Manonmaniam Sundaranar University

Directorate of Distance and Continuing Education Tirunelveli – 627012, Tamil Nadu.

M.A. ECONOMICS
(Second Year)

Population Studies
(SECE31)

Prepared by
Dr. K. AJITHA
Assistant Professor of Economics
Manonmaniam Sundaranar University
Tirunelveli – 627 012.

Subject Experts:

Dr. D. Amutha Associate Professor and Head Department of Economics S.T. Mary's College (Autonomous) Thoothukudi	**Dr. C. A. Sham Shankar** Associate Professor and Head Department of Economics ST. Hindu College Nagercoil
Dr. S. Sarasudevi Associate Professor Department of Economics Rani Anna Government College for Women Tirunelveli	**Dr. V. Raja Rajeswari** Associate Professor Department of Economics Sri KGS Arts College Srivaikundam, Thoothukudi District
Dr. M. Neeladevi Associate Professor Department of Economics V.O.C College Thoothukudi	**Dr. P. Mary Thangam** Assistant Professor Department of Economics Sarah Turker College (Autonomous) Tirunelveli
Dr. R. Rajan Babu Assistant Professor Department of Economics ST. Hindu College Nagercoil	**Dr. V. Arockia Amuthan** Assistant Professor Department of Economics Nazareth Margoschis College Pillaiyanmanai, Thoothukudi
Dr. S. Sasikumar Assistant Professor Department of Economics ST. Xavier's College (Autonomous) Palayamkottai, Tirunelveli	**Dr. G. Gnana Elpinston** Assistant Professor Department of Economics Nesamony Memorial Christian College Marthandam

Course Coordinator:

Dr. G. Monikanda Prasad
Assistant Professor of Economics
Manonmaniam Sundaranar University
Tirunelveli – 627 012

Course Material Compiled by:

Dr. K. Ajitha
Assistant Professor of Economics
Manonmaniam Sundaranar University
Tirunelveli – 627 012

POPULATION STUDIES

Course Objectives:

1. To apply demographic concepts and population theories to explain past and present population characteristics.

2. To evaluate the use of demographic concepts and population theories to understand contemporary socio-economic issues and current affairs and to assess the relationship between demographic change and policy.

Unit	Details
I	**Introduction Population Studies:** Nature and scope, Concepts and Definitions, Population Studies and Demography Development of population Studies in World and India, Inter relationship between population studies and other disciplines. Sources of Population Data: Population Census-History of Census Taking in India, Vital Statistics Registration Systems Historical Background-Vital Registration in different countries, Civil Registration in India-Historical Background, Sample Surveys-Important Demographic Sample Surveys conducted in India. Dual Reporting System, Population Registers and International Publications.
II	**Population Growth and Distribution**: Population Growth World, Developing and Developed countries. India's Population Growth-Trends and differentials in state and union territories, Factors Responsible for Rapid Population increase in India, Current Population situation and Future Prospects, Population Distribution among developed and developing regions of the world, Factors affecting Population distribution of India, Basic measures of population distribution.
III	**Population Structure and Characteristics:** Sex and Age Structure Sex and Age Structure of various countries, Population PYRAMID, Factors affecting Age and Sex Structure of population, Aging Population. Marital status classification of population, Literacy and Educational attainment: Definition, Source of Data Measures used to study Literature, Religious classification of population.
IV	**Population Dynamics Fertility:** Terms and Concepts, Factors affecting Fertility: Physiological factors, Social and Cultural factors, Proximate determinants of Fertility, Sources Fertility data, Basic measures of Fertility. Mortality: Importance of the study, Terms and Concepts Data Sources and limitations, Factors important in the analysis of mortality, Measures of mortality, infant childhood and Maternal Mortality, Components of infant mortality, Levels and Trends and Mortality rates, Global HIV/AIDS Epidemic. Migration: of the study, Concepts and Definitions, Internal and International migration, Sources of Migration data, Measures of migration: Direct and Indirect methods, Everett Lee's Conceptual Framework for Migration analysis
V	**Population Policy Concepts:** Types of population Policies, Mortality, Fertility and Migration influencing Policies, World Population Plan of Action, Millennium Development Goals (MDGs), India's Population Policy, Family Planning Programme under various Five-Year Plan Periods, Approaches to Family Planning Programme, Reproductive and Child Health Approach, National Population Policy 2000.

Table of Content

Unit. No	Title	Page No.
1.	Introduction Population Studies	1 - 17
2.	Population Growth and Distribution	18 - 36
3.	Population Structure and Characteristics	37 - 51
4.	Population Dynamics Fertility	52 - 79
5.	Population Policy Concepts	80 - 105

UNIT – I

POPULATION STUDIES

1.1. Introduction

Demography is the study of human populations, their growth and decline due to changing patterns of migration, fertility and mortality and characteristics such as the sex-ratio, dependency ratio and age structure. The subject is also known by the name demography. The subject is sometimes divided for further elucidation into 'formal demography' meaning the formal statistical analysis of population parameters and dynamics and 'population studies' meaning the wider investigation of the causes and consequences of population structures and change. It is in the latter area that is population studies that many demographers have interests which overlap with those of sociologists and anthropologists and in their investigations demographic analysis forms an important component in the description and understanding of the human societies. The methodology of population studies consists of analysis of databases of official statistics from births, deaths and marriage registration, and from population censuses. They seek ultimately to produce population projections that is forecasts not only of the size of the population over coming decades, but also its changing age-structure, which can be important for social policy.

1.2. History of Population Studies:

During the period of middle of seventeenth centaury the population studies emerged as a discipline in England. Most of its early development took place in England, France, Germany and a few other European countries. Later in United States of America contributed substantially towards the development of this discipline. The Founding Fathers- Curiosity and concern about the size and characteristics of the population have had a long history. Investigations, however, were sporadic and received little systematic attention, for they were usually undertaken in response to some specific problems faced by the society. The credit for initiating a new field of empirical research in population studies goes to John Graunt, an English haberdasher, who generally acclaimed as the father of Demography or Population Studies. Graunt's observations mainly contained a quantitative analysis of mortality

and only incidentally that fertility and migration. The "bills of mortality" from which Graunt obtained the data for his analysis were current reports n burials and christenings in a population of nearly half a million persons in London and its environs. These reports were compiled and maintained regularly from 1603 onwards by parish clerks. Graunt assembled the data contained in these reports for the period 1604-1661 and prepared a report, which today regarded as the first systematic and objective study of population. It is said "in the maze of events recorded in the bills of mortality, he sought and found order." The discipline of population studies is indeed indebted to John Graunt for laying the foundation of a new science. Some of Graunt's English contemporaries and successors share with him the credit of founding population studies. Sir William Petty (1623-1687), an English scholar and Graunt's contemporary, was also his friend and collaborator. He inspired and encouraged Graunt in his undertaking. Petty's own Political Arithmetic has considerably influenced the future development of population studies. Early explorers in the field of population studies, hailing from different social strata were engaged in varied avocations and had different ideologies. Yet these amateurs had one thing in common- their desire and enthusiasm to discover the hithero unknown relationships, especially in quantitative terms, in the vital processes of life and death. (Durand, J., 1962). In general, the focus of demographic studies is on the three components of population change called fertility, mortality and migration. Thus, the approach of demographic studies is narrow. On the other hand, population studies cover many aspects of population, such as urban growth, health and well-being of people. Thus, demographic studies are a part of population studies. However, this distinction is no longer considered and the terms population studies and the demographic studies are used without any distinction.

1.3. Definition of Population Studies:

While population studies, obviously is understood as studies concerning population, the term demography is derived from the Greek word "demos", meaning people and hence is the science of population. Demography in the broad sense includes, in addition to the quantitative study of population, the study of interrelationships between population and socio economic, cultural

and other variables. Though a number of researchers and social scientists have defined population studies in their own way, in general, you may understand it as an empirical, statistical and mathematical study of human populations. However, when they embark on the analysis of various socio economic and political factors affecting different aspects of population phenomena, the population scientists have to go beyond numbers and seek explanations. Thus, a student of population is more involved in describing and comparing the size, structure, characteristics and territorial distribution of the population, and the changes occurring in it through the study of fertility, mortality, migration and social mobility. He / she also attempts to explain population phenomena and situations and the changes in them in the context of the biological, social, economic and other settings. Since population phenomena take place in a social setting and cannot be studied in isolation, hence, while describing, comparing or explaining the determinants and consequences of population phenomena, social phenomena have also to be also taken into consideration. The study of population is multidisciplinary in nature. It involves an understanding of biology, genetics, mathematical, statistics, economics, sociology, cultural anthropology, psychology, politics, medicine, public health, etc.

1.4. Scope of population studies:

The scope of population studies is quite wide. In fact, for the study of population, one has to primarily depend on the two quantitative sciences namely: Numbers are an important tool in the study of population. The population scientists have to handle numbers when they are analyzing the size of population, its growth during a specific period, the components of population growth, the distribution of population, the structure and characteristics of population etc.

A. Basically, population studies comprise the mathematical and statistical approaches for quantitative studies of the human population. But it is not exclusive for all the natural and social sciences to study population across the region and duration. Population study is multidisciplinary and interdisciplinary in nature which involves life science, geography, economics, statistics, mathematics, health sciences, agricultural

sciences, politics, behavioural sciences, psychology, ecology, biology, etc. The scope of population studies can be understood as below.

B. Population Studies and Demography- Demography and population studies are not mutually exclusive and demography includes race, nationality, language, marital status, place of birth, education status, occupation, sources of income generation and inheritance, etc. It also deals with impacts of population on environment, resources, eugenics, migration, urbanization and its problems, human resource and distribution of income and expenditure.

C. Population Studies and Statistics – Founding father of population studies is John Graunt. Number is the best indicator of population studies. Statistics is the heart of population studies and its components. Statistics measures the growth and trends of population over the time and its rate and ratio for particular geographic location. Statistics rates the population change and speed of population change or population tempo. Thus, statistics is the tool and technique of the population studies for population projection and construction of life tables.

D. Population Studies and Science- Science connotes four steps "systematic, controlled, empirical and critical investigation of hypothetical propositions about the presumed relations among natural phenomena" (Kerlinger, 1970). Similarly, population studies are all about the systematic, controlled, empirical and critical study of the population components and factors affecting all the components in demographic events. All the demographic techniques are universal by acceptable. Jhingan et. al., (2006) population studies is both positive and normative science which deals what is and what ought to be respectively

E. Micro and Macro Study of Population – Population study is both micro and macro study of population. In micro study it measures growth rate, distribution and redistribution of population within community in an area (Bogue). In macro study, it has covers multidisciplinary and interdisciplinary approaches.

F. Population Studies and Economic Activity of the Population – Population affects by income, education, occupation, labour force participation, production of goods, services, industrial activities. These are important economic variables for population studies. Population density and capital-intensive technology more popular in the world, and both are subject matters of population studies and economics. Labour supply and demand is the matter of population studies and economic studies.

G. Population Studies and Policy Data- Population census is the best source of data for policy purposes. Premi (2001) has stated that complete and reliable data for population studies is population census of any country. Census is the complete enumeration of head count in a particular area for specific duration. Indian Census has been conducting since 1872 every ten years interval (Decadal). First census was de-facto after that each census is conducting as de-jure. De-facto census means count person wherever found in single night exercise, while, de-jure census means count person at their place of birth or place of legal and regular residence. Census collected, compiled, tabulated and presented information of population regarding general population, economic information, socio-cultural information, migration information, fertility information and household information in the name of A, B, C, D, F, and H Tables respectively.

H. Population Studies and Marital Status- Population studies reveal the status of nuptiality by age and residence. Marital status in population studies covers currently married, widowhood, separated, unmarried and divorcee. Marital status is important to know the natural population growth rate and maternal and child health care facilities.

I. Population and Migration Studies- Population studies not only studies natural population growth, but it also population growth through socioeconomic and political process. Thus, scope of population studies is broader in terms of national and global population growth rate through immigration and emigration process.

J. Population Studies and Sociology- Sociology and population studies are

treats population as social animal. Sociology deals with the action and reaction of social process and social interaction in the society. Both subjects are studying the social problems such birth, death, marriage, divorce, social organization, social groups, social race, sex, social discrimination, social norms, etc. Social stratification and social class are the main idea of sociologists, while, for demogophen, population characteristics in different strata of society and different class of society. Here population studies are quantitative study, while sociology is qualitative study of the population in the society (Hans Raj).

1.5. Sources of Population Data:

The data required for the study of population are obtained mainly through three sources namely; 1. population Census 2. Registration of vital events, such as births, death, marriages and divorces 3. Sample Surveys.

Let us discuss, these three sources of population data, covering broadly the nature of each source, its historical development and its uses for population analysis, with more focus on the sources of data that are available for the study of the population of India.

1.5.1. History of Census Taking in India:

The available literature pertaining to the history of census in India suggests that no extensive census enumerations were made in ancient India. In the sixteen centuries during the rule of Akbar, some population data were collected. The administrative report known as Ain-i-Akbari included comprehensive data regarding population, industry, wealth and many other characteristics, India has the unique distinction of conducting an unbroken chain of regular decennial population censuses over the last 130 years. The first attempt to obtain the size of population in India by actually counting heads was made during 1867-1872. This count was not synchronous, not did it cover the entire country. The first comprehensive census of population was conducted in 1881 on a uniform basis covering the whole country. The 1971 census was the eleventh and marked the completion of one hundred years of census taking in India. In 1972, the centenary of the Indian census was celebrated. The recent 2001 census represents the fourteenth census of India.

1.5.2. Features of a Population Census:

1. If the censuses are spaced exactly 5years or 10 years apart, cohort analysis can be carried out more readily and the result can be presented in more conventional terms. In the interest of international comparability, the United Nations suggests that population censuses be taken as feasible to the years ending "0".
2. In several countries, the interval between two successive censuses is ten years. From 1881 onwards, the census in India has been taken at regular intervals of ten years. In some countries, however for example, the United Kingdom and Japan – a census is conducted at an interval of five years.
3. United Nations publications also emphasize the importance of sponsorship of the census by the national government. A national census is conducted by the national government, with the active cooperation of state or provincial governments.
4. An estimate of future population and its age-sex structure helps us in estimating future military and economic manpower, future school going population and related requirements, future growth in metropolitan cities, and requirements of food, water, housing and health services. The number of voters, present and future, can also be estimated with the help of census data.

1.5.3. Structure of census operations in India:

In India, census taking has been the sole responsibility of the government from the beginning. Today population census is a union subject and the ministry of home affairs is in charge of undertaking the census task in the country. With the appointment of a nucleus of permanent staff at the center and in the state, there is now a permanent and continuing organization. A senior officer of the Indian administrative service, with experience in the conduct of census operations is appointed as the registrar general and census commissioner and is responsible for conducting population census, registration of births and deaths, and for undertaking other connected studies and surveys.

1.5.4. Census Schedules:

There are two types of questionnaires have been used in India for census taking:

1. Household schedule: Household schedule was introduced in 1981 and it collects some information on the usual residents of the household such as relationship to the head of the household, sex, age, marital status, whether belonging to any scheduled caste or tribe, literacy status and occupation.
2. Individual slip: the core questionnaire in the Indian census is the individual slip which consists of 23 items. The various items on which information was obtained at the population censuses since 1901.

1.5.5. Uses of census:

To conclude, it may thus be said that the modern census evolved gradually. Beginning with the narrow objectives of determining military, tax, and labour obligations, censuses have come long way and their scope has been widened to not only meet administrative needs but also the needs of business, labour education and academic research. Overtime, improvements in administrative experiences and technology have yielded higher standards of completeness, accuracy and simultaneity in the censuses overtime. By the middle of the nineteenth century, census operations have come to stay in almost all European countries. After the second world war, the importance of population data was realized to a greater extent; the United Nations began to assist several developing countries in various ways in the conduct of census operations. As a result, census taking became more scientific, and several developing countries established permanent organizations for the purposes of a census. Inclusion of new questionnaires in the censuses provides get data base for the newer problems confronting state and society.

1.6. Vital Statistical System:

India has a long tradition of registration of vital events and the administrative machinery for this purpose has been in existence for over a century. In the beginning. Only deaths used to be registered with a view to assessing the health situation and hence emphasis remained on collection of

statistics on deaths at that time. The requirement for a complete and up to date Vital Statistical System to yield reliable data on vital events hardly needs any emphasis. These data are essential for socio-economic planning and development and also to evaluate the effective implementation of various public schemes and programs. The main sources of data on vital events in India are Civil Registration System (CRS), Sample Registration System (SRS) and Population Census. Though the Population Census is the main source of information on population and its characteristics; however, being a decennial exercise, it does not provide the measure of changes in population from year to year. The measures of fertility and mortality derived from Census are centered on the midpoint of the decade and as such do not provide yearly change in the population. Of the other two sources of vital statistics for getting the vital rates on a regular basis, the SRS has been designed to provide reliable estimates at National and State level. Robust estimates of vital rates at District level on an annual basis through sample survey are difficult to obtain on account of prohibitively large sample size and variety of resultant factors such as controlling of non-sampling errors etc. CRS is thus the only source for providing vital rates at district level. Rather, a complete CRS can provide these rates at all administrative levels.

1.6.1 Civil Registration System:

The Civil Registration System (CRS) may be defined as a unified process of continuous, permanent, compulsory and universal recording of the vital events and characteristics thereof, as per legal requirements in the country. In India, the Civil Registration System covers registration of births and deaths. Civil registration system provides the best source of information on the vital rates at all levels. Ensuring cent percent coverage of vital events by registration machinery can help in getting the critical vital statistics, equally important for planning and research. Therefore, emphasis should also be given to the proper monitoring of the activities under the system. Civil registration system is considered to be complete if it covers 100 per cent of all births and deaths taking place within a country or area. The registration records are primarily useful for their value as legal documents and secondarily as the source of vital statistics. Civil registration as a source of

vital statistics is relatively less expensive, as the statistics generated from the registration records are the by-products of an essential administrative process. The registration records can also generate current and continuous statistics, which can be more accurate than any other method of data collection apart from being a continuous source of such data. However, the accuracy of the vital statistics obtained through the registration system depends much on the completeness and promptness with which events are registered and the correctness of the information in the registration records. The improvement in the system of registration of births and deaths is critically dependent on the importance given by the respective States and District administrations to this work and regular monitoring by them. Besides, the level of awareness among the general public about the utility of birth or death certificate is also equally and crucially important. Vital statistics obtained through registration records at different administrative levels enable estimation of the size, structure and geographical distribution of the population except for migration. Vital statistics also enables the projections for coming years on the basis of probable trends of fertility and mortality as derived from these vital statistics and their interactions with social, economic and other demographic factors. The vital statistics data generated through an effective Civil Registration System is of immense use for formulation of various development and welfare programmes/schemes and increases their effectiveness at State and District level. The Civil Registration data acquires paramount importance in the wake of 73rd and 74th amendments to the constitution of India, as it can provide data at local level for micro level planning, monitoring and evaluation of schemes. At national level, the vital statistics data generated through Civil Registration is also quite useful for medical research and in the study of sex ratio, mortality and morbidity rates and also in the study of causes of deaths.

1.6.2. History of Civil Registration in India

Civil Registration in India dates back to 19th century. The first legislation at national level to register births, deaths and marriages was made in 1886. Registration under this act was voluntary. Foreigners mostly British were the ones to register the vital events under the act. It was virtually inoperative as

far as the general population was concerned. Registration was carried on under various legal provisions in different parts of the country. In the urban areas the registration was carried on under municipal by-laws and in the rural areas according to administrative orders issued from time to time to village officials under the revenue codes and police manuals.

Before the Central Act, some of the States had their own laws to register vital events. The erstwhile Central Province of Berar introduced a system of registration as early as 1866. Punjab and United Provinces followed a little later. In 1873, the Bengal Births and Deaths Registration Act was passed and it was later adopted by the neighboring states of Bihar and Orissa. Like Bengal, the erstwhile composite Madras had its own Act. (Madras Registration of Births and Deaths Act 1899). Some other States had enabling provisions in this behalf in the Municipal Act, Panchayat Act, Chowkidar Manual or Land Revenue Manual and registration was governed by executive orders or by-laws setting out local registration procedures. The need for registration of births and deaths had been felt by the Administration much earlier. In the middle of nineteenth century, deaths were registered by sanitary commissioners. With a view to introducing sanitary reforms for control of pests and disease, registration of deaths was started. The Provincial Sanitary Commissioners obtained statistics on deaths from the local health officers and passed them on to the Sanitary Commissioner of the Government of India. However, the quality of registration was highly deficient and inadequate.

The Indian Famine Commission in 1880 pointed out the need for registration of vital events such as births and deaths. It made a recommendation that the registration of births and deaths should be made legally obligatory in villages as well as in towns and the regular monthly publication of the main vital statistics should be enforced. The Commission also fixed the responsibility on the Sanitary Commissioner to warn the Government of any unusual rise in the death rate in order that the Government might enquire into the cause of such a rise and take remedial action. This recommendation was a land-mark one in the history of development of vital statistics in India. The 1886 Act was a consequence of this recommendation.

1.6.3. Problems of Civil Registration System:

Through any failure to register births and deaths is punishable by law, the coverage of registration of vital events in India is far from satisfactory. Because of under reporting, the rates derived from registered vital events present a very distorted picture. According to the survey conducted in Madras city in 1966 by the census department, as many as 27percent of the deaths were not reported, extent of non-reporting of vital events is found to be very high in the rural areas. One of the basic reasons for this deficiency in Indian vital registration statistics is mass illiteracy and the rural character of the population.

1.6.4. Sample Registration System:

The Government of India, in the late 1960s, initiated the Sample Registration System that is based on a Dual Recording System. In the Sample Registration System, there is a continuous enumeration of births and deaths in a sample of villages/urban blocks by a resident part-time enumerator and then, an independent six-monthly retrospective survey by a full-time supervisor. The data obtained through these two sources are matched. The unmatched and partially matched events are re-verified in the field to get the correct number of events. At present, the Sample Registration System (SRS) provides reliable annual data on fertility and mortality at the state and national levels for rural and urban areas separately. In this survey, the sample units, villages in rural areas and urban blocks in urban areas are replaced once in ten years. Sample registration system estimates are vital rates are being extensively used for policy making and planning purposes. In the absence of relaiable CRS data, the SRS has been the authoritative source if vital rates as national and state level. Registrar general of India also uses SRS data for obtaining abridged life table at national and state level.

1.6.5. Objectives of Sample Registration System:

The main purpose of sample registration system is to provide reliable annual estimates of vital rates separately for rural and urban areas. It also provides other indicators of fertility and mortality like age specific fertility rates, mortality rates etc.

1.6.6. Features of Sample Registration System (SRS):

1. Baseline survey of sample units to obtain usual resident population of

the sample areas.

2. Continuous enumeration of vital events pertaining to usual resident population, by the enumerator.
3. Independent half yearly survey of births and deaths by the departmental official updating the house list, household schedules and list of pregnant women.
4. Matching of events enumerated as part of continuous enumeration and listed during the course of half yearly surveys.
5. Field reverification of unmatched or partially matched events.

1.6.7. Statistics available from SRS:

The earlier sample was based on the reliability of birthrate at the state level, whereas the 2004 and 2014 samples are estimated using IMR reliability. In 1964 when the scheme was introduced, the selection of pilot villages was made purposively in order to present typical conditions in the state. Subsequently in 1966, when experience of running a pilot survey in seven states was available, a sub sample of 20 villages out of the total sample was taken up. The pilot surveys in urban areas were also conducted in a few states since 1964 for formulating the methodology for the collection of data. The full-scale survey was launched in urban areas of most of the states in 1967-68. The number of sample units then ranged from 40 to 100 in states. In the union territories, the sample size is small. At present the SRS is being implemented in all states and the Union territories on full scale both in rural and urban areas.

1.7. National Sample Survey:

The foundation of the statistical system in India was laid down by the British administration. The provincial governments were required to publish the relevant statistics in their annual administration reports. These statistics covered a wide range of subjects. The forms for this information were later made uniform and the first “Statistical Abstract of British India” (1840-1865) was based on such information provided by the provinces.

1.7.1. Sample Survey Organization:

A Statistical branch was established in 1862 in the finance department of government of India. In 1895 the statistical branch was converted into full-

fledged statistical Bureau. Functions and activities of the bureau were carried out through two wings namely commercial intelligence and statistics headed by the director general. The director general of commercial intelligence and statistics until 194 was responsible for the compilation and publication of almost all the principal statistics information on demography, crop production and prices, rainfall, industrial production, education, health and hygiene, mining, roads and communication and other subject matters. In April 1914, a separate directorate of statistics came into being. Subsequently the directorate of statistics and commercial intelligence department were merged into a single organization which was renamed as Directorate of Commercial Intelligence and Statistics in January 1925. The Indian Economic Enquiry Committee (1925) recommended the establishment of Central Statistical Bureau.

The committee appointed by the government of India in 1934 under Messrs Bowley and Robertson, about the organization of central statistical department. The need for sound database of various fields was keenly felt by late prime minister of India Pandit Jawaharlal Nehru. It was at his instance a largescale sample survey agency known as National Sample Survey (NSS) came into existence in 1956.

Prof.P.C.Mahalnobis who was regarded as a pioneer in both theoretical and professional statistics was appointed as the first statistical adviser to the cabinet government of India in January 1949. He was the architect of statistical system of independent India. National Sample Survey Office carries out socio economic surveys, undertakes data collection for annual survey of industries, sample checks on area enumeration and crop estimation surveys and prepares the urban frames useful in drawing of urban samples, besides collection of price data from rural and urban sectors. The data on consumer expenditure and employment - unemployment were also collected in every round from a thin sample along with the main subject of enquiry up to 64th round of NSS. NSSO has also launched a new employment – unemployment survey namely, “periodic Labour Force Survey” (PLFS). Reports on various rounds of NSSO surveys have been published. More than 525 NSS reports have been published. Results of NSSO surveys are brought out in the form of

NSS reports available at the website of the ministry (www.mospi.nic.in).

1.8. Population Register:

The term "population register" was defined in 1969, in the publication entitled Methodology and Evaluation of Population Registers and Similar Systems (United Nations, 1969), as "an individualized data system, that is, a mechanism of continuous recording, and/or of coordinated linkage, of selected information pertaining to each member of the resident population of a country in such a way to provide the possibility of determining up-to-date information concerning the size and characteristics of that population at selected time intervals" (chap. I.A). Thus, the population register is the product of a continuous process, in which notifications of certain events, which may have been recorded originally in different administrative systems, are automatically linked to it on a current basis. The method and sources of updating should cover all changes so that the characteristics of individuals in the register remain current. Because of the nature of a population register, its organization, as well as its operation, should have a legal basis.

Basic characteristics that may be included in a population register are date and place of birth, sex, date and place of death, date of arrival/departure, citizenship(s) and marital status. Depending on the possibility of proper linking with other registers, much additional information may be added to the single record, such as language(s), ethnicity, educational attainment, parity, activity status and occupation. In order to be useful, any additional information must be kept up to date. If complete, population registers can produce data on both internal and international migration through the recording of changes of residence as well as the recording of international arrivals and departures.

1.8.1. Main Uses of the Population Register

It has to be stressed that the primary function of the population register is to provide reliable information for the administrative purposes of government, particularly for programme planning, budgeting and taxation. The registers are also useful in other administrative areas, such as establishing personal identification, voting, education and military service, social insurance and welfare, and for police and court reference. Register information is also

utilized for issuing documents needed for the admission of children to nurseries, kindergartens and schools and the assignment of residents to health clinics (United Nations, 1991).

The use of the population registers for vital statistical purposes entails linking events to the pertinent population at risk. The timeliness of the updating of the population registers and the accuracy of the information recorded therein are thus factors critical to the quality of the statistics to be computed. The continuous and intensive administrative use of registers is an important means of ensuring their quality, since the everyday use of those registers in the society can facilitate the detection of errors. If the statistical and administrative functions of the population register are separated, an efficient system must be put in place to ensure perfect synchronization. Further, excellent coordination with the national and/or local authorities owning the vital events registers and a reliable technical infrastructure, based on computerization, are then required. In cases, where concerns about intrusion into the private lives of persons and about confidentiality risks may be spreading among the public, action should be undertaken to demonstrate the advantages of the system. Only widespread acceptance by the population can transform the population register into a reliable statistical source.

1.8.2. Requirements of population register

At the minimum, a population register includes a list of individuals with whom the local and/or national administration(s) of the country need to communicate. Although the national population register may very well be a virtual entity based on the linkage of population registers established at the local level (decentralized system), the overall geographical coverage must be of the entire territory of the country. If this condition is not met, the national population register will not be an appropriate system for the production of statistical data for the country. Statistics on population and vital events should refer to the usually resident population. While for administrative purposes it is certainly legitimate to include in the population register persons who are not usual residents of the country (e.g., citizens living abroad, temporary residents, etc.), for statistical purposes care must be taken to identify the correct population of reference, especially if the statistics are used

for international purposes and comparisons. The term “resident population” may indeed reflect various concepts of population and hence may refer, e.g., to the legal or registered (resident) population. However, the right of stay in the country (determining the legal or de jure population) or the simple registration of persons (who then make up the registered population) should not be considered sufficient criteria for identifying the usually resident population for international statistical purposes. Appropriate efforts should be undertaken to identify the usually resident population.

1.8.3. Coordination arrangements between the population register and the civil registration and vital statistics systems:

It is not required that additional information be physically recorded in the population register. What is necessary is the coordinated linkage of the population register with any other register containing that information. These other registers may also be structured differently, for instance, they may have in their single records units other than individuals, or they may refer only to registers of subset(s) of the population, such as the employed, students and retirees. The more registers are linked, the higher the possibility that the timing of their updates may be a risk factor for the quality of the information. Care should be taken to synchronize the operation of updating across all registers concerned. A great advantage of computing vital statistics from population registers is the possibility of calculating directly specific demographic rates with potentially no numerator-denominator bias. For instance, it could be possible to compute specific fertility rates for employed and/or immigrant women, parity progression ratios, life expectancy by educational attainment, indicators on mixed marriages by ethnic group/foreign background, divorce rates by socioeconomic class of the spouses, etc. This requires full matching between civil registration and population register data as well as the same level of detail of information in the two sources, meaning that the certificate of the event (birth, etc.) must contain the same topics with the same classification as those available in the population register. In general, the use of the population register provides a broader opportunity to correctly identify the population at risk of an event.

Check Your Progress:

Q.No	Short Answer Question	LOCF Mapping		
1.	Define Population Studies and explain its nature and scope.	K2	CO1	PO2
2.	Distinguish between Demography and Population Studies.	K4	CO1	PO2
3.	Trace the development of Population Studies in the World and India.	K2	CO2	PO1
4.	Explain the historical background of Population Census in India.	K2	CO3	PO1
5.	Describe the Dual Reporting System and its importance in demographic data collection.	K3	CO4	PO2
Q.No	**Long Answer Questions**	**LOCF Mapping**		
1.	Discuss the inter-relationship between Population Studies and other disciplines such as Economics, Sociology, Geography and Public Health.	K4	CO1	PO2
2.	Examine the evolution and significance of Population Census in India.	K4	CO3	PO3
3.	Explain the Vital Statistics Registration System and compare civil registration systems in India with other countries.	K5	CO4	PO4
4.	Discuss important demographic sample surveys conducted in India and evaluate their role in policy formulation.	K5	CO4	PO3
5.	Explain various sources of population data including Population Registers and International publications. Assess their reliability and limitations.	K4	CO4	PO4

UNIT- II

POPULATION GROWTH AND DISTRIBUTION

2.1. World's Population Growth:

A Twentieth Century Phenomenon The growth of the world's population growth accelerated during the 20th Century, largely an outcome of technological and social changes which resulted in a steep fall in death rates around the world. From 1.6 billion people in the beginning of the century, it had grown to 6.1 billion by its end. Most of the growth had occurred in the second half of the twentieth century (Census of India, 2011). In fact, the global population touched two billion in 1927, just before the Great Depression and nearly 123 years after the first billion. In 1960, only 33 years later, there were three billion people on the planet; and the four billion mark was reached in only 14 years in 1974. By 1987, global population and reached five billion population, which increased to six billion in 1999. The decade of the 1990s saw the highest growth in the world's population. In the period 1900–1950, the average annual growth rate of the world's population was 0.8 per, which increased to1.9 per in 1950–1970. In the first half of the 20thcentury, the population growth rates were nearly identical in both developing and developed countries. However, in the next twenty years, the population growth rate of the developing countries accelerated to slightly over 2 per cent. The population growth rate of the developed countries was also increasing, but it was significantly less than that in the developing countries. World War I (1914-1918), which embroiled most European nations, Russia, the United States, the Middle East and other regions, had significant impact on population. There were huge losses due to the excess deaths occurring on both the armed forces and the civilian population. The war affected birth rates in the regions involved. Average annual growth rate of population was 0.89 per cent in this period. The Great Economic Depression followed in about a decade after the war. During the depression years (1929-1939), people avoided marriage and having families because the financial crisis with the result that the growth rate in countries of North America and Europe fell to 0.75 per cent. The second world war (1939–1945) followed. It was fought on a much larger scale and involved more nations, who united in two opposing

groups the Allies and the Axis. World War Two is considered as the deadliest in the human history. There were mass deaths of civilians, including the systematic killing of six million Jews, destruction of cities by sustained bombings. The destruction culminated in the dropping of nuclear bombs on the cities of Hiroshima and Nagasaki. It is estimated that about 50 million to 85 million died in the war years. The terms 'baby boom' and 'population explosion' were introduced in the public discourse after the World War II. The baby boom took place mostly in the countries which suffered tremendous damage from the war, and undergoing economic hardships. These countries included Germany and Poland. From 1945 to 1961, more than 65 million children were born in the United States, an average of one child being born every seven seconds. Young couples who had put off marriage during the war, started to marry and have children after the war ended. Governments also encouraged growth of families and, culturally, pregnancy, parenthood and large families were celebrated. At the start of the baby boom, average age of a woman at marriage was 20 years, which was 22 earlier. This continued till 1956 after which a decline could be observed. The rates of population growth in Asia were increasing since the 1920s. This continued till the 1970s after which the rates began to decline. The rates of population growth in the latter half of the century showed a moderate increase in East Asia, very high in South Asia and middle-South Asia. It was the highest in western South Asia. A similar trend was observed in the Western, Eastern and middle-Northern African countries. The African continent started having the highest recorded birth and death rates in the world. Latin American countries also experienced high population growth after 1930 not only because of decreasing mortality levels, but also persistently high fertility rates. The natural rate of increase in population growth in Australasia had begun to decline in the beginning of the 20th century; however, the population growth rate increased after the Second World War. With the exception of the war years, immigration to Australia and New Zealand continued to be very high. After the World War II, health services in under-developed and developing countries became better organized, which resulted in declining death rates all over the world. After 1950, Europe and North America had the lowest birth and death rates, and the lowest rates of

population growth. In South-Central Asia, the rate of growth was the same as that in Northern America, but above that of Europe. The population growth rates remained very high in Africa, Asia, and Central and South America till 1960. Population growth continued to be high in the under-developed and developing countries. A new problem surfaced 'population explosion'. Birth rates in the under-developed countries were well above 40 per thousand, while in Europe they were well below 20 per thousand population. In North America, Oceania and the U.S.S.R. birth rates were about 24 to 25 per thousand in this period. Death rates in these underdeveloped regions were regions were also significantly higher than in the West. According to the United Nations World Population Prospects (1998 revision), in the period 1995 - 2000, 60 per cent of the increase in the world's population was contributed by only 10 countries, including India (21 per cent) and China (16 percent). The other countries included Pakistan, Indonesia, Nigeria, U.S.A., Brazil, Bangladesh, Mexico and Philippines. All of these countries had a population of over 100 million.

2.2. The 21st Century:

The world's population reached 6.1 billion in the mid-2000s. Most of the share of the population remained in the under-developed and developing regions of the world. In contrast, the population of the developed region changed only marginally. Populations in the less developed regions of the world remained relatively young with children under 15 years of age accounting for about 28 per cent of the total, and young persons for about 18 percent. In the more developed regions, children and youth accounted for 16 and 12 per cent of the population respectively. The working age population in the less developed countries at this period accounted for 2.6 billion, while it was only 608 million in the developed regions. This raised concerns over the increasing numbers of aged people in the population. The ageing population (those above 60 years of age) started increasing at an annual rate of 1 per cent per annum. In the less developed countries this growth was about 3.7 per cent annually in the period 2010-2015. The number of aged people in the population surpassed that of the younger population in many countries. The average global fertility level was 2.53 children per woman in 2005–2010,

which included 1.66 children per woman in the developed countries. In contrast, the 49 LCDs (Least Developed Countries) continued to have the fastest growing population in the world at 2.3 per cent per year. The populations of 43 countries or areas are expected to decrease between 2013 and 2050. In 40 of these countries, the decline is expected to continue beyond 2050 to 2100. Several countries are expected to see their populations decline by more than 15 per cent by 2050, including Belarus, Bulgaria, Croatia, Cuba, Georgia, Latvia, Lithuania, Republic of Moldova, Romania, the Russian Federation, Serbia, and Ukraine. Fertility levels will continue to decrease throughout the world and about 32 developing countries will reach the replacement level of fertility in this time period. On the other side, half of the growth in the world's population will be concentrated in Nigeria, India, the United Republic of Tanzania, the Democratic Republic of Congo, Niger, Uganda, Ethiopia, and the United States of America.

2.3 The growth and distribution of world population:

The world's population is growing at an unprecedented rate, and its distribution across different regions and countries has a profound impact on economic, social, and political issues.

2.3.1. Meaning of Growth and Distribution of World Population

The growth and distribution of world population refer to the increase in the number of people living on the planet and their spatial distribution across different regions and countries. Population growth is influenced by factors such as fertility, mortality, and migration, while the distribution of the population is influenced by factors such as geography, climate, and economic opportunities.

2.3.2. History of Growth and Distribution of World Population

The history of the growth and distribution of world population can be traced back to the prehistoric era, when human populations were small and scattered across different regions. The agricultural revolution, which began around 10,000 years ago, led to a significant increase in human population, as people began to settle in larger communities and engage in food production. The Industrial Revolution, which began in the 18th century, led to further population growth, as improvements in healthcare and living standards led

to a decline in mortality rates.

2.3.3. Types of Growth and Distribution of World Population

The growth and distribution of world population can be classified into several types, including:

a. **Natural Increase:** This refers to the difference between the number of births and deaths in a population. A positive natural increase leads to population growth, while a negative natural increase leads to population decline. Example: The population of India is expected to surpass that of China by 2027, due in part to a higher natural increase rate in India.
b. **Migration:** This refers to the movement of people from one place to another. Migration can be internal, within a country, or international, between different countries. Example: The Syrian refugee crisis has led to significant population movements, with over six million Syrians displaced from their homes.
c. **Urbanization:** This refers to the process of increasing the proportion of people living in urban areas. Urbanization is often associated with economic development and industrialization. Example: The urban population in Africa is projected to triple by 2050, as economic growth and demographic trends drive urbanization in the region.

2.3.4. Issues with Growth and Distribution of World Population

Despite the benefits of population growth and distribution, there are several issues associated with the topic, including:

a. **Overpopulation:** Overpopulation occurs when the number of people in a given area exceeds the capacity of the environment to sustain them. Overpopulation can lead to environmental degradation, resource depletion, and social and economic problems.
b. **Aging Population:** The aging of the population in many developed countries is a concern, as it can lead to labor shortages, a decline in economic growth, and increased demand for healthcare and social services.
c. **Unequal Distribution:** The unequal distribution of population across different regions and countries can lead to economic, social, and political imbalances. Unequal distribution can lead to disparities in economic

opportunities, healthcare, education, and political representation.

d. **Urbanization Issues:** Urbanization can lead to several issues, such as inadequate housing, traffic congestion, pollution, and social inequality.
e. **Migration Issues:** Migration can lead to social and political tensions, as well as economic challenges. Migrants may face discrimination and difficulty accessing healthcare, education, and employment.

2.4. World Population Distribution

The 2015 Revision of World Population Prospects is the twenty-fourth round of the United Nations' estimates and projections of population. They are prepared by the Population Division of the Department of Economic and Social Affairs of the United Nations (United Nations 2015). The world's population reached 7.3 billion in mid-2015, which means that the world has added approximately one billion people in the span of the twelve years. The global population is highly dispersed over the seven continents. Most of the world's population (about 60 per cent) lives in Asia (4.4 billion), 16 per cent in Africa (1.2 billion), 10 per cent in Europe (738 million), 9 per cent in Latin America and the Caribbean (634 million), and the remaining 5 per cent in Northern America (358 million) and Oceania (39 million). China (1.4 billion) and India (1.3 billion) are the world's most populous countries and home to19 and 18 per cent respectively of the world's population. India's population is expected to continue growing for several decades. It is projected to reach 1.5 billion in 2030 and 1.7 billion in 2050, while that of China is likely to remain constant and then decrease slightly. Therefore, it is projected that India's population will surpass China in the future.

The ten most populous countries in the world are distributed in all continents: one in Africa (Nigeria), five in Asia (Bangladesh, China, India, Indonesia, and Pakistan), two in Latin America (Brazil and Mexico), one in North America (United States of America), and one in Europe (the Russian Federation). Nigeria's population, currently the seventh largest in the world, is growing most rapidly. With the present rate of growth, the population of Nigeria is projected to surpass that of the United States by about 2050 at which point it will become the third most populous country in the world. By 2050, six of

the ten largest countries in the world are expected to have population more than 300 million: China, India, Indonesia, Nigeria, Pakistan, and United States of America. It is estimated that 50.4 per cent of the world's population is male and 49.6 per cent, female. The median age of the global population, that is, the age at which half the population is older and half younger, is 29.6 years. About one-quarter (26 per cent) of the world's population is below 15 years of age, 62 per cent are aged 15-59 years, and 12 per cent are 60 years or over. The countries of the world can be divided into three categories according to fertility level. About 46 per cent of the world's population lives in countries with low fertility, where women have fewer than 2.1 children on average, such as those of North America and Europe and 20 countries in Asia, 17 in Latin America and Caribbean, 3 in Oceania, and 1 in Africa. Another 46 per cent lives in 'intermediate fertility' countries where women have, on average, 2.1 to 5 children as in India, Indonesia, Pakistan, Mexico, etc. The remaining 9 per cent lives in 'high fertility' countries (Nigeria, Democratic Republic of Congo, Uganda, Afghanistan, etc.)

In terms of ageing, 12 per cent of the world population comprises of aged population. The ageing population is growing at 3.26 per cent per year. Presently, Europe has the highest percentage of aged population,24. Except in Africa, all other regions of the world will have a quarter of their population aged over 60 years in the near future. In terms of in-migration, high-income countries have always had the maximum net inflow of migrants— about 4.1 million migrants annually from the lower and middle-income countries annually. Large-scale refugee movements have had profound influence on the level of net migration, particularly those affected by the Syrian crisis. It is projected that the migration additions to populations will fail to compensate fully for the decreasing birth rate and high death rates in Europe. Thus, Europe's population is projected to shrink by about 32 million in the near future. Forty-eight countries, or areas, are projected to experience population decline between 2015 and 2050. Eleven countries are expected to see their populations decline by more than 15 per cent by 2050: Bosnia and Herzegovina, Bulgaria, Croatia, Hungary, Japan, Latvia, Lithuania, Republic of Moldova, Romania, Serbia, and Ukraine.

2.5. Spatial Distribution of Population:

Spatial distribution of population is the distribution of population by geographic area or by administrative and political divisions (country, state, provinces, district, etc.). It is usually measured by population density i.e., the number of persons living in per square kilometer/mile area. There are various types of population density:

i) Crude population density: This is the ratio of population to area, and is generally measured in terms of number of persons per square kilometer.

ii) Physiological density, which is the ratio of population to cultivable area

iii) Agricultural density: The ratio of agricultural population/rural population to cultivable area.

India population grew from 361 million in 1951 to 1,210 million in 2011. The population growth rate reached a peak during 1971–81 when the annual growth rate was 2.2 %. Recent census data show that the annual growth rate is 1.6 %. Similarly, population density, which was 117 persons per sq km (1951) has increased to 382 in 2011. India occupies 2.4 % of world's surface area and supports 17.5 % of its population. In comparison, the USA occupies 7.2 % of world's surface area and only 4.5 % of the world's population. In South Asia, only Bangladesh has a higher population density than India. In India, Bihar has highest density of population (1,102) and Arunachal Pradesh, the lowest (17) according to 2011 Census.

2.6. Factors affecting Population distribution of India

Populations are not evenly distributed over the earth's landmass. Physical environments vary from place to place. Hence, it is necessary for demographers to understand how and where populations are distributed. Present spatial distribution as well as projections for the future are integral to a demographer's work. With an understanding of certain patterns, and of the factors that have significant impact on population density and the total population, it is possible to make projections of the growth (or possible decline) in the global population, and its spatial distribution. It will then become possible for leaders and policymakers to frame appropriate policies and strategies to protect the environment, plan for sustainable development,

and prepare for changes that accompany changes in population characteristics. Adverse physical conditions and lack of sufficient livelihood opportunities mainly responsible for discouraging inhabitation of certain areas. The factors affecting distribution of population may broadly be grouped into the following major categories:

1. Physical factors
2. Socio-economic factors
3. Demographic factors and
4. Political factors.

The physical factors include, chiefly, climate, landforms, topography, soil, energy and mineral resources, accessibility in terms of distance from the coast, natural harbors, navigable rivers or canals etc. Socioeconomic factors include cultural characteristics, types of economic activities, technology used (including the type of farming), and social organization. Demographic factors include changes resulting from natural increase and migration. Factors such as political boundaries, political stability (or unrest), disturbances, controls on migration and trade, government policies and transportation facilities are considered as political factors.

1. Physical Factors affecting distribution of population: Man makes the choice of molding space according to his cultural values and hence, there are variations in habitations in response to environmental stimuli. He relates to the natural environment through settlements, which are physical embodiments of an ideal environment.

A. Climate is one of the most important natural conditions. It determines the nature of the flora of the region and influences agriculture. Climate also determines the type of animals that are associated with the region. Humans seek favorable climatic conditions in the places they want to settle in. The climatic belts are the principal areas of most of the human activity. It is evident from the world's population distribution that the highest populated countries of the world are mostly located in the tropical regions. A warm, comfortable climate attracts people. Regions with such climates provide favourable conditions for a wide range of fauna to thrive, supporting the life systems in the place. Agriculture and animal husbandry make it possible to

provide food for large populations. On the other hand, places with extreme climatic conditions are usually scarcely populated because it is difficult to sustain human life in such places. Countries in the temperate regions are also well populated. The regions are colder than the tropical regions but are hotter than the polar zones. The polar zones of the Arctic and Sub-Arctic regions remain the least populated of all. The extremely low temperature is not favourable for habitation. Vegetation is scarce. Cold winters and very short summers make living difficult.

B. Topography or terrain: Navigable areas are more populated than rough ones. Mountains are less preferred because of lack of arable land. In addition, the cost of transportation, construction and agriculture are considerably higher in such places. In general, high altitudes also impose a physiological on humans' capacity to adapt. This is because of reduced atmospheric pressure and low oxygen content. Higher altitudes, therefore, do not favour population and growth. Low lying plains and coastal areas are more favoured areas for human settlement. The Himalayas are thinly populated, the Ganges valley is one of the densely populated areas of the world. Coastal regions have the advantage of ocean-going trade and transportation and thus, the major cities of the world are mostly located in the coastal areas.

C. Water is essential for human survival. The ancient civilizations of the world flourished near rivers and the coastal areas. The Nile, Amazon, and Ganges River systems supported rich civilizations on their banks. Adequate rainfall favours vegetation and agriculture which in turn, determine a place's suitability for habitation. Because of lack of water, vast expanses of deserts are uninhabited. For the same reason, there is less population on the rain-shadow side of a hill or mountain; however, the leeward side is often densely populated. Thus, population is tending to be concentrated in the well-watered river valleys and coastal plains.

D. Soil quality influences density and distribution of the population. A substantial population of populations earn their livelihood from agriculture which depends on the quality of soil. Food crops are grown on the soil, thus, is one of the most important raw materials required by population. The alluvial regions, deltas and the coastal regions of India support high

population densities. On the other hand, mountainous regions, where soil erosion is a problem, such as the Terai region of Uttarakhand, or the sandy soils of the desert of Rajasthan, cannot support dense populations. However, scientific agricultural practices, with the aid of technology, have succeeded in converting low-yield soils to better quality ones. In the past, degradation or overutilization of soil led to the disappearance of flourishing civilizations, such as the Mayan in Central America. Vast reserves of mineral resources encouraged the establishment of industries, which attracted settlements. The Chhota Nagpur plateau is an area rich in mineral resources. The higher population densities in the Chhota Nagpur Plateau of Jharkhand and in the adjoining areas of Orissa are largely due to the availability of minerals.

E. Location of a place proximity to major towns and cities favours concentration of population. Generally, staying within the city limits increases living costs. The city's periphery or nearby towns provide affordable housing facilities. Cheap and reliable transportation provide convenient means of commuting.

F. Natural disasters discourage population concentration. Frequent storms, earthquakes, floods, wild fires discourage formation of settlements as people migrate to safer places. There are many examples of destruction of settlements due to the natural disasters. The city of Bichuan, in Sichuan province of China was completely destroyed in 2011 by an earthquake of magnitude 8.0 causing collapse of eighty percent of the buildings and a huge loss of lives. The city was not rebuilt and left abandoned to prevent any further loss of human life in the event of recurrence of the disaster in future.

2. Socio Economic Factor Affecting Population Distribution

The choice of settlement is generally based on natural processes. However, with time, man has been able to adjust and control the natural processes to some extent. Thus, the factors influencing the choice of a place for settling no longer depends entirely on natural conditions. As needs changed with the evolution of human society, social and economic perspectives gained primacy.

A. Economic activity is an indicator of employment opportunities. People in the rural areas are largely dependent on agriculture for their livelihood. If the

land fails to support the rural population, or with more opportunities available in urban areas, they may choose to migrate to cities. Concentration of population in urban areas is an outcome of diverse economic activities and livelihood options offered by cities. Usually, there is work for almost everyone, which is unlike in villages where there are fewer options. Therefore, population density in the towns and cities tends to be higher than in rural areas, and will continue to increase. By their very nature, cities provide diverse livelihood opportunities in both the formal and the informal sectors. Industries are a large job market, and have attracted cheap labour for several decades. The influx of labour leads to settlements being established, often on otherwise uninhabitable land. For example, Hydroelectric power stations in largely uninhabited areas attract migrants to these places, resulting in increase in population. Similarly, due to growing service and tourism industry, a large migrant population have settled in the city of Dubai, making it one of the fastest growing cities in the world due to tourism.

B. Social Organization of communities in new areas encourages the movement of people and settling in newer lands. Man is a social animal and it becomes essential for him to form a community, creating a familiar environment where he stays. People moving out of their native places tend to settle in those areas, or parts of the areas, where there are people with language, culture, food habits and habits that are like theirs. It is common to find cities having residential areas which are communal in nature.

3. The demographic factors are the characteristics of the population that have considerable influence on population distribution and settlement patterns. These include fertility and mortality trends, and migration. Fertility and mortality together influence the natural increase in a region. Over time, the differential growth rates, results of fertility and mortality, lead to changes in population density and distribution.

A. Migration has deep influence on population distribution. The push factors, or negative circumstances, at the place of origin tend to motivate people to leave their native places to newer areas. Better opportunities in distant lands also encourage migration. People may choose to move due to land scarcity, shortage of work in current place of residence, insufficient wages or salaries,

inadequate medical facilities and education, etc. Expectations of a better standard of living are often the main factors that drive rural to urban migration. The migration process allows redistribution of population, but it also puts pressure on the place of destination and increases the population density in this place.

B. Natural increase is the net outcome of fertility and mortality in a region. If in a region, the fertility level is high, the population of that place tends to increase. In such situations, mortality brings stability because of deaths. Epidemics and disease have always significantly influenced mortality levels. In earlier times, high occurrence of disease resulted in more deaths. To offset the loss, a high level of fertility was maintained. With medical advances, many diseases could be cured and the death rate fell sharply. In effect, the population grew. However, this created the problems of high population density and pressure on limited resources. With the introduction of contraceptives and with several family planning options available, birth rate began to go down.

4. Political factors influencing population distribution War, political disturbance, conflict, and weak administration negatively affect population distribution.

A. War and political conflicts take a great toll on human lives. Death rates are high, and people are forced to move out in search of safety. Mortality rates peak and the out-migration dominates. Safer locations experience a sizeable population growth because of the in-flow of migrants. This is also the situation in regions near the political boundaries of countries that do not have peaceful relations. Even if there is no conflict, the fear of one compels people to move, making these areas the least populated ones.

B. Political unrest and discrimination are detrimental to population growth. Clashes between different political parties or people with different religious beliefs have often resulted in a reduction of population in the affected area. Before settling in a new place permanently, migrant population looks for a place that not only provides economic opportunities but also provides safe and healthy environment for wholesome living. A politically unstable region is unable to provide both these conditions and hence it discourages not only the

incoming migrant population but also the already residing population which might be forced to leave the region in search of peaceful locations for settlement. Discrimination faced by migrants because of race, language, food, culture etc., discourages in-migration. This has reduced the population growth on one hand and newer settlements on the other.

C. Policies encouraging migration have often led to population growth in the destination region. International labour movements take place where rules governing cross-border migration are lenient. Migration helps in the redistribution of population. Policies that promote reduction in fertility levels, banning of infanticide, etc. also influence the population growth in a place. For example, China's strict enforcement of one-child policy succeeded in curbing fertility levels and controlling population.

2.7. India's Population Growth

The growth of population in India was slow up to 1921 but after this year it increased significantly. It is for this reason that 1921 is described as the year of the Great Divide. After 1921, India passed through successively all the phases of demographic transition and now has entered into the fifth phase which is characterized by rapidly declining fertility. Rate of growth of population is a function of birth rate and death rate. The increase in population in India can be explained by the variations in birth and death rates. The birth rate in India declined from 49.2 per thousand in 1901 to 25.8 in 2001. In the same period, the death rate has fallen from 42.6 per thousand to 8.5 per thousand. The natural growth rate during 1901- 1911 was 6.6 whereas it was 17.3 in 1991-2001. The increase in natural growth rate explains that the fall in death rate was more than the fall in birth rate. The fall in death rates were due to the development of medical facilities and control of epidemics and diseases. This is a very healthy sign of development. The census results of birth rate shows that the family planning programmes have to target the country especially the rural areas in a much more effective manner so that birth rate can still be reduced.

2.7.1. Characteristics of Population:

A. Exponential growth:

When a quantity increases by a constant amount per unit time e.g. 1, 3, 5,7 etc. it is called linear growth. But, when it increases by a fixed percentage it is known as exponential growth e.g. 10, 102, 103, 104, or 2, 4, 8, 16, 32 etc. Population growth takes place exponentially and that explains the dramatic increase in global population in the past 150 years.

ii. Doubling time: The time needed for a population to double its size at a constant annual rate is known as doubling time. It is calculated as follows: Td = 70/r where Td = Doubling time in years r = annual growth rate If a nation has 2% annual growth rate, its population will double in 35 years.

iii. Total Fertility Rates (TFR): It is one of the key measures of a nation's population growth. TFR is defined as the average number of children that would be born to a woman in her lifetime if the age specific birth rates remain constant. The value of TFR varies from 1.9 in developed nations to 4.7 in developing nations. In 1950's the TFR has been 6.1. However, due to changes in cultural and technological set up of societies and government policies the TFR has come down which is a welcome change.

iv. Infant mortality rate: It is an important parameter affecting future growth of a population. It is the percentage of infants died out of those born in a year. Although this rate has declined in the last 50 years, but the pattern differs widely in developed and developing countries.

v. Zero population growth (ZPG): When birth plus immigration in a population are just equal to deaths plus emigration, it is said to be zero population growth.

vi. Male-female ratio: The ratio of boys and girls should be fairly balanced in a society to flourish. However, due to female infanticides and gender-based abortions, the ratio has been upset in many countries including India. In China, the ratio of boys to girls became 140: 100 in many regions which led to scarcity of brides.

vii. Life expectancy: It is the average age that a new-born infant is expected to attain in a given country. The average life expectancy, over the globe, has risen from 40 to 65.5 years over the past century. In India, life expectancy of males and females was only 22.6 years and 23.3 years, respectively in 1900. In the last 100 years improved medical facilities and technological

advancement has increased the life expectancy to 60.3 years and 60.5 years, respectively for the Indian males and females. In Japan and Sweden, life expectancy is quite higher, being 82.1-84.2 for females and 77-77.4 for males, respectively.

viii. Demographic transition: Population growth is usually related to economic development. There occurs a typical fall in death rates and birth rates due to improved living conditions leading to low population growth, a phenomenon called demographic transition. It is associated with urbanisation and growth and occurs in four phases:

(a) Pre-industrial phase characterized by high growth and death rates and net population growth is low.

(b) Transitional phase that occurs with the advent of industrialization providing better hygiene and medical facilities and adequate food, thereby reducing deaths. Birth rates, however, remain high and the population shows 2.5-3% growth rate.

(c) Industrial phase while there is a fall in birth rates thereby lowering growth rate.

(d) Post-industrial phase during which zero population growth is achieved. Demographic transition is already observed in most developing nations. As a result of demographic transition, the developed nations are now growing at a rate of about 0.5% with a doubling time of 118 years. However, the matter of concern is that more than 90% of the global population is concentrated in developing nations which have a growth rate a little more than 2%, and a doubling time of less than 35 years.

2.7.2. Population Explosion: Population Explosion refers the sudden and rapid rise in the size of population, especially human population. It is an unchecked growth of human population caused as a result of increased birth rate, decreased infant mortality rate, and improved life expectancy. In other words, a drastic growth in population beyond normal limits is called population explosion. It is more prominent in underdeveloped and developing countries than in developed countries. Population explosion mainly refers to the surge in population post-World War II. However, in context to India, it refers to the rapid increase in population in post-independent era. In the year

2000, the world population was 6.3 billion and it is predicted to grow four times in the next 100 years. This unprecedented growth of human population at an alarming rate is referred to as population explosion. India is the second most populated country in the world. If the current growth rates continue, it will have 1.63 billion people by 2050 and will become the most populated country surpassing China. Population explosion is causing severe resource depletion and environmental degradation. Our resources like land, water, fossil fuels, minerals etc. are limited and due to over exploitation, these resources are getting exhausted. Even many of the renewable resources like forests, grasslands etc. are under tremendous pressure. Industrial and economic growth are raising our quality of life but adding toxic pollutants into the air, water and soil. As a result, the ecological life-support systems are getting jeopardized. There is a fierce debate on this issue as to whether we should immediately reduce fertility rates through worldwide birth control programs in order to stabilize or even shrink the population or whether human beings will devise new technologies for alternate resources, so that the problem of crossing the carrying capacity of the earth will never actually come.

The causes of population explosion are as follows:

1. Accelerating birth rate: Due to lack of awareness about the positive impact of using birth control method, there has been a steady growth in birth rate.
2. Decrease in infant mortality rate: An improvement in medical science and technology, wide usage of preventive drugs (vaccines), has reduced the infant mortality rate. There has been great improvement in medical and health-care facilities during the past few decades.
3. Increase in life expectancy: Due to improved living conditions, better hygiene and sanitation habits, better nutrition, health education, etc. the average life expectancy of human population has improved significantly. Steady supply of good quality food makes sure that the population is well nourished. Populations grow when they are adequately nourished.
4. Increased immigration: An increase in immigration often contributes towards population explosion, particularly in developed countries. It

happens when a large number arrive at an already populated place with the intention to reside permanently.

5. Less space than required: In urban cities, it is often found that there is very less scope for making available extra space to absorb the additional population. In such cases, a large population is seen packed into a smaller space.

The effects of Population growth in India are as follows:

1. **Over-population**: Population explosion may lead to overpopulation, i.e., a condition where population surges to a level that the earth cannot accommodate comfortably, and poses a threat to the environment.
2. **Unemployment:** In developing countries like India, with a backward economy and little scope for fruitful employment, millions of people find no work to do. The unemployed, having nothing to do and without an ensured living, are left frustrated and demoralize, losing their faith in life itself. As it happens in India and several underdeveloped countries in Asia and Africa, the unemployed threatens the very process of development and plunge the country in gloom. It is only natural. Those who are born with two hands consider it a curse when they are denied the simple right to work and earn a living. While their numbers go on multiplying and the growth rate becomes menacing, the fruits of development are found to be too inadequate to bridge the yawning gulf.
3. **Poverty:** High birth rate, both historically and statistically, is associated with poverty and low standard of living. It may be noted that poverty is both the cause and effect of population explosion. Due to poverty, there has been massive growth of population. On the other hand, the large masses of people live in poverty due to overpopulation. It may sound queer, but the law is that the poorer a country the greater is the growth rate of its population. India, caught in the morass of her age-old poverty, finds herself in the midst of a population explosion. The population that was less than 400 million in the forties was found to be about 1.21 billion in 2011 census. As a result of this even the six plans completed by now have so far failed to cope with the enormous problem of unemployment. Whatever our plans might have achieved in some

sixty-five years is found to be too little to eradicate poverty. More than seventy percent of Indians live in villages and most of them languish in their dark, dreary nooks; the fruits of our plans have not quite reached them. Many of them have no occupation. Due to lack of awareness, poor people fail to check population growth

4. Illiteracy: The resources available are fixed. In theory and in practice, the total available resources are shared by the people using them. Population explosion is the key reason for illiteracy in India. People prefer engage their children in economic activities, rather than providing them education.
5. Malnutrition: If people do not get adequate food and nutrition, then they may suffer from poor health. vi. Economy: People need food, clothes, shelter, and occupation to make their living. The demand for consumption should never exceed the production or resource limit. The economy of any country is negatively impacted, if there is massive population explosion beyond the tolerance limit.

2.8. Current Population situation

- The current population of India is 1,455,062,083 as of Saturday, October 26, 2024, based on Worldometer's elaboration of the latest United Nations data[1].
- India 2024 population is estimated at 1,450,935,791 people at mid-year.
- India population is equivalent to 17.78% of the total world population.
- India ranks number 1 in the list of countries (and dependencies) by population.
- The population density in India is 488 per Km^2 (1,264 people per mi^2).
- The total land area is 2,973,190 Km2 (1,147,955 sq. miles).
- 36.6 % of the population is urban (530,387,142 people in 2024).
- The median age in India is 28.4 years.

Check Your Progress:

Q.No	Short Answer Question	LOCF Mapping		
1.	Define population growth and explain its basic measures.	K2	CO1	PO1
2.	Compare population growth trends in developed and developing countries.	K4	CO2	PO2
3.	Describe the trends and differentials in India's population growth across states and union territories.	K2	CO2	PO3
4.	Explain the major factors responsible for rapid population increase in India.	K3	CO3	PO2
5.	State the basic measures of population distribution.	K1	CO1	PO1
Q.No	**Long Answer Questions**	**LOCF Mapping**		
1.	Analyze the pattern of population growth in the world with reference to developed and developing regions.	K4	CO2	PO2
2.	Examine the trends and regional differentials in India's population growth since independence.	K4	CO2	PO3
3.	Discuss the factors affecting population distribution in India.	K4	CO3	PO2
4.	Evaluate the current population situation of India and discuss its future prospects.	K5	CO4	PO4
5.	Assess the relationship between population growth and economic development in developing countries.	K5	CO4	PO2

UNIT -III

POPULATION STRUCTURE AND CHARACTERISTICS

3.1. Introduction

The age and the sex structure of the population are the most important demographic characteristics that are captured by a census of a population. Age and sex are two attributes that largely influence an individual's role in society. The data on population by age and sex is vital for demographers, health administrators etc. for planning and evaluation of various developmental and health programs. The classification of rural, urban, sex and marital status by age unveils the characteristics of population composition and provides disaggregated data for target-oriented projects. Age and sex influence the working of society in important ways because society assigns social roles and frequently organizes people into groups on the basis of their age and gender (the social component of sex). Age is a biological characteristic, but it is constantly changing; whereas sex is biological in nature, but does not change (except by human intervention in rare cases). It is the changing nature of age that creates such a dynamic process because younger people are treated differently from older people, and different kinds of behavior are expected of people as they move through different ages. At the same time, biological changes inherent in the ageing process influence what societies expect of people and influence how people behave. At very young and very old ages, people are more dependent on others for survival, and so the proportions of people at these ages will influence how society works. In the teen years, reproductive hormones influence behavior and every society has to deal with this phenomenon as well. The idea that societies have separate sets of expected roles and obligations for people of different ages is captured by the concept of age stratification, whereas cohort flow captures the notion that at each age we are influenced by the historical circumstances that similarly affect other people who are the same age. The perspective of age stratification and cohort flow was first put forwarded as a cohesive package by Riley (1976a, 1976b) and Foner (1975).

3.2. AGE STRUCTURE

The age structure of a population refers to the number of people in different

age groups in a country and it constitutes an important subject of demographic analysis and development planning. To an important degree, a person's age influences what he needs, buys, does and his capacity to perform. Consequently, the number and percentage of a population found within the children, working age and aged groups are notable determinants of the population's social and economic structure. The population of a nation is generally grouped into three broad categories: Children (generally below 15 years). They are economically unproductive and need to be provided with food, clothing, education and medical care. Age structure is a important indicator of population composition, since a large size of population was in the age group of 15-59 indicates a large working population which require more expenditure on health care facilities. Similarly, high proportion of population would mean that the region has a high birth rate and the population is youthful. India has high birth rate which in turn shows an age structure which is typical of the countries of less developed region a very broad base and a tapering top. In demographic terms such an age structure is known as "young population". Nearly 40% of India's population, according in the 2011 census, is below 15 years of age and only 6.9% is aged 65 years and above. A larger percentage of the dependent population tends to reduce savings and investments, and the rate of economic and social advancement since a large proportion of the scarce resources are diverted towards consumption. Also, an increasingly larger number of persons continue to enter the working ages swelling the ranks of the unemployed. Before the beginning of the First Five-Year Plan an estimated three and a half million persons were unemployed in India. At the end of the Third Five- Year Plan, their number increased to ten million even though thirty-one million additional jobs were created during the three plan periods. The present age structure is also conducive to higher population growth as bigger cohorts of males and females continue entering reproductive ages, especially since universal and early marriage is the pattern in India. This would tend to further aggravate the unemployment problem.

The age structure of India's population for the 1981 Census, when compared with that of the 1971 Census, reveals that it has changed slightly and has become "older". The change is noticed specially in the age groups 0-9, 10-19

and 45 and above. In the age group 0-9, the proportion declined due to the decline in the level of the birth rate. The quantum of decline is higher in the age group 5-9, which suggests that fertility decline may be greater in the second half of the last decade compared to that in the first half. In the age group 10-19 and 45 years and above, the proportions have increased which indicates general improvement in the health conditions, especially in the young old ages.

3.3. Age-sex Pyramid:

The age-sex structure of the population refers to the number of females and males in different age groups. A population pyramid is used to show the age-sex structure of the population. The shape of the population pyramid reflects the characteristics of the population. The left side shows the percentage of males while the right side shows the percentage of females in each group. India: Age Composition Adults, 58.7% Aged, 6.9% Children, 34.4% India. Age structural dynamics includes fertility, mortality and as well as related changes in family planning and social arrangements. The use of age structure goes beyond demographic analysis to other important areas. Public polices aim to improve the welfare of a population; population welfare in turn is determined and shaped by the needs of present and future population; a population's needs and its potential are strongly shaped by its demographic composition- i.e. by age-structural transition. In consideration of various uses of age data, information on age is routinely collected in every census and survey conducted in the country. Age misreporting remains a problem in the census. Certain segments of the population do not know their dates of birth so it ultimately leaves the enumerator to estimate the age to the likeliest age to be. In some cases, the estimates could be several years off from their actual age. Age composition by residence and broad age groups 0-14, 15-59 and 60+ for the year 2015 at the National level is shown in Table 1. The age group 0-14 is further sub categorized into the age groups 0 4, 5-9 and 10-14. It is observed that for most of the age groups, Male female differences in the age distribution of population are negligible except in the combined age group of 0-14, 15-59, 60+, 15-64 and 65+. In the age group 0-14, Male population is about one percent more than female, whereas in the age group 60+ as also

65+, percentage of female 0.6 and 0.5 percent more than Male. The proportion of young children in the age group 0-4 and also the proportion of population in the age group 0-14 are higher in rural areas than in urban areas for both Male and Female. A higher proportion of Male and Female in the working age group 15-59 live in urban areas as compared to rural areas. Table 1 gives percentage distribution of estimated population by quinquennial age groups sex and residence for India and bigger States and UTs.

3.4. SEX COMPOSITION

Sex composition of the human population is one of the basic demographic characteristics, which is extremely vital for any meaningful demographic analysis. Changes in sex composition largely reflect the underlying socio-economic and cultural patterns of a society in different ways. Sex ratio defined

Table 1: Percentage distribution of Population by age groups to total population by sex and residence, India, 2015

Residennce	Sex	Broad age groups (years)							
Total		0-4	5-9	10-14	0-14	15-59	60+	15-64	65+
	Total	8.6	9.0	9.7	27.3	64.4	8.3	67.5	5.2
	Male	8.8	9.2	9.9	27.9	64.1	8.0	67.1	5.0
	Female	8.4	8.8	9.5	26.9	64.7	8.6	67.8	5.5
	Total	9.2	9.5	10.2	28.9	62.9	8.3	65.8	5.3
Rural	Male	9.4	9.6	10.4	29.4	62.6	7.9	65.6	5.0
	Female	9.0	9.3	10.0	28.3	63.1	8.6	66.2	5.6
	Total	7.3	8.0	8.6	23.9	67.7	8.4	70.9	5.2
Urban	Male	7.5	8.2	8.8	24.5	67.2	8.3	70.5	5.0
	Female	7.1	7.9	8.4	23.3	68.2	8.5	71.3	5.3

Note: Total percentage may not add to 100 on account of rounding in broad age groups

Source : www.censusindia.gov.in/vital_statistics/srs_report/9chap%202%20-%202011.pdf

here as the number of females per 1000 males in the population, is an important social indicator to measure the extent of prevailing equity between males and females in a society and influences directly the incidence of marriage, birth, migration, economic activities, etc. Development programmes may also have differential impact on male and female quality of life. Sex Ratio There are more males than females in India. This is mainly because of higher mortality experienced by the females than the males. The trend of the sex ratio, defined as the number of females per 1, 000 males, shows that up to

the 1971 Census it was declining. However, in the 1981 Census it had slightly increased. The cause for the declining trend is attributed to the widening in the gap between the life expectancies of males and females. During the decade 1971-81, it appears that the death rate of females declined relatively more than that of the males. It is a common assumption that there are the same numbers of males and females at each age- actually, this is rarely the case. Migration, mortality, and fertility operate to create inequalities in the ratio of males to females (known as the sex ratio):

Sex ratio= Number of males/Number of females*100

A sex ratio is greater than 100 thus means that there are more males than females, while a value of less than 100 indicates that there are more females than males. The ratio can obviously be calculated for the entire population or for specific age groups. Fertility has the most predictable impact on the sex ratio because in virtually every known human society more boys are born than girls. Sex ratios at birth are typically between 104 and 110. The United States tends to be on the low end of that range and Asian societies tend to be on the high end, but the data do not permit many generalizations. Despite a great deal of research into the question of why the sex ratio is not simply 100, no one really knows (Clarke, 2000). This is perhaps a biological adaptation to compensate partially for the higher male death rates (or vice versa, since we are not sure why death rates are higher for males. In fact, data on miscarriages and fetal deaths suggest that more males are conceived than females, and that death rates are higher for males from the very moment of conception. Thus, some of the variability in the sex ratio at birth could be due to differences in fetal mortality. Mortality creates sex inequalities because at all age males have higher death rates than females. The cumulative effect of this is to produce a situation in which, as mortality declines, there are increasingly fewer males at the older ages than there are females. Western nations, having experienced the earliest declines in mortality, have thus become increasingly characterized by having substantially more older females than males. This seems to be an inevitable shift inherent in the demographic transition. On the other hand, migration offers a way to alter the biologically driven component of the sex ratio. In some instances, females are more likely

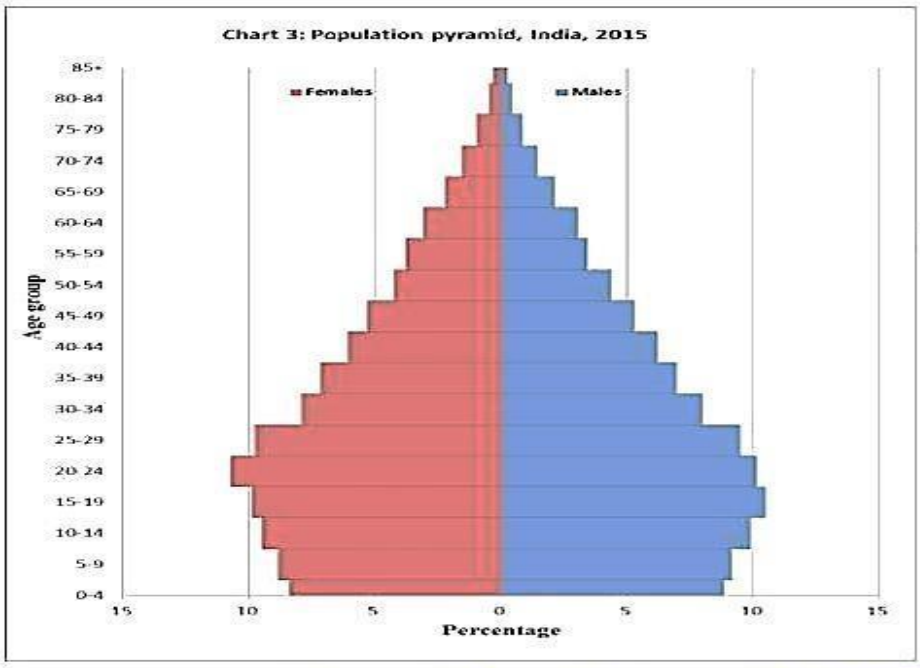
to migrate (and thus to be added to or subtracted from a specific age group). In other situations, males are more likely to be the migrants and thus also to produce changes in the sex ratio that trump those created by the combination of the sex ratio at birth and the mortality differential by sex.

3.5. Measuring the Dynamics of the Age Transition:

A population is considered old or young depending on the proportion of people at different ages. In general, a population with about 35 percent or more of its people under age 15 is "young," and a population with about 12 percent or more of its people aged 65 or older can be considered "old." Further, as the proportion of young people increases relative to the total, we speak of the population as growing younger. Conversely, an aging population is one in which the proportion of older people is increasing relative to the total. We can graphically visualize the age structure by constructing an age pyramid. We quantify the age structure in three major ways, by calculating the average age of a population, the dependency ratio, and the growth rates by age. Although we can compare these measures over two or more time periods to get a sense of trends, demographers have worked out more detailed ways of modeling the dynamics of age structure changes, and these include stable and stationary populations and computing population projections.

3.6. Population Pyramids:

A population pyramid (or age pyramid) is a graphic representation of the distribution of a population by age and sex. It can graph either the total number of people at each age or the percentage of people at each age. It is called a pyramid because the "classic" picture is of a high mortality society (which characterized most of the world until only a several decades ago) with a broad base built of numerous births, rapidly tapering to the top (the older ages) because of high death rates in combination with the high birth rate.



Source:www.censusindia.gov.in/vital_statistics/srs_report/9chap%202%20-%

3.7. Average age and Dependency Ratio:

The concept of dependency is essential to understand the age structure. Dependency ratio is the ratio of dependent population (60 year) on working-age population. In India, the working age population is defined as the population between 15-59 years of age whereas for some other countries it is defined as population in the age-group of 15-64. Dependency ratio is categorized as young age dependency ratio (YADR), old age dependency ratio (OADR). Combining these two gives us the total dependency ratio. Although a picture may be worth a thousand words, there are times when we like to summarize an age structure in only a few short words or, even better, in a few numbers. The average age and dependency ratio are two measures to help us do just that. The average age in a population is generally calculated as the median, which measures the age above which is found half of the population and below which is the other half. An index commonly used to measure the social and economic impact of different age structures is the dependency ratio the ratio of the dependent age population (the young and the old) to the working- age population. The higher this ratio is, the more people each potential worker is having to support; conversely, the lower it is, the fewer people there are dependent on each worker. For example: suppose that a population of 100 people had 45 members under age 15, 3 people 65 or older,

and the rest of approximately economically active ages (15-64). This is the situation in Nigeria, one of the highest fertility nations in the world. Forty-eight percent of the population is of dependent age (0-14 and 65+) compared with the remaining 52 percent of working age. Thus, the dependency ratio is 48/52 0R 0.92, which means that there are 0.92 dependents per working age-person nearly one dependent for each person of working age, which is a fairly load, especially as in most societies we will not find everyone of working age actually working. The dependency ratio does not capture all the intricacies of the age structure, but it is useful indicator of the burden (or lack thereof) that some age structure place on a population. For individuals with large families, the impact of a youthful age structure, for example, will be immediately apparent. But even for the childless or those with only a few children, the effect may be higher taxes to pay for schools, health facilities, and subsidized housing. For those in business (whether government or private), an age structure that includes numerous dependents may mean that workers are able to save less, having no spend it on families, while government taxes must go toward subsidizing food, housing, and education rather than to financing industry or economic infrastructure, such as roads, railways, and power and communication systems.

3.8. Growth Rates by Age:

The population growth occurs by age, not really as an overall number. Increases in the average age tell us generally that the age structure is going through alterations, but we cannot tell for sure where those changes are occurring. This is important because the age-graded aspects of society that tell us that we should examine the growth rates by age if we are going to fully understand what is happening in a society.

3.9. The Age Transition:

Premodern society will have high fertility, high mortality, and probably very little in or out migration. This is associated with a young population, whereas the end of the transition is associated with an older population characterized by low fertility, low mortality, and probably a moderate amount of migration. This transition from a younger to an older population progresses through some predictable stages, with reasonably predictable consequences for the

fabric of social life.

3.10. Changing Sex Ratio in India

After understanding the age structure, it is important for us to know the sex ratio by major important age group. Sex ratio is analyzed to understand the degree of balance between two sexes of the population i.e. males and females. This ratio is normalized to refer to a standard unit of people, usually 100 persons but in India it is measured as female per 1000 of males. Though, in general, the number of male and female should be more or less the same, but this does not happen. At birth sex ratio among human population in general is 105 male babies per 100 female babies. Gender differential in mortality is a universal phenomenon. In the society without any gender-based discrimination, chances of death for the male neonates and infants are higher than the female babies thus balancing the sex ratio. However, in some countries differential treatment to female babies overwhelms such a biological phenomenon resulting in female deficit due to excess mortality amongst female babies. Sex ratio needs to be studied, especially for India in four components such as: i) overall sex ratio (OSR) ii) sex ratio at birth (SRB), iii) child sex ratio (CSR), iv) elderly sex ratio (ESR).

3.11. Overall Sex Ratio:

Most of the world's country where son preference is not entrenched, over all sex ratio favours the females. Numbers of populated countries in Asia have sex ratio favouring males dominating the overall world sex ratio in favour of males. 100 males (source: India, unlike other developed countries, remained female deficit country for more than a century. In 1901, the sex ratio in India was 972; until the recent census of 2011, the sex ratio of India remained much lower than the level recorded by 1901. More alarmingly, after Independence, the sex ratio has been declining almost steadily till 1971. 1991 has recorded the lowest sex ratio of 926. To understand the gender dynamics in the overall sex ratio, it is important for us to analyse the child sex ratio and elderly sex ratio separately. This will help us to understand the vulnerability of the section of the females to discrimination.

3.12. Sex Ratio at Birth:

Sex Ratio The standard sex ratio at birth is 105 males per 100 female births.

However, due to higher infant mortality among the males in most of the society, number of females increases in overall sex ratio. This pattern does not hold true in the society like India where gender-based discrimination is observed. The discrimination starts before birth through the use of ultrasound technology (Sonography)which is most commonly used for sex determination. Sex determination is a result of deep-rooted son preference in the society. Preconception and prenatal sex selection leads to avoid the live of female foetus, resulting into extremely skewed sex ratio favouring male babies at birth. Understanding the scope of using technology to satisfy their preference for male baby Government of India took several legal initiatives. Misuse of pre-natal diagnostic techniques especially amniocentesis was banned in government hospitals and government laboratories. However, that could not improve the fate of the female fetus those were aborted before seeing the light of the earth. Health activists and women's group relentlessly tried for a more effective legislation and launched a campaign in 1986 in Maharashtra.

3.13. Child Sex Ratio

As SRB reveals the status of sex selection prior to conception and birth, CSR reveals after birth gender-based discrimination. Adverse CSR to the female could be a result of low SRB or could be because of excess female mortality over male in that particular age group. It was only during 1991 when population at 7+ age group was published by the Census of India separately to calculate literacy rate, scholars noticed that CSR has gone below 950 which was considered as standard sex ratio at birth. It is important to mention here that since Independence, CSR was showing a continuous decline which has crossed the critical mark in 1991 and continue to decline. It is quite evident that the states with critically low CSR also have SRB which is extremely skewed for the male babies. It has already been noted that overall sex ratio in India has declined from the level of 1901. But the decline in CSR during 1961 to 2011 is much faster than over all sex ratio which has shown some improvements over the decades. An attempt is made to graphically represent SRB and CSR for the major states of India. Though the result is not strictly comparable as the CSR is from census data and SRB is from Sample Registration System data; it is evident that India has hard task ahead to reach

the target of 950 female per 1000 male baby. It is only in the state of Kerala and Chhattisgarh which have maintained this sex ratio both at birth and among the children. Elderly Sex ratio as it has been already mentioned that India is experiencing a faster growth among the elderly population, it is essential to understand the phenomena from a gender perspective. This is important with the faster increase in longevity among the women that it is among the men. Under equal treatment to both the gender, chances of survival are more for the women than it is among the men. With the consistent availability of health technology women continue to live longer making elderly sex ratio inclined towards female. One may ask that how gender discrimination is diminishing at older ages. In effect factors together work for this. Firstly, almost universal motherhood in India and high maternal deaths put women in the risk of maternal deaths. Their chances of survival automatically increase once they cross their reproductive age. Similarly, in Indian society, with age they gain control over the household resources and decision making. That reduces the discrimination between genders. However, with the men dying earlier than them, the impending widowhoods may bring another set of deprivational sufferings and hardships to many lives.

3.14. Sources of Data

Population is described as the entire collection of the people living in our town, state, region or in a country and the respective characteristics such as age, sex, marital status and gender. Population is an entire group regarding whom we are interested in drawing the conclusions. Basically, the population data tell us about the number of people that are living or planned to be living in an area and it is also about the all the number of people belonging to different religions and races living in a specified area.

Definition

The most important problem that the social scientists are facing now days is the collection of the accurate, reliable and relevant data. Basically, the subject matter of the population geography is so vast so that's why the population geographers require large variety and amount of data which pertains to all the attributes of the population. Although, the particular data which is being requires by the population geographers is also dependent upon the issue he

is working upon. At the micro level the population geographers collect the primary data whereas on the macro level it is far more beyond the level of any individual to collect the data on all the attributes of the population. So, is should say that it is very difficult for an individual to collect data for large area that's why a population geographer always prefer to look for other official sources for the collection of the data. The primary sources of the population data on the population size, characteristics and demographic structure are the census, projections, the registrations, migration reports and the surveys. Whereas, some of the statistics regarding the population can be produced in the form of secondary sources such as statistical abstracts indeed. In the regard of secondary sources for the collection of population data the United Nation Organization itself is the biggest producer of the Population data.

Population Census

The population census which is regarded as the most important source of basic data for the population data and it is conducted either decennially or quinquennially. A census count offers us a spectrum of the population at a specific point in time covering a vast range of the economic demographic and social attributes of the very population. Ones we have the process of census in our country then it became a continuous process and repeated in the country after every 5 to 10 years. In modern terms the census is defined as a process of collecting, compiling and publishing the economic, social and demographic data pertaining to all the individuals living in a country at any specific point in time. The first ever complete census of population of data has been conducted in 1881 on a uniform basis throughout the India. Even now days the modern census also faced a series of limitations according to population geographer Zelinsky countries that have low level of technological achievement faced the problems such as ignorance, suspicion and dishonesty have made the task of census very difficult to perform. Even though, these countries also faced the administrative problem of getting funds for conducting the census. Another most important limitation to the census is the frequent boundary modification both at the international as well as at the regional level. As we all know that the censuses always have a specific reference point in time so if we introduce any boundary modifications then it

will strict the utility of census data. In those states where the census take place after every 10 years so in that gap of Ten years a remarkable change occurred in the population. So, it is suggested that a sample survey should be conducted in such countries in order to fill the gaps between the two censuses.

The Surveys

It is very difficult to distinguish between a census and the survey as there is no clear-cut differentiation between both of them. Census is described as the complete national canvass of the whole population of the country whereas the canvass of the selected households with an idea of collecting information regarding demographic attributes and socio-economic conditions is regarded as survey indeed. In fact, surveys are conducted for supplementing the census data. In the recent tears the surveys have been conducted in order to collect the information regarding the fertility, mortality, mobility, morbidity, under employment, welfare, health, education and unemployment. Such kind of surveys often include attitudinal question regarding the problems of the population. So, we could say that the role of surveys is just to provide explanatory information to the population analysis. Both the private organizations and governments are very much engaged in conducting the surveys. The National Sample Surveys are conducted in the form of rounds and each round covers several subjects but the emphasis is made on only one of the subjects during a specific period.

The Registration

The practice of the population registration has been very common even before the emergence of the process of regular census. The Far East has a great demographic tradition of the population registration and its major function is to control the population. In this registration process the family is considered as the basic social unit for keeping record of the population. However, such a record keeping phenomena should have yielded a continuous population register but in reality, the compilation has been never made or if made then in inaccessible secret archives. Presently, in the modern world many countries have adopted the registration systems in order to keep the record of deaths, births, marriages, adoptions, divorces etc. In some states it is known as

population registers for record keeping.

Administrative Records:

Basically, these are the statistics that are acquired from the different administrative process. These administrative records not only include the vital events that have been recorded in the civil registration system but it also includes the data on employment, deaths, births, education and health etc. well, the reliability of the data obtained from administrative records is dependent upon the completeness with the classifications and concepts that have been used in the census in order to collect population data. Theses administrative records are regarded as the by-products of the administrative records. The administrative data is collected due to the day-to-day operations of the organizations and their administrative files can be used as a substitute for census and surveys.

3.15. Religious Classification of Population

Religious profile of the populace is an important socio-cultural and demographic feature noticeable from the first Census in 1872 till now. The data of religions or religious groups for which information was collected had some variations in the pre-Independence period. But after Independence, particularly since 1961 there has been some uniformity in the collection and the generation of the religious data. Besides the six major religions, e.g. Hindu, Muslim, Christian, Jain, Buddhist and Sikh, census also collected data on other religious faiths and denominations. Some of the religious faiths and persuasions are variants or varied manifestation of the major religious groups. The huge list of these other religions was checked, edited, classified and processed to get the precise picture of the data.

Distribution of Population by religious groups and their sex ratios

Of the total population of India in 2001, 80.5 per cent are Hindus while Muslims account for 13.4 percent and Christian's 2.3 percent respectively of the total population. In absolute numbers, approximately 828 million are Hindus while Muslims are around 138 million out of India's total population of approximately 1,029 million. Sikhs account for 1.9 per cent of the total population. The proportion of Buddhists, Jains and other religions are 0.8 per cent, 0.4 per cent and 0.6 per cent respectively. Sex ratio which is the number

of females per one thousand males is 933 for all the religious groups at the national level. Hindus and Sikhs are below the national average while the rest are above the average. The highest sex ratio is seen among Christians with 1009 females while the lowest is among Sikhs (893). Constituting the largest segment of the population, the Hindus have a sex ratio of 931 while Muslims, the second largest religious community have 936.

Literacy rate by religious communities

The rate of literacy of the population computed for 2001 Census after excluding the population less than 7 years of age is found to be 64.8 per cent for the whole country, male literacy percentage being 75.3 per cent while the percentage for female being 53.7 per cent. Except Muslims and other religions, all the rest of the major religions have literacy rates higher than the national average. Jains have the highest total literacy rate of 94.1 per cent followed by Christians with 80.3 per cent. Buddhists with 72.7 per cent occupy the third position. The lowest total literacy rate of 47 per cent is found among other religions. Hindus have a total literacy rate of 65.1 per cent which is slightly above the national average while Muslims have a total literacy rate of 59.1 per cent, below the national average. The pattern of the total literacy rates emerged among the major religious communities is followed in general among males and females also. Jains have the highest literacy rates for both males (97.4 per cent) and females (90.6 per cent). In the second place Christians have 84.4 per cent for males and 76.2 per cent for females. While for males, Buddhists (83.1 per cent) occupy the third position, for females the position has gone to Sikhs (63.1 per cent). In the case of the Hindus, the male literacy rate (76.2 per cent) is above the national average of 75.3 per cent whereas the female literacy rate (53.2 per cent) is slightly below the national average of 53.7 per cent. The gap of male-female literacy rates is the lowest among Jains which is only 6.8 per cent points against the national gender literacy gap of 21.6 per cent points. Among Christians also the gap is as low as 8.2 per cent points. The biggest gap is found against other religions (27.6 per cent points) followed by Hindus (23 per cent points) and Buddhists (21.4 per cent points).

Check Your Progress:

Q.No	Short Answer Question	LOCF Mapping		
1.	Define sex ratio and age structure. Explain their importance in population studies.	K2	CO1	PO1
2.	Describe different types of population pyramids with suitable examples.	K2	CO2	PO3
3.	State the factors affecting age and sex structure of population.	K1	CO2	PO1
4.	Explain the concept of aging population and its causes.	K3	CO4	PO2
5.	Define literacy and educational attainment. Mention the measures used to study literacy.	K2	CO3	PO3
Q.No	**Long Answer Questions**	**LOCF Mapping**		
1.	Analyze the sex and age structure of developed and developing countries with suitable illustrations.	K4	CO2	PO3
2.	Explain the determinants and consequences of aging population in modern societies.	K5	CO4	PO4
3.	Discuss marital status classification of population and its demographic significance.	K4	CO3	PO2
4.	Examine literacy and educational attainment in India – trends, measures and data sources.	K4	CO3	PO3
5.	Assess the religious composition of population and its socio-economic implications.	K5	CO3	PO4

UNIT – IV

POPULATION DYNAMICS FERTILITY

4.1. Introduction

Under the domain of population studies, there is 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 child bearing, the age-structure of the population, life expectancy and so forth. It 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 events of birth and death is the changes in the variables of population structure. There are 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.

4.2. Fecundity, Fertility and Natality

Fecundity is the capacity to conceive or bear children. It is defined as a "biological potential or the physiological capacity to participate in reproduction." The absence of fecundity is called sterility or infecundity. It is the potential level of performance or the physical capacity for bearing children of the population.

Fertility on the other hand refers to the actual reproductive performance of individual or group. It follows that fertility of an individual will be limited by the physiological capacity to reproduce i.e., fecundity.

Natality is the birthrate, which is the ratio of total live births to total population in a particular area over a specified period of time; expressed as childbirths per thousand population per year.

4.3. Factors Determining Fertility and Human Behaviour

A causal analysis of fertility may involve a great number of factors and complicated chain reactions. Lists of eleven variables which directly affect fertility are indicated which are as follows:

1. Age of entry into sexual unions: In the European nation's culture, a couple is not supposed to marry until the husband is able to support a wife and family. In pre-industrial Europe, the age at marriage was relatively low but began to rise gradually. In Asian nations, on the other hand, the age at first marriage has always been very early, since marriages are arranged and the husband is not expected to support his family entirely by his own efforts.

2. Permanent Celibacy: A rather high proportion of permanent celibates are frequent in the nations which have a late average age at marriage.

3. Amount of reproductive period spent after or between unions: In all societies actual fertility is reduced below the biologically maximum level because part of the part of the reproductive spent after or between sexual unions. Where monogamy is institutionalized, it is almost inevitable that a certain proportion of widows never remarry, since there are almost always more widows than widowers, and many widowers prefer to marry never-married women. Period of separation between marital unions are also important in some societies in reducing fertility.

4. Voluntary Abstinence: Almost all societies enjoy period of ansiste3nce during late pregnancy and also during postpartum period. The former has no detrimental effect on fertility and the latter has little since almost all women have very low biological fecundity during this time.

5. Involuntary Abstinence: In a few societies a large proportion of men must absent themselves from their wives periodically to obtain gainful labor.

6. Frequency of intercourse: Evidence suggests that this variable may be rather important in determining differences in fertility between individuals of different nations. It is possible, however, that factors such as diet, temperature, humidity and the prevalence of certain enervating diseases may have effects on the average frequency of intercourse in different populations.

7. Fecundity as affected by involuntary causes: Several factors may affect the probability of conception, given the fact that intercourse occurs at a

specified frequency. On a worldwide basis perhaps the chief of these is the incidence of venereal diseases. Extreme hunger has also been found to cause amenorrhea in women and a reduced sperm count in men.

8. Use or non-use of contraception: Contraception is the most important of all the variables effecting fertility. Actually. Although there is no doubt that contraception is very influential in reducing levels of fertility, it is definitely not so overwhelming a contribution that the other variables can be ignored.

9. Fecundity as affected by voluntary causes: The surgical operation of tubectomy in females and vasectomy in males provide an individual permanent freedom from further parenthood. On a worldwide basis, prolonged breast feeding is one of the most important means by which women may temporarily reduce her fecundity. Women are sterile during their period of postpartum amenorrhea and a short period of an ovulatory cycle following their resumption of their menses. Prolonged lactation has a pronounced effect on the length of the period of post-partum sterility around 13 months and only four months in a population with no lactation.

10. Fetal mortality from involuntary causes: On average, about 20% of all known pregnancies are spontaneously aborted. There is much individual variation in the proportion of pregnancies which miscarry, but little is known how populations may vary in this respect.

11. Fetal mortality from voluntary causes: Induced abortion is one of the most important means of birth control. Primitive methods of abortions have been practised throughout human history.

4.4. Factors associated with long term decline in fertility in developed countries

1. Motivational factors: Motivational factors have played an important role in bringing about a change from high fertility to low fertility. Demographers 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 several children to a strong motivation for a limited family. These forces operated at the individual couples who translated into action the desire for a small family.

2. Economic and social factors

The phenomenon of fertility declines in the now developed countries is very complex. Several interacting and overlapping economic and social factors were responsible for the transition from high to low fertility. These are:

- Industrialization
- Urbanization
- Rising levels of living and increased cost of bringing up children
- Family functions and structures
- Relationship between mortality and fertility
- Social mobility

3. Differential Fertility

It has been observed that the levels and patterns of fertility vary considerably in various subgroups of the same population. These subgroups may be based on residence, whether urban or rural, social and economic status in terms of educational attainment, occupations, income, size of land holding, religion, caste and race etc. A study of differential fertility is useful in identifying the factors which determine fertility levels among various sub-groups. Differential fertility can be understood as a result of following factors.

Ecological factors

A. **Regional differences in fertility:** The fertility rates of various regions of states or provinces within the one country may differ widely.
B. **Rural-Urban residence and fertility:** Towards the end of the last century, in the low fertility areas of the world, it was found that the fertility of those residing in cities was lower than that of rural residents and these differentials were more or less stable.

Socio-economic factors:

A. **Educational Attainment and fertility:** The educational attainment of couples has a very strong bearing on the number of children born. Educational attainment especially of women is one of the indicators of modernization and the status of women in society and higher the educational level, the lower was the family size.
B. **Economic status and fertility:** general studies in the past have highlighted the inverse relationship between the economic status of the

family and fertility.

C. **Occupational of husband and fertility:** In developed countries, occupation especially that of the husband is used as an indicator of social economic status and differential fertility is studies according to the occupation of the husband. It is indicated that the wives of farmers and farm workers recorded a higher fertility than the wives of men engaged in non-agricultural occupations. These differences were more pronounced in France and the United States than in the other countries.

D. **Employment of wife and fertility:** It has been found in several studies that the gainfully employed women have a smaller number of children than those who are not employed.

E. **Religion, caste, race and fertility:** Religion is considered to be an important factor affecting fertility. The study of differential fertility of various religions as well as ethnic groups has important social and political implications. At one time, all the religions of the world, except Buddhism, were pro-natalist or "populationist". The injunctions laid down in various religions indicate the importance of high fertility.

4.5. Fertility:

Fertility is one of the three components of population dynamics (the others being mortality and migration) and is essential to any study on population study. Fertility is regarded as a positive force in population dynamics because it is responsible for biological replacement, and the continuation of human society. Fertility levels determine the age structure of a population which, in turn, governs the social, economic and demographic characteristics of the population. The study of fertility is of interest to scholars and researchers because it is a complex phenomenon that is influenced a host of social, cultural, psychological, economic and political factors and variables. The effectiveness of population programmes depends on a proper understanding of the interplay between fertility and other variables. Fertility refers to the number of live births to a woman, or a group of women. It is a measure of actual performance and should not be confused with fecundity, which refers to the physiological capacity to reproduce. Since it is not possible to measure

the actual reproductive capacity of a woman, fecundity can only be assessed with the help of the maximum levels of fertility (or natural fertility) ever observed in a non-contraceptive population (Misra, 1982:160). In the absence of a conscious effort to control the size of families, the larger the fraction of the population who are in the fertile age range, the more rapid will be the population growth, which will influence the average age of the population structure towards the younger end of the spectrum. In terms of populations rather than individuals, fertility is usually expressed using the proxy measure of birth rate, either crude or standardized, for age and sex. Worldwide, there are significant differences between birth rates. A major study in the 1980s, carried out by the Population Division of the Department of International Economic and Social Affairs of the UN Secretariat studied the relationship between population age and sex distribution, and crude fertility rates for twenty-one countries in the developing world. They concluded that the higher the birthrate, the more markedly the birthrate is depressed by the age structure. The mean number of children ever born also ranged widely among the twenty-one countries. Differences in completed family size ranged from 8.6 children in Jordan to 5.2 children in Indonesia. In the developed world though, there is a tendency for family sizes to be smaller than the replacement level. This is true of every country in the European Union. Birth and death rates are the most important determinants of population growth; in some countries, net migration is also important in this regard. Until the mid-19th century birth rates were only slightly higher than death rates, so the human population grew very slowly. The industrial era changed many factors that affected birth and death rates, and in doing so, it triggered a dramatic expansion of the world's population.

4.5.1. Types of Fertility Measure:

There are two broad types of measures of fertility: The analysis of fertility is basically carried out in two ways: one is in a period perspective and the other in a cohort perspective. The events that occur in a given period of time (calendar years) are studied in relation to the durations of exposure of the population during that period. In cohort the events and duration of exposure are studied for well-defined cohorts as they move over time. The term “cohort”

indicates a group of people who have a similar experience at the same time. Two types of cohorts are generally used in demography – Birth cohorts and marriage cohorts.

- **Period measures:** They are related to a period and based on data on the number of births in that period. These include Crude Birth Rate (CBR) General fertility rate (GFR), and Child Women Ratio (CWR).
- **Cohort measures:** In any sample fertility survey, a question is usually asked about number of children ever born (CEB) to women up to a time in the reproductive age groups. Using this approach, fertility is estimated indirectly on the basis of age and sex distribution of the population. These include Total Fertility Rate (TFR), Gross Reproduction Rate (GRR), and Net Reproduction Rate (NRR).

Second categorization of measures of fertility is:

- Direct Measures of Fertility:
- Indirect Measures of Fertility:

Direct Measures of Fertility: In these methods, data on live births are directly used. Some Direct Measures of Fertility are described below:

Crude Birth rate (CBR): It is defined as the ratio of total births in a year in a specified area divided by total mid-year population of the same specific area in the same year multiplied by a constant K. CBR= B/P*1000

Where B= the total number of live births in a year

P = the total population in the middle of the year and

K= is constant, usually 1000.

Example: **CBR** = $\frac{\mathbf{539427}}{\mathbf{31841374}}$ X 1000 = 16.9

Advantages and Disadvantages of CBR:

CBR is an important measure of fertility, for it directly links fertility to the growth rate of population. Computation of CBR is easy and quick, and requires minimum data. CBR also indicates the level of fertility in a population. A major weakness of CBR is that it is not very sensitive to small fertility changes; in fact, it tends to minimize them. CBR is affected by many factors: age, sex, and marital status. It is also influenced by age structure of the population, and by level of fertility and age pattern of fertility.

General fertility rate (GFR): The relative frequency of childbirth varies

significantly with the age of parents. The age at which maximum fertility occurs may be different for the males and females. Further, fertility is highest among couples who have established some type of cohabitation (legal marriage, or common law marriage) than among persons not in such a union (single). Conversely, specific fertility rates are given separately for female parents and male parents. Usually, children are born to women between the ages of 15 and 45 years, which is known as the reproductive age group. The fertility rate for this group, called the "General Fertility Rate" (GFR), is calculated as the ratio of total number of yearly births to the total number of females (mid-year population) of child bearing ages (15-44 or 15-49 years).

GFR = No of Births during a year / Mid – year female population aged 15 – 49 X 1000

Where B is the total number of births that occur during a calendar year and F 15-44 is the female population of child bearing ages (15-44 or 15-49 years) in the middle of the calendar year. K is a constant, usually taken as 1000. The purpose of having a GFR is to restrict the denominator to potential mothers, but too not restrictive for analysis.

General Marital Fertility Rate (GMFR): Besides age, marital status is an important factor in fertility. In almost all societies in the world, birth is allowed only in a marital bond. Therefore, it may be more appropriate to consider only currently married women, and not all women, in the reproductive ages. Fertility calculated in this manner is termed as General Marital Fertility Rate (GMFR), and is calculated from the following expression:

GMFR = Live births in a year / Married women aged 15 – 49 X 1000.

The Gross Reproductive Rate (GRR): The total fertility includes all births, both male and female. The GRR shows how many girls babies, potential future mothers, would be born to 1000 women passing through their child bearing years, if the age specific birth rates of a given year remained constant and if no women entering the child bearing period died before reaching menopause. It represents the average number of daughters who would replace their mothers, assuming that the age and sex specific fertility rate for the current period were to continue indefinitely (Woods, R., 1979). GRR indicates the number of daughters that every woman is likely to bear during her entire

childbearing age span, if she is subjected to a fertility schedule as prescribed by given sex and age specific fertility rates. Also considered as replacement index, this measure is generally used while comparing current fertility in different populations. Calculation of GRR requires data on the number of live births by sex along with distribution of women in different age groups in the childbearing age span. In case the data is available, GRR can also be worked out by simply multiplying the TFR by feminity ratio (the ratio between the number of female babies born and the total live births in a population). In India, for example, 105 male babies are born for every 100 female babies. Thus, the feminity ratio is 0.4878 (i.e., 100/205). Then, GRR will be calculated from the following formula:

GRR = TFR X Feminity Ratio

As with TFR, GRR also assumes that women in the reproductive age group will survive till the end of their child-bearing period. GRR, thus, indicates the number of daughters a woman is expected to produce, if there is no attrition in the cohort due to mortality (Bhende and Kanitkar, 2000:262). This is, however, not a realistic assumption.

Net Reproduction Rate (NRR): The Net Reproduction Rate (NRR), a refinement over GRR, with a component of mortality built into it, allows for decrease due to deaths among mothers. Thus, NRR is the number of daughters ever born to a woman, if she gives birth according to the given schedule of age-specific fertility rates, and experiences given age-specific mortality rates up to the end of her reproductive span. NRR measures the extent to which a woman will replace herself by female babies under predetermined schedules of fertility and mortality.

4.6. Mortality

The study of mortality involves studying the effect of death on a particular population, where 'death' is an event, but when studied for a particular population in any given geographical areas over a period of time, then the study of mortality involves explaining the 'force of mortality' or the 'process of death' (Prakasam 2017). According to the United Nations and the World Health Organization, death is defined as, "Death is the permanent disappearance of all evidence of life at any time after live birth has taken

place.." (United Nations 2017). Therefore, we can say that death is an event that occurs only after live birth, and the period of time between birth and death is life. Death is one of the most important vital events. It is a central component in the calculation and understanding of population change. Aside from migration, death is the only variable that causes change in population balance through reducing population in permanency. There are a number of factors that influence the health of individuals, and, thereby, affect the mortality rate or death rate of a community. These factors are biological, social, economic, cultural factors, as well as genetic factors. With regard to constitutional and environmental factors, there are many, and which are wide ranging. These factors include physical, physiological, anatomical, psychological factors, as well as factors pertaining to nature, water, sanitation etc.

4.6.1. Mortality and Population:

A demographer studies mortality so as to determine the size of a particular population, its structure, as well as the variation in population size due to mortality. Thus, mortality is one of the three components of population change. The other two components are Fertility and Migration.

4.6.2. Mortality and Population Size: In the past, mortality rates play a significant role in determining changes in the size of population, specifically in the growth of population and a decline in population was understood to be a decline in mortality rate (not considering migration). Mortality rates or death rates and its relation to population size is expressed by the equation:

Natural increase = Birth – Death

This equation helps to understand the impact of death rates on the size of the population at a given point of time, as follows:

a) If the death rate is greater than the birth rate, then the natural increase of population will decline.

b) If the death rate is less than the birth rate, then the natural increase of the population will increase. Observations in the past have shown that the most important factor to cause a rapid increase in population growth is a sharp decrease in death rates, rather than in fertility rates. To illustrate, during the Industrial Revolution, many countries in Europe had very high death rates.

Post the Industrial Revolution, the high death rates began to decline, but as the decline in birth rates was not at pace with the decline in death rates, there was an increase in population growth.

4.6.3. Mortality and Age Distribution of Population:

Mortality or death rates also affects the age distribution of the population. The impact of mortality on the age distribution of the population is different than the impact of fertility. Fertility affects the age distribution of the population at initial stages, that is, at birth. However, mortality affects the age distribution of the population at all ages and varies according to various other factors. Therefore, if a population were to have a high level of fertility, alongside a low level of mortality, then there would be a relatively larger percentage of population in ages of early childhood and at older ages, and, as a result, reduced percentages in the middle age groups. The risk of mortality is always greater in the initial phase of life (0-4 years) and at advanced ages (above 60 years), than in the phase of adolescence and adulthood.

4.6.4. Importance of Mortality Data:

Mortality statistics, if considered in the short run, are important indicators of health and well-being of any given population. To estimate summary measures of population health, mortality statistics are needed, such as, for example, the life expectancy at birth. Mortality statistics can also help to understand differentials amongst sub-groups of a population with regard to population health. The data obtained from an analysis of mortality is useful for public health agencies with regard to the development, implementation and evaluation of various public health programs. It is also useful for disease control programs, where local authorities use mortality data to determine what action needs to be taken towards improving public health in local areas. For example, knowing the number of deaths due to a particular disease in any given area will indicate the health status of the community, data which can be used by health planners. So, death due to diarrheal disease among children in a given area is indicative of the prevalence of waterborne diseases in the community. The data of number of deaths due to diarrheal disease would enable health workers to take up interventions of water purification and improvement of sanitation facilities, as well as other measures to create

awareness in the community towards using purified water at the household level. Mortality statistics also provide information about the nature and efficiency of systems of health care delivery. For example, if there are high levels of child mortality observed for any given population during a period of time, then health care personnel may take up interventions to improve child health such as through improving access to and availability of immunization programmes. But the data necessary for analysis is not only that pertaining to number of deaths by age and by sex, but also with regard to the underlying cause of death. Mortality statistics, particularly regarding cause of death, can enable policy makers to understand a country's movement through the epidemiological transition, or the transition through different stages…. Therefore, mortality records in a country usually pertains not just to basic demographic characteristics, but also regarding occupation and cause of death data.

4.6.5. Study of Trends in Mortality Data:

Examining the mortality data of developed countries, will reveal that the developed countries achieved very low levels of mortality in the past, and while death after very early years until older ages have become a common phenomenon, mortality at infancy and childhood have not stayed as significant as is with developing countries. The levels of mortality across the world widely differ, by region, whether it is developed or developing, but also across countries and within countries as well. These differences are often a result of disparities with regard to access to basic services such as food, sanitation, clean and safe drinking water, as well as access to medical and health care. The risk factors, behavioural patterns and differing social contexts all affect individuals and the overall mortality patterns in any given region. Across the world, countries aim to reduce mortality, and mortality rates over the centuries have been declining in both developed and developing regions. However, the timing as well as the pace of the decline in mortality rates has varied across regions over this time period. Historically, the mortality decline has been part of the ongoing demographic transition, a process whereby a population moves from a state of high birth and death rates to a state of low birth and death rates, affecting population size. The process

of demographic transition was first observed based on the experiences in countries in Europe in the late 18th early 19th century during the Industrial Revolution, and it is expected that all countries in the world will go through the transition. Mortality rates also go through a transition during this process of demographic transition, sometimes referred to as the mortality transition. This transition is discussed in other modules in this paper. In order to bring about declines in mortality levels across the world, the international community has looked to address some of the challenges of development through policies at the global and regional levels. Towards this end, trends in life expectancy at birth and other variables are studied. The Millenium Development Goals and the Sustainable Development Goals are responses to development challenges from the international community for direct impact on measures of mortality including maternal mortality and infant mortality. In order to examine the trends in mortality across the world, the UN and WHO have developed data bases of mortality statistics over time, drawn from country data of mortality patterns and applying different estimation techniques. Study of mortality patterns across countries enables analysis of age, sex differentials over time, as well as other differences in mortality patterns. It also enables identification of cause of death, as with regard to communicable, non-communicable diseases, injuries and other causes that produce the mortality patterns over the studied period. The data enables comparison across countries and also aggregates by region or other classification to facilitate the study and understanding of mortality patterns worldwide (UN 2012).

4.7. Global HIV/AIDS Epidemic

June 1981, scientists in the United States reported the first clinical evidence of a disease that would later become known as acquired immunodeficiency syndrome, or AIDS. Its cause, the human immunodeficiency virus (HIV), was identified in 1983. According to UNAIDS, since the start of the epidemic around 85.6 million people have acquired HIV and around 40.4 million people have died of AIDS-related illnesses. In 2022, 39 million people were living with HIV, and 53% of them were women and girls.

HIV is found in the bodily fluids of a person who is living with HIV blood,

semen, vaginal fluids and breast milk. It can be transmitted through unprotected sexual contact. It is also spread among people who inject drugs with non-sterile needles–syringes, as well as through unscreened blood products. It can spread from mother to child during pregnancy, childbirth or breastfeeding if the mother is living with HIV.

Antiretroviral treatment

Over the ensuing decades, the rate of people becoming HIV-positive soared dramatically, as did the rate of fatalities. But eventually, new antiretroviral treatment began to extend the lives of those who were living with HIV. At the end of December 2022, almost 30 million of all people living with HIV were accessing antiretroviral therapy. At the same time, even though the number of people becoming HIV-positive has declined, there are still an unacceptably high number of people acquiring HIV and AIDS-related deaths each year. In 2022, 1.3 million people were newly infected with HIV and around 630.000 people died from AIDS-related illnesses. Since 2010, new HIV infections have declined from 2.1 million to 1.3 million in 2022 (from 310.000 to 130.000 in children) and AIDS-related deaths have declined by 69% since the peak in 2004.

Gender inequalities and lack of treatment delay the end of AIDS

The effects of gender inequalities on women's HIV risks are especially pronounced in sub-Saharan Africa, where women and girls accounted for 63% of all new HIV infections in 2022. Harmful masculinities are discouraging men from seeking care. Despite the progress made, AIDS claimed a life every minute in 2022. Globally, in 2022, about 9.2 million people living with HIV were not receiving HIV treatment and about 2.1 million people were getting treatment but were not virally suppressed. Treatment progress is especially slow in eastern Europe and central Asia and the Middle East and North Africa, where only about half of the over 2 million people living with HIV were receiving antiretroviral therapy in 2022. Men living with HIV were still significantly less likely than women living with HIV to be on treatment in sub-Saharan Africa, the Caribbean and eastern Europe and central Asia.

HIV funding gap is on the rise

Funding for HIV from both international and domestic sources also declined

in 2022, returning to 2013 levels. Funding totalled US$20.8 billion in 2022, far short of the US$29.3 billion needed by 2025. UNAIDS states that there is now an opportunity to end AIDS by increasing political will and investing in a sustainable response to HIV by funding what matters most: evidence-based HIV prevention and treatment, health systems integration, non-discriminatory laws, gender equality and empowered community networks.

4.8. Migration

Migration of people across administrative/political jurisdictions within a country, or across countries, has been a crucial factor in changes in societies. For a better understanding of migration, it is necessary to classify migration according to its types. There are two major types of migration:

a) internal migration, which takes place within a country; and

b) international migration that takes place across international boundaries (Bhende and Kanitkar, 2006). The processes, causes and consequences of internal migration are very different from those in international migration. The former is a response to the socioeconomic spatial situations within a country, while the latter is related to international socioeconomic and political conditions, especially the immigration and emigration laws and policies of these countries. The relatively permanent movement of people across territorial boundaries is referred to as in-migration and out-migration, or immigration and emigration when the boundaries crossed are international. The place of in-migration or immigration is called the receiver population, and the place of out-migration or emigration is called the sender population. There are two basic types of migration studied by demographers: Internal migration. This refers to a change of residence within national boundaries, such as between states, provinces, cities, or municipalities. An internal migrant is someone who moves to a different administrative territory. International migration. This refers to change of residence over national boundaries. An international migrant is someone who moves to a different country. International migrants are further classified as legal immigrants, illegal immigrants, and refugees. Legal immigrants are those who moved with the legal permission of the receiver nation, illegal immigrants are those who moved without legal permission, and refugees are those crossed an

international boundary to escape persecution.

Therefore, the learning objective of this module is an understanding of the various classifications of internal and international migration.

4.8.1 Internal Migration: Internal migration is the migration of people within the country. The characteristics and patterns of a country's internal migration are vital indicators of the pace and process of its development. For instance, the United States, is quite literally a nation on the move, and it always has been (Weeks, 2008), on the other hand population of many developing countries is less mobile. However, the mobility of people within national boundaries is very difficult to measure. For this reason, it is necessary to have a clear understanding of the definition of internal migration. People constantly move from one place to another; and these movements are diverse in nature. The distances covered vary from a few kilometers to several kilometers. Moreover, the duration of stay involved in the new location may vary from a few hours to several years. Many movements are casual, such as commuting to and from the place of work, shopping, visiting, and travelling for business or for pleasure etc. Such movements do not involve a sustained or a permanent change of residence and must, therefore, be distinguished from migration, which involves a change of place of usual residence-a taking up of life in a new or different place an operational definition of internal migration is that it is a change of residence from one civil division to another, or across the administrative boundary of a civil division. Thus, it may be said that a migrant is a mover who changes her (or his) residence from the political area of her usual residence. It is obvious that the civil division, as a migration-defining criterion, lacks uniformity, for divisions vary widely in size, shape and length of the border. This criterion is, therefore, not suitable when comparisons of migration in different countries are made. Internal migration therefore is classified based on various criteria which are described in the following sections.

Based on direction of movement Within internal migration, there is a four-way classification according to the direction of movements within and between rural and urban areas, which are:

a) Rural to Rural migration

b) Rural to Urban migration

c) Urban to Rural migration

d) Urban to Urban migration

Of these streams, it is rural to urban migration which is the most significant, because it contributes to the transfer of labour force from the traditional agricultural sector to the urbanized industrial sector, and is directly linked to urbanization. Income differentials between rural and urban areas is one of the main reasons for this type of migration, since in developing economies like India, agriculture alone cannot sustain rural livelihoods. Factors that pull the high-income groups in rural areas are availability of a better social infrastructure (education, health, etc.), better amenities and the quest for independence from social, cultural religious and familial shackles. Likewise, urban to urban migration is also related to the concentration of population in large towns and cities which may be the result of step migration from rural areas to any small towns and then small towns to large cities. However, in many developing countries like India, rural to rural migration is also significant, especially among women who move primarily due to marriage, or familial reasons. Each migration stream has distinct premises, causes and consequences.

Based on spatial dimensions Internal migration stream based on spatial dimensions may be classified into following categories:

a) Intra-district migration, i.e., migration within the district.

b) Inter-district migration, i.e., migration from one district to another within the state.

c) Inter-state migration, i.e., migration from one state to another It is important to note that migration within the district is called short-distance migration, migration within the state across the district is called medium-distance migration, and migration across state boundaries is called long-distance migration.

Based on the motive/reasons for migration: Internal migration takes place due to various motivations and reasons. These fall in the following main categories:

a) Marriage migration

b) Labour migration or migration of people for work, employment, etc.

c) Migration due to natural calamities Marriage migration is by far the largest form of migration in India; and it is close to universal for women in rural areas (Fulford, 2013). Several economic theories have been proposed to explain labour migration. For example, the neoclassical economic theory has tried to frame motivation for migration in terms of the wage differentials between the origin and destination, as well as the employment conditions and migration costs. On the other hand, the theory of New Economics of Labour Migration (NELM) considers many conditions, along with the wage differentials, in the labour market. According to Census 2011, only 10.2 per cent of India's population was labour migrant during the decade of 2001-2011. This reflects a declining trend of labour migration from the earlier census (2001) when it was 14.4 % (Census of India, 2001; Census of India, 2011). Migration due to natural calamities is essentially a kind of forced migration due to extreme environmental events like floods, tsunami, droughts, etc.

Based on duration of migration Here, migration is classified into two kinds:

a) Permanent migration

b) Temporary migration

The migrant's intention to permanently change his/her residence distinguishes permanent labour migration from temporary migration (Zelinsky, 1971). In permanent labour migration, the usual place of residence of the migrants' changes and the chances of returning home are weak. In temporary migration, however, migrants continue to remain a usual member of the household and tend to move circularly between the places of origin and destination.

4.8.2. International Migration:

An international migration occurs when people cross the political boundary of their home country and enter another. International migration is as old as human history, whether voluntary or forced upon people by famines, conquests and diverse types of persecution. Unfortunately, because of lack of precise information, the size and nature of such migrations are not exactly known. Today, statistics on international migration are maintained by various countries for their own use and hence, comparisons based on such statistics

become difficult because of lack of uniformity.

International migrants change residence across national boundaries. An international migrant is a person who moves to a different country. Every year, millions of people across international borders for a variety of reasons. Some do so for business, while some go on vacations. Still other people leave their homeland with no intentions of moving back. No study of migration is complete without a study of international migration, which has had an important bearing on the population growth of several countries, such as the United States, Canada, Australia, and New Zealand, Israel, Singapore, Hong Kong, South Africa, and many Latin American countries. International migrations can be classified into the following types:

1. **Forced migration:** Forced migration is "…migratory movement in which an element of coercion exists, including threats to life and livelihood, whether arising from natural or man-made causes (e.g. movements of refugees and internally displaced persons as well as people displaced by natural or environmental disasters, chemical or nuclear disasters, famine, or development projects)".
2. **Circular migration:** This is the fluid movement of people between countries, including temporary or long-term movement, which may be beneficial to all involved, if occurring voluntarily, and is linked to the labour needs of countries of origin and destination.
3. **Irregular/undocumented migration:** Movement that takes place outside the regulatory norms of the sending, transit and receiving countries. There is no clear or universally accepted definition of irregular migration. From the perspective of the destination countries, it is entry, stay or work in a country without the necessary authorization or documents required under immigration regulations. From the perspective of the sending country, the migration is irregular if, for example, a person crosses an international boundary without a valid passport or travel document, or does not fulfill the administrative requirements for leaving the country. However, the term "illegal migration" is usually applied only to cases of smuggling of migrants and people trafficking.

4.8.3. Sources of Migration Data

Introduction

Besides fertility and mortality, migration is the third component of demographic change. The analysis and measurement of migration is significant in the preparation of population estimates and projection for a nation or a region. For example, number of in-migrants in particular duration in any country is an important requirement along with fertility and mortality data to estimate its future population. However, the migration process poses several challenges in data collection. Globally there exists no standard process for gathering data on internal as well as international migration (Bell et. al, 2015), which makes comparison of data difficult. Despite the challenges and its limitations, census data is the largest source of information on internal migration (Bhagat, 2008). This is also one of the main sources of international migration to India. However, it does not provide any information related to international emigrants from India - persons of Indian origin leaving the country and residing in other parts of the world (Rajan, 2008). The surveys conducted by National Sample Survey Office (NSSO) of India provide information on internal as well as international migration; the most recent available round of the NSSO (2007-2008) has ample of information of emigration from India too (National Sample Survey Organization, 2010). Migration data is obtained from three main sources in India:

a) Censuses, b) Surveys, and, c) Population registers. This module will help the student-learner to become familiar with these sources.

A). Census: The population census is a comprehensive exercise for collecting, compiling, evaluating, analyzing and publishing demographic, economic and social data on all persons in a country, or in a clearly demarcated part of a country. Census data remain the main sources of information on migration in most countries, including India. India has a decadal census, which means that the census is conducted every ten years. Direct questions related to migration are usually for such information as place of birth, place of last residence, duration of residence in the place of enumeration, place of residence on a specific date before the census, etc. In India, information on migration is being collected since 1872. Till 1961, census data on migration

were obtained through information about birth place. In that year, the scope of data on migration was expanded to include details on whether the place of birth was a rural or urban area, and duration of stay at a place at the time of census. From 1971, census data was collected for the place of last usual residence in addition to birth place. In 1981, census data also included information about the reasons for migration from place of last residence, and duration of residence at the place of enumeration. Information about migration was collected on a sample basis. In the 2001 Census, the rural/urban status of place of birth was not collected. In the census of 2011, respondents were asked to choose from seven possible reasons for migration: a) Work/employment b) Business, c) Education, d) Marriage, e) Moved after birth, f) Moved with household. Immigrants are also enumerated, but the Indian census, being defacto, does not provide information on Indians who have emigrated. De-facto means at the place where a person is actually found on the reference date of the census (Census of India, 2011). Therefore, it is not possible to gain an understanding about net international migration from census data though net interstate migration in India can be studied. Districts are the lowest unit for which migration data are available. There were 593 districts in the 2001 census, which increased to 640 in the 2011 census (Bhagat, 2011). Analysis of census data on migration requires understanding of the concepts of place of birth (POB) and place of last residence (POLR).

Migrants based on the place of birth: If the place of birth is different from the place of enumeration, a person is defined as migrant according to place of birth. On the other hand, if both place of birth and residence are the same, then that person is defined as a non-migrant. It is easy to determine the migration (or non-migrant) status of a person if the place of birth is known but if a person migrates from her place of birth and returns at the time of census enumeration, the place of birth and place of enumeration will be same. As a result, the person will not be considered as a migrant. Thus, based on the question of place of birth, we cannot capture data on return migration. Data on return migration can be captured by knowing place of last residence. As per census 2001 data 307 million persons were reported as migrants by place of birth (Census of India, 2001).

Migrant based on the place of last residence: If the place of last residence is different from place of enumeration, a person is defined as migrant according to the place of last residence; otherwise, the person is considered as a non-migrant. If the place of last residence is different from the place of enumeration, the actual place of last residence (name of the village or town) is recorded. By place of last residence there 314.5 million persons were reported as migrants as per census 2001 data (Census of India, 2001). The Indian census does not specify the duration of stay while considering place of last residence. Census instructions say that the circumstances of each case would have to be taken into consideration before deciding a person's last residence. For example, temporary movement of a woman to a hospital for delivery at a place other than her usual residence will not be considered as the place of last residence.

Surveys: Periodic sample surveys in many countries provide direct information on migration. Sample surveys have considerable potential for use in migration statistics. Such surveys place emphasis on obtaining information on the processes, causes and consequences of migration, which are not available in national censuses. These migration surveys have specific objectives and cover a part of the study area. There are few sample surveys in India that collect country-level data on migration. The survey conducted by the Indian National Sample Survey Office (NSSO) is one and the most important for collecting migration data on regular basis.

The Indian National Sample Survey: The National Sample Survey Office (NSSO) conducts various kinds of socioeconomic surveys and its employment and unemployment related survey is an important source of migration data. The National Sample Survey (NSS) is a nationally representative, large-scale and multi-round survey. It collects socioeconomic information and migration data as part of its “Employment & Unemployment” schedule at six to seven years intervals.

4.9. Push and Pull Factors and Lee’s Theory of Migration

4.9.1. Introduction:

Migration is one of the distinguishing features of human beings that has been occurring since it started from the very beginning of man’s appearance in this

universe. Human mobility was even present in the primitive times and people used to migrate in search of abundant food and in search of a safe living environment and protection from physical dangers. In modern age, migration has gained importance with the ushering of the era of industrialization and urbanization. The factors like development of modern means of transport and communication, intermingling and interaction of different cultures, globalization, etc. has led thousands of people to migrate in search of better opportunities related to education, employment and living standard among other factors. Migration is one of the causes of social change and it is one of the three basic components of demographic change, the other two being birth and death. Migration is a complex phenomenon affected by many factors and attempts have been made from time to time to understand the various factors influencing the process.

4.9.2. Push and Pull Factors Migration:

Push and Pull Factors Migration is broadly understood as a permanent or semi-permanent change of residence. In other words, migration may be defined as a form of relocation diffusion (the spread of people, ideas, innovations, behaviours, from one place to another), involving permanent moves to new locations. The reasons that people migrate are determined by push and pull factors, which are forces that either induce people to move to a new location, or oblige them to leave old residences. These could be economic, political, cultural, and environmental. Push factors are conditions that can force people to leave their homes and are related to the country from which a person migrates. Push factors include non-availability of enough livelihood opportunities, poverty, rapid population growth that surpasses available resources, "Primitive" or “poor” living conditions, desertification, famines/droughts, fear of political persecution, poor healthcare, loss of wealth, and natural disasters. Pull factors are exactly the opposite of push factors they attract people to a certain location. Typical examples of pull factors of a place are more job opportunities and better living conditions; easy availability of land for settling and agriculture, political and/or religious freedom, superior education and welfare systems, better transportation and communication facilities, better healthcare system and stress-free

environment attractive, and security.

Everett Lee's "Push-Pull theory", it is necessary to acknowledge the contribution of Ravenstein's 'Law of Migration' to the discipline of population studies. It was first presented before the Royal Statistical Society on March 17, 1885. Ravenstein's original paper was based upon the British Census of 1881. In 1889, Ravenstein explored the subject further with data from more than twenty countries. They referred more to internal than international migration. These laws (or generalizations) are presented in a condensed form:

1. Migrants move mainly over short distances; those travelling longer distances head for the great centers of industry and commerce.
2. Most migration is from agricultural to industrial areas.
3. Large towns grow more by migration than by natural increase.
4. Migration increases with the development of industry, commerce, and transport.
5. Each migration stream produces a counter-stream.
6. Females are more migratory than males, at least over shorter distances. Males are dominant in international migration.
7. The major causes of migration are economic.

Lee's Theory of Migration:

Everett Spurgeon Lee, Professor of Sociology at the University of Georgia is known for his pioneering theory of migration, which is known as the Push and Pull Theory, or also as Lee' Theory. Lee first presented his model at the Annual meeting of Mississippi Valley Historical Association, Kansas City, in 1965. In 1966, his seminal work, 'A Theory of Migration', was published in Demography journal. The theory, which draws on principles of sociology, attempts to formalize a 'theory' of migration which would provide a scheme of the factors that could explain the volume of migration between origin and destination. Lee's theory is both simple and has withstood the test of times. Everett Lee has conceptualized the factors associated with the decision to migrate and the process of migration into the following four categories:

(1) Factors associated with the area of origin;
(2) Factors associated with the area of destination;
(3) Intervening obstacles; and

(4) Personal factors.

Lee elaborates all these four categories by pointing out that, in each area, there are numerous factors which act to drive away the people from the area, or to hold the people in the area or to attract the people to it. In this respect, there are significant differences between the factors associated with the area of origin and those associated with the area of destination. Migration may take place after both these are properly weighed. Usually, however, a person has a better and more realistic knowledge about the place of origin, while his knowledge about the place of destination is somewhat superficial and inexact. Intervening obstacles also have to be overcome before migration finally takes place. These include distance and transportation. Technological advances, however, have lessened their importance in modern times. Finally, the personal factors are of the utmost importance because, instead of the actual factors associated with the place of origin and/or destination, the individual's perception of these factors is found to influence the actual act of migration.8 We will examine the motivation for migration by considering how the relationship between origin and destination are affected by Push and Pull factors. Push factors exist at the point of origin and act to motivate out migration (a lack of economic opportunities, education, etc., which are mentioned earlier). On the other hand, pull factors are present at the destination, which attract migrants (work opportunities and availability of jobs, conducive educational facilities, religious or political freedom. Push and pull factors are paired, that is, migration can occur if the reason of emigrating (the push) has a solution in the pull by destination. In the context of labor migration, the push factors are often characterized by the lack of job opportunities in sending areas or countries; and the pull factors are the economic opportunities available in the receiving areas. Migration flow between two places origin and destination also depends on the intervening obstacles. These are the distance between the two places, lack of transport facilities, inaccessibility because of the topography (rugged mountains and physical barriers), and restrictive immigration laws. The flow may not be strong in the presence of such intervening obstacles. The number of migrants is directly proportional to the extent of opportunities (the pull factors)

available at the destination and inversely proportional to the intervening obstacles. The potential migrant may also consider the intervening obstacles as intervening opportunities, that is, the presence of other places between an origin and destination points to which one could migrate. Therefore, the volume of migration from one place to another is associated not only with the distance between places and number of people in the two places but also with the number of opportunities or obstacles between each place.

Empirical Model:

There are multiple factors which act to hold people within an area, or attract people to it. There are also others which tend to repel them. These are shown in figure as (+) and (-) signs. There are others, shown as (0)'s, to which people are essentially indifferent. Some of these factors affect most people in much the same way, while others affect different people in different ways. Thus, a conducive climate is attractive and promotes migration, while an unfavorable climate is repulsive to nearly everyone. Likewise, a good educational infrastructure may be a (+) by a parent with young children to migrate to, but (-) for house owners without children. The set of (+'s) and (-'s) at both origin and destination are differently defined for every migrant or prospective migrant. Potential migrants living in an area (i.e., the origin) have an immediate and often long-term acquaintance with the place, and are usually able to make considered and unhurried judgments regarding their locality. This is not necessarily true of the factors associated with the area of destination. Migrants' knowledge of the area of destination is rarely accurate and, indeed, some of the advantages and disadvantages of an area can only be perceived by living there. Hence, there are important differences between the factors associated with the area of origin and those associated with the area of destination. Therefore, to the migrants, there is always an element of ignorance, or even mystery, about the area of destination. Hence, the migrants will experience some uncertainty or apprehensions over their reception in a new area. While migration results from an association of factors at the origin (push) and destination (pull), the intervening obstacles work to creating a balance in favour of movement by the migrant. The most studied among these obstacles are distance, physical barriers, and restrictive immigration laws.

Lee is, therefore, of the opinion that the decision to migrate is never completely rational and hence, it follows that it is always possible to come across exceptions to any type of generalization about migration. Within this conceptual framework, Lee attempted to formulate several hypotheses for the four types of factors associated with migration, incorporating the push and pull factors at both places of origin and destination. These hypotheses cover the volume of migration, development of streams and counter-streams of migration, and characteristics of migrants to explain why some people migrate and others do not. These hypotheses are mentioned in the following sections:

Volume of Migration:

- The volume of migration within a given territory varies with the degree diversity of the areas included in that territory.
- The volume of migration varies with the diversity of the people in that territory.
- The volume of migration is related to the difficulty of the surmounting intervening variables. In other words, the more is the intervening obstacles the less is the volume of migration.
- The volume of migration fluctuates with the economy.
- Unless severe checks are imposed, both volume and rate of migration tend to increase with time.
- The volume and rate of migration vary with the state of progress in a country or area.

Characteristics of Migrants:

- Migration is selective. Due to differences in personal factors, the conditions at the places of origin and destination, and intervening obstacles are responded differently by different individuals. The selectivity could be both positive and negative. It is positive when there is selection of migrants of high quality, and negative when the selection is of low quality.
- Migrants respond primarily to the plus factors at destination term to be positively selected;
- Migrants responding primarily to minus factors at origin tend to be negatively selected; or, where the minus factors are overwhelming for the

entire population group, they may not be selected for migration; In other words, migrants responding to negative factors at origin tend to be negatively selected.

- When all migrants are considered together, selection for migration tends to be bimodal;
- The degree of positive selection increases with the difficulty posed by the intervening obstacles;
- the heightened propensity to migrate at certain stages of the life-cycle is important in the selection of migrants;
- The characteristics of migrants tend to be intermediate between the characteristics of the population of the place of origin and of the population of the place of destination.

Criticism:

Although the push-pull theory has been acknowledged as a path breaking model that explains migration at various periods and has stood the test of time, it has also faced criticism. Many scholars claim that it is difficult to determine which plus factors and which minus factors at both origin and destination are quantitatively the most important to different groups and classes of people. Moreover, the presence of intervening obstacles does not help demographers to identify which factors have major influence and which ones are minor factors. For this reason, Lee's theory offers little practical guidance for policy and decision-making in developing nations.

Check Your Progress:

Q.No	Short Answer Question	LOCF Mapping		
1.	Define fertility and explain its basic measures.	K2	CO1	PO1
2.	State the proximate determinants of fertility.	K1	CO2	PO1
3.	Define infant mortality rate and maternal mortality ratio.	K2	CO1	PO3
4.	Distinguish between internal and international migration.	K4	CO3	PO2
5.	Explain Everett Lee's conceptual framework for migration.	K2	CO3	PO2
Q.No	**Long Answer Questions**	**LOCF Mapping**		
1.	Discuss the physiological, social and cultural factors affecting fertility.	K4	CO2	PO2
2.	Examine the measures, levels and trends of mortality with special reference to infant and maternal mortality.	K4	CO2	PO3
3.	Evaluate the sources and limitations of fertility and mortality data.	K5	CO4	PO3
4.	Analyze the patterns, causes and consequences of internal and international migration.	K4	CO3	PO4
5.	Discuss the global HIV/AIDS epidemic and its demographic impact on mortality trends.	K5	CO2	PO4

UNIT - V

POPULATION POLICY CONCEPTS

5.1. Report on World Population Policies

The World Population Policies 2013 report published by the United Nations gives details pertaining to Governments' views and policies relating to population and development for 197 countries, including all 193 Member States, two Observer States (the Holy Sea and the State of Palestine) and two non-member States (Niue and Cook Islands). The report itemizes policies in the areas of population size and growth, population age structure, fertility, reproductive health and family planning, health and mortality, spatial distribution and internal migration, and international migration. The World Population Policies report is published biennially since 2003, and prior to 2003, the report was published as National Population Policies in 2001 and 1998. Before 1998, the world population policies data were published in a series of monitoring reports and biennial revisions of the Global Review and Inventory of Population Policies (GRIPP) database. All the international population conferences of the United Nations since 1974 have laid greater emphasis to monitoring implementation of the goals and recommendations of the conferences. For instance, International Conference on Population and Development held at Cairo in 1994 recommended that actions be taken "to measure, assess, monitor and evaluate progress towards meeting the goals of its Programme of Action". The systematic monitoring of population policies at the international level commenced after adoption of the World Population Plan of Action at the World Population Conference held at Bucharest in 1974. The Plan of Action, which was the first global intergovernmental instrument on population policy, called upon the United Nations to monitor national population trends and policies.

5.2 Definitions of Indicators:

Definitions of the various population indicators used in the policy documents as well as UN reports/documents are given below:

a. Population size: Estimated midyear population indicated in thousands, according to the latest year. Revision of the official United Nations population estimates and projections, medium variant is considered.

b. Annual growth rate: Average exponential rate of growth of the population over a given period, expressed as per cent.
c. Percentage of population underage 15 years: Estimated midyear population under age 15, indicated as percentage of the total population.
d. Percentage of population aged 60 years or over: Estimated midyear population aged 60 years or over, indicated as percentage of the total population.
e. Statutory age at retirement: Age at which a person is expected or required to cease work and is usually the age at which they may be entitled to receive full pension, superannuation or other benefits. It is expressed as years.
f. Total fertility: Average number of children a hypothetical cohort of women would have at the end of their reproductive period if they were subject during their whole lives to the fertility rates of a given period and if they were not subject to mortality. It is expressed as children per woman.
g. Adolescent birth rate: Annual number of births to women aged 15 to 19 years, divided by the number of women aged 15 to 19 years. It is expressed as births per 1,000 women.
h. Percentage of women aged 20–24 years married by age 18: Percentage of women aged 20 to24 years who got married or entered a union before age 18. A union involves a man and a woman regularly cohabiting in a marriage-like relationship.
i. Percentage of married women with unmet need for family planning: Percentage of women aged 15 to 49 years who are married or in a union with an unmet need for family planning. Women with an unmet need for family planning are those who are fecund and sexually active but are not using any method of contraception although they report not wanting any more children or wanting to delay the next pregnancy.
j. Index of family planning effort: This index measures the level of effort of national family planning programmes. In 2009, the index was calculated for 81 developing countries, covering 93 per cent of the

developing world population. The index is based on 31 measures of family planning effort, organized into four components: (1) policy and stage-setting activities; (2) service and service-related activities; (3) record keeping and evaluation; and (4) availability and accessibility of methods and supplies. Each measure of family planning effort was assigned a score from 1 to 10, where 1 is non-existent or very weak effort and 10 is extremely strong effort, based on a survey questionnaire completed by 10 to 15 expert observers in each country. The overall index for a country is the total score for the 31 measures, expressed as a percentage of the maximum score possible.

k. Induced abortion rate: Number of legally induced abortions per 1,000 women aged 15 to 44 years. Induced abortions are those initiated by deliberate action taken with the intention of terminating pregnancy; all other abortions are considered spontaneous.
l. Percentage of women in non-agricultural wage employment: Female workers in wage employment in the non-agricultural sector expressed as a percentage of total wage employment in that same sector. The non-agricultural sector includes industry and services.
m. Life expectancy at birth: Average number of years of life expected by a hypothetical cohort of individuals who would be subject during all their lives to the mortality rates of a given period. It is expressed as years.
n. Infant mortality rate: Probability of dying between birth and exact age one year, expressed as deaths per 1,000 live births.
o. Under-five mortality rate: Probability of dying between birth and exact age five years, expressed as deaths per 1,000 live births.
p. Percentage of children 12–23 months with 3 doses of DPT vaccine: Percentage of children aged 12–23 months who had received three doses of the combined diphtheria, tetanus toxoid and pertussis (DPT) vaccine in a given year.
q. Prevalence of stunting among children aged 0–59 months: Percentage of children aged 0 – 59 months whose height-for-age was less than two standard deviations below the median height-for-age of the international reference population.

r. Maternal mortality ratio: Number of maternal deaths over a year per 100,000 live births in that year. According to the World Health Organization, a maternal death is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. In circumstances in which cause of death attribution is inadequate, a maternal death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death.
s. Percentage of births attended by trained health professional: Percentage of deliveries attended by trained health personnel. Traditional Birth Attendants (TBAs), even if they had received a short training course, are not included.
t. Percentage of obese among adults aged 20 years or over: Percentage of adults aged 20 years or over whose Body Mass Index (BMI) (weight in kg/height in meters squared) was 30 or higher.
u. Percentage of deaths caused by non-communicable diseases: Number of deaths due to non-communicable diseases as a percentage of deaths due to all causes. The major noncommunicable diseases include cardiovascular diseases, cancers, chronic respiratory diseases and diabetes.
v. HIV prevalence among adults aged 15–49 years: Percentage of adults aged 15 to 49 years living with HIV at the end of the reference year.
w. Number of people living with HIV: Estimated number of people of all ages living with HIV at the end of the reference year.
x. Population density: Population per square kilo-meter.

5.3. Population policies:

population policies may be referred to as government views and policies with respect to population size and growth, population age structure, fertility, reproductive health and family planning, health and mortality, spatial distribution of population and internal and international migration within the

context of demographic, social and economic change. Now, the major issues facing developed countries with regard to population on which policies are focused are three; one is aging, second is low or below replacement fertility and third immigration, the rate of immigration is around 3 per 1000 population which is quite high. And all these points are interrelated, because low or below replacement level fertility; persistent over decades and centuries is bound to produce the phenomenon of aging and it is a kind of irreversible process.

So, aging becomes a problem, number of inactive papers 65 plus 80 plus 85 plus though dependent on pension, though in hospice, a number is starts increasing. In developing countries, developing can be called to be in the second or third stage of demographic transition.

Moderate fertility rates which need to be brought down further characterize them, then there are reproductive health issues. Issues related to high or moderate infant mortality, HIV-AIDS especially in the context of sub-Saharan Africa. There are some sub-Saharan African countries, where incidence of HIV-AIDS is quite high, almost as high as 20 percent of the couples in reproductive ages. As far as international migration is concerned it is not so much problem, there is a net emigration and that is 1 per thousand. Accordingly developed countries are more concerned with immigration and raising birth rate through various incentives to women. Developing countries focus more on expanding health infrastructure, increasing marriage age, launching effective family planning programs, communication and health and HIV and AIDS, wherever incidence of HIV is high and in other countries for preventive purposes. No task is easy; neither to control fertility nor to raise it. Perhaps raising birth rate as in European countries has been found to be more difficult, because it results from irreversible processes like women education and empowerment.

The next issue regarding population policies is of availability of data. For building a policy framework and taking action there is a need for data, to know what are the current rates of fertility, infant mortality, maternal mortality, what are the measures of health. And these data are also indicative of the areas of concern, because the areas of concern vary from country to

country. So, there are data needs of different kinds for different countries. The world population policies database, last updated in 2015, provides comprehensive and up-to-date information on the population policy situation and trends for all member states and non-member states of the United Nations. UN policy section database provides information on government views and policies on seven major topics, these seven topics are 1, population size and growth; growth means growth rate concern about growth of population. 2nd population age structure, countries are worried about age structure also, because age structure defines the problem of aging. Neither too young an age structure, not too old an age structure are required for economic progress or development.

3rd is fertility, which means birth rate, total fertility rate and other measures of fertility, mostly total fertility rate. Then reproductive health and family planning, couple production rate, nutrition among women and service facilities and many other things may be of interest to different countries. Health, overall health and spatial distribution there are some large countries like India and we are interested in regional or state wide distribution of population and internal migration and also international migration. So, these are seven topics seven themes on which UN policy section collects data from member and non-member countries. To repeat population size and growth; population age structure; fertility; reproductive health and family planning; health; spatial distribution and internal migration; and international migration.

5.4. India's Population Policy

Population was growing at about 1 percent per year. This 1 percent itself is indicative of second stage of demographic transition because in the first stage of transition, growth rate of population is 0; both fertility and mortality are high and fluctuating and therefore, growth rate is 0. But we had a persistent growth rate of around 1 percent per year which shows that some progress was made towards transition. But, at that time reliable estimates of fertility, mortality and migration were not available. Demographers depended on a stable population theory and some other analytical models of estimation for assessment of what were the rates and ratios at that time.

Mostly, we took census data. Census was the most reliable and data which was available at a gap of 10 years right from 18, 1881. So, by using analytical models, mathematical equations, regression lines, we estimated rates and ratios using census growth rate and age distribution. There was no experience of population control policy in any part of the world not only in India, but not in any part of the world.

The rational for population policy following type: Negative externalities. Negative externalities mean that while at the state level or at the national level or at the international level; there are economic benefits which accrue from reduction in birth rate. But due to cultural, traditional, regions and values and norms and institutional patterns and mode of production, individual couples benefit from having large number of children. So, this conflict has to be resolved and in the context of this conflict government then or a state has to do something. Then humanistic reasons: humanistic reasons means that some interventions of policy kind have to be made for their own sake. For example, education, raising age of marriage, they are important humanistic aims for themselves and then, family planning programme policies providing facilities, knowledge, behavioural change communication and laws nobody would object to them.

Now, the major themes of this policy draft were 20-Point programme which was implemented during emergency time targets for birth rate and death rate. Essentially targets for birth rate and growth rate because growth was of concern. Targets for death rate were indisputable everybody wanted to live longer, everybody wanted good health and no community, cast, region ever opposed the idea of helping people live longer; but birth rate and growth rate are a problem.

So, then raising age of marriage. For the first time, it was suggested and later on a law was passed that the minimum legal age of marriage of girls should become 18 and that a boy is 21 and arranging for marriage of children daughters and sons below this age would become a cognizable offence. There was a big issue that if at that time in 1976, fertility was more controlled in South Indian states and less in North Indian states. So, South Indian states were fearing that if these differences in population growth rate remain, then

in political representation on parliament as well as in financial allocation which is which is attached to population South Indian states will suffer. And therefore, it was decided that for representation on parliament and legislative assemblies and allocation of funds, until the year 2001, only 1971 census figures will be considered to allay the fear that their representation and it was also decided that girl's education should be increased to at least middle level. Now, we say high school, but at that time since the levels of enrolment and levels of education were low. So, it was decided that girl's education we raise to at least middle level.

Then, some other important points were that family planning was to become responsibility of all departments. All departments of government of India; all departments of centre; agriculture, sports, administration, police, education, industry all departments will cooperate and pool their resources to implement population policy of India. They also suggested monetary incentives which became quite popular or which sort of lured very poor and tribal people some time to go for sterilisation and the incentives were 150 after 2 children, 100 after 3 children and 70 after 4 children.

Group incentives were also thought of that villages or districts which will do better in population; population planning or population policy implementation, they will be given incentives at the Panachayath level, at the block level, at the district level, states will also be given incentive in various forms. Wherever the central government helps gram panachayaths or blocks or districts or states more help or more financial allocation or more facilities will be given to those which do better in population control.

And there was a point which actually this it was this point which boomerang that government said that states may go for compulsory sterilization and after 3 children irrespective of caste, community, creed, religion, the draft also said that society is ready to accept more stringent measures in population control. But they are not going for compulsion simply because the facilities in India's hospitals are not ready to sterilize a large number of couples who will come to these facilities under this law. It was first time in 2000 that national population policy was issued and look at there is no panic. It has to be more people friendly; welfare oriented, human rights based; reproductive health

based. So, the policy says that the immediate objective of the National Population Policy 2000 is to address the unmet needs for contraception. There are many people who want to use contraception, they do not want more children, but is still they are not doing anything. They are they are supposed to be having the unmet needs. Healthcare infrastructure and health personnel and to provide integrated service delivery for basic reproductive and child health care, the medium-term objective is to bring the total fertility rate which will mean average number of children we may bear in lifetime when mortality is not considered to replacement levels by 2010. A total fertility rate of 2.1 is considered to be a replacement level fertility, through vigorous implementation of inter sectoral operational strategies.

The long-term objective; so, short term is to address the unmet need and 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. Actually, the problem is that bringing down total fertility to 2.1 does not mean that population ceases to grow; population continues to grow due to younger age distribution and in demographic, there is a technical term for that it is called demographic momentum. So, because of demographic moment; we are passing through this demographic momentum phase. Our fertility has declined to 2.2, but the growth rate of India's population is still around 1.4 which is due to population or demographic momentum.

5.5. Objectives of Population Policy

- The immediate objective of the policy is to address the unmet needs for contraception, health care infrastructure, and health personnel, and to provide integrated service delivery for basic reproductive and child health care.
- The medium-term objective is to bring the TFR (Total Fertility Rate) to replacement levels by 2010, through vigorous implementation of inter-sectoral operational strategies (TFR is the average number of children each woman would have in her life time).
- 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.

- The importance of long-term goals makes a serious concern for few people to think about future. So, greater attention needs to be paid to the other socio-economic goals, which include the attainment by 2010 of:
- Free and compulsory school education up to age 14 and lowering of the dropout rates at primary and secondary level to 20% for both boys and girls. (The task is particularly difficult in rural areas of backward states and among the scheduled tribes and agricultural or rural labourers.)
- Lowering IMR to 30 and maternal mortality rates to below 100 per 100,000 live births.
- Universal immunization of children against all vaccine preventable diseases.
- Promotion of delayed marriage among girls to after age 18, and preferably after 20 years of age. (The rule of law and the perceptions about the safety of unmarried women are the critical issues.) Raising the institutional deliveries to 80% and those by trained persons to 100%. (The rural infrastructure is the main bottleneck here.)
- 100% registration of births, deaths, marriages and pregnancies. (While the goal is laudable, its attainment is not likely to be easy even over a 15-to-20-year period.)

5.6. Family Planning Programme under various Five-Year Plan Periods:

Family planning efforts in India can be traced in country's Five-year Development Plans which constituted the development agenda of the country. India's First Five-year Development Plan (1952-57) recognized that the increase in population and the pressure exercised on India's limited resources had brought to the forefront the urgency of the problem of family planning and population control. The Plan argued that application of medical knowledge and social care had lowered the death-rate, while the birth-rate remained fairly constant which had led to rapid increase in the growth of population. The Plan acknowledge that a lowering of the birth-rate might

occur as a result of improvements in the standards of living but such improvements were not likely to materialize if there was a concurrent increase of population. The Plan, therefore, emphasized that population control could be achieved only by the reduction in the birth-rate to the extent necessary to stabilise population at a level consistent with the requirements of the national economy. The Plan advocated that this could be secured only by the realization of the need for family limitation on a wide scale by the people. The Plan however insisted that the main appeal for family planning was based on considerations of the health and welfare of the family. Family limitation or spacing of the children was necessary and desirable in order to secure better health for the mother and better care and upbringing of children. Measures directed to this end should, therefore, form part of the public health programme.

The Second Five-year Development Plan (1957-61) proposed a programme for family limitation and population control. The Plan suggested that this programme should, among others, make advice on family planning an integral part of government hospitals and public health agencies and called for establishing clinics, one for 50,000 population, in all big cities and major towns. For small towns and rural areas, the Plan proposed to establish clinics in association with primary health units. The Plan also proposed training in family planning to all medical and nursing students and availability of family planning services in all hospitals and an increasing number of dispensaries in due course.

The Third Five-year Development Plan (1961-66) emphasised that the greatest stress should be placed on the programme of family planning and that the objective of stabilising the growth of population over a reasonable period must be at the very centre of planned development. The emphasis during the Plan was on expanding the availability of family planning services, especially sterilisation services within the public health care delivery system.

The Fourth Five-year Development Plan (1969-74) signalled the domination of the demographic rationale of family planning over its health rationale. The Plan, for the first time, set up targets in terms of sterilisation and IUCD insertions and to widen the acceptance of oral and injectable contraceptives

in order to achieve the aim of reducing the birth rate to about 32 per thousand population by 1973-74 from the birth rate of 39 per thousand population that prevailed at that time. The Plan also targeted to increase the number of users of conventional contraceptives 3.24 million personsin 1969-70 and 10 million persons by 1973-74 with the ultimate aim of protecting 28 million couples and averting 18 million births through family planning by the year 1973-74. In order to give a push to planned family planning efforts, the Department of Family Planning was created within the Ministry of Health and Family Welfare at the national level. This was the beginning of the target approach that dominated the planning and implementation of planned family planning efforts in India for the next 35 years.

The Fifth Five-year Plan (1974-79) also gave topmost priority to family planning. The period 1974-79 was also a period of political turbulence in India. Emergency was clamped in 1975 and a major push was given to family planning, especially sterilisation, during 1975-77. This push brought in elements of coercion and force in planned family planning efforts. The defeat of the party in power in the 1977 general elections put planned family efforts on a back-burner. The new government that came into power even changed the name of the Department of Family Planning to the Department of Family Welfare and the name of the National Family Planning Programme to National Family Welfare Programme.

The Sixth Five-year Development Plan (1980-85) attempted to bring the planned family efforts at the centre stage of the development agenda of the country and aimed at the long-term demographic goal of reducing the net reproduction rate (NRR) to one by 1996 for the country as a whole and by 2001 in all the States from the NRR of 1.67 that prevailed at that time. As a result, the focus of the Department of Family Welfare was no longer confined to family planning alone. Health related issues such as reduction in infant, child and maternal mortality started getting a priority over family planning within the Department. Planned family planning. Planned efforts however continued to be based on the target driven approach.

The Seventh Five-year Plan (1985-90) targeted a couple protection rate of 42 per cent to bring down the birth rate to 29.1 per thousand population along

with targets in terms of reduction in the death rate, infant mortality rate and improvements in the coverage of child immunisation and ante-natal care. The Plan stipulated 31 million sterilisations, 21.25 million IUD insertions and 14.5 million conventional contraceptive users. There was however a definite shift in the focus of Department with the launch of Universal Immunisation Programme 1985.

Eighth Five-year Plan (1992-97) which aimed at reducing the birth rate from 29.9 per thousand in 1990 to 26 per thousand by 1997. The Plan stressed the need of a National Population Policy and suggested an inter-sectoral approach supported by political commitment and popular mass movement. During this Plan period, the target-based approach of planned family planning efforts was replaced by the community needs assessment approach. Moreover, increasing attention was accorded to child survival and safe motherhood with the launch of Child Survival and Safe Motherhood Programme. Family planning was just one of the many components of this programme.

During the Ninth Five-year Development Plan (1997-2002), the rationale for planned family planning efforts was confined to meeting the felt-needs of family planning of eligible couples. Planned family planning efforts were completely subsumed in the reproductive and child health efforts resulting in a substantial dilution of family planning efforts.

The Tenth Five-year Plan (2002-07) called for the integration of numerous vertical programmes for family planning and maternal and child health into integrated programme of health care for women and children; a shift from demographic targets to enabling couples to achieve their reproductive goals; and meeting all unmet needs of contraception to reduce unwanted pregnancies. The target regime of planned family planning efforts also staged a comeback in terms of centrally defined targets to community needs assessment. The National Rural Health Mission was launched during the Plan and the Department of Family Welfare was merged with the Department of Health.

The Eleventh Five-year Plan (2007-12) reiterated the goals and objectives of the National Rural Health Mission which also included reduction in total

fertility rate to the replacement level. However, at the policy level, the focus explicitly shifted towards universal access to health care rather than universal access to family planning. Planned family planning efforts were conceptualized within the framework of health care and were limited to voluntary fertility regulation only.

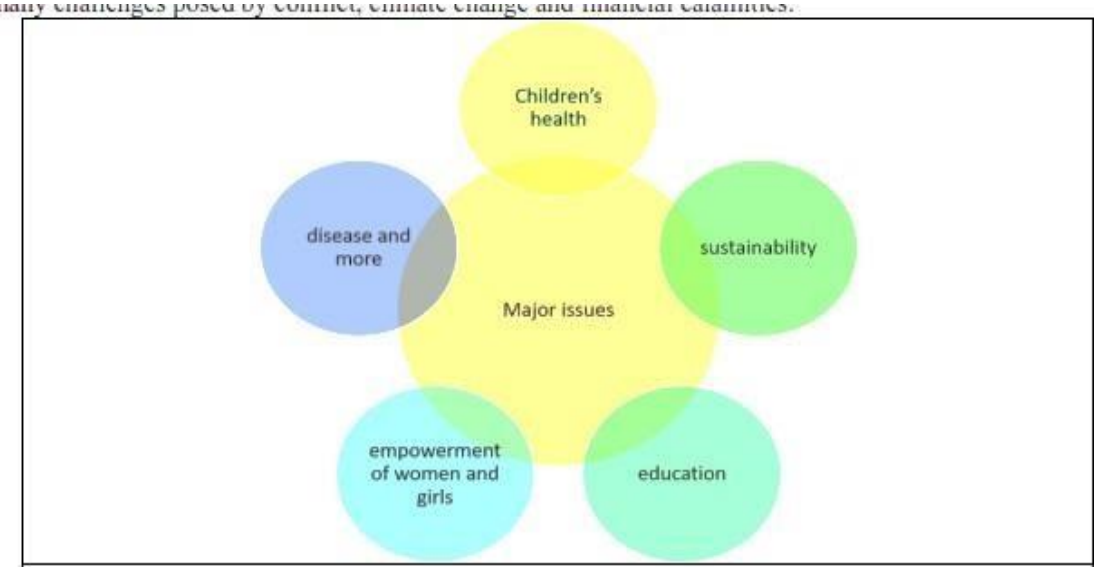
Twelfth Five-year Plan (2012-17) has recognised that the total fertility rate continues to be above the replacement level that was supposed to be achieved by the end of the Eleventh Five-year Plan and that the couple protection rate has stagnated. The papers stresses that the need for population stabilisation is urgent as widely differing rates of population growth in a democratic set-up could potentially generate regional conflicts. The approach paper recommends dedicated funding for family planning services in high fertility states, bundled with reproductive and child health care services under the National Rural Health Mission. It is also recommended that convergence should also be established with programmes that address the underlying factors of high fertility like child mortality, women's empowerment, early age of marriage etc. The approach paper however lacks a comprehensive approach towards population stabilisation. For example, the approach paper is silent about the challenge of population momentum in those State and Union Territories of the country which have either achieved or close to achieve the replacement fertility.

5.7. Millennium Development Goals (MDGs):

5.7.1. Introduction

The MDGs are not the first time that global promises have been made about eradicating or rapidly reducing human deprivation. Antecedents can be found stretching back to President Franklin D. Roosevelt's 'Four Freedoms' speech of January 1941 and to the Declaration of Human Rights of 1948 and its stipulation that 'Everyone has the right to a standard of living adequate for the health and wellbeing of himself and of his family, including food, clothing, housing and medical care…' (UN Declaration of Human Rights, Article 25). A common pattern of behaviour can be observed at many summits education, food, small islands, and drugs. The 1980s saw the stalling of global summitry

and goal-setting, and a dramatic change in the global intellectual environment. The UN's influence waned, while that of the IMF and World Bank increased as they imposed structural adjustment policies on the increasing numbers of poor countries coming to them for loans. The Bank and Fund imposed a recipe of liberalisation, privatisation and reduced government to 'get the prices right', leading to what many have seen as development's 'lost decade'. Towards the end of the 1980s, more and more evidence began to emerge that structural adjustment and the associated conditionality were not delivering on the promise of growth and prosperity and that the fiscal restraint they called for were damaging education, health and other essential services (Cornia et al, 1987; Mosley et al, 1995). In 2000, led by the United Nations, world leaders came together to set ambitious targets for reducing poverty and improving social and economic conditions around the globe by 2015. The Millennium Development Goals (MDGs) are a commitment to establish peace and a healthy global economy by focusing on major issues such as children's health, empowerment of women and girls, education, sustainability, disease and more. Progress toward achieving the eight MDGs has been impressive, despite the many challenges posed by conflict, climate change and financial calamities.



Major Issues focused by 8 MDGs

The choice of indicators for targets in MDG 8 was ostensibly justified by the UN on the basis of the same criteria as those for the other MDGs (UN, 2003). According to this source, five main criteria guided the selection of indicators,

namely, that they should:

Provide relevant and robust measures of progress towards the targets of the Millennium Development Goals.

- Be clear and straightforward to interpret and provide a basis for international comparison.
- Be broadly consistent with other global lists and avoid imposing an unnecessary burden.
- On country teams, Governments and other partners.
- Be based to the greatest extent possible on international standards, recommendations and best practices.
- Be constructed from well-established data sources, be quantifiable and be consistent to enable measurement over time.

Mass migration, often caused by violence and conflict, has led to massive displacement, instability, and large populations living in dangerously overcrowded refugee camps and informal settlements. Gender inequality remains widespread, as many young girls are deprived of education and forced into early marriages. Under the MDGs the world has made tremendous progress in reducing child mortality, but six million children still die each year from preventable causes (The United Nations Department of Economic and Social Affairs, 2015). Maternal mortality rates have come down in most countries, but not sufficiently to meet the MDG. Large numbers of people do not have access to affordable primary health care [see Tracking universal health coverage: First global monitoring report], and major efforts are needed to ensure universal access to basic infrastructure, including energy, water, sanitation, and transport. While a lot of progress has been made in increasing primary school enrolment in all countries, completion rates remain low, and far too many children do not complete a full cycle of education from early-childhood development through to secondary school completion. Approximately 800 million people remain chronically undernourished and do not have access to sufficient, safe, and nutritious food. Another billion or so face various kinds of micronutrient deficiencies. For these reasons the SDGs commit to ending extreme poverty in all its forms, including hunger, and call on all people to enjoy universal access to essential social services and basis

infrastructure by 2030. At the beginning of the new millennium, world leaders gathered at the United Nations to shape a broad vision to fight poverty in its many dimensions. That vision, which was translated into eight Millennium Development Goals (MDGs), has remained the overarching development framework for the world for the past 15 years. As we reach the end of the MDG period, the world community has reason to celebrate. Thanks to concerted global, regional, national and local efforts, the MDGs have saved the lives of millions and improved conditions for many more. The data and analysis presented in this report prove that, with targeted interventions, sound strategies, and adequate resources and political will, even the poorest countries can make dramatic and unprecedented progress.

The 8 MDGs

5.7.2. Goal and Achievement

Goal 1: Eradicate Extreme Poverty and Hunger:

- Extreme poverty has declined significantly over the last two decades. In 1990, nearly half of the population in the developing world lived on less than $1.25 a day; that proportion dropped to 14 per cent in 2015.
- Globally, the number of people living in extreme poverty has declined by more than half, falling from 1.9 billion in 1990 to 836 million in 2015. Most progress has occurred since 2000.
- The number of people in the working middle class living on more than

$4 a day—has almost tripled between 1991 and 2015. This group now makes up half the workforce in the developing regions, up from just 18 per cent in 1991.

- The proportion of undernourished people in the developing regions has fallen by almost half since 1990, from 23.3 per cent in 1990–1992 to 12.9 per cent in 2014–2016.

Goal 2: Achieve Universal Primary Education:

- The primary school net enrolment rate in the developing regions has reached 91 per cent in 2015, up from 83 per cent in 2000.
- The number of out-of-school children of primary school age worldwide has fallen by almost half, to an estimated 57 million in 2015, down from 100 million in 2000.
- Sub-Saharan Africa has had the best record of improvement in primary education of any region since the MDGs were established. The region achieved a 20-percentage point increase in the net enrolment rate from 2000 to 2015, compared to a gain of 8 percentage points between 1990 and 2000.
- The literacy rate among youth aged 15 to 24 has increased globally from 83 per cent to 91 per cent between 1990 and 2015. The gap between women and men has narrowed.

Goal 3: Promote Gender Equality and Empower Women:

- Many more girls are now in school compared to 15 years ago. The developing regions as a whole have achieved the target to eliminate gender disparity in primary, secondary and tertiary education.
- In Southern Asia, only 74 girls were enrolled in primary school for every 100 boys in 1990. Today, 103 girls are enrolled for every 100 boys.
- Women now make up 41 per cent of paid workers outside the agricultural sector, an increase from 35 per cent in 1990.
- Between 1991 and 2015, the proportion of women in vulnerable employment as a share of total female employment has declined 13 percentage points. In contrast, vulnerable employment among men fell by 9 percentage points.
- Women have gained ground in parliamentary representation in nearly

90 per cent of the 174 countries with data over the past 20 years. The average proportion of women in parliament has nearly doubled during the same period. Yet still only one in five members are women.

Goal 4: Reduce Child Mortality:

- The global under-five mortality rate has declined by more than half, dropping from 90 to 43 deaths per 1,000 live births between 1990 and 2015.
- Despite population growth in the developing regions, the number of deaths of children under five has declined from 12.7 million in 1990 to almost 6 million in 2015 globally.
- Since the early 1990s, the rate of reduction of under-five mortality has more than tripled globally.
- In Sub-Saharan Africa, the annual rate of reduction of under-five mortality was over five times faster during 2005–2013 than it was during 1990–1995.
- Measles vaccination helped prevent nearly 15.6 million deaths between 2000 and 2013. The number of globally reported measles cases declined by 67 per cent for the same period.
- About 84 per cent of children worldwide received at least one dose of measles containing vaccine in 2013, up from 73 per cent in 2000.

Goal 5: Improve Maternal Health:

- Since 1990, the maternal mortality ratio has declined by 45 per cent worldwide, and most of the reduction has occurred since 2000.
- In Southern Asia, the maternal mortality ratio declined by 64 per cent between 1990 and 2013, and in sub-Saharan Africa it fell by 49 per cent.
- More than 71 per cent of births were assisted by skilled health personnel globally in 2014, an increase from 59 per cent in 1990.
- In Northern Africa, the proportion of pregnant women who received four or more antenatal visits increased from 50 per cent to 89 percent between 1990 and 2014.
- Contraceptive prevalence among women aged 15 to 49, married or in a union, increased from 55 per cent in 1990 worldwide to 64 per cent in 2015.

Goal 6: Combat HIV/AIDS, Malaria and other Diseases:

- New HIV infections fell by approximately 40 per cent between 2000 and 2013, from an estimated 3.5 million cases to 2.1 million.
- By June 2014, 13.6 million people living with HIV were receiving antiretroviral therapy (ART) globally, an immense increase from just 800,000 in 2003. ART averted 7.6 million deaths from AIDS between 1995 and 2013.
- Over 6.2 million malaria deaths have been averted between 2000 and 2015, primarily of children under five years of age in sub-Saharan Africa. The global malaria incidence rate has fallen by an estimated 37 per cent and the mortality rate by 58 per cent.
- More than 900 million insecticide-treated mosquito nets were delivered to malaria-endemic countries in sub-Saharan Africa between 2004 and 2014.
- Between 2000 and 2013, tuberculosis prevention, diagnosis and treatment interventions saved an estimated 37 million lives. The tuberculosis mortality rate fell by 45 per cent and the prevalence rate by 41 per cent between 1990 and 2013.

Goal 7: Ensure Environmental Sustainability:

- Ozone-depleting substances have been virtually eliminated since 1990, and the ozone layer is expected to recover by the middle of this century.
- Terrestrial and marine protected areas in many regions have increased substantially since 1990. In Latin America and the Caribbean, coverage of terrestrial protected areas rose from 8.8 per cent to 23.4 per cent between 1990 and 2014.
- In 2015, 91 per cent of the global population is using an improved drinking water source, compared to 76 per cent in 1990.
- Of the 2.6 billion people who have gained access to improved drinking water since 1990, 1.9 billion gained access to piped drinking water on premises. Over half of the global population (58 per cent) now enjoys this higher level of service.
- Globally, 147 countries have met the drinking water target, 95 countries have met the sanitation target and 77 countries have met

both.

Goal 8: Develop a Global partnership for Development:

- Official development assistance from developed countries increased by 66 per cent in real terms between 2000 and 2014, reaching $135.2 billion.
- In 2014, Denmark, Luxembourg, Norway, Sweden and the United Kingdom continued to exceed the United Nations official development assistance target of 0.7 per cent of gross national income.
- In 2014, 79 per cent of imports from developing to developed countries were admitted duty free, up from 65 per cent in 2000.
- The proportion of external debt service to export revenue in developing countries fell from 12 per cent in 2000 to 3 per cent in 2013.
- As of 2015, 95 per cent of the world's population is covered by a mobile-cellular signal.
- The number of mobile-cellular subscriptions has grown almost tenfold in the last 15 years, from 738 million in 2000 to over 7 billion in 2015.
- Internet penetration has grown from just over 6 per cent of the world's population in 2000 to 43 per cent in 2015. As a result, 3.2 billion people are linked to a global network of content and applications.

5.8. Reproductive and Child Health Approach:

The Reproductive and Child Health (RCH) Programme was launched throughout the country on 15th October, 1997. This programme aims at achieving a status in which women will be able to regulate their fertility, women will be able to go through their pregnancy and child birth safely, the outcome of pregnancies will be successful and will lead to survival and wellbeing of the mother and the child. The couples will also be able to have their sexual relation free from fear of pregnancy and of contracting sexually transmitted diseases. The reproductive and child health surveys (RCH), 1-2 were conducted to generate district level data on utilization of services provided by the government health facilities and people's perception on quality of these services. About 50 percent districts were covered in the first phase in 1998 and the remaining 50 percent were covered in the second phase in 1999. The surveys were conducted by various regional agencies and

coordinated by the International Institute for Population Sciences (IIPS), Mumbai. Among other things, RCH surveys have produced data on the following indicators: girls marrying below age 18, births of order 3 and above, women of ages between 15-44 knowing all modern methods of family planning, married women using any modern method of family planning, married women having unmet need for family planning, women who receive antenatal care (ANC), women having institutional delivery, women having safe delivery, children receiving complete vaccination, women who reported knowledge of HIV/AIDS, women who had any symptoms of RTI/STI, men who reported knowledge of HIV/AIDS, men who had any symptoms of RTI/STI, and rural women who were visited by ANM during three months prior to survey. RCH report produced data on the above variables for states and union territories and districts. It also produced bi-variate tables linking the above variables to urban-rural residence, caste (SC/ST and others), education (illiterate of ages, 0-9 years and 10 and above) and types of houses (kachcha, semi-pucca and pucca).

Five Key Principles as the basis of RCH Programme:

- Moving away from traditional approach of numerical, method-specific, contraceptive targets and incentives to a client-centered system of performance goals and measures.
- Expanding the use of male and reversible contraceptive methods and broadening the choice of contraceptives.
- Improving the bredth, availability and quality of services and involving communities for managing the public sector programmes.
- Strengthening the role of the private sector in the programme.
- Assuming adequate funding for the current programme and for the expansion, which is implicit in adopting the reproductive health approach.

5.9. National Population Policy 2000:

India was the first developing country to adopt a population policy and to launch a nationwide family planning programme in 1952. The main objective of the population policy is to ensure that there is reasonable gap between the fall of death and birth rates. Population policy refers to the efforts made by

any Government to control and change the population structure. The National Population Policy (NPP)-2000 recently adopted by the Government of India states that the long-term objective is to achieve a stable population by 2045, at a level consistent with the requirements of sustainable development, and environment protection. The National Population Policy (NPP)-2011 stated that as per the latest World Population Prospects released by United Nations (revision 2015, the estimated population of India will be 1419 million approximately whereas China's population will be approximately 1409 million, by 2022. In spite of the perceptible decline in Total Fertility Rate (TFR) from 3.6 in 1991 to 2.3 in 2013, India is yet to achieve replacement level of 2.1. Twenty-four states/UTs have already achieved replacement level of TFR by 2013, while states like UP and Bihar with large population base still have TFR of 3.1 and 3.4 respectively. The other states like Jharkhand (TFR 2.7), Rajasthan (TFR 2.8), Madhya Pradesh (TFR 2.9), and Chhattisgarh (TFR 2.6) continue to have higher levels of fertility and contribute to the growth of population. The National Population Policy 2000, is uniformly applicable to the whole country. In pursuance of this policy, Government has taken a number of measures under Family Planning Programme and as a result, Population Growth Rate in India has reduced substantially which is evident from the following: - i. The percentage decadal growth rate of the country has declined significantly from 21.5% for the period 1991-2001 to 17.7% during 2001-2011. ii. Total Fertility Rate (TFR) was 3.2 at the time when National Population Policy, 2000 was adopted and the same has declined to 2.3 as per Sample registration Survey (SRS) 2013 conducted by the Registrar General of India. As the existing NPP-2000 is uniformly applicable to all irrespective of religions and communities etc., therefore no proposal is under consideration of the Government to formulate new uniform population policy. The steps taken by the Government under various measures/programme are given below: - Measures taken by the Government of India to Control the Population Growth are as below:

A. On-going interventions:

i. More emphasis on Spacing methods like IUCD.

ii. Availability of Fixed Day Static Services at all facilities.

iii. A rational human resource development plan is in place for provision of IUCD, minilap and NSV to empower the facilities (DH, CHC, PHC, SHC) with at least one provider each for each of the services and Sub Centres with ANMs trained in IUD insertion.

iv. Quality care in Family Planning services by establishing Quality Assurance Committees at state and district levels.

v. Improving contraceptives supply management up to peripheral facilities.

vi. Demand generation activities in the form of display of posters, billboards and other audio and video materials in the various facilities.

vii. National Family Planning Indemnity Scheme' (NFPIS) under which clients are insured in the eventualities of deaths, complications and failures following sterilization and the providers/ accredited institutions are indemnified against litigations in those eventualities.

viii. Compensation scheme for sterilization acceptors - under the scheme MoHFW provides compensation for loss of wages to the beneficiary and also to the service provider (& team) for conducting sterilisations.

ix. Increasing male participation and promotion of Non-Scalpel Vasectomy.

x. Emphasis on Miniap Tubectomy services because of its logistical simplicity and requirement of only MBBS doctors and not post graduate gynecologists/surgeons.

xi. Accreditation of more private/NGO facilities to increase the provider base for family planning services under PPP.

xii. Strong political will and advocacy at the highest level, especially, in States with high fertility rates.

B. Interventions under Family Planning Programme:

i. Scheme for Home delivery of contraceptives by ASHAs at doorstep of beneficiaries: The govt. has launched a scheme to utilize the services of ASHA to deliver contraceptives at the doorstep of beneficiaries.

ii. Scheme for ASHAs to ensure spacing in births: The scheme is operational from 16th May, 2012, under this scheme, services of ASHAs to be utilized for counselling newly married couples to ensure delay of 2 years in birth after

marriage and couples with 1 child to have spacing of 3 years after the birth of 1stchild. ASHAs are to be paid the following incentives under the scheme: -
a. Rs. 500/- to ASHA for ensuring spacing of 2 years after marriage. b. Rs. 500/- to ASHA for ensuring spacing of 3 years after the birth of 1st child. c. Rs. 1000/- in case the couple opts for a permanent limiting method up to 2 children only. The scheme is being implemented in 18 States of the country (8 EAG, 8 NE Gujarat and Haryana).

iii. Boost to spacing methods by introduction of new method PPIUCD (Post-Partum Intra Uterine Contraceptives Device.

iv. Introduction of the new device Cu IUCD 375, which is effective for 5 years.

v. Emphasis on Postpartum Family Planning (PPFP) services with introduction of PPIUCD and promotion of minilap as the main mode of providing sterilisation in the form of post-partum sterilisation to capitalise on the huge cases coming in for institutional delivery under JSY. Assured delivery of family planning services for both IUCD and sterilisation.

vi. Compensation for sterilisation acceptors has been enhanced for 11 High Focus States ith high TFR.

vii. Compensation scheme for PPIUCD under which the service provider as well as the ASHAs who escorts the clients to the health facility for facilitating the IUCD insertion are compensated.

viii. Scheme for provision of pregnancy testing kits at the sub-centres as well as in the drug kit of the ASHAs for use in the communities to facilitate the early detection and decision making for the outcome of pregnancy.

ix. RMNCH Counsellors (Reproductive Maternal New Born and Child Health) availability at the high case facilities to ensure counselling of the clients visiting the facilities.

x. Celebration of World Population Day 11th July & Fortnight: The event is observed over a month-long period, split into fortnight of mobilization/sensitization followed by a fortnight of assured family planning service delivery and has been made a mandatory activity from 2012- 13 and starts from 27th June each year.

xi. FP 2020- Family Planning Division is working on the national and state wise action plans so as to achieve FP 2020 goals. The key commitments of FP

2020 are as under: a. Increasing financial commitment on Family Planning whereby India commits an allocation of 2 billion USD from 2012 to 2020. b. Ensuring access to family planning services to 48 million (4.8 crore) additional women by 2020 (40% of the total FP 2020 goal). c. Sustaining the coverage of 100 million (10 crore) women currently using contraceptives.

C. Strategies to control population growth:

Reducing the unmet need by an improved access to voluntary family planning services, supplies and information. In addition to above, Jansankhya Sthirata Kosh/National Population Stabilization Fund has adopted the following strategies as a population control measure: -

i. Prerna Strategy: - JSK has launched this strategy for helping to push up the age of marriage of girls and delay in first child and spacing in second child the birth of children in the interest of health of young mothers and infants. The couple who adopts this strategy awarded suitably. This helps to change the mindsets of the community.

ii. Santushti Strategy: - Under this strategy, Jansankhya Sthirata Kosh, invites private sector gynaecologists and vasectomy surgeons to conduct sterilization operations in Public Private Partnership mode. The private hospitals/nursing home who achieved target to 10 or more are suitably awarded as per strategy.

Check Your Progress:

Q.No	Short Answer Question	LOCF Mapping		
1.	Define fertility and explain the basic measures of fertility.	K2	CO1	PO1
2.	Explain the proximate determinants of fertility.	K2	CO2	PO2
3.	Define infant mortality rate, child mortality rate and maternal mortality ratio.	K1	CO1	PO3
4.	State the sources of mortality data and mention their limitations.	K3	CO2	PO3
5.	Distinguish between internal and international migration with examples.	K4	CO3	PO2
Q.No	**Long Answer Questions**	**LOCF Mapping**		
1.	Discuss the physiological, social and cultural factors affecting fertility.	K4	CO2	PO2
2.	Examine the importance of mortality studies and analyze the measures, levels and trends of mortality including infant and maternal mortality.	K4	CO2	PO3
3.	Evaluate the sources of fertility and mortality data and assess their reliability.	K5	CO4	PO3
4.	Analyze the causes, consequences and measurement of migration using direct and indirect methods.	K4	CO3	PO4
5.	Explain Everett Lee's conceptual framework of migration and discuss the demographic impact of the global HIV/AIDS epidemic on mortality trends.	K5	CO3	PO4

Text Books:

1. Shrivastava O.S. (2007), Demography and Population Studies,Quality Publishing Company (ajay)
2. Jain R.K. (2014), Textbook of Population Studies,Astha Publishers and Distributors

References:

1. BhendeAsha, A and Tara Kanitkar, (2012) Principles of Population studies, Mumbai Himalaya Publishing House.
2. Bogue, Donald J (1969), Principles of Demography, New York: John Wiley and Sons.
3. BaskarD.Misra. (1980), An introduction to the Study of Population, Madras: South Asian Publishers Pvt.Ltd.

Web Resources:

1. https://censusindia.gov.in/census.website/
2. https://www.taylorfrancis.com/series/international-population-studies/ashser1353
3. https://data.worldbank.org/indicator/SP.POP.GROW

Course Outcomes (Cos):

Upon Completion of this course, the students will be able to

No.	Course Outcomes	K-Levels
CO1	To define and explain the basic concepts of population studies.	K1,K2,
CO2	To outline construct and conclude the population growth and distribution.	K2,K3,K5,
CO3	To organize and interpret the various population structure.	K3,K4,
CO4	To examine and criticise the various population dynamics.	K4,K5,
CO5	To label, and outline the various population policy.	K1,K5,

K1 – Knowledge, K2 - Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create

CO-PO Mapping (Course Articulation Matrix)

CO /PO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)

Assign the value

1 – Low, 2 – Medium, 3 – High,0 – No Correlation