyses the relationships between economic, social, cultural, and biological processes influencing a population.

2.1 Objectives

In this lesson, the focus of our discussion will be on the scope of demography. We will highlight the relationship of demography with other disciplines and relationship between demography and population studies. We will also highlight the importance or significance of demography. After going through this lesson, it is expected that you should be able to:

- Familiar with the scope of demography
- Understand the relationship of demography with other disciplines
- Understand relationship between demography and population studies.
- to know about the importance of demography

2.2 Scope of Demography:

The scope of demography is very wide. It includes the subject matter of demography, is it a micro or macro study? Whether it is a science or art? These are vexed questions about the scope of demography about which there is no unanimity among writers on demography. We discuss them as under:

- **Size and Shape of Population:**

Generally, the size of population means the total number of persons usually residing in a definite area at a definite time. The size and shape of population of any region, state or nation are changeable. It is because every country has its own unique customs, specialities, social-economic conditions, cultural atmosphere, moral values, and different standards for acceptance of artificial means of family planning and availability of health facilities, etc.

All these factors affect the size and shape of the population and if these factors are studied with reference to any area under demography, we can clearly understand the role they play in determining the shape and size of the population.

- **Aspects Related to Birth Rate and Death Rate:**

Birth rate and death rate are the decisive factors that influence the size and shape of the population and therefore their importance in population studies is crucial. In addition to these, factors like marriage rate, belief regarding social status and marriage, age of marriage, orthodox customs related to marriage, early marriage and its effects on the health of the mother and the child, child infanticide rate, maternal death, still birth, resistance power, level of medical services, availability of nutritious food, purchasing power of the people, etc. also affect the birth and death rate.

- **Composition and Density of Population:**

In the subject matter of demography, the study of composition and density of population is important. In the composition of population factors like the sex ratio, race wise and age- group wise size of population, the ratio of rural and urban population, distribution of population according to religion and language, occupational distribution of population, agricultural and industrial structure and per sq. km. density of population are very important.

With this type of information regarding the possibilities of development in that particular area, social-economic problems of the area, problems created due to increase in urban population, and density of population form part of population studies.

- **Socio-Economic Problems:**

Out of the many problems relating to population growth, the effects of high density due to industrialization in the urban areas are of more importance as they affect the socio-economic life of the people. Problems like slum areas, polluted air and water, crime, addiction to liquor, juvenile delinquency, and prostitution, are also important subjects of study in demography.

- **Quantitative and Qualitative Aspects:**

Along with the quantitative problems of population, the qualitative problems also form part of population studies. Moreover, the study of demography includes the availability of physicians in the total population, number of hospitals, the number of beds in hospitals, expectation of life at birth, daily availability of minimum calories, resistance power, advertisement of family planning programme and its development, the changes brought in the attitudes of people regarding child birth and adequate medical facility for delivery, etc.

- **Distribution of Population:**

Population studies include the following:

(a) How people are distributed among and within continents, world regions and developed and underdeveloped countries?

(b) How their numbers and proportions change?

(c) What political, social and economic causes bring changes in the distribution of population. Within a country, it also includes the study of distribution of population in rural and urban areas, fanning and non-farming communities, working classes, business communities, etc.

Migration plays an important role in the distribution of population and supply of labour. Demography studies the factors that lead to internal and external migration of people within a country and between countries, the effects of migration on the migrants and the place where they migrate.

Urbanisation is another factor in the distribution of population within the country. The focus in population studies is on factors responsible for urbanisation, the problems associated with urbanisation and the solutions thereto.

Similarly, theories of migration and urbanisation form part of the study of demography.

- **Theoretical Models:**

There are vast theoretical aspects of population studies which include the various theories of population propounded by sociologists, biologists, demographers and economists, and theories of migration and urbanisation.

- **Practical Aspects:**

Practical aspects of population studies relate to the various methods of measuring population changes such as the census methods, age pyramids, population projections, etc.

- **Population Policy:**

Population policy is an important subject of demography especially in the context of developing countries. It includes policies for population control, and family planning strategies; reproductive health, maternal nutrition and child health policies; policies for

human development of different social groups, etc., and the effects of such policies on the total population of the country.

- **Micro vs Macro Study:**

The true scope of demography relates to whether it is a micro or macro study.

- **Micro Demography:**

Micro demography is the narrow view of population studies. Among others, Hauser and Duncan include the study of fertility, mortality, distribution, migration, etc. of an individual, a family or group of a particular city or area or community.

As pointed out by Bogue, "Micro demography is the study of the growth, distribution and redistribution of the population within community, state, economic area or other local area." According to the micro view, demography is primarily concerned with quantative relations of demographic phenomena.

- **Macro Demography:**

A majority of writers take the macro view of population studies and include the qualitative aspects of demography. To them, demography includes the interrelationships between population and social, economic and cultural conditions of the country and their effects on population growth.

It studies size, composition and distribution of population, and long run changes in them. Why migrations take place and what are their effects? What leads to urbanisation and what are its consequences? All these form part of macro aspects of population studies which also include unemployment, poverty and policies relating to them; population control and family welfare; and theories of population, migration and urbanisation, etc.

Prof. Bogue explains macro demography as "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. 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."

- **Balanced View:**

Writers like Bogue, Lorimer and others favour a balanced view of population studies. They do not believe in dividing the study of demography into two separate micro and macro divisions.

As pointed out by Lorimer,"A demographer limited to the merely formal treatment of changes in fertility, mortality and mobility would be in a position like that of a formal chemist observing the compression of mercury with no information about associated changes in temperature or the constituent of the liquid."

Therefore, the scope of demography should include both micro and macro aspects of population. According to Thompson and Lewis, it should relate to fertility, mortality, information about female population, their health, marital status, distribution and classification of population according to occupation, and collection and study of information about social and economic condition, and migration of population.

- **Demography as a Science:**

Before studying whether demography is a science, it is essential to know what science is and to what extent the characteristics of science are applicable to demography.

A science is a systematised body of knowledge ascertainable by observation and experimentation. It is a body of generalisations, principles, theories or laws which traces out a causal relation between cause and effect.

For any discipline to be a science:

(i) It must be a systematised body of knowledge;

(ii) It must have its own laws or theories;

(iii) They can be tested by observation and experimentation;

(iv) They can make predictions;

(v) They can be self-corrective; and

(vi) have universal validity.

Demography possesses all the above noted elements of a science which can be described as under:

1. It is a systematised body of knowledge in which facts are studied and analysed in a systematic manner.
2. It has its own theories like the Malthusian Theory, the theory of Demographic Transition, etc.
3. These theories have been tested on the basis of observation.
4. Demography can make predictions on the basis of cause and effect relationships. It can predict about changes in population.
5. Demography is self-corrective in nature. It goes on revising its conclusions in the light of new facts based on observations.
6. The principles of demography have universal validity as they are applicable to all countries, given the same conditions.

Thus on all counts, demography is a science. It is not only a positive science of 'what is' but also a normative science of "what ought to be." It studies the causes and effects of population problems and also suggests policy measures to solve them.

To conclude with Irene Taeuber, "With improved data, new techniques and precise measurement of the demographic transition that is occurring, demography has become a science. In fact, it has become an applied science and applied technology."

2.3 Relationship of Demography with other Disciplines

To have more clarity about demography, let us look at the interrelationship of demography with other disciplines.

Demography deals with composition, organization and distribution of population in human society. It is concerned with different aspects of human life, e.g. biological, geographical, social, economic, culturaland so on. Each of these subjects focus on only particular aspect or selected aspects of human being or human life. However, all subjects or disciplines gradually expanded their scope to the extent possible and got closely liked with each other. Here, we look at how demography is related with certain disciplines.

i) **Sociology and Demography:** Demography primarily studies and is concerned with collecting data and information about biological, economic and social problems. Sociology believes that man is a social animal. Similarly, demography also accepts human being as a unit of a society and a group in

which a man is born, lives and dies. The group, however, continues. The relation between the two subjects is that in actual life all problems connected with population studies are also social problems. For instance, demography covers birth (birth rates) which is closely linked with marriage, and sociologists also study the institution of marriage with keen interest.

ii) **Demography and Anthropology**: Demography is concerned with population figures of the whole world, whereas anthropology is concerned only with the study of few sections of society. In anthropology we are concerned with the development and growth of only few tribes sections and not with the whole data which a demographer will collect.

iii) **Demography and Human Ecology:** Population is an outcome of births, and birth of human beings and their living is the main concern of human ecology. In human ecology along with human births and environment, relationship between them is also studied. It is well know fact that population of an area is effected by the environments around it, and at the same time, environment is also affected by the density and quality of populations. From the ecological viewpoint, population can be seen in terms of the extent to which people share in exploiting and developing the same environmental resources.

iv) **Demography and Geography:** Importance of human geography has increased more as compared to physical geography. In other words, geographers have also started keenly studying population growth and problems. According to Ackerman (quoted in Hans Raj, 1986, p.24) "Recent geographers have taken the cultural features of the earth, analysed them generically and in their space-relations and established covariant relations of cultural features with each other and with the physical and biotic environment. These distributional features are common both to demography and geography".

Then another point of similarity that exists between demography and geography is that the census is conducted in a geographical area. It is during census that vie study regional imbalances and disparities and compare regional growths. Today both the demographers and the geographers try to analyse population so that area differentiations are brought to focus. Geographers such as Dodge, Steigenga and Trewaftha have deeply studied birth, death and migration rates of many areas. By these studies they have tried to achieve, what usually demographers aim to achieve (Hans Raj, 1986, p.24).

The geographers of today are keen to study ethnic distribution of population - races and their distribution - in different parts of the country and the world and also study health, race and sex problems. In geography, like in demography and population studies, important problems such as those related to urbanization and non-urbanization, etc are covered. The geographers are showing more interest in population in economic dynamics, with which demographers are also concerned very much.

v) **Demography and Economics:** Relationship between demography and economics has considerably increased during 20th century and both the subjects have come quite closer and nearer to each other. This perhaps, is the reason that today demography is considered as a branch of economics. Where there is more population, economic activities are bound to increase. Population problems are directly linked and connected with education, employment, transportation, rehabilitation, industrialization, per capita income, etc.

Demography influences economics in different ways. Changes in population influence labour force and the source of production. Depending upon the changes in labour force the economists shall be in a position to find out what amount of socially useful and productive labour is available in the country and whether it is the labour-intensive or capital-intensive techniques that suit nation's economy, and so on. Demographers will help economists

VI) **Statistics and Demography:** There is no social science subject which can do without statistics. Demography is rather more dependent on statistics than many other disciplines. Main aim of a statistics is to collect figures1 data and leave its interpretation to the social scientist. Hence, it is quite often said that statistics is value-neutral. This equally applies to demography. Main aim of demographer too is to collect data about population. Demography is, thus, closely linked or related to all other social science disciplines. In case these subjects are not closely studied the results are bound to be misleading.

2.4 Relationship between Demography and Population Studies

Though the terms, 'demography' and 'population studies' are often used interchangeably, some scholars have tried to distinguish between 'demographic analysis' and 'population studies'. It is considered that (Philip and Otis, 1959, p.2): "demographic analysis is confined to a study of the components of population variation and change", whereas "population studies are concerned not only with population variables but also with the relationships between population changes and other

variables - social, economic, political, biological, genetic, geographical and the like" The term 'demography' may be used in a narrow sense, as synonymous with 'demographic analysis' or 'formal demography', which is primarily concerned with quantitative relations among demographic phenomena in abstraction from their association with other phenomena. Demography may also be conceived in a broad sense to include, in addition to the quantitative study of population, the study of interrelationship between population and socioeconomic, cultural and other variables.

Some scholars do not approve of creating such an artificial distinction between Demographic Concepts demography and population studies. Frank Lorimer (quoted in Asha and Tara, 2006, p.24) highlights, "a demographer limited to the mere formal treatment of changes in fertility, mortality, and mobility would be in a position like that of a 'formal chemist' observing the compression of mercury with no information about associated changes in temperature or the constitution of the liquid. 'Pure demography' as a concept is like the skeleton of science and is therefore an illusion. Any meaningful study of population, therefore, has to be interdisciplinary .

With independence of countries in many parts of the world, there have been raising aspirations and hopes for the removal of poverty, for rdising the standard of living of the people, and for ensuring them a better quality of life. As result, a new era of planning for development dawned in many countries, including India, after their independence, and the terms such as 'economic planning', 'planning for development', 'five-year plans', etc., came to be widely used which encompassed all the demographic and other terms and concepts in them. This has led to use of more broader term 'population studies' that subsumed 'demography' as well.

2.5 Importance of Demography

Demography is concerned with the growth and distribution of population in less developed countries as well as underdevelopment and developed countries. The importance of demography is clear from the following points.

1. Health Planning

Due to high fertility rate, health problems are created both for mother and child. In most of the developing countries, married women are facing pregnancies problem due to malnutrition. Also due to ill health of mother, infant mortality rate is high in our country. High fertility is connected to the child development. So, demography is concerned with the fertility and mortality and studies the birth and death rates. These health problems are solved by the demographer in the establishment of health planning of the country.

All the problem related to health and its causes as well as its possible solutions is the work of social demography.

2. Planning for Food Supply

Planning for food supply means availability of adequate food for the total population. The inadequate food results in the poor health, low growth, high mortality rates and low physical activity. Food supply grows with the growth of population. The undeveloped and underdeveloped countries are unable to meet the demands of food supply. They depend on other countries for fulfillment of their basic food needs. So, population study is important to meet the demands of food of the poor countries through the aid of national as well as international agencies.

3. Housing Planning

When the size of population is increasing, the demand for housing is also increasing. Therefore data collected about fertility, mortality, migration, urbanization and family formation gives basis for the estimation of housing planning. Demography is concerned that how the problem of housing of a large population should be solved. So, the population increasing rapidly which creates so many problems of housing and these are undertaken by the field of social demography.

4. Employment Planning

Unemployment is a social and international problem. From developed to underdeveloped as well as undeveloped countries, the unemployment problem growing rapidly. A demographic factor is the high dependency ratio in less developed countries. For example; In Pakistan, four or five persons depends on the income of one person. So, for employment planning, population study and dependency ratio must be studied. Therefore demography studies all aspects of population where it makes planning for employment and unemployment problem.

5. Educational Planning

Today every nation is concerned with providing proper education to children. The numbers of children are constantly increasing which creates educational problems. The demographers are interested to make planning for these children of a specific area or the whole country. Due to educational planning by demographers, these children should be provided proper educational facilities. Abdul education is also provided to a large number of population and demography has estimated the future plan for education.

6. Migration Planning

Most of the people are migrated to western countries. It is necessary to estimate the trends of migration, the immigrants, the emigrants and the heavy burden on other countries. It is the study of social demography to make plans, to stop the problem. A

large number of emigrants from a country affects a population adversely and a qualitative change occur because these emigrants may be experts as well as skilled and qualified persons which affects the economy of a country very badly. Due to immigration to a country, the population growth takes place which is a hurdle for the development of a country. For example; A large number of people who are illiterate and poor are coming from Bangladesh to India which creating difficulties particularly in the states of west Bengal and Assam. So, the migration planning is made by the govt. as well as non-governmental organization and agencies to overcome the problem of migration. It is the main study of social demography.

7. For the Economy

The study of demography is of immense importance to an economy. Population studies help us to know how far the growth rate of the economy is keeping pace with the growth rate of population. If population is increasing at a faster rate, the pace of development of the economy will be slow. The government can undertake appropriate measures to control the growth of population and to accelerate the development of the economy.

Rapid population growth reduces per capita income, lowers the standard of living, plunges the economy into mass unemployment and under employment, brings environmental damage and puts a burden on existing social infrastructure. Population studies highlight these problems of the economy to be solved by the government.

8. For Society

Population studies have much importance for the society. When population is increasing rapidly, the society is faced with innumerable problems. Shortages of basic services like water, electricity, transport and communications, public health, education, etc. arise.Along with these, problems of migration and urbanisation are associated with the growing population which further lead to the law and order problem. Faced with such problems which are the concomitant result of population growth, the state and non-government social organisations can adopt appropriate measures to solve them.

9. For Economic Planning

Data relating to the present trend in population growth help the planners in formulating policies for the economic plan of the country. They are kept in view while fixing targets of agricultural and industrial products, of social and basic services like schools and other educational institutions, hospitals, houses, electricity, transport, etc.

Population data are also used by the planners to project future trends in fertility and to formulate policy measures to control the birth rate.Based on population data, projections are made about the increase in labourforce, and the number of people in the

age-groups 1-15 years, 15-50 years and above in order to estimate the labour force available for productive employment. This, in turn, helps in making estimates regarding employment to be generated during the plan period.

10. For Administrators

Population studies are also useful for administrators who run the government. In under-developed countries, almost all social and economic problems are associated with the growth of population. The administrator has to tackle and find solutions to the problems arising from the growth of population. They are migration and urbanisation which lead to the coming up of shanty towns, pollution, drainage, water, electricity, transport, etc. in cities.

These require improvement of environmental sanitation, removal of stagnant and polluted water, slum clearance, better housing, efficient transport system, clean water supply, better sewerage facilities, control of communicable diseases, provision of medical and health services, especially in maternal and child welfare by opening health centres, opening of schools, etc.

11. For Political System

The knowledge of demography is of immense importance for a democratic political system. It is on the basis of the census figures pertaining to different areas that the demarcation of constituencies is done by the election commission of a country. The addition to the number of voters after each election helps to find out how many have migrated from other places and regions of the country.

Political parties are able to find out from the census data the number of male and female voters, their level of education, their age structure, their level of earning, etc. On these basis, political parties can raise issues and promise solutions in their election manifestos at the time of elections.Further, it is on the basis of male and female voters in an area that the election commission establishes election booths for voters and appoints the election staff.

It has been concluded from the above discussion on the **"importance of demography"** that, demography studies all aspects of the people's population.

2.6 Self- Check Questions

(1) Describe the scope of demography.

(2) Highlight the relationship between demography and population studies.

(3) Discuss the importance of demography.

(4) Explain the relationship of demography with other disciplines in detail.

2.7 Summary

In this lesson, Firstly, we discussed the scope of demography in detailed manner. Secondly, we talk about the relationship of demography with other disciplines. Thirdly, we discussed the relationship between demography and population studies. Lastly, we also understood the importance of demography in this lesson. This lesson gives lot of help to understand the concept of demography.

2.8 Glossary

- **Population Explosion** - a sudden, large increase in the size of a population.
- **Anthropology** - the study of human beings, especially of their origin, development, customs and beliefs.
- **Urbanization** - the process by which large numbers of people become permanently concentrated in relatively small areas, forming cities.
- **Immigration -** Immigration means people moving from their native regions into another country to live. People who immigrate are called immigrants.The same people are emigrants when they leave their own country or region, and immigrants when they arrive somewhere else.

2.9 Self-Check Answers

Ans. 1 See section 2.2

Ans. 2 See section 2.4

Ans. 3 See section 2.5

Ans. 4 See section 2.3

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2.11Terminal Questions

1. What is scope of demography? Explain.
2. Highlight the relationship between demography and population studies.
3. Describe briefly the relationship between demography with other disciplines.
4. Through light on the importance of demography.

Lesson -3

Sources of Demographic Data

Structure

3.0 Introduction

Demography is the statistical study of human populations. Demographic characteristics of a country provide an overview of its population size, composition territorial distribution, changes therein and the components of changes such as nativity, mortality, and social mobility. Demography is important for town planners due to need of forecasting and planning for the people. People are the ones for which planning is being carried out. Indirect methods of collecting data about demography are required in countries and periods where full data are not available, such as is the case in much of the developing world, and most of historical demography.

3.1 Objective

This chapter is devoted to a discussion of population data, covering the nature os each source, its historical development and its uses for population analysis. Special consideration is given to the sources of data that are available for the study on the population of India.:

- explain the population census and features of Census
- to know the registration method of demographic data

- to understands the sample survey method of demographic data

3.2 Population Census:

The most important source of demographic data is the census. The word “census” is derived from the Latin word censere which means “to assess”.

The New International Webster’s Dictionary defines it thus – “An official count of the people of a country or district including age, sex, employment, etc.”

A United Nations Study defines the population census 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.”

Thus a population census is an official enumeration of the inhabitants of a country with statistics relating to their location, age, sex, marital status, literacy status, language, educational level, economic activity, number of children, migration, etc.

Population census is a regular feature of all progressive countries, whatever be their size and political set up. It is conducted at regular intervals, usually every 10 years, for fulfilling well-defined objectives.

Features of Census:

A census has the following features:

1. A census is usually conducted after an interval of 10 years.

2. The census covers the entire country or a part of it.

3. The census operations are completed within specified dates.

4. It is organised and conducted by the Government through the Census Commission of the country.

5. For conducting the census a reference period is determined by the Census Commission at that point of time.

6. A household or family is treated as a unit. However in large census operations, migrant individuals and homeless persons are also enumerated at night at their places of rest or sleep.

7. Before starting the census operations, some preliminary steps are taken by the Census Commission such as preparation of schedules, lists of households in each area, training of enumerators, etc.

8. The filled up census schedules are collected, examined and analyzed statistically by the Census Commission.

9. The census data are published for circulation.

10. The census operations involve collection of information from households from door to door by enumerators. In some countries, schedules are sent by post and the required information is collected.

11. A census is a process whereby information is collected relating to age, sex, marital status, occupation, education etc. from people residing in a country.

12. Every country is legally bound to undertake a census after an interval of 10 years and people are bound to cooperate and provide the required information.

*Uses of Census**:***

Population census is very useful for researchers, administrators, social organisations, etc.

We highlight its uses as under:

1. It provides primary population data relating to age, sex, marital status, economic activities, occupations, migration, literacy, etc.

2. Population data throw light on the socio-economic problems of the country such as the status of women, male-female sex ratio, population density, literacy level, urbanisation, living standards, etc.

3. These data help researchers, administrators, planners and social organisations to suggest and adopt measures to solve the various problems.

4. Census data are used for constructing life tables by insurance companies.

5. They are highly useful for making population projections.

6. Census data are used for carrying out sample surveys.

7. They are used by the Election Commission of the country for demarcation of constituencies and allocation of seats for municipal corporations, state legislatures and parliament of the country.

8. Population data are one of the bases of allocation of resources between the centre and states in a federal country.

9. They guide the city planners in planning measures for the future growth of cities regarding their future needs relating to housing, transport, flyovers, sanitation, pollution, water, educational institutions, etc.

10. Population projections and age-sex structure of the population help the government in estimating for the future military personnel of the country.

Some Problems of Census:

Census operations are costly in terms of men, materials and money. They require huge manpower, piles of forms containing schedules and lot of money on them and on processing, preparing and publishing population data. The entire census work is also very time consuming.

1. Census is not a continuous process and is usually conducted after 10 years. So this is an ad hoc work which requires the training of census staff before each census. Thus experienced staff is not available.

2. The enumerators often interpret the terms used in the schedules in their own way despite the guidelines supplied to them by the Census Commission.

3. In the census operations, the enumerators are required to go from door to door to collect information. This work is not only time consuming but also monotonous. Some enumerators who shirk work and are dishonest fill up the schedules with cooked up figures sitting at home.

4. Often many persons are reluctant to provide correct information for fear that it may be used for some other purposes. This happens if the household is illiterate or the enumerator is not able to convince the former that the entire information is kept secret by law.

5. The household schedule pertaining to the census does not have any column about the number of family members who might have gone abroad.

6. In many developing countries, the column in the household schedule relating to age is based on age groups 1-5, 6-10, etc. thereby leaving a wide gap of 5 years. This creates a problem for the enumerator to fill up the age column which becomes a mere guess work. This is a defective method because age- specific information cannot be collected. In India and developed countries, age at the last birth in completed years is taken.

We may conclude with Barclay:

"In practice, some people are always missing. It is unpracticable to include all cases which belong to the universe. Some cases which ought to be covered according to rule are always omitted. On the other hand, some may be recorded more than once."

3.3 Registration:

Another source of population data is the registration of life or vital statistics. Every person is required by law to register with a specified authority such demographic events as birth, death, marriage, divorce, etc. Unlike the census, registration of vital events is a continuous process throughout the year.

It is an important source of information about citizenship, marital status, succession rights and settlement of disputes regarding birth and death

Registration is a secondary source of demographic data which is available from four sources:

(1) Vital Registration;

(2) Population Register;

(3) Other Records, and

(4) International Publications.

They are explained as under:

1. Vital Registration:

Recording of vital events (or vital statistics) like births, deaths, marriages, divorces, etc. is obligatory on the part of every citizen in a country. For instance, the birth of a child

has got to be registered with the municipal corporation of the town where the child is born in India.

Similarly, the occurrence of a death is required to be registered.

Such registration involves the filling up of a proforma with the following columns in each case:

Birth Certificate:

Name, Father's Name, Mother's Name, Age of Father, Age of Mother and Legitimacy.

Death Certificate:

Name of the deceased, date of death, sex, race/caste, age of the deceased, place of death, cause of death, occupation, marital status, permanent residence, etc.

In developed countries and in many developing countries, registration of marriage is also compulsory. But it is not so in India. Very few people want to register marriages with the Registrar of Marriages in developing countries like India. Bangladesh, Pakistan and Sri Lanka.

Similarly, in almost all the developing countries where the majority of people are illiterate and reside in rural areas, births and deaths are not reported to the registration authorities. Thus the registration records remain incomplete and ars imperfect source of demographic data.

But this is not the case in developed countries where people are educated and record births, deaths, marriages, divorces, etc. with the appropriate authorities

2. Population Register:

This is another secondary source of collecting population data. A number of European and Asian countries like Belgium, Sweden, Korea, Israel, etc. maintain permanent population register for administrative and legal purposes.

It contains the names, addresses, age, sex, etc. of every citizen, of those who migrate to other countries and who enter the country. The population registers helps in verifying the correctness of the census figures for that year.

3. Other Records:

Besides the population register, there are other records which are secondary sources of demographic data in developed countries. They maintain population records to meet social security schemes like unemployment insurance and allowance, old age pension, maternity allowance, etc.

In some countries, insurance companies maintain life tables relating to births and deaths and population trends. Selective demographic data are also available from electoral lists, income tax payers' lists, telephone subscribers' lists, etc. Though such administrative data are limited, they are helpful in providing for carrying out sample surveys.

4. International Publications:

Other sources of demographic data for the world and different countries are the United Nations Demographic Year Book and Statistical Year Book. The World Health Organisation (WHO) publishes a monthly journal Epidemiological and Vital Records which gives data on public health and mortality of different countries.

The United Nations Development Programme (UNDP) in its Human Development Report and the World Bank in its World Development Report publish annually demographic data relating to population growth, projections, fertility, mortality, health, etc. for countries of the world.

3.4 Sample Surveys:

Sample survey is another source of collecting population data. In a sample survey, information is collected from a sample of individuals rather than from the entire population. A sample consists of only a fraction of the total population. Several different population samples can be drawn on the basis of sample surveys such as the number of abortions, contraceptives used, etc. for the study of fertility.

Some countries conduct national sample surveys based on Random Sampling or Stratified Random Sampling. Whatever method is adopted, care should be taken to select a representative sample of the total population. The survey of the sample requires a small trained staff and small questionnaires relating to one aspect of the population. The data so collected are tabulated, analysed and published.

So this method takes less time and is less costly. Sample survey can be used to supplement the census data and to carry out further the trends in population growth in

between two census operations. Sampling is also used to check the accuracy of the census data where there is doubt in census results. This method yields good results if the sample is properly chosen.

Limitations:

The sampling method has certain limitations.

1. It is highly subjective and it is possible to arrive at different data with different samples of the same population.

2. There are bound to be errors in coverage, classification and sampling of population data.

3. As the survey requires many surveyors who may not be efficient and sincere, it is subject to large errors.

4. If the informants in the sample do not cooperate with the surveyors, the survey will not give accurate results.

To conclude with Stephen, “Samples are like medicines. They can be harmful when they are taken carelessly or without adequate knowledge of their effects.”

3.5 The national Family health survey (NFHS):

The National Family Health survey which is a household sample survey was carried out in 24 states and National Capital Territory of Delhi during 1992-93 NFHS has collected data from a nationally representative sample of 89,777 ever married women in the age the group 13-50 from 18,562 households. The NFHS is a collaborative project of the international institute for population science, Mumbai, all the Population research centre in the country, various data collecting organizations and the east – west Center/Macro international, United State of America and Ministry of Health and Family Welfare, New Delhi.

Main objective of the NFHS was to provide reliable and up to date state level and national level estimates on nuptiality, fertility, knowledge and practice of family planning, fertility preference, infant and child mortality, utilization of maternal and child health services, breast feeding and food supplementation practices, child nutrition and health. A further objective is to explore the demographic and socio-economic determinants of these factors. The information collected was intended to assist policy makers and programme administrators and researchers in assessing and evaluating population and

family welfare programmes and strategies. Some unique features of the NFHS are: uniform methods of sampling, uniform method of collection, uniform method oa analysis of data and uniform way of presentation of data. This has made inter-state comparison valid. The data collected in the NFHS are also comparable with to those of the Demographic Health Survey conducted in many other countries. The NFHS is an important source of demographic data for various states and India as a whole.

The NFHS is one of the most completed sample survey of its kind ever conducted in India after completion of data collection NFHS, the reports have been written and published for the each of the constituent state. Two volumes have been published for India. The NFHS conducted in 1992 - 93 was a major landmark in the development of demographic database for Indian states.

During 1998-99 a second round of the NFHS called the National Family Health Survey (NFHS-2) has started. The NFHS-2 is another important step to strengthen the database further for the implementation of the reproductive and child health approach, adopted by India since 1996.

NFHS-2 again is the outcome of collaborative of efforts of many organizations such as International Institute for Population Sciences (designated by the Ministry of Health and Family Welfare, New Delhi as a nodal agency), the United States agency for the International Development (funded the entire project of NFHS-2) ORC, Macro, East-West Center of USA (provided technical assistance). Responsibility of data collection was entrusted to 13 reputed organizations in India including some Population Research Centers.

The NFHS-2 covers a representative sample of about 90,000 ever-married women in the age group 15-49 years, from 25 states in India. The data collection for the NFHS-2 was collected during November 1998 to March 1999 in two phases. As NFHS-1, the NFHS-2 provides, state-level estimates on various demographic and health parameters. One important feature of the NFHS-2 is that data on nutritional status of women and children are collected by carrying out blood test for hemoglobin levels in addition to the measurement of their weight and height. The NFHS-2 collected information on two additional topics quality of care and the status of women.

3.6 Self- Check questions

(1) Meaning of census.
(2) Population Register.

(3) Meaning of Sample Survey Method.

3.7 Summary

Thus demographic data helps us to deepen our knowledge of the target audience, and to create our buyer personas. It is primarily used to strategically tailor offerings to specific target groups, and can serve as the basis for business analysis and performance reporting.

3.8 Glossary

- **Census –** A count for official purposes, especially one to count the number of people living in a country and to collect information about them.

- **Vital Registration-** vital statistics are conventionally numerical records of marriage birth, sickness, and death by which the health growth of community may be studied.

- **Sample Survey-** A sample survey is a survey which is carried out using a sampling method i.e. in which a portion only, and not the whole population is surveyed.

- **Population Register –** A population register is a register of residing persons normally in a given country. A additionally, a population register often provides some characteristics of individuals.

3.9 Self-Check Answers

Ans. 1 See section 3.2

Ans. 2 See section 3.3

Ans. 3 See section 3.4

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3.11Terminal Questions

1) What is demographic data? Explain.
2) Discuss the various methods of demographic data.
3) Explain the National Family Health Survey.

Lesson – 4

Malthus Theory of Population

Structure

4.0 Introduction

Thomas Robert Malthus was a famous 18th-century British economist known for the population growth philosophies outlined in his 1798 book "An Essay on the Principle of Population." In it, Malthus theorized that populations would continue expanding until growth is stopped or reversed by disease, famine, war, or calamity. He is also known for developing an exponential formula used to forecast population growth, which is currently known as the Malthusian growth model.

- Thomas Malthus was an 18th-century British philosopher and economist noted for the Malthusian growth model, an exponential formula used to project population growth.

- The theory states that food production will not be able to keep up with growth in the human population, resulting in disease, famine, war, and calamity.
- A noted statistician and proponent of political economy, Malthus founded the Statistical Society of London.

4.1 Objectives

After reading this lesson, you should be able to:

- Familiar with the Malthus theory of population
- Understand the background of Malthus, major elements and importance of Malthusian population theory
- discuss the criticism of Malthusian theory of population
- know about the Karl Mark's response to the Malthusian theory and also understand the Is Malthusian Theory valid today?

On February 13, 1766, Malthus was born into a prominent family near Guildford, Surrey, in England. Malthus was home-schooled before he was accepted to Cambridge University's Jesus College in 1784. There he earned a master's degree in 1791 and became a fellow two years later. In 1805, Malthus became a professor of history and political economy at the East India Company's college at Haileybury.

Malthus became a fellow of the Royal Society in 1819. Two years later, he joined the Political Economy Club, along with economist David Ricardo, and Scottish philosopher James Mill. Malthus was elected among the 10 royal associates of the Royal Society of Literature in 1824. In 1833, he was elected to both the Académie des Sciences Morales etPolitiques in France, as well as Berlin's Royal Academy. Malthus also co-founded the Statistical Society of London in 1834. He died in St. Catherine, near Bath, Somerset in 1834.

4.3 Malthus Theory of Population

The Malthusian Theory of Population is the theory of exponential population and arithmetic food supply growth. The theory was proposed by Thomas Robert Malthus. He believed that a balance between population growth and food supply can be established through preventive and positive checks.

Thomas Robert Malthus (1766-1834) was the key figure to analyse the population statistics. His formulation on population was a landmark in the history of

population theories. He generalized the relationship between population factors and social change.

In his Essay on the Principle of Population (1798) Malthus argued that because of the strong attraction of the two sexes, the population could increase by multiples, doubling every twenty-five years. He contended that the population would eventually grow so large that food production would be insufficient.

Human capacity for reproduction exceeded the rate at which subsistence from the land can be increased. Malthus further wrote 'Population when unchecked increases in a geometrical ratio. Subsistence increases only in an arithmetical ratio.'

Malthus contended that the world's population was growing more rapidly than the available food supply. He argued that the food supply increases in an arithmetic progression (1, 2, 3, 4, and so on), whereas the population expands by a geometric progression (1, 2, 4, 8, and so on).

According to him, the population could increase by multiples, doubling every twenty-five years. He said the gap between the food supply and population will continue to grow over time. Even though food supply will increase, it would be insufficient to meet the needs of expanding population. Moreover, the famine and other natural calamities cause widespread sufferings and increase the death rate, which is nature's check against population.

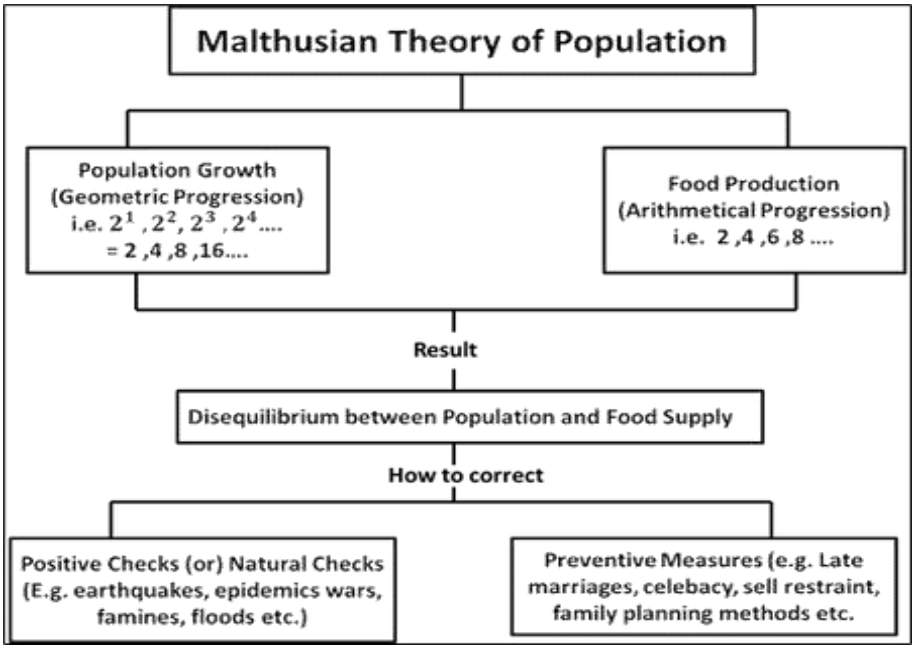
The theory propounded by Malthus can be summed up in the following propositions:

1) Food is necessary to the life of man and, therefore, exercises a strong check on population. In other words, population is necessarily limited by the means of subsistence (i.e., food).
2) Population increases faster than food production. Whereas population increases in geometric progression, food production increases in arithmetic progression.
3) Population always increases when the means of subsistence increase, unless prevented by some powerful checks.
4) There are two types of checks which can keep population on a level with the means of subsistence. They are the preventive and a positive check.

4.4 Major Elements of the Malthusian Theory

1. Population and Food Supply

The Malthusian theory explained that the population grows in a geometrical fashion.The population would double in 25 years at this rate. However, the food supply grows in an arithmetic progression. Food supply increases at a slower rate than the population. That is, the food supply will be limited in a few years. The shortage of food supply indicates an increasing population.



2. Checks on Population

When the increasing population rate is greater than the food supply, disequilibrium exists. As a result, people will not get enough food even for survival. People will die due to lack of food supply. Adversities such as epidemics, wars, starvation, famines and other natural calamities will crop up which are named as positive checks by Malthus. On the contrary, there are man-made checks known as preventive checks.

3. Positive Checks

Nature has its own ways of keeping a check on the increasing population. It brings the population level to the level of the available food supply. The positive checks include famines, earthquakes, flood, epidemics, wars, etc. Nature plays up when the population growth goes out of hand.

4. Preventive Checks

The preventive measures such as late marriage, self-control, simple living, help to balance the population growth and food supply. These measures not only check the population growth, but can also prevent the catastrophic effects of the positive checks.

6.5 Criticism of Malthusian Theory of Population

The Malthusian theory was criticised based on the following observations:

1. In Western Europe, the population was rising at a rapid rate. At the same time, the food supply had also increased due to technological developments.
2. Many times, food production had increased more than the population. For eg., 2% of the total population is working in the agricultural sector in the US. Still, the total GDP is more than 14 trillion dollars.
3. Malthus theory stated that one of the reasons for limited food supply is non-availability of land. However, the amount of food supply in various countries has increased due to increased globalization.
4. The estimations for the geometric growth of population and arithmetic growth of population were not provided by Malthus. It was stated that the rate of growth is not consistent with Malthus' theory.

The Malthusian theory of population has been a subject of keen controversy.

The following are some of the grounds on which it has been criticized:

(1) Mathematical Form of the Theory Wrong:
The mathematical formulation of Malthus' doctrine that food supply increases in arithmetical progression and population increases in geometrical progression in 25 years have not been proved empirically. Rather, the food supply has increased more than in the arithmetical progression while population growth has not been in geometrical progression so as to double the population in 25 years. But this criticism is beside the point because Malthus used his mathematical formulation to make his principle clear in the first edition of his Essay and deleted it in its second edition.

(2) Failed to foresee the Opening up of New Areas:
Malthus had a narrow vision and was particularly influenced by local conditions in England. He failed to foresee the opening up of new areas of Australia, the United

States and Argentina where extensive farming of virgin lands led to increased production of food.

As a result, countries like England on the continent of Europe have been provided with abundant supplies of cheap food. This has been made possible with rapid improvements in the means of transport, a factor almost overlooked by Malthus. No country need fear starvation and misery if it does not produce sufficient for its increasing population these days.

(3) Applied a Static Economic Law to a Period of Time:

The Malthusian notion that the food supply increases in arithmetical progression is based on a static economic law at any one time, i.e. the law of diminishing returns. Malthus could not foresee the unprecedented increase in scientific knowledge and agricultural inventions over a period of time which has stayed the law of diminishing returns. Consequently, the food supply has increased much faster than in arithmetical progression. Malthus has been proved wrong not only in the advanced countries but also in developing countries like India with the 'green revolution'.

(4) Neglected the Manpower Aspect in Population:

One of the principal weaknesses of Malthus' thought has been that he neglected the manpower aspect in population growth. He was a pessimist and dreaded every increase in population. He forgot, according to Cannan, that **"a baby comes to the world not only with a mouth and a stomach, but also with a pair of hands."**

This implies that an increase in population means an increase in manpower which may tend to increase not only agricultural but also industrial production and thus makes the country rich by an equitable distribution of wealth and income. As rightly pointed out by Seligman said "The problem of population is not merely one of mere size but of efficient production and equitable distribution." Thus the increase in population may be necessary.

(5) Population not related to Food Supply but to Total Wealth:

The Malthusian theory rests on a weak relationship between population and food supply. In fact, the right relationship is between population and total wealth of the country. This is the basis of the optimum theory of population. The argument is that if a country is rich materially and even if it does not produce enough food for its population, it can feed the people well by importing food stuffs in exchange for its products or money.

The classic example is of Great Britain which imports almost all its food requirements from Holland, Denmark, Belgium and Argentina because it concentrates more on the production of wealth rather than on food products. Thus the very basis of the Malthusian doctrine has been proved wrong.

(6) Increase in Population the Result of declining Death Rate:

The Malthusian theory is one sided. It takes the increase in population as the result of a rising birth rate, whereas population has grown considerably the world over due to a decline in death rate. Malthus could not foresee the marvellous advancements in the field of medical sciences which have controlled fatal diseases and made human life longer. This has been particularly so in underdeveloped countries like India where the Malthusian theory is said operate.

(7) Empirical Evidence proves this Theory Wrong:

Empirically, it has been proved by demographists that population growth is a function of the level of per capita income. When per capita income increases rapidly, it lowers the fertility rate and the rate of population growth declines. Dumont's "social capillarity thesis" has proved that with the increase in per capita incomes, the desire to have more children to supplement parental incomes declines.

When people are accustomed to a high standard of living, it becomes a costly affair to rear a large family. Population tends to become stationary because people refuse to lower their standard of living. This has actually happened in the case of Japan, France and other western countries.

(8) Preventive Checks do not pertain to Moral Restraint:

Malthus was essentially a religious man who laid emphasis on moral restraint, celibacy, late marriage, etc. to control population. But he could not visualize that human beings would invent contraceptives and other family planning devices for birth control. This was perhaps due to the fact that he could not make any distinction between sexual desire and the desire to have children.

People have sexual desire but they do not want to have more children. Thus moral restraint alone cannot help to control the increase in population which Malthus suggested. Family Planning is essential as a preventive check.

(9) Positive Checks not due to Over-population:

Malthus' pessimism and religious education led him to believe that over-population was a heavy burden on the earth which was automatically lessened by God in the form of misery, wars, famines, floods, diseases, pestilence, etc. But all these are natural

calamities which are not peculiar to over-populated countries. They visit even those countries where the population is on the decline or stationary, such as France and Japan.

(10) Malthus a False Prophet:

The Malthusian theory is not applicable to countries for which this was propounded. In the western European countries, the bogey and pessimism of Malthus has been overcome. His prophecy that misery will stalk these countries if they fail to check the growth of population through preventive checks has been proved wrong by a decline in birth rate, adequacy of food supply, and increase in agricultural and industrial production. Thus Malthus has proved to be a false prophet.

Its Applicability:

Despite these weaknesses, the Malthusian doctrine contains much truth. The Malthusian doctrine may not be applicable to the Western Europe and England but its principal tools have become the part and parcel of the people of these countries. If these lands do not face the problems of over-population and misery, it is all due to the bogey and pessimism of Malthusianism.

In fact, the people of Europe were made wiser by Malthus who forewarned them of the evils of over-population and they started adopting measurers toward it off. The very fact that people use preventive checks, like late marriage and various contraceptives and birth control measures on an extensive scale proves the vitality of the Malthusian law.

Even famous economists like Marshall and Pigou and sociologists like Darwin were influenced by this principle when they incorporated it in their theories. And Keynes, initially overawed by the Malthusian fears of over-population, later wrote about “Some Economic Consequences of Declining Population.” Is it not the fear of Malthusianism which has created the problem of declining population in France?

The Malthusian doctrine may not be applicable now to its place of origin, but its influence spreads over two-third of this universe. Excluding Japan, the whole of Asia, Africa and South America come under its purview. India is one of the first countries to adopt family planning on state level to control population. Positive checks like floods, wars, droughts, diseases, etc. operate. The birth and death rates are high. The growth rate of population is about 2 per cent per annum.

The real aim of population policy is, however, not to avoid starvation but to eliminate poverty so as to raise output per head in an accelerated manner. Thus the

Malthusian theory is fully applicable to underdeveloped countries like India. Walker was right when he wrote: **"The Malthusian theory is applicable to all communities without any consideration of colour and place. Malthusianism has stood un-shattered, impregnable amid all the controversy that has raged around it."**

4.6 Karl Marx's Response to Malthus Thesis:

The debate about the Malthusian theory has continued down to the present. Economists such as J.S. Mill and J.M. Keynes supported his theory whereas others, especially, sociologists, have argued against it. According to them, the widespread poverty and misery of the working class people was, not due to an eternal law of nature as propounded by Malthus but to the misconceived organization of society.

Karl Marx went one step further and argued that starvation was caused by the unequal distribution of the wealth and its accumulation by capitalists. It has nothing to do with the population. Population is dependent on economic and social organization. The problems of overpopulation and limits to resources, as enunciated by Malthus, are inherent and inevitable features associated with the capitalist system of production.

Marx's contention that food production could not increase rapidly was also debated when new technology began to give farmers much greater 5delds. French sociologist E. Dupreel (1977) argued that an increasing population would spur rapid innovation and development to solve problems, whereas a stable population would be complacent and less likely to progress.

During the depression of the 1930s, the debate changed somewhat because the birth rate fell sharply in industrial (western) nations. Some predicted that human species would die out. Schemes were proposed to encourage families to have more children by giving them allowances for each child born. The birth rate rose sharply after World War II, especially in the underdeveloped nations like India, Africa and Bangladesh. Birth control programmes were instituted to control the population so as to eliminate starvation.

Despite the criticisms, the Malthusian thesis gained widespread currency during his lifetime. His ideas had profound effects on public policies, on the classical and neo-classical economists, on demographers and evolutionary biologists led by Charles Darwin.

His principle of population has been successful in highlighting the urgency to maintain a balanced relationship between population growth and means of subsistence. The critics of Malthus failed to realize that it was because of a large measure of truth in

Malthusian principle of population that men today feel the need of resorting to contraception to keep their families within reasonable limits. Another main contribution of Malthus was to give a new line of thinking whereby the dynamics of population growth were viewed in the context of man's welfare.

4.7 Importance of Malthusian Theory of Population

- There are certain aspects of the Malthusian idea that are worth considering. Humans are driven by a strong urge to procreate. This is to ensure that the family's genealogy and history are preserved. As a result, if birth control measures are not implemented, the population will continue to expand fast.
- To some extent, Malthus' ideas about positive checks are correct. History has proven that anytime a country's population grows, thousands of people die as a result of natural disasters.
- After considering these points, it is possible to conclude that the theory is valid to some extent. Some of the most prominent economists of our time have remarked that Thomas Malthus indicated the partial truth in this population growth theory, which no one can deny.

4.8 Things to remember based on Malthusian Theory of Population

- Neo-Malthusianism advocates that in order to protect the environment and resources for present and future human populations and other species, human population control must be followed.
- In the United Kingdom, the name 'Malthusian' may also apply to arguments in favor of contraception, as evidenced by groups like the Malthusian League.
- Neo-Malthusians are distinguished from Malthus' views mostly by their support for contraception.
- Compared to Malthus, the modern neo-Malthusians are more concerned with catastrophic starvation & environmental deterioration than with poverty.

- According to Malthusian theory, the rate of increase in the human population outpaces that of the means of sustenance, such as food, clothes, and other agro-products.

- Because the agro-product output is slower, population expansion outpaces it, resulting in the advent of poverty.

- Controlling population increase is critical for population sustainability.
- Positive checks help to re-establish the equilibrium between population expansion and food availability.

4.9 Is Malthusian Theory Valid Today?

We must, however, add that though the gloomy conclusions of Malthus have not turned out to be true due to several factors which have made their appearance only in recent times, yet the essentials of the theory have not been demolished. He said that unless preventive checks were exercised, positive checks would operate. This is true even today. The Malthusian theory fully applies in India.

We are at present in that unenviable position which Malthus feared. We have the highest birth-rate and the highest death-rate in the world. Grinding poverty, ever-recurring epidemics, famine and communal quarrels are the order of the day. We are deficient in food supply.

Our standard of living is incredibly low. Who can say that Malthus was not a true prophet, if not for his country, at any rate for the Asiatic countries like India, Pakistan and China? No wonder that intense family planning drive is on in India at present.

4.10 Self- Check Questions

(1) Elements of Malthus theory.

(2) Importance of Malthus theory.

(3) Highlight the Malthus theory of population.

(4) Discuss the criticism of Malthus theory of population.

4.11 Summary

In this lesson, we have dealt with the Malthus theory of population. We have also touched upon the background and major elements of the Malthusian theory of population. We have also covered the criticism and importance of the Malthus theory of

population. All these must have provided you broader perspective regarding Malthus theory of population.

4.12 Glossary

- **Subsistence -** is defined as the very basic necessities of life**.** Farming to provide yourself with the necessary food to eat is an example of subsistence. Means of support or livelihood; often, specif., the barest means in terms of food, clothing, and shelter needed to sustain life. The quality of being inherent.

- **Gross domestic product -** (GDP) is the total monetary or market value of all the finished goods and services produced within a country's borders in a specific time period.

- **Equilibrium -** a state of balance, especially between forces or influences that are working in opposite ways.

- **Sustainability -** the ability to be sustained, supported, upheld, or confirmed. Environmental Science. the quality of not being harmful to the environment or depleting natural resources, and thereby supporting long-term ecological balance: The committee is developing sustainability standards for products that use energy.

4.13 Self-Check Answers

Ans. 1 See section 6.4

Ans. 2 See section 6.7

Ans. 3 See section 6.3

Ans. 4 See section 6.5

4.14 Suggested Readings

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4.15 Terminal Questions

1) Explain the major elements of the Malthusian theory of population.
2) Discuss the criticism of the Malthusian theory of population.
3) Write a note on Malthusian theory of population.
4) Discuss in detail Malthusian theory of population with examples

Lesson- 5

Optimum Theory of Population

Structure

5.0 Introduction

Human has a tendency to increase population number much rapidly in proportion to his mean income and capability of looking after the children. For this reason, population needs to be checked at certain points. Though many social scientists and economists do not believe that Malthus disaster is helpful or appropriate to control

population, but they believe that human has the knowledge and ability to reach optimum population in a convenient way, and thus optimum theory of population has come to light. (Rouf, Bilah and Rahman, 2007)

5.1 Objectives

After reading this lesson, you should be able to:-

- Familiar with the optimum theory of population
- Understand the history, definitions and explanation of optimum population theory
- to know about the merits, demerits of the optimum theory of population and also understand how superiority of optimum theory of population over the Malthusian theory

5.2 History of Optimum population Theory

Theory The optimum theory of population was propounded by Edwin Cannan in his book Wealth published in 1924 and popularized by Robbins, Dalton and Carr-Saunders. Unlike the Malthusian theory, the optimum theory does not establish relationship between population growth and food supply. Rather, it is concerned with the relation between the size of population and production of wealth. The Malthusian theory is a general theory which studies the population problem of a country in keeping with its economic conditions. Thus the optimum theory is more realistic than the Malthusian theory of population. (Gupta, 2010) It is also called modern theory of population. In recent years, Prof. Robbins, Dalton and Carr- Saunders have refined and polished the theory and put it in a more presentable form. This theory is an improvement over the Malthusian Theory.

5.3 Optimum Theory of Population

The optimum theory of population was propounded by Edwin Cannan in his book “Wealth” published in 1924 and popularised by Robbins, Dalton and Carr-Saunders of London School of Economics. Unlike the Malthusian theory, the optimum theory does not establish relationship between population growth and food supply. Rather, it is concerned with the relation between the size of population and production of wealth. The Malthusian theory is a general theory which studies the population problem of a country in keeping with its economic conditions. Thus the optimum theory is more realistic than the Malthusian theory of population.

The optimum population is the ideal population which combined with other available resources or means of production of the country will yield the maximum returns or income per head. Given these assumptions, the optimum population is that ideal size of population which provides the maximum income per head. Any rise or diminution in the size of the population above or below the optimum level will diminish income per head. Given the stock of natural resources, the technique of production and the stock of capital in a country, there is a definite size of population corresponding to the highest per capita income. Other things beings equal, any deviation from this optimum-sized population will lead to a reduction in the per capita income. If the increase in per capita income, the country is under -populated and it can afford to increase its population till it reaches the optimum level.

The optimum population is the ideal population which combined with other available resources or means of production of the country will yield the maximum return **or** income per head.

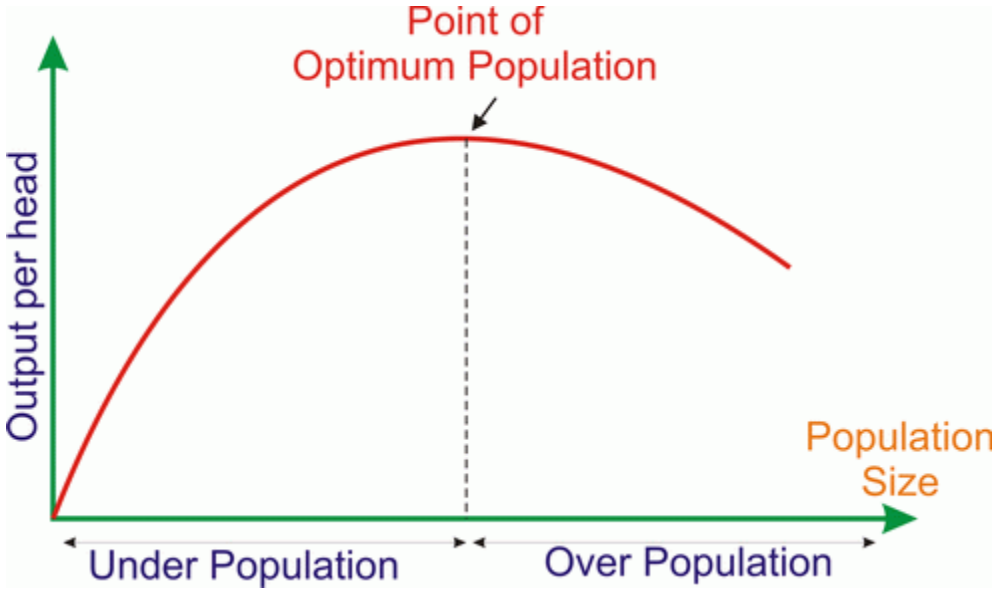
The concept of the optimum population was first propounded by Confucius.

- 'Excessive growth may reduce output per worker, repress levels of living for the masses and engender strife'. - Confucius (551 – 479 BCE)

In the 19th century, the first beginnings of this concept may be traced to the writings of a German professor, Karl Winkelblech (1810-1865), who while describing population theory and policy, classified nations into three categories according to the size of their population:

1. Under-populated nations
2. Over-populated nations; and
3. Nations with normal populations, meaning a size favourable to the greatest possible productivity.

The optimum theory of population was propounded by Edwin Cannan in his book Wealth(1924). The theory was popularised by Robbins, Carr Saunder, and Dalton.



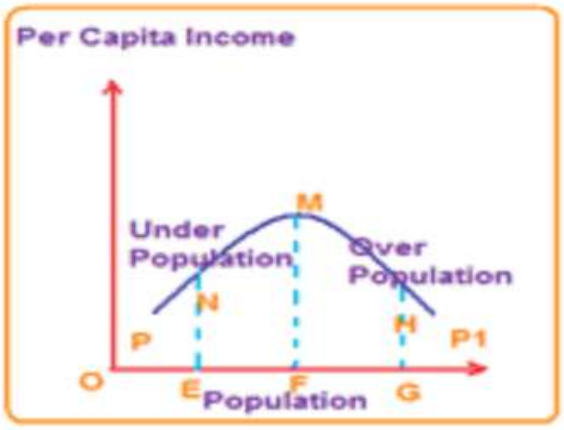
Optimum Population Theory is based on the following postulations:

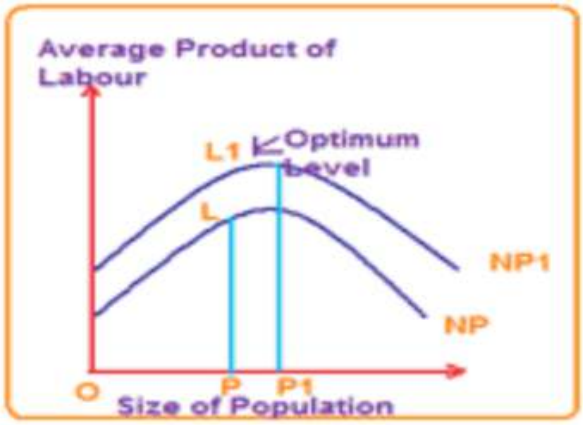
1. The natural resources of a country are given at a point of time, but they change over time.
2. There is no change in techniques of production.
3. The stock of capital remains constant.
4. The habits and taste of the people do not change.
5. The ratio of the working population to total population remains constant even with the growth of population.
6. Working hours of labour do not change.
7. Modes of business organisation are constant.

The short main points of Theory

- The optimum population is that ideal size of population which provides the maximum income per head.
- Any rise or reduction in size of population above or below the optimum level will diminish income per head.
- Given the stock of natural resources, the technique of production and stock of capital in a country, there is a definite size of population corresponding to highest per capita income.
- Other things being equal, any deviation from optimum size population will lead to reduction in per capita income.

- If the increase in population is followed by the increase in per capita income, the country is under-populated and it can afford to increase in population till it reach the optimum level.
- If the increase in population leads to diminution of per capita income, the country is over-populated and needs a decline in population till the per capita income is maximised.
- The per capita income is the highest at the optimum point, after that the average product of labour start falling.
- Optimum population is not fixed point, it changes with the change in any of the factors.
- If there is improvements in methods and techniques of production, the output per head will rise and the optimum point will shift upwards.
- With increase in stock of natural resources, the optimum point of the country will increase.





5.4 Definitions of Optimum Theory of Population

The concept of optimum population has been defined differently by Robbins, Carr-Saunders and Dalton.

Robbins defines it as “the population which just makes the maximum returns possible is the optimum population or the best possible population.”

Carr-Saunders defines it as “that population which produces maximum economic welfare.”

According to Dalton, “Optimum population is that which gives the maximum income per head.”

5.5 Statement of the Theory

The founders of the theory state it as-

“Given the natural resources, stock of capital and the state of technical knowledge, there will be a definite size of population with the per capita income. The population which has the highest per capita income is known as optimum population”.

Optimum Population: The economists like Carr Saunders considered “optimum population" as that which produces maximum welfare. On the other hand, Prof. Cannan defined this theory in terms of „return to labour". He remarked, “Knowledge and circumstances remaining the same, there is what may be called maximum return when the amount of labour is such that both an increase and decrease in it would diminish proportionate return.” Similarly, Bounding has rightly observed, “Optimum population is that at which standard of living is maximum.

Under population: If the actual population in a country is less than theoptimum or ideal population, there will not be enough people to exploit all the resources of the country fully. Thus, the population and the per capita income will be lower. In other words, if the per capita income is low due to too few people, the population is then under population.

Over Population: If the actual population is above the level of optimumpopulation, there will be too many people to work efficiently and produce the maximum goods and the highest per capita income. As a result, the per capita income becomes poorer than before. This is the stage of over population. In other words, if the per capita income is low due to too many people, the population under these circumstances would be over population.

5.6 Explanation to the Optimum Theory of Population

Given these assumptions, the optimum population is that ideal size of population which provides the maximum income per head. Any rise or diminution in the size of the population above or below the optimum level will diminish income per head.

Given the stock of natural resources, the technique of production and the stock of capital in a country, there is a definite size of population corresponding to the highest per capita; income. Other things being equal, any deviation from this optimum-sized population will lead to a reduction in the per capita income.

If the increase in population is followed by the increase in per capita Population income, the country is under-populated and it can afford to increase its population till it reaches the optimum level. On the contrary, if the increase in population leads to diminution in per capita income, the country is over-populated and needs a decline in population till the per capita income is maximised. This is illustrated in Fig.1

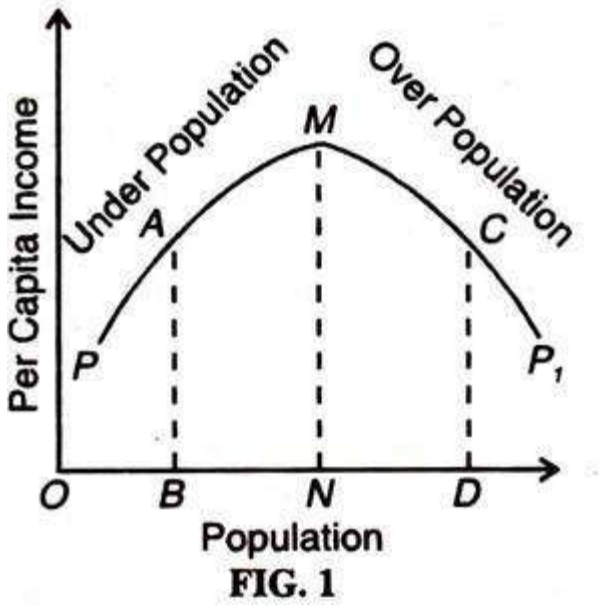


FIG. 1

In the figure population is measured along the horizontal axis and per capita income on the vertical axis. In the beginning there is under-population and per capita income increases with population growth, the per capita income of OB population is BA; which is less than the maximum per capita income level NM. The ON size of population represents the optimum level where per capita income NM is the maximum.

If there is a continuous increase in population from ON to OD then the law of diminishing returns applies to production. As a result, the per capita production is lowered and the per capita income also declines to DC due to increase in population. Thus ND represents over-population. This is the static version of the theory.

But the optimum level is not a fixed point. It changes with a change in any of the factors assumed to be given. For instance, if there are improvements in the methods and

techniques of production, the output per head will rise and the optimum point will shift upward.

What the optimum point for the country is today, may not be tomorrow, if the stock of natural resources increases and the optimum point will be higher than before. Thus the optimum is not a fixed but a movable point.

This is explained in terms of Cannan's theory. According to Cannan, "At any given time, increase of labour up to a certain point is attended by increasing proportionate returns and beyond that point further increase of labour is attended by diminishing proportionate returns."

The per capita income is the highest at the point where the average product of labour starts falling. This point of maximum returns is the point of optimum population. This is illustrated in Figure 2.

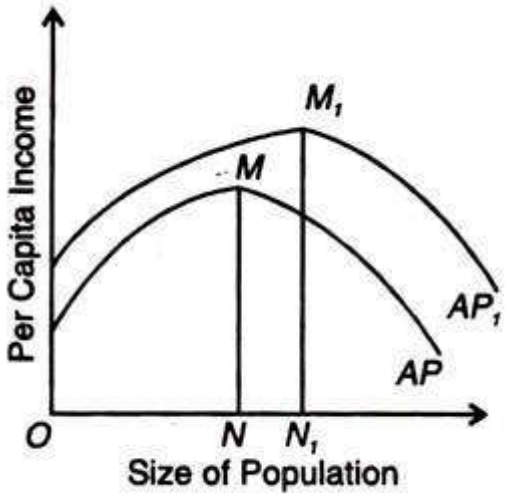


FIG. 2

The size of population is measured on the horizontal axis and the average product of labour on the vertical-axis. AP is the average product of labour or income per head curve. Upto ON, increase in population leads to a rise in the average product of labour and per capita income.

Beyond ON, the average product of labour and per capita income fall. Hence when population is ON, the per capita income is the highest at point M. Thus, ON is the optimum level of population. To the left of ON, the country is under-populated and beyond ON, it is over-populated.

However, ON is not a fixed point. If due to inventions there are improvements in the techniques of production, the average product of labour might increase and push the level of per capita income upward so that the optimum point rises. This is shown in Figure 2 where the AP_1 curve represents the higher average product of labour and point M_1 shows the maximum per capita income at the new optimum level of population ON_1.

5.6.0 Dalton's Formula:

Dalton has deduced over-population and under- population which result in the deviation from the optimum level of population in the form of a formula. The deviation from the optimum, he calls maladjustment. Maladjustment is a function of two variables, the optimum level of population O and the actual level of population A. Then the maladjustment is

$$M = \frac{A - O}{o}$$

When M is positive, the country is over-populated, and if it is negative, the country is under-populated. When M is zero, the country possesses optimum population. Since it is not possible to measure O, this formula is only of academic interests

5.6.1 Sengupta's formula

- I = (P1-P)/A
- Where I is the index of population
- P1 is the rural population capable of being supported by land resource base.
- P is the actual rural population.
- A is the total area.
- This method has applicability in India which is an agrarian country.

5.7 Merits/Benefits of the Optimum Population Theory

The theory is a landmark in the science of demography. Its merits are under noted:

1. Comprehensive Approach: It explains the problems of population in a comprehensive way from the production side. It also explains the relationship between productive efficiency and production.

2. Qualitative Nature of the Theory: Prof. Bye said, “Optimum population is difficult to find because size of population must lead to the fullest development of social and economic life.”
3. Pragmatic Approach: This theory is also pragmatic, i.e. it is concerned with practical results.
4. More Detailed Analysis: The optimum theory of population provides more detailed analysis as it considers over and under- population and brings out the evils of both.

5.8 Superiority of Optimum Theory of Population over the Malthusian Theory

The optimum theory of population is superior to the Malthusian theory on the following grounds:

1) The Malthusian law is a general study of the population problem because it is applicable to all countries irrespective of their economic conditions. The optimum theory is superior to the Malthusian theory because it studies the population problem in relation to the economic conditions of a particular country.

2) Malthus had a narrow vision. He related the growth of population to food supply. Cannan, on the other hand, had a much wider outlook. He related the problem of population to the total production of the country, both industrial and agricultural.

3) The Malthusian theory is a static concept which applies to a period of time. The optimum theory is a dynamic one because over a period of time the per capita income may rise with the expansion in output due to improvements in knowledge, skill, capital, equipment and other elements in production. This may raise the optimum level of population. Thus, the optimum theory is more realistic.

4) The Malthusian doctrine is simply theoretical and is devoid of all practical considerations. It regards all increases in population bad, for they bring untold miseries to the people. Malthus wrote, “The table of nature is laid for a limited number of guests and those who come uninvited must starve.”On the other hand, the optimum theory is very practical because it regards an increase in population not only desirable but also necessary for the maximum utilisation of the country’s natural resources.

5) The Malthusian theory of population is based on the unrealistic assumption of the niggardliness of nature. This belief arises from the operation of the law of diminishing returns in agriculture, but the optimum theory takes a realistic view when according to this, the law of diminishing returns does not operate in agriculture immediately but after the optimum point is reached. In other words, first the law of increasing returns operates up to the optimum point and the law of diminishing returns after it.

6) Malthus was so much obsessed by the fear of over-population that he ignored a fundamental fact that a newly born child 'comes not only with a mouth and a stomach but also with a pair of hands'. The optimum population theory allays all such fears of the Malthusians by stressing the fact that increasing population increases the labour force which helps raise the optimum expansion of the country's natural resources.

So long as the actual population is less than the optimum, the increase in population is safe and good. It is only when the actual population exceeds the optimum that the increase in population needs control. Thus unlike the Malthusian theory which necessitates the use of preventive checks all the time for fear of the country being over-populated, the optimum theory is free from all such taboos and is silent about any type of checks to control population.

7) Malthus was essentially a pessimist who portrayed a gloomy picture about the future of mankind which was full of misery, vice, floods, droughts, famines and other natural calamities. The optimum theory is superior to the Malthusian theory because it does not suffer from any pessimism, rather it adopts an optimist and realistic attitude towards the problem of population when it relates population to the wealth of the country.

5.9 Demerits or Criticism of the Optimum Population Theory

The optimum theory of population is not free from defects. The critics have criticized the theory on the basis of the following grounds.

(1)Difficult to Determine Optimum Population: It is extremely difficult to know the optimum population of a country at any time. Many factors like technical knowledge, stock of capital, per capita income and natural resources etc. have to be taken into account for this purpose.

(2)A Static Theory: The optimum theory is criticized as a static short period theory. It ignores changes in natural and human resources which affect per capita income. This

theory is also silent about the important questions of the determinants of population growth.

(3)Neglects Biological and Sociological Factors: Some critics also argue that this theory has not taken into account the biological and sociological factors which govern the size and growth of population. Strictly speaking, this theory is not a theory of population. It simply explains the state of population with reference to per capita income.

(4)Not a Realistic Theory: It is pointed out that two assumptions, on which the theory has been based, are not realistic. So, the practical value of this theory is reduced. In fact, natural resources, technical knowledge and production methods are generally changeable.

(5)Only Economic Factors Considered: The critics point out that the theory takes into account purely economic factors which determine the optimum size of the population of a country. This is one side of the picture. It should also be considered the social, political and other noneconomic factors.

(6) Not Practicable: The optimum theory is not practicable and it is not fixed. Thus, it is unable to guide to the formation of any policy. Prof. Robbins says that this theory is the most sterile idea of economics.

(7)Distributional Aspect Neglected: The theory neglects the distributional aspect of the problem. This theory considers simple population to income per head. This increase of population and national income cannot be useful to a country if the increased national income is not properly and equitably distributed among the various sections of the society. Therefore, realistic theory must account for income distribution as a factor in determining the optimum population.

(8) No Evidence of Optimum Level:

The first weakness of the optimum theory is that it is difficult to say whether there is anything like an optimum population. There is no evidence about the optimum population level in any country.

(9) Optimum Level Vague:

Optimum population implies a qualitative as well as a quantitative ideal population for the country. The qualitative level implies not only physique, knowledge and intelligence, but also the best age composition of population. These variables are subject to change and are related to an environment. Thus the optimum level of population is vague.

(10) Correct Measurement of Per Capita Income not Possible:

Another difficulty pertains to the measurement of per capita income in the country. It is not an easy task to measure changes in per capita income. The data on per capita income are often inaccurate, misleading and unreliable which make the concept of optimum as one of doubtful validity.

(11) No Place in State Policies:

The concept of optimum population has no place in the policies of modern states. While fiscal policy aims at increasing the level of employment, output and income in a country, no reference is made to the optimum level of population.

(12) Does not explain determinants of population growth:

It does not explain the reasons for rise or fall in birth and death rates, the influence of urbanisation and migration on population growth, etc.

Critical Analysis

Despite the superiority of the optimum theory over the Malthusian theory of population, it has serious weaknesses.

- No Evidence of optimum level in any country
- Difficult to measure optimum level
- Correct measure of per capita income is not possible
- Neglects the distribution aspects of per capita income
- Optimum level not fixed but changes with time
- Neglects social and institutional conditions
- No place in state policies
- Does not explain the determinants of population growth.

5.10 Self- Check Questions

1) Definitions of optimum population.
2) Merits of optimum population theory.
3) Highlight the optimum theory of population.
4) Discuss the criticism of optimum theory of population.
5) Explain Dalton's formula.

5.11 Summary

Modern economists have rejected the Malthusian theory of maximum population, which if exceeded will spell misery in the country. Instead of the maximum population the modern economists have substituted the idea of optimum population. Despite of so much criticism leveled against optimum theory, it is surely said that it is an improvement over Malthusian Theory. The optimum theory is an important landmark in the science of demography. It is valuable because it enables us to overcome the bogey of Malthusianism and give us a test of progress (in per capita income). But this theory is not useful in social life due to its static nature. Thus, it is not a guiding principle to any economic policy. It requires being re-casted in a dynamic setting for making it more successful.

5.12 Glossary

- **Optimum Population** - The optimum population is a concept where the human population is able to balance maintaining a maximum population size with optimal standards of living for all people.

- **Production -** is the process of manufacturing or growing something in large quantities.
- **Per capita income -** is a measure of the amount of money earned per person in a nation or geographic region. Per capita income can be used to determine the average per-person income for an area and to evaluate the standard of living and quality of life of the population.

5.13 Self-Check Answers

Ans. 1 See section 7.4

Ans. 2 See section 7.7

Ans. 3 See section 7.3

Ans. 4 See section 7.9

Ans. 5 See Sub Section 7.6.0

5.14 Suggested Readings

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5.15 Terminal Questions

1) Explain the major points of the Optimum theory of population.
2) Discuss the criticism of the Optimum theory of population.

3) Write a note on Dalton's formula.
4) Discuss in detail optimum theory of population with examples.
5) Describe how superiority of optimum theory of population over the Malthusian theory.

Lesson- 6

Demographic Transition Theory of Population

Structure

6.0 Introduction

In demography, demographic transition is a phenomenon and theory which refers to the historical shift from high birth rates and high death rates in societies with minimal technology, education (especially of women) and economic development, to low birth rates and low death rates in societies with advanced technology, education and economic development, as well as the stages between these two scenarios. Although this shift has occurred in many industrialized countries, the theory and model are frequently imprecise when applied to individual countries due to specific social, political and economic factors affecting particular populations.

However, the existence of some kind of demographic transition is widely accepted in the social sciences because of the well-established historical correlation linking dropping fertility to social and economic development. Scholars debate whether industrialization and higher incomes lead to lower population, or whether lower populations lead to industrialization and higher incomes. Scholars also debate to what extent various proposed and sometimes inter-related factors such as

higher per capita income, lower mortality, old-age security, and rise of demand for human capital are involved.

6.1 Objectives

After reading this lesson, you should be able to:-

- Familiar with the demographic transition theory of population
- Understand the demographic transition in India
- to know about the various theories of population

6.2 History of Demographic Transition

The theory is based on an interpretation of demographic history developed in 1929 by the American demographer Warren Thompson (1887–1973). Adolphe Landry of France made similar observations on demographic patterns and population growth potential around 1934. In the 1940s and 1950s Frank W. Notestein developed a more formal theory of demographic transition. By 2009, the existence of a negative correlation between fertility and industrial development had become one of the most widely accepted findings in social sciences.

6.3 Demographic Transition in India

Following are the four stage trends in demographic transition in India.

First Stage

In India, the first stage of demographic transition was witnessed till 1920 when both the birth and death rates were very high.

Second Stage

The first stage of demographic transition was witnessed from the early 1920s and extended till early 1970s. During this period, India witnessed decline in death rates. The decline was possible since the major causes of mortality such as the famines and epidemics were brought under control. However, the decline in death rates increased the population growth rates of the country, especially between 1921 and 1951.

Third Stage

India is witnessing the third stage of demographic transition from 1971. During the 1970s, the country witnessed a decline in death rate which was almost the same as the decline in birth rate, leading to a plateau in population growth in 1960s and 1970s.

During the 1980s and 1990s, there was a faster decline in birth rate than death rate which is still continuing to the present times.

Fourth Stage

The Office of the Registrar General of India has predicted that India is set to enter the fourth stage of demographic transition by around 2026. The Registrar General have also released the expected dates when the major States are expected to achieve Total Fertility Rate (TFR) of 2.1. The goal of TFR of 2.1 has been already achieved by Kerala, Tamil Nadu, Andhra Pradesh, Karnataka, Maharashtra and West Bengal. But the states like Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Rajasthan, Uttar Pradesh and Uttarakhand are expected to achieve total fertility rate of 2.1 only around 2030.

6.4 Theory of Demographic Transition

Demographic transition is a term, first used by Warren S. Thompson (1929), and later on by Frank W. Notestein (1945), referring to a historical process of change which accounts for the trends in births,deaths, and population growth that occurred in today's industrialized societies, especially European societies. This process of demographic change began for the most part in the later 18th century.

Demographic transition should not be regarded as a 'law of population growth', but as a generalized description of the evolutionary process. In simple terms, it is a theory which attempts to specify general laws by which human populations change in size and structure during industrialization. It is frequently accepted as a useful tool in describing the demographic history of a country.

The theory postulates a particular pattern of demographic change from high fertility and high mortality to low fertility and low mortality when society progresses from a largely rural agrarian and illiterate society to a dominant urban, industrial, literate and modern society.

It is typically viewed as a three-stage process:

(i) that the decline in immortality comes before the decline in fertility,
(ii) that the fertility eventually declines to match mortality,
(iii) that socio-economic transformation of society takes place simultaneously with its demographic transformation.

The demographic transition theory is characterized by conspicuous transition stages.

The transition from high birth and death rates to low rates can be divided into three stages (some scholars like Haggett, 1975 have divided into four or five stages):

- Pre-transition stage – High and fluctuating birth and death rates with little population growth.
- Stage I: High birth rates and declining death rates with rapid population growth.
- Stage II: Low birth and death rates with slow population growth.
- Stage III: Birth and death rates both decline appreciably leading to zero population growth. The theory holds that pre-industrial societies were characterized by stable populations that had both a high death rate and birth rate. It postulates a little and slows population growth. The theory states that the high mortality rates characteristic of undeveloped areas will decline before fertility rates which are also high.

❖ First Stage or Stage of High Birth Rate and High Death Rate

In the first stage, the country is at a low level of economic development**.** Agriculture is the main occupation of the people**.** The standard of living of the people is low.The death rate is high because of a lack of medical facilities, epidemics, famines, and illiteracy. The birth rate is high because of social and economic reasons. The key notable features of this stage are as follows:

- Population Pyramid in the first stage is Expanding at the bottom
- Stable population
- High birth rate, High infant mortality, and High death rate = low life expectancy
- Many young people, very few older people
- High fertility rate (8+)
- A society dominated by religious belief
- The stagnant economy, No surplus subsistence type of living
- Ex – Sierra Leone, Somalia

The first stage has high fertility and high mortality because people reproduce more to compensate for the deaths due to epidemics and variable food supply. The population growth is slow and most of the people are engaged in agriculture where large families are an asset. Life expectancy is low, people are mostly illiterate and have low levels of technology. Two hundred years ago all the countries of the world were at this stage.

In pre-industrial society, death rates and birth rates were both high, and fluctuated rapidly according to natural events, such as drought and disease, to produce a relatively constant and young population. Family planning and contraception were virtually nonexistent; therefore, birth rates were essentially only limited by the ability of

women to bear children. Emigration depressed death rates in some special cases (for example, Europe and particularly the Eastern United States during the 19th century), but, overall, death rates tended to match birth rates, often exceeding 40 per 1000 per year. Children contributed to the economy of the household from an early age by carrying water, firewood, and messages, caring for younger siblings, sweeping, washing dishes, preparing food, and working in the fields. Raising a child cost little more than feeding him or her; there were no education or entertainment expenses. Thus, the total cost of raising children barely exceeded their contribution to the household. In addition, as they became adults they become a major input to the family business, mainly farming, and were the primary form of insurance for adults in old age. In India, an adult son was all that prevented a widow from falling into destitution. While death rates remained high there was no question as to the need for children, even if the means to prevent them had existed.

During this stage, the society evolves in accordance with Malthusian paradigm, with population essentially determined by the food supply. Any fluctuations in food supply (either positive, for example, due to technology improvements, or negative, due to droughts and pest invasions) tend to translate directly into population fluctuations. Famines resulting in significant mortality are frequent. Overall, population dynamics during stage one are comparable to those of animals living in the wild. According to Edward, Revocatus. (2016) This is the earlier stage of demographic transition in the world and also characterized by primary activities such as small fishing activities, farming practices, pastoralism and petty businesses.

❖ Second Stage or Stage of High Birth Rate and Low Death Rate or Stage of Population Explosion

In this Second stage, the birth-rate is high but the death rate is low**.** It results in **a** high growth rate of the population**.** In this stage**,** income begins to rise and economic activities expand**.** On account of better health facilities and a nourishing diet, the death rate falls rapidly. The birth rate remains high due to social backwardness and limited access to contraceptives. The key notable features of this stage are as follows:

- Population Pyramid in this stage is Rapidly Expanding
- Very rapid increase in population (population explosion)
- Rapid decline in death rate but death rate remains below the birth rate
- Fertility rate remains high
- High birth rate
- High rate of natural increase
- Decline in infant mortality
- Many young people

Fertility remains high at the beginning of the second stage but it declines with time. This is accompanied by a reduced mortality rate. Improvements in sanitation and health conditions lead to a decline in mortality**.** Because of this gap, the net addition to the population is high.

❖ Third Stage or Stage of Declining Birth Rate and Low Death Rate

In the third stage,a declining birth rate and low death rate lead to low population growth**.** Along with the economic development of the country, structural changes in the economy begin to take place. A large population begins to reside in urban areas. People start considering large families as a liability. Consequently**,** the birth rate begins to fall. The death rate continues to be low. The growth rate of the population declines**.** India is passing through this stage of demographic transition**.** The key notable features of this stage are as follows:

- The Population Pyramid in the third stage is Stationary
- Population growth slows down
- Birth rate declining rapidly
- The decline in fertility rate
- Death rate declining slowly
- Birth rate approaching death rate
- High life expectancy
- An increasing number of older people

In Stage three of the Demographic Transition Model (DTM), death rates are low and birth rates diminish, as a rule accordingly of enhanced economic conditions, an expansion in women's status and education, and access to contraception. The decrease in birth rate fluctuates from nation to nation, as does the time span in which it is experienced.[14] Stage Three moves the population towards stability through a decline in the birth rate. Several fertility factors contribute to this eventual decline, and are generally similar to those associated with sub-replacement fertility, although some are speculative:

- In rural areas continued decline in childhood death means that at some point parents realize they do not need to have as many children to ensure a comfortable old age. As childhood death continues to fall and incomes increase parents can become increasingly confident that fewer children will suffice to help in family business and care for them in old age.

- Increasing urbanization changes the traditional values placed upon fertility and the value of children in rural society. Urban living also raises the cost of dependent children to a family. A recent theory suggests that urbanization also contributes to reducing the birth rate because it disrupts optimal mating patterns. A 2008 study in Iceland found that the most fecund marriages are between distant cousins. Genetic incompatibilities inherent in more distant out breeding makes reproduction harder.

- In both rural and urban areas, the cost of children to parents is exacerbated by the introduction of compulsory education acts and the increased need to educate children so they can take up a respected position in society. Children are increasingly prohibited under law from working outside the household and make an increasingly limited contribution to the household, as school children are increasingly exempted from the expectation of making a significant contribution to domestic work. Even in equatorial Africa, children (age under 5) now required to have clothes and shoes, and may even require school uniforms. Parents begin to consider it a duty to buy children(s) books and toys, partly due to education and access to family planning, people begin to reassess their need for children and their ability to raise them.

- Increasing literacy and employment lowers the uncritical acceptance of childbearing and motherhood as measures of the status of women. Working women have less time to raise children; this is particularly an issue where fathers traditionally make little or no contribution to child-raising, such as southern Europe or Japan. Valuation of women beyond childbearing and motherhood becomes important.

- Improvements in contraceptive technology are now a major factor. Fertility decline is caused as much by changes in values about children and gender as by the availability of contraceptives and knowledge of how to use them.

The resulting changes in the age structure of the population include a decline in the youth dependency ratio and eventually population aging. The population structure becomes less triangular and more like an elongated balloon. During the period between the decline in youth dependency and rise in old age dependency there is a demographic window of opportunity that can potentially produce economic growth through an increase in the ratio of working age to dependent population; the demographic dividend.

However, unless factors such as those listed above are allowed to work, a society's birth rates may not drop to a low level in due time, which means that the society cannot proceed to stage three and is locked in what is called a demographic trap.

❖ Fourth Stage or Stage of Low Birth Rate and Low Death Rate

In the fourth stage, **a** low birth rate and a low death rate lead to Population stabilization**.** In this stage, because of rapid economic development**,** the standard of living of the people becomes very high**.** Quality of life is given a priority to the size of the family. The key notable features of this stage are as follows:

- Population Pyramid is Contracting
- Stable or slow population increase
- Low birth rate
- Low death rate
- High life expectancy
- Birth rate is approximately the same as the death rate
- Many older people

In the last stage**,** both fertility and mortality decline considerably. The population is either stable or grows slowly. The population becomes urbanized, literate, and has the high technical know-how, and deliberately controls the family size. This shows that human beings are extremely flexible and are able to adjust their fertility. In the present day, different countries are at different stages of demographic transition.

6.5Key Points of Demographic Transition Theory

- Demographic transition theory suggests that populations grow along a predictable five-stage model.

- In stage 1, pre-industrial society, death rates and birth rates are high and roughly in balance, and population growth is typically very slow and constrained by the available food supply.

- In stage 2, that of a developing country, the death rates drop rapidly due to improvements in food supply and sanitation, which increase life spans and reduce disease.

- In stage 3, birth rates fall due to access to contraception, increases in wages, urbanization, increase in the status and education of women, and increase in investment in education. Population growth begins to level off.

- In stage 4, birth rates and death rates are both low. The large group born during stage two ages and creates an economic burden on the shrinking working population.

- In stage 5 (only some theorists acknowledge this stage—others recognize only four), fertility rates transition to either below-replacement or above-replacement.

6.6 Theories of Population

The theorizing about population (population size and change) have remained an important subject since time immemorial. Many of the ancient philosophers like Confucius (China), Kautilya (India), IbnKhaldin (Arab), Plato (Greece) and modem thinkers like Adam Smith, David Richard and others, eidier directly or indirectly, have said somewhat significant on population issues. For instance, Kautilya, a contemporary of Plato, had written in his Arthashastra that 'a large population is a source of political, economic and military strength of a nation'. Similarly, the 14th century Arab historian, IbnKhaldin maintained in his theory of 'rise and fall' that the growth of dense population is generally favourable to the maintenance and increase of imperial power. To the Jews, the injunction to Adam and Eve by the Almighty to 'be fruitful and multiply, and replenish the earth' has been a guiding principle for their attitude towards marriage and procreation. The Chinese philosopher, Confucius argued that a numerical balance be maintained between population and environment.

Thus, he was not in favour of unchecked growth of population. He was the first who gave the concept of optimum population level. In ancient Greece, the earliest thinkers favoured the expansion of population, but Plato was a restrictionist who advocated as absolute limit of population.

One of the earliest demographers Edmond Halley (1656-1742) was the first scientist to use death statistics in different age groups to determine a person's likelihood of death as he or she passed through each age group (Population Today, 1986). But, as a science, it emerged only in the last 250 years. The systematic compilation of data was first begun on a large scale in the 19th century Europe.

The following points highlight the top three theories of population. The theories are:

6.6.0 The Malthusian Theory of Population

The Malthusian doctrine may not be applicable now to its place of origin, but its influence spreads over two-third of this universe. Excluding Japan, the whole of Asia, Africa and South America come under its purview. India is one of the first countries to adopt family planning on state level to control population. Positive checks like floods, wars, droughts, diseases, etc. operate. The birth and death rates are high. The growth rate of population is about 2 per cent per annum.

The real aim of population policy is, however, not to avoid starvation but to eliminate poverty so as to raise output per head in an accelerated manner. Thus the Malthusian theory is fully applicable to underdeveloped countries like India. Walker was right when he wrote: **"The Malthusian theory is applicable to all communities without any consideration of colour and place. Malthusianism has stood un-shattered, impregnable amid all the controversy that has raged around it."**

6.6.1 The Optimum Theory of Population

Unlike the Malthusian theory, the optimum theory does not establish relationship between population growth and food supply. Rather, it is concerned with the relation between the size of population and production of wealth.

The Malthusian theory is a general theory which studies the population problem of a country in keeping with its economic conditions. Thus the optimum theory is more realistic than the Malthusian theory of population.

6.6.2The Theory of Demographic Transition.

The theory of demographic transition is the most acceptable theory of population growth. It neither lays emphasis on food supply like the Malthusian theory, nor does it develop a pessimistic outlook towards population growth.

It is also superior to the optimum theory which lays an exclusive emphasis on the increase in per capita income for the growth of population and neglects the other factors which influence it. The demographic transition theory is superior to all the theories of population because it is based on the actual population growth trends of the developed countries of Europe.

Almost all the European countries of the world have passed through the first two stages of this theory and are now in the final stage. Not only this, this theory is equally applicable to the developing countries of the world.

Very backward countries in some of the African states are still in the first stage whereas all the other developing countries of the world are in the transitional stage two it is on the basis of this theory that economists have developed economic-demographic models so that underdeveloped countries should enter the final stage and attain the stage of self-sustained growth. Thus this theory has universal applicability.

6.7 Criticism of Demographic Transition theory

Although the theory of demographic transition has been appreciated widely by the demographers, it has been criticized on many grounds also. There are even critics who have gone to the extent of saying that it cannot be called a theory.

The main points of criticism are:

Firstly, this theory is merely based upon the empirical observations or the experiences of Europe, America and Australia.

Secondly, it is neither predictive nor its stages are segmental and inevitable.

Thirdly, the role of man's technical innovations cannot be underrated, particularly in the field of medicine, which can arrest the rate of mortality.

Fourthly, neither does it provide a fundamental explanation of the process of fertility decline, nor does it identify the crucial variables involved in it.

Fifthly, it does not provide a time frame for a country to move from one stage to another.

Finally, it does not hold good for the developing countries of the world, which have recently experienced unprecedented growth in population due to drastic decline in death rates.

6.8 Self- Check Questions

(1) Demographic Transition in India

(2) Highlight the demographic transition theory of population.

(3) Discuss the criticism of demographic transition theory of population.

6.9 Summary

In spite of these criticisms and shortcomings, the demographic transition theory does provide an effective portrayal of the world's demographic history at macro level of generalizations. As an empirical generalization developed on the basis of observing the demographic trend in the West, the transition process for any country can easily be understood.

6.10 Glossary

- Demographic transition - is a long-term trend of declining birth and death rates, resulting in substantive change in the age distribution of a population.

- Birth Rate - the number of babies born in a particular group of people during a particular period of time.

- Death Rate - the ratio of deaths to the population of a particular area or during a particular period of time, usually calculated as the number of deaths per one thousand people per year.

- Population Pyramid - a population pyramid is a graph that shows the distribution of ages across a population divided down the center between male and female members of the population. The graphic starts from youngest at the bottom to oldest at the top.

6.11 Self-Check Answers

Ans. 1 See section 8.3

Ans. 2 See section 8.4

Ans. 3 See section 8.7

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6.13 Terminal Questions

1) Explain the major points of the demographic transition theory of population.
2) Discuss the criticism of the demographic transition theory of population.
3) Write a note on demographic transition in India.

4) Critically examine the demographic transition theory of population with examples.
5) Describe how different the demographic transition theory of population over the Malthusian theory.
6) Describe the various theories of population.
7) Critically examine the theories of population.

Lesson – 7

Population Structure and Dynamics: Fertility

Structure

7.0 Introduction

In Lesson-3, we have highlighted the important concepts related to the aspects of population size, distribution, composition or structure used in the study of demography. Now it is easy for you to understand the determinants of population change, namely births, deaths and migration. Technically, i.e. in demographic terminology, birth rate is called 'fertility rate' while death rate is called 'mortality rate'. Since the changes in population basically take place due to births, deaths and migration, these are called determinants of population change. Of course, there are some other factors such as natural calamities which also affect the populations occasionally. We need to know about all these determinants. Therefore, in the present lesson (i.e. Lesson-3), our discussion will centre around fertility with emphasis on types, measurements/indices as well as factors influencing them, among other things.

7.1 Objectives

After going through this lesson, we expect you to be able to:

- know the concept of fertility in detail.
- Describe the measures or indices of fertility.
- understandthe causes and factor of influencing fertility.

7.2 Concept of Fertility

'Fertility' in demography refers to the actual birth performance of a group of women or to the relative frequency with which the births occur in total population or in the population exposed to it. The growth of the population of the world largely depends on human fertility. Any society replenishes itself through the process of human fertility. Thus, in population dynamics, fertility is a positive force through which the population expands, counteracting the force of attrition caused by mortality. If this replacement of human numbers is not adequate, that is, if the number of deaths in a particulars society continues to be more than that of births, that society would face the danger of becoming extinct. On the other hand, excessive replacement of human number can also create several social and political problems for a country.

Fertility is, in fact, a result of 'fecundity. Fecundity is the physiological capacity Education: An Overview to reproduce. Obviously, it is not possible to measure exactly the real capacity of women to produce off-springs; it can only be guessed observed with the help of the maximum levels of fertility ever observed in a non-contraceptive population.

It is important to differentiate between fecundity and fertility. 'Fecundity' refers to "the capacity of a man, a woman or a couple to participate in reproduction, i.e. the capacity to produce a live child or children' (UN, 1958, p.38). Fertility, on the other hand, "refers to the actual reproductive performance whether of an individual or a couple or a group". While there is no direct measurement for fecundity, fertility can be studied from the statistics of births.

Let us look at some useful terms that have relevance in the context of study of fertility.

- **Sterility:** While a man or woman or a couple who has given birth to at least one live child, is considered fertile, one who has not had a single child is considered

sterile. While fertility promotes continuation of human race, sterility hinders population growth and gradually leads to its extinction.

- **Birth order**: The sequence of live births of a women are classified according to their order or rank; e.g. first order birth (i.e. first in order), second order birth, (i.e. second in order), etc.

- **Parity:** Women may be classified according to the number of children born alive to them. For instance, the first parity women are those who have given birth to one child; the second parity women are those who have given birth to two children; and so on. Thus, while the birth order refers to the child, parity refers to the mother.

- **Natural fertility:** As defined by Henry (1 953 in Asha and Tara, 2006, p.253), the French demographer, natural fertility is "fertility of a human population that makes no deliberate effort to limit births." Fertility may be considered to be natural if no contraception or induced abortion is used. Practice such as prolonged breastfeeding andlor abstinence after childbirth do tend to lower fertility, but when such practices are adopted without any intention of controlling fertility, the results of fertility is considered as natural.

- **Contraception:** Contraception refers to measures which are taken in order to prevent sexual intercourse or coitus from resulting in conception. A contraceptive method is sometimes termed as a birth control method, though "birth control" is used in a broader sense to include intentional abortions, sterilization and complete abstinence from coitus (Asha and Tara, 2006).

7.3 Meaning of Fertility

Fertility is the capability to produce offspring through reproduction following the onset of sexual maturity. The fertility rate is the average number of children born by a female during her lifetime and is quantified demographically. Fertility is addressed when there is a difficulty or an inability to reproduce naturally, which is referred to as infertility. Infertility is widespread, with fertility specialists available all over the world to assist mothers and couples who experience difficulties having ababy.Human fertility depends on factors of nutrition, sexual behaviour, consanguinity, culture, instinct, endocrinology, timing, economics, way of life, and emotions.

Fertility differs from fecundity, which is defined as the *potential* for reproduction (influenced by gamete production, fertilization and carrying a pregnancy to

term). Where, a woman or the lack of fertility is infertility while a lack of fecundity would be called sterility.

7.4 Definition of Fertility

Thompson and Lewis well said," the fertility of women has always been a matter of vital concern to all the people."

According to Hansraj," Fertility is the standard of measuring the capacity of the women to produce children."

Barcylay said," The fundamental nation of fertility is an actual level of performance in a population, based on the number of births that occur - fertility can be ascertained from statistics of births."

Barnard Benjamin defines fertility," 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 the child bearing age."

7.5 Measures or Indices of Fertility

Bhaskar D. Misra (1980) provides following measures of fertility which, in fact, are different fertility rates ranging from crude to accurate measures.

7.5.0 Crude Birth Rate

The most commonly used measure of fertility is crude birth rate (CBR), which is also the easiest to calculate and understand. It requires minimum information to calculate it. CBR is the ratio of the total number of births during a given year to the average or mid-year population in that year. Symbolically,

$$\text{CBR} = \frac{B}{p} \times K$$

Where:

- B and P respectively denote the total number of births occurring in a given year and the total average or mid-year population in that year,
- and K is a constant, usually 1,000.

Crude birth rate is affected by the age and sex structure of the population, because persons of all ages are not involved in the process of reproduction, Therefore, it can lead to erroneous conclusions in comparing the populations with varying age-sex

structures. However, for short periods of time it can meaningfully be used to depict the changes in fertility in a population.

7.5.1 General Fertility Rate

General fertility rate (GFR) is an improvement over crude birth rate with regard to the population exposed to the chance of conception. It differs from CBR in defining the denominator population, which in the case of GFR is the number of women in fertile age group (in the age range 15-49 or sometimes 15-44) and not the total female population. GFR is expressed as:

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

Where,

- W15-49 represents the average number of women in the reproductive ages in the period concerned,
- and B and K are same as already defined above.

We can say that the GFR is a type of standardized rate, standardized for the proportion of women in reproductive ages. However, it is affected by the distribution of women by age in the whole reproductive span. Among the various populations with similar pattern of fertility, a population with higher proportion of fertile-age women in the age of fertility-peak will produce a higher value of GFR than other groups. Further, where the tradition and customs do not permit unmarried women, widows and divorced women the right of becoming mother, it is preferable to consider only the currently mamed women in reproductive ages and not all women.

General marital fertility rate (GMFR) is based on the logic mentioned above, and it is expressed as:

GMFR = $\frac{B}{W^{m}_{15-49}} \times K$

Where:

W^{m}_{15-49}denotes the average number of married women in reproductive ages (15-49).

GMFR is certainly a better or more refined measure than GFR. But, again, as the chance of giving birth by a married women is not uniform over all the ages, it is also affected by the distribution of women in the age range 15-49.

7.5.2 Age-Specific Fertility Rates

A detailed and more meaningful analysis of the pattern of fertility in a population is provided by the fertility rates calculated for various ages. ASFR can be calculated separately for each age or for any convenient age-group(s).

ASFR is calculated by the formula:

$$\text{ASFR} = \frac{B_X}{W_X} \times K$$

Where,

Bx and Wx are the births to women aged 'x' and the average number of women aged 'x' respectively.

Age-specific marital fertility rate (ASMFR) is an improvement over age-specific fertility rate, in the same sense as general marital fertility rate is over general fertility rate. ASMFRs describe the fertility experience of married women by age. The formula for calculation of ASMFRs is:

$$\text{ASMFR}_X = \frac{B_X}{W_X^m} \times K$$

$$= \text{ASFR}_x M_x \, K$$

Where:

- W_X^m the average number of married women at age 'x',
- M_x is the reciprocal of proportion of married women at age x.

When TFR per woman is multiplied by the proportion of births that are female out of the total births, we get gross reproduction rate. The proportion of female births in India is around 0.4878, and it varies slightly from country to country.

7.5.3 Total Fertility Rate

Total fertility rate (TFR) summarizes the patterns of fertility exhibited by the age-specific fertility rates and represents a single index of total fertility. It is just a summation of ASFRs over all ages, i.e

TFR = $\left(\frac{\sum_{x=15}^{49}}{} ASFR_x\right)$

If the ASFRs are given in five-year age intervals, their sum should be multiplied by 5. The physical meaning of total fertility rate is that it is the expected number of children that a cohort of 1,000 women will bear in their life time, if none of them dies before crossing the age of reproduction. It is sometimes also expressed as per woman in place of per 1,000 women. It can also be said that the total fertility rate is a type of the standardized rate with equal weights given to all ages Change and therefore, is independent of the age-composition of the population.

7.5.4 Gross Reproduction Rate

The gross reproduction rate (GRR) is a measure of population replacement which describes the rate of increase of population over a generation. It is defined as the average number of daughters among a birth cohort of women, which they will bear in their life time, passing through the reproductive ages and bearing children according to a fixed schedule of fertility, if they all survive to the end of child bearing period. In other words, it states how many female children a cohort of women passing through the child-bearing period would have, if they were as fertile at each age as a current schedule of age-specific fertility rates indicates, and none of them died before reaching the end of the child-bearing period. Clearly, it has a close resemblance with the total fertility rate. The difference between the GRR and TFR is that while the latter considers all the births, the former includes the births of daughters only. Thus, the GRR indicates how effectively mothers are replacing themselves with daughters who will bear the next generation. GRR can be expressed as:

GPR = $\frac{\sum_{x=15}^{49}}{} \frac{B_x}{W_x} \times \frac{B_{fx}}{B_x}$

Where:

- $B_{x/}W_x$ is the age specific fertility rate of age ‘x’ and
- $B_{fx}/B_x$is the proportion of female births among of total births at age ‘x’ of mothers.

Since the sex ratio at birth does not appreciably change with the age of mother, usual practice is to ignore such variations in the calculation of GRR, which is given by

GRR = $\left(\frac{\sum_{x=15}^{49}}{}ASFR_x\right)$ × proportion of all births that are females

= TFR × $\frac{100}{205}$ (or 0.4878)

It is assumed that in India for every 100 females 105 males are born. If the data be given in five-year age-groups, GRR is calculated as :

GRR = 5 x = $\left(\frac{\sum_{x=1}^{7}}{}ASFR_x\right) \times \frac{100}{205}$

The gross reproduction rate can also be defined as the ratio between the size of birth cohorts in two successive generations, in a one sex population model, if the mortality force does not operate before the end of child-bearing period. In strict sense, the GRR is a generational measure. However, it can be calculated for both the synthetic and real cohort. The GRR, when calculated from the period-fertility rates, show what would happen in terms of birth performance (considering only female births) in a real birth cohort of females if they pass through child-bearing ages experiencing the fertility rates described by the period-fertility schedule and without experiencing any mortality before the end of reproductive ages.

7.5.5 Net Reproduction Rate

The assumption of no mortality before the end of child-bearing ages in the definition of gross reproduction rate is a serious limitation of GRR. This limitation is overcome in the calculation of net reproduction rate (NRR) which indicates the rate of replacement over a generation; had the cohort of women had the experience of mortality over all the ages represented by a mortality schedule. It is a measure of the number of daughters which a cohort of girl-infants will bear as they grow to adulthood and pass through the child-bearing period, provided that as they pass through each age they bear children at the rate indicated by a current schedule of age-specific fertility rate and from birth till the end of the child-bearing period they are subjected to mortality as per the life table. Thus, it is a measure of replacement that considers both the schedule of fertility and the schedule of mortality. In symbols it is defined as:

NRR= $\frac{\sum_{x=15}^{49}}{}\frac{B_x}{w_x}\left(\frac{B_{fx}}{B_x}\right)\frac{L_x}{l_o}$

Where:

- L_x/l_o is the life table survival rate
- (B_x/w_x) and (Bf_x/w_x) are the age specific fertility rate at age 'x' and proration of females among the total birth at age 'x' respectively.

Assuming that in Indian for every 100 females, 105 male are born, we have:

$$\text{NRR} = \frac{100}{205} \sum_{x=15}^{49} \frac{B_x}{w_x} \frac{L_x}{l_o}$$

If the data are given in five year age groups, then,

$$\text{NRR} = \frac{100}{205} \sum_{x=1}^{7} \frac{B_x}{w_x} \frac{5L_x}{l_o}$$

The NRR indicates that on an average how many daughters would be born to a group of women starting life together and experiencing throughout their life a given schedule of fertility and mortality. It is an estimate of the extent to which a newly born girl-infant will live to replace herself with a daughter, taking care of her livelihood or health before she accomplishes replacement. Like GRR, it is also a generational measure but can be meaningfully calculated for both the synthetic and real cohort. The NRR describes the long-term growth potential of a population experiencing given sets of fertility and mortality rates by age. If NRR is one, the population will in the long run become stationary which indicates exact replacement. If the NRR is less than 1, in the long term, the population will not be replacing itself and if NRR is greater than 1, in the long run the population will be more than replacement.

7.6 Causes and Factors Influencing Fertility

We will discuss the factors that influence fertility, with an emphasis on those that have brought about a change from high fertility to low fertility in developed countries.

Fertility, in general, is influenced by the following factors.

- Social and religious customs: Most often these customs favour high fertility in many societies of the developing countries.
- Mean duration of married life due to early marriage: The higher the mean duration of married life the higher will be the fertility.

- Environmental causes such as hot or cold climate: The countries or regions with hot climate generally have high fertility compared to the areas with cold climate.
- Economic factor: The poverty breeds high fertility.
- Level of literacy /education: The higher the level of education the lower the fertility.
- Age and sex structure ofpopulation: Young population with more females in reproductive age-group is likely to have higher fertility than the older populations.
- Mortality rate: The higher the mortality the higher the fertility.

Now, let us look at the following factors which have played an important role in bringing down the high fertility rates to lower level in developed countries.

- **Attitudinal/Motivational Factors:**

Demographers (Asha and Tara, 2006. p.3 1 1) are of the opinion that, over the years, tremendous changes have occurred in the attitudes of couples towards reproduction. It appears that they have moved away from a strong positive desire to have more children to a strong motivation for a limited family. Such attitudinal change operated at the level of individuals and couples, who translated it into action to have a small family. Such actions of individual families acted as a motivational force for change in the social atmosphere in favour of birth control and use of diverse and effective means of contraception and in the wake of social and economic conditions arising out of the Industrial Revolution. Thus, motivational factors have played an important role in bringing about a change from high fertility to low fertility. It has, in fact, also a relationship with their literacy and educational level.

- **Economic and Social Factors:**

The phenomenon of decline in fertility that happened in the developed countries is very complex. There are several interacting and overlapping economic and social factors responsible for the transition from high fertility to low fertility. These factors include: i) Industrialization; ii) Urbanization; iii) Rising levels of living and increased cost of bringing up children; iv) Family functions and structure; v) Relationship between mortality and fertility; and vi) Social mobility (Asha and Tara, 2006)

The process of industrialization initiated the process of modem economic growth; the per capita productivity increased and real income rose. Advancements in science and technology further improved the productivity of labour, for they created conditions in

which workers received better education and training worked shorter hours as a result of social reforms, and had better nutrition because of increased availability of food supplies. Several structural changes also took place about the same time. The share of agriculture to total product and that in the labour force decreased; there was a corresponding rise in the share of industry and other non-agricultural sectors.

Industrialisation was accompanied by urbanization. Declines in mortality were registered because of agricultural, economic and social developments that came in the wake of industrialization. Several changes accompanied the growing industrialization and urbanization, which had implications for fertility decline. Of particular interest are the changes which took place in the structure and functions of the family - the basic unit of society. The family lost its function as an economic unit, in the sense that it ceased to be a producing unit and became only a consumer unit. With the introduction of laws which prohibited child labour and making of education compulsory, the economic usefulness of children to their parents was drastically reduced. In fact, they became a liability because of the increasing costs and lengthening duration of education. At the same time, there were declines in mortality, specially infant and child mortality; more children survived and the burden of binging them up fell entirely on the nuclear family (Asha and Tara, 2006).

Parents soon realized that, because of declining mortality, there was no need to have a large number of children in the hope that a few at least would survive. They, therefore, started having fewer children. The advantages of rising real incomes flowing from industrialization were in danger of being nullified by large families, especially because of the rising costs of bringing up children. A large family was, therefore, seen as a threat to maintenance of a certain standard of life, and couples responded to this threat by having smaller number of children. Rising costs of child-rearing was, thus, an important factor in fertility decline in developed and developing countries. Certain measures initiated by the Governments of various countries also contributed to changes in the attitudes of parents towards their children. Financial responsibility for medicines and medical , treatment, provision of old-age security, etc., which were originally shouldered by the family, were taken over by the State in many countries; children, therefore, were no longer the only source of old-age security.

With the spread of education among women, social attitudes to women as well as the attitudes of women to themselves underwent profound changes. It was realized that a woman need not be restricted to her age-old role of homemaker and bearer of children. Women began to participate in gainful employment which provided an alternative to childbearing and childrearing. Education was also responsible for bringing about a rational outlook, free from religious dogma; and this rational outlook facilitated the acceptance of the idea of fertility control. Moreover, flowing from educational

opportunities rising prosperity was the aspiration of the individual so as to rise in the social scale. Too many children were perceived to be an obstacle in the attainment of this objective - to climb up the social ladder; and the natural result was the limiting of the size of the family.

According to Notestein (1953) the growth of a huge and mobile city population largely changed the corporate family life of traditional society; instead came individualism which was characterized by increasing personal aspirations to move upward. Large family became "a progressively difficult undertaking; expensive and difficult for a population ever increasingly freed from old taboos and increasingly willing to solve its problems rather than accept them. Notestein (1953) pointed out that the decline in fertility in the West occurred as a result of the growth of an urban industrial society. He concluded that the development of technology was the underlying factor for fertility transition. He also pointed out that industrialization and urbanization resulted in the development of rational and secular point of view; the growing awareness of the world and modern techniques through proper education, improved health and the acceptance of alternatives to early marriage and childbearing as a means of livelihood and prestige of women.

Asha and Tara (2006) summarise the reasons for the recent decline in fertility and current low levels of fertility in most of the developed countries as follows: i) Development of improved methods of fertility control - increasing use of the most-effective methods; ii) Liberalised abortion laws - extensive grounds and facilities for abortion; iii) Decreasing desire for large families; iv) Rising costs of rearing child; v) The increasing trend of women's employment in paid jobs outside the home; and vi) Instability and changes in the values attached to the rewards and penalties of parenthood in the context of other needs and anspirations.

7.7 Self- Check Questions

(4) causes of fertility.

(5) Meaning of Crude birth rate.

(6) Meaning of fertility.

(7) Definition of fertility.

Social

7.8 Summary

In this lesson, we discussed the concept of fertility in detail. Firstly, we discussed the concept, meaning and definition of fertility. Secondly, we talk about the measures and

indices of fertility. Thirdly, we discussed later causes and factors of influencing fertility in this lesson. This lesson gives lot of help to understand the concept of fertility.

7.9 Glossary

- **Fecundity -** is the physiological maximum potential reproductive output of an individual (usually female) over its lifetime and represents one of the major cornerstones of theoretical and applied population biology. Fertility, a related concept, is defined as the current (actual) reproductive performance of an individual.

- **Parity -** The parity of a female at a given point in time is defined as the number of live births of babies to the female so far. ... Parity values are often used to subdivide the female population into subpopulations of interest.

- **Fertility rate -** The fertility rate at a given age is the number of children born alive to women of that age during the year as a proportion of the average annual population of women of the same age.

7.10 Self-Check Answers

Ans. 1 See section 3.2 & 3.3

Ans. 2 See section 3.4

Ans. 3 See section 3.6

Ans. 4 See section 3.5.0

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7.12 Terminal Questions

1. Discuss meaning and causes of fertility.
2. Write various measures of fertility.
3. Define the concept of fertility.
4. Explain the term crude birth rate.
5. Describe the term total fertility rate and gross reproduction rate.

Lesson – 8

Population Structure and Dynamics: Mortality

Structure

8.0 Introduction

Mortality is one of the three basic determinants of population change, the other two being fertility and migration. Historically, the factor of mortality has played a dominant role in determining the change in population, the size of which fluctuated in the past mainly in response to variations in mortality. The increase in the population of European countries following the Industrial Revolution in the seventeenth century was mainly due to decline in the death rates. The developing countries, which are undergoing a typical demographic transition, have also been affected initially by the fall in the death rates. In fact, the single most important contribution of demography has been the revelation of the fact that sharp declines in mortality rates rather than any rise in the fertility rates has been responsible for bringing about a rapid growth of population.

The study of mortality is useful for analyzing current demographic conditions as well as for determining the prospects of potential changes in mortality conditions of the future. The public health administration depends heavily on the study of mortality, for

statistics on death in the population cross-classified by age, sex, and the cause of death are of great value for the formulation, implementation and evaluation of public health programmes. Statistics on deaths also form the basis of the policies of insurance companies.

Mortality rate is a measure of the frequency of occurrence of death in a defined population during a specified interval. Demographers use two different concepts when referring to mortality – the life span which is the numerical age limit of human life and life expectancy or expectation which is the average expected number of years of life to be lived by a particular population at a given time. However demographers often use the maximum-recorded age at death as an accepted operational definition of the human life span. A high income at aggregate and individual levels is expected to cause decline in mortality because it facilitates increased consumption of items favorable to health such as food and nutrition, medical and public health services, education, housing and leisure. Provision of public health services is another important factor affecting mortality. In developed countries the validation of the germ theory of disease in the late 19th century and its impact on public health practices and technology had a significant impact on subsequent mortality decline. Education has an important role in affecting mortality. The link between education and mortality may be stated as the education of mother is of crucial significance. One possible mechanism is greater awareness among literate women about the need to use modern health facilities and consequently higher utilization of the facilities by them than by the illiterate women. Other mechanisms through which education affects mortality are perhaps by generating modern attitudes regarding health, disease, nutrition, personal hygiene and sanitation.

Like fertility, mortality also depends on the age and gender distribution of a population. Older people are more likely to die, so countries with a higher proportion of old people may also have a higher mortality rate. Similarly, men and women may have different life expectancies; therefore, mortality rates can vary with the gender distribution of a population. Thus, for example, the number of deaths per 1000 people can be higher for developed nations than in less-developed countries, despite life expectancy being higher in developed countries due to better standards of health. This happens because developed countries typically have a completely different population age distribution, with a much higher proportion of older people, due to both lower recent birth rates and lower mortality rates.

To more accurately estimate mortality rates, demographers calculate age and gender specific mortality rates. These rates are compiled in a life table, which shows the mortality rate separate for each age group and gender. Overall, developing countries tend to have higher mortality rates, higher infant mortality rates, and lower life

expectancies. The causes of death also tend to vary between countries. For example, mortality due to malnutrition tends to be much higher in developing countries, whereas in developed countries, people are more likely to die of age-related diseases.

Sociologists have theorized that one of the best predictors of longevity, or a high life expectancy, is education, even when other factors are controlled, people with more education tend to live longer. A few additional years of schooling statistically corresponds to several additional years of life expectancy and vastly improved health in old age. The mechanism through which works is not the schooling itself, but rather schooling's influence on other health-related behaviors. Education tends to lower the likelihood of smoking and engaging in unhealthy and high risk behaviors. Education also increases the probability of engaging in healthy behaviors, like exercise.

8.1 Objectives

After reading this lesson, you should be able to:-

- Familiar with the scope of demography
- Understand the relationship of demography with other disciplines
- Understand relationship between demography and population studies

8.2 Concept of Mortality

Mortality is nothing but occurrence of death of a live being after its birth. According to United Nations (1953), mortality or death is defined as follows: "Death is the permanent disappearance of all evidence of life at any time after birth has taken place i.e. post-natal cessation of vital functions without capacity of resuscitation". A death can, thus, occur only after a live birth, and the span between birth and death is life.

You may like to know the difference between still birth, abortion and miscarriage. Still birth is the delivery of dead foetus (naturally dead, not killed) not by the pregnant mother. Abortion is nothing but expulsion of foetus from the uterus before it attains extra-uterine life; foetal mortality. It is again categorized into two types as induced abortion and spontaneous abortion. Induced abortion is forced expulsion of foetus. The spontaneous abortion is also called miscarriages. Often, miscarriages occur due to morbidity. Morbidity is nothing but falling sick or ill; state of sickness / illness due to various reasons.

From demographic point of view, child mortality infant mortality and maternal mortality are very crucial.

- **Child Mortality Rate (CMR):** It is defined as the number of deaths at age 1 - 4 years in a given year per 1000 children in that age-group at the mid-point of year concerned. It excludes infant mortality.
- **Infant Mortality Rate (IMR):** A live born child up to the completion of 365 days of life is called an infant. The infant mortality rate is the number of deaths of infants under one year of age per 1000 live births in a given year (Haupt and Kane, 1980).
- **Maternal Mortality Rate (MMR):** It is the number of deaths among women of reproductive age due to puerperal (pregnancy and the related) causes per 1,00,000 live births in a given year.

The sources of data on mortality in India include the following.

i) The Demographic Year Book of the United Nations - provides statistics on the number of deaths.
ii) A special issue of the Demographic Year Book - gives data on deaths in greater detail.
iii) Census Surveys of India.
iv) National Family Health Surveys conducted in 1992-93,1998-99,2005-06 - provide some information on mortality in India and States.
v) Other Research Reports.

8.3 Measures / Indices of Mortality

Various measures are employed in the measurement and analysis of mortality. These measures are discussed below.

- **Crude Death Rate**

The crude death rate is the most simple and the commonly used measure of mortality, which can be quickly calculated and, at the same time, easily understood. It is a ratio of the total registered deaths in a specified year to the total mid-year population multiplied by 1,000. It is computed as follows:

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

Where:

- D is the total number of deaths registered during a calendar year (January 1 to December 3 1);

- P is the total population at the middle of the year (July 1);
- K is 1,000 constant.

For example, the crude death rate for Greater Bombay for 1973 for the given data may be computed as follows:

Total number of deaths during 1973 (January 1 to December 3 1) = 61,931

Total population at the middle of the year, i.e. mid-year population

(July 1, 1973) = 6,55 1,000

Therefore, crude death rate for Greater Bombay for:

1973 = $\frac{61,931}{6,551,000} \times 1000 = 9.45$

The crude death rate of 9.45 indicates that, in 1973 in Greater Bombay 9.45 deaths occurred per 1,000 population. The crude death rate, thus, expresses the frequency of deaths in the entire population taken as a single number.

Uses of CDR: These include the following.

- CDR provides one of the bases for computing the rate of natural increase in population.
- It is the most widely available index of the level of mortality.
- It gives us a general idea about the trend in mortality in a particular area over a period of time.

Limitations of CDR: Though it is summary measure and very useful indicator of the level of mortality in any population, it is not a refined measure, as is evident from its very name itself, and suffers from limitations such as the following

- Inadequate coverage of death statistics, though this is not inherent in its very nature.
- It is silent about age and sex-wise details of deaths.

- **Age-Specific Death Rate**

Age-Specific Death Rate (ASDR) is an improved measure over CDR, as the relative frequency of deaths varies with age. Using this measure, a better comparison can be made in terms of the death rates calculated separately for each age. It can separate the component of mortality from the inherent effect of age composition on the number of

deaths and its ratio to the population. Death rate specific for age are generally calculated separately for the two sexes so as to exhibit the variations by sex also.

$$\text{ASDR} = \frac{\substack{No.\ of\ deaths\ an\ age\ 'a'\ of\ sex\ 's' \\ (or\ of\ both\ sexes)}}{\substack{Mid\ year\ population\ of\ given\ year\ at\ age's'\ of sex\ 's' \\ (or\ of\ both\ sexes)}} \times K$$

K is usually taken as 1000

- **Maternal Mortality Rate**

The maternal mortality rate is the number of women who die as a result of I childbearing in a given year per 100,000 births in that year. Maternal deaths are those caused by complications of pregnancy and childbirth.

- **Infant Mortality Rate**

Infants are defined in demography as an exact age-group, namely, age 'zero', or those children in the first year of life, who have not yet reached age one. Infant mortality rate (IMR) is a measure of mortality among infants. It is customarily defined or computed as the ratio of the infant deaths (deaths of children in the Chant first year of life or under one year of age) registered in a calendar year to the number of live births registered in the same year, usually multiplied by 1000. This rate is computed as follows:

$\frac{d_o}{B} \times$ K

Where:

- do is the number of deaths below age one, registered during a calendar year.
- B is the number of live births, registered during the same year.
- K is 1,000 constant.

The importance of studying IMR is obvious because of several reasons. First, the IMR is one of the most sensitive indicators of availability of the medical and health facilities to a population. Second, it measures the mortality in that segment of the population where it is extremely high and to which the expectation of life at birth is very sensitive. Third, any reduction in mortality, in general, affects the IMR to a greater extent, and influences the age-distribution of the population. Further, a number of empirical studies have shown some sort of statistical relationship between IMR and the birth rate. Thus, IMR becomes one of the important parameters to understand the mechanism of fertility change in a population.

- **Cause-Specific Death Rate**

Cause-specific death ratios and rates (CSDRs) are used to make analysis of the death statistics classified by cause. The two devices (CSD ratios and rates) are of great help in comparing the distribution of deaths by cause between two populations or to trace the time-trend for a particular population. These are also used to make multiple decrement life tables by cause of death and to describe how much sensitive the expectation of life at a specified age is for the changes in mortality due to one or more causes. The study of mortality by cause provides a detailed picture to the researcher, planners and the policy makers of the general state of health and mortality situation prevailing in a community or a country.

The cause-specific death ratio is simply a ratio of deaths due to a specific cause to total deaths occurring during a period of time. The cause-specific death rate is expressed as the ratio of deaths in a year due to a specific cause to the total midyear (average) population. It is calculated as:

$\frac{D_i}{D} \times K$, P= $\frac{\overline{\sum_{i=1}^{n}}}{} D_i$

Where:

- Dl represents the deaths due to cause 'i',
- and D is the total number of deaths; value of K is usually 1,000.

Cause-specific death rates can also be calculated for specific age. An age- and cause-specific death rate is given as:

$\frac{D_{ia}}{p} \times K$

Where:

- D_{ia} represents deaths at age 'a' due to cause 'i',
- P is the mid-year population,
- K is a constant, usually 10,000 or 100,000.

8.4 Causes of Mortality

The World Health Organisation has prepared a Manual on the International Statistical Classification of Diseases, Injuries and Causes of Death. According to this Manual (WHO, 1955), one thousand groups of diseases have been identified, and these are re-grouped into an intermediate list of 150 causes numbered A1, A2, A3, etc.

These, in turn, are regrouped into an abbreviated list of 50 causes numbered as B 1, B2, B3, etc. This last list of 50 groups of causes is used for computing deaths and death rates on the basis of the causes of death.

Again, from this list of 50 groups of causes, various diseases have been grouped according to their response to various health measures, resulting in five groups.These are:

1. Infectious and parasitic diseases of the respiratory system,
2. Cancer,
3. Diseases of the circulatory system,
4. Deaths by violence, and ,
5. All other causes.

The pattern of mortality on the basis of causes of death in the developing regions is quite different from that in the developed regions, though this pattern too has undergone changes over the years as mentioned above. For those countries for which data on causes of death are available, it is possible to study the changes in the causes of death along with the changes in mortality.

(i) Reasons for high mortality in the past: It has already been pointed out that, up to the nineteenth century, death rates all over the world were very high and fluctuating. The main reasons for such high mortality rates were:

- Acute and chronic food-shortages causing famines and conditions of malnutrition;
- Epidemics;
- Recurrent wars;
- and Poor sanitary conditions.

The study of infant mortality gains importance, especially because mortality during the first year of life is invariably high for all countries, irrespective of whether the overall levels of mortality are high or low. Further, level of infant mortality acts as an indicator of the medical and health facilities, expectation of life at birth, age structure of population and fertility change in a population.

(ii) Factors affecting infant mortality: A variety of factors affecting infant mortality are customarily classified as biological/endogenous and exogenous (socio-economic and environmental) factors. These categories should not be treated as watertight compartments for there is a great deal of interaction between them. At times, it is even possible to modify biological factors by introducing changes in socio-economic factors or environmental factors.

- **Endogenous/Biological factors:**

  Most of the endogenous factors related - to the formation of the foetus in the womb are biological in nature. Among the biological factors affecting foetal and neo-natal infant mortality rates, the important ones are the age of the mother, the birth order, the period of spacing between births, prematurity birth, weight at birth and the fact of multiple births. Based on in-depth studies done on the age of the mother, the parity of the mother or the order of pregnancy and/or of birth it has been generally observed that foetal and neo-natal mortality rates are higher at the younger ages of the mother (that is, below the age of 19), at first parity and for the first birth order. These mortality rates start declining up to the age of 29 of the mother, and at the second and third parity and then again increases with higher age of the mother, higher parities, and high birth orders. It is now an established fact the causes of foetal and neo-natal deaths arise mainly out of genetic factors, and may be traced back to the intrauterine life of the foetus and to the damage occurring during the process of birth.

- **Exogenous Causes:**

Social, cultural, economic and environmental factors are also found to affect infant mortality, especially during the post-neonatal period. However, post-neo-natal deaths are mainly due to various epidemics caused by communicable diseases, both of the digestive system such as diarrhoea and enteritis, and of the respiratory system such as bronchitis and pneumonia as well as by faulty feeding patterns and poor hygiene. The important environmental factors include crowding and congestion, insanitary surroundings, lack of proper sunshine and fresh air, etc. Changing patterns of lifestyle impacting on culture producing illegitimate births and consequent effects leading to infant mortality is also contributing to a high infant mortality rate.

One interesting feature of the role of endogenous and exogenous factors in Education: An Overview determining infant mortality rates is worth noting. In developed countries where infant mortality rates are very low, a higher proportion (that is, more than two-thirds) of infant deaths occur during the neo-natal stage only, because, being developed they have been successful in almost completely eliminating the environmental factors responsible for such deaths. The main causes of infant mortality in these countries are, therefore, mainly genetic or biological in nature. On the other hand, in countries where infant mortality rates are high, majority of infant deaths occur after the neo-natal stage and are mainly due to environmental factors (United Nations, 1973).

International comparisons of the causes of death by regions, continents or countries is made difficult because of differences in terminology, method certification, diagnostic techniques and the interpretation of death certificates by the coders.

8.5 Causes of mortality decline in developed countries: In Europe, North America and Oceania continuous economic progress resulting from Agricultural and Industrial Revolutions have been the main reasons for the reduction in mortality rates, which first began to decline rather weakly in the seventeenth century and then with an increasing tempo throughout the eighteenth and nineteenth centuries.

Important developments that affected morality in European countries since the eighteenth century have been the increase in the supply of food, advances in technology, extension of the benefits of medical research, development of immunology, advances in chemotherapy (use of drugs to cure or inhibit the progress of diseases) and other improved health services, improvements in sanitary conditions and public health measures, and heavy and better clothing to combat severe winters, social reforms, etc. All these have collectively led to improvements in the standards of living and fall in morality in many ways.

8.6 Causes of Decline in Mortality Rates in Developing Countries:

Mortality rates have declined considerably in developing countries in recent years due to the following reasons:

- **Disease Control Medicines:**
  By importing drugs from developed countries, the developing countries have been able to control such mass killers as typhoid, malaria, small pox, pneumonia, plague, etc. The World Health Organisation, in particular, has been helpful in eradicating malaria, small pox, polio, TB, etc. to a considerable extent.

- **Public Health Programmes:**
  Developing countries with the assistance of WHO have been adopting public health programmes for keeping the environment clean and free of pollution. Governments have been following strict pollution control measures. Consequently, deaths due to respiratory diseases have declined.

- **Medical Facilities:**
  Medical facilities have not only increased but also improved in such countries. The number of doctors and trained nurses has increased considerably. Besides

the spread of government hospitals in urban centres and primary health centres in rural areas, private hospitals and nursing homes are fast coming up which provide the best of medical facilities comparable to those in advanced countries. As a result, the number of deaths are on the decline.

- **Spread of Education:**
  With the spread of education, people are becoming rational. They are giving up superstitious and fatalist attitude towards life. They have started taking keen interest in their own health and that of their children. They have become health conscious. They take nutritive and balanced diet, do exercise, go for a walk and even to a gym. All these have brought down the death rate.

- **Status of Women:**
  In almost all the developing countries, the status of women in society has increased with spread of literacy among them. Women now understand the importance of cleanliness and hygiene and take better care of their children's health. Consequently, the infant mortality rate is on the decline. Early marriage of girls has been banned in the majority of developing countries, thereby reducing the death rate at the time of the first child.

- **Food Supply:**
  With the increase in food supply in the majority of developing countries and through imports of food grains from developed countries like the USA and Australia, famines have been controlled. This has resulted in reduction of death rates in such countries.

- **Life Expectancy:**
  Over the years, life expectancy has increased in developing countries due to increase in economic growth rates, rise in per capita incomes, improved health, medical, sanitation facilities, etc. Consequently, the death rate is on the decline and the percentage of population in 60 plus age group is on the increase.

8.7 Self- Check Questions

(1) Describe the concept of mortality.

(2) Highlight the measures or indices of mortality.

(3) Discuss the causes of mortality.

(4) Explain the causes of decline in mortality rates both in developing or developed countries.

8.8 Summary

In this lesson, we have dealt with the maincomponent of population change i.e. mortalitywith emphasis on their concept and measures / indices and factors influencing them. We have also touched upon the causes of mortality based on various aspects. We have also covered causes of decline in mortality rates in both developed and developing countries. All these must have provided you broader perspective of how, when and to what extent the changes take place in the mortality at national and international levels.

8.9 Glossary

- **Fecundity -** Fecundity refers to "the physiological capacity of a man, a woman, or a couple to participate in reproduction (i.e. the capacity to produce a live child or children)." Fertility, on the other hand, "refers to the actual reproductive performance of an individual or a couple or a group. It is important to differentiate between fecundity and fertility. From the above, it is clear that the fecundity is the actual capacity to reproduce children while fertility refers to the number of children actually produced. While there is no direct measurement for fecundity, fertility can be studied from the statistics of births, though, of course, the fertility of an individual is limited by his/her own fecundity, which refers to the physiological capacity to reproduce.

- **Natural Fertility-** As defined by Henry (1953) natural fertility is "fertility of a human population that makes no deliberate effort to limit births." Fertility Change may be considered to be natural if no contraception or induced abortion is used. Practices such as prolonged breastfeeding and / or abstinence after childbirth do also tend to lower fertility, but when such practices are adopted without any intention of controlling fertility, the results of fertility is considered as natural.

- **Contraception-** Contraception refers to measures which are taken in order to prevent sexual intercourse or coitus from resulting in conception. A contraceptive method is sometimes termed as a birth control method, though "birth control" is used in a broader sense to include intentional abortions, sterilization and

complete abstinence from coitus. Contraception refers to all measures taken for the prevention of conception or of birth.

8.10 Self-Check Answers

Ans. 1 See section 4.2

Ans. 2 See section 4.3

Ans. 3 See section 4.4

Ans. 4 See section 4.5 & 4.6

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8.12 Terminal Questions

1) Explain the causes of decline in mortality rates both in developing or developed countries.

2) Describe the concept of mortality in detail.
3) Highlight the measures or indices of mortality.
4) Discuss the causes of mortality.
5) Write a note on mortality rates in India.
6) Crude death rate explains with its formula.

Lesson-9

Population Structure and Dynamics: Migration

Structure

9.0 Introduction

Migration is one of the components of population growth and change (others are fertility and mortality). However, migration is different from the other two processes, namely, mortality and fertility in the sense that it is not a biological factor like the other two, which operate in a biological framework, though influenced by social, cultural and economic factors. Migration is influenced by the wishes of persons involved. Usually each migratory movement is deliberately made, though in exceptional cases this may not hold true. Thus migration is a response of human organisms to economic, social and demographic forces in the environment. The study of migration occupies an important place in population studies, because, along with fertility and mortality, it determines the size and rate of population growth as well as its structure and characteristics. Migration also plays an important role in the distribution of the population of any country, and determines the growth of labour force in any area. Migration is thus an important symptom of social change in society.

9.1 Objectives

After reading this lesson, you should be able to:-

- familiar with the concept and definitions of migration
- understand the types of migration
- understand the causes of migration
- to know about the consequences and constraints of migration

9.2 Concept of Migration

In this section, we will touch upon migration, which is the third determinant of population change, the other two being fertility and mortality which we have already discussed in previous lessons. Unlike fertility and mortality, migration is purely a social phenomenon which is the result of a complex mechanism involving social, a psychological, economic, political, institutional and other determinants (Bhaskar D. Misra, 1980).

The process of migration not only affects the size and growth of population of an area but also produces remarkable alterations in the structure and distribution of population. The study of migration, thus, occupies an important place in population studies. In addition, the study of migration is a matter of interest and importance not only to demographers but also to economists, sociologists, human geographers, political scientists, legal departments, policy-makers and planners, public administrators, social pathologists and social psychologists.

Some of the reasons why different persons working in a variety of fields are interested in the study of migration are as follows:

Migration may be considered as a symptom of basic social change.

- Industrialization and economic development have been accompanied by large-scale movements of people from farm areas to towns, from one town to another, from one city to another, and from one country to another.
- Technological and other changes in certain areas causing migration of people from rural to urban areas has given rise to towns, cities and metropolitan cities.
- Increased market and business operations requiring supply of skilled and unskilled workers.
- Growth of industries leading to the occupational and employment status of the migrants.

- The emergence of such a massive population phenomenon, especially that of rural-urban migration, and new problems arising out of such migration.

9.3 Definition of Migration

In a layman's language, the word 'migration' refers to the movements of the people from one place to another. According to Demographic Dictionary, "migration is a form of geographical mobility or spatial mobility between one geographical unit and another, generally involving a change in residence from the place of origin or place of departure to the place of destination or place of arrival." Such migration is called permanent migration, and should be distinguished from other forms of movement, which do not involve a permanent change of residence.

Everett Lee, a well-known demographer, defines migration broadly "as a permanent or semipermanent change of residence". No restriction is placed upon the distance of the move or upon the voluntary and involuntary nature of the act.

Migration, according to Eisenstadt, refers to "the physical transition of an individual or a group from one society to another. This transition usually involves abandoning one social-setting and entering another and different one."

Mangalam also stresses the permanent shifting of people in his definition and considers migration as a relatively permanent moving away of a collectivity, called the migrants, from one geographical location to another. It is preceded by decision-making on the part of the migrants. They weigh and consider sets of values in two comparative situations, resulting in changes in the interactional system of the migrants. Holiday trips or sailor's occupations are not included in it. Mehta, in his study of Rajasthan, treats migration as an act of movement or spatial mobility.

According to Lundquist, Anderton and Yaukey, "Migrations are those population movements that add or subtract from the members of a population or society." Thus, a vacation trip, a move to a neighbouring apartment, an errand to the store, a daily commute to work cannot be considered as migration. Reason is no population in these cases is added or subtracted to a particular population or society.

For demographers, membership in a population is closely linked to the idea of residence. Residence, in this context, means more than just being physically present at a geographic location at a moment in time; it implies being socially affiliated with a population.

The society in the area of origin (the sending society) wants to know how many people, of what kind, it is losing. The society in the area of destination (the receiving society) wants to know how many people, of what kind, it is gaining. And, from the perspective of individuals, changes in residence that involve the tearing up of old roots and the setting down of new ones are psychologically, socially, and economically more important than casual moves.

In preceding sections, the terms used such as "death," disease", "births," "abortion," etc., are easily understood by the public, for scientific and commonly understood meanings of these terms do not differ much from each other. On the other hand, terms such as "change of place," "migration," "communication," "mobility," "emigration," "immigration," "out-migration," etc that we will be using in this section connote different meanings to different persons, for their meanings in scientific language and common parlance may differ widely.

So, we will cover these terms under the concept of migration and types of migration.

9.4 Types of Migration

The United Nations' Multilingual Demographic Dictionary (1958) defined migration as follows: "Migration is a form of geographical mobility or spatial mobility of people between one geographical unit to another, generally involving a change in residence from the place of origin or place of departure to the place of destination or place of arrival. Such migration is called permanent migration and should be distinguished from other forms of movement which do not involve a permanent change of residence."

Migrant and migration: A migration is defined as a move from one defining area to another (or a move involving some minimum specified distance) made during a given migration interval and involving a change of residence. A migrant is a person who has changed his/her usual place of residence from one defining area to another (or one who has moved some specified minimum distance) at least once during the migration interval.

(i) Typology of migration: Migration can be classified into different types based on different criteria.

a) Spatial migration: Based on space it is divided into internal migration (within a country) or international migration (across political borders). The internal migration can again be divided into intra-local and inter-local, and intra-regional and inter-regional.

b) Temporal migration (based on time-length): The temporal migration is divided into four categories - daily, periodic, seasonal and long-term migrations.

c) Causal migration: Based on the cause, the migration is voluntary or forced.

d) Consequential: Based on the consequences, migration is of two types: innovative (to introduce or to adapt to innovations) or conservative (to conserve one's own values, traditions, etc).

However, it is customary to study migration with respect to: i) Internal migration, and ii) International migration. Internal migration is the migration of persons within a country, while international migration refers to the movement of people from one country to another.

In order to have better understanding of the concept and types of migration, we may have a look at the following concepts / terms.

- **Immigration and Emigration:** The terms immigration and emigration refer respectively to movement into or out of a particular territory, and are used only in connection with international migration. Thus, migrants leaving India to settle down in the United States are immigrants to the United States and emigrants from India.

- **In-migration and Out-migration:** In-migration refers to movement into a particular area, while out-migration refers to movement of people out of a particular area, both referring to movements within a country, that is, internal migration. Thus, migrants from Tamil Nadu to Maharashtra are considered to be immigrants for Maharashtra and out-migrants for Tamil Nadu. Each move is either an immigration or in-migration with respect to the place of destination and emigration or out-migration with respect the place of origin and departure.

- **Place of origin or Place of departure and Place of destination or Place of Determinants of Population arrival:** The place from which a move is made by the migrants is the place Change of origin or departure. The place of arrival or the place of destination refers to the place at which a move of the migrants terminates.

- **Gross migration and Net migration:** The total of the arrivals of immigrants and in-migrants and departures of emigrants and out-migrants is known as gross migration or the volume of migration. Net migration is the difference between the total number of persons who arrive and the total number of persons who leave.

This is also referred to as the balance of migration. i.e. difference between the number of immigrants and emigrants is net migration with reference to a country in the context of international migration, and the difference between in-migrants and out-migrants is also net-migration with reference to a place within a country in the context of internal migration.

- **Migration stream:** It refers to the total number of moves made during a given migration interval which have a common area of origin and common area of destination. In practice, it refers to a body of migrants having a common area of origin and a common area of destination.

- **Migration interval:** Though migration occurs more or less continuously over a period of time, it is necessary to specify the interval over which it is observed. This interval may be definite, i.e. when data refers to a definite interval such data measure a fixed-term or fixed-period of migration, be it one year, two years, five years, or an inter-censual period, etc. Or, it may be indefinite - the life-time migration of a population based on the place of last residence which does not have a definite time-reference or at only a given point of time.

9.5 Causes of Migration

Traditionally people use to move from the place of birth to destination for the cause ofwork (livelihood, employment) in the case of males, and as a consequence of marriage to matrimonial home in case of women (except in the case of matrilineal society). Now-a-days people use to move fiom rural to rural, rural to urban, urban to urban or urban to rural for education, job, marriage and for the causes of natural disasters like drought, earthquake, floods and famines.

The causes of migration can be broadly classified as two types: i) Push factors, and ii) Pull factors (Lewis, 1982).

i) Push factors:

These are the factors related to the place of origin which are unfavourable conditions forcing or prompting the persons to move out to other places. These factors include: a) decline in or exhaustion of local natural resources, decrease in demand for the local resources, loss of employment for any reason, oppressive, repressive or discriminatory treatment because of political, religious and ethnic origins, among others, alienation from a community for any reason, voluntary retreat from a community for

better opportunities outside, or forced retreat or displacement due to natural calamities such as floods, fire, draught, earthquake, epidemic, etc.

ii) Pull factors:

These are the factors related to the place of destination or amval which attract or motivate the people from other areas/places. These include: superior opportunities for employment in one's occupation or to enter a preferred occupation or to earn more income; opportunities to obtain desired specialization in education or for specialised training; preferable environment and living conditions in terms of climate, housing and other facilities; dependency movements - movement of dependents to join the bread winner or migration of a bride to join her husband, etc; and line of new or different activities, environment or people.

iii) Socio-Cultural and Political Factors:

Besides these push and pull factors, social and cultural factors also play an important role in migration. Sometimes family conflicts also cause migration. Improved communication facilities, such as, transportation, impact of the radio and the television, the cinema, the urban-oriented education and resultant change in attitudes and values also promote migration.

iv) Demographic Effects:

Migration reduces population growth in rural areas. Separation from wives for long periods and the use of contraceptives help control population growth. When very young males migrate to urban areas, they are so influenced by the urban life that they do not like to marry at an early age.Their aim is to earn more, settle in any vocation or job and then marry. Living in urban areas makes the migrants health conscious. Consequently, they emphasize on the importance of health care, and cleanliness which reduces fertility and mortality rates.

Migration increases the population of the working class in urban areas. But the majority of migrants are young men between the ages of 15 to 24 years who are unwed. Others above this age group come alone leaving their families at home.This tendency keeps fertility at a lower level than in rural areas. Even those who settlepermanently with their spouses favour small number of children due to high costs of rearingthem. The other factor responsible for low fertility rate is the availability of better medical andfamily planning facilities in urban areas.

v) Economic Effects:

The effects of migration on income and employment in urban areas are varied depending uponthe type of migrants. Usually the migrants are unskilled and find jobs of street hawkers, shoeshine boys, carpenters, masons, tailors, rickshaw pullers, cooks and other tradesmen, etc. These are “informal sector” activities which are low paying. But, according to the ILO, the evidence suggests that the bulk of employment in the informal sector is economically efficient and profit-making. Thus such migrants earn enough to spend and remit to their homes. Other migrants who are educated up to the secondary level find jobs as shophelpers, assistants, taxi drivers, repairing machines and consumer durables, marketing goods and in other informal activities that are small in scale, labour intensive and unregulated. Their earnings are sufficient to bring them in the category of a common urbanite with an income level higher than the unskilled workers. Another class of migrants that is very small is of those who come for higher education in colleges and institutes to towns. They find good job in the “formal sector”, get good salaries, and follow a good standard of living. These are the persons who remit large sums to their homes and help in modernising the rural scenario.

Migration from rural to urban areas has a number of adverse effects. Towns and cities in whichthe migrants settle, face innumerable problems. There is the prolific growth of huge slums andshantytowns. These settlements and huge neighbourhoods have no access to municipalservices such as clean and running water, public services, electricity, and sewage system.There is acute housing shortage. The city transport system is unable the meet the demand ofthe growing population. There are air and noise pollutions, and increased crime and congestion.The costs of providing facilities are too high to be met, despite the best intentions of the localbodies.Besides, there is massive underemployment and unemployment in towns and cities. Men andwomen are found selling bananas, groundnuts, balloons and other cheap products onpavements and in streets. Many work as shoeshine’s, parking helpers, porters, etc.Thus, urban migration increases the growth rate of job seekers relative to its populationgrowth, thereby raising urban supply of labour. On the demand side, there are no enough jobsavailable for the ruralities in the formal urban sector for the uneducated and unskilled ruralmigrants.

Consequently, this rapid increase in labour supply and the lack of demand for such labour lead to chronic and increasing urban unemployment and underemployment.

9.6 Consequences and Constraints of Migration

Since migration is a often a voluntary action, societal values and norms are involved, and therefore, the manner in which these are manifest in individual and group

behaviour, in relation to both the migrant and non-migrant population has wide-spread consequences. Migration has an effect on many aspects of human activity and at several geographical scales. It can bring about changes in several spheres such as demographic, economic, social, cultural, political, etc and at several scales of analysis such as individual, community, societal, national and international. As result, there will be some constraints to migration (Lewis, 1982). So, in this section we will touch upon the consequences of migration as well as constraints to migration.

- **Consequences of Migration**

Migration has its effects or consequences on:

- the size and structure of the society in general;
- the community of origin and the community of destination;
- and the individual migrants themselves.

These consequences are briefly presented below.

(a) Societal consequences:

Migration acts as an agent for the transformation of a society from a traditional one to modem one. It acts as a means by which more advanced form of human activity spreads to different parts of the world and therefore forms an essential part of the modernization process. Migrants often take with them skills which form the basis of the economies of the 'new lands'. Migration also strengthens the development of economic Determinants Of Popu1ation Change infrastructure such as roads and transportation facilities. While these are some advantages of migration to the society, it also causes considerable social and political problems in terms of unemployment, unskilled labour force, group tensions, violent population, disruption of agricultural - production, etc. Increase in slum-settlements, increase in the cost of housing, pollution, raising cost of living, changes in family norms and standards, social values, and related problems could be seen as the consequences of migration to cities. In the process of attempts to solve such social, environmental and political problems, it leads to a slowing down in developmental process or reduced rate of economic change.

(b) Community consequences:

The community consequences of migration depend upon intensity of migration, its differential nature and social composition of the communities involved. Continuous in-migration of young migrants accelerate the birth rate of the communities involved. On the other hand, continuous out-migration of young people leads to falling birth rate

resulting in consequential natural decrease in the growth of the population. Among the differentiating factors which have been shown to generate social change include: socio-economic status, education, ethnicity, occupation, language and religion. More often than not migrants are innovators and prospective leaders within a community. Sometimes, large scale rural to urban migration promotes intensive urban growth and social segregations at series of different stages in cities and depopulation and decreasing rural communities.

(c) Individual consequences:

These are related to the extent to which the individual's needs and aspirations are (being) met in the host community as well as his own adaptation to new surroundings - social, economic, political, cultural, etc - and involves adjustment, participation, acculturation and process of assimilation.

- **Constraints to Migration**

The constraints to migration mainly depend upon the following: i) Market situation, and ii) operation of public policy. Access to resources, roles and functions of individuals and institutions involved in the supply, allocation and utilization of resources such as employment and housing to a large extent influence the market situation. The goal of public policy should be to develop and promote the benefits of society as a whole rather than the personal objectives of selected groups or members. Any biased approaches to the market situation and the public policy will act as major constraints to migration. At present, the market situation and operation of public policy at national and international level vary widely because of the effects of increasing industrialization, urbanization, modernization, globalization and liberalization. Further, non-availability of official information on safety and security situation at the place of destination could also be considered as constraints to migration in general, and at international level in particular.

9.7 Self- Check Questions

(1) Define migration.

(2) Describe the concept of migration.

(3) Highlight the various types of migration.

(4) Discuss the causes of migration.

(5) Explain the consequences of migration.

9.8 Summary

In this lesson, we have dealt with the maincomponent of population changei.e migration. We have also touched upon the concept, definition, causes and types of migration. We have also covered the consequences and constraints of migration. All these must have provided you broader perspective of how, when and to what extent the changes take place in the migration at local, national and international levels.

9.9 Glossary

- **Seasonal migration** - Movement from one place to another generally associated with agriculture and tourism; seasonal agricultural migrants follow crop cycles, moving from place to place to plant or harvest crops.

- **Emigration** - The movement of a person or persons out of a country or national region, for the purpose of permanent relocation of residence.

- **Immigration** - The passing or coming of a person into a country for the purpose of permanent residence.

9.10 Self-Check Answers

Ans. 1 See section 5.2

Ans. 2 See section 5.4

Ans. 3 See section 5.5

Ans. 4 See section 5.6

9.11 Suggested Readings

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9.12 Terminal Questions

1) Explain the causes of decline in mortality rates both in developing or developed countries.
2) Describe the concept of mortality in detail.
3) Highlight the measures or indices of mortality.
4) Discuss the causes of mortality.
5) Write a note on mortality rates in India.
6) Crude death rates explain with its formula.

Lesson 10

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Population Growth in India

Structure

10.0 INTRODUCTION

The growth of population has been a deterrent and can be instrumental in the transformation of economy if properly addressed and utilized. India's vast and relatively young population has a lot of things to promise in terms of her transient demographic dividend. It ought to be speculated well in advance and requires an intensive programme intervention for fruitful utilization. In India, the proportion of children in the age group 0-14 years has been steadily declining with proportional increase in youth. It owes to the decline in fertility and acceptance of small family norms by the people. Health care facilities enhanced the life expectancy, resulting in the increase in elderly population.

10.1 Objectives

After reading this lesson, you should be able to:

- To know the population growth of India.
- Understand the background of Indian population growth.
- know about the birth rate, death rate and age structure.

10.2 POPULATION GROWTH IN INDIA

The first census was taken in India in 1871 and thereafter once every ten years. It is , therefore, possible to study changes in population size, structure, characteristics, etc. the estimates of population size in India during the ancient, medieval and the early modern periods (that is, from the beginning of the Christian Era to 1871) have been derived by Kingsley Davis from a careful examination of archaeological evidence, relevant literature and historical records left behind by scholars of history. The ensuing discussion on the growth of population in India from the ancient times up to 1900 draws heavily on the scholarly work of Kingsley Davis.

10.3 Population Growth up to 1600 A.D.:

Since the ancient times, India had had the legacy of a thickly settled population. The excavations at Harappa and Mohenho-Daro reveal that, as far as the third and fourth millennium B.C., India had a highly developed civilisation, and densely populated cities, It appears that even three to seven thousand years ago, India possessed adequate technological knowledge support dense population. The available records for the first truly Indian empire, under the rule of Chandragupta Maurya almost three centuries before Christ, reveal that this empire could maintain a standing army of about 700,000 men. It may well be presumed from this that a substantial population must have been required to maintain such a large army. Putting together all the available evidence, Davis asserts, " Before the Christian Era, India had a substantial population, first because of its advanced technology and second because of the fertile environment for the application of this technology." Conforming the estimates of Davis, Pran Nath estimates that, around 300 B.C. the population of Ancient India was between 100 million and 140 million.

Estimates made by Moreland, the well known historian, reveal that, in 1600 A.D., the population of India was100 million. It therefore, appears that from 300 B.C., to 1600 A.D., a period of over two thousand years, India's population was almost stationary. The underlying reason for this near static growth of population was the same as that which cheeked the growth of world population in the pre-industrial period. There was some fluctuation in the death rate. During this period, death rates were high and fluctuating, while birth rates, though also high, were, more of less stable. This stage can be termed as the stage of high potential growth.

10.4 Population Growth from 1600 to 1870:

It is unfortunate that little documentary evidence is available on the basis of which estimates of population size for the period 1600-1870 may be made. Heavy reliance has

therefore, to be placed on the impressions of the Europeans who, during this period, visited India or stayed in India for differing periods of time for either trade or military purposes. Davis, while attempting to reconstruct the growth of population in India during the period1660 to 1870 on the base of all available evidence, has finally arrived at the conclusion that “there is little use trying to puzzle out India’s growth rate prior to the census period. the best policy is to revise Moreland’s figure for 1600 upward to 125 million, and to assume that the population remained at these point for one and a half centuries more, after which a gradual enhancement of growth began, accelerating as 1870 approached.

10.5Population Growth from 1871 to 1901:

From 1871 onwards the base for the study of the population of India is more firm, for actual counts rather than only estimates, are available. These actual counts, however, connot be accepted as reliable because, with each census, additional territories were covered and improvements effected in the methodology of conducting a census. The necessary adjustments in the total population figures have, therefore, been made.

The population count for 1867-1871 was 203.4 million, while the adjusted figure was 255.2 million. The growth rate of India’s population computed on the basis of adjusted figures, indicates that between 1867-71 and 1881-1891 it increased by 9.4 percent. In the next decade (1891-1901) however, the growth rate went down to 1.0 percent. The fluctuations in the rates of growth may be evaluated from the following figures:

Year	percent change from previous decade
1881	0.9
1891	9.4
1901	1.0
1910	5.7

Fig. 1

10.6 Population Growth from 1901 to 2011

The population in India has increased from 238 million to 1211 million[1901-2011]The growth has not been evenly distributed. It was stationary at a comparatively low level and shot up rapidly, which went through three phases, viz. 1901-51, 1951-2001 and Post-2001.

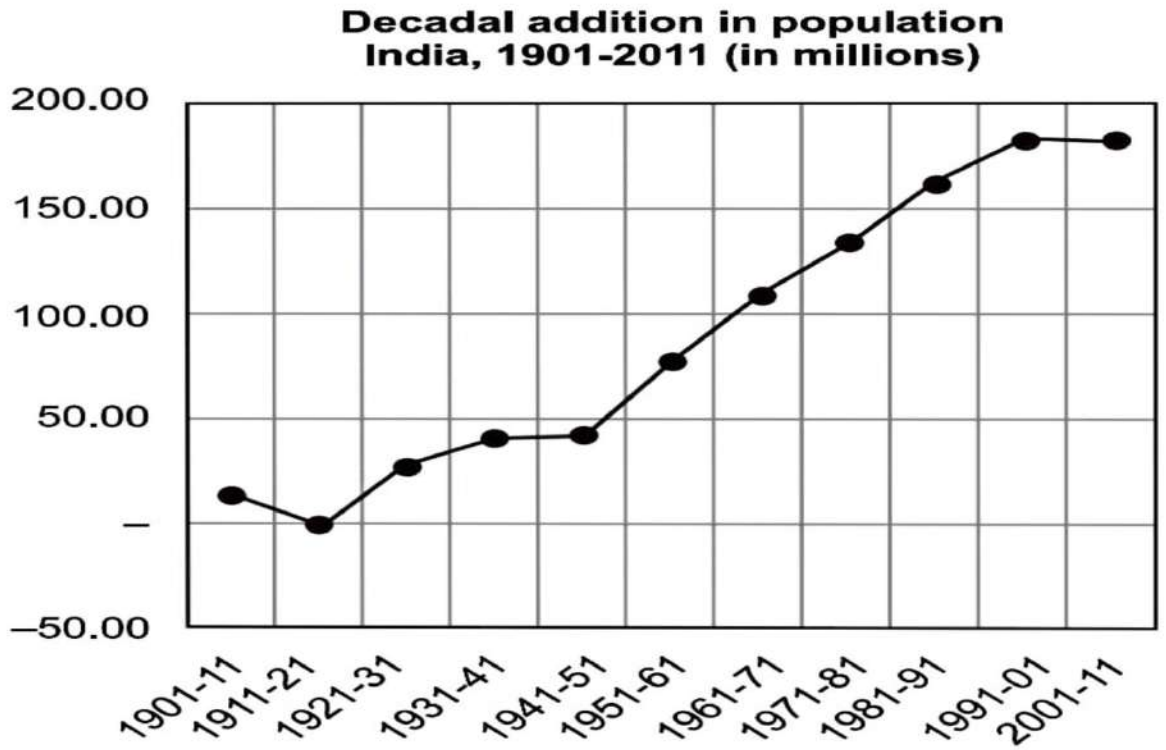

Fig.10.2

Fig.10.2 decadal addition in population India 1901-2011 (in million)

Barring 1921 [the year of great famine],the high birth and death rates prevailing up to 1951, showed the first phase of demographic transition in the country (Fig. 1), India witnessed significant addition in population, during every decade up to 2001, resulting in the huge population growth from 361 million in 1951 to 1,029 million in 2001. It is the second phase of such demographic transition called “Early expanding phase” characterized by high birth and relatively low death rates. India witnessed a marginal decline in the absolute number of addition during 2001-11, offsetting the third phase of demographic transition, called “Late expanding phase”. This phase is characterized by significantly low death rate and but comparatively higher birth rates. The first two phases had been in force for almost have decades each. The third phase which is very crucial in deciding the future trajectory of population needs to be examined with reference to the trends in birth and death rates along with the projected population for the coming decades.

10.6.1 Birth and Death Rate:

The statistics on vital rates in India is basically provided by the Sample Registration System (SRS) from the Registrar General of India. It came into existence in 1969 and the first figures on birth and death rates were declared in 1971. Demographers hitherto

were to rely upon the estimated vital rates worked out by various researchers. The figures were shown upto 1969 and 1971 onwards (Fig 10.3 and 10.4 respectively). The birth and death rates were high in the beginning of the twentieth century. Around 1916, the death rate increased noticeably due to the great famine faced by the country. The birth rate was stationary at the higher level during the first half of the century. The death rate declined sharply after 1916. The faster decline in the death rate coupled with high birth rate during the first half of the century yielded rapid expansion of population. When this cohort reached the age of fertile union, they again contributed to the growth of population, seen from the high momentum of population growth in the post-independence era (Fig. 10.2). The data was unavailable for the period between 1966 and 1971, other than procurement from different sources. The first set of figures on vital rates was procured from the SRS. India had a CBR of 36.9 and a CDR of 14.9 that declined to 21.4 and 7.0, respectively during 1971-2013 (Fig. 10.4). Unlike the previous decades, here

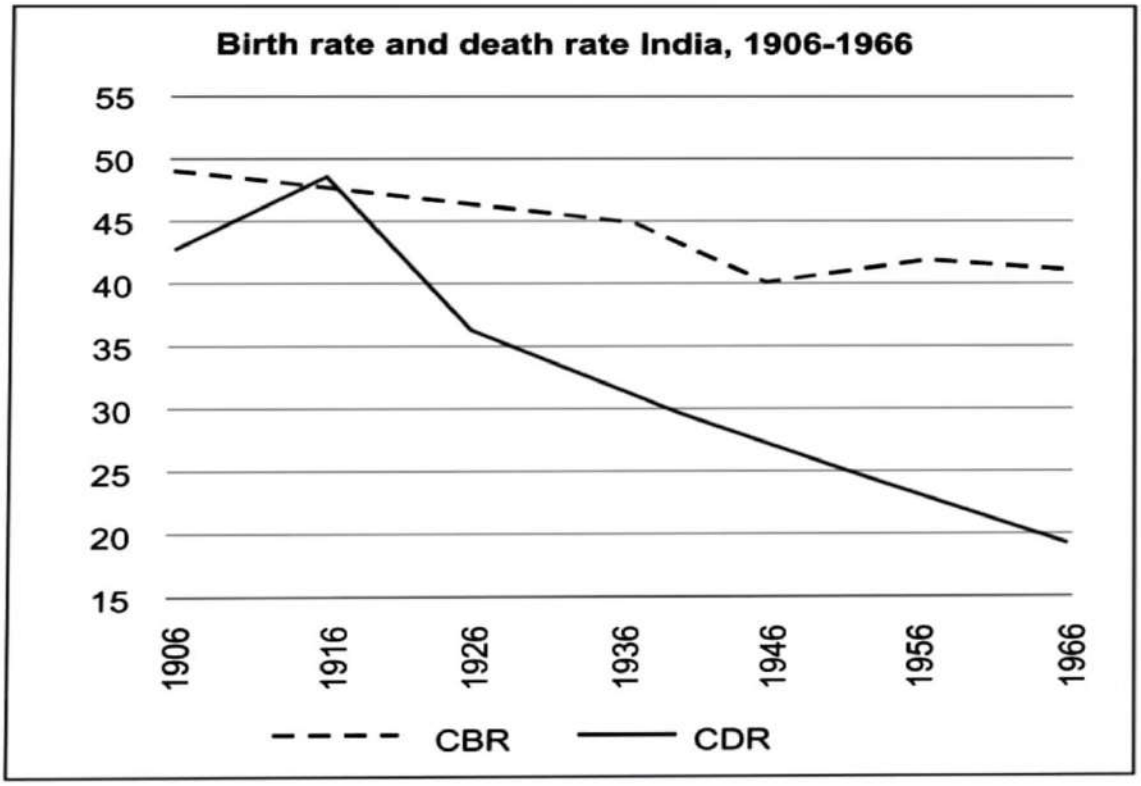

Fig. 10.3

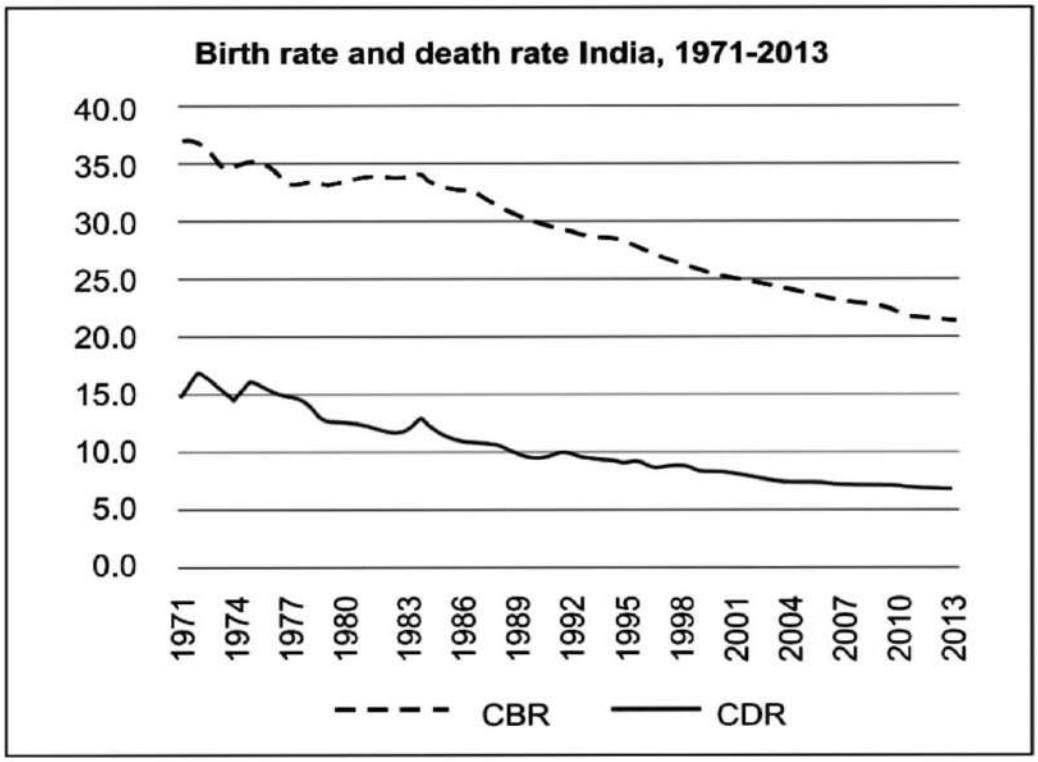

Fig.10.4

The CBR declined faster than the CDR. It is also to be kept in mind that the CDR is already at a lower level leaving comparatively less scope of decline. This marks the onset of the next phase of demographic transition in the country, where birth rate falls more rapidly than the death rate. However, the population continued to increase by virtue of momentum as discussed earlier.

10.6.2 Age Structure:

The net addition in population during 2001-11 was slightly lesser in number than what India added during the decade gone by. It could throw some light on the possible future trends about the age structure. Population by five-year age groups for 1961 Census projects over 40 percent of the population was in the age group 0-14 years (Fig. 10.5). The proportion of child population in 0-14 age group however, has declined by more than 10 percentage points during 1961-2011.

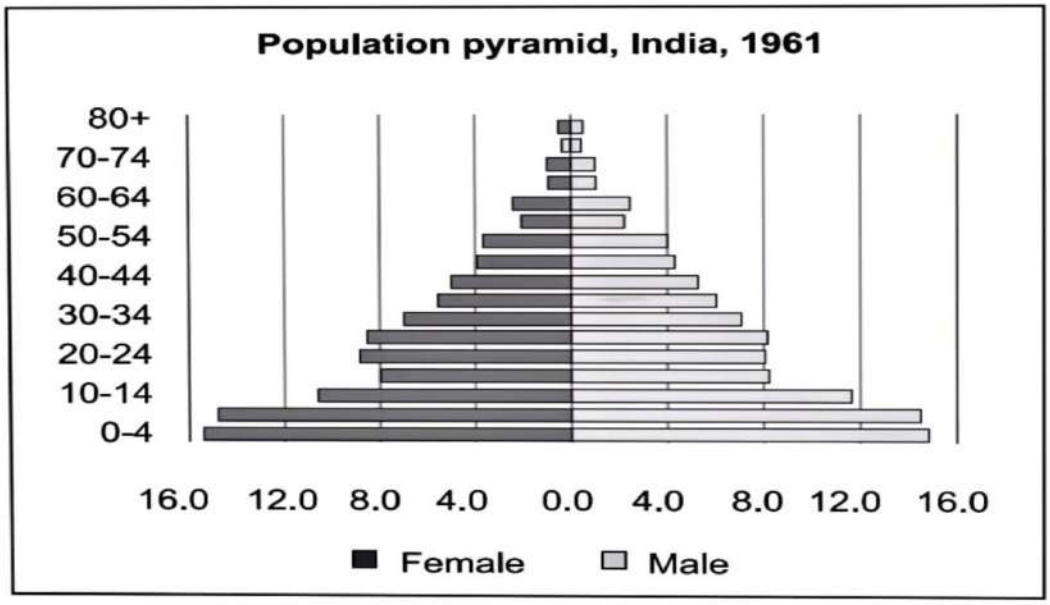

Fig.10.5

Sources: Census of India, 1961

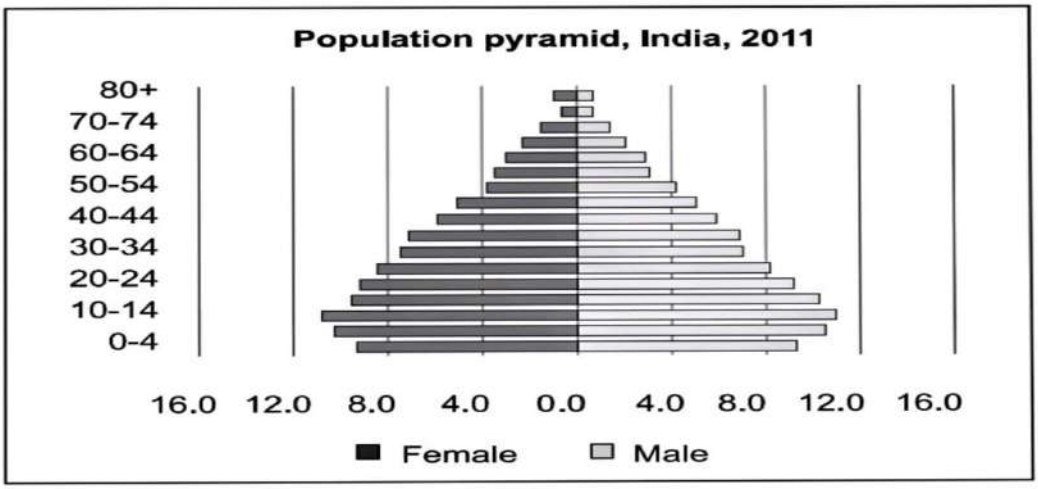

Fig. 10.6

Sources: Census of India, 2011

The population pyramid in 1961 was broadest at the bottom showing the concentration of child population. This bulge has noticeably moved upwards to the higher ages by 2011, indicating the increase in the proportion of adult population (Fig. 10.6). For the first time, Census 2011 displayed, the working-age population exceeded 60 percent mark. Undoubtedly, this is the proof of demographic window of opportunity thinkers. The

increase in population puts the survival at risk. In absence of ample job opportunities, social unrest, anti-social activities even suicides may increase leaving the vibrant and enthusiastic youth population to become a liability to the economy. Another aspect associated with the age structure is the increasing proportion of elderly population i.e., population aged 60 and above was up from 6.8 [1991] to 8.6 [2011]. Though, it is insignificant, various projections expect some increase in the near future.

10.7 Self- Check Questions

(1) Discuss Population growth in India .

(2). Explain the Population Growth from 1901 to 2011

(3) Explain the Age Structure

10.8 Summary

Indian population has not declined at the expected rate. It is evident from the two revisions of projected population by the UN justifying India to surpass China by 2022 (revision 2015), six years earlier (revision 2012). Though, this has dragged the country behind by a few more years, it has allowed some time to prepare for harnessing the demographic dividend. The future population pyramids of India depict a significant change in its age structure within a very short period of time. By 2040, the population in the working-age as well as the elderly will significantly increase. The challenges for the country ahead are creating enough employment opportunities and infrastructure needed for geriatric health care. By 2070, the population pyramid of India will be heavy at the top, meaning some significant increase in the median age and the concentration of population will be in the upper age-groups. By this time, the demographic window of opportunity will completely cease to exist.

10.9 Glossary

- **Population Growth**- Population growth is the increase in the number of people in a population or dispersed group**.**
- **Age structure-** The age structure of a population is the **distribution of people of various ages.** It is a useful tool for social scientists, public health and health care experts, policy analysts, and policy-makers because it illustrates population trends like rates of births and deaths.
- **Birth Rate –** Birth rate is the ratio between births and individuals in a specified population and time

10.10 Self-Check Answers

Ans. 1 See section 10.3

Ans. 2 See section 10.6

Ans. 3 See section 10.6.2

10.11 Suggested Readings

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10.12 Terminal Questions

5) What is population growth? Explain.
6) Discuss the population growth in different era.
7) Explain the development of population growth in India.

Lesson - 11

Population Policy in India

Structure

11.0 Introduction

Population education at present emerged as the most important topic of concern in the world. United Nations has played an influential role in determining the population policies of developed and developing countries. After the establishment of Population Commission in 1946, different organizations have tried to influence population control in different countries. In the year 1974, United Nations celebrated World Population Year (WPY).

In simple sense, population policy is a policy of welfare economics of population control. The main issues of population policy are primarily to reduce fertility and mortality and secondarily to manage re-distribution of population. It suggests ways and means of developing the knowledge, attitude and gap about the family planning. Population policy gives equal importance to the qualitative and quantitative aspects of population growth. It should aim at reducing death rates and birth rates.

Population policy related with socio-cultural, economic, demographic and political environment of the country.

11.1 Objectives

After going through this lesson, you will be able to:

- explain the population policies in India during pre-independence and post-independence period
- identify the different policies proposed in Five-year Plans of Government of India for development of the quality of population
- find the impact of population policies in India

11.2 Development of Population Policies In India

We can study India's population in four periods, which included different approaches to the population problems of the country. The population policy of India has to aim at

- Describing nature of birth rate,
- Limiting number of children in the family,
- Decreasing the rate of mortality,
- Creating awareness among the general people about the effect of over population,
- Adopting necessary steps,
- Apply the laws relating to population growth in the country.
- Population policies in pre-independence period

Over population is not a new topic for our country. The British rulers of India were not interested in formulating population policy for Indian people. Before independence, family planning was suggested by Dr. R.D Karve and Mr. P.K. Wattal in 1916. In 1935, planning committee of the Indian National Congress chaired by Jawaharlal Nehru said about growing population of India. In 1931, Census Commissioner JH Hutton expressed his views on control of rapid growth on Indian population. During the Second World War, people of India showed concerned about the density of population growth. RabindraNath Tagore also strongly supported the family planning movement. Some significant progresses of preindependence period are as follows –

- In 1930, the Government of Mysore opened the first Government Birth Control Clinic in the world.

- In the year 1931, Madras University started instructions in methods of birth control. In 1932, the All India Women Conference at Lucknow recommended methods of birth control in recognized clinics for men and women
- In the year, 1935, the Society for the Study and Promotion of family hygiene was founded.
- In 1940 P.N. Sapru moved a resolution in the Council of States for the establishment of birth control clinics.
- In 1943, Famine Enquiry Commission gave an adverse report to the practice of birth control clinics. Besides the above mentioned achievement, Gandhiji also involved with this movement. But Gandhiji and other national leaders of India did not think population problem as the burning problem of India.

11.3 Population policies in post-independence period

After independence, 1946, the Health Survey and Development Committee reported that the control of disease and improvement of health would cause a serious problem of population growth. In 1952, India became the first developing country in the world to adopt a policy of Governmental efforts to promote a reduction in the number of children. There are some significant policies regarding population education.

- **Policy on Family Planning (1952):** In the year 1952, Government of India adopted a national programme of family planning to reduce the birth rate. But the policy failed to achieve the goal.

- **National Population Policy (1976):** The main focus of this policy were reducing birth rate, raising the age of marriage, creating awareness among people to adopting small family norm, mass-media approach to spread the benefits of small family norms, emphasis on population related research, introduction of population education in school curriculum, gave incentive of the employees helping in the process of sterilization.

- **Revised Population Policy (1977):** In this policy emphasis was given on family planning. There would not be any pressure in connection with the size of the family; all private and public organizations were involved in population education programmes. Government of India emphasized on the research activities regarding population education.

- **National Health Policy (1983):** This policy emphasized on the importance of having the small family norm through the voluntary efforts of the people.

- **Committee on Population Education (1991):** The National Development Council appointed this committee under the chairmanship of Karunakaran. The committee recommended that the National Policy on population should be formulated.

- **Draft National Population policy (1993):** Under the leadership of Dr. M.S. Swaminathan a group of expert was asked to prepare a draft of National Population Policy. The draft was approved by Cabinet but it could not be placed due to dissolution of the LokSabha.

- **National Population Policy (2000):** In the year 2000, it was found that Indian population was increasing more than 1000 millions. The main objectives of the policy were to focus on the unmet needs of contraception, health infrastructure, integrated service delivery for basic reproductive and child health care, to bring out the total fertility rate under control by 2010 and to realize the stable population by 2045. There were fourteen National Socio-Demographic Goals under this policy. These goals are as follows

- Address the unmet needs for basic reproductive and child health service.
- Make school education free and compulsory up to 14 years of age and reduce dropouts.
- To reduce infant mortality rate. m To reduce maternal mortality rate.
- Achieve universal immunization of children against all vaccine preventable diseases.
- Promote delayed marriage for girls.
- Achieve 80% institutional deliveries and 1005 deliveries by trained persons.
- Achieve universal access to information and service for fertility regulation.
- Contain the spread of AIDS and promote integration between management and reproductive tract infection.
- Control and prevent communicable diseases.
- Integrate Indian System of Medicine in the provision of reproductive and child health services.
- Promote the small family norm to achieve replacement levels of TPR.
- Bring about convergence in implementation of related social sector programmes so that family welfare becomes a people centered programme.
- Achieve 100% registration of births, deaths, marriage and pregnancies.

11.4 Five Year Plans of Government of India for development of the quality of Population

❖ **First Five Year plan (1951-1956):**

In the First Five Year Plan, the main focus was economic development and highlights the importance of educational development. Three points were highlighted in this plan

- Recognition of the need of family planning to create healthy living condition.
- Limiting the family size through the training of medical officers for birth control.
- Improvement of population problems caused due to over population.

❖ **Second Five year plan (1956-1961):**

During this plan, it was found that rapid growths of population seriously affect the economic development of the country. So, effective measures for control of population growth were emphasized.

❖ **Third Five Year Plan (1961-1966):**

This plan gave stress on following points

1. Birth control and spacing,
2. Education of women,
3. Opening new employment facilities,
4. Raising the age of marriage,
5. Education imparting family life and sex.

❖ **Forth Five Year Plan (1969-1974):**

In this plan, it is viewed population from the point of social change. Family planning and reducing birth rate were essential for the development of the society.

❖ **Fifth Five Year Plan (1974-1979):**

During the Fifth plan National Population Policy announced in April 1976. It was targeted that for a birth rate of 25 per thousand and a population growth rate of 1.4 percent. Some new aspects were included in family planning programme, such as- community health, maternity and child care and nutrition.

❖ **Sixth Five Year Plan (1980-1985):**

The main importance of this plan were recorded as raising people above the poverty line, bringing economic equality, increasing avenues for employment etc.

❖ **Seventh Five Year Plan (1985-1990):**

- During this period, The National Population Policy was made more comprehensive. Some of the important points were as follows
- Education to children, adolescents and adults on family welfare,
- Information to couple about conception, pregnancy, childcare and health,
- Use of mass-media for general awareness of population problems.

❖ **Eighth Five Year Plan (1992-1997):**

This plan mainly focused on the modernization of industries. The major objectives of this plan included population growth of the country, poverty, employment opportunities and human resource development. This plan is very significant because family planning programmes went under some radical changes. During the Eighth Plan, International Conference on Population and Development was held at Cairo in 1994. The main objectives of this conference were relating to the reproductive and child health, employment of women, adolescence education, immunization health and nutrition etc.

❖ **Ninth Five Year Plan (1997-2002):**

The major objective of this plan was to reduce the growth rate of population. Focus was given on the Reproductive and Child Health (RCH).

❖ **Tenth Five Year Plan (2002-2007):**

The population related objectives of this plan were- reduce gender gap, increase literacy rate, increase forest and trees, assess the unmet needs of contraception etc. During this period Government of India made serious efforts to improve the quality of Indian population.

❖ **Eleventh Five year Plan (2007-2012):**

The main focus of this plan was population education related issues. Reduce dropout rates of children, increasing literacy rate, reduce infant mortality rate, provide pure drinking water, reduce malnutrition among children, reduce anaemia among girls and women, provide proper atmosphere for the children, increase forest and trees etc.

Rapid growth of population is the serious problem for the developing country like India. If the present growth of population is unchecked, it will create problems in the

overall development of the country as well as in the quality of life of people and environment. So population control should get top priority for the proper development of the nation.

11.5 National Population Policies - 1951, 1976/1977 and 2000

It was even long before procuring our independence that several discussion benches saw the onset of population policy. Much before Independence; in the year 1938 only, a Sub-committee on population was set up by the National Planning Committee appointed by the then Interim Government. The National Planning Committee passed a resolution in 1940 that stated the need for the State to adopt family planning and welfare policies in order to bring about a harmonious order of social economy. The resolution also stressed the need for limitation of children. Further developments took place after independence in the wake of formation of the First Five Year Plan.

I) National Population Policy - 1951:

April 1951 recorded further enhancements in this policy formulation as the First Five Year Plan labeled for an overt population policy and adjudged family planning as a pragmatic and essential step towards improvement in health of mothers and children. The overriding objective of economic and social development is to improve the quality of lives that people lead, to enhance their well-being, and to provide them with opportunities and choices to become productive assets in society. It was because, in the Plan, family planning was treated as a part of the health programme and received a 100% funding from the central government. India was the first country in the world to launch a national programme in 1952, emphasizing family planning to the extent necessary for reducing birth rates "to stabilize the population at a level consistent with the requirement of national economy'

The National Family Planning Programme, initiated in 1952 during the First Five Year Plan (1951 -56), adopted a "clinical' approach to family planning and opened a number of clinics with the expectation that the people would take advantage of the facilities. This approach was modified thereafter. The 'community extension' and 'cafeteria' approaches were followed during the Third Five Year Plan (1 961 -66) with an

emphasis on creation of motivation among the people to respond to the family planning message and to utilise the services offered by changing popular attitudes and values to family planning. The 'cafeteria approach' in which various alternative means of family limitation (temporary and permanent) were propagated from the middle of 1960s, did not make much headway as the official emphasis remained on terminal methods alone. Later, many legislations were brought out, including on abortion (medical termination of pregnancy) and the age of marriage. An 'incentives and disincentives' scheme was introduced. Women's education, population education, child nutrition, etc and their integration with the family planning programme was thought of.

After 1952, though there was sharp decline in death rates, it was, however, not accompanied by a similar drop in birth rates. As a result, with each passing year, the amount of these funds has increased. The success of this family planning agenda was so dear to the heart of the government that even a separate department coined as Department of Family Planning was carved out in the Ministry of Health in the year 1966. Further efforts in the policy front were undertaken by the this Department. This was done with an objective to reinforce the population control programme.

Consequently, a comprehensive National Population Policy, integrated with the overall strategy of socio-economic development, was evolved in April 1976 with a view to promoting family planning at a faster pace by involving in the programme the other development departments of the Government, both at the Centre and in the States. Also, all the organisations which commanded credibility and influence with the people and were interested in the public welfare were given importance in the task of promoting family

II) National Population Policy – 1976/1977: Let us look at National Population Policy 1976, as it is this policy which was revised in 1977.

Some of the important features of the National Population Policy of 1976 are (SreedharaSwamy, 1984, pp. 154- 155):

- increase in the age of marriage from 15 to 1 8 years for girls and from 18 to 2 1 for boys;
- freezing of the population figures at the 197 1 level until the year 2001 for the purpose of representation in the National Parliament as well as for allocation of Central assistance, devolution of taxes, etc, to the States;
- linking of a part of Central assistance to the States for their development with their performance in family planning;
- greater attention to girls' education;
- proper place for population education in the total system of education;

- involvement of all Ministries Departments of the government in the m family planning programmes;
- increase in monetary compensation for sterilisation;
- institution of group awards as incentives for various organisations and bodies representing the people at local levels, including ZillaParishads and PanchayatSamitis;
- intimate association of voluntary organisations particularly those representing women, with the implementation of the programme;
- greater attention to research; and
- greater use of motivational media, particularly in rural areas, for increasing acceptance of family planning. The National Population Policy was further modified and re-announced in . 1977. In this new policy, what was reinforced was education and health. The latter component of the reformulated policy included both the general as well as the maternal and child health. A voluntary family planning was also introduced here on. This also saw the change of the phrase from Family Planning to Family Welfare programme that is maintained till date.

The revised Population Policy stressed the importance of limiting population growth and emphasised the voluntary nature of the family planning programme. . Simultaneously, the 'family planning programmes' were redesignated as 'family welfare programmes'. In addition to the items of the 1976 policy, this policy statement advocated a greater role for. maternity and child health services, an expansion of the immunisationprogramme, improvement of women's education and population education, and the involvement of voluntary, youth and women's organisations. The major feature is the 'educational and voluntary approach' to family welfare. Population education as a part of normal courses of study was stressed for : youth. Special attention was given to encourage necessary research inputs in the field, alongside education. Thus, a multi-pronged strategy was evolved to attain the envisaged demographic goals and the family planning (welfare) programme has been adopting increasingly effective approaches from time to time, i.e. from 'clinical' approach to'cafeteria' approach to 'community extension' approach coupled with 'incentives and disincentives' to promote family planning. The educational approach is rather imminent as population and development are closely interrelated and embrace a number of complex factors that require thorough and rational consideration by the individuals, families and communities.

"On! 1 May 2000 India is projected to have 1 billion (100 crore) people, i.e. 16 percent of the world's population on 2.4 percent of the globe's land area If current trends continue, India may overtake China in 2045, to become the 48 most populous country in

the world. While global population has increased three-fold during this century, from 2 billion to 6 billion, the population of National Measures of Population Control India has increased nearly five times from 23 8 million (23 crores) to 1 billion in the same period. India's current annual increase in population of 15.5 million is large enough to neutralize efforts to conserve the resource endowment and environment".

Stabilising population is an essential requirement for promoting sustainable development with more equitable distribution. However, it is as much a function of making reproductive health care accessible and affordable for all, as of increasing the provision and outreach of primary and secondary education, extending basic amenities including sanitation, safe drinking water and housing, besides empowering women and enhancing their employment opportunities, and providing transport and communications.

We will deal with these in greater details in National Population Policy 2000, since it is the latest one that continues till date.

III) National Population Policy - 2000:

The National Population Policy (NPP), 2000 is the central government's second population policy. The NPP states its immediate objective as addressing the unmet needs for contraception, healthcare infrastructure, and health personnel, and providing integrated service delivery for basic reproductive and child healthcare.

- The medium-term objective of the NPP 2000 was to reduce the Total Fertility Rate (TFR) to replacement levels by 2010.
- The TFR was to be 2.1 children per woman.

The long-term objective is "to achieve a stable population by 2045, at a level consistent with the requirements of sustainable economic growth, social development, and environmental protection."

- **Important features of National Population Policy**

- The NPP reinforces the vision of the government to encourage voluntary and informed choices and citizens' agreeability in order to achieve maximum benefits from reproductive health services.
- Making school education free and compulsory up to the age of 14 years and also reducing the dropout rates of both boys and girls.
- Decreasing the Infant Mortality Rate (IMR) to under 30 per 1000 live births in the country (to be achieved by 2010 as prescribed when the NPP was brought out).

- Reducing the Maternal Mortality Rate (MMR) to under 100 per 1 lakh live births (to be achieved by 2010 as prescribed when the NPP was brought out).
- Achieving universal immunization for all children against vaccine preventable diseases.
- Encouraging delayed marriage for girls (preferrably before 18 years and above 20 years).
- Achieving 80 percent institutional deliveries and 100 percent deliveries by trained persons.
- Attaining 100% registration of pregnancies, births, deaths and marriages.
- Making available universal access to information/counseling, and services for fertility regulation and contraception with a huge range of choices.
- Containing the spread of AIDS, boosting better coordination between the management of reproductive tract infections (RTI) and sexually transmitted infections (STI) and the National AIDS Control Organisation (NACO).
- Preventing and controlling communicable diseases.
- Integrating Indian medicine systems (AYUSH) in reproductive and child health services.
- Vigourously furthering the small family norm.
- Bringing about a convergence of all related social programmes so that family planning and welfare becomes a people-centric programme.

The NPP 2000 is different from the previous population regulation programmes in that here, for the first time, the population problem was seen in combination with child survival, maternal health, women empowerment and contraception issues.

11.6 Impact of Population Policies In India

India was the first country in the world to launch the National Family Planning Programme in 1951. India Government is conscious about the growth rate of population in the country and is trying to handle the situation. To overcome the situation, government announced various population related policies time to time. But the recommendations of the policies were not properly implemented at the grass root level. There are some another factors also related with population growth, like-early marriage, child marriage, illiteracy, superstitions, child labor etc. Development of education is necessary in this connection. The Central and State Government must take some steps together for the control of population in the country. Government should take effective

measures, which can solve the population problems. Population policies and programmes should make popular among the mass people. The health worker and primary health centre should follow up the population policies. There are some other women related issues such as sexual harassment, women reproductive, rights sexual health right, gender equality –people must be conscious about these issues. The following steps should be taken to check the rampant growth of population in India:

i. Increase the marriage age of male and female.
ii. Adopting the two child norm.
iii. Providing population programme from 15 years of age.
iv. People married before legal age should be punished.
v. Make the family planning programme popular among the people.
vi. Motivate couple to use birth control measures.
vii. Provide adult and non-formal education.

11.7 Self- Check Questions

1) National Population Policy 2000.
2) National Population Policy 1976.
3) Impact of population policies in India.

11.8 Summary

- In simple sense, population policy is a policy of welfare economics of population control. The main issues of population policy are Population policy gives equal importance to the qualitative and quantitative aspects of population growth.
- Population policy should aim at reducing death rates and birth rates primarily to reduce fertility and mortality and secondarily to manage re-distribution of population.
- In 1952, India became the first developing country in the world to adopt a policy of Governmental efforts to promote a reduction in the number of children.
- There are various population policies and five year plans in our country for the improvement of rapid growth of population.
- There are various issues related with population growth, such as early marriage, superstitions, lack of education, child labor etc. Central and State Government should take steps to control the rapid growth of population.

11.9 Glossary

- **Family Planning -** controlling the number of children you have by using birth control. The World Health Organization definition is this: “Family planning allows individuals and couples to anticipate and attain their desired number of children and the spacing and timing of their births. It is achieved through use of contraceptive methods and the treatment of involuntary infertility.

- **Sterilisation -** Sterilization describes a process that destroys or eliminates all forms of microbial life and is carried out in health-care facilities by physical or chemical methods. Female sterilisation is an operation to permanently prevent pregnancy. The fallopian tubes are blocked or sealed to prevent the eggs reaching the sperm and becoming fertilised.

- **Superstition -** a belief or practice resulting from ignorance, fear of the unknown, trust in magic or chance, or a false conception of causation.

- **AYUSH -**AYUSH scheme is the acronym of the medical systems that are being practiced in India such as Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homeopathy. These systems are based on definite medical philosophies and represent a way of healthy living with established concepts on prevention of diseases and promotion of health.

11.10 Self-Check Answers

Ans. 1 See section 12.5

Ans. 2 See section 12.5

Ans. 3 See section 12.6

11.11 Suggested Readings

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11.12 Terminal Questions

1) What is population policy of India? Highlight its main points.
2) Discuss the National population policy 2000 and its main features.

Assignment

Q. 1 Define demography. Explain the importance and development of demography.

Q.2 Discuss the various demographic data method.

Q. 3 Discuss meaning and causes of fertility and mortality.

Q. 4 What do you mean migration? Discuss its main types.

Q. 5 Explain the Malthusian theory of population and its criticism.

Q. 6 Describe briefly the theory of demographic transition of population.

Q. 7 Discuss population growth in different era.

Q. 8 What is population polices in India. Highlights its strength and weakness.