

MAE-005

POPULATION AND DEVELOPMENT EDUCATION

HOW TO CONTROL?

Per	Population	Addition
	World	India
Minute	250	60
Hour	15000	3600
Day	360000	86400
Month	10800000	2592000
Year	131400000	31536000 (One and a half Australia)
Decade	1314000000 (One India)	315360000 (15 Australias)

THINK OF IT!

Block

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COURSE MAE-005: POPULATION AND DEVELOPMENT EDUCATION

Block 1 Population and Development Education: An Overview

- Unit 1 Population Education: Concept and Development**
 - Unit 2 Demographic Concepts**
 - Unit 3 Determinants of Population Change**
 - Unit 4 Consequences of Population Change**
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-

Block 2 Family Life Education and Quality of Life

- Unit 6 Family Life**
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-

Block 3 Population Control Measures: Individual, National and International

- Unit 10 Individual Measures of Population Control**
 - Unit 11 National Measures of Population Control**
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-

COURSE MAE 005: POPULATION AND DEVELOPMENT EDUCATION

Introduction to the Course

Adult education helps in promoting development and in improving the quality of life of people. Education about population matters is an important component of adult education. There is close relationship between population and development. An adult educator is required to play a significant role in bringing about changes in the knowledge, attitudes and behavior/practices of people in respect of population matters and issues. Hence, an adult educator needs to understand the inter-relationship between and among population, development, welfare and standard of living/quality of life of the individuals, the communities, the nation and the world at large. This course presents different concepts, aspects, factors, issues, etc., related to population as well as its distribution, change, and consequences on various aspects of life and development, plus measures of controlling population change. It is divided into 3 Blocks, together consisting of 12 units.

Block 1 “Population and Development Education: An Overview” presents an overview of population and development education. It touches upon the concept, objectives, goals, and different aspects of population education. It highlights demography, determinants of population change and consequences of population change as major components of population education. It explains relevant terms/concepts that are often misconceived as synonymous to population education and draws out the similarities and differences between them so as to promote their vogue use and harmony in academic discourse as well as action on population matters. This Block contains five units.

Block 2 is titled **“Family Life Education and Quality of Life”**. It deals with various aspects of family life, adolescence education and sex education and their significance in improving the quality of life of the individuals and families. It also highlights the significance of reproductive rights and reproductive health in the context of mother and child care. It discusses different aspects of reproductive health and hygiene and how the same get affected with RTIs, STIs/STDs including HIV/AIDS. It deals with different aspects of family welfare with focus on nutrition, health and family planning. It also emphasises the need for promotion of gender equity and equality in the matters of family welfare. This Block consists of 4 units.

Block 3 “Population Control Measures: Individual, National and International” deals with different measures of population control – individual (pre-marriage and post-marriage measures), national (population policies and programmes) and international (role of international agencies in funding, consultancy, training and information dissemination). It has three Units.

BLOCK 1 POPULATION AND DEVELOPMENT

EDUCATION: AN OVERVIEW

Introduction to the Block

This Block presents an overview of population and development education. It touches upon the concept, development, aspects and scope of population education with emphasis on demography, determinants of population change, and consequences of population change. It explains relevant terms/concepts that are often misconceived as synonymous to population education and draws out the similarities and differences between them to promote their vogue application and harmony in academic discourse, information dissemination and action on various population matters. This Block contains five units.

Unit 1 “Population Education: Concept and Development” discusses population education with special reference to its concept, need, significance, features, aspects, scope and development. It explains as to how the decisions of individuals, families and communities regarding population matters will have implications for development at micro and macro levels and overall quality of life of people. It also emphasises that the national level decisions such as those related to population change (policies and programmes) – either for increasing population (pro-natalist) or decreasing it (anti-natalist) – will also influence the nature, focus and aspects of population education. Further, it touches upon certain related concepts that will be helpful in better understanding of the discussions in other units that follow.

Unit 2 deals with “*Demographic Concepts*”. It explains the concept and significance of the study of demography. It covers the nature, aspects and scope of demography and introduces various terms/concepts including the measures of population distribution and change that are relevant to the study of demography. It discusses various characteristics of population like age structure, sex structure, age and sex structure taken together, population pyramids, dependency ratio, urban-rural differentials, and their implications for the study of population. Further, it highlights the inter-relationship between demography and population studies and their relationship with other disciplines as well. It also touches upon various national and international sources of demographic data.

Unit 3 titled “*Determinants of Population Change*” provides comprehensive picture of the determinants of (or factors influencing) population change with emphasis on births, deaths, migration, environmental and other related factors. It discusses various measures/indices of population change such as proportion, rates, ratios and per cent. It presents possible sources of data related to these determinants and their differentials based on various criteria. It covers different types of migration as well as the causes, consequences and constraints of migration.

Unit 4 “Consequences of Population Change” presents broader perspective of how, when and to what extent the changes in the population affect the development at local, national and international levels. It presents different views, schools of thought or the theories of population change and the consequences or effects of population change on important aspects of development such as socio-economic development, environment, education and social welfare measures.

Unit 5 is on ***“Population and Development Education: Relevant Terms, Misconceptions and Clarifications”***. It attempts to highlight the relationships, similarities and differences between and among certain terms/concepts such as demography, population dynamics, population studies, family planning, family planning education, family welfare, sex education, family life education, and population education which are related to population and development education. It presents a comparative and holistic perspective of these terms/concepts in more precise manner which helps in dispelling misconceptions about the same and in promoting their vogue use/application in the academic discourses on population and development education and greater harmony in addressing the serious issues of concern to all.

UNIT 1 POPULATION EDUCATION: CONCEPT AND DEVELOPMENT

Structure

- 1.0 Introduction
- 1.1 Objectives
- 1.2 Population Education: Concept and Significance
 - 1.2.1 Concept and Features of Population Education
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 - 1.2.1.2 Definition of Population Education
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 - 1.2.2 Need and Significance of Population Education
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- 1.3 Population Education: Objectives and Scope
 - 1.3.1 Objectives and Goals of Population Education
 - 1.3.1.1 Objectives of Population Education
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- 1.6 Answers to 'Check Your Progress' Questions
- 1.7 References

1.0 INTRODUCTION

We are aware that there is intricate relationship between population and development, both at micro and macro levels. Every individual, family, community and nation desires to achieve better standard of living. But, an undisputed fact is that any increase or decrease in population will have its relative impact on development in the given context – family, community, nation and the world. As you have studied in Course MAE-004, the concept of development is very comprehensive, and understanding of the relationship between population and development becomes highly complex given the qualitative and quantitative variables of development. In this context, it is appropriate for you to revisit MAE 004 “Extension Education and Development”, in particular the concept of development and the factors that influence it.

Decisions of individuals, families, communities and the nations regarding population matters will have their implications for development at micro and macro levels and overall quality of life of people. At the national level, decisions related to population change – increasing or decreasing it – are a matter of

population policy, which may be pro-natalist or anti-natalist. However, the emphases in these policies and programmes vary from nation to nation based on the political, social and cultural, environmental and other aspects. And, population education in many countries has emerged in response to population problems and issues, and in particular as part of their policies. It is an indirect means to attain national demographic goals by influencing the people's knowledge, attitudes and practices or behaviour towards such problems and issues.

1.1 OBJECTIVES

In this Unit we, therefore, attempt to highlight the concept, significance, scope and development of population education. After going through this Unit, we expect you to be able to:

- Define the concept of population education;
- Explain the need and significance of population education;
- State the goals and objectives of population education;
- Discuss the aspects and scope of population education; and
- Describe the origin, growth and development of population (and development) education including its present status.

1.2 POPULATION EDUCATION: CONCEPT AND SIGNIFICANCE

World population which was 300,000,000 in 1 AD took 1700 years to increase (double itself) to 640,000,000, but it took only 150 years to double itself again to reach 1,265,000,000 by 1850, and after that only 100 years to double itself to touch 2,516,000,000 figure by 1950 (http://en.wikipedia.org/wiki/World_population_estimates). At this stage (i.e. in 1950s), such unprecedented phenomenal growth of world population has received global attention.

When the population changes began to affect the development and quality of life of people at individual, familial, community, national and international level, debate started on problems and issues of population followed by efforts to control the same. That was the beginning of the efforts to control population both at global and national levels. Efforts to promote direct methods of population control such as adoption of family planning by people have not yielded adequate results due to lack of understanding and motivation at individual and familial levels to adopt family planning methods and techniques. Thus, population education has been identified as one of the effective interventionist strategies to influence adoption of family planning by the eligible couple and other age-groups of population through imparting necessary knowledge, attitudes, skills and practices in respect of population matters. Yet, by 1995, once again the figure has more than doubled (reached 5,760,000,000) in just 45 years. Further, it crossed 7 billion mark on 31 October 2011.

As a result, population education has acquired increasing global attention in view of its place in the overall development of the individuals, families, communities, nations and the world. It is, therefore, essential for us to understand the concept and significance of population education at national and international levels.

1.2.1 Concept and Features of Population Education

Population problem is a man-made problem and hence solution to it also lies in human mind and actions only. The solution becomes sound and possible by educating the people about the population issues and problems. So, population education, in simplest terms, is the education on or related to population matters. But, the term population matters is very wide and includes many things, and delimiting these matters is not an easy task. It refers to the conceptual understanding of both 'population' and 'education' and encompasses all that is related to population matters – situation, issues, problems, etc.

Population, in general, refers to the total number of people inhabiting in a specified geographical area, be it a village, taluk, district, country or the world as a whole; or belonging to any particular race, religion, sex, class, caste, group, community, and so on. *Education* is the process that imparts, improves or changes the knowledge, information, understanding, attitudes, skills, abilities, practices and so on of the people for their effective performance in life as an individual and as a member of the family, society, nation and the world. Having considered the two terms, 'population' and 'education' as above, deciding on what sort of education can be imparted to which section of population, on what population matters and to what extent poses a serious challenge to population educators and educationists.

Broadly speaking, the population matters include:

- a) the size, structure, distribution, density, growth, etc, of population;
- b) the trends in population change at different levels – local, state, national and global as well as the factors that determine or influence these changes;
- c) the consequences of population change on different aspects of human life – social, religious, economic, political, cultural, etc, and also on environment and ecological balance;
- d) the human reproductive system, the process of conception, the progress of pregnancy and delivery, reproductive health and rights, etc; and
- e) various measures of population control, viz. i) individual – different temporary and permanent methods and techniques of family planning; ii) national – national population policy and programmes; and iii) international – agencies engaged in providing different types of support such as financial, material and human to various population control efforts in different countries.

In fact, it clearly covers any or all matters related to population that influence(s) development, standard of living and quality of life. Thus, population matters are comprehensive and all-embracing and together form the content of population education that enables people or the target groups to take rational and responsible decisions in respect of these matters.

1.2.1.1 Nature and Meaning of Population Education

Population matters are not constant and keep changing. Accordingly, the concept of population education has gradually evolved by adapting itself to the changing needs, requirements and emerging issues and concerns. While promotion of the observance of the small family norm has been the basic concern of population

education, its approach has been to present to the students (the target groups) the multi-faceted aspects of population situation at micro and macro levels with clear-cut emphasis on cause and effect relationship between different aspects and factors of population.

Conceptualisation of population education is, of course, a question of emphasis, rooted in complex socio-cultural and historical differences. Since the population situation is not expected to remain static, the concept of population education also cannot be expected to remain unchanged. "Although some countries do not openly accept any kind of sex education or family planning education in schools, they do realise the need for including some content related to these areas in the population education curriculum. A number of surveys conducted in some countries in Asia vouch to this change in the perception of people and their acceptance to include sex education related contents in the framework of population education" (Sharma, 1991, p.10). In many countries of Asia and the Pacific region there is cultural and religious resistance to including any kind of family planning or sex education component in school curricula. Sex education is still considered 'untouchable' in many countries in Asia, although some countries such as the Republic of Korea and the Philippines have included family planning and sexuality as a part of population education curriculum in schools. In Fiji, sex education is a major component of family-life education. It should, however, be noted that in Latin America and to a lesser degree in francophone Africa, 'sex education' may be the most accepted term for what has been called 'population education' in Asia (Ibid, pp.9-10).

Population change and development are interdependent. Population change at any level – family, community or nation – is the result of the decisions based on certain considerations, which they consider rational in the given situation/context. Whether the decisions are rational or not depends upon their understanding of all the relevant matters at that level. This is what precisely means population education – knowledge, understanding, attitudes and practices/behaviours of people in respect of their population situation – which is intended to lead to such population change that influences their quality of life, among others, at present and in the future as well. It, thus, has bearing on population matters at micro and macro levels both at present and in the future.

Population education, therefore, means and includes all educational efforts aimed at presenting to people the population situation, its determinants, consequences and controlling measures in scientific manner with a view to developing among them the rational and responsible decision-making ability in respect of population regulation for better quality of life at present and in future for themselves and for their off-spring.

1.2.1.2 Definition of Population Education

Population education, being innovative programme of education, needs to be clearly understood. Given the cultural diversities and different target groups to be educated on population matters, it may be difficult to give one definition of population education which can be universally accepted. Further, definitions may be directive or non-directive. Also, the definitions based on directive approach differ in their specific behavioural outcomes such as promotion of acceptance of a small family norm, contraceptives, etc. For instance, the assertion that 'a small family is a happy family' is not universally true for there are many instances of

bigger families being happy families. The pursuit of such an objective may have psychological implications for children who come from large families' (Sharma, 1991, p.11). While the directive definitions of population education may be controversial, non-directive definitions will be non-controversial.

In India, the first crucial attempts at defining population education and developing its conceptual framework with a scheme of contents were made in the National Seminar on Population Education held at Bombay in 1969. It was regarded as 'a motivational force for creating right attitudes to family size and the need for family planning methods' (Rao, 1969). In the same seminar, Chandrasekhar (1969) regarded population education as 'the statistics, economics and sociology of the growth of population, its distribution and relation to the standard of living, and its ultimate economic and social consequences'.

UNESCO made an attempt to define population education in internationally acceptable manner: "Population education is an educational programme which provides for a study of the population situation in the family, community, nation and the world, with the purpose of developing in the students rational and responsible attitude and behaviour towards that situation" (UNESCO, 1971, p.13). From this definition, one can understand two important attributes of population education. *Firstly*, it is an educational programme that provides for a study of population situation at different levels. *Secondly*, it is intended to develop rational and responsible attitude and behaviour towards that situation. The words 'rational' and 'responsible' are quite relative and the bases/criteria to establish a decision on a population matter as rational and responsible vary widely depending upon the context at a given level. Thus, the term 'population situation' is not amenable for any precise definition. This is so because, what is rational and responsible to one – be it individual, society or nation – may be absolutely irrational and irresponsible to others. However, reflecting on all such details in any definition will be extremely difficult task, as there cannot be any hard and fast rule in this regard. Nevertheless, the above definition of population education is accepted by the majority of countries in the world.

However, individual experts do differ and offer their own definitions. Massialas (1972, p.44) defined population education as "the teaching and learning of reliable knowledge about the ways of inquiring into the nature of human population and the natural and human consequences of population change". This definition stresses the 'reliable knowledge of ways of inquiring' thus intends to promote skills and abilities of the target group related to researching into population matters to enable them to learn on their own about these matters.

Lane and Wileman (1974, p.10) defined population education as "the study of human population and how it affects and is affected by several aspects of life: physical, social, cultural, political, economic and ecological". This definition attempts to include the study of the repercussions of population change on several aspects of life and vice versa.

Viederman (1974, p.319) defines population education as an educational process which assists persons: a) to learn the probable causes and consequences of population phenomena for themselves and for their communities (including the world); b) to define for themselves and for their communities the nature of the problems associated with population processes and characteristics; and c) to assess

the possible effective means by which society as a whole and the person as an individual can respond to and influence these processes in order to enhance the quality of life now and in the future.

Thus, the conceptions and definitions are, on the whole, shrouded with epistemological difficulties. Several persons and institutions have conceived and defined population education in different ways depending upon their knowledge, own perceptions and points of view. Some defined it in terms of its aims and objectives or in terms of the behavioural outcomes expected of population education, while some others defined it by giving a list of its contents. They conceived it as synonymous to family planning/birth control or contraceptive education or family life education or population studies or demography. While some definitions are directive aimed at achieving the acceptance of small family norm, some others are non-directive aimed at the development of rational and responsible attitudes and behaviour towards family size and other population matters (Lakshmi Reddy, 1993, pp.9-10). We can thus notice that the emphasis in different definitions is on bringing changes in the knowledge, understanding, attitudes and behaviour or practices/response of people in respect of population situation and ways and means of its regulation or control for better quality of life.

1.2.1.3 Distinguishing Attributes of Population Education

Lakshmi Reddy (1994, p.47) presents the following as distinguishing attributes / features of population education.

- i) It is an **educational programme** designed to make learners understand the inter-relationship among population situation, change, development and aspects of quality of human life.
- ii) Its **ultimate goal** is to make learners contribute to the improvement of the quality of human life, now and in some future time.
- iii) It is **population problem-centred**, hence lends itself to discovery and inquiry learning processes. If the population related problems are non-existent then the question of population education does not arise at all.
- iv) It is a **value-laden subject**, hence more open to the use of values-clarification approach to learning, i.e. to pose realistic alternatives, to examine consequences of each alternative and to enable learners to make sound decisions for action on population issues. Population education, thus, is more sensitive and warrants skilful handling of it in multi-lingual, multi-religious, and multi-racial societies or nations.
- v) It is **multi-disciplinary** and derives its content from demography, population studies, biology, statistics, sociology, psychology, economics and other disciplines.

1.2.2 Need and Significance of Population Education

Having studied the concept of population education, we will now attempt to highlight the need and significance of population education.

1.2.2.1 Need

As mentioned elsewhere above, world population which was 300,000,000 in 1 AD took 1700 years to double itself, for its further doubling it took only 150 years (by 1850), for the next doubling only 100 years (by 1950), and after that (by 1995) only 45 years to double itself to reach the figure of 5,760,000,000. It is further estimated that it is likely to cross 9,352,000,000 by 2050.

China is the world's most populous country, with about 1.34 billion people in 2010. It's closest rival, India, has 1.21 billion people but is expected to have more people than China by the year 2030 as a result of having a less successful family planning policy than China. Both, China and India together account for a third of the world's population (<http://factsanddetails.com/china.php?itemid=129&catid=4&subcatid=15>). India is estimated to increase its population by about 18 million every year -- the size of Australia. While India alone is adding one Australia to it every year, the world population is likely to add one India or China to its population every decade. There is thus pressing need to spread population education in the countries like India and China and all developing countries in particular and the world in general, which suffer from the problems of ever increasing population.

The human beings, by contributing to rapid growth of their population, are endangering their individual, familial, social and national well-being. It is thus a man-made problem and effective solution should, therefore, also evolve from his rational thinking and action – rational mind and behaviour. That is possible mainly through educating people about their role in respect of population problems and issues – population education.

1.2.2.2 Significance

In the light of the above discussion, the significance of population education is explained below.

- 1) Many developing countries have started Family Planning programmes in 1950's and 1960's to curb their population growth rates. But, these programmes were aimed at only the population in the reproductive age group (15-44 years). Population below 14 years of age which ranges between 35-60 percent of population in many countries are left out from the purview of family planning education. This group that constitutes the adult population in the coming years (future) is a potent source of fertility. Therefore, it is the cultivation of desirable attitudes among this group of youngsters towards population matters that can provide potential and viable solution to the continuing problem. Further, the need to catch them young is thus obvious and, hence, population education becomes more relevant as an important instrument to develop in them rational attitudes and responsible behaviour towards population problems.
- 2) Like education, population education is a life-long process; it cannot be considered as co-terminus with formal schooling. To face different population problems arising from time to time, population education becomes essential at all other levels and forms of education such as non-formal education. Hence, population education has its significance at all levels of education through all forms of education.

- 3) Increasing population will continue to affect the quality of life of people leading in general to deficiency of food and inadequate facilities for education and health, among others. Further, the other social problems such as crime, violence, anti-social activities, juvenile delinquency, terrorism, etc., and environmental problems such as pollution, global warming, ecological imbalance would also increase. Population education only can provide lasting solutions to all such problems.
- 4) Population education being an educational programme is capable of influencing the knowledge, skills, attitudes and practices of people in respect of population matters. It has been shown by many investigations that knowledge influences attitudes and attitudes in turn influence practices. Population education, therefore, becomes a pre-condition for desirable practices in respect of population matters.
- 5) Every country in the world strives to increase the quality of life of its people. Over population in any country would certainly have adverse impact on the quality of life of people. Hence, either to increase the quality of life or to maintain the existing quality of life, the population must not be allowed to grow beyond its resources and, therefore, its control assumes significance. As one of the strategies, every nation is involved in educating its people in matters pertaining to population with the purpose of enabling them to take rational decisions and implement them to reduce the growth rates with a view to promote quality of life.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under "Answers to 'Check Your Progress' Questions".

- 1) Define population education.

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- 2) What are the distinguishing attributes of population education?

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3) Explain the need and significance of population education

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4) What are population matters that form the broad contents of population education?

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1.3 POPULATION EDUCATION: OBJECTIVES AND SCOPE

In this section, we will focus on the objectives, goals and scope of population education.

1.3.1 Objectives and Goals Population Education

We know that the goals are broad and quite general in nature and are meant to be realised in the long term, while the objectives are narrow, precise, specific and sought to be achieved in the short term. The goals are general intentions which are abstract and intangible, while the objectives are concrete and tangible. The goals can't be validated as such while the objectives can be validated. With this clarity on the differences between goals and objectives we will now look at the objectives of population education.

1.3.1.1 Objectives of Population Education

The first 'United Nations Population Conference' held in 1954 in Rome had drawn global attention towards population problems. Subsequently, different countries began their efforts in the form of population policies and programmes, which later have been revised time and again in tune with the national and international developments. Of course, India is the first country to have official population policy during the first Five Year Plan (1951-56) itself – when National Family Planning Programme (NFPP) was launched by focussing on 'clinical approach'. But, the beginning of population education in India can be traced to the third Five Year Plan (1961-66) when NFPP was given extension-orientation with 'cafeteria approach' to family planning. Thus, population education has

emerged as an indirect means to strengthen direct intervention strategies and approaches aimed at attaining the national demographic goals.

“UNESCO’s General Conference declared in 1968 that the purpose of UNESCO’s activities in the field of population should be to promote a better understanding of the serious responsibilities which population growth imposes on individuals, nations and the whole international community. In 1970, it authorised the Director-General to assist Member-States, on request, in the elaboration of population and family planning policies; and in 1972 it recommended that the Director-General promote, by means of education and information, a clearer insight among the public into the nature, causes and consequences of demographic trends. The General Conference of UNESCO at its seventeenth session adopted resolution I.221 authorising the Director-General to pursue and undertake activities designed inter-alia for the promotion of population education” (Sharma, 1991, p.8). Thus, time and again, the focus of population activities and education has been changing around certain core contents.

Nevertheless, in view of different socio-cultural backgrounds and population policies of different countries, the specific objectives of population education may be different. In India, the following objectives have been decided at a workshop organised by NCERT (1971a, pp.9-10) which stand as the general objectives of the country even today:

- i) to develop an understanding of some demographic concepts and processes;
- ii) to develop among the younger generation an understanding of the most important phenomenon of the modern world viz., rapid growth of population and its causes;
- iii) to develop an understanding of the influence of population trends on the various aspects of human life – social, cultural, political and economic;
- iv) to develop an understanding of the close interaction of population growth and the developmental process with particular reference to development programmes for raising the standard of living of people;
- v) to develop an understanding of the evil effects of over population on the environment and the concomitant dangers from pollution;
- vi) to develop an understanding of scientific and medical advancement enabling to get an increasing control over famines, diseases and ultimately death and the imbalance thus created between death rate and birth rate;
- vii) to develop an understanding of biological factors and phenomenon of reproduction which are responsible for continuance of the species;
- viii) to develop an appreciation of: a) the small family norm as proper and desirable; b) the relation between population size and the quality of life; and c) the fact that family size is a matter of deliberate choice and human regulation rather than of accident or forces beyond human control;
- ix) to develop an attitude of responsibility and mutual help and cooperation in all aspects of personal and family living;
- x) to develop an appreciation of the relationship between the preservation of the health of the mother, the welfare of the children and the small size of the family;

- xi) to develop an appreciation of the fact that the actions of each individual member of the society affects others, and personal and national decisions concerning family size and population have long range consequences for the whole world;
- xii) to develop an awareness of population policies and programmes of the country; and
- xiii) to provide students with a basic demographic vocabulary so that they are able to read and interpret demographic material with some understanding.

“The main objective of population education should be to enable the students to understand that family size is controllable, that population limitation can facilitate the development of a higher quality of life in the nation, and that a small family size can contribute materially to the quality of living for the individual family. It should also enable the students to appreciate the fact that for preserving the health and welfare of the members of the family, for ensuring the economic stability of the family and for assuring good prospects for the younger generation, the Indian families of today and tomorrow should be small and compact...” (NCERT, 1971a, pp.7-8).

Depending upon the specific objectives the content, scope, etc., of population education may vary from community to community, from society to society and from country to country. “In some countries, population education was instituted in response to the recommendation of the World Plan of Action, which stated that government should consider making provision in both the formal and non-formal educational programmes for informing their people on the consequences of existing or alternate fertility behaviour for the well-being of the family, for the educational and psychological development of children and for the general welfare of society, so that an informed and responsible attitude to marriage and reproduction will be promoted” (United Nations, 1974, in Sharma, 1991, p.9).

Though the above mentioned objectives are specific to India, they are more or less like the broad general objectives that are appropriate for any country. Yet, the specific objectives of population education differ slightly or significantly from country to country. Also, they are different for different grade levels and target groups within a particular country. It will, therefore, not be appropriate here to list the specific objectives or go into the details related to different grade levels. However, in the words of Sharma (1991, p.16) although countries differ in respect of specific objectives of their population education programmes, the general objectives are more or less the same. According to him, the following general objectives could very well represent the nature of population education.

- 1) To develop awareness and understanding about:
 - a) population situation – national and world;
 - b) basic demographic concepts and theories;
 - c) processes and determinants of population change;
 - d) concept of quality of life in different socio-cultural settings;
 - e) inter-relationship between population change and different aspects of quality of life at micro and macro levels;
 - f) consumption explosion and its implications on quality of life for others;

- g) human reproduction, eugenics and family welfare; and
 - h) population policies, plans and programmes.
- 2) To develop the ability to assess the quality of life implications in relation to population change and consumption of resources, now and in the future, for oneself, one's community, nation and the world.
 - 3) To develop rational attitudes, values and skills for taking responsible decisions and actions regarding population related issues and improvement of quality of life.

Since the first UN Population Conference held in 1954 the Governments, donors and the practitioner-agencies involved in promoting the scientific knowledge and understanding on population matters popularly used the term 'population education'. The fifth International Conference on Population and Development held in 1994 came out with 10-year Programme of Action and had given due recognition to sexual and reproductive health, and reproductive rights and freedom of individuals in the overall context of simultaneously and comprehensively addressing the issues of both population and development. With increase in national measures such as national population policy and programmes, and international measures such as involvement of international agencies in providing different types of support – financial, material, human, technical, etc – to the policies and programmes of different countries, population education has become more popular as population and development education at global level. One can see the close linkages between the 10-year Programme of Action prepared by ICPD held in Cairo in 1994 and its follow-up that informed the Millennium Summit in 2000 in setting the Millennium Development Goals (MDGs). Since then, population education became an integral part of development efforts aimed at achieving the MDGs as well as the 10-year review held in 2010. Thus, 1994 International Conference on Population and Development (ICPD) was a milestone in the history of population and development, and accordingly the Governments, donors and the practitioner-agencies, in tune with the above declaration, have changed the nomenclature of 'population education' to 'population and development education'. But, the definition of 'population and development education' remained same as the definition of 'population education' and accordingly its objectives also remained the same.

1.3.1.2 Goals of Population Education

The ultimate goal of population education is to enable the individuals to extend their understanding, attitudes, perspective and practices related to population matters – issues and problems – in a way that is personally meaningful and familially, socially, nationally and globally relevant.

Population policies and programmes in different countries are the result of policy makers' perceptions of and reflections on the population situation, its trends, problems, repercussions and relevance to national development at present and in future. A population policy consists of both the formulation of and articulation by the government of some population objectives or a set of objectives that maximise the public welfare and levels of living. Population policies are "measures and programmes designed to contribute to the achievement of economic, social, demographic, political and other collective goals through affecting critical demographic variables, namely, the size and growth of

population, its geographic distribution (national and international), and its demographic characteristics (UNESCO, 1974, in Premi and Saxena, 1991, p.106). It involves the commitment and manipulation of resources in pursuit of the population policy and programmes. To sum up, the major goals of population education as part of population policies and programmes include the following.

- To develop in the individuals appropriate knowledge, understanding, skills and abilities to identify, analyse, define and address the problems and issues of population and development in a way that is personally meaningful, familially advantageous, socially relevant, nationally progressive, developmentally sustainable and globally welfare-oriented.
- To contribute to the realisation of the goals and objectives of national population policies and programmes by affecting critical demographic variables that have significant relevance to the achievement of economic, social, demographic, political and other collective goals of the nation.

All the eight MDGs set by Millennium Summit 2000 are intricately linked to population and development matters only. The goals of population and development education have thus become the integral part of the MDGs given below.

- ✓ Goal 1: Eradicate extreme poverty and hunger
- ✓ Goal 2: Achieve universal primary education
- ✓ Goal 3: Promote gender equality and empower women
- ✓ Goal 4: Reduce child mortality rates
- ✓ Goal 5: Improve maternal health
- ✓ Goal 6: Combat HIV/AIDS, malaria, and other diseases
- ✓ Goal 7: Ensure environmental sustainability
- ✓ Goal 8: Develop a global partnership for development

In 2010, the UN system reviewed progress, identified gaps and explored ways to accelerate progress in a series of events leading up to the MDG 10-Year Review.

1.3.2 Scope of Population Education

From the foregoing discussion in sections 1.2 and 1.3 it is possible to draw out the content of population education that provide us an idea of the scope of population education. To begin with, it was essentially demography-laden. In course of time, the content has been elaborated and specified to include various other concepts, thus enlarging the scope of population education.

The 1974 World Plan of Action adopted at Bucharest stressed that “educational institutions in all countries should be encouraged to expand their curricula to include a study of population dynamics and policies, including where appropriate family life, responsible parenthood and the relation of population dynamics to socio-economic development and to international relations”.

According to Mehta (1982, pp.35-39) demography (the population situation), determinants of population growth, and consequences of population growth form the core components of population education which are more or less universally accepted. To make population education more comprehensive, sex education

with two elements – human reproduction and family planning – is also added to it so as to gear it to the needs of the country. In fact, sex education as a component of population education will help a lot in removing the blind beliefs of the people regarding the birth of the child. For instance, many people in India and many other developing countries consider child birth as gift of the gods, which in fact is not correct. Once they understand the process of conception and child birth and are convinced of it, there is every likelihood of they rejecting their blind belief on child birth. Besides, there are many blind beliefs regarding sex including its determination which can also be effectively eliminated through sex education.

Although virtually all population education programmes espouse an open-ended, non-prescriptive approach in their goals and objectives, the content as well as approach is, often implicitly and sometimes explicitly, directed more towards the specific goal of promoting a small family norm. The funding agencies also want to see the effect of population education programmes on the reproductive behaviour of the target audience. This is more true for out-of-school youth and adults (Sharma, 1991, p.20).

What is even more important in the case of population education is the full understanding and appreciation, on the part of all concerned, of its nature, objectives, content and methodology and the acquisition of professional skills and competencies in its transmission to different kinds of clientele – students, teachers and other educational functionaries (Seshadri and Pandey, 1991, p.ix). Further, the content and scope of population education also differ based on the policy and programme objectives and also the target group. The family life education programme in Afghanistan is intended to ‘design and organise functional literacy programmes for the rural and urban women related to family health, better family living and family guidance, while in Malaysia it intends to strengthen family development programme by broadening the scope of its family planning component to family life education. Besides family planning, the need for the improvement of quality of life of the individual, family and community are given emphasis to contribute to the achievement of general objectives of the family development programme (Sharma, 1991, pp.14-15). Although opinions differ with regard to the nature and content of a population education programme for youth and adults, the information on sex and family life is considered to be of immediate relevance to both, youth and adults. This further widens the scope of population education so as to include family planning, sex education and population policies in it. So, broadly and in general, it can be said to include:

- i) demography (includes the determinants and causes of population change);
- ii) consequences of population growth on
 - various aspects of human life – biological, social, economic and cultural;
 - environment and ecological balance, and
 - on development and welfare programmes of the country;
- iii) family life education; and
- iv) population policies and programmes.

Nevertheless, the quality of life has increasingly been the focal aspect of population education. Consequent upon the stipulation made in the National Policy on Education 1986, it has become value-laden as well as quality of life

improvement-oriented. In view of this, NCERT (1988) has built the conceptual framework around *six major themes*. These are:

- i) family size and family welfare,
- ii) delayed marriage,
- iii) responsible parenthood,
- iv) population change and resource development,
- v) population related beliefs and values, and
- vi) status of women.

The content focussing on these themes is drawn from *six content areas*:

- i) population and economic development,
- ii) population and social development,
- iii) population, environment and resources,
- iv) population and family life,
- v) population, health and nutrition, and
- vi) population dynamics.

The emerging issues such as problems of adolescents, sexually transmitted diseases including AIDS, urbanisation and concern for the aged are woven into this conceptual framework. Further, the attitude and value-orientation of individuals are shaped by their socialisation process. Therefore, population education should provide a suitable setting for values-clarification and development of scientific temper (Parakh and Pandey, 1991, pp.31-34). Since population education is a value-laden area, one is bound to deal with many value-related issues of population even in implementing this programme. "These issues arise because of the differences in the social, cultural, religious, economic and political systems and values of the people. Most of the values are so deep-rooted in the socio-cultural milieu of the people that concerned and continuous effort is needed to change them. During the last decade or so countries with population education programmes have developed a rich experience in dealing with these issues and as a result new trends in the implementation of population education programmes are emerging" (Sharma, 1991, pp.16-17).

It is obvious from the above discussion that population education deals not only with the cognitive domain but also with the affective domain, more importantly with attitudes, appreciations and values which are not easy to assess and address. Besides these, population education content is an integral part of different subjects. This makes evaluation of population education more complicated. Further, in the absence of any reliable tool of evaluation, it would be difficult even to answer the question – whether the objectives of population education have been really achieved or not?

However, since 2000 when the goals of population and development education have become integral part of the MDGs, the content and scope of population and development education have increased very widely to include everything that has any relevance to achieving the MDGs, namely: *eradicating poverty and hunger; achieving universal primary education; promoting gender equality and*

empowering women; reducing child mortality rates; improving maternal health; combating HIV/AIDS, malaria, and other diseases; ensuring environmental sustainability; and developing a global partnership for development.

One of the special features of population and development education as an educational endeavour is that it lays more emphasis on objectives relating to affective domain, necessitating the selection of such contents as have a potential to initiate among learners the processes of attitude transformation and value orientation towards population issues. Moreover, the content and scope of population and development education is objective-specific, clientele-specific, location-specific, and problem-specific and the related content is not automatically available. Since population and development education is population problem-centred, multidisciplinary and value-laden educational programme aimed at improving the quality of life at present and in future, its content is to be drawn from demography, population dynamics, population studies, sex education, family planning and population policies and programmes. Its content, thus, is to be judiciously derived from several academic disciplines such as demography, sociology, geography, economics, psychology, biology, ecology, population studies, medicine, etc.

Nevertheless, it may be remembered that the objectives, content and scope of population education vary from target group to target group depending upon their educational level as well as national, local and individual needs and problems.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under "Answers to 'Check Your Progress' Questions".

- 5) Mention the goals of population education and the Millennium Development Goals (MDGs). Explain how the goals of population education are related to the MDGs.

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1.4 DEVELOPMENT OF POPULATION EDUCATION: AN OVERVIEW

In this section, we will present you an overview of development of population education, with an emphasis on its growth and development in India.

1.4.1 Origin and Growth of Population Education at International Level

The origin of population education at international level can be traced to the first United Nations Population Conference held in 1954 in Rome (Italy) which has drawn the global attention to the problems and issues of population. Such effort began in the context of the world population touching 1,265,000,000 in 1950, which was just half of it 100 years ago (i.e. 640,000,000 in 1850). The second UNPC was held in 1965 in Belgrade (Yugoslavia). The first and second UNPCs were organised in collaboration with the International Union on the Scientific Study of Population (IUSSP) and comprised of technical experts aimed at expanding scientific knowledge and understanding on population issues. The third conference held in 1974 in Bucharest (Romania) and the fourth one held in 1984 in Mexico City, were organized by the United Nations alone and comprised of government representatives. These conferences benefitted from extensive preparations, scientific symposia, regional meetings, and meetings of preparatory committees involving technical experts and focused on development of policies (<http://www.rhrealitycheck.org/reader-diaries/2010/01/11/international-conference-population-and-development-icpd-a-historical-account-and-future-trajectory>). Since the first UN Population Conference held in 1954, the Governments, donors and the practitioner-agencies involved in promoting the scientific knowledge and understanding on population matters popularly used the term 'population education'. Beginning with 1954 UNPC every ten years such a conference has been held to discuss population problems and issues and to promote measures to address them at international level.

The fifth International Conference on Population and Development (ICPD) held from 5-13 September 1994 in Cairo (Egypt) had, at the end of nine days of intense debate, adopted a wide-ranging 20-year action plan that delegates and commentators hailed as opening of a "new era in population". The programme contained highly specific goals and recommendations in the mutually reinforcing areas of infant and maternal mortality, education, reproductive health and family planning. This Programme of Action has the potential to change the world with its far wide ranging effect (<http://www.unfpa.org/swp/2004/english/ch1/index.htm>). Underpinned by a commitment to human rights and gender equality, the Cairo agreement called on countries to ensure reproductive health and rights for all as a critical contribution to sustainable development and the fight against poverty, illiteracy and gender disparity, which the ICPD saw as inseparable from addressing population concerns. It is at this conference that the concepts of reproductive rights, sexual and reproductive health were officially incorporated in the programme of action to serve as a blueprint for population programmes of the United Nations and individual countries until 2015.

The 1994 International Conference on Population and Development (ICPD) was, thus, a milestone in the history of population and development as well as in the history of women's rights. The Programme of Action agreed to at the ICPD

along with benchmarks added at the ICPD+5 review informed the eight Millennium Development Goals (MDGs) derived from Millennium Summit, 2000. These mutually reinforcing development blueprints continued to guide United Nations Fund for Population Activities (UNFPA) in its efforts to improve lives, support reproductive health and rights, and advance gender equality. UNFPA, governments and development partners marked the 15th anniversary of the ICPD in 2009 by taking stock of how much has been accomplished and how much more has been left to be done. A series of expert meetings and events helped to identify gaps and challenges, to consolidate lessons learned over the last 15 years, and to come up with practical recommendations for accelerating progress (<http://www.unfpa.org/public/icpd>)

At the Millennium Summit in 2000, a framework for progress consisting of eight Millennium Development Goals (MDGs) was derived from the Millennium Declaration adopted by the world leaders from 189 Member States who agreed to help the world's poorest countries significantly by the year 2015. The MDGs serve as a time-bound, achievable blueprint for reducing poverty and improving lives agreed to by all countries and all leading development institutions. They guide and focus development priorities for governments, donors and practitioner-agencies worldwide (<http://www.unfpa.org/public/icpd>).

In 2010, the UN system reviewed progress, identified gaps and explored ways to accelerate progress in a series of events leading up to the MDG 10-Year Review of all population and development related matters. One can see the close linkages between the 10-year programme of action prepared by ICPD held in Cairo in 1994 and its follow-up that informed the MDGs. Thus, 1994 International Conference on Population and Development (ICPD) was a milestone in the history of population and development, and accordingly the Governments, donors and the practitioner-agencies have changed nomenclature of 'population education' to 'population and development education', and its definition remained the same, but, in practice, focus has shifted to matters of interrelationship between population and development.

1.4.2 Growth and Development of Population Education in India

India is the first country in the world to have a State-sponsored population policy favouring family planning to limit the size of the family. The National Family Planning Programme, initiated in 1952 during the First Five Year Plan (1951-56), adopted a "clinical" approach to family planning and opened a number of clinics with the expectation that the people would take advantage of the facilities. Faced with inadequate response, this approach was modified thereafter. The 'community extension' and 'cafeteria' approaches were followed during the Third Five Year Plan (1961-66) with an emphasis on creation of motivation among the people to respond to the family planning message and to utilise the services offered by changing popular attitudes and values to family planning. The 'cafeteria approach' in which various alternative means of family limitation (temporary and permanent) were propagated from the middle of 1960s also did not make much headway as the official emphasis remained on terminal methods alone. Later, many legislations were brought out, including on abortion (medical termination of pregnancy) and the age of marriage. 'Incentives and disincentives' scheme was introduced. Women's education, population education, child nutrition, etc and their integration with the family planning programme was

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

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

- i) increase in the age of marriage from 15 to 18 years for girls and from 18 to 21 for boys;
- ii) freezing of the population figures at the 1971 level until the year 2001 for the purpose of representation in the National Parliament as well as for allocation of Central assistance, devolution of taxes, etc, to the States;
- iii) linking of a part of Central assistance to the States for their development with their performance in family planning;
- iv) greater attention to girls' education;
- v) proper place for population education in the total system of education;
- vi) involvement of all ministries/departments of the government in the family planning programmes;
- vii) increase in monetary compensation for sterilisation;
- viii) institution of group awards as incentives for various organisations and bodies representing the people at local levels, including Zilla Parishads and Panchayat Samitis;
- ix) intimate association of voluntary organisations particularly those representing women with the implementation of the programme;
- x) greater attention to research; and
- xi) greater use of motivational media, particularly in rural areas, for increasing acceptance of family planning.

The Janata Government was formed at the Centre in 1977 and the revised Population Policy was announced. While the new government, in its population policy statement, stressed the importance of limiting population growth, it emphasised the voluntary nature of the family planning programme. Simultaneously, the 'family planning programmes' were redesignated as 'family welfare programmes'. In addition to the items of the 1976 policy, this policy statement advocated a greater role for maternity and child health services, an expansion of the immunisation programme, improvement of women's education and population education, and the involvement of voluntary, youth and women's organisations. The major feature is the 'educational and voluntary approach' to family welfare. Population education as a part of normal courses of study was stressed for youth. Special attention was given to encourage necessary research inputs, alongside education, in the field. Thus, a more prolonged strategy was evolved to attain the envisaged demographic goals and the family planning

(welfare) programme has been adopting increasingly effective approaches from time to time, i.e. from a 'clinical' approach to a 'community extension' and 'cafeteria' approaches coupled with 'incentives and disincentives' to promote family planning. Such shift in approach is rather imminent as population and development are closely interrelated and embrace a number of complex factors.

In India the concern for population planning permeates all government policies and programmes related to health, environment, energy, agriculture, food, urban and rural development, housing, etc. Success on the population front is considered crucial for securing national developmental goals (Parakh and Pandey, 1991, p.27).

The National Population Policy (2000) provided a framework for the next decade in several sectors for population development, with the objective to improve the quality of life of the people, to enhance their well-being and to provide them with opportunities and choices to become productive assets in society. Its aim is to achieve a stable population by 2045 at a level consistent with the requirements of sustainable economic growth, social development and environment protection (http://www.ugc.ac.in/financialsupport/guidline_PEU.pdf).

Until 1986, when the National Education Policy was announced, population education was a part of the National Population Policy. The extension orientation to the family planning programme during the Third Five Year Plan marks the starting point of population education in the non-formal sector. Later, a number of seminars and conferences were organised by national and international organisations working in India in response to the demands of policy changes that were brought out from time to time. As a result, population education has found a place in non-formal and formal education programmes, including higher education.

The family welfare program over the last five decades with holistic approach towards population control, followed by other social factors like female literacy, age at marriage, status of women, spacing of children, immunization, health care, infant mortality, etc. have made, no doubt, significant contributions in the direction, but the necessity for the intervention of educational efforts to bring appropriate social transformations so as to promote population stabilization and ensure quality of life can never be denied. The Universities/Institutions can play a vital role by providing adequate knowledge and necessary awareness in relevant areas. To provide awareness, the Universities/Institutions need to mobilize the students as soon as they enter into the same (http://www.ugc.ac.in/financialsupport/guidline_PEU.pdf).

While concerted and sustained efforts have been made since 1980 to integrate elements of population education in both formal and non-formal education systems, the adoption of the "National Policy on Education 1986" has been the most significant development. The policy reflects the magnitude of the demographic situation and all the concerns related to the causes and consequences of rapid population growth. It categorically mentions that 'the growth of our population needs to be brought down significantly over the coming decades' (National Policy on Education, 1986, para 1.13).

The policy document is imbued with issues related to the prevailing population situation. It is generally observed that 'the perception of population-related issues by an individual may vary from that desired by the community or defined by

national policies. This so happens because the national policies in respect of population issues are formulated according to the needs and requirements of the well-defined national goals, whereas individuals ... perceive the population phenomena in their own socio-cultural milieu shaped by the traditional norms and value-patterns. Unless a perceptible social change directed towards the attainment of national goals takes place, there cannot be a commonality in the patterns of perception at individual, community and national levels. With a view to including such a social change, education can play a decisive role (Pandey, 1985, pp.xvii-xix). The policy encapsulates almost all critical concerns in respect of the national system of education. 'A common core' reflected in the national curricular framework includes all those issues on which rational attitude has to be developed in each individual (National Policy on Education, 1986, p.2, para 1.10). These issues constitute more than half of the ten 'core curricular areas' mentioned in the Programme of Action of National Policy on Education (1986, pp.144-145). These are: constitutional obligations, equality of sexes, protection of environment, removal of social barriers, observance of small family norm, and inculcation of scientific temper. The National Literacy Mission (1988, p.14) document also incorporated these issues and made them an integral part of functional literacy to be imparted to illiterate adults.

For the first time in the history of the nation the 'observance of small family norm' finds a place of importance as a core element in the national education policy. This value is sought to be achieved, not in isolation, but by promoting proper attitudes, particularly in women, in respect of removal of illiteracy, interrelationship among population, environment, development and quality of life, and prevalent values and beliefs. 'Recognising the holistic nature of child development', the policy accords high priority to 'Early Childhood Care and Education (ECCE) and suitably integrates it with the Integrated Child Development Services (ICDS) programme, wherever possible' (National Policy on Education, 1986, p.6, para 5.2). This stipulation has a direct bearing on the demographic goal of bringing down the death rate in general and infant mortality rate in particular. Towards this end is the policy commitment that 'education will be used as an agent of basic change in the status of women' (Ibid, p.6, para 4.2) on which greatly depends the hope of restricting the fertility rate. The policy has itself recognised that 'the largest single factor that could help achieve this (limiting population growth) is the spread of literacy and education among women' (Ibid, pp.2-3, para1.1). It states that 'the whole nation must pledge itself to the eradication of illiteracy, particularly in the 15-35 age-group' (Ibid, p.9, para 4.12). The policy document simultaneously assures that 'the new thrust in elementary education will emphasise universal enrolment and universal retention of children up to 14 years of age...' (Ibid, p.11, para 5.5).

It is abundantly evident from the exposition in the preceding pages that the National Policy on Education 1986 is imbued with the demographic concerns of the nation and committed to reorient the education system so that it can help in the attainment of demographic goals. Even while making stipulations regarding the future perspectives, it states that 'the main task is to strengthen the base of the pyramid, which come close to a billion people at the turn of the century. Equally, it is important to ensure that those at the top of the pyramid are among the best in the world' (Ibid, p.29, para 12.2). Never before has the education policy lent such unequivocal support to the national population policy. *Until the adoption of this policy in 1986, population education was a component of the*

national population policy; but since then it has become a truly educational programme drawing support from the education policy itself.

All the above provisions provided credibility and strength to education activities being conducted with a view to institutionalising population education in the education system. As a part of institutionalising population education, various kinds of educational activities are conducted to make it an integral part of the entire education system. "A broad strategy of integration has been adopted for development of different types of materials, incorporation of population education contents into existing syllabi and textbooks, making it a part of the on-going examination system, training of teachers and other functionaries, organising curricular and co-curricular activities and evaluation of various activities" (Parakh and Pandey, 1991, p.35) in school education by National Council of Educational Research and Training. But, population education is not treated as a separate subject or a separate educational activity. Similar efforts were also made in the field of non-formal education. Thus, all possible attempts have been made at various levels to integrate the elements of population education in almost all aspects of school education. In addition, efforts at institutionalisation of population education in the Adult Education sector were made by the Directorate of Adult Education, Government of India while such efforts in the University Education sector were undertaken by the University Grants Commission. All this has been designed to institutionalise population education in the entire education system of the country and to promote functional coordination among all the sectors of education through effective institutional arrangement.

The efforts of institutionalisation of population education in all the above three sectors – school and non-formal, adult education, and university education or higher education – are dealt with in detail below.

1.4.2.1 Population Education in School Education Sector

Population education programmes in the country owe their origin to the National Seminar on Population Education held at Bombay on August 2-3, 1969 under the joint auspices of the Union Ministries of Education and Youth Services and of Health and Family Planning. The seminar recommended that population education be introduced in the curriculum of schools and colleges. It further recommended that a separate Population Education Cell be established in the NCERT in order to develop suitable curricula on population education.

During the decade 1970-80, efforts were initiated to develop curricula, teaching units and to revise teacher education programme in the country. As mentioned earlier, National Population Policies announced in 1976 and 1977 stressed the need to introduce population education in schools. The joint meeting of all the Boards of Secondary Education in the country held in New Delhi in September 1978 unanimously decided to introduce population education in schools and teacher training institutions. Sri Venkateswara University, Tirupati set up a Population Studies Centre in April 1973. The Centre, the first of its kind in the country, has been organising teaching, training, extension and research activities. Population education has been included in the curriculum of teacher training institutes and in BED programmes of many Universities.

NCERT conducted a base-line status survey in 1979-80 and organised four regional seminar-cum-workshops before embarking upon a challenging and

prestigious National Population Education Project (NPEP). A number of curricular, textual, instructional and source materials were developed as a preparation for launching the Project in schools and other educational institutions in the States and Union Territories. The Government of India entered into an agreement with the United Nations Fund for Population Activities (UNFPA). The National Population Education Project was launched aiming at the institutionalisation of population education in the existing education system. Since then the project has run through three cycles, each of five years duration. In the first cycle the emphasis was on expansion of project activities. During the first stage, project activities were started in the States of Bihar, Rajasthan, Maharashtra, Madhya Pradesh, Gujarat, Karnataka, Tamil Nadu, Punjab, Haryana, and in the Union Territory of Chandigarh in 1980. In 1981 the activities were extended to the States of Andhra Pradesh, Assam, Himachal Pradesh, Jammu and Kashmir, Kerala, Orissa, Uttar Pradesh, West Bengal and the Union Territory of Delhi. Later they were extended further to bring into the fold 28 States and the Union Territories where activities were conducted for students and teachers of primary, upper primary and secondary stages, and for student-teachers of elementary and secondary teacher education. Consolidation of multi-dimensional project activities and further expansion to cover senior secondary stage and the non-formal education sector have been the foci during the second (1986-90) and third (1990-95) cycles.

Reaching adolescents in educational institutions: The first version of this partnership was initiated in 1980 in the form of the National Population Education Project (NPEP) that was implemented in all the states of the country with a focus on family life education. Due to ongoing efforts under the program, the National Policy on Education (adopted in 1986) identified NPEP as a thrust area in school education. In the 1990s, when the focus moved towards achieving the goals set in 1994 in the International Conference on Population and Development (ICPD), Adolescent, Reproductive and Sexual Health (ARSH) was identified as an important focus-area under the NPEP. India Country Office of UNFPA has a long-standing history of working with young people through direct engagement with the Department of Education (Ministry of Human Resource Development) at the national level (India.unfpa.org.doc - UNFPA India).

UNFPA recognizes that young people's concerns extend beyond the issues of reproductive health and include issues related to their education, livelihood and citizenship. Hence, the Fund has positioned its adolescent reproductive and sexual health niche within the broader framework of the holistic development of young people. Broad strategies include supportive policy making, provision of gender-sensitive, life skills-focused education linked with youth-friendly sexual and reproductive health services driven by young people's leadership and participation. Empowerment of adolescents (both in and out of schools) and youth with the knowledge and life skills necessary for maintaining better reproductive and sexual health is one of the outputs of India's country program. At the national level, UNFPA reaches adolescents through a range of interventions and partners, like the Ministry of Human Resource Development (MHRD), the Ministry of Youth Affairs and Sports (MOYAS), Non-Government Organizations (NGOs) and other UN agencies. Several initiatives for young people are also implemented through our state offices. Overall, UNFPA provides technical support to advocacy efforts that further youth interests and contribute towards youth-friendly policies. In partnership with relevant national/state-based institutions, UNFPA is contributing

towards improving quality of adolescent outreach programs in school and out-of-school settings through a standardized curricula, prototype materials and monitoring mechanisms (Ibid).

Post 2005, in the wake of the controversy around sex education; the program was restructured as the Adolescence Education Program (AEP) that focused on enhancing life skills among adolescents to enable them to respond to real life situations effectively. Positioning AEP in the wider context of an educational approach to develop life skills to empower young people proved to be a useful strategy with a clear focus on age/experience-appropriate and culturally-sensitive information. Furthermore, National Curriculum Framework (2005) that guides the school curriculum across the country recognized Adolescence Education as an important area in school education (Ibid).

With National Council of Educational Research and Training (NCERT) as the co-ordinating agency the program works through both co-curricular and curricular formats. *The co-curricular approach* works through the three national school systems - Central Board of Secondary Education (CBSE), Navodaya Vidyalaya Samiti (NVS) and Kendriya Vidyalaya Sangathan (KVS). The program works on a cascade training approach that has created a pool of master trainers who orient nodal teachers who are entrusted with the responsibility of transacting life-skills-based education (16 hours module) to secondary school students through interactive methodologies. Nodal teachers are provided guidelines and materials to facilitate the transaction process. Advocacy sessions are organized with principals of participating schools and sensitization sessions are held with parents. *By 2010 end, at least two nodal teachers from 3500 CBSE schools, all the 919 KV schools, and all the 583 NVS schools have received orientation on adolescence education issues* (Ibid).

Curricular Approach: The NCF 2005 clearly outlines that rather than a stand-alone program the AEP should become an integral part of school education. *It is noteworthy that although UNFPA's current work at the national level with the MHRD has a large co-curricular component, our larger goal is to mainstream the components of adolescence education in the larger context of education and curricular formats.* In this regard, the content analysis exercise undertaken by NCERT shows that textbooks in different parts of the country have integrated adolescent education issues in various scholastic subjects. Efforts are underway for more comprehensive inclusion of adolescent concerns in the curriculum. The Council of Boards for School Education (COBSE) is involved in advocacy efforts for curricular integration of life skills in selected state education boards in India with relevant stakeholders. *Curricular interventions* also include UNFPA's ongoing support for integration of life skills in the secondary curriculum of National Institute of Open Schooling (NIOS) that enrolls approximately 400,000 learners each year. In order to maximize the reach of the integrated lessons, the most popular subjects of Home Science, Social Science, Science and Languages (Hindi and English) were identified for integration (Ibid).

In 2005, life-skills-focused adolescence education was introduced as a separate subject in the senior secondary curriculum across approximately 4500 government schools in the state of Rajasthan and the subject is now institutionalized within the government schools. Kalinga Institute of Social Sciences (KISS) in the state of Orissa reaches out to 12,000 tribal girls and boys at different stages of schooling.

Since 2009, UNFPA's Orissa office is partnering with KISS to provide the adolescents with accurate age-appropriate and culturally-relevant education and build skills on issues related to their health. Relevant resource materials have been developed and the program is working on enhancing capacities of teachers to transact the curriculum in classroom-settings. The institute has introduced life-skills-focused adolescence education in its secondary classes and is also working towards building a strong research-base on issues related to adolescent health and well-being (Ibid).

In the state of Bihar, UNFPA has entered a partnership with the Department of Human Resources Development, Government of Bihar to reach out to young people in approximately 1000 secondary schools (across 9 districts) in Bihar with information and skills for improved health and well-being. Center for Development and Population Activities (CEDPA) is the lead technical agency responsible for providing technical assistance and ensuring that adolescent concerns get institutionalized in the government system (Ibid).

In 2010, the conceptual framework that guides the program design and implementation has been updated to recognize *adolescents as a positive resource and focus on transformational potential of education* in a rights framework. The training/ resource materials have been updated to address the themes of making healthy transitions to adulthood (being comfortable with changes during adolescence), understanding and challenging stereotypes and discrimination (including abuse and violation) related to gender and sexuality, prevention of HIV/AIDS and substance abuse. *For better impact and quality, the program has been consolidated in 5 UNFPA priority states (rather than across 32 States/UTs in the country) to achieve a goal of one trained teacher for every 150 secondary school students* (Ibid).

More robust and regular monitoring mechanisms have been introduced to ensure regularity and quality in reporting. *Concurrent evaluation of the program* was fielded across 200 schools to assess the program's achievements and identify gaps for improved programming. The quantitative and qualitative data from students, teachers and school principals is being analyzed and the report should be available in April, 2011 (Ibid).

1.4.2.2 Population Education in Adult and Non-Formal Education Sector

The National Conference on Population Education conducted by the NCERT in 1971 recommended that population education should be integrated into the ongoing programmes of functional literacy and the ideas of population education be systematically incorporated in the literature being produced for neo-literates. Since then, population education has found a place in all the non-formal education programmes initiated by the Government of India. But, the major breakthrough in this regard happened after the launch of the National Adult Education Programme (NAEP) on 2nd October, 1978. The major aim of NAEP was the total development of the individual through education. In this context, population education was recognised as one of its vital components. Having recognised the need of population education in NAEP, a National Seminar on Integration of Population Education in NAEP was organised at Bombay jointly by the Directorate of Adult Education and the Family Planning Association of India on

March 3-7, 1979 which recommended the integration of population education in the overall framework of NAEP, through establishment of systematic linkages including training and material preparation and evaluation.

Later, the National Conference on Planning and Development of Population Education in Adult Education held at Tirupati on September 17-20, 1979 paid attention to how the content of population education could be incorporated in the NAEP curriculum. It recommended participatory action research projects towards the integration of population education in adult education.

The National Steering Committee on Population Education in its meeting on 14th May 1984 has recommended that “in the Seventh Five Year Plan suitable provision should be made for population education programmes in the school education, both formal and non-formal, university education and adult education sector” (Directorate of Adult Education, 1984, p.2). Accordingly, in order to take up the integration of population education in the existing adult education programme, a preparatory project on population education funded by UNESCO/ UNFPA was launched by the Directorate of Adult Education from January 1, 1985 which was followed by a Five Year Project (1986-90) during the Seventh Five Year Plan in all States in a phased manner. Under this UNFPA project, the Directorate of Adult Education organised the first “Planning and Development Meeting for Integration of Population Education in Adult Education Project” at New Delhi from 2-30 April, 1985, and prepared work plans for integrating population education contents in the existing basic literacy materials. Within a short period after the first meet, the second “Planning and Development Meeting for Integration of Population Education in Adult Education Programme” was held at Literacy House, Lucknow from 5-10 August 1985 for integrating population education in the post-literacy and follow-up materials for the learners and training materials for the functionaries – instructions, supervisors and project officers. This work was mainly undertaken with the help of the State Resource Centres and other agencies through such materials as primers, workbooks, teachers’ guides, flash cards, etc. (Lakshmi Reddy, 1994, pp.22-23).

Reaching out-of-school adolescents: UNFPA and the Ministry of Youth Affairs and Sports (MOYAS) have been collaborating since 2003 and have been supporting the Adolescent Health and Development (AHD) project with the overall objective of ensuring a healthy and safe growing-up process for out-of-school adolescents. The support has also been in keeping with the focus of the National Youth Policy on the “need for youth to be equipped with requisite knowledge, skills and capabilities”. The partners involved in implementation of the project have been the *Nehru Yuva Kendra Sangathan* (NYKS), the National Service Scheme (NSS), and the Rajiv Gandhi National Institute of Youth Development (RGNIYD) (India.unfpa.org.doc – UNFPA India).

In 2011, the collaboration with the Ministry of Youth Affairs and Sports has been re-strategized with the objective of consolidating teen clubs in the 5 UNFPA priority states of Orissa, Madhya Pradesh, Bihar, Rajasthan and Maharashtra for better quality and enhanced impact. The revised strategy that will be implemented by the *Nehru Yuva Kendra Sangathan* (NYKS) proposes to provide (unmarried) adolescents with life-skills-focused experiential learning on reproductive and sexual health issues in a gender-sensitive manner, to provide them with information on education and skills-building for better employability and to

improve access to youth-friendly and gender-sensitive services in the public and private sectors (Ibid).

In order to achieve these objectives, UNFPA has engaged an NGO 'Restless Development' that will provide technical support to the Teen Clubs. 'Restless Development' will facilitate capacity building of NYKS functionaries, including the District Project Officers (DPOs) placed at the district level and the Adolescent Peer Volunteers (APVs) placed at the block level and help institutionalize accountability in the system through establishment of clear monitoring protocols. Given that teen clubs are village-based institutions, stratified plans are being proposed to reach out-of-school adolescents [in a village of approximately 1000 population, there are likely to be 25% adolescents (250). Based on recent data, nearly 60% (150) of them are likely to be out-of-school, hence potential target for the project] through different levels of engagement. *One level* of engagement is with members of the Teen Clubs, around 30 young people. It is proposed to identify 4 enthusiastic members of the Teen Clubs who will be trained to facilitate activities at the teen clubs under the close supervision of Adolescent Peer Volunteers. In order to motivate peer educators, they will be preferentially linked to education and skill-building opportunities for better employability. Certificate courses to train and accredit them offered through the Indira Gandhi National Open University could also serve as an important value addition to the Curriculum Vitae of peer educators that will be explored (Ibid).

The *second level* of engagement will be with the remaining 120 young people in the village who will be reached through mass media activities like village-based fairs that could be organized twice a year around themes related to adolescent issues. The fairs could include enter-educate activities like films, games, chat shows and stalls for youth-friendly services including health, and linkages with education and livelihood opportunities available in geographic proximity. These fairs could serve as opportunities to sensitize adolescents as well as enrol new members to the teen clubs. It is not possible to reach out to adolescents, particularly girls, without sensitizing the larger community of adults who interact with them, for example their parents, teachers, opinion leaders and others. In this context, the entire village community has been recognized as the *third level* for engagement. They could be sensitized through special stalls set up during the village fairs. Other existing village-based fora would be identified for sensitizing the community members at regular intervals (Ibid).

In order to ensure continuing, long-term engagement with young people, UNFPA will explore setting up of youth centers at district or block level as a dedicated space for organizing youth-friendly activities. It is proposed to involve National Service Scheme (NSS) volunteers and Peer Educators (PEs) to lead these youth centers. These NSS and PEs would be trained to manage the youth centers. UNFPA is particularly interested in energizing the link between young people enrolled in colleges and those in out-of-school situations (drop-outs and/or those never been to school). This particular link has immense potential in terms of creating an ongoing link between young people in urban colleges and those in rural settings so that both are able to better understand each other's realities. It is proposed that NSS volunteers may be involved in organizing the community mobilization campaign as well as jointly coordinating the functioning of youth centers along with the peer educators. UNFPA will explore the feasibility of this strategy. The above strategy will be implemented in 1860 Teen Clubs in 10 districts of the 5

UNFPA states. There will be 1500 teen clubs that will be directly implemented and monitored by NYKS. UNFPA will set up 360 additional model teen clubs (120 clubs each in the states of Rajasthan, Madhya Pradesh and Orissa) through 'Restless Development' (Ibid).

The Rajiv Gandhi National Institute of Youth Development (RGNIYD) is being supported for its Masters Programme on Life Skills Development. Focus will be on building the capacities of faculty and development of a robust methodology for research in life skills. A Community Radio program, the first of its kind in the country that is being run by young people is also being supported by the CO (Ibid).

In four blocks of four districts in the state of Rajasthan, support is being provided to an initiative for out-of-school adolescents that reaches out to approximately 20,000 adolescent girls with the objective of empowering them with knowledge and life skills for improved reproductive and sexual health. Adolescent girls clubs have been established in these blocks and awareness sessions are held every week through a village level animator. The programme also focuses on connecting these out-of-school adolescent girls to formal or non-formal education and aims to address the larger issue of early age at marriage. The experiences of the programme have been utilised for the approval of the national level out-of-school adolescents programme (SABLA) by the Government of India. The resource material developed under the UNFPA supported programme has been nationally disseminated to all the states where the SABLA programme is being implemented (Ibid).

In Sehore district of Madhya Pradesh, UNFPA is supporting a pilot (with the NGO Samarthan as the implementing partner) for empowering out-of-school adolescents and youth with knowledge and life skills for improved reproductive and sexual health. The pilot is being implemented from 2009 and attempts to develop the capacity of youth to better understand reproductive health (RH) issues, to engage them in demand generation of RH services and in planning and monitoring of utilization of key RH services by the clients. The pilot also aims to create a platform for youth to raise their issues and concerns during *gram sabhas* and at block headquarters through public dialogue. Initial results of the pilot are quite encouraging and there is marked improvement in regular organization of village health and nutrition days and uptake of RH services through demand generation (Ibid).

1.4.2.3 Population Education in Higher Education Sector

Population education has been recognized as a critical input and support for several other policy thrusts to promote extension education as the third dimension of University system of education.

Major Objectives: The major objectives of incorporation of Population Education within the University and from there to the Community are both academic and social. These objectives intend to provide opportunities to the University/College youth and from them to the Community for creating awareness of a relationship between the population and quality of life through access to information and transmission of knowledge (http://www.ugc.ac.in/financialsupport/guidline_PEU.pdf).

Objectives of the PE Programmes through Universities are highlighted below:

- 1) To undertake and prepare UG/PG/Diploma/Certificate/Short courses to benefit at all levels of the Universities / Community concerned, among others, and to augment and update university curricula commensurate with national and global developments in the areas related to PE;
- 2) To integrate population education / studies in the curriculum at UG / PG / BEd / MEd level and incorporate PE in distance education as well.
- 3) To promote capsule course on core components of PE in Training / Orientation of teachers through Academic Staff Colleges for widening the base of PE among teachers and through them among students.
- 4) To make attempts to bring desirable changes in the attitude, practices and values in the society on gender related issues including equal opportunities for participation in social, economic and political processes, and in national and global developments.
- 5) To identify areas of priorities in Teaching, Research and Extension Outreach and to find out strengths and weaknesses in implementing the programme/ Scheme by the Department / Centres;
- 6) To create and develop learning materials using Audio-Visual cassettes/DVD.
- 7) To bring Universities closer to population by establishing PE Clubs, PE Cells and Population Education Resource Centres (PERCs) and to provide suitable solutions to population related issues;
- 8) To produce sensitive and quality human resources for committed meaningful roles and to play special responsibilities in different spheres including teaching, research, curriculum and training and to take up challenges in promoting values such as gender equality, secularism, socialism and democracy;
- 9) To coordinate and collaborate with various Universities/Institutions in teaching, designing and restructuring curriculum, research, and extension activities in view of inter-disciplinary nature of the population studies / education;
- 10) To create UGC Non-Formal Education Field Investigators (UNFEF) and enable them to have better understanding of population issues and problems related to the people – children, men and women (within the family, community or at the workplace) and to have close contact to deal with and to assist specific-issues/item-based solutions in the right perspective without any bias or otherwise; and
- 11) To make a survey of the status of the PE, Education Extension and Outreach to a few target groups (BPL and Educationally Backward groups) district-wise as per GOI/States declaration with the help of UGC-NFE Field Investigators and thereby to prepare further activities and programmes of practical utility or benefit of the scheme and to the cause of services of the target groups (http://www.ugc.ac.in/financialsupport/guidline_PEU.pdf).

The extension of the National Population Education Project to the level of higher education in India provided population education opportunity to young people in the universities and colleges, and through them to those in the community. The commitment of the UGC to population education at the university and college levels goes back to 1983 when 92 universities and 1300 college were provided financial support to organize population education activities through Population Education Clubs both for college youth on campus and through them to the community. Thus, the concept of Population Education through Higher Education was introduced in selected Universities by setting up Population Education Clubs (PE clubs) as co-curricular activities. The steps taken by UGC to promote the cause of population education through universities and colleges include the following (UGC, 1986, pp.184-186):

- i) Circulation of a set of 15 lecture series on various aspects of population education for use by universities and colleges;
- ii) Inclusion of population education in the scheme of restructuring of courses at the undergraduate level in foundation and applied courses;
- iii) Strengthening of population education at the post-graduate level and provision of UGC assistance under its normal developmental programmes;
- iv) Assistance to universities and colleges for surveys / research projects on population education with particular references to small family norm, infant mortality, malnutrition, age at marriage, sex ratio, indigenous practices of population control, knowledge, attitudes and practices (KAP), etc;
- v) Population education as one of the major activities under the Programme of Adult, Continuing and Extension Education through universities and colleges;
- vi) Promotion of television series on population education; and
- vii) Institution of Population Education Clubs through universities and colleges for students and the general community.

In 1986 the UGC-UNFPA joint project on Population Education (PE) in Higher Education was launched. The financial support of the UNFPA and technical assistance of UNESCO provided further impetus to the programme for development of contents for the courses at UG and PG levels, research and extension education. The UNFPA agreed to assist the UGC for strengthening population education activities during 1986-90. UGC decided to involve all the universities and colleges in a phased manner in the programme of population education during the period April 1986 to March 1990. Though the project document had visualised the setting up of the PERCs in three phases – six in 1986, three in 1987 and three in 1988, in view of the rapid expansion of population education clubs all over the country, it was found essential to locate all the 12 PERCs in very first year. Twelve Population Education Resource Centres (PERCs), distributed all over the country have thus been set up to provide resource support to universities, colleges and adult education centres.

While the project was to see completion of its first cycle in 1991, a mid-term review was undertaken in 1989. An evaluation was also undertaken by an external agency in 1992 which submitted its report with very comprehensive recommendations regarding strengthening the management structure, human resource development, population education clubs, curriculum development,

learning materials, training, monitoring, research and evaluation, documentation and dissemination, women's programmes, and financial aspects for strengthening the institutionalisation of population education in higher education in India (Ed.CIL, 1992, pp.77-89).

Thus, since 1986 the PE program has been implemented by establishing Population Education Resource Centers (PERCs) in the Department of Adult Continuing Education and Extension in *twelve* universities, namely, Jammu, Delhi, Gujarat Vidyapeeth, SNDT Women's University, Poona, Madras, Kerala, Vikram, Burdwan, Ranchi, NEHU, Gandhigram Rural University, with the provision of faculty and other non-teaching staff on deputation by the concerned university and other full-time project staff. Of the 12, one PERC is specialised in population education programmes for women and one for rural populations. The number of PERCs was later raised to 17 in 1998 by opening of 5 PERCs in the universities at Lucknow, Bhubaneswer, Bangalore, Tirupati and Jaipur. The joint UGC–UNFPA Program was completed as per the terms of reference jointly agreed by the UGC and the UNFPA during the IX Plan (1997-2002). However, besides 17 PERCs, more than 100 Adult Education Departments in Universities and 1400 PE Clubs set up in Universities/Colleges have continued to implement various activities and programmes on population education. During the X Plan (2002-2007), 50 universities were provided funds to implement Population Education Programme. Keeping in view the expertise developed in the universities in Population Education, it is proposed to include this area as one of the important aspects of the work of the Departments of Adult Education during the XI Plan (2007-2012) (<http://www.ugc.ac.in/financialsupport/xiplan/lifelong2.pdf>).

PERC is a sub-structure created under the Population Education in Higher Education Project. Each PERC has been assigned a service area within which it is expected to provide resource support to the strengthening and extension of population education in universities and colleges. For that, UGC had provided staff and programme support to each PERC with a view to enabling it to promote implementation and overview of the programme. Each PERC receives guidance from UGC for its work. It receives support from the six Task Forces – one each in i) training, ii) curricular development, iii) learning materials (print), iv) learning materials (audio-visual), v) research, documentation and dissemination, and vi) monitoring and evaluation – constituted with a convener for each under the project.

The National Steering Committee on Population Education constituted by the Ministry of Education and Culture in the Government of India has the overall authority to coordinate the implementation of the project. There are advisory committees in universities and colleges for target-oriented, time-bound implementation of population education activities. These committees have adequate representation from the universities/colleges, Government departments, voluntary organisations at the National, State and district levels for ensuring effective implementation, coordination, monitoring and evaluation of the programme.

Among the many socio-demographic goals to be achieved by 2010 under national population policy, 2000 several can be achieved at accelerated pace through population education activities and programs at the university level. A few of them are reproductive and child health, compulsory school education up to 14 years of age for boys and girls, age at marriage, infant mortality and maternal

mortality, access to health services, checks on HIV/AIDS, communicable diseases, small family norm, etc. Training and sensitization of the university youth to the socio-demographic goals and through the youth, a reach out to the community through extension education is likely to enable us to achieve the goals of National Population Policy (2000) sooner than projected (http://www.ugc.ac.in/financialsupport/guidline_PEU.pdf).

Population Education formed an important component of Population Studies, a recognized discipline at Post-Graduate level in several Universities. The Population Studies (NET Subject Code-15) and Non-Formal Education like Adult Continuing Education and Extension (NET Subject Code 46) are also two subjects among 76 subject disciplines of the UGC-organized and implemented scheme for conducting National Education Test (NET) for eligibility of lectureship and Junior Research Fellowship for post-graduate students twice in a year, normally in June and December (Ibid).

During the IX Plan the UGC has been implementing the schemes on: i) Adult Continuing Education and Extension and Field Outreach, ii) Population Education, and iii) Women Studies. These schemes are under the Non-Formal Education Bureau of the UGC with suitable allocation of fund for these programmes. The UGC vision and strategy for X plan document relates that the scheme on population education (Under sector-2, item 2.1.3. (iv)) would be operationalized during the X Plan by the UGC under Non-Formal Education group (Page 36, item 2.1.3 Non-Formal Education). The purpose of incorporation of Population Education in University and Colleges in the XI Plan is to create awareness on population issues among students and non-student youth through various activities which may include organisation of awareness programmes for student and non-student youth, workshops for developing materials and training field functionaries, developing and offering short courses, etc. However, efforts have to be made to bring about desirable changes in the attitude, practices and values in the society on gender related issues through organization of the workshops and mass contact programmes (Ibid).

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

6) Which are the institutions that played significant roles in institutionalization of population education in India?

1.5 LET US SUM UP

Every family, community and nation desires to achieve better standard of living by increasing or decreasing the size of its population through rational decisions and actions thereof which have their implications for development at micro and macro levels. At the national level such decisions are taken in response to population problems and issues and are a matter of national population policy, which may be pro-natalist or anti-natalist and aimed at overall improvement in quality of life of people. These policies and programmes vary from nation to nation based on the economic, political, social, cultural, environmental and other aspects. And, population education is an indirect means to attain national demographic goals by influencing the people's knowledge, attitudes and practices or behaviour towards such problems and issues. It is with this purpose we have highlighted different aspects of population education such as its concept, need, significance, scope and development so as to enable you to cope up with discussions in the other units that follow in this course.

1.6 ANSWERS TO 'CHECK YOUR PROGRESS' QUESTIONS

- 1) It is difficult to give one definition of population education which is acceptable to every individual, institution and nation. Moreover, these definitions may be directive or non-directive. Again, the definitions based on directive approach also differ in their specific behavioural outcomes such as promotion of acceptance of a small family norm, contraceptives, etc. While the directive definitions of population education may be controversial, non-directive definitions will be non-controversial. However, the definition of population education as given by UNESCO in 1971 is universally accepted and is as follows.

Population education is an educational programme which provides for a study of the population situation in the family, community, nation and the world, with the purpose of developing in the students rational and responsible attitude and behaviour towards that situation.

- 2) The distinguishing attributes/features of population education include the following.
- It is an *educational programme* designed to make learners understand the inter-relationship among population situation, its change, development and aspects of quality of human life.
 - Its *ultimate goal* is to make learners contribute to the *improvement of the quality of human life* now and in some future time.
 - It is *population problem-centred*, hence lends itself to discovery and inquiry learning processes.
 - It is a *value-laden subject* and open to the use of values-clarification approach to learning, i.e. to pose realistic alternatives, to examine consequences of each alternative and to enable learners to make sound decisions for action on population issues. However, in multi-lingual, multi-religious, and multi-racial societies it requires skilful handling.

- It is *multi-disciplinary* and derives its content from demography, population studies, biology, statistics, sociology, psychology, economics and other disciplines.
- 3) World population was 300,000,000 in 1 AD. It took 1700 to double itself, but the second doubling occurred in 150 years, the third in 100 years, the fourth in only 45 years to reach the figure of 5,760,000,000 by 1995. On 31 October 2011 it crossed 7 billion mark. It is estimated that it is likely to cross 9,352,000,000 by 2050. The population of just two countries namely China and India account to more than one-third of world's population. While India alone is adding one Australia to world's population every year, the world population is likely to add one India or China to its population every decade. There is thus pressing need to spread population education in the countries like China, India and the developing countries in particular and the entire world in general to avoid further suffering from the problems of population growth.

The human beings, by contributing to such phenomenal growth of their population and associated problems, are endangering their individual, familial, social and national well-being. It is thus a man-made problem and effective solution should evolve from his rational thinking and action – rational mind and behaviour. That is possible through educating people about their role in respect of population problems and issues – population education. Herein lies the significance of population education.

- 4) Broadly speaking, the population matters include the following.
- a) the size, structure, distribution, density, growth, etc, of population;
 - b) the trends in population change at different levels – local, state, national and global as well as the factors that determine these changes;
 - c) the consequences of population change on different aspects of human life – social, economic, political, cultural, etc, and also on environment and ecological balance;
 - d) the human reproductive system, the process of conception, the progress of pregnancy and delivery, etc; and
 - e) various measures of population control viz. individual – different temporary and permanent methods and techniques of family planning; national – national population policy and programmes; and international – agencies engaged in providing different types of support such as financial, material and human to various population control programmes in different countries.

The above matters together form the effective content for population education.

- 5) Population education forms integral part of national population policy as well as educational policy. Therefore, the major goals of population education as part of population policies and programmes include the following.
- To develop in the individuals appropriate knowledge, understanding, skills and abilities to identify, analyse, define and address the problems and issues of population and development in a way that is personally

meaningful, familially advantageous, socially relevant, nationally progressive, developmentally sustainable and globally welfare-oriented.

- To contribute to the realisation of the goals and objectives of national population policies and programmes by affecting critical demographic variables that have significant relevance to the achievement of economic, social, demographic, political and other collective goals of the nation.

There are eight MDGs goals set by Millennium Summit 2000 and are as follows.

- ✓ Goal 1: Eradicate extreme poverty and hunger
- ✓ Goal 2: Achieve universal primary education
- ✓ Goal 3: Promote gender equality and empower women
- ✓ Goal 4: Reduce child mortality rates
- ✓ Goal 5: Improve maternal health
- ✓ Goal 6: Combat HIV/AIDS, malaria, and other diseases
- ✓ Goal 7: Ensure environmental sustainability
- ✓ Goal 8: Develop a global partnership for development

On close examination of the above, we can easily understand that the goals of population education are intricately linked to development goals. So, the goals of population and development education are integral part of the MDGs and vice versa.

- 6) Population education is not treated as a separate subject or a separate educational activity. Accordingly, all possible attempts have been made at various levels to integrate the elements of population education in almost all aspects of education in three sectors — school education, non-formal and adult education, and university and higher education. For institutionalisation of population education in school education National Council of Educational Research and Training (NCERT) played a crucial role. The efforts at institutionalisation of population education in the Adult Education sector were made by the Directorate of Adult Education while such efforts in the University Education sector were undertaken by the University Grants Commission. All this has been designed to institutionalise population education in the entire education system of the country and to promote functional coordination among all the sectors of education through effective institutional arrangement. Role of UNFPA as a funding agency is paramount in this regard.

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UNIT 2 DEMOGRAPHIC CONCEPTS

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2.0 INTRODUCTION

We have discussed the concept and development of population education in Unit-1. While studying Unit-1 you must have noticed that population education encompasses demography as one of its components. Thus, in the context of population and development education, study of demography assumes greater significance all over the world. It is primarily because ever-growing population in developing and under-developed countries in particular and developed countries in general strains social, economic and political systems, amongst others, due to concomitant dynamics within and across the nations. It is, therefore, essential that you are introduced to the demographic concepts in Unit-2 so that your understanding of further units of this Block would be easy, smooth, clear and comprehensive.

2.1 OBJECTIVES

In this Unit, the focus of our discussion will be on the concept, nature and scope of demography and population studies. We will also highlight the inter-relationship between demography and population studies and also their relationship with other disciplines. After going through this unit, it is expected that you should be able to:

- Define the concepts of demography and population studies;
- Explain the meaning of different terms/concepts as are used in the study of demography and in population studies;
- Distinguish between demography and population studies; and
- Discuss different aspects or components of demography.

2.2 DEMOGRAPHY: CONCEPT, NATURE AND SCOPE

In this section, we will present you the concept, nature and scope of demography. As a part of its nature and scope, we will also highlight the interrelationship of demography with other disciplines.

2.2.1 Concept of Demography

Demography, in fact, originated when human beings started forming civilized society. As the time passed, every society and nation realized the need and necessity of maintaining proper records of human population for smooth running of administration and for solving many social as well as economic problems associated with growth of population. Different countries began registration of vital events in different periods and for variety of reasons. Thus, demography has assumed much more significance in modern times. Realizing the importance, the churches started keeping records of baptisms, marriages and death of their members in some countries from the beginning of 15th century. In fact, credit goes to John Graunt (1620-74) for starting demographic studies during modern times. He brought out his famous volume entitled, "Natural and Political Observations upon the Bills of Mortality" (1662) which made him the real founder of demographic studies. In this volume he analysed and discussed the number

and causes of death of certain places and the need and necessity of such analysis, the births, migrations, family growth and similar other problems of some places in sonic details. He analysed the population which was capable of serving in the army, amongst others. He suggested that the population should be studied on the basis of sex, religion, age, occupation, status and state.

John Graunt (1662) believed that fertility, mortality and migration were interrelated processes and that these were based on definite postulates. According to him male birth rate was always greater than that of females, if in a given society the number of both the sexes was the same. Then his another finding was that mortality rate was higher in urban as compared to rural areas and also it was higher, at the beginning of life, than at any after-stage. He also had knowledge of sample survey, because where the records were not available, he compiled them on the basis of such surveys. Credit also goes to him for the preparation of life tables. While discussing the contribution of John Graunt, Peter. R. Cox said (quoted in Hans Raj, 1986, pp.2-3): "Graunt's work covers so wide an area of interest that it may be said that a large part of demography was born all at once. The developments that occurred subsequently were in the nature of consolidations".

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

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

Stenford (Quoted in Hansraj, 1986) views it as follows: "In its most formal sense, demography is a very technical and highly mathematical study of the vital statistics of human population (especially birth, death and migration) as well as of the characteristics of population structure (including age, sex and marital status) as they contribute to an understanding of population change." In the words of Irene Tanker: "With improved data, new techniques and measurement of the demographic transition that is occurring, demography has become science rather than literature" (Hansraj, 1986). *Demography is the statistical study of human population*. It can be a very general science that can be applied to any kind of dynamic human population, that is, one that changes over time or space (*population dynamics*). It encompasses the study of the size, structure and distribution of these populations, and spatial and/or temporal changes in them in response to *birth, migration, aging and death*. (<http://en.wikipedia.org/wiki/Demography>). These definitions raise the status of demography from studies to a science of population.

2.2.2 Nature and Scope of Demography

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

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

- i) **Broader view:** According to this view, the scope of demography is wide and it studies the causes of slow or rapid change in birth rate, death rate, population growth, sex ratio, health conditions, etc. According to holders of this view, in demography many economic problems such as those related to employment and income conditions of the masses; labour conditions and their living standard, information about production and consumption, saving habits of the population belonging to all sections of the society, rate of growth of population, working efficiency of the masses and the relationship of economic development, population change and overall quality of life, could be understood and analysed.

Demographic studies can be placed broadly under *four categories*, namely,

- a) *Descriptive Demography*, under which are studied census and registration statistics,
- b) *Analytical Demography*, which deals with analysis of the data collected, and rates and ratios of population change,
- c) *Comparative demography*, which covers study of different aspects of population and their determinants at two different places and at two different points of time, and
- d) *Historical Demography*, under which time series, and study of rates and ratios of population change are studied.

Reflecting on social problems, Hans Raj (1986, p.11) believed that demography helps in the study of many problems such as marital status, composition of the family and growing trends about caste, religion, education, etc. Geography can also be studied with the help of demography, e.g. trends in urbanisation and problems of migration from villages to the cities, etc. These thinkers also believe that demography is collective or comprehensive, or interdisciplinary study of human life. It deals with individual ancestries, hereditary nature of the population and collects physical, social and vital facts. It registers facts, from birth to death including family, marriage, divorce and sickness, human growth structure and strength. It also studies, at some length, the diseases and their relation with human body. In this sense it can be considered as population studies. UNO (Hans Raj, op.cit) has said that under demography we study the determinants and consequences of population change.

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

- ii) **Narrower view:** As against the broader view, there is also a narrower view about the nature and scope of demography. This view, among others, is represented by Phillip and Otis (1959, p.2). According to them the scope of demography is not as wide as we have been made to believe by some thinkers.

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

- iii) **Balanced view:** There is a third school of thought which claims to have presented balanced view of the nature and scope of demography. According to Warren, S. and Thompson (1953), under demography, we can study death, birth and actual rates of growth of population, information about female population, their education, health conditions, marital status, distribution of population and their classification according to their occupations, their socio-economic conditions, etc.

In fact, today it is accepted that demography is the study of human society and has very little to do with individualistic human problems. While dealing with groups it takes the help of figures and arithmetic.

2.2.3 Relationship of Demography with other Disciplines

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

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

- i) **Sociology and Demography:** Demography primarily studies and is concerned with collecting data and information about biological, economic and social problems. Sociology believes that man is a social animal. Similarly, demography also accepts human being as a unit of a society and a group in which a man is born, lives and dies. The group, however, continues. The relation between the two subjects is that in actual life all problems connected with population studies are also social problems. For instance, demography covers birth (birth rates) which is closely linked with marriage, and sociologists also study the institution of marriage with keen interest.
- ii) **Demography and Anthropology:** Demography is concerned with population figures of the whole world, whereas anthropology is concerned only with the study of few sections of society. In anthropology we are concerned with the development and growth of only few tribes/sections and not with the whole data which a demographer will collect.

- iii) **Demography and Human Ecology:** Population is an outcome of births, and birth of human beings and their living is the main concern of human ecology. In human ecology along with human births and environment, relationship between them is also studied. It is well known fact that population of an area is effected by the environments around it, and at the same time, environment is also affected by the density and quality of populations. From the ecological viewpoint, population can be seen in terms of the extent to which people share in exploiting and developing the same environmental resources.
- iv) **Demography and Geography:** Importance of human geography has increased more as compared to physical geography. In other words, geographers have also started keenly studying population growth and problems. According to Ackerman (quoted in Hans Raj, 1986, p.24) "Recent geographers have taken the cultural features of the earth, analysed them generically and in their space-relations and established covariant relations of cultural features with each other and with the physical and biotic environment. These distributional features are common both to demography and geography".

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

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

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

Demography influences economics in different ways. Changes in population influence labour force and the source of production. Depending upon the changes in labour force the economists shall be in a position to find out what amount of socially useful and productive labour is available in the country and whether it is the labour-intensive or capital-intensive techniques

that suit nation's economy, and so on. Demographers will help economists in finding out the extent of unemployment and the types of training and opportunities needed by the country to remove unemployment from the soil.

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

2.2.4 Institutionalisation of Demography: Terminological Changes

Demographic studies received greater importance with increasing population growth and associated problems. As a result, efforts at institutionalization of demographic studies or population research began.

The Central Family Planning Board, set up in 1956, appointed a sub-committee on Demographic Studies under the chairmanship of Dr. V. K. R. V. Rao. This sub-committee recommended the establishment of four demographic research centres in different parts of the country, where studies might be conducted in fertility, mortality and associated factors. As a result, the *Demographic Training and Research Centre* was established in Bombay in 1956; followed by the Demographic Research Centres in Calcutta, Delhi and Trivandrum in 1957 and one at Dharwar in 1960. In 1959, the Demographic Advisory Committee was appointed by the Ministry of Health, mainly to co-ordinate research on population. The 'Family Planning Communication Action Research Committee' was set up in 1960 to coordinate and promote research in family planning communication and motivation. The two committees were merged in 1967 to form the 'Demographic and Communication Action Research Committee' which became defunct when its term expired on November 3, 1971. This committee was reconstituted on December 6, 1972 as the 'Committee on Socio-Economic Studies on Family Planning' to cover the economic, sociological, educational, psychological, communicational and demographic aspects of population growth and family planning. Subsequently, Centres for Population Studies came into existence. In addition to these, at present, there are fifteen *Population Research Centres* (as they are now called) in different parts of the country and four more centres have recently been sanctioned (Asha and Tara, 2006, p.18).

The 1961 Census of India provided first ever wealth of data to students of demography, and a large number of reports and monographs based on these data were published later. The Sample Registration Scheme initiated by the Registrar-General of India in 1964-65; was a step forward in solving the problem of obtaining reliable estimates of birth and death rates and rates of natural growth. The progress made by this system in obtaining reliable estimates has been quite promising. Subsequent censuses continued to provide rich and reliable data about Indian population thereby facilitating more and more research studies related to population.

What was formerly known as the Demographic Training and Research Centre, Bombay has become the premier institute, after its renaming as *International Institute for Population Sciences* popularly called by its acronym, IIPS known for training and research in population studies in India. This Institute has *four functions*, namely, teaching, research, consultative services and documentation. Establishment of Centres for Population Studies and from the change of nomenclature of DTRC into IIPS indicates that the terms 'Population Studies' and 'Population Sciences' are more broader and include in them demography as well.

Now let us look at the relationship between demography and population studies and between population studies and other disciplines.

2.3 POPULATION STUDIES: CONCEPT AND SCOPE

The study of human population is popularly known by two terms: i) Demography, and ii) Population studies. We have already discussed the concept of demography. In this section, we will focus on population studies including its relationship with other disciplines.

2.3.1 Concept of Population Studies

As mentioned in the preceding section, demography is derived from the Greek words 'demos' which means population, and 'graphy' which means to describe or to draw. It means, it describes population (situation). This concept has gradually been broadened by the demographers by enlarging its scope; a study of population (population studies) and later (i.e. currently) the science of population (population science). As a result, these terms 'demography' and 'population studies' are often used interchangeably by some and distinctly by others, thereby creating a confusion. We deal with these terms among other terms and their distinction from each other in detail in Unit-5. However, we will discuss in brief about the relationship between demography and population studies below so that the concept of population studies becomes very clear.

2.3.2 Relationship between Demography and Population Studies

Though the terms, 'demography' and 'population studies' are often used interchangeably, some scholars have tried to distinguish between 'demographic analysis' and 'population studies'. It is considered that (Philip and Otis, 1959, p.2): "demographic analysis is confined to a study of the components of population variation and change", whereas "population studies are concerned not only with population variables but also with the relationships between population changes and other variables – social, economic, political, biological, genetic, geographical and the like" The term 'demography' may be used in a narrow sense, as synonymous with 'demographic analysis' or 'formal demography', which is primarily concerned with quantitative relations among demographic phenomena in abstraction from their association with other phenomena. Demography may also be conceived in a broad sense to include, in addition to the quantitative study of population, the study of interrelationship between population and socio-economic, cultural and other variables.

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

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

2.3.3 Relationship between Population Studies and other Disciplines

The above discussion has provided the clarity about the distinction between demography and population studies. Now, we will see the interrelationship between population studies and other disciplines.

- i) ***Population Studies and Biology:*** The study of fertility provides a good illustration of the relationship between population and biology. It is a biologically determined fact that only females can give birth to children and, that too, only during certain age span. Similarly, in the study of mortality, it is known that the age and sex differentials are biologically determined. Even the sex ratio among the new-born is biologically determined. Population genetics have been an important area of specialisation. The knowledge of reproduction, so necessary for the study of fertility, is gained mainly from reproductive physiology, an area of biology. An effective regulation of fertility through improvements in contraceptive techniques has been the contribution of applied research workers in the field of reproductive physiology. It is also well-known that advances in the medical sciences and the adoption of widespread public health measures have been responsible for declining mortality rates even in developing countries, irrespective of the level of development in these countries.
- ii) ***Population Studies, Mathematics and Statistics:*** Quantification is an important element in population studies, as population data are available in a discrete quantifiable form. The relationship of population studies with mathematics, therefore, assumes great importance. The study of population size, growth, structure and components is entirely done with the help of mathematics. Population experts have attempted to build various mathematical models regarding population growth. Mathematics is, thus, an important tool in the study and understanding of population phenomena.

Population studies also depend on statistics, as a tool. It may be recalled that the development of statistics fostered the development of demography in

the nineteenth and the twentieth centuries. The theory of probability has been extremely useful for an analysis of mortality. The actuarial science was useful in the preparation of life tables with a high degree of precision and sophistication mainly because of its use of the probability theory.

- iii) ***Population Studies and Social and Behavioural Sciences:*** Till recently, population studies was generally regarded as a branch of sociology or economics or even geography. Most of the variables and the theories which explain demographic phenomena originated in the social sciences. The theory of demographic transition is based on an understanding of such other disciplines as economics, sociology, political science, psychology, anthropology and geography. Many of the fertility theories are based on biology, sociology and economics. The changes in the birth rate cannot be explained as independent phenomena. Rather, their explanations have to be sought in the changing economic, social, cultural, psychological and political situations in which they occur. Similarly, the levels and trends in mortality are related to socio-economic factors. In recent times, another dimension has been added to the study of population; demographic questions such as those related to fertility regulation are examined with reference to humanistic issues like human rights and the status of women.

Though it is possible to speak broadly of the inter-relation between population studies and the social and the behavioural sciences considered together, it would be more useful if we consider the social and behavioural sciences separately with population studies to understand their specific inter-relationships.

- iv) ***Population Studies and Sociology:*** Kingsley Davis (1959, p.314) has referred to the following areas of study which require a combination of demographic and sociological skills: 1) Fertility in connection with attitudes and social institutions; 2) Population changes in relation to social and economic change; 3) The labour force with respect to population structure and social organisation; and 4) The family with regard to demographic behaviour. International and internal migration are two other areas of study mentioned by Davis, where a knowledge of sociology and demography need to be combined. Even the study of mortality, age and sex differentials, though biologically determined, may have sociological bases, and, therefore, need to be recognised as such (Asha and Tara, 2006, p.26).
- v) ***Population Studies, Psychology and Social Psychology:*** Several questions connected with family planning and fertility regulation can be answered only when the reproductive behaviour of individuals is understood in the context of the social standards and cultural norms which influence and govern such behaviour. For instance, some questions which are often asked are: What is the family size norm in a community? How is it determined? Is it possible to modify this norm by stimulating planned change? Even in the field of mortality, utilization patterns of healthcare services can be understood only when individual behaviour is explored and the relevant social norms are studied. Movements of people from rural to urban areas can also be studied only by understanding the motivation behind such migrations.

- vi) **Population Studies and Economics:** The study of population is an important area of investigation in the field of economics, specially since problems of economic development and development planning have come to the forefront in most developing countries. In order to gain a better understanding of the relationship between population trends and economic growth the following topics have emerged over the years and continue to occupy an important place, both in economics and population studies: a) population and development; b) manpower studies; c) the economics of fertility; and d) comprehensive economic-demographic models.
- vii) **Population Studies and Geography:** Students of population studies are usually interested in the geographical distribution of the population and its movements between rural and urban areas. Those geographers who are interested in geography not only as an academic discipline but also as a geographic point of view to understand the world, point out that it is useful to know how the various issues facing the world, for instance, rapid population growth, urbanization, race-relations, etc. assume different forms in different regions or contents (Asha and Tara, 2006, p.23).
- viii) **Population Studies and Law:** The inter-relationship between population and law becomes clear when an attempt is made to study what the present and the future laws of any country can do to solve the problem of over-population. Chandrasekhar (1976, p.51) has pointed out that population laws may be defined as “that body of law which relates directly or indirectly to the three basic demographic variables of fertility mortality and migration and their various components, which in turn affect the more general problems of the size, growth and distribution of the population”. Population laws, could, therefore, relate to “public health and sanitation; food preparation, distribution and sale; drugs and pharmaceuticals; clinics, hospitals and medical personnel; migration, marriage, fertility, child care and all aspects of education and the role and status of women. The Indian Medical Termination of Pregnancy Act of 1972, which has made induced abortion fairly easy, is the illustration of how the law of the land can affect an important demographic variable, that is, fertility”.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

- 1) Explain the interrelationship between demography and economics.

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2.4 POPULATION DISTRIBUTION

In any demographic or population study the concern is not only about finding out how many people live in a particular area at a given point of time but also about whether the number is larger than what it was and what it is likely to be in the future, what will be its effect, and so on. Such facts are needed for industrialists, particularly those concerned with providing social utility services like education, medical aid, as well as for legislators and social scientists. It is with the help of these figures that the government and planners can develop their future plans, strategies and expansion activities. It is again after getting this actual and estimated data that production for consumer goods can be increased and arrangement for providing basic facilities to the society can accordingly be made. A demographer also likes to find out the extent of changes, but he is also required to find out the causes of such changes – the changes in the births, deaths, migration; poor medical and other facilities; lack of awareness among the masses about their health, etc. This is all a complex process involving systematic application of different tools and techniques.

Nevertheless, in this sub-section, we will just begin to understand population distribution. Population distribution is always discussed with reference to the size of population at particular point of time, over a period of time and over specific geographical space. Of course, other details related to distribution by sex, age, sex and age, and so on are also studied.

2.4.1 Distribution of Population by Size – At a Point of Time

The size of population gives us an idea of how many people live in a given place at a given point of time. But, the size can be accurately found out by clearly defining the terms 'place', 'person' and 'time'. For instance, see population distribution in different states in 2011 as given in Table 2.1.

Table 2.1: List of States and Union Territories by Total Population (Size) and Rank - 2011

Rank	State/Union Territory	Population	% of Total Population
1	Uttar Pradesh	199,581,520	16.49%
2	Maharashtra	112,372,972	9.29%
3	Bihar	103,804,637	8.58%
4	West Bengal	91,347,736	7.55%
5	Andhra Pradesh	84,665,533	7.00%
6	Madhya Pradesh	72,597,565	6.00%
7	Tamil Nadu	72,138,958	5.96%
8	Rajasthan	68,621,012	5.67%
9	Karnataka	61,130,704	5.05%
10	Gujarat	60,383,628	4.99%

11	Orissa	41,947,358	3.47%
12	Kerala	33,387,677	2.76%
13	Jharkhand	32,966,238	2.72%
14	Assam	31,169,272	2.58%
15	Punjab	27,704,236	2.29%
16	Haryana	25,353,081	2.09%
17	Chhattisgarh	25,540,196	2.11%
18	Jammu and Kashmir	12,548,926	1.04%
19	Uttarakhand	10,116,752	0.84%
20	Himachal Pradesh	6,856,509	0.57%
21	Tripura	3,671,032	0.30%
22	Meghalaya	2,964,007	0.24%
23	Manipur ^a	2,721,756	0.22%
24	Nagaland	1,980,602	0.16%
25	Goa	1,457,723	0.12%
26	Arunachal Pradesh	1,382,611	0.11%
27	Mizoram	1,091,014	0.09%
28	Sikkim	607,688	0.05%
UT1	Delhi	16,753,235	1.38%
UT2	Puducherry	1,244,464	0.10%
UT3	Chandigarh	1,054,686	0.09%
UT4	Andaman and Nicobar Islands	379,944	0.03%
UT5	Dadra and Nagar Haveli	342,853	0.03%
UT6	Daman and Diu	242,911	0.02%
UT7	Lakshadweep	64,429	0.01%
Total	India	1,210,193,422	100.00%

Source: http://en.wikipedia.org/wiki/Demographics_of_India

The data in Table 2.1 is self-explanatory regarding the size and rank and does not require any elaborate discussion — we can easily say which is the biggest State/UT in terms of its population size. To read more, by taking the total population of the States with ranks 1-7, we can notice that they together account for more than 60% of the total population of the country in 2011.

Similarly, we can say which particular city is bigger or smaller in terms of its population compared to any other city. For example, see the Table 2.2.

Table 2.2: Largest Cities in India in 2001

Rank	Name of the City	State	Population
1	Mumbai	Maharashtra	13,830,884
2	Delhi	Delhi	12,565,901
3	Bengaluru	Karnataka	5,438,065
4	Kolkata	West Bengal	5,138,208
5	Chennai	Tamilnadu	4,616,639
6	Lucknow	Uttar Pradesh	4,589,651
7	Hyderabad	Andhra Pradesh	4,068,611
8	Ahmedabad	Gujarat	3,959,432
9	Pune	Maharashtra	3,446,330
10	Kanpur	Uttar Pradesh	3,421,435
11	Surat	Gujarat	3,344,135
12	Jaipur	Rajasthan	3,210,570
13	Nagpur	Maharashtra	2,447,063
14	Patna	Bihar	1,875,572
15	Indore	Madhya Pradesh	1,854,930
16	Bhopal	Madhya Pradesh	1,792,203
17	Thane	Maharashtra	1,807,616
18	Ludhiana	Punjab	1,740,247
19	Agra	Uttar Pradesh	1,686,976
20	Pimpri	Maharashtra	1,637,905

Source: en.wikipedia.org/wiki/demographics_of_India.

The study of demography does not confine to only such data based on just one aspect, as it is not much useful.

2.4.2 Distribution of Population over the Period of Time and Space

Data on size of population at particular point of time provides us very little information. So, to have somewhat better understanding of population we can consider its distribution over a period of time i.e. at different points of time. For example, see the distribution of population given in Table 2.3 below.

Table 2.3: Population Growth in India — 1901-2011

Census Year	Population	Decadal growth		Average annual exponential growth rate (per cent)	Progressive growth rate over 1901 (per cent)
		Absolute	Per cent		
1	2	3	4	5	6
1901	238,396,327	—	—	—	—
1911	252,093,390	13,697,063	5.75	0.56	5.75
1921	251,321,213	- 772,177	- 0.31	- 0.03	5.42
1931	278,977,238	27,656,025	11.00	1.04	17.02
1941	318,660,580	39,683,342	14.22	1.33	33.67
1951	361,088,090	42,427,510	13.31	1.25	51.47
1961	439,234,771	78,146,681	21.64	1.96	84.25
1971	548,159,652	108,924,881	24.80	2.20	129.94
1981	683,329,097	135,169,445	24.66	2.22	186.64
1991	846,387,888	163,058,791	23.86	2.14	255.03
2001	1,027,015,247	180,627,359	21.34	1.93	330.80
2011	1,210,193,422	183,178,175	17.8%	1.78	407.64

Notes:

- 1) In working out 'Decadal Growth and Percentage Decadal Growth' for India 1941-51 and 1951-61 the population of Tuensang district for 1951 (7,025) census and the population of Tuensang (83,501) and Mon (5,774) districts for 1961 Census of Nagaland state have not been taken into account as the areas were not covered for the first time in 1951 and the same are not comparable.
- 2) The 1981 Census could not be held owing to disturbed conditions prevailing in Assam. Hence, the population figures for 1981 of Assam have been worked out by 'interpolation'.
- 3) The 1991 Census could not be held owing to disturbed conditions prevailing in Jammu and Kashmir. Hence, the population figures for 1991 Census for Jammu and Kashmir have been worked out by 'interpolation'.
- 4) It may be further noted that the figures have been adjusted for the territorial changes which occurred because of the partition of the Indian subcontinent into two countries, India and Pakistan.
- 5) For 2011, the figure under column (2) is obtained from http://en.wikipedia.org/wiki/Demographics_of_India, and accordingly the rest of the figures are calculated.

Table 2.3 presents the growth of India's population as per the censuses from 1901 to 2011. This gives us more information to study the population at different

points of time. For instance, we get more information from it and can infer the following points.

- i) The course of population growth up to 1931 was undulating. The decades of marked increases alternated with decades of small increases, while during 1911-1921 a negative growth was experienced.
- ii) The absolute number of people added to the population during each decade has been on the increase from 1921 onwards. The decennial rate of growth has also increased from 1921 up to 2011, although there were fluctuations in the positive growth rate. From 1951 onwards, India's population has been growing at a phenomenal rate. While during 1941-1951, the average decennial growth rate was 13.31 per cent, during 1951-1961 it increased to 21.6 per cent, and during 1961-1971, it was 24.8 per cent. From 1901 to 2011, there has been an increase of 407.64 per cent in the population. India's population has more than doubled in a period of 50 years, that is, from 1921 to 1971.
- iii) The year 1921 is designated as "the great divide" in the sense that it is the turning point which marks the beginning of not only regular/continuous growth but also the beginning of a rapid and massive population growth in India.
- iv) The decennial population growth rate during 1961-71 was 24.80 per cent, during 1971-81 it was 24.66 per cent, during 1981-91 it was 23.85 per cent, during 1991-2001 it was 21.34 per cent and during 2001-2011 it was 17.8 per cent. Thus, it can be observed that while the population size has been growing, the rate of population growth has decreased from 1981 onwards.

Nevertheless, Table 2.3 does not give us other relevant information such as the nature of changes that took place during these periods which resulted in the change of the size of the population over time. If we know the reasons underlying the changes in the population that will provide us more meaningful information to understand these changes. It requires additional efforts to enlarge the scope of coverage beyond simply the distribution of population over time and space. For instance, for our better understanding of the above data, we can look at the following additional information.

- During 1901-1911, the seasonal conditions were much more favourable, according to the census reports, which refer to the agricultural conditions as being "normal" or even "prosperous." No indication of any famine being an important cause of high mortality is found in these reports. It appears, therefore, that the days when people died in large numbers due to local crop failures were over. Improved transportation and communication because of the building of roads and railways had reduced the isolation of certain areas. These changed conditions were reflected in population growth, and the rate of this growth rose to 5.7 per cent during the "normal" decade of 1901-1911.
- In the decade 1911-1921, there is a phenomenal decrease in population of India. All the fluctuations in the population growth in the preceding periods pale into insignificance when the situation during 1911-1921 is considered. This decade was extraordinary in many ways. The natural checks which are

known to curb the growth of population were found to operate during this period. Though agricultural conditions were on the whole favourable, an epidemic of plague took a toll of nearly three million lives. The First World War took place during this decade and, most important, after the War, the entire country was swept by distinct waves of a worldwide pandemic of influenza. This epidemic may be considered the most severe and the most deadly of its kind for, even according to the conservative estimates of official reports, nearly 12 to 13 million people died of this disease during the short span of three or four months. In this disastrous year of 1918, the official death rate rose to 63 per thousand population, whereas it was 33 in 1917 and 36 in 1919. J. T. Marten reported in the Census Report of 1921 that rural areas were severely affected by this epidemic. Mortality was particularly high among adults between the ages of 20 and 40. Women were the worst affected. "In the worst period, whole villages were absolutely laid desolate by the disease. There was sometimes no means of disposing of the dead; crops were left unharvested. To add to the distress, the disease came at a period of widespread crop failure and reached its climax in November, when the cold weather set in. And, as the price of cloth happened at the time to be the highest, many were unable to provide themselves with the warm clothing that was essential in the case of illness that so readily attacked the lungs. All these are mentioned here to highlight the usefulness of the census surveys.

Distribution of population over geographical area and time: If our interest is to know the size of other countries in terms of their population at a particular point of time, then we will look for relevant information accordingly. For example, see Table 2.4 in this regard.

Table 2.4: Countries with a Population of Over 100 Million — 1998 and 2050 (Population in Millions, Medium Variant)

Countries with a Population of Over 100 Million								
In 1998			By 2050					
1.	China	1256	1.	India	1529	11.	Mexico	147
2.	India	982	2.	China	1478	12.	Philippines	131
3.	USA	274	3.	USA	349	13.	Vietnam	127
4.	Indonesia	206	4.	Pakistan	346	14.	Russian Fed.	122
5.	Brazil	166	5.	Indonesia	312	15.	Iran	115
6.	Pakistan	148	6.	Nigeria	244	16.	Egypt	115
7.	Russian Fed.	147	7.	Brazil	244	17.	Japan	105
8.	Japan	126	8.	Bangladesh	213	18.	Turkey	101
9.	Bangladesh	125	9.	Ethiopia	170			
10.	Nigeria	106	10.	Democratic Republic of the Congo	160			

Source: United Nations Population Division, *World Population Prospects: The 1998. Revision*.
(See <http://www.aph.gov.au/library/pubs/rn/1999-2000/2000rn09.htm>)

According to Table 2.4, the number of countries with a population of over 100 million will increase from ten in 1998 to 18 in 2050, only three of which (United States, Russia and Japan) are located in the more developed world. India will replace China as the most populous country with a population of 1529 million by 2050.

To get more details, the distribution of population of a country can be sub-divided depending upon any other special criteria. For example, in a population study one would be interested to find out the population living in advanced urban industrial areas, in newly developing or growing urban industrial areas, in pre-urban industrial areas, in rural areas and so on including the reasons for changes in these populations. This calls for complex data.

Table 2.5: Rural-Urban Composition of Indian Population – 2001

Sl No	India/State/ Union Territory	Population, 2001			Urban Population as Percentage of Total Population 2001	Decennial Growth Rate of Population (Per cent) 1991-2001		
		Total	Rural	Urban		Total	Rural	Urban
1	2	3	4	5	6	7	8	9
	India	1,028,610,328	712,490,639	286,119,689	27.82	21.54	17.90	31.20
1.	Andhra Pradesh	76,210,007	55,401,067	20,808,940	27.30	14.59	13.60	14.60
2.	Arunachal Pradesh	1,097,968	870,087	227,881	20.75	27.00	15.20	10.30
3.	Assam	26,655,528	23,216,288	3,439,240	12.90	18.92	16.70	36.20
4.	Bihar	82,998,509	74,316,709	8,681,800	10.46	28.62	28.30	29.30
5.	Chhattisgarh	20,833,803	16,648,056	4,185,747	20.09	18.27	NA	NA
6.	Goa	1,347,668	677,091	670,577	49.76	15.21	-2.20	39.40
7.	Gujarat	50,671,017	31,740,767	18,930,250	37.36	22.66	17.10	32.70
8.	Haryana	21,144,564	15,029,260	6,115,304	28.92	28.43	20.60	50.80
9.	Himachal Pradesh	6,077,900	5,482,319	595,581	9.80	17.54	16.10	32.40
10.	Jammu & Kashmir	10,143,700	7,627,062	2,516,638	24.81	29.43	25.60	40.70
11.	Jharkhand	26,945,829	20,952,088	5,993,741	22.24	23.36	NA	NA
12.	Karnataka	52,850,562	34,889,033	17,961,529	33.99	17.51	12.10	28.80
13.	Kerala	31,841,374	23,574,449	8,266,925	25.96	9.43	10.10	7.60
14.	Madhya Pradesh	60,348,023	44,380,878	15,967,145	26.46	24.26	22.00	31.20
15.	Maharastra	96,878,627	55,777,647	41,100,980	42.43	22.73	15.20	34.30
16.	Manipur	2,166,788	1,590,820	575,968	26.58	24.86	36.60	12.80
17.	Meghalaya	2,318,822	1,864,711	454,111	19.58	30.65	28.30	37.10

18.	Mizoram	888,573	447,567	441,006	49.63	28.82	21.00	38.70
19.	Nagaland	1,990,036	1,647,249	342,787	17.23	64.53	63.40	69.40
20.	Orissa	36,804,660	31,287,422	5,517,238	14.99	16.25	13.80	29.80
21.	Punjab	24,358,999	16,096,488	8,262,511	33.92	20.10	12.30	37.60
22.	Rajasthan	56,507,188	43,292,813	13,214,375	23.39	28.41	27.50	31.20
23.	Sikkim	540,851	480,981	59,870	11.07	33.06	30.10	62.10
24.	Tamil Nadu	62,405,679	34,921,681	27,483,998	44.04	11.72	-5.20	42.80
25.	Tripura	3,199,203	2,653,453	545,750	17.06	16.03	13.40	28.80
26.	Uttar Pradesh	166,197,921	131,658,339	34,539,582	20.78	25.85	24.10	32.90
27.	Uttarakhand	8,489,349	6,310,275	2,179,074	25.67	20.41	NA	NA
28.	West Bengal	80,176,197	57,748,946	22,427,251	27.97	17.77	16.90	20.20
29.	A.&N. Islands	356,152	239,954	116,198	32.63	26.90	16.60	26.90
30.	Chandigarh	900,635	92,120	808,515	89.77	40.28	39.20	40.50
31.	D&N Haveli	220,490	170,027	50,463	22.89	59.22	34.10	330.30
32.	Daman & Diu	158,204	100,856	57,348	36.25	55.73	86.40	20.60
33.	Delhi	13,850,507	944,727	12,905,780	93.18	47.02	1.50	51.30
34.	Lakshadweep	60,650	33,683	26,967	44.46	17.30	48.90	-7.40
35.	Puducherry	974,345	325,726	648,619	66.57	20.62	12.00	25.40

NA= Not available

Source: Census of India 2001. Registrar General India

But, studying the distribution of population on a limited geographical area and its sub-division becomes easier. For instance, the study of spatial distribution of population in a particular country/geographical area such as rural, urban, farm, non-farm, etc as well as the ratios of these groups of people including the causes for such distribution in a country or a state is easier. For example, see the urban-rural distribution of population in India.

Before 1961, the definition of 'urban' was not uniformly followed in all the States of India and there was considerable scope for the use of discretionary powers on the part of the State Census Superintendents. Apart from the usual test of a settlement having more than 5000 population, the classification of a place into urban or rural was based on a subjective assessment by the Census Superintendents of the presence of 'urban characteristics'.

A more precise national definition of 'urban' was introduced for the first time by the Census Commissioner in 1961. According to this definition, the 'urban places' were those settlements which satisfied the following criteria: (a) All places within a Municipal Area/Corporation, Cantonment or notified area committee; (b) Selected places with: (i) a population of 5,000, (ii) three-fourths of the working population outside agriculture, and (iii) density of not less than 1,000 persons per sq mile. The definition adopted for an urban area for the 1971 Census followed the 1961 pattern. However, the criterion (b)(ii) was changed from "three fourths of the working population" to "three fourths of the male working population" being non-agricultural.

The study of urban-rural composition of a country is important for a variety of reasons. The developed countries of today had undergone changes as was observed in the demographic transition where we looked at the birth and death rates. Similar change could also be observed in respect to the urban-rural composition of other countries. One finds that the proportion of urban population in the developed countries increased substantially with economic development.

Thus, study of different demographic characteristics of distribution will be useful in different ways. But, if you are interested to engage yourself in a more detailed population study, you need to know about other important aspects of population such as structure or composition of population.

2.5 POPULATION STRUCTURE/COMPOSITION

Population structure or composition covers all the measurable characteristics of given population. The universal characteristics of any population in any geographical area at any point of time or at different points of time are: age, sex, and age and sex taken together. These characteristic components determine the structure of a given population. It is also universally accepted that the composition of a given population varies with changes in its fertility, mortality, and net migration. These demographic processes effect/affect the basic characteristics of the population, viz. age and sex, and thus change the composition or structure of population.

2.5.1 Age Composition: Influencing Factors

- i) **Significance of age structure:** There is a functional relationship between age composition of population of a country and other components of population and changes in them. Schedules of nuptiality, fertility, mortality and migration shape the distribution of population by age and are in turn affected by it. Age distribution can be used for inferring the vital rates. Age distribution of a country also has a socio-economic significance. The level of consumption, income, social services needed, participation in productive work, taking part in reproduction process and many other aspects of life is effected by age.

The population pyramid of India is broad-based and conforms to a population of an underdeveloped country; as opposed to this, the age pyramid of a developed country has a narrow base where small number of children are born but they live longer. Some important features of Indian population distribution based on age and their implications are as follows.

- Under-enumeration of children at young ages, especially in the age group 0-4 has been a recognized feature of the Indian census. Gradually, in recent Censuses this feature has changed. Now, partly due to an improvement in the enumeration of younger population and increase in fertility and decrease in mortality there has been a rise in proportion of population below age 15. It has greater social, economic and demographic relevance. Such a young population necessitates more allocation of funds to provide for its health, medical, educational and consumption needs. Such an age-structure dominated by young population also favours a very rapid population increase in coming years.

- Dependency ratio, the ratio of non-workers to workers, is high in which the contribution of children under 15 years of age is overwhelming and implies less per capita produce, if not per worker produce directly. It also affect the productivity of labour, as it reduces the remainder of national income after deducting the high investment needed for satisfying immediate needs of the young population; otherwise that can be mobilized for capital formation.
- Large base of the population means persisting high natural increase, at least in absolute numbers.

ii) **Nature of age data:** The United Nations has defined age as “the estimated or calculated interval of time between the date of birth and the date of census, expressed in completed solar years. It has also recommended that information on age should be collected in the census by asking the date of birth of the individual (day, month and year) or by asking a direct question to obtain information on the age at the last birthday, or by asking both these questions together. Though the question on the date of birth obviously yields more accurate information of age, it is not always possible to obtain date of birth from a population in which the majority are either illiterate or semi-literate and are ignorant about their own age. In such a situation, information on age is collected by asking about “the years completed on the last birthday.”

The Indian age data, therefore, show concentration of population at a certain age, for Indians prefer to report their age in numbers ending with 0 or 5. Errors in age reporting also creep in because of carelessness in reckoning age, misunderstanding of the question or deliberate misstatement.

iii) **Factors determining the age structure of populations:** *Fertility, mortality and migration* are the main causes of the growth rate of any population and are also responsible for determining its age structure. Growth rate is mathematically determined by the levels of fertility, mortality and migration. However, the world situation with regard to national population policies, commitments, international power structure, and world-wide economic trends is changing fast; and this has implications for the growth of population from national as well as global point of view.

- *The age structures of various populations of the World:* The age structures of different populations are usually compared in terms of three broad age groups — working age (15-64), children below the working age (i.e. below 15) and persons above the working age (i.e. above 64). Accordingly, the persons are identified with particular group. As the developed countries have a much lower proportion of population consisting of dependent children, their over-all dependency ratios are also of smaller values than those in developing countries.

iv) **Analysis of the age structure:** Age data are usually available in the form of single years, that is, the number of persons in the population of age 13, 14, 15, etc. For demographic analysis, however, age data are seldom used in discrete form. It is customary to classify them in five-year age-groups such as 0-4, 5-9, 10-14, 15-19, 20-24 and so on. The age data, thus, classified in mutually exclusive age groups are used for an analysis of the age structure of any population, and are also useful for a wide variety of analytical and comparative purposes.

The age-structure of any population is most commonly studied with the help of a simple mathematical measures like the per cent distribution and an equally simple measure like the age pyramid. The other measures used for an analysis of the age structure are the average age (mean, median, mode), and a few other indices based on the distribution of persons in various age-groups.

The simplest measure is the percentage distribution of the population based on the absolute numbers in various five-year age-groups. This measure is helpful in forming an idea about the age structure of any population, and is used for describing it. It is also used to compare the age structures of two or more populations at a point of time or to compare the age structure of the same population at different points of time. The age-sex histograms, known as the age-sex pyramids, which we will discuss in sub-section 2.5.3, may be used precisely for the same purposes.

Table 2.6 is, just an illustration of, the age-group-wise percentage distribution of the population of India as in 1991, which is presented in five-year age-groups both in terms of absolute numbers and percentages.

Table 2.6: Distribution of Population of India according to Five-year Age-Groups – 1991

<i>Age Group</i>	<i>Population (Figures in Thousands)</i>	<i>Percentage</i>
0-4	102378	12.21
5-9	111295	13.27
10-14	98692	11.77
15-19	79035	9.42
20-24	74472	8.88
25-29	69239	8.26
30-34	54804	6.96
35-39	52399	6.25
40-44	42556	5.07
45-49	36134	4.31
50-54	31114	3.71
55-59	21473	2.56
60-64	22749	2.71
65-69	12858	1.53
70-74	10554	1.26
75-79	4146	0.49
80-84	3989	0.48
85-89	1146	0.14
90-94	825	0.10
95-99	263	0.03
100+	152	0.02
Age not specified	4695	0.56
All ages	838568	100.00

Source: Registrar General and Census Commissioner of India. *Census of India, 1991*. India (Excluding Jammu and Kashmir).

Table 2.7: Distribution of the Population of India according to Broad Age-groups — 1901-1991

Age Group	1901	1911	1921	1931	1951*	1961*	1971*	1981	1991
0-14	38.58	38.45	39.05	40.02	37.45	41.08	42.10	39.56	37.25
15-44	46.60	46.69	45.82	46.35	45.99	44.01	43.52	43.25	44.84
45-64	—	12.47	12.64	11.46	12.97	11.99	11.62	10.70	13.29
65+	—	2.39	2.49	2.17	3.59	2.92	2.76	6.49	4.05
All Ages	100.00	100.00	100.00	100.00	100.0	100.00	100.00	100.00	100.00

* Percentages based on adjusted figures.

Sources:

- 1) United Nations. 1956. The Aging of the Populations and its Economic and Social Implications, *Population Studies*. No.26, p.114.
- 2) Registrar General and Census Commissioner of India. *Census of India 1961, India Paper No.2, Age Tables*, Part II, p.35.
- 3) Registrar General and Census Commissioner of India. *Census of India 1971, Series I - India, Miscellaneous Studies, Paper-2 of 1974, Age and Life Tables* (one per cent sample), pp. 8-10.
- 4) Registrar General and Census Commissioner of India. *Census of India 1991*. India (Excluding Jammu and Kashmir).

Table 2.8 presenting the age distribution of the population of India (1991) and of the United States (1995) in broad age-groups illustrates how the age distribution of two countries may be compared with the help of percentage distribution.

Table 2.8: Comparison of Age Group-wise Percentage Distribution of Population of India (1991) and the United States of America (1995)

Age Group	India (1991)	United States (1995)
0-4	12.21	7.46
5-14	25.04	14.51
15-24	18.30	13.68
25-34	15.22	15.55
35-44	11.32	16.15
45-54	8.02	11.73
55-64	5.27	8.04
65+	4.05	12.88
Age not stated	0.57	—
All ages	100.00	100.00

Source: 1) Registrar General and Census Commissioner of India. *Census of India, 1991*, India, (Excluding Jammu and Kashmir). New Delhi.

2) United Nations. 1997. *Demographic Year Book 1995*. New York, pp.192-193.

It is evident from Table 2.8 that the age distribution of the Indian population differs a great deal from that of the American population. The percentage of Indians in the age group 0-4 is a little less than twice that of the Americans. On the other hand, the percentage of Americans above age 65 is more than three times that of Indians. From this information, it is clear that there is high promotion of children in the Indian population compared to the US population, and high proportion of elderly people in the American population compared to that of India.

Table 2.9: Percentage Distribution of Population in Broad age-groups for some Developing and Developed Countries

Country	Year	0-14	15-64	65+	Age not Stated	All ages
India	1991	37.25	58.13	4.05	0.56	100.00
Kenya	1989	47.84	48.73	3.43	—	100.00
Pakistan	1995	41.33	54.92	3.75	—	100.00
Bangladesh	1990	43.78	46.26	9.46	—	100.00
Sri Lanka	1994	35.20	60.48	4.32	—	100.00
China	1990	27.69	66.73	5.58	—	100.00
Japan	1994	16.33	69.60	14.07	—	100.00
United Kingdom	1994	19.49	64.76	15.75	—	100.00
United States	1995	21.97	65.15	12.88	—	100.00
Thailand	1994	29.99	65.74	4.27	—	100.00
Sweden	1994	18.86	63.68	17.46	—	100.00
Philippines	1995	37.36	58.76	3.88	—	100.00
Ethiopia	1995	48.18	47.15	4.67	—	100.00
More Developed	1997	20.00	66.00	14.00	—	—
Less Developed		35.00	60.00	5.00	—	100.00

Sources: 1) United Nations. 1997. *Demographic Year Book 1995*. New York, pp.180-212.

2) Population Reference Bureau. 1997. *World Population Data Sheet 1997*. Washington D.C.: United Nations.

2.5.2 Sex Composition

Like age composition, sex composition also has its significance in the study of population structure.

Sex Structure: Sex is an easily identifiable characteristic and its dichotomous nature presents few problems for classification. The data on sex are also easily obtained. For the study of the sex-structure of any population, the following two measures are generally adopted: 1) the percentage of males in the population or masculinity proportion, and 2) the sex ratio. Of these two measures, the latter is more frequently used in the study of population.

2.5.3 Age and Sex Structure: Population Pyramid and its Implications

Study of population structure by age and sex, taken together, gives us better understanding of population structure than its study by taking age or sex only.

- i) **Sex and Age Structure:** Sex and age are the basic characteristics or the biological attributes of any population which affect not only its demographic structure but also its social, economic and political structure. They influence marriages, birth and death rates, internal and international migration, population composition, manpower, gross national product, planning regarding housing, educational and medical services, and so on.

For better understanding of population structure by age and sex we can look at Table 2.10.

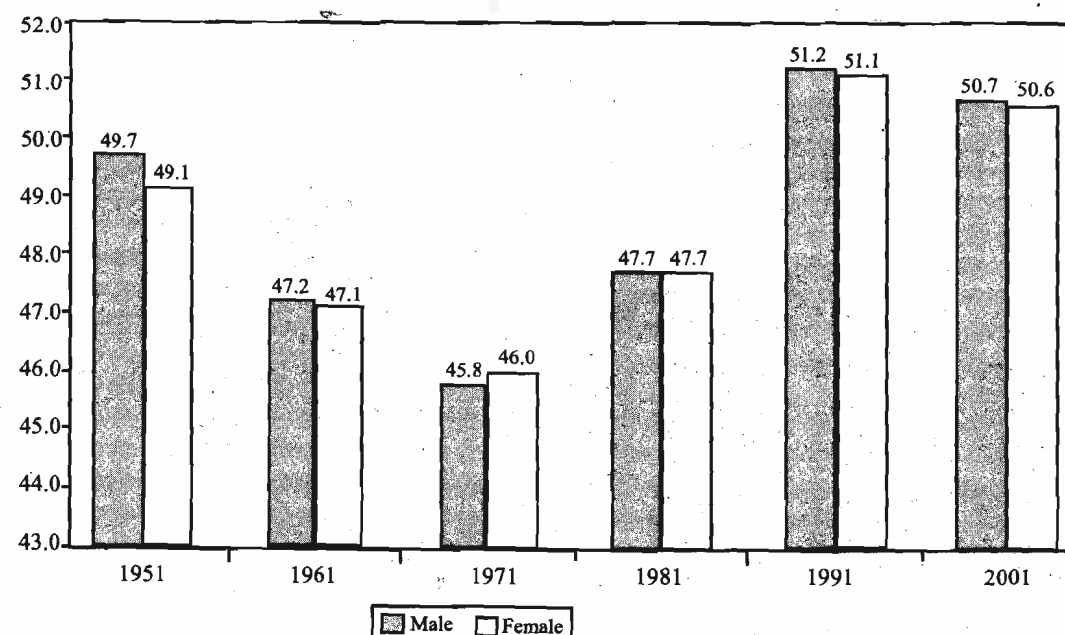
Table 2.10: Percentage Distribution of Population of India by Age and Sex: 1951-2001

Year	Age Groups (in years)					
	0-14		15-49		50+	
	Male	Female	Male	Female	male	Female
1951	38.2	38.6	49.7	49.1	12.1	12.2
1961	40.9	41.1	47.2	47.1	11.8	11.7
1971	41.7	42.2	45.8	46.0	12.3	11.8
1981	39.6	39.8	47.7	47.7	12.7	12.5
1991	36.5	35.9	51.2	51.1	12.4	13.0
2001	35.6	35.1	50.7	50.6	13.4	14.0

Source: Census, Registrar General, India

Note: Totals may not add up to 100 due to rounding off.

Figure 2.1: Percentage Distribution of Population by sex in the Age Group 15-49, years India



Population data are invariably classified by sex and age and then made available to data users. All data on fertility, mortality, migration, marital status, and economic characteristics are first presented separately for males and females and are cross-classified according to age. Sex and age are very important because they are the visible, indisputable, definite and convenient indicators of social status.

- ii) ***Population pyramid and its implications:*** Let us understand the impact of population structure in the form of population pyramid. Population pyramid is a widely used graphical device to show the age-sex composition of a population. It consists of a number of horizontal bars representing successive age-groups in ascending order, from the lowest age at bottom to the highest age at top. The length of a bar for any age-group represents the number or percentage of males or females in that age-group, according to a scale along the horizontal axis.

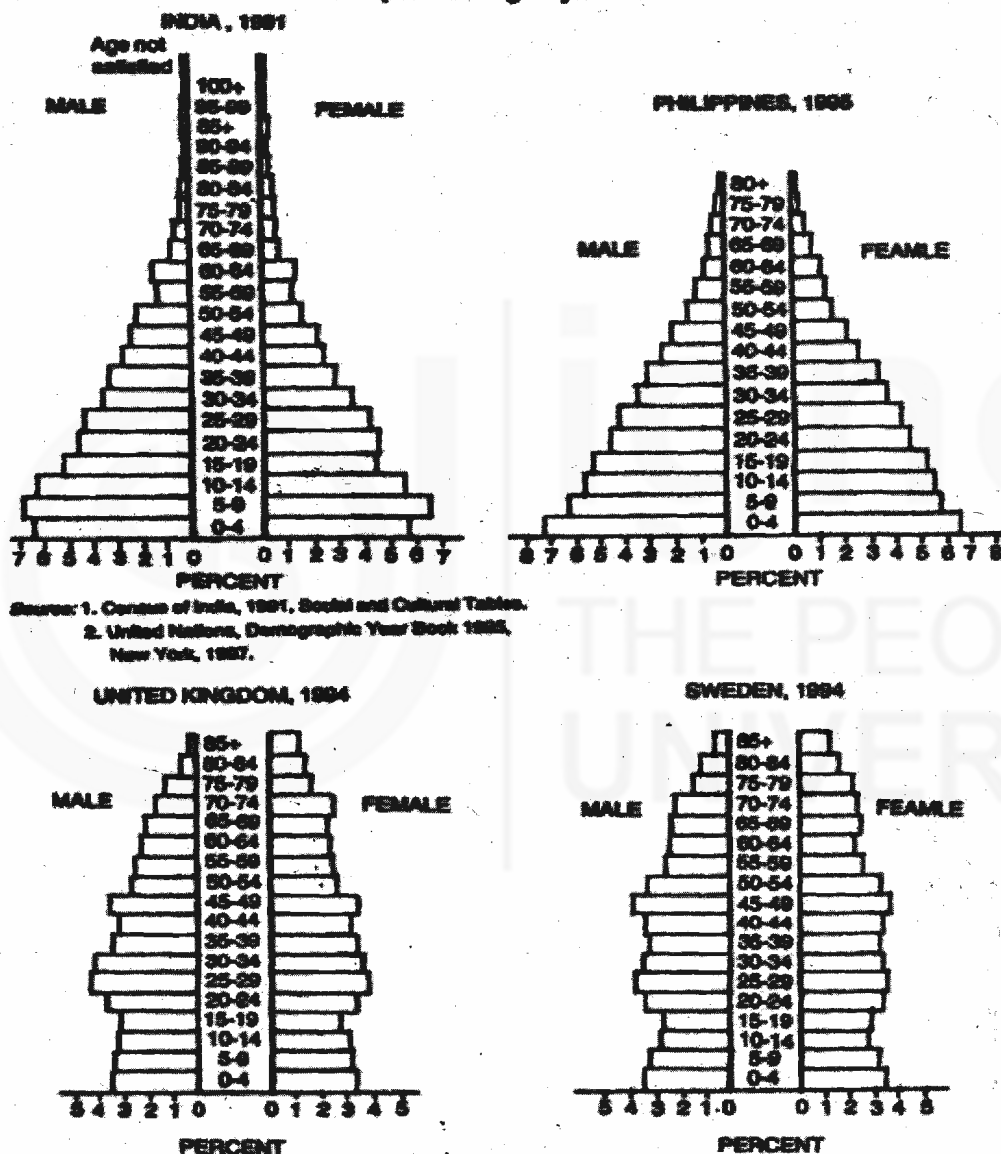
The pyramid can be made either way, in age-groups of width of 5 or 10 years or of single year. In any case the highest bar refers to an open age interval (say 80 years and above). The number of males and females can directly be traced on the graph or represented in percentage form, without producing any change in the geometrical shape of the pyramid. It is notable that the percentage in sex-age-group is calculated as in the total population and not in the population of that sex. Depending on the trends of fertility, mortality and migration, pyramid can take various shapes. The relative length of the bar at the bottom indicates whether the recent fertility has been high or low. Protuberances and indentations in the shape of pyramid reveal that corresponding periods of either high fertility, immigration or low mortality, or low fertility, emigration or high mortality. If the historical trend does not confirm the shape, it can, then, be explained by errors in reporting of age-data. Pyramid made for the single-year-age distribution of population can also show the phenomenon of digital preference or digit avoidance in reporting of age.

Figure 2.2 below contains the age-sex pyramids of two developing countries, India and the Philippines, and two developed countries, Sweden and the United Kingdom.

From Figure 2.2, it is obvious that the pyramids are of two sets of countries which have two different shapes. i) The pyramids of the two developing countries, India and the Philippines, have broad base and steeply sloping sides, indicating a large proportion of children and young persons and a small proportion of old people in the population. ii) The pyramids of the two developed countries, Sweden and the United Kingdom, are almost rectangular in shape, with a slight sloping at the older ages. These pyramids indicate a lower proportion of children and a higher proportion of the adults and the elderly in the population. Those populations which have a higher proportion of children and young persons are termed as “Young” populations, while those with lower proportions of children and youth and a higher proportion of adult and old population are known as “old” populations. It is, therefore, ironical to observe that old countries, in the sense of having long histories, such as India, Egypt and China, have very “young” populations, while comparatively young countries like the United Kingdom, France, Sweden and the United States have “old” populations. Thus, it must

be clearly understood that there is a distinction between the chronological age of a nation, which is measured from the time of a country's inception, and the "age" of the population, that is, the age distribution of the population. Similarly, the distinction between the age of an individual in the population and the age of the population must also be kept in mind. The former, that is, the age of an individual, moves only in one direction, that of an inexorable increase as time passes, while the population may get older or younger as time passes, in the sense that *the proportions of different age-groups may undergo changes with the passage of time.*

For Population Age Pyramids



Age-Sex Pyramids for India (1991), the Philippines (1995), United Kingdom (1994) and Sweden (1994)

Figure 2.2: Population Pyramids of Two Developing and Two Developed Countries

Thus, demographic data is of great help in studying various aspects of population and the factors influencing the same. Based on some preliminary data available from the current census, among others (Family Welfare Year Book, 2009 and

http://en.wikipedia.org/wiki/Demographics_of_India) some demographic characteristics are given below.

Demographic characteristics of India, Census 2011

Population	1, 210, 193, 422 (2011 estimate)
Male Population	623,700,000 (623.7 millions)
Female Population	586,500,000 (586.5 million)
Sex Ratio	914 females per 1000 males
Growth Rate	1.41% (2009 estimate)
Birth Rate	22.22 births /1000 population (2009 est)
Death Rate	6.4 deaths / 1000 population (2009 est)
Life Expectance	69.89 years (2009 est)
Male Life Expectance	67.46 years (2009 est)
Female Life Expectance	72.61 years (2009 est)
Total Fertility Rate	2.68 (2010 est)
Infant Mortality Rate	30.15 deaths /1000 live births
Density	382
Sex Ratio	940
Literacy Rate	74.0 (2011)
Female Literacy	65.5 (2011)
Male Literacy	82.1 (2011)

Due to constraints of space, time and scope we will not discuss all such characteristics of population here. However, we will discuss below the measures of population distribution and population change.

2.6 MEASURES OF POPULATION DISTRIBUTION AND POPULATION CHANGE

In the preceding section, we have discussed at length the concepts of population distribution and its structure or composition. In this section, we will deal with the measures of population distribution and of its changes.

2.6.1 Measures of Population Distribution/Composition

In this sub-section, we will focus on the measures of population distribution and/or its composition mainly pertaining to population density (how densely it is distributed), sex ratio (distribution by males and females) and dependency ratio (distribution of the young, old and other dependents).

2.6.1.1 Population Density

The density of population in an area is usually computed as the number of persons per square km or per square mile of land area. It is, however, a misleading index

of population distribution since different areas are not uniformly inhabited. For an example, the density of population living in Madhya Pradesh and Rajasthan is much less than those in Kerala and West Bengal.

The densities of urban areas are much higher than those of rural areas. Countries with vast areas under deserts, mountains, forests, icecaps, etc., have low densities. The most thinly-settled countries are those in the Antarctic Circle.

As an illustration, population density of different States and Union Territories in India is presented in Table 2.11.

Table 2.11: Ranking of States and Union Territories by Density – 1991 and 2001

Rank in 2001	States and Union territories*	Density (per sq. km.)		Rank in 1991
		2001	1991	
1	2	3	4	5
1	Delhi*	9,294	6,352	1
2	Chandigarh*	7,903	5,632	2
3	Pondicherry*	2,029	1,683	3
4	Lakshadweep*	1,894	1,616	4
5	Daman & Diu*	1,411	907	5
6	West Bengal	904	767	6
7	Bihar	880	685	8
8	Kerala	819	548	7
9	Uttar Pradesh	689	403	9
10	Punjab	482	429	11
11	Tamil Nadu	478	372	10
12	Haryana	477	282	12
13	Dadra & Nagar Haveli*	449	316	15
14	Goa	363	286	13
15	Assam	340	274	14
16	Jharkhand	338	257	16
17	Maharashtra	314	263	18
18	Tripura	304	242	17
19	Andhra Pradesh	275	235	19
20	Karnataka	275	211	20
21	Gujarat	258	203	21
22	Orissa	236	158	22
23	Madhya Pradesh	196	129	23
24	Rajasthan	165	133	26

25	Uttaranchal	159	130	24
26	Chhattisgarh	154	73	25
27	Nagaland	120	93	31
28	Himachal Pradesh	109	82	27
29	Manipur	107	79	28
30	Meghalaya	103	77	29
31	Jammu and Kashmir	99	57	30
32	Sikkim	76	34	32
33	Andaman & Nicobar Islands*	43	33	33
34	Mizoram	42	33	34
35	Arunachal Pradesh	13	10	35

Note: While working out the density figures for Jammu and Kashmir for 1991 and 2001 censuses, the entire area and population of those portions of Jammu and Kashmir which are under illegal occupation of Pakistan and China have not been taken into account.

Barclay (1958) has suggested another measure of density which relates to the “ratio between requirements of a population and the resources made available to it by production in the area it occupies”.

$$Density = \frac{NK}{SK''}$$

Where:

N = Total population,

K = the quantity of requirement per capita,

S = area in square kilometers, and

K'' = the quantity of resources produced per square kilometer.

2.6.1.2 Sex Ratio

Sex ratios are the measures of composition of either sex of the given population.

- a) **Masculinity proportion:** The simplest measure of sex composition of a population is the masculinity ratio defined as the percentage of males in the population. The formula for the masculinity proportion is:

$$\frac{P_m}{P_m + P_f} \times 100 \quad \text{or} \quad \frac{P_m}{P_t} \times 100$$

Where:

P_m and P_f denote the population of males and females respectively, and P_t denotes the total population.

- b) **Sex ratio:** This is the most widely used and principal measure of sex composition that has enjoyed the maximum use in analytical demography. It is usually defined as the number of females per 1000 males in a population, that is,

$$\text{Sex ratio} = \frac{P_f}{P_m} \times 1000$$

But, some demographers use it as, $\text{Sex ratio} = \frac{P_m}{P_f} \times 1000$ as well, i.e. number of males per 1000 females.

It is obviously directly related to masculinity proportion. The points of balance of sexes of the two measures, i.e. masculinity proportion and sex ratio are 50 and 1000. It means, a masculinity proportion of less than 50 indicates excess of females than males and if it is more than 50 it indicates excess of males. Similarly, a sex ratio more than 1000 depicts the excess of females over males and a sex ratio below 1000 indicates an excess of males.

Sex ratio can be calculated for various brackets of the population. It can be used for evaluation of data providing a check for internal consistency. It is essentially a function of: (a) sex ratio at birth; (b) sex ratio of migrants; and (c) differential mortality patterns of the two sexes.

Example: Sex ratio for India, 1971.

Population of males $P_m = 284,049,276$

Population of females $P_f = 264,110,376$

$$\text{Masculinity proportion} = \frac{P_m}{P_m + P_f} \times 100 = 51.82$$

$$\text{Sex ratio} = \frac{P_f}{P_m} \times 1000 = 929.8$$

The study of sex ratio in a population is important primarily because of two reasons. *Firstly*, analysis of the sex ratio can help us in drawing several inferences regarding the dynamics of demographic phenomena; and *secondly*, it has bearing upon the marriage rate, birth rate, death rate and even on the rate of migration directly.

In India, however, sex differential of external migrants, even if it exists cannot explain the deficit of females, simply because the external migration in relation to the size of population of India is small; migration may have slight effect at the state level, and in urban and rural areas.

Sex ratio is invariably lower in the urban areas than in the rural areas. One finds a much higher proportion of males in the working ages in urban India. This is certainly because of migration of single males from rural to urban areas for educational, economic or such other related purposes. Thus, there exists variations in the sex ratios between the States of a given country or those of different countries as well.

In Table 2.12 we can observe the differences in the sex ratio of selected countries.

Table 2.12: Overall Sex ratios of Selected Developed and Developing Countries

Country	Year	Sex Ratio (Males per 1000 females)
Indian	2001(c)	1072
Pakistan	1995	1060
Bangladesh	1990	1067
Indonesia	1995	995
Japan	1994	963
Iran	1991(c)	1063
Nepal	1991(c)	995
Sri Lanka	1994	1040
Philippines	1995	1010
Singapore	1995	1010
United States of America	1995	954
China	1990(c)	1060
Argentina	1993	956
Brazil	1994	976
United Kingdom	1994	959
France	1993	949
Sweden	1994	977
Germany	1994	946
Thailand	1995	1005

Note: C = Census Year; Data is accessed as available for the particular year for the selected country.

Source: United Nations. 1997. *Demographic Year Book 1995*, New York, pp.182-213.

Tables 2.13, 2.14 and 2.15 show the differentials in sex ratios of India as a whole and of different States and Union Territories respectively at different time periods as computed based on the data available in the relevant sources.

Table 2.13: Sex Ratios of different States and Union Territories in India (1901-1971)

	(Female per 1000 males)							
State/UT	1901	1911	1921	1931	1941	1951	1961	1971
Andhra Pradesh	985	992	993	987	980	986	981	977
Assam	919	915	896	874	876	868	869	896
Bihar	1,054	1,044	1,016	994	996	990	994	954

Gujarat	954	946	944	945	941	952	940	934
Haryana	867	835	844	841	869	871	868	867
H.P.	884	889	890	897	890	912	938	958
J. and K.	882	876	870	865	869	873	878	878
Karnataka	983	981	969	965	960	966	959	957
Kerala	1,004	1,008	1,011	1,022	1,027	1,028	2,022	1,016
M.P.	990	986	974	973	970	967	953	941
Maharashtra	978	966	950	947	949	941	936	930
Manipur	1,037	1,029	1,041	1,065	1,055	1,036	1,015	980
Meghalaya	1,036	1,013	1,000	971	996	949	937	941
Nagaland	973	993	992	997	1,021	999	933	871
Orissa	1,037	1,056	1,086	1,067	1,053	1,022	1,001	988
Punjab	832	780	799	815	836	844	854	865
Rajasthan	905	908	896	907	906	921	908	911
Sikkim	916	951	970	967	920	907	904	863
Tamil Nadu	1,044	1,042	1,029	1,027	1,012	1,007	992	978
Tripura	874	885	885	885	886	904	932	943
U.P.	937	915	909	904	907	910	909	879
West Bengal	945	920	905	890	852	865	878	891
Andaman and Nicobar Island	318	352	303	495	574	625	617	644
Arunachal Pradesh	—	—	—	—	—	—	894	861
Chandigarh	771	720	743	751	763	781	652	749
Dadra and Nagar Haveli	960	967	940	911	925	946	963	1,007
Delhi	862	793	733	722	715	768	785	801
Goa, Daman and Diu	1,085	1,103	1,122	1,088	1,028	1,083	1,071	989
Lakshadweep	1,063	987	1,027	994	1,018	1,043	1,020	978
Mizoram	1,113	1,120	1,109	1,102	1,069	1,041	1,009	946
Pondicherry	NA	1,058	1,053	NA	NA	1,030	1,013	989

Table 2.14: Overall Sex Ratio in India — 1901-2011

<i>Census Year</i>	1901	1911	1921	1931	1941	1951	1961	1971	1981	1991	2001	2011
<i>Sex ratio* (Females per 1000 males)</i>	972	964	955	950	945	946	941	930	934	927	933	940
<i>Sex ratio** (Males per 1000 females)</i>	1029	1037	1047	1053	1058	1057	1063	1075	1071	1079	1072	1064

Sources: * <http://censusmp.gov.in/censusmp/All-PDF/06Gender%20Composition.pdf>.

** Computed from the above data in second row.

Table 2.15: State-wise Sex Ratio in India in 2011 compared with 2001 Census

Code	States / Union Territory #	Total 2001	Total 2011	Change
	INDIA	933	940	0.75%
1	Jammu & Kashmir	892	883	-1.01%
2	Himachal Pradesh	968	974	0.62%
3	Punjab	876	893	1.94%
4	Chandigarh #	777	818	5.28%
5	Uttarakhand	962	963	0.10%
6	Haryana	861	877	1.86%
7	NCT of Delhi #	821	866	5.48%
8	Rajasthan	921	926	0.54%
9	Uttar Pradesh	898	908	1.11%
10	Bihar	919	916	-0.33%
11	Sikkim	875	889	1.60%
12	Arunachal Pradesh	893	920	3.02%
13	Nagaland	900	931	3.44%
14	Manipur	974	987	1.33%
15	Mizoram	935	975	4.28%
16	Tripura	948	961	1.37%
17	Meghalaya	972	986	1.44%
18	Assam	935	954	2.03%
19	West Bengal	934	947	1.39%
20	Jharkhand	941	947	0.64%
21	Orissa	972	978	0.62%
22	Chhattisgarh	989	991	0.20%
23	Madhya Pradesh	919	930	1.20%
24	Gujarat	920	918	-0.22%

25	Daman & Diu #	710	618	-12.96%
26	Dadra & Nagar Haveli #	812	775	-4.56%
27	Maharashtra	922	925	0.33%
28	Andhra Pradesh	978	992	1.43%
29	Karnataka	965	968	0.31%
30	Goa	961	968	0.73%
31	Lakshadweep #	948	946	-0.21%
32	Kerala	1058	1084	2.46%
33	Tamil Nadu	987	995	0.81%
34	Puducherry #	1001	1038	3.70%
35	Andaman & Nicobar Islands #	846	878	3.78%

Source: <http://updateox.com/india/state-wise-sex-ratio-in-india-in-2011-compared-with-2001-census/>

2.6.1.3 Dependency Ratio

Another aspect of population composition is dependency ratio. The dependency ratio is measured as follows.

$$\text{Dependency Ratio} = \frac{P_{0-14} + P_{60+}}{P_{15-59}} K$$

Where:

- P_{0-14} , P_{60+} , and P_{15-59} denote the populations in the age groups 0-14, 60+ and 15-59 respectively, and
- K is 100.

e.g. If a country has 263065, 43172 and 358772 population in the age-groups 0-14, 60+ and 15-59 respectively, the dependency ratios are calculated as follows.

$$\text{Young Dependency Ratio} = \frac{263065}{358772} \times 100 = 73.33$$

$$\text{Old Dependency Ratio} = \frac{43172}{358772} \times 100 = 12.03$$

$$\text{Total Dependency Ratio} = \frac{263065 + 43172}{358772} \times 100 = 85.36$$

Total Dependency Ratio = Young Dependency Ratio + Old Dependency Ratio

$$\text{i.e. } 85.36 = 73.33 + 12.03.$$

The dependency ratio is not a completely accurate measure for assessing the dependency burden, because not all persons in the working age are employed, nor all those in the dependent age are economically-dependent. This measure, however, gives us a broad idea of economic dependency in any population and is, therefore, widely used.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

- 2) What is dependency ratio? Explain, in brief, its importance in population analysis. Compute it with any hypothetical/actual data of your choice.

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- 3) Explain the importance of population pyramid analysis.

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2.6.2 Measures of Population Change

It is needless to mention that population always refers to a fixed boundary or area, such as a Country, State, Province, District, Village, etc. The size of the population in any area increases through births and immigration and decreases mainly through death and out-migration.

Study of population change over time and space is an important aspect of demography. Population change implies the change not only in its size but also in its internal composition and structure with respect to its various characteristics and spatial distribution. Before one envisages to study the implications of such changes in population on various social, economic, political, cultural and eco-systems including the demographic processes such as births, deaths and migration, one needs the measurement of such change so as to have assessment of its actual impact and magnitude of change potential on any given populations.

The total population of an area may be determined by a census count in two ways. The easier way is the “*de-facto*” head-count in which all the persons are to be counted in a place where they are found at the time of enumeration irrespective of the fact that they actually belong to that place or not. This system has greater chance of counting the moving population and ensures maximum coverage of the population. It, however, fails to provide the exact area-wise distribution of the population which is very much essential not only for administrative purposes but also for planning various welfare programmes in

different areas and for studying population trends. The other way in which census count is done is known as “*de-jure*” method in which persons are enumerated on the basis of their place of usual residence. Most of the countries follow the *de-jure* system of obtaining the total population of all areas. The concept of “usual residence” is, however, vague and provides enough scope of misjudgement. This does not include foreigners and temporary visitors, though they may be substantial in number to affect the social and economic activities of the population. Most of the modern censuses, therefore, combine the two systems to derive the maximum information about the population.

Simple use of the exponential rate of growth of the population gives the idea of birth and death rates in the remote past. This idea may further be expanded to ascertain the change in birth rate over time.

Ratios and rates: The terms ‘ratio’ and ‘rate’ are not well defined in demography. There are conceptual distinctions between the two, but these distinctions are not consistently observed. For instance, survival rate, frequently used in demography and actuarial science, is the ratio of the number of persons in a cohort at one date to the number at an earlier date. It simply implies survival from a given age to a subsequent age. It is usually calculated from two age distributions of different censuses, or from a life table population. Survival rate fits the definition of a ratio, in situations where one number is related to another number, to provide comparison or relation between these two numbers. However, there are many types of ratios. For more clarity about the ratios and rates, let us discuss them below.

2.6.2.1 Ratios

A “ratio” is a single term which expresses the size of one number in relation to the size of another. Take for example, the sex ratio in the United States. It is possible to express in a single figure — a ratio, — the fact that there are 978 males per 1000 females. A ratio of 1000 would mean that the number of males is equal to the number of females, whereas a ratio over 1000 would mean that there are more men than women, and a ratio less than 1000 would mean there are fewer men than women.

Rates are computed in the same manner as ratios. Conceptually, a rate may be considered as a special case of a ratio. The difference between the two is the kind of source material/data used for the two numbers, numerator and denominator. In demography, the term ‘rate’ implies a relationship between the numerator and the denominator. The numerator refers to the events and the denominator is the population at risk. The precision of a rate depends upon how closely we relate events in the numerator to the population at risk in the denominator. For instance, the incidence of divorce is often measured by the Crude Divorce Rate, which is defined as the number of divorces in a given year per 1000 (or 100,000) midyear population. This is not a refined measure because it is based on the mid-year population (denominator) which includes, besides the divorced, the never married, widowed and other persons who are not at the risk of being divorced.

2.6.2.2 Rates

As mentioned above, rate may be considered as a special case of a ratio. A “rate” is computed like the ratios, but it has the additional feature of expressing what

has happened in terms of a certain unit of time. Usually, in demographic work, the unit of time is a year if no other time unit is specified. The two most commonly used rates are *crude birth rates* and *crude death rates*.

The use of rates and ratios is clear to most population specialists/scientists. Ratios are used for descriptive purposes, and rates are used in the specific analysis of change. Ratio indicates the degree of growth of a population, but it is not a "rate" of growth." A rate of growth should express growth as a relative change in population size per year (Barclay, 1958).

2.6.2.3 Proportions

A "proportion" is a particular kind of ratio. It does not express the size of one part of a whole in relation to the size of another part of the same whole, which you have already noticed under masculinity proportion in sub-section 2.6.1.2 above. A proportion shows the ratio of one part to the whole, or base number. Its value is always between 0 and 1. For example, dividing the number of males in 1960 (89,008,000) by the total population in 1960 (180 million) of the United States gives us 0.494, i.e. the proportion of males in the total population. When there are only two components, as in this case, the proportion of females in the total population can be calculated by subtracting the proportion of males from 1. The sum of all the component proportions of a population must add up to 1.

2.6.2.4 Percents

A "percent" is a proportion multiplied by 100. A percent is a ratio calculated on the assumption that the base number equals 100. For example, if the above proportion of males (0.494) in the United States in 1960 is multiplied by 100, it gives us 49.4, which means the percent of male population, that is, the number of males per 100 population. For popular consumption, demographers turn their proportions into percents, because the percent is more commonly used and more generally understood.

2.7 SOURCES OF DEMOGRAPHIC DATA: SYSTEMS AND METHODS

For any subject, to know data, sources of data are very essential. Data is required for analysis, comparison or drawing conclusions, etc. There are different systems, methods and procedures used for collection of data which provide reliable and rich sources of data about population for use or analysis by the demographers and others.

2.7.1 Systems

The systems existing for population data in general are as follows.

2.7.1.1 Registration of Vital Events: Vital Statistics

The events such as birth, death, marriage, migration, etc are called vital events. The registration of vital events is an important source of population information. It is, therefore, essential to understand the terms "vital events", "vital records" and "vital statistics."

A person's entry into the world (by birth) and a person's departure from it (by death) are considered to be *vital events*; because these events mark the beginning and the end of a person's life. A still birth or a foetal death is also considered as a vital event from the demographic point of view, for it is related to both the events of birth and death. During the span of life from birth to death, a change may take place in an individual's civil condition, that is, he or she may get married or divorced, or may be adopted or move away from place of his/her birth. Such events involving changes in the civil status of a person are also considered vital events.

Vital records may be defined as those concerned with vital events or those which have recorded vital events such as births, deaths, still-births, marriages, divorces, etc. The occurrence of a vital event is reported by the persons concerned to the appropriate authorities. For instance, parents report the occurrence of a birth, relatives report a death in the family or an individual reports his or her own marriage.

Along with the vital events, some ancillary information is also recorded. In case of a birth, such information includes the date of birth, the sex of the baby, the age of the mother and the number of her previous children, the order of the birth, the residence of the mother, etc. In the case of a death, information of the date of occurrence, age and sex of the deceased, place of occurrence, usual residence of the deceased, cause of death, etc., is recorded.

2.7.1.2 Civil Registration in India: Background and Problems

The system of registration of vital events was introduced in India by the British more than a hundred years ago. In the middle of the nineteenth century, administrators began to attach importance to the registration of civil events, especially of deaths. During that time, the death rate in India was very high, perhaps, because sanitary and public health conditions were appalling. In such circumstances, it was necessary to have fairly reliable estimates of death rates, through registration of the number and the causes of deaths.

Though any failure to register births and deaths is punishable by law, the importance of the registration of vital events is neither realized by the masses nor by the local registering authorities. For most Indian people, few occasions arise when birth and death certificates are required. It is, therefore, not surprising that they do not appreciate the necessity of registering vital events.

2.7.1.3 Sample Registration System in India

In 1963-64, a new system, called the Sample Registration System, was initiated in India, in which the technique of the dual report system was used for reliable estimates of vital rates such as birth and death rates as well as the population growth rate for India and different States. The Sample Registration System (SRS) also fulfils the need to measure short-term changes in the rate of population growth with a view to evaluating the effect of the national family planning programme and projecting future trends of population growth. The SRS does this by providing estimates of birth and death rates and population growth rates in India as a whole and separately for rural and urban areas of various States and Union Territories. The estimates of the SRS are considered to be fairly reliable.

2.7.1.4 Dual Reporting System

In many developing countries, in general, the data on births and deaths obtained from the Civil Registration System are inadequate and inaccurate and, therefore, are not useful for computing birth and death rates, the rate of population growth or for any type of demographic analysis. Although efforts to improve the coverage and quality of data on births and deaths have already been initiated, it is not possible to improve the entire registration system in a short period of time. Meanwhile, the need persists for yearly data on births, deaths and population increase. To overcome this problem, a new method of data collection was developed by demographers. This system is referred to as the “dual reporting system”. This method, in some form or the other, was tried out in India, Pakistan, Turkey, Liberia, Colombia, Thailand, Morocco, the Philippines and Kenya, and the experience gained was quite satisfactory. It is now widely recognized that this dual report system is a powerful and useful instrument for demographic purposes.

This new system, i.e. dual reporting system, may be broadly described as follows: In a dual reporting system, each event of birth and death is enumerated by two independent procedures; one is the registration of births and deaths, and the other is the sample survey. The design of this system is based on an appropriate number of small geographic samples. In each of these sample areas, a continuous record is kept of the events of births and deaths as they occur. Ancillary information about the events is also recorded at the same time. In the same sample area, information about births and deaths along with the relevant information is collected through periodic retrospective sample surveys. The information on each event of birth and death, obtained through the continuous current registration and the retrospective sample survey, is matched and the number of events missed by both procedures is mathematically estimated. It is thus possible to arrive at an accurate estimate of total births and deaths in the sample.

2.7.2 Methods

While the systems are in place the methods that the systems follow may be different. However, the popular methods followed all over the world for population data are given below.

2.7.2.1 Census Survey or Census Method

The most fundamental source of data for the study of population is the census survey, which in India, is carried out by the Census Commissioner of India. In fact, the very purpose of a census survey in modern times is to produce statistical data on various aspects of population. Census survey involves a complete enumeration of the entire population and the collection of information about some important characteristics of each person at regular intervals with a view to obtaining knowledge about the trends in population growth, its structure and characteristics, among others.

A census survey of population may be defined “as the total process of collecting, compiling and publishing demographic, economic and social data pertaining, at a specified time or times, to all persons in a country or delimited territory”. In other words, it can be said that census is the collection of information about births, deaths occupational, social and economic conditions of the people of the country at a given time. Census has become a very popular method of collecting

information about the people. It helps not only in collecting figures but is much more informative beyond that. It provides information about the economy of the nation, rates of birth and death, rural-urban migration, living standard of the people, family size, educational achievements, etc.

The first attempt to obtain information about the size of population in India, by actually counting heads, was made during 1867-1872. This count was neither synchronous, nor did it cover the whole country. As the noted demographer Kingsley Davis (quoted in Asha and Tara, 2006, p.32) observed, it was just “an auspicious beginning” of census taking in India. The next census, which was synchronous, covered a wider area and was more modern in nature, was undertaken in 1881. Since then, once in every ten years, a new census has been taken in India. 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 2011 census represents the fifteenth census of India, in this continuous series.

The Census of 1951, the ninth in the series, was in fact the first census conducted in independent India. This census report discussed the growth and structure of the population, and its economic development. The threat posed by the alarming increase in population was properly evaluated, and the need for curbing the rate of growth was emphasized. The practice of preparing district census handbooks was also initiated. Data for smaller administrative units such as a village or an urban block were thus made available, and micro-level planning became possible. The Census of 1961 was marked by further improvements; carefully planned and a great deal of publicity was given to it through the mass media such as newspapers, pamphlets, radio, cinema, etc. The same practice was continued for the 1971, 1981, 1991, 2001, 2011 censuses, with even further improvements wherever possible. The data we have used in some tables in the preceding sections are based on these census reports only.

According to the Indian Census Act of 1948, the Central Government is empowered to notify and conduct a census in the whole country or any part of it. It authorizes census enumerators to ask the prescribed census questions and legally compel all persons to answer these questions truthfully. The Act also guarantees that the information collected at any census from individuals shall be kept confidential, shall be used only for statistical purposes and shall not be used as evidence even in a court of law.

Today, the need and necessity of scientific means and methods of data collection is being increasingly realised. Almost every State has passed a legislation by which it is obligatory on each and every individual to provide relevant information to the census enumerator. Today census covers not only population but also figures are collected about houses, animals, schools, religious and charitable institutions, etc. In fact, with every census every possible effort is made to collect more and more data, since census survey is done, but only once in every 10 years.

Realising the need and necessity of census UNO in a census handbook has given certain guidelines to all nations of the world to conduct census on uniform basis. The data is now collected and brought to the notice of the society as a finished product after putting it through different stages (Hans Raj, 1986, p.40).

Census Procedure: The procedure of census involves the following steps.

- i) Determination of Contents
- ii) Development of Census Schedule
- iii) Division of Work
- iv) Required Propaganda
- v) Household-survey
- vi) Pre-Testing of Questionnaire
- vii) Proper Training
- viii) Stress on Impartiality
- ix) Tabulation of Information
- x) Publication of data

- i) **Determination of Contents:** It is the first important stage which decides as to what type of information ought to be collected and what should be omitted. During census operation, information on the following aspects is collected: a) Geographical, b) Personal, c) Economic, d) Cultural, e) Educational, f) Fertility, and g) Other Information.

Though the data on above lines is collected, yet in order to ensure that data is correct, some precautionary steps such as the following are taken:

- All the terms used have been properly defined;
- Enumerators have been properly trained and motivated;
- A climate has been created by which people are made ready to provide information;
- No column is added which seeks information of purely private and personal nature;
- Information to be collected is not very time-consuming;
- Confidentiality of information collected should be fully ensured;
- Information to be collected is manageable;
- Each enumerator is given sufficient time to complete his work;
- There is provision for checking that the information supplied is accurate.

- ii) **Development of Census Schedule:** The questions should be so worded that answer to one question can provide information on more than one point. Not only this but also the questions should be so worded that the answers are quite precise, clear and brief. All the questions should be pre-tested and chained in such a manner that answers to one question becomes a link to another question.

- iii) **Division of work:** Before census time comes, the whole country should be divided into regions and sub-regions for effective survey. In India, such divisions include States, divisions, districts, tehsils, towns, cities, villages, etc.

- iv) **Required propaganda:** In every country, before census officials approach the respondents to start their work, the people are mentally prepared. With the help of newspapers, posters, T.V., cinema, slides, etc., they are informed that the census time has approached and also that the field-staff will be contacting every person. They are also made to realise the importance and significance of census work and legal obligation which they have in this regard. They are also assured that all the information which will be supplied by them will be kept strictly confidential.
- v) **Household survey:** Few months before actual census work is undertaken an actual household survey is unavoidable. Each area is divided into locality and in each such locality each house is counted. With the help of past census, it is found out in which area new dwelling units have come up and from which areas, the population has migrated and in which areas population has become less. This helps in finding out density and population on the one hand and on the other, it is ensured that at the time of actual census no house is omitted.
- vi) **Pre-testing of questionnaire:** Census operation being both costly as well as time consuming, every country questionnaire to be used at the time of census is pre-tested. Questions included are put on select persons at random and then it is seen, if the questions are so worded that these communicate the same sense in which they were included and also that these do not carry different meanings with different persons. In a country like India, where questionnaires are to be translated into regional languages as well, it is to be seen that each such questionnaire translated into regional language is pre-tested. For this, it is obvious that people will have to be trained in advance and clarity provided.
- vii) **Proper Training:** Since census operation is a very complex process, before the work starts, every effort should be made to see that the staff which is being put on duty is well trained.
- viii) **Stress on Impartiality:** Those who are put on duty may have their own preferences and prejudices. However, they should be made to realise well in advance that while collecting information from the respondents they should not allow personal preferences to creep in. Similarly, they should ensure that they are impartial in their duty and, thus, data collected is unbiased.
- ix) **Tabulation of Information:** During census period thousands are put on duty who collect information from crores of people spread in different parts of the country. The collected information has to be properly tabulated for further processing.
- x) **Publication of data:** All information that is coded and tabulated is published for the use of the society.

2.7.2.2 Sample Surveys

The Sample Survey is another method of demographic data collection for population studies. In a sample survey, information is collected only from a sample, which is representative of the whole of the population, from which

conclusions are drawn by the use of scientific methods. In a country like Afghanistan, where no census was conducted, population data were collected through sample surveys and some estimates were made of its size, growth, structure and characteristics. Even in countries where regular census operations are conducted, the need for collection of population data through sample surveys is felt, for a census is taken in most countries only once in ten years. Therefore, collection of data through sample surveys assumes greater significance in the context of any interim data required on certain aspects of the population.

- ***The National Sample Survey:*** The main objective of the National Sample Survey has been to collect data on some important socio-economic aspects on a comprehensive basis for the whole country through its various rounds by using the technique of sample survey. The First Round of the National Sample Survey (NSS) was conducted in 1950; since then, information on different items has been collected through various rounds of the NSS. The topics covered so far include the following: fertility, mortality, population growth, economically active population, family planning, employment and unemployment, consumers' expenditure patterns, housing conditions, manufacturing industries, physically handicapped persons, conditions of the aged, etc.
- ***The National Family Health Survey (NFHS):*** The NFHS is a collaborative project of the International Institute for Population Sciences, Mumbai, all the Population Research Centers in the country, various data collecting organisations such as the East-West Center/Macro International, United States of America, and the Ministry of Health and Family Welfare, New Delhi.

The National Family Health Survey (NFHS) which is a household sample survey was carried out in 24 states and National Capital Territory of Delhi during 1992-93. During 1998-99 a second round of the NFHS (NFHS-2) was started. The NFHS-2 is another important step to strengthen the database further for the implementation of reproductive and child health approach, adopted by India since 1996. The third survey, (NFHS-3) was taken up in 2005-2006. Thus, these NFHS surveys include:

- National Fertility Household Survey (NFHS) – Phase I, 1992-1993.
- National Fertility Household Survey (NFHS) – Phase II, 1998-1999.
- National Fertility Household Survey (NFHS) – Phase III, 2005-2006.

2.7.2.3 Population Registers

In some countries such as Sweden, Finland, Belgium, Israel, Taiwan and Korea data about population can be obtained from continuously maintained population registers, in which the name of each person in the country is entered. Important migratory movements of individuals are also registered. The primary object of setting up of this system of population registers is to establish the identity of individuals and control them. These registers, however, are also used to obtain such demographic information as current population size, internal migration, data on vital events, etc.

2.7.2.4 International Publications

The United Nations and other international organisations periodically publish demographic data for the world and for different countries. Some of the important publications are:

- **Demographic Year Book:** In this periodical, which is annually published by the United Nations, data for the world and different countries are presented on the following topics: population size, area, density, population growth, population characteristics, number of births and birth rate, number of deaths and death rate, number of marriages and marriage rate, etc. Every year, a special topic is selected for the presentation of data pertaining to it. Detailed information is presented on the special topic selected and may cover one of the following: fertility (natality) mortality, population census statistics, marriage, etc. For instance, the Demographic Year Book for 1974 presents detailed data on mortality. The periodical is very useful not only to the students of population studies but also to all others interested in population studies.
- **Statistical Year Book:** In this annual publication of the United Nations, information on the following topics is available for various countries of the world: national accounts, facilities of hospitals and availability of doctors, energy consumption, food production, educational facilities, newspaper circulation, availability of labour force, etc.
- **Epidemiological and Vital Records:** In this monthly periodical published by the World Health Organisation information on public health and mortality is presented for different countries of the world.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

4) Present in brief various international sources of population data.

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5) Explain the significance of sample surveys in India.

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2.8 LET US SUM UP

In this Unit, we have explained you important concepts used in demography or population studies. We have highlighted the interrelationship: between demography and other social sciences; between demography and population studies; and between population studies and other disciplines. Further, we have covered the aspects of population distribution and various characteristics of population like age-structure, sex-structure, age- and sex-structure both taken together, population pyramid and its implications, dependency ratio, and urban-rural differentials in the composition. We have also touched upon various national and international sources of demography / population data along with systems and procedures involved in collection of such data.

2.9 ANSWERS TO 'CHECK YOUR PROGRESS' QUESTIONS

- 1) *Interrelationship between Demography and Economics:* Relationship between demography and 'economics has considerably increased during 20th century and thus both the subjects have come quite closer to each other. This, perhaps, is the reason that demography today is even considered as a branch of economics. Economics studies economic problems of the people, and in that the demographic and population studies plays a very vital role. Where there is more population, economic activities are bound to increase. Population problems are directly linked and connected with employment, per capita income, problems of development, rehabilitation, education, transportation, industrialization, etc.

Demography influences economics in many important and different ways. Changes in population influence labour force and the source of production. Depending upon the changes in labour force the economists shall be in a position to find out what amount of socially useful and productive labour is available in the country and whether the labour intensive or capital intensive techniques suit nation's economy, and so on. Demographers will help economists in finding out the extent of unemployment and the types of training as well as the opportunities needed by the country to remove unemployment from the soil.

- 2) *Dependency Ratio:* It is a measure to study the structure of the population. It is calculated as follows.

$$\text{Dependency Ratio} = \frac{P_{0-14} + P_{60+}}{P_{15-59}} K$$

Where:

- P_{0-14} , P_{60+} , and P_{15-59} denote the populations in the age groups 0-14, 60+ and 15-59 respectively, and
- K is 100.

For example, if a country has 263065, 43172 and 358772 population in the age-groups 0-14, 60+ and 15-59 respectively, the dependency ratio is calculated as follows.

$$\text{Young Dependency Ratio} = \frac{263065}{358772} \times 100 = 73.33$$

$$\text{Old Dependency Ratio} = \frac{43172}{358772} \times 100 = 12.03$$

$$\text{Total Dependency Ratio} = \frac{263065 + 43172}{358772} \times 100 = 85.36$$

Total Dependency Ratio = Young Dependency Ratio + Old Dependency Ratio

Therefore, $85.36 = 73.33 + 12.03$.

However, it may be remembered that the dependency ratio is not a completely accurate measure for assessing the dependency burden, for not all persons in the working age are employed, nor all those in the dependent age are economically-dependent. This measure, however, gives us a broad idea of economic dependency in any population and is, therefore, widely used.

- 3) *Population pyramid* is a widely used graphical device to show the age-sex composition of a population. It consists of a number of bars representing successive age-groups in ascending order, from the lowest age at bottom to the highest age at top. The length of a bar for any age-group represents the number or percentage of males or females in that age-group, according to a scale along the horizontal axis.

The pyramid can be made either way, in age-groups of width of 5 or 10 or in single years of age. In any case, the highest bar refers to an open age interval (say 80 years and above). The number of males and females can directly be traced on the graph or represented in percentage form, without producing any change in the geometrical shape of the pyramid. It is notable that the percentage in sex-age group is calculated as in the total population and not in the population of that sex. Depending on the trends of fertility, mortality and migration, pyramid can take various shapes. The relative length of the bar at the bottom indicates whether the recent fertility has been high or low. Protuberances and indentations in the shape of pyramid reveal that corresponding periods of either high fertility or high mortality, low mortality or low fertility, immigration or emigration. If the historical trend does not confirm the shape, it can, then, be explained by errors in reporting of age-data. Pyramid made for the single-year-age distribution can also show the phenomenon of digital preference or digit avoidance in reporting of age.

- 4) *International sources/publications of population data*: The United Nations and other international organisations periodically publish demographic data for the world and for different countries. Some of the important publications are given below.

- *Demographic Year Book*: In this periodical, which is annually published by the United Nations, data for the world and different countries are presented on the following topics: population size, area, density, population growth, population characteristics, number of births and birth rate, number of deaths and death rate, number of marriages and marriage rate, etc. Every year, a special topic is selected for presentation of data

pertaining to it. Detailed information is presented on the special topic selected and may cover one of the following: fertility (natality), mortality, population census statistics, marriage. For instance, the Demographic Year Book for 1974 presents detailed data on mortality. The periodical is very useful not only to the students of population studies but also to all others interested in it.

- *Statistical Year Book*: In this annual publication of the United Nations, information on the following topics is available for various countries of the world: national accounts, facilities of hospitals and availability of doctors, energy consumption, food production, educational facilities, newspaper circulation, availability of labour force, etc.
 - *Epidemiological and Vital Records*: In this monthly periodical published by the World Health Organisation information on public health and mortality is presented for different Countries of the world.
- 5) *Significance of Sample Surveys*: In a sample survey, information is collected only from a sample, which is representative of the whole of the population, and conclusions are drawn for the whole population by the use of scientific methods. In a country like Afghanistan, where no census was conducted, population data were collected through sample surveys and some estimates were made of its size, growth, structure and characteristics. Even in countries where regular census operations are conducted, the need for collection of population data through sample surveys is felt, for a census is taken in most countries only once in ten years. The collection of data through sample surveys has several advantages also.

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UNIT 3 DETERMINANTS OF POPULATION CHANGE

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3.0 INTRODUCTION

In Unit-2, we have highlighted the important concepts related to the aspects of population size, distribution, composition or structure used in the study of demography. Now it is easy for you to understand the determinants of population change, namely births, deaths and migration. Technically, i.e. in demographic terminology, birth rate is called 'fertility rate' while death rate is called 'mortality rate'. Since the changes in population basically take place due to births, deaths and migration, these are called determinants of population change. Of course, there are some other factors such as natural calamities which also affect the populations occasionally.

We need to know about all these determinants. Therefore, in the present Unit (i.e. Unit-3), our discussion will centre around fertility, mortality and migration with emphasis on types, measurements/indices as well as factors influencing them, among other things.

3.1 OBJECTIVES

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

- Explain different determinants of population change;
- Describe the types, measures/indices fertility, mortality and migration and factors influencing them;
- Identify the sources of data on the determinants of population change; and
- Analyse and interpret the concepts of differential fertility, mortality and migration and related trends.

3.2 FERTILITY

In this section, we will deal with the concept of fertility, its measures/indices and factors influencing it.

3.2.1 Concept of Fertility

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

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

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

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

- **Sterility:** While a man or woman or a couple who has given birth to at least one live child, is considered fertile, one who has not had a single child is considered sterile. While fertility promotes continuation of human race, sterility hinders population growth and gradually leads to its extinction.
- **Birth order:** The sequence of live births of a women are classified according to their order or rank; e.g. first order birth (i.e. first in order), second order birth, (i.e. second in order), etc.
- **Parity:** Women may be classified according to the number of children born alive to them. For instance, the first parity women are those who have given birth to one child; the second parity women are those who have given birth to two children; and so on. Thus, while the birth order refers to the child, parity refers to the mother.
- **Natural fertility:** As defined by Henry (1953 in Asha and Tara, 2006, p.253), the French demographer, natural fertility is "fertility of a human population that makes no deliberate effort to limit births." Fertility may be considered to be natural if no contraception or induced abortion is used. Practice such as prolonged breastfeeding and/or abstinence after childbirth do tend to lower fertility, but when such practices are adopted without any intention of controlling fertility, the results of fertility is considered as natural.
- **Contraception:** Contraception refers to measures which are taken in order to prevent sexual intercourse or coitus from resulting in conception. A contraceptive method is sometimes termed as a birth control method, though "birth control" is used in a broader sense to include intentional abortions, sterilization and complete abstinence from coitus (Asha and Tara, 2006, p.17).

As we have discussed in Unit-2, the sources of data on fertility include: i) Vital registration system, ii) Population census, iii) Sample surveys, iv) National family household surveys, and v) Research reports.

3.2.2 Measures / Indices of Fertility

Bhaskar D. Misra (1980, pp.161-171) provides following measures of fertility which, in fact, are different fertility rates ranging from crude to accurate measures.

3.2.2.1 Crude Birth Rate

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

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

Where:

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

Crude birth rate is affected by the age and sex structure of the population, because persons of all ages are not involved in the process of reproduction. Therefore, it can lead to erroneous conclusions in comparing the populations with varying age-sex structures. However, for short periods of time it can meaningfully be used to depict the changes in fertility in a population.

3.2.2.2 General Fertility Rate

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

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

Where:

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

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

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

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

Where:

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

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

3.2.2.3 Age-Specific Fertility Rates

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

ASFR is calculated by the formula:

$$ASFR = \frac{B_x}{W_x} \times K$$

Where:

B_x and W_x are the births to women aged 'x' and the average number of women aged 'x' respectively.

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

$$\begin{aligned} ASMFR_x &= \frac{B_x}{W_x^m} \times K \\ &= ASFR_x M_x K \end{aligned}$$

Where:

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

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

3.2.2.4 Total Fertility Rate

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

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

If the ASFRs are given in five-year age intervals, their sum should be multiplied by 5. The physical meaning of total fertility rate is that it is the expected number of children that a cohort of 1,000 women will bear in their life time, if none of them dies before crossing the age of reproduction. It is sometimes also expressed

as per woman in place of per 1,000 women. It can also be said that the total fertility rate is a type of the standardized rate with equal weights given to all ages and therefore, is independent of the age-composition of the population.

3.2.2.5 Gross Reproduction Rate

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

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

Where:

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

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

$$\begin{aligned} GRR &= \left(\sum_{x=15}^{49} ASFR_x \right) \times \text{proportion of all births that are female} \\ &= TFR \times \frac{100}{205} \text{ (or 0.4878)} \end{aligned}$$

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

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

The gross reproduction rate can also be defined as the ratio between the size of birth cohorts in two successive generations, in a one sex population model, if the mortality force does not operate before the end of child-bearing period. In strict sense, the GRR is a generational measure. However, it can be calculated for both the synthetic and real cohort. The GRR, when calculated from the period-fertility rates, show what would happen in terms of birth performance (considering only female births) in a real birth cohort of females if they pass through child-bearing

ages experiencing the fertility rates described by the period-fertility schedule and without experiencing any mortality before the end of reproductive ages.

3.2.2.6 Net Reproduction Rate

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

$$NRR = \sum_{x=15}^{49} \frac{B_x}{W_x} \left(\frac{B_{fx}}{B_x} \right) \frac{L_x}{l_0}$$

Where:

- L_x/l_0 is the life table survival rate, and
- (B_x/W_x) and (B_{fx}/B_x) are the age-specific fertility rate at age 'x' and proportion of females among the total births at age 'x' respectively.

Assuming that in India for every 100 females, 105 males are born, we have

$$NRR = \frac{100}{205} \sum_{x=15}^{49} \frac{B_x}{W_x} \frac{L_x}{l_0}$$

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

$$NRR = \frac{100}{205} \sum_{x=1}^7 \frac{B_x}{W_x} \frac{{}_5L_x}{l_0}$$

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

3.2.3 Factors Influencing Fertility

In this sub-section, we will discuss the factors that influence fertility, with an emphasis on those that have brought about a change from high fertility to low fertility in developed countries.

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

- *Social and religious customs:* Most often these customs favour high fertility in many societies of the developing countries.
- *Mean duration of married life due to early marriage:* The higher the mean duration of married life the higher will be the fertility.
- *Environmental causes such as hot or cold climate:* The countries or regions with hot climate generally have high fertility compared to the areas with cold climate.
- *Economic factor:* The poverty breeds high fertility.
- *Level of literacy / education:* The higher the level of education the lower the fertility.
- *Age and sex structure of population:* Young population with more females in reproductive age-group is likely to have higher fertility than the older populations.
- *Mortality rate:* The higher the mortality the higher the fertility.

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

Attitudinal/Motivational Factors: Demographers (Asha and Tara, 2006. p.311) are of the opinion that, over the years, tremendous changes have occurred in the attitudes of couples towards reproduction. It appears that they have moved away from a strong positive desire to have more children to a strong motivation for a limited family. Such attitudinal change operated at the level of individuals and couples, who translated it into action to have a small family. Such actions of individual families acted as a motivational force for change in the social atmosphere in favour of birth control and use of diverse and effective means of contraception and in the wake of social and economic conditions arising out of the Industrial Revolution. Thus, motivational factors have played an important role in bringing about a change from high fertility to low fertility. It has, in fact, also a relationship with their literacy and educational level.

Economic and Social Factors: The phenomenon of decline in fertility that happened in the developed countries is very complex. There are several interacting and overlapping economic and social factors responsible for the transition from high fertility to low fertility. These factors include: i) Industrialization; ii) Urbanization; iii) Rising levels of living and increased cost of bringing up children; iv) Family functions and structure; v) Relationship between mortality and fertility; and vi) Social mobility (Asha and Tara, 2006. pp.11-12).

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

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

Industrialisation was accompanied by *urbanization*. Declines in mortality were registered because of agricultural, economic and social developments that came in the wake of industrialization. Several changes accompanied the growing industrialization and urbanization, which had implications for fertility decline. Of particular interest are the changes which took place in the structure and functions of the family – the basic unit of society. The family lost its function as an economic unit, in the sense that it ceased to be a producing unit and became only a consumer unit. With the introduction of laws which prohibited child labour and making of education compulsory, the economic usefulness of children to their parents was drastically reduced. In fact, they became a liability because of the increasing costs and lengthening duration of education. At the same time, there were declines in mortality, specially infant and child mortality; more children survived and the burden of bringing them up fell entirely on the nuclear family (Asha and Tara, 2006. pp.311-312).

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

With the spread of education among women, social attitudes to women as well as the attitudes of women to themselves underwent profound changes. It was realized that a woman need not be restricted to her age-old role of homemaker and bearer of children. Women began to participate in gainful employment which provided an alternative to childbearing and childrearing. Education was also responsible for bringing about a rational outlook, free from religious dogma; and this rational outlook facilitated the acceptance of the idea of fertility control. Moreover, flowing from educational opportunities rising prosperity was the aspiration of the individual so as to rise in the social scale. Too many children were perceived to be an obstacle in the attainment of this objective — to climb up the social ladder; and the natural result was the limiting of the size of the family.

According to Notestein (1953, pp.15-18), the growth of a huge and mobile city population largely changed the corporate family life of traditional society; instead

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

Asha and Tara (2006, pp.311-313) summarise the reasons for the recent decline in fertility and current low levels of fertility in most of the developed countries as follows: i) Development of improved methods of fertility control – increasing use of the most-effective methods; ii) Liberalised abortion laws – extensive grounds and facilities for abortion; iii) Decreasing desire for large families; iv) Rising costs of rearing child; v) The increasing trend of women’s employment in paid jobs outside the home; and vi) Instability and changes in the values attached to the rewards and penalties of parenthood in the context of other needs and aspirations.

3.2.4 Differential Fertility

It has been observed that the levels and patterns of fertility vary considerably in various sub-groups of the same population. These sub-groups may be based on residence (urban or rural), social and economic status, educational attainment, occupation, income, size of land-holding, religion, caste, race, etc. A study of differential fertility is useful in identifying the factors determining fertility (Asha and Tara, 2006, pp.316-323).

Different factors are responsible for fertility differentials among different groups within a particular country or society. These differentials can be studied under two broad categories.

- i) *Regional differences in fertility.* These include: a) Rural-urban differences in fertility, and b) Fertility differential due to ecological or geographical factor.
- ii) *Fertility differentials based on socio-economic factors.* These include: a) educational attainment and fertility; b) economic status and fertility; c) occupation of the husband and fertility; d) employment of women and fertility; e) religion, caste, race and fertility; f) demographic factors such as the age and sex structure of the population and fertility, and so on.

3.2.4.1 Regional Differences in Fertility

Regional differences in fertility are presented as follows.

- ***Rural-urban Residence and Fertility:*** Numerous studies have been conducted on fertility differential according to rural-urban residence. It has been found that the fertility of those residing in cities was lower than that of

rural residents; and these differentials were more or less stable. However, when national birth rates declined the fertility differentials widened in a more pronounced manner among urban upper classes than among other classes.

In India, the rural-urban fertility differentials in 1951 were relatively smaller as a result of the gradual narrowing down of these differentials which had begun since 1931. After 1951, urban fertility was more or less consistently lower than rural fertility in most of the States in India. These differentials, however, have become more pronounced in recent times.

The national sample survey and the sample registration schemes in India have consistently shown the rural crude birth rates to be higher than the urban crude birth rates (See Table 3.1).

Table 3.1: Crude Birth Rates in India for Rural and Urban Areas: 1968-1997

Year	Fertility		Year	Fertility	
	Rural	Urban		Rural	Urban
1968	39.0	-	1979	34.3	28.3
1969	38.8	32.8	1980	34.6	28.1
1970	38.9	29.7	1981	35.6	27.0
1971	38.9	30.1	1982	35.5	27.6
1972	38.4	30.5	1983	35.3	28.3
1973	35.9	28.9	1984	35.1	29.2
1974	35.9	28.4	1988	33.1	26.3
1975	36.7	28.5	1995	30.0	22.7
1976	35.8	28.4	1996	29.5	21.6
1977	34.3	27.8	1997	28.9	21.5
1978	34.7	27.8			

Sources:

- 1) Office of the Registrar General, India. 1981. *Sample Registration System*. Appendices 1-4. New Delhi: Vital Statistics Division, Ministry of Home Affairs.
- 2) Office of the Registrar General, India. 1983. *Sample Registration System 1976-78*, New Delhi: Vital Statistics Division, Ministry of Home Affairs, p.9.
- 3) Office of the Registrar General, India. *Sample Registration Bulletin*, Vol.X, No.2, April 1976, p.2, Vol.XIX, No.2, December, 1985, p.5, and Vol.XXIV, No.2, Dec.1990, p.6.

Further, the total fertility rates for rural and urban areas were 5.8 and 4.3 respectively in 1972. The total marital fertility rate was also higher for rural areas (6.8) than for urban areas (6.0). In fact, each fertility index shows that, in 1972, rural fertility was unambiguously higher than urban fertility.

These rural-urban differences also vary from State to State even at a point of time depending upon geographical and ecological factors.

3.2.4.2 Fertility Differentials based on Socio-economic Factors

Socio-economic factors that cause differential fertility include the following.

- **Educational Attainment and Fertility:** The educational attainment of couples have 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. In low fertility countries, historically the relationship between fertility and the educational attainment of the wife has been negative, in the sense that the higher the educational level the lower was the family size (Asha and Tara, 2006, p.320).

In the high fertility countries, such as Egypt, Taiwan and Chile (Greater Santiago) a distinct negative relationship has been observed between the educational attainment of the woman and the number of children born to her. In a high fertility country like India also, in Bangalore City, women with high school or college education were found to have a smaller family than those with a lower educational attainment.

The sixteenth round of the National Sample Survey (1960-61 urban areas) also brought out a clear-cut relationship between the educational attainment of the married urban woman and her completed family size. It was observed that the complete average family size was 6.10, 6.32 and 6.25 respectively for the illiterate, for those whose education did not go beyond the primary school level, and for those who had completed their primary school education. For those who had the secondary school education or higher education (above secondary school) the average family size was 4.25 and 2.62 respectively.

Two Indian studies have established a distinct relationship between the education of the woman and fertility. The first study was conducted in the metropolitan city of Greater Bombay in 1966 (J. R. Rele, 1972) and the second in Panaji, Goa, in 1969 (Asha and Rama Rao, Unpublished). A negative association between the educational attainment of currently married women and fertility was observed in Greater Bombay; and this association was sharp and consistent for each age-group.

Table 3.2: Mean Number of Children Born Alive per Currently Married Woman by her Present Age and Educational Level

Present age of woman (years)	Illiterate & below primary	Secondary	Matriculation & above	Total
Total 15 and over	3.57	3.43	2.26	3.35
15-19	0.47	0.38	*	0.42
20-24	1.43	1.39	0.96	1.35
25-29	2.58	2.62	1.66	2.41
30-34	3.82	3.33	2.22	3.41
35-39	4.58	4.17	3.06	4.26
40-44	4.78	4.86	3.54	4.65
45 and over	4.59	4.93	4.17	4.66
Average standardized for present age	3.51	3.45	2.57	

Source: Asha A. Bhende and G. Rama Rao. *Fertility and Family Planning in Panaji, Goa.* (unpublished).

The age distribution of all currently married women of Panaji and suburbs was taken as the standard.

Table 3.3: Differential Fertility by Background Characteristics of Mothers in India-1992-93

Background characteristics	Total Fertility Rate	Mean Number of Children Ever Born to Women (Age 40-49 years)
I. Residence		
Urban	2.70	4.16
Rural	3.67	5.13
II. Education		
Illiterate	4.03	5.26
Literate < middle complete	3.01	4.50
Middle school complete	2.49	3.71
High school and above	2.15	2.80
III. Religion		
Hindu	3.30	4.78
Muslim	4.41	5.83
Christian	2.87	4.01
Sikh	2.43	3.99
Other	2.77	4.24
IV. Caste / Tribe		
Scheduled caste	3.92	5.40
Scheduled tribe	3.55	4.81
Other	3.30	4.76
Total	3.39	4.84

Source: International Institute for Population Sciences (IIPS). 1995. *National Family Health Survey (MCH and Family Planning) India — 1992-93*. Bombay.

The above findings underline the progressive emergence of fertility differentials in India, beginning with metropolitan cities and other urban areas. It may be emphasized here that the cutting point in women's educational attainment for exhibiting a negative relationship with fertility was the level of matriculation and above. Women who had either passed the matriculation examination or had studied beyond that level generally have on an average 1.0 to 1.5 children less than that of illiterate or semi-literate women. This finding has important implications for development planning and points to the need for emphasizing, to a greater extent, the value of the education of women.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

1) What is fecundity? Explain how it is different from fertility.

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2) What is natural fertility? How is it affected by contraception’?

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3) What are various sources of data on fertility?

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3.3 MORTALITY

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

The study of mortality is useful for analyzing current demographic conditions as well as for determining the prospects of potential changes in mortality conditions of the future. The public health administration depends heavily on the study of mortality, for statistics on death in the population cross-classified by age, sex, and the cause of death are of great value for the formulation, implementation and evaluation of public health programmes. Statistics on deaths also form the basis of the policies of insurance companies.

3.3.1 Concept of Mortality

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

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

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

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

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

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

3.3.2 Measures / Indices of Mortality

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

3.3.2.1 Crude Death Rate

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

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

Where:

- D is the total number of deaths registered during a calendar year (January 1 to December 31);
- P is the total population at the middle of the year (July 1);
- K is 1,000 constant.

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

Total number of deaths during 1973 (January 1 to December 31) = 61,931

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

(July 1, 1973) = 6,551,000

Therefore, crude death rate for Greater Bombay for 1973 = $\frac{61,931}{6,551,000} \times 1,000$
= 9.45

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

Uses of CDR: These include the following.

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

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

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

Table 3.4 provides estimates of average annual death rates of what we call CDRs in India from 1881-1981.

Table 3.4: Estimates of Average Annual Death Rate in India — 1881-1981

Decade	Average Annual Death Rate (Deaths per 1000 population)	Decade	Average Annual Death Rate (Deaths per 1000 population)
1881-1891	41.3	1931-1941	31.2
1891-1901	44.4	1941-1951	27.4
1901-1911	42.6	1951-1961	22.8
1911-1921	48.6	1961-1971	18.9
1921-1931	36.3	1971-1981	14.9

Source: Asha and Tara. 2006. *Principles of Population Studies*. Mumbai: Himalaya Publishing House, p.225.

- 1) Up to 1941: Kingsley Davis. 1968. *The Population of India and Pakistan*. New York: Russell and Russell, p.36.
- 2) 1941-1971: C.I.R.E.D. 1971. *The Population of India: World Population Year. 1971 Series*, p.35.
- 3) 1971-1981: *Census of India, 1981. Population Projections for India 1981-2001*, p.19.

In fact, each measure of mortality is usually computed separately for males and female.

3.3.2.2 Age-Specific Death Rate

Age-Specific Death Rate (ASDR) is an improved measure over CDR, as the relative frequency of deaths varies with age. Using this measure, a better comparison can be made in terms of the death rates calculated separately for each age. It can separate the component of mortality from the inherent effect of age composition on the number of deaths and its ratio to the population. Death rates specific for age are generally calculated separately for the two sexes so as to exhibit the variations by sex also.

$$ASDR = \frac{\text{Number of deaths at age 'a' of sex 'S' (or of both sexes)}}{\text{Mid - year population of a given year at age 'a' of sex 'S' (or of both sexes)}} \times K$$

K is usually taken as 1,000.

3.3.2.3 Maternal Mortality Rate

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

3.3.2.4 Infant Mortality Rate

Infants are defined in demography as an exact age-group, namely, age 'zero', or those children in the first year of life, who have not yet reached age one. Infant

mortality rate (IMR) is a measure of mortality among infants. It is customarily defined or computed as the ratio of the infant deaths (deaths of children in the first year of life or under one year of age) registered in a calendar year to the number of live births registered in the same year, usually multiplied by 1000.

This rate is computed as follows:

$$\frac{d_0}{B} \times K$$

Where:

- d_0 is the number of deaths below age one, registered during a calendar year.
- B is the number of live births, registered during the same year.
- K is 1,000 constant.

This rate is only an approximate measure of the true risk of death between the birth of the baby and its first birthday, for no adjustment is made for the fact that some of the infants, who died in the year considered, were born in the proceeding year.

Neo-natal mortality rate is the infant deaths that occur before the completion of one month of age.

Post-neo-natal mortality rate is the infant deaths that occur between first and eleven completed months.

Peri-natal mortality rate: The exact definition of perinatal mortality varies from country to country. The following two formulae are commonly used to estimate the perinatal mortality ratio:

$$(a) \frac{\text{Deaths under one week} + \text{Fetal deaths}}{\text{Births}} \times 1,000$$

$$(b) \frac{\text{Neonatal death} + \text{Fetal deaths}}{\text{Births}} \times 1,000$$

The perinatal death rate differs from the perinatal death ratio as the former also includes the fetal deaths in the denominator, besides the births in a year. Therefore,

$$\text{Perinatal death rate} = \frac{\text{Perinatal death ratio} \times \text{Births}}{\text{Births} + \text{Fetal deaths}} \times 1,000$$

Fetal death ratios and fetal death rates, as defined below are used for measuring the reproductive loss due to fetal deaths. The fetal deaths include either all the fetal deaths or late fetal deaths only (usually after 28 weeks of gestation).

$$\text{Fetal death ratio} = \frac{\text{Fetal deaths}}{\text{Births}} \times 1,000$$

$$\text{Fetal death ratio} = \frac{\text{Fetal deaths}}{\text{Births} + \text{Fetal deaths}} \times 1,000$$

$$= \frac{\text{Fetal death ratio} \times \text{Births}}{\text{Births} + \text{Fetal deaths}} \times 1,000$$

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

3.3.2.5 Cause-Specific Death Rate

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

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

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

Where:

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

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

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

Where:

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

3.3.2.6 Comparative Mortality Index

The comparative mortality index (CMI) measures the relative level of mortality in an area, as compared with the level of mortality in that area in some past specified (standard) years. It takes into consideration both, the changing schedule of mortality as well as the changes in age-distribution of population over time.

The CMI is defined as the ratio of the weighted sum of the ASDRs in current year to that in a standard year, at par with the price index number. The weights are the averages of the proportion of population in various age-groups in the standard and current (later) year.

The formula for calculating the CMI is:

$$CMI^c = \frac{\sum_a w_a ASDR_a^c}{\sum_a w_a ASDR_a^s}$$

Where:

- $ASDR_a^c$ is the age-specific death rate at age 'a' in current year 'c',
- $ASDR_a^s$ is the same as above, and 's' is the standard year, and
- w_a represents the weight at age 'a'.

$$w_a = \frac{1}{2} \left(\frac{P_a^c}{P^c} + \frac{P_a^s}{P^s} \right)$$

Where:

P_a^c / P^c and P_a^s / P^s are the proportions of population at age 'a' in current year 'c' and standard year 's' respectively.

Though the basic purpose for which the CMI is employed is to compare the level of mortality at two dates due to its typical weight pattern, it can also be used to trace a time-trend of mortality over a short period of time.

3.3.2.7 Standard Mortality Ratio

Standard mortality ratio (SMR) is a type of indirectly standardized death rate. It is used to compare the general level of mortality (or the mortality due to particular cause) in an occupation or industry with the general level of mortality (or the mortality due to a particular cause) in the total population. It is defined as the ratio of observed deaths to the expected number of deaths in an occupation or industry had the age-specific death rate for the total population prevailed in that. It is calculated by the formula.

$$SMR^o = \frac{\text{Observed deaths}}{\text{Expected deaths}} \times 100$$

$$= \frac{d^o}{\sum P_a^o ASDR_a^t} \times 100$$

Where:

- d^o and P_a^o are the total deaths and the population at age 'a' in occupation 'o', and
- $ASDR_a^t$ is the age-specific death rate at age 'a' in total population 't'.

For a particular cause, in an occupation, SMR is expressed as:

$$SMR^{oc} = \frac{d^{oc}}{\sum P_a^{oc} ASDR_a^{oc}} \times 100$$

Where:

- d^{oc} denotes the deaths in occupation 'o' due to cause 'c', and
- $ASDR_a^{oc}$ is the age- and cause-specific death rate at age 'a' in total population 't'.

3.3.2.8 Average Expectation of Life at Birth or Average Life Expectancy

The average expectation of life at birth is a good measure of the level of mortality because it is not affected by the age-structure of the population. This measure is derived from the life-table which is constructed to summarise the mortality experience of a single hypothetical generation or a cohort of people subject to a set of constant age-specific death rates throughout its lifetime.

The term "average expectation of life" represents the average number of years of life which a cohort of new-born babies (that is, those born in the same year) may be expected to live if they are subjected to the risks of death at each age according to the age-specific mortality rates prevailing in a given country at the time to which the measure refers. Though the average expectation of life at birth is a measure which is rather complicated to calculate it is most easily understood by the common man. It is, therefore, widely used to compare mortality levels and analyse mortality trends in different countries.

The expectation of life at birth is denoted as (e_x^0). The average number of years to which a survivor of age x is expected to live is given by:

$$e_x^0 = T_x / l_x$$

Where:

- e_x^0 = expectation of life at age 'x',
- T_x = total number of person-years lived by survivors,
- l_x = survivors of initial cohort to age 'x'.

Table 3.5: Estimated Average Expectation of Life at Birth in India — 1901-1910 to 1991-2000

	YearAverage Expectation of Life at Birth		
	Males	Females	Both Sexes
1901-1910	22.6	23.3	22.6
1911-1920	19.4	20.9	20.1
1921-1930	26.9	26.6	26.8
1931-1940	32.1	31.4	31.8
1941-1950	32.5	31.7	32.1
1951-1960	41.9	40.6	41.3
1961-1970	47.1	45.6	46.4
1971-1980	52.5	52.1	52.3
1981-1990	55.6	56.4	56.0
1991-2000	58.1	59.1	58.6

Source: Asha and Tara, 2006, op cit, p.227.

- 1) C.I.R.E.D. 1974. *The Population of India, World Population Year Series*, p.36.
- 2) Registrar-General of India. 1985. *Sample Registration Bulletin*, Vol.19, No.1, June, p.20.
- 3) *Family Welfare Year Book 1989-90*, p.113.

Recent Global Mortality Levels: Though around 1980 data on mortality were available only for a little over one-third of the world population, it is possible to estimate approximate levels of mortality for various countries of the world on the basis of data collected in Sample Surveys.

Table 3.4 presents estimates of the crude death rate and the average expectation of life at birth for 1950-55, 1970-75 and 1990-95.

Table 3.6: Estimates of Crude Death Rates and Average Expectation of Life for the World and Various Regions of the World

Regions	Crude Death Rate (Death per 1000 population)			Average Expectation of Life at Birth		
	1950-55	1970-75	1990-95	1950-55	1970-75	1990-95
<i>World Total</i>	18.8	12.8	9.3	46.0	55.2	64.4
<i>More Developed Regions</i>	10.1	9.2	10.1	65.0	71.1	74.4
<i>Less Developed Regions</i>	23.3	14.3	9.1	41.6	52.2	62.3
Africa	26.7	19.8	13.7	36.1	45.0	53.0
Latin America	14.4	9.2	6.8	52.3	61.4	68.9
South America	10.3	8.9	7.1	66.5	69.7	67.9
North America	9.4	9.3	8.7	69.0	71.4	76.1
East Asia	20.1	9.8	7.2	62.5	68.4	69.7
South Asia	25.2	16.7	8.1	48.5	54.9	63.6
Europe	10.9	10.4	11.2	65.4	71.2	72.9
Oceania	12.4	9.3	7.8	72.3	74.8	76.5
Australia and New Zealand	9.4	8.1	7.5	72.3	74.8	76.3
Russian Federation	9.2	7.9	13.3	61.7	70.4	67.6

Source: United Nations. *World Population Prospects, Assessed in 1973, 1984 and 1990.*

Developing Countries: The crude death rates for selected developing countries with comparatively reliable data indicated that these countries had very high crude death rates in 1920-24. For instance, CDR was 31 in Singapore, 30 in Chile and 29 in Sri Lanka. In the past 50 to 54 years, these countries have made a tremendous progress in reducing their crude death rates. In 1982, not much variation was observed in the crude death rates of these countries which were very similar to those of the developed countries, and occasionally even lower. Thus, some developing countries have made very rapid progress in the reduction of their mortality rates.

3.3.2.9 Standardized Death Rates

Standardization of CDR aims at the estimation of the levels of mortality, comparable with various populations, irrespective of their varying age- and sex-structures. Standardized rates, however, do not carry any meaning in themselves

and can only be used for comparison with such rates calculated in a similar fashion for other/different populations. The advantage of standardized rates over age- and sex-specific rates is that while the latter are too detailed and clumsy to allow a convenient comparison, the former give a single index easy for comparison.

There are two different ways of standardization — one is called the direct standardization and the other is the indirect standardization. *Direct standardization* is a simple and straight-forward method of adjusting death rate for age-structure. It requires the set of ASDRs of the population under study and the age-distribution of a standard population. Any population can be selected as standard; from the set of those to be compared or any other population not in the set. However, a population that approximately makes the average age composition of the populations under study may be preferred. The meaning of a *directly standardized death rate* (DSDR) of a population is that it is a crude death rate that would result if the ASDRs of the population under study apply to a population with the age distribution as that of standard population. It can be expressed as:

$$DSDR^p = \sum_a ASDR_a^p \times \left(\frac{P_a^s}{P^s} \right)$$

Where:

- DSDR is directly standardized death rate of population 'p',
- is the ASDR at age 'a' in population 'p', and
- P_a^s / P^s is the proportion of population at age 'a' in standard population 's'.

Non-availability of the ASDRs of a population, many times, present difficulty in the use of the above mentioned procedure. The problem in such cases can be dealt with the technique of indirect standardization. It requires knowledge of the age-distribution and the crude death rate of the population to be compared and the ASDR and crude death rate of standard population. The formula for the indirectly standardized death rate (ISDR) is (Bhaskar D. Misra, 1980, pp.138-146):

$$ISDR^p = \frac{CDR^p}{\sum_a \left(\frac{P_a^p}{P^p} \right) \times ASDR_a^s} \times CDR^s$$

Where:

- CDR^p = CDR of population 'p',
- CDR^s = CDR of standard population 's'
- $\frac{P_a^p}{P^p}$ = Proportion of population at age 'a' in population 'p',
- $ASDR_a^s$ = Age-specific death rate at age 'a' in standard population 's'.

3.3.3 Differential Mortality

In this section, we present you sex and age-patterns of mortality.

3.3.3.1 Average Expectation of Life at Birth: Sex Differences in Mortality

It has been observed that in most countries of the world, mortality conditions differ for males and females. The general experience is that females have an overall advantage over males with respect to mortality. The exceptions to this rule are India and Bangladesh. As is evident in Table 3.7 for most countries, the average expectation of life at birth is higher for females than males. The gap between the average expectation of life for females and males is wider in the developed countries than in the developing countries.

Table 3.7: Sex Differentials in Average Expectation of Life at Birth for Selected Developing and Developed Countries

Expectation of Life at birth				
Country	Year/Period	Male	Female	Difference
Bangladesh	1988	56.91	55.97	-0.94
Egypt	1991	62.86	66.39	3.53
Kenya	1990-1995	54.18	57.29	3.11
Mauritius	1989-1991	65.57	73.39	7.82
Mexico	1990-1995	67.84	73.94	6.10
Chile	1990-1995	68.54	75.59	7.05
India	1981-1985	55.40	55.67	0.27
Kuwait	1990-1995	73.31	77.22	3.91
Korea	1989	66.92	74.96	8.04
Malaysia	1990-1995	68.68	73.04	4.36
Pakistan	1990-1995	60.60	62.60	2.00
Sri Lanka	1981	67.70	71.66	3.88
Singapore	1992	73.70	78.27	4.57
United States	1991	72.00	78.90	6.90
Japan	1992	76.09	82.22	6.13
France	1991	72.91	81.13	8.22
Denmark	1990-1991	72.18	77.74	5.56
Romania	1992-1994	66.56	73.17	6.61
Spain	1990-1991	73.40	81.49	7.09
Sweden	1992	73.35	80.79	5.44
United Kingdom	1992	73.52	79.05	5.53
Australia	1992	74.47	80.41	5.94
Russian Federation	1992-1994	62.02	73.75	11.73

Source: United Nations. 1995. *Demographic Year Book 1993*. New York. pp.506-536.

In India, though the female expectation of life at birth has always been lower than that of males, it is now only slightly better (Asha and Tara, 2006, p.195).

3.3.3.2 Age-Pattern of Mortality

Age is an important variables in the analysis of mortality, for death rates vary with age and sex (Asha and Tara, 2006, pp.198-210).

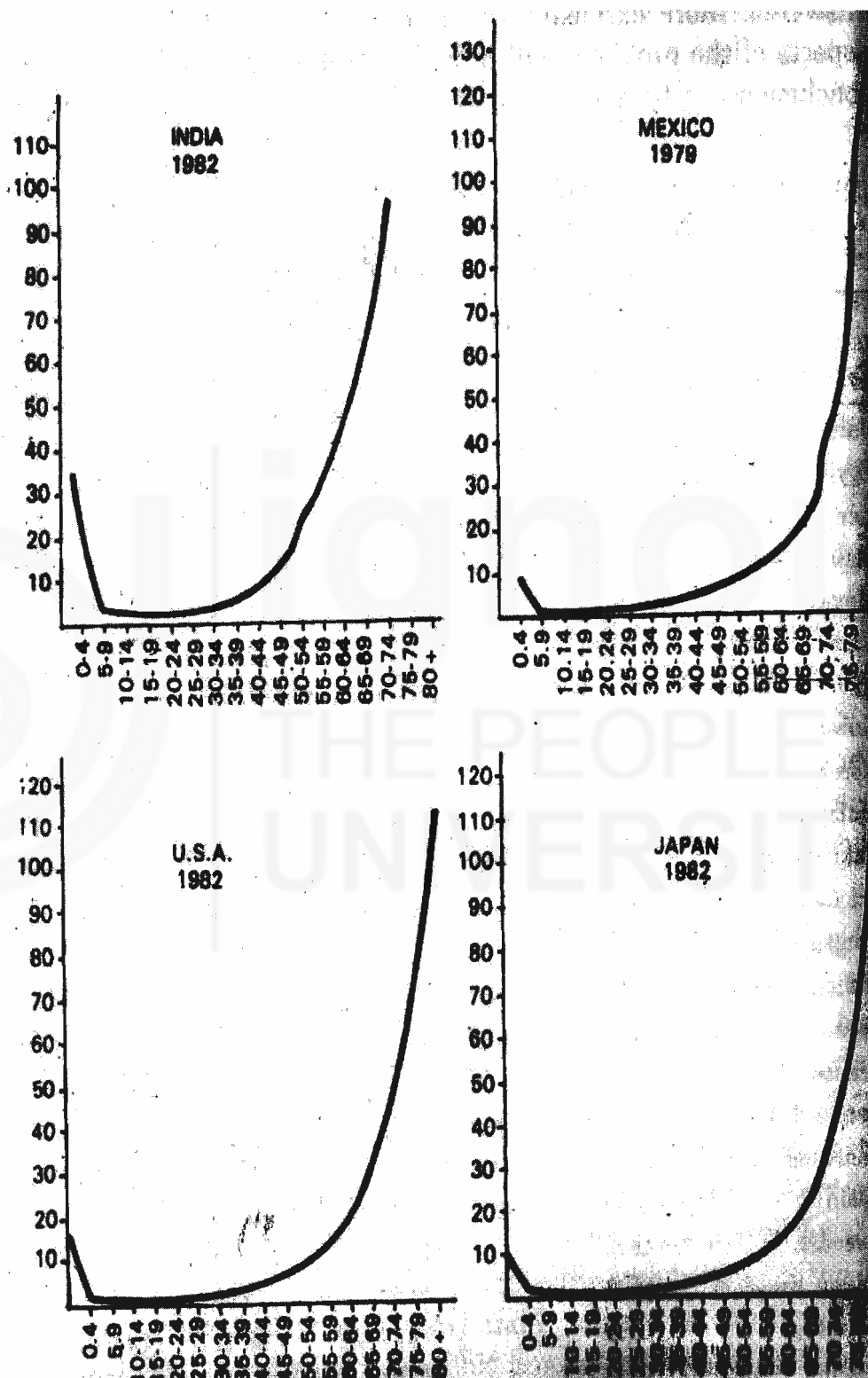


Fig.3.1: Age-Specific Death Rates for Males for some Selected Developing Countries and Developed Countries (around 1980)

Table 3.8: Age-Specific Death Rates for Some Selected Developing and Developed Countries
(Age-group-wise deaths per 1000 in specific age-groups)

Country and Year	Sex	Age																			
		All ages	Below 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
Mauritius(1991)	Male	7.6	- 5.3	-	*0.3	0.6	*0.6	1.3	1.6	2.9	3.6	6.3	9.7	15.6	19.2	31.1	45.5	65.2	98.1	150.1	206.9
	Female	5.6	-4.0	-	*0.3	0.6	0.6	0.9	0.7	0.9	1.6	2.2	3.7	5.8	9.7	15.9	25.5	39.0	68.1	130.2	172.6
Mexico (1990)	Male	6.0	37.7	2.5	0.7	0.6	1.4	2.3	2.9	3.3	4.1	5.1	7.0	9.2	13.8	18.0	27.2	37.5	60.6	85.6	142.8
	Female	4.4	29.8	2.3	0.5	0.4	0.6	0.8	0.9	1.2	1.8	2.5	3.6	5.4	8.9	12.5	20.1	29.3	48.9	72.7	138.5
Trinidad & Tobago (1989)	Male	7.0	10.1	1.0	*0.4	*0.4	1.2	1.8	2.4	2.4	2.4	3.8	5.6	9.6	16.2	23.3	36.7	61.1	87.6	-171.8	-
	Female	6.5	6.8	0.7	*0.3	*0.4	*0.6	1.0	1.1	1.2	1.5	2.7	6.3	9.1	15.0	20.9	33.3	46.9	70.3	-162.4	-
United States of America (1991)	Male	9.1	10.2	0.5	0.2	0.3	1.3	1.7	1.8	2.2	2.8	3.5	5.0	7.4	11.9	18.6	28.1	42.3	63.8	100.1	178.0
	Female	8.1	8.0	0.4	0.2	0.2	0.5	0.5	0.6	0.8	1.2	1.6	2.7	4.2	6.8	10.5	15.9	24.3	37.8	62.8	140.7
Japan (1992)	Male	7.6	4.9	0.5	0.2	0.2	0.6	0.7	0.7	0.8	1.2	1.9	3.1	4.9	8.4	13.4	19.7	32.2	56.1	97.2	183.9
	Female	6.2	4.0	0.4	0.1	0.1	0.2	0.3	0.3	0.4	0.7	1.1	1.6	2.4	3.7	5.6	9.0	15.8	30.3	58.7	135.6
United Kingdom (1992)	Male	10.9	7.3	0.3	0.2	0.2	0.6	0.9	0.9	1.0	1.4	2.1	3.3	5.8	10.0	17.7	30.2	47.5	75.7	116.7	195.8
	Female	11.0	5.7	0.3	0.1	0.1	0.3	0.3	0.4	0.5	0.8	1.3	2.2	3.6	6.0	10.3	17.2	27.2	45.0	74.4	150.4
Sweden (1992)	Male	11.3	6.0	0.3	0.1	0.2	0.5	0.8	0.8	1.0	1.4	2.0	3.0	4.7	8.2	14.3	23.4	38.0	63.8	106.2	199.0
	Female	10.5	4.7	0.2	0.1	0.1	0.2	0.3	0.3	0.5	0.7	1.2	2.0	3.0	4.6	7.6	12.4	20.2	36.7	67.5	154.2
India ** (1992)	Male	9.5	-22.7	-	2.0	1.2	1.6	2.1	2.3	2.9	4.0	5.1	8.0	13.2	20.6	30.7	46.2			-94.5	-
	Female	9.1	-24.8	-	2.5	1.6	2.2	3.0	2.7	2.8	3.9	5.3	9.0	14.4	24.2	34.6				-81.1	-

* Rates based on 30 or fewer deaths.

** Estimated.

Source: 1) United Nations. 1995. *Demographic Year Book, 1993*. New York, pp.454-469.

2) Registrar General. India. 1993. *Sample Registration System: Fertility and Mortality Indicators*. New Delhi, p.148.

Table 3.8 presents age-specific death rates for males and females for selected developing and developed countries and Fig. 3.1 presents age-specific death rates for males for two developing and developed countries each. It may be observed that the age-specific death rates are higher at age 0 than at other ages for all countries, irrespective of whether the country is developed or developing. The death rate suddenly drops for the age-group 1-4 and then gradually decreases up to the age group 10-14. For almost all the countries, the lowest values of the age-specific death rates are observed for the age group 10-14. After age 14, the values of the age specific death rates slowly increase up to age 50 or 55, and then rise steeply at the higher ages. It may be observed from Fig. 3.1 that the typical age-specific mortality curve in countries of high mortality is roughly U-shaped, which indicates that mortality is very high at both the extremes of the life span, that is, in infancy and in old age. The shape of the age-specific mortality curve of countries with low mortality is roughly J-shaped, the difference in the shape of the two curves being due to the difference in the infant mortality rate of these two countries. In countries with low mortality rates the curve extends over a large number of age-groups. A similar pattern of the age-specific mortality curve is observed for females, the only difference being that the values of the age-specific death rates are lower for most of the age-groups because of lower female mortality.

3.3.3.3 Other Differentials of Mortality

Important variations in the levels of mortality are evident for different sub-groups of the population even in the same country. For instance, the rural areas and urban areas of the same country have widely different death rates. In addition to mortality differentials by geographical residence, differentials due to other demographic and socio-economic factors may also be observed within the boundaries of a particular country. Such factors include occupation, income level, educational attainment, sex, age, marital status, etc. These differentials, among others, vary widely from country to country, and across different regions/States within a country including India.

3.3.4 Causes of Death

The World Health Organisation has prepared a Manual on the International Statistical Classification of Diseases, Injuries and Causes of Death. According to this Manual (WHO, 1955), one thousand groups of diseases have been identified, and these are re-grouped into an intermediate list of 150 causes numbered A1, A2, A3, etc. These, in turn, are regrouped into an abbreviated list of 50 causes numbered as B1, B2, B3, etc. This last list of 50 groups of causes is used for computing deaths and death rates on the basis of the causes of death.

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

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

The pattern of mortality on the basis of causes of death in the developing regions is quite different from that in the developed regions, though this pattern too has

undergone changes over the years as mentioned above. For those countries for which data on causes of death are available, it is possible to study the changes in the causes of death along with the changes in mortality.

- i) **Reasons for high mortality in the past:** It has already been pointed out that, up to the nineteenth century, death rates all over the world were very high and fluctuating. The main reasons for such high mortality rates were:
- Acute and chronic food-shortages causing famines and conditions of malnutrition;
 - Epidemics;
 - Recurrent wars; and
 - Poor sanitary conditions.

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

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

- **Endogenous/Biological factors:** Most of the endogenous factors related to the formation of the foetus in the womb are biological in nature. Among the biological factors affecting foetal and neo-natal infant mortality rates, the important ones are the age of the mother, the birth order, the period of spacing between births, prematurity birth, weight at birth and the fact of multiple births. Based on in-depth studies done on the age of the mother, the parity of the mother or the order of pregnancy and/or of birth it has been generally observed that foetal and neo-natal mortality rates are higher at the younger ages of the mother (that is, below the age of 19), at first parity and for the first birth order. These mortality rates start declining up to the age of 29 of the mother, and at the second and third parity and then again increases with higher age of the mother, higher parities, and high birth orders. It is now an established fact the causes of foetal and neo-natal deaths arise mainly out of genetic factors, and may be traced back to the intrauterine life of the foetus and to the damage occurring during the process of birth.
- **Exogenous Causes:** Social, cultural, economic and environmental factors are also found to affect infant mortality, specially during the post-neo-natal period. However, post-neo-natal deaths are mainly due to various epidemics caused by communicable diseases, both of the digestive system such as diarrhoea and enteritis, and of the respiratory system such as bronchitis and pneumonia as well as by faulty feeding patterns and poor hygiene. The important environmental factors include crowding and congestion, insanitary surroundings, lack of proper sunshine and fresh air, etc. Changing patterns of lifestyle impacting on culture producing illegitimate births and consequent effects leading to infant mortality is also contributing to a high infant mortality rate.

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

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

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

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

Similar developments over a period in other countries also have gradually contributed to the decline of their mortality rates.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under "Answers to 'Check Your Progress' Questions".

- 4) List out different measures of mortality.

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3.4 MIGRATION

In this section, we will touch upon migration, which is the third determinant of population change, the other two being fertility and mortality which we have already discussed above. Unlike fertility and mortality, migration is purely a social phenomenon which is the result of a complex mechanism involving social, psychological, economic, political, institutional and other determinants (Bhaskar D. Misra, 1980, p.224).

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

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

- Migration may be considered as a symptom of basic social change.
- Industrialization and economic development have been accompanied by large-scale movements of people from farm areas to towns, from one town to another, from one city to another, and from one country to another.
- Technological and other changes in certain areas causing migration of people from rural to urban areas has given rise to towns, cities and metropolitan cities.
- Increased market and business operations requiring supply of skilled and unskilled workers.
- Growth of industries leading to the occupational and employment status of the migrants.
- The emergence of such a massive population phenomenon, especially that of rural-urban migration, and new problems arising out of such migration.

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

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

3.4.1 Concept and Types of Migration

The United Nations’ Multilingual Demographic Dictionary (1958) defined migration as follows: “Migration is a form of geographical mobility or spatial mobility of people between one geographical unit to another, generally involving

a change in residence from the place of origin or place of departure to the place of destination or place of arrival. Such migration is called permanent migration and should be distinguished from other forms of movement which do not involve a permanent change of residence.”

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

- i) **Typology of migration:** Migration can be classified into different types based on different criteria.
 - a) *Spatial migration:* Based on space it is divided into internal migration (within a country) or international migration (across political borders). The internal migration can again be divided into intra-local and inter-local, and intra-regional and inter-regional.
 - b) *Temporal migration* (based on time-length): The temporal migration is divided into four categories – daily, periodic, seasonal and long-term migrations.
 - c) *Causal migration:* Based on the cause, the migration is voluntary or forced.
 - d) *Consequential:* Based on the consequences, migration is of two types: innovative (to introduce or to adapt to innovations) or conservative (to conserve one’s own values, traditions, etc).

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

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

- **Immigration and Emigration:** The terms immigration and emigration refer respectively to movement into or out of a particular territory, and are used only in connection with international migration. Thus, migrants leaving India to settle down in the United States are immigrants to the United States and emigrants from India.
- **In-migration and Out-migration:** In-migration refers to movement into a particular area, while out-migration refers to movement of people out of a particular area, both referring to movements *within a country*, that is, *internal migration*. Thus, migrants from Tamil Nadu to Maharashtra are considered to be immigrants for Maharashtra and out-migrants for Tamil Nadu. Each move is either an immigration or in-migration with respect to the place of destination and emigration or out-migration with respect to the place of origin and departure.

- **Place of origin or Place of departure and Place of destination or Place of arrival:** The place from which a move is made by the migrants is the place of origin or departure. The place of arrival or the place of destination refers to the place at which a move of the migrants terminates.
- **Gross migration and Net migration:** The total of the arrivals of immigrants and in-migrants and departures of emigrants and out-migrants is known as gross migration or the volume of migration. Net migration is the difference between the total number of persons who arrive and the total number of persons who leave. This is also referred to as the balance of migration. i.e. difference between the number of immigrants and emigrants is net migration with reference to a country in the context of international migration, and the difference between in-migrants and out-migrants is also net-migration with reference to a place within a country in the context of internal migration.
- **Migration stream:** It refers to the total number of moves made during a given migration interval which have a common area of origin and common area of destination. In practice, it refers to a body of migrants having a common area of origin and a common area of destination.
- **Migration interval:** Though migration occurs more or less continuously over a period of time, it is necessary to specify the interval over which it is observed. This interval may be *definite*, i.e. when data refers to a definite interval such data measure a fixed-term or fixed-period of migration, be it one year, two years, five years, or an inter-censal period, etc. Or, it may be *indefinite* — the life-time migration of a population based on the place of last residence which does not have a definite time-reference or at only a given point of time.
- **Sources of data:** A periodic national census surveys, population registers and sample surveys are the three principal sources of information on internal migration (Asha and Tara, 2006, pp.363-369).

3.4.2 Measures / Indices of Migration

It is customary to classify the measures of migration into two categories: 1) *direct measures*, and 2) *indirect measures*. The direct measures are based on data obtained from direct questions asked during a census on the movements of persons. Questions on the following items provide information for direct estimation of migration movements: i) the place of birth of the person, ii) the last or previous place of residence of the person, or iii) the duration of stay of a person at the present place of residence. The indirect measures of estimating migration do not require special questions; the extent of migration can be estimated from the total counts in a census and the available age-sex distribution of the population.

3.4.2.1 Direct Measures of Migration

In this type of measure data elicited directly from the migrants is used for measuring migration. It is done in the following ways.

- 1) **Based on the Place of Birth:** In almost every census, a question is asked on a person's place of birth. On the basis of the information obtained through this question, all enumerated persons in the population can be classified in either of the following two groups:

- a) Migrants or life-time migrants, defined as persons who are enumerated in a place which is different from the place where they were born; and
- b) Non-migrants defined as persons who were enumerated in the place where they were born.

The category of migrants is then further sub-divided into various migration streams on the basis of specific places of birth and places of residence.

- 2) **Based on Duration of Residence:** Sometimes a question on the duration of residence at the place of enumeration is included in the census questionnaire. An analysis of information obtained through this question forms another approach to the study of migration. Persons who have lived in the place of enumeration all their lives are treated as non-migrants. The following categories are included as migrants on the basis of their duration of residence at the place of enumeration:

- a) those born outside the area of enumeration, and
- b) those born in the area of enumeration who had at some time lived outside of it (return migrants).

Thus, while measuring migration with the help of the question on the duration of residence, we take into account the number of return migrants; but in the place-of-birth approach we exclude the number of return migrants from the category of migrants.

- 3) **Based on Place of Last Residence:** In order to obtain information on the last move, information is obtained about the place of last residence. This information may then be classified into the following two categories:

- i) Migrants whose place of last residence and place of present residence differ, and
- ii) Non-migrants who have never moved outside the area of their place of birth.

The data on the place of last residence identifies all migrants and covers all persons who had migrated at any time during their life-time.

- 4) **Place of Residence at a Fixed Prior Date:** In some countries, a question about the residence on a specified date is included in the census questionnaire or in the sample survey questionnaire. The replies obtained to those questions are useful in any study of migration, for migration interval is clear-cut, migration status is determined by a comparison of residence at two definite points in time; and a migrant is defined as a person whose residence at the census date differs from his residence at the specified prior date. Such information is very useful in analyzing current migration and for computing the "period migration rate."

Any measurement of migration on the basis of residence at a fixed prior date is simple and specific. It is, therefore, considered by many demographers to be a more satisfactory and useful measure for migration analysis than the measures based on place of birth data or last residence data. Certain limitations of this approach, however, need to be noted. The possibility of inaccuracy in the data due to recall-lapse cannot be ruled out. When the

reference period for the question on the place of residence at a fixed prior date is not the same as that of the inter-censal period, such data cannot be used for determining the components of inter-censal population growth.

3.4.2.2 Indirect Measures of Migration

In addition to the measurement of migration based on information obtained through direct questions on migratory movements asked in a census surveys, it is possible to estimate net inter-censal migration by using the population counts in two successive census operations.

The growth in the population of any area/region is due to a natural increase (excess of births over deaths) plus migratory movements. If the population counts of an area at two points of time are available and if the number of births and deaths which had occurred in that area is also known, it is possible to compute the expected population count at the end of the interval in the absence of any migration data. The difference between the observed (actual population count at the end of the period) and the expected population gives the estimate of the net change due to migration. Such estimates can be arrived at by adopting: i) the use of vital statistics, and ii) the use of estimates of the probability of survival.

- 1) **The Vital Statistics Method:** In a country or a place where reliable information on the births and deaths in its population is available, the estimate of a natural increase between two successive census operations can be obtained. The estimates of net migration can be arrived at by subtracting the natural increase from the total population change. It should be remembered that the estimates of net migration obtained by the vital statistics method also include international migration figures. This simple equation to estimate net migration is a form of the "balancing equation."

$$\text{Net } M = (P_1 - P_0) - (B - D)$$

Where, for any give area:

- Net M is the Net Migration,
- P_0 is the population at the earlier census,
- P_1 is the population at the later census,
- B is the number of births in that area during the inter-censal period, and
- D is the number of deaths which occurred in that area during the same period.

In developing countries, however, the data on births and deaths obtained from vital registration systems are not accurate and adequate, and hence are of poor quality. The errors in the reporting of births and deaths, therefore, affect the estimation of net migration based on this approach.

- 2) **The Survival Ratio Method:** This approach for estimating the net internal migration for the period between two census operations is based on the survivorship probabilities obtained from existing life-tables. The basic information needed is the age-distribution by sex, as enumerated in each area in two successive census operations and a set of survivorship ratios which may be applied to the population of the first census in order to derive

an estimate of the number of persons expected to survive to the second census. The differences between the enumerated population at the end of the second census and the expected population is the estimation of net-internal migration.

In case appropriate life-tables are not available or where the use of the available life-tables is forbidden for some reason or the other, the estimates of net-migration may be obtained by computing the survival ratios of two consecutive census operations. Both the *life-table survival ratio method* and the *census survival ratio method* cannot, however, provide estimates of net-migration for persons born during the inter-censal period. Other appropriate methods may have to be used for this purpose. It should be noted that the migration estimates obtained by the census survival ratio method are better than those arrived at by computing life-table survivorship probabilities as the former has built-in corrections for the age-errors, inherent in census data.

- 3) **Migration Rate:** A migration rate is the number of migrants related to the population that may have migrated during given migration interval. The migration rate is computed as follows (Asha and Tara, 2006, pp.370-380):

$$m = \frac{M}{P} \times k$$

Where:

- m is the rate of migration for the specified migration interval;
- M is the number of migrations or the number of persons migrating during the interval;
- P is the population exposed to the likelihood of migration during the interval (or mid-year population);
- k is 100 or 1000 (constant).

Similar rates can be calculated for in- and out-migration and gross- and net-migration.

For In-migration (in-m):

$$\text{In-m} = \frac{M_i}{P} \times k$$

Where:

- In-m is immigration, and
- M_i is the number of in-migrants in a given population

For out-migration (out-m):

$$\text{Out-m} = \frac{M_o}{P} \times k$$

Where:

- Out-m is out-migration, and
- M_o is the number of out-migrants in a given population.

For gross-migration (gross-m):

$$\text{Gross - } m = \frac{Mi + Mo}{P} \times k$$

Where, *Gross-m* is gross-migration.

For net-migration (net-m):

$$\text{Net - } m = \frac{Mi - Mo}{P} \times k$$

Where, *Net-m* is net-migration.

3.4.3 Differential Migration

Distinct group differentials in migration are studied by comparing the characteristics of migrants with those who do not migrate but continue to stay in the place of origin and / or with those who live in the place of destination. Some of these differentials are as follows.

- Differential migration by age.
- Differential migration by sex.
- Differential migration by marital status.
- Differential migration by educational attainment.
- Differential migration by employment status.

Given below is some information on differential migration in India.

3.4.3.1 Internal Migration in India: Some Differentials

The main source for the study of internal-migration in India is provided by the decennial population census. In the 1961 census, about 68.6 percent of the population was enumerated at the place of birth, indicating that only 31.4 percent had moved from their place of birth. The percentage of life-time migrants was found to have slightly decreased to 29.5 in the 1971 census. A large number migrants moved only short distances, that is, they move from one place to another within their own district.

Majority of the Indian population has been immobile or non-migrating. Generally, the following factors have been mainly responsible for their immobility: i) predominance of agriculture, ii) the caste system, iii) early marriage, iv) joint family system, v) diversity of languages and culture, and vi) lack of education, etc.

Inter-State Migration in the Indian States During 1951-61 and 1961-71 Based on Place of Birth Data: The study of inter-state migration in India is fraught with problems because of the boundary changes which have taken place during the inter-censal periods. Some demographers have overcome these difficulties by adjustment of various types of migration and have tried to estimate the inter-State migration in India (Asha and Tara, 2006, pp.386-387).

Based on the estimates of net-migration in the States of India during 1951-1961, following is the order of gaining and losing states.

Rank Order of Gaining States		Rank Order of Losing States	
Rank	State	Rank	State
1	West Bengal	1	Uttar Pradesh
2	Maharashtra	2	Bihar
3	Delhi	3	Kerala
4	Madhya Pradesh	4	Rajasthan
5	Assam	5	Madras (Tamil Nadu)
6	Punjab	6	Orissa
7	Mysore (Karnataka)	7	Jammu and Kashmir
8	Gujarat		
9	Andhra Pradesh		

During 1951-1961, heavy net-migration was observed to Bengal, Maharashtra, Delhi, and Madhya Pradesh. West Bengal net gain was of nearly 2.8 million population and that of Maharashtra 1.0 million.

The estimates of net-migration in the Indian States during 1961-1971 yielded the following results:

Rank Order of Gaining States		Rank Order of Losing States	
Rank	State	Rank	State
1	Maharashtra	1	Uttar Pradesh
2	Delhi	2	Kerala
3	Orissa	3	West Bengal
4	Assam and Meghalaya	4	Andhra Pradesh
5	Madhya Pradesh	5	Karnataka (Mysore)
6	Rajasthan	6	Punjab Group
7	Tamil Nadu (Madras)		
8	Nagaland and Union Territories		
9	Gujarat		
10	Jammu and Kashmir		
11	Bihar		

On comparison of the two periods i.e. 1951-1961 and 1961-1971 for inter-State net-migration, the change in the pattern of gaining and losing population has been observed as follows: Maharashtra, Delhi, Madhya Pradesh, Assam, and Gujarat continued as gaining States, though their rank order had changed, with Maharashtra gaining the first rank. Some States like Jammu and Kashmir, Rajasthan, Bihar and Tamil Nadu which were losing population due to migration during 1951-1961, became gaining States during 1961-1971. On the other hand, same gaining States in 1951-1961 like West Bengal, Karnataka (Mysore), Andhra Pradesh became losing States during 1961-1971, with the most striking one being

the case of West Bengal; it gained the largest population due to migration during 1951-1961, but lost population during 1961-1971.

1981 Census: Ranks of States based on estimates of inter-decadal migration by place of birth data for the major States of India based on 5 per cent sample data of the 1981 census for males and females are as follows:

Male		Females	
Rank Order of Gaining States	Rank Order of Losing States	Rank Order of Gaining States	Rank Order of Losing States
1. Maharashtra	1. Uttar Pradesh	1. West Bengal	1. Uttar Pradesh
2. Gujarat	2. Bihar	2. Maharashtra	2. Kerala
3. West Bengal	3. Kerala	3. Orissa	3. Haryana
4. Orissa	4. Tamil Nadu	4. Gujarat	4. Andhra Pradesh
5. Punjab	5. Andhra Pradesh	5. Karnataka	5. Bihar
6. Haryana	6. Madhya Pradesh	6. Rajasthan	6. Madhya Pradesh
7. Karnataka			7. Punjab
8. Rajasthan			8. Tamil Nadu

Rural-urban migration in India: According to 1971 Census, an analysis of State-wise internal-migration gives us some idea about the main lines of population movement with respect to in-migration and out-migration. It was observed that, of all the migrants in 1971:

- the movements for 70.66 per cent were from rural areas to other rural areas;
- the percentage of persons born in rural areas and enumerated in urban areas was 14.88;
- the percentage of persons born in urban areas and had migrated to other urban areas was 8.75;
- the percentage of persons born in urban areas and migrated to rural areas was 4.88.
- Unclassified migrants were 0.83 per cent.

It is, thus, clear that migration in India is mainly from one rural area to another rural area and that its volume from rural areas to urban areas is comparatively very small, indicating that the pull factor does not seem to be operating yet vigorously or may be operating only in the case of metropolitan cities.

3.4.4 Causes of Migration

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

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

- i) **Push factors:** These are the factors related to the place of origin which are unfavourable conditions forcing or prompting the persons to move out to other places. These factors include: a) decline in or exhaustion of local natural resources, decrease in demand for the local resources, loss of employment for any reason, oppressive, repressive or discriminatory treatment because of political, religious and ethnic origins, among others, alienation from a community for any reason, voluntary retreat from a community for better opportunities outside, or forced retreat or displacement due to natural calamities such as floods, fire, draught, earthquake, epidemic, etc.
- ii) **Pull factors:** These are the factors related to the place of destination or arrival which attract or motivate the people from other areas/places. These include: superior opportunities for employment in one's occupation or to enter a preferred occupation or to earn more income; opportunities to obtain desired specialization in education or for specialised training; preferable environment and living conditions in terms of climate, housing and other facilities; dependency movements – movement of dependents to join the bread winner or migration of a bride to join her husband, etc; and line of new or different activities, environment or people.

3.4.5 Consequences and Constraints of Migration

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

3.4.5.1 Consequences of Migration

Migration has its effects or consequences on:

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

These consequences are briefly presented below.

- a) **Societal consequences:** Migration acts as an agent for the transformation of a society from a traditional one to modern one. It acts as a means by which more advanced form of human activity spreads to different parts of the world and therefore forms an essential part of the modernization process. Migrants often take with them skills which form the basis of the economies of the

‘new lands’. Migration also strengthens the development of economic infrastructure such as roads and transportation facilities. While these are some advantages of migration to the society, it also causes considerable social and political problems in terms of unemployment, unskilled labour force, group tensions, violent population, disruption of agricultural production, etc. Increase in slum-settlements, increase in the cost of housing, pollution, raising cost of living, changes in family norms and standards, social values, and related problems could be seen as the consequences of migration to cities. In the process of attempts to solve such social, environmental and political problems, it leads to a slowing down in developmental process or reduced rate of economic change.

- b) **Community consequences:** The community consequences of migration depend upon intensity of migration, its differential nature and social composition of the communities involved. Continuous in-migration of young migrants accelerate the birth rate of the communities involved. On the other hand, continuous out-migration of young people leads to falling birth rate resulting in consequential natural decrease in the growth of the population. Among the differentiating factors which have been shown to generate social change include: socio-economic status, education, ethnicity, occupation, language and religion. More often than not migrants are innovators and prospective leaders within a community. Sometimes, large scale rural to urban migration promotes intensive urban growth and social segregations at series of different stages in cities and depopulation and decreasing rural communities.
- c) **Individual consequences:** These are related to the extent to which the individual’s needs and aspirations are (being) met in the host community as well as his own adaptation to new surroundings – social, economic, political, cultural, etc – and involves adjustment, participation, acculturation and process of assimilation.

3.4.5.2 Constraints to Migration

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

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

- 5) What are the indices that one could derive from migration data for analysis and understanding of migration?

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3.5 LET US SUM UP

In this Unit, we have dealt with the three components of population change viz. fertility, mortality and migration with emphasis on their concepts and measures / indices and factors influencing them. We have also touched upon the sources of data related to these determinants and their differentials based on various aspects. We have also covered the consequences and constraints of migration. All these must have provided you broader perspective of how, when and to what extent the changes take place in the population at local, national and international levels.

3.6 ANSWERS TO ‘CHECK YOUR PROGRESS’ QUESTIONS

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

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

Natural fertility is affected by contraception. Contraception refers to measures which are taken in order to prevent sexual intercourse or coitus from resulting in conception. A contraceptive method is sometimes termed as a birth control method, though “birth control” is used in a broader sense to include intentional abortions, sterilization and complete abstinence from coitus. Contraception refers to all measures taken for the prevention of conception or of birth.

- 3) The main sources of data on fertility include: i) vital registration system, ii) population census, iii) sample surveys, iv) research reports, and v) national family household surveys.
- 4) The various measures or indices of mortality include: i) Crude Death Rate (CDR), ii) Age-Specific Death Rate (ASDR), iii) Cause-Specific Death Rate (CSDR), iv) Comparative Mortality Index, v) Standard Mortality Ratio (SMR), vi) Average Expectation of Life at Birth or Average Life Expectancy, and vii) Standardized Death Rates (SDR).
- 5) The indices or measures that are used to analyse and understand migration from the relevant data can be grouped into two categories: i) direct measures, and ii) indirect measures.

The direct measures are based on data obtained from direct questions asked during a census on the movements of persons. These questions cover the following items: (a) the place of birth of the person, (b) the last or previous place of residence of the person, (c) the duration of stay of a person at the present place of residence. Accordingly, the direct measures for estimating migration is done using the data: i) Based on place of birth, ii) Based on duration of residence, iii) Based on place of last residence, iv) Based on place of residence at a fixed prior date.

Indirect Measures for Estimating Net Internal Migration: The growth in the population of any area or region is due to a natural increase (excess of births over deaths) as well as to migratory movements. If the population counts of an area at two points of time are available and if the number of births and deaths, which had occurred in that area is also known, it is possible to compute the expected population count at the end of the interval even in the absence of any data on migration. The difference between the observed (actual population count at the end of the period) and the expected population gives the estimate of the net change due to migration. Such estimates can be arrived at by adopting: a) the use of vital statistics, and b) the use of estimates of the probability of survival. Accordingly, the indirect measures include: a) The Vital Statistics Method, b) The Survival Ratio Method, and c) Migration Rate.

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UNIT 4 CONSEQUENCES OF POPULATION CHANGE

Structure

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- 4.1 Objectives
- 4.2 Theories of Population Change
 - 4.2.1 Ancient Greek and Roman Thinking about Population
 - 4.2.2 Pre-Malthusian Thinking on Population
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4.0 INTRODUCTION

We know that the population during ancient time was experiencing a high mortality due to lack of progress in science and technology. Therefore, the concern about population in ancient societies was restricted to replacement of population lost through the unusually high mortality. During Greek period there were some definite views on population. For example, Plato, the great Greek philosopher, emphasized that for human perfection stability of population is indispensable. In other words, he emphasized the importance of quality of population rather than mere quantity. Kautilya, ancient Indian administrator and economist was of the view that too few people is a greater evil than too many. At the height of the Roman Empire, being *pro-natalist* was more common. Cicero was of the view that rapid population growth is necessary to replace war casualties; this was an era of colonization which would be easier with more people.

However, with decline of the Roman Empire an *anti-natalist policy* started gaining ground. It was a period of economic stagnation and “fatalist period” of European history. Celibacy was considered to be the highest form of human existence. By the thirteenth century, slight changes in the anti-natalist policy were visible. For

example, Thomas Aquinas argued that marriage and family building were not inferior to celibacy. With the growth of mercantilism, where nations were built on increasing trade and wealth, population assumed new importance. Thus, there were different views and policies as a response to changing population situations. Such efforts have gradually led to theorizing about the population changes keeping in view the consequences of population change.

In this unit, we attempt to present you different views, schools of thought or the theories of population change and the consequences or effects of population change on important aspects such as education, social development, environment, economic development and welfare measures.

4.1 OBJECTIVES

After going through this unit, you should be able to:

- Explain important theories of population change; and
- Analyse the consequences of population change on education, social development, environment, economic development and welfare measures.

4.2 THEORIES OF POPULATION CHANGE

There have been divergent views on population situations which have contributed to formulation of important theories of population change. Important of them are: Contribution of the Ancient Greek and the Roman thinking about population, Pre-Malthusian Thinking on Population, Malthusian Theory, Optimum Population Theory, and Theory of Demographic Transition.

4.2.1 Ancient Greek and Roman Thinking about Population

In the Greek scheme of political life, the individual was only a part of the state and he/she had to play a subordinate role to it. In ancient Sparta, all Spartans were compelled to get married and celibacy was punishable by law and denounced in public. Procreation within marriage was emphasized, as the continual wars demanded a constant supply of able-bodied men. Deformed babies were invariably eliminated. Fathers who had sired three or four sons were publicly rewarded in Sparta. Plato and Aristotle considered the problem of population size not so much in economic terms, but more from the point of view of defense, security and government. Plato, in his laws held that if the so-called “highest good” was to be achieved the city-state should have 5,040 citizens. In the event of either excess or shortage of population he proposed measures to maintain desired size. In the case of under-population, he recommended rewards, advice or rebuke to the young in order to increase the birth rate and immigration. To remedy over-population he proposed birth control for large families, and if necessary, colonization. Aristotle in his “Politica” held that land and property could not be increased as rapidly as the population would grow and concluded that an excessive number of inhabitants would increase poverty and social ills (Miller, Fred D. 1995).

The Romans viewed population questions in the perspective of a great empire rather than a small city-state. They were less conscious than the Greeks of possible limits to population growth and more alert to its advantages for military and

related purposes. Roman writers encouraged procreation by granting certain privileges to married couples with children on the one hand, and by taxing and disinheriting those who did not get married or have children.

Early and mediaeval Christian writers considered questions of population almost entirely from a moral and ethical standpoint. On the one hand, they condemned polygamy, divorce, abortion, infanticide and child exposure, and on the other, they glorified virginity and continence and frowned upon second marriage. Some early Christian writers attributed the growth of world's population to want and poverty and cited pestilence, famine, war, etc., as nature's means of reducing excess population. Whereas, some others favoured high birth rates because of the constant threat of depopulation through famines, epidemics and wars.

The views of Muslim authors on population resemble those of Hebrew and Christian authors. The worth noting among Muslim writers was Ibn Khaldoun (1332-1460), an Arab author of the fourteenth century. In the first place, he held that a densely settled population was conducive to higher levels of living since it permitted a greater division of labour, a more effective use of resources, and military and political security. Secondly, he maintained that favourable economic conditions and political order stimulated population growth by increasing natality and checking mortality. He also sounded a note of warning stating that economic progress also encouraged luxurious living, led to higher taxation and brought about political instability, which in turn caused economic depression and depopulation.

4.2.2 Pre-Malthusian Thinking on Population

The period between the beginning of sixteenth century to the end of eighteenth century is known for rapid changes that took place in several aspects of human life. It was the beginning of modern age. During this period new routes to India were explored, America was discovered, gun-power and printing were invented and a new impetus was provided to arts and sciences as well as to trade and manufacturing. Old feudal system collapsed making way to capitalism.

Mercantilist, Physiocratic and Related Views: Mercantilist doctrine oriented towards economic policy did not develop a population theory in a strict sense, although views on population occupied a prominent place in the mercantilist system.

Mercantilist ideas dominated economic thinking in most of Europe during much of the seventeenth and part of the eighteenth century. They attached utmost importance to industry and foreign trade because these activities alone could earn precious metals like gold. As a result, they favored large population and large labor force.

According to Botero (1956) the strength of the state is to be found in its population and the predominance of industry over agriculture. However, he also noted that population tends to increase to the full extent made possible by human fecundity, while means of subsistence and their capacity to increase it were limited and, therefore, imposed a ceiling on population increase. This limit on population growth manifested itself through poverty which discouraged marriage, and through periodic calamities such as wars and pestilence. Botero advocated the establishment of colonies which could help to absorb a surplus population and

at the same time would strengthen the power of the state. Thus, the Mercantilist writers in general stressed the advantages of large and growing population and favoured policies of stimulating population growth including measures to encourage marriage and large families, to improve public health, to check emigration to other countries and to promote immigration especially of skilled workers. Some other mercantilists, like Child, Coke, Devenant argued that wealth itself consists in the largest possible population. Population was not only an important factor in the power of the state but also played a role in increasing the state's revenue and wealth. They asserted that the density of population is the basis of wealth. He argued that when population is scarce, people can easily obtain their livelihood and that, as a result, they would become lazy. On the contrary, under conditions of high density people would have to work hard to live which creates attitudes favouring economic activity and industry. According to most mercantilist writers, the benefits of a larger population and additional labour would be particularly great, if they served to develop manufacturing. Manufactured products could yield increasing returns as they could be exchanged abroad for precious metals.

The *physiocratic school of thought* was in part a reaction against the ideas and policies proposed by mercantilist writers, and consequently opposed state intervention, trade regulation and other aspects of mercantilist thinking. Unlike the mercantilist, the physiocrats found the agricultural sector to be most strategic: the growth of the entire economy was supposed to be governed by the increase in agricultural produce. The physiocrats did not agree with the mercantilist policy of increasing population even at the expense of levels of living. Nevertheless, they took a generally favourable view of population growth on the condition that it was possible to expand agricultural production to support the increasing population (Bhende and Kanitkar, 1993).

Some of the ideas of the physiocrats were shared by Cantillon who in other respects can be considered mercantilist writer. He believed that land was the main factor determining wealth, and that population would be limited by the amount of agricultural production. In his explanation of population trends, Cantillon (quoted in Bhende and Kanitkar, 1993) distinguished between maximum people living at subsistence level and the wealthier classes such as royalty, landowners, etc., who were willing to either give up or postpone marriage in order to maintain higher standard of living. Immediate predecessors of Malthus like Condorcet, Godwin were optimistic about the future due to the influence of the French Revolution and the ideas of liberty, equality and fraternity. Adam Smith (1776) the Father of Economics was influenced by the Industrial Revolution in England. He advocated naturalism in his book 'Wealth of Nations' (1776) and expressed optimism about the future of world.

4.2.3 Malthusian Theory

Thomas Robert Malthus was an English Clergyman, a Wrangler in Mathematics by education and a college professor of History and Political Economy. His views on population provided the first systematic approach to study of population. His views were published in 1798 in his first essay "An essay on the principle of population" which emphasizes that population affects the future improvement of society with remarks on the speculations of Mr. Godwin, Mr. Condorcet and other writers. William Godwin, a philosopher and social reformer, and Condorcet,

a mathematician and philosopher, had tremendous faith in science. According to them science would help to multiply the food supply, and men will be able to live with little work and more leisure. According to them men's will-power is sufficient to control procreation. Contrary to it, Malthus (1798, p.18) put forth the '*pessimistic view*' which stated that a large and growing population is a burden for the society and a cause of poverty, misery and all types of societal problems. He postulated that populations have a tendency to grow at a faster rate than the means of subsistence.

The basic assumption underlying Malthus population theory is that reproduction is faster than production. He expressed this in mathematical terms, as it was easy to convey the message. According to him population increased in geometric series (i.e. 1,2,4,8,16,32,...) while food production increased in arithmetic series (i.e., 1,2,3,4,5,...). That means, with every increase in population further increase becomes easier which is not exactly the same in the case of food production. However, he also stated that population is necessarily limited by the means of subsistence. Population invariably increases more than the means of subsistence increases, unless prevented by some very powerful and obvious check. These checks, according to him are in the form of *moral-restraint*, *vice* and *misery*. The former two he termed as preventive checks and the last as positive checks. Under moral restraint he considered late marriage, prostitution, extra-marital sexual relation and abortion, while under the umbrella of misery comes epidemics, wars, famines, etc. His theory is referred to as Malthusian dilemma or Malthusian trap. This is, of course, a different theory, which was stated by Ricardo later.

In general, Malthus appears to assume diminishing returns from land. Unrestrained population growth can be prevented by late marriage coupled with economical use of available resources. He substantiated his theory by reviewing the situations that prevailed in various countries. His theory was a landmark in the history of population theories. In recognition of this, the population theories were later referred to as *pre-Malthusian*, *Malthusian* and *post-Malthusian theories*. He also stated that if wages of labourers are increased, they will produce more children and poor people will multiply. It implied that he assumed positive relation between income and fertility.

Criticism of Malthusian Theory: The importance of Malthusian theory can be measured by the number of books/articles written favouring or criticizing him. There are three major aspects in his theory which are subjected to strong criticism. They are:

- 1) the assertion that food production cannot keep up with the population growth,
- 2) the belief that moral restraint was the only acceptable preventive check, and
- 3) the conclusion that poverty was an inevitable result of population growth.

Malthus's conclusion that population would double in a period of 25 years was based on the evidence of doubtful statistics. He placed undue emphasis on the limitation of the supply of land. David Glass criticized him as a poor prophet because his model did not consider the enormous impact of technological progress in offsetting the growth-inhibiting forces of rapid increase in population. The availability of food could be increased by improving production and productivity. All countries, therefore, have the potential of escaping the Malthusian Population Trap. The agricultural revolution of the nineteenth century brought rotation of

crops, chemical fertilizers, plant and animal breeding and improvements in the quality of livestock which tremendously increased the agricultural production. The gloomy predictions of Malthus, therefore, did not come true. Moreover, it is argued that the tendency for diminishing returns in agriculture will be more than compensated by improved productivity in manufacturing. The neo-Malthusians also believed that modern artificial contraceptives are better than moral restraint. He also could not visualize that with development more and more couples, even the poor, will accept contraception on their own. After industrial revolution one by one all the countries in Europe, America and Oceania experienced fertility decline. Further, the pessimistic attitude reflected in increased poverty was questioned in the light of technological development, which comes to the aid of mankind. It helps in improving the production, in discovering substitutes and in finding new sources of satisfying needs. Moreover, population pressure was eased by large-scale migration to the New World, a possibility which he did not foresee. It was also said that his ideas were not original and the usage of mathematical language was inappropriate. The use of arithmetic and geometric series was the weakest link in his theory.

The Classical and Neo-Classical School of Economics: The classical economists incorporated in their theory of wages the views of Malthus. They postulated that wages tend towards a level which is just sufficient for them to survive: If wages were above subsistence level production will be more and will bring the wage back to subsistence level. Let us examine how this could happen. As long as subsistence wage is the deciding factor, when population increases the wage will go below subsistence level which will lead to a decline in population because of poverty and starvation. Then, slowly there will be labour shortage and competition among producers to obtain labour resulting in wage increase. This in turn will lead to population increase and surplus labour and subsistence level equilibrium of wages will be restored. But, they also recognized that wages will be determined by the supply of labour and demand for labor and the demand will be determined by capital.

The law of diminishing returns supported by the Malthusian doctrine stated that population growth tends to depress per capita production meaning, thereby, that after the ratio of workers to resources reaches a certain point, any further increase in population would cause a fall in the average production per worker. Diminishing returns, however, were thought to be typical for agriculture only, whereas industry, with the possibilities it offered for increasing the division of labour and continued technological improvement was assumed to be working under either constant or increasing returns. Decreasing returns in agriculture were expected, at least beyond a certain point, because first, the quantity and quality of land was fixed and, secondly the opportunities for a far-reaching division of labour and technological progress were limited in agriculture.

J. S. Mill, one of the classical economists believed in Malthus's theory with qualifications. Mill (1848) was a strong advocate of birth control. His basic thesis is that standard of living is the major determinant of fertility levels. According to him, the rational thinking in man will help to restrain growth. Also, he was a strong advocate of women's cause. He was convinced that women, compared to men, desire less number of children and if they are allowed to pursue their desire the fertility will decline. He believed in equal rights for men and women and that the low status of women plays major role in high fertility.

According to Marx (1867), any society based on private ownership of means of production has two classes: haves and have-nots. In a capitalist society, labourers who are have-nots are exploited by haves, i.e. the class which owns means of production; it is built in this system that due to vested interests, haves will invest more and more in fixed assets, and will not be interested in creating more employment opportunities. This will gradually lead to unemployment, which will be perceived as over population.

4.2.4 Optimum Population Theory

Optimum population theory received attention in 1920s and 1930s even though an element of the theory was found in the writings of earlier scholars as well. The basis of the theory of optimum population is the relationship between population and resources. The basic elements of the optimum population theory can be found in the writings of Sidgwick (1874). He observed that as a result of factors such as population size and growth, division of labour and the onset of diminishing returns, the productivity of labour tended to diminish as the proportion of labourers to land increased after a certain degree of density had been reached; that there is a point of maximum return per head, and this depended on the state of arts, the capital accumulated and technical progress.

In fact, optimum population is a point at which the population is neither too large nor too small, but is just enough to secure a maximum return per head under the given conditions of production (Lionel Robbins, 1927). Thus, the optimum population is determined by i) the available natural resources; ii) the skill, knowledge and habits of the population; and iii) the capital and technological progress. Given these factors there is one “right population”, that is ‘optimum’. The basic assumption limiting the theory is that, the particular population size is optimum, means other things are constant, which is not possible.

The concept of optimum population has been interpreted in several ways, to mean: the size of the population which results in the highest per capita income, the highest productivity as measured in different manners, or the highest level of other less well-defined economic indicators such as economic welfare, level of living, real income and in some cases employment. Economic optimum being too restrictive, some writers tried to include the total well-being, health, longevity of a nation, ideal family size, etc, in the optimum population theory. However, the economic optimum was the main consideration in the optimum population theory, and gradually the idea of a population of optimum size for maximum production was accepted.

Criticism on Theory of Optimum Population: Critics viewed optimum population theory as not a theory but the description of a desirable situation. Further, its assumption of other things remaining constant is impractical. In this dynamic world, things are constantly changing making any optimum obsolete in few years. Another problem pointed out is, the “optimum” population for each sector will be different. For example, optimum population for total production, for employment, for health, for education, etc will be different from one another. The merit of the theory, however, is that it is dynamic, it emphasized that whatever is considered over population today can be optimum or even under population if the technology improves the capacity of the country to maintain larger size of population.

4.2.5 Ester Boserup Theory

Ester Boserup (1965) indicated that population growth and the pressure it exerts are important stimuli for increasing agricultural yields. Population increase, which expands food requirements, also tends to produce increased food supplies by bringing about a shift towards more intensive land use. The basic premises has been that the primitive society would be able to sustain itself better than a stagnant population when it comes to generating genuine economic development. Boserup's hypothesis linked population growth to shifting technology. The genuine drive behind the process of economic development is population increase. Population increase destroys land causing search for new land to cultivate. Population sustained on a piece of land will deplete food potentials. When a particular density of population is reached, food production switches over to intensive land use employing improved technology. Adoption of new technology may be difficult if there is no population pressure.

Until recently, the idea that it is desirable to slow down or stop the population growth rate of the world had been virtually unchallenged. Recently however, new views have emerged. The thesis of economist Julian Simon (1977; and 1981) is illustrative of this and opposes the pessimists' approach. He views people as the ultimate resource — a vast pool of imagination, skill and industry that should not be limited. Simon has vigorously challenged the widely held view that there are or will soon be too many people on Earth. Simon argues that the economic evidence coming from the past suggests that population growth leads to the improvement of the living conditions and not to their deterioration. The death rate has declined and life expectancy increased over the past 50 years, as has the population. He believed that there are two features of population dynamics. *First*, the very pressure produced by the needs of the population will stimulate activities to meet the pressure, e.g. advancement of agricultural technology. New technologies would offer alternatives to depleting resources thereby making them infinite, contrary to the general understanding. *Second*, with more people there are more minds available to apply themselves to relevant questions. Simon's views balance some extremists on the other side of population issues.

4.2.6 Theory of Demographic Transition

In Europe, with improvement in agricultural techniques like crop rotation, use of fertilizers, use of agricultural equipments, etc. food production increased. This released some persons from agriculture who migrated to cities. At the same time, industrial development resulted in improved standard of living of masses. General improvement in sanitation, changes in the habits of personal hygiene, medical improvement, immunization and so on helped to bring down death rates. All these changes had effect on fertility. People were motivated to obtain their desired family size through use of birth control methods. Thus, fertility also started declining slowly at first and rapidly later. This process of change from high birth and death rates to low birth and death rates has been called "*demographic transition*".

The demographers such as Landry (1909) and Warren Thompson (1929) had attempted to construct a typology to describe the transition from conditions of high mortality and high fertility to conditions of low mortality and low fertility. C. P. Blacker (1947) attempted to identify the following *five phases*.

- 1) The high stationary stage – characterized by high birth rates and high death rates;
- 2) The early expanding stage – characterized by high birth rates and high but decreasing mortality;
- 3) The late expanding stage – characterized by falling birth rates but more rapidly decreasing mortality;
- 4) The low stationary stage – characterized by low birth rates balanced by equally low mortality; and
- 5) The declining stage – characterized by low mortality and lower natality but deaths exceeding births.

Later on, Frank Notestein (1945) identified industrialization, urbanization and modernization as the casual mechanisms, which bring about decline in mortality and fertility. The reason for population growth during the transitional stage was also identified. It was stated that mortality always starts declining earlier and fertility declines after a lag. This time lag leads to population growth. Finally, when the transition is complete the new balance is established. According to him, the stages are:

- 1) *Old Balance* – both birth and death rates are high, growth rate near zero,
- 2) *Transitional stage* – High growth rate: a) Early transition, birth rate high and death rate declining, b) Mid-transition – both birth and death rates declining, c) *Late transition* – death rate almost constant at low level and birth rate still declining,
- 3) *New balance* – Both birth and death rates low, and growth rate near zero, and
- 4) *Post-transitional stage* – Negative growth rate, i.e. death rate greater than birth rate.

Limitations of the Demographic Transition Theory: It is only a narration of historical events of the present day developed countries and cannot explain the situation of present day developing countries. Today the term ‘demographic transition’ means simply a change in fertility and mortality from high to low rates. The assumption that fertility-decline in Less Developed Countries (LDCs) would require a typical sequence of economic development is no longer valid. The mortality-decline in LDCs at unprecedented rate was the result of ready-made technology borrowed from More Developed Countries (MDCs), thus experienced mortality-decline without substantial development. Similar argument cannot be made about fertility-decline in LDCs which is slow yet some LDCs started showing. The LDCs started showing decline of birth rates unaccompanied by urbanization, industrialization, and the like. For example, Bangladesh with \$160 per capita GNP had reduced its birth rate from 47 in 1960 to 41 in 1986. Similarly, India did bring down its birth rate from 48 in 1960 to 26 in 1999 – with a per capita income of about \$440 only. This situation has created doubts about the applicability of the theory to LDCs and the need to modify it. The theory is based purely on deductive logic. In traditional societies, fertility and mortality were high. In modern societies, fertility and mortality are low. In between there is demographic transition (Bhende and Kanitkar, 1993).

Kingsley Davis (1963, pp.345-366) in his demographic theory of change and response examined what happens when mortality declines. More children will survive and reach adulthood. This will put pressure on family resources. Thus, people being rational will respond to the declined mortality rate by reducing fertility and thereby reducing the population pressure.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

1) i) What is the basic assumption behind Malthusian theory?

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ii) What are the basic determinants of an optimum population?

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iii) What are the different demographic stages explained in the theory of demographic transition?

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4.3 CONSEQUENCES OF POPULATION CHANGE

In the above section, we have discussed theories of population change which focused on the bases of population change. However, there are many important and essential aspects of life such as education, social development, environment, economic development and welfare measures which are affected by the changes in the population. We will discuss, in brief, the consequences of population change on these aspects.

4.3.1 Effects on Educational and Social Development

In MAE-001, you learned about formal, non-formal and informal education. These forms of education collectively and indisputably are the desirable and

most effective means to promote among people the desirable knowledge, values, attitudes, behavior and skills which enable the societies and nations to function effectively in an integrated global society. Education helps people in promoting their all round development and make the world a better place to live in. The goal of education is to make people wiser, knowledgeable, better informed, ethical, responsible, critical, and capable of continuing to learn. It provides a critical reflection on the world, especially on its failures and injustices to mankind, for greater consciousness and awareness, for exploring new visions and concepts, and for inventing new techniques and tools. All these get affected, quantitatively and qualitatively, by the large and fast growing population. The ultimate goal of peace and happiness to humankind and its liberation is possible essentially through proper education. But, adverse population changes inevitably affect effective realization of such goal.

Education is one of the most important indicators of social development and human prosperity. Education is an instrument not only of social and psychological change but also of scientific and technological knowledge in different fields of life. Now, it is well accepted fact that the level of prosperity of a nation depends upon the level and quality of education imparted to its citizens. It provides answers to many social, political, economic, and psychological problems of the society. Education is, no doubt, the panacea for most of the social evils. It has been one of the basic social forces for the formation of a desirable society. It has become an essential concern of every society and the nation to provide good education to all its citizens. Given such concern, rapid increase in population will seriously affect educational endeavours of the state in meeting the growing needs, demands and aspirations of diverse categories of people.

The outcomes of education have been most vigorously contextualized in terms of relationship between education, society and the economy. Most of the developing countries view education as a radical agent for social transformation and progress. The most striking feature of developing country is the migration of educated persons from villages to cities in search for higher education and/or employment which has brought both social change and development. Thus, education is firmly woven to the fabric of socio-economic life and seen as vital to the development and maintenance of advanced industrialised societies and the nations. Any significant change in population, calls for suitable changes in the educational effort of the state. Rapid growth in population means more additional efforts, both quantitative and qualitative, on the part of the Government and also the society. If such efforts of educational expansion are not proportionate to the growth of population, the growing educational needs and aspirations of the population cannot be met adequately, and eventually the system fails to give satisfactory results. It may lead to failures in achievement of universal enrolment, retention and achievement in education at different levels. As a result, the social development also gets affected. Disparities in education arise between and across various social groups based on gender, age, caste, religion, region, and so on resulting in social frictions affecting different groups, and thus, finally affecting their development and harmony in the society and in the national efforts as a whole.

In today's world, education plays paramount role in social, economic and technological development. It has a positive contribution to combating problems related to poverty, environmental degradation, population control, nutrition, health

and overall quality of life of people. Scientific or systematic education has a unique role to play in facilitating sustainable development by building people's capacities, especially in areas of eco-technology and development of renewable energy sources which can ensure the widespread availability of scientific information to them. It provides motivation, justification, and social support. It increases the capacities of people to transform their vision of society into operational realities. Improving the quality and coverage of education and reorienting its goals to recognize the importance of social and economic development must be among society's highest priorities. But, the pressure of growing population will have nullifying effect on the actual result in these fronts. Thus, the efforts of the government in the field of education in terms of providing equitable education, promoting equal opportunities for education with suitable teacher-pupil ratio, other facilities, etc at all the levels of education, and finally generating sustainable employment to utilize the trained-manpower will be adversely affected by undesirable changes in the population situation of a nation.

4.3.2 Effects on Economic Development: Environmental Degradation

Environmental degradation has been the global concern in recent times. Quality of land, water and air has increasingly been affected by the growing population. This has been due to expansion of economic activities as a consequence of growing population. Hence, in this sub-section, we will focus on how economic activities have diversified and intensified thereby causing increased degradation in environment.

4.3.2.1 Land Degradation: Erosion of Soil and Forests

India supports approximately 16 per cent of the world's human population and 20 per cent of the world's livestock population on merely 2.5 per cent of the world's geographical area. Decline in forest cover and depletion of soil nutrients are the two most important forms of land degradations. In fact, the land degradation is associated with the habitat alternation leading to the decline and disappearance of biodiversity. Human beings share this Earth with more than a million of plant and animal species linked with each other in the food-chain and complex system of food-web. Any disruption in this system is not free from the price that needs to be paid in terms of loss of support system for each one of us on this planet. Looked from this perspective land degradation ultimately degrades the biosphere (UNDP, FAO, and UNEP, 1993).

Increasing pressure for land is leading to deforestation. But, deforestation does a great harm to the biosphere. It is estimated that during the period 1700 to 1980, the forest and woodland declined by nearly 20 per cent, whereas the cropland increased by 460 per cent. However, globally, the pace of change has accelerated with more cropland expansion occurring in the 30-year span from 1950 to 1980 than in the 150-year span from 1700 to 1850. The process of decline of the forestland has, however, gone unchecked and the expansion of cropland is encroaching into the marginal area like the tropical forests, steep hillsides, and semiarid regions — that have fragile ecosystem. Further, the world commodity markets for the goods such as cotton, tea, bananas, coffee, sugar and beef have contributed significantly to forest conversion (World Resources, 1994-95).

The expansion of global agriculture has taken a heavy toll on soil health. Soil productivity depends on its organic matter and soil humus. It is estimated that agricultural activity has reduced the world supply of organic carbon in soil humus by about 15 per cent of its original pre-agricultural stock. The principal causes of such soil degradation are over grazing, deforestation and agricultural activities. Excessive irrigation has converted the fertile land into wastelands by increasing the salinity and alkalinity of soil in the irrigated land. The states of Punjab and Haryana are most sufferers of this menace affecting the thousands of farmers in these states. Salinity and alkalinity directly affect the productivity of soils by making the soil unfavourable for good crop growth. Indirectly, it lowers productivity through adverse effects on the availability of nutrients and on the beneficial activities of soil micro-flora. According to Brandon, Hommann and Kishor (1995), based on FAO data the loss in crop production due to salinity and alkalinity in India amounts to 6.2 million tonnes and 9.7 million tones respectively.

The land- and soil-degradation not only affects the productivity, but also disturbs the ecosystem ultimately, mainly by destroying the sources of sustenance for many plant and animal species. The decline in bio-diversity is also an important threat to the existence of mankind in the long run.

The pollution of soil with heavy metals due to improper disposal of industrial effluents and use of domestic and municipal wastes and pesticides is becoming a major concern. Though no reliable estimates are available of the extent and degree of this type of soil degradation, it is believed that the problem is extensive and its effects are significant. Some commercial fertilizers also contain appreciable quantities of heavy metals, which have undesirable effects on the environment. The indiscriminate use of chemical fertilizers and pesticides is often responsible for land degradation. Increasing incidence of landslides is another area of concern due to land degradation. In many parts of Himalayas due to degradation of lands resulting from deforestation, road construction and mining and quarrying, occurrence of landslides has posed a serious threat to the settlements on the slopes.

Recently the frequency of floods has increased in India. This is largely due to deforestation in the catchment areas, destruction of surface vegetation, changes in land-use, increased urbanization, and other developmental activities. Processes leading to flooding are becoming more common due to increased sedimentation and reduced capacity of drainage systems.

Land management has been largely unsystematic, arbitrary and, by no means, sustainable. So far the country has not implemented a well-defined integrated land use policy. This lacuna has largely been responsible for the current phase of land degradation.

To make things worse, there is no rural fuel-wood as well as grazing and fodder policy also at the national level; with the result, grazing is far beyond the carrying capacity and extraction of fuel and fodder from forests is also far beyond the sustainable limits, creating enormous negative impacts on the forests and land. Land management in conjunction with water management needs to be the core of any agenda for national development as the two resources are absolutely inter-dependent and cannot be dealt with independently (Govt. of India and UNEP, 2001).

4.3.2.2 Water Pollution

Comprising over 70 per cent of the Earth's surface, water is undoubtedly the most precious natural resource that exists on our planet. Water pollution occurs when a body of water is adversely affected due to the addition of large amounts of undesirable materials to the water. When it is unfit for its intended use, water is considered polluted. Two types of water pollutants exist; point source and non-point source. Point sources of pollution occur when harmful substances are emitted directly into a body of water. The Exxon Valdez oil-spill best illustrates point source water pollution. A non-point source delivers pollutants indirectly through environmental changes. An example of this type of water pollution is when fertilizer from a field is carried into a stream by rain, in the form of run-off, which in turn effects aquatic life. The technology exists for point sources of pollution to be monitored and regulated. Non-point sources are much more difficult to control. Pollution arising from non-point sources accounts for a majority of the contaminants in streams and lakes. The major sources of water pollution can be classified as municipal, industrial, and agricultural. Municipal water pollution consists of wastewater from homes and commercial establishments. Industries markedly differ in their potential of polluting water, however it is possible to treat the wastewater and reuse in the industry. Increasing use of fertilizer and pesticides in the agricultural activities pollute both the surface and ground water and make it unfit for drinking and its use for cultivation.

Exploitation of petroleum and radioactive substances for industrial and nuclear purposes poses serious threat to water bodies. These large-scale accidental discharges of petroleum are an important cause of pollution along shorelines. Besides the supertankers, offshore drilling operations contribute a large share of pollution. One estimate is that one ton of oil is spilled for every million tons of oil transported. Water bodies are exposed to the risk of wastes due to uranium and thorium mining and refining. Mines and mining wastes account for the major part of the discharges of heavy metals into water.

Nutrients, mainly nitrogen and phosphorus contribute to the eutrophication of lakes, rivers and marine waters. Approximately half of the nitrogen discharges are estimated to originate from agricultural land. Eutrophication is harmful for the growth and survival of aquatic life, as it does not allow the sunrays to go inside the water.

4.3.2.3 Air Pollution and Green-house Effect: Global Warming

The green-house gases play a crucial role in regulating the heat balance of the Earth. These gases allow the incoming short-wave solar radiation to pass through the atmosphere relatively unimpeded, but the long-wave terrestrial radiation emitted by the Earth's surface is partially absorbed and then re-emitted by a number of trace gases in the atmosphere. These gases known as GHGs (green-house gases) include: Water vapour, Carbon-dioxide, Methane, Nitrous oxide and Ozone in the troposphere and in the stratosphere.

The green-house gases (Carbon dioxide, Methane, etc.) prevent some of the heat radiation from the Earth from escaping into space. The concentration of green-house gases is increasing which is presumed to raise the temperature of the Earth in a long-term perspective. Eighty percent of the effect of the green-house gases is caused by carbon dioxide.

As a result of the green-house gases, the temperature of the Earth's surface is rising. This rise in the Earth's temperature is known as *global warming*. Global warming can have major physical, environmental and socio-economic consequences. This is also referred as climatic change. The global warming could cause changes in precipitation patterns, ocean circulation and marine systems, soil moisture, water availability and sea level rise. This would make an impact on agriculture, forestry and natural eco-systems. A rise in sea level threatens sections of all the coastal states of the country. A rise in sea level would inundate wetlands, erode shoreline, exacerbate coastal flooding, increase the salinity of estuaries and aquifers and impair water quality.

Vehicular pollution is major source of air pollution and increasing green-house gases in the atmosphere. Total number of vehicles in India has increased from about 11 million in 1986 to more than 33 million in 1996. A large number of them are concentrated in metropolitan cities. The important aspects of vehicular pollution that are affecting the air quality are types of engine used, age of the vehicles, poor road conditions and congested traffic. The principal vehicular pollutants are Carbon Monoxide, Oxides of Nitrogen, Hydrocarbons, suspended and particulate matters, a varying amount of Sulphur Dioxide depending on the Sulphur content of the fuel and lead compounds (Andrew, 1986).

Discharges and emissions of heavy metals are difficult to estimate. A large proportion of emissions/discharges of heavy metals into air originates from the iron and steel industry. Road traffic is the main source of lead emissions. Sulphur dioxide and nitrogen oxides emitted into the air are converted into acids. At their deposition they have an acidifying effect on soil and water. The emission of ammonia also contributes to the acidification. Main sources of sulphur dioxide are burning of sulphur containing fuel like coal power stations and oil by vehicles, and refining of oils in refineries (for more see Table 4.1).

Table 4.1: Some Major Air Pollutants and their Sources

Pollutant	Source
Carbon monoxide	Incomplete fuel combustion (e.g. two stroke engine)
Sulphur dioxide	Burning of sulphur containing fuel like coal in power plants and oil by vehicles
Suspended particulate matter	Smoke from domestic, industrial and vehicular sources
Oxides of nitrogen	Fuel combustion of motor vehicles, power stations and furnaces
Volatile hydrocarbons	Partial combustion of carbonaceous fuels by two stroke engines, industrial processes, disposal of solid wastes.
Oxidants and ozone	Emissions from motor vehicles, photochemical reactions of nitrogen oxides and reactive hydrocarbons
Lead	Emissions from motor vehicles

Source: Central Statistical Organization (1999).

Recently, environmental issues are also taken up actively by women. This is known as eco-feminism in the academic literature. They argue that plundering of Nature is the result of men's greed and amounts to the increased suffering of women as it depletes sources of day- to-day sustenance like food, water, fuel, and fodder for which women are put to more drudgery to acquire them in the event of their depletion in their vicinity.

Various impacts of development process on environmental degradation is presented in Table 4.2.

Table 4.2: Some Impacts of Development Activities on Environment

Development activities	Major impacts on environment
Forest clearing and land resettlements	Extinction of rare species of flora and fauna, creation of condition for mosquito breeding leading to infectious diseases such as malaria, dengue, etc.
Shifting cultivation in upland agriculture	Soil erosion in upland areas, soil fertility-declines due to shorter cultivation cycle, which is practiced due to population pressure, flooding of low land areas. (The problems could be resolved by terraced cultivation).
Agro industries	Air pollution due to burning of bagasse as fuel in sugar mills, large amount of highly polluting organic wastes, surface water pollution.
Introduction of new varieties of cereals	Reduction of genetic diversity of traditional monoculture resulting in instability, danger of multiplication of local strains of fungus, bacteria or virus on new variety.
Use of pesticides	The pesticides used in agriculture sometimes go into food chain or in water bodies and as such results in harmful health hazards.
Timber extraction	Degrades land, destroys surface soil, reduces production-potential of future forests.
Urbanisation and industrialization	Concentration of population in urban centers make huge demands on production in rural areas and put pressures on land, air and water pollution.
Water resource projects, e.g. Dam, extensive irrigation	Human settlement and resettlement, spread of water-borne diseases, reduction of fisheries, siltation, and physical changes e.g. temperature, humidity.

Source: Central Statistical Organisation (1999).

The different forms of environmental degradations are found to operate at different scale. The manifestation of environmental degradation at local, regional, continental and global scales is summarized in Table 4.3.

Table 4.3: Local, Regional and Global Effects of Pollution

Local effects	Regional	Over marine water and continents	Global
• Heavy metals in air, soil and plants, e.g. From industrial emissions and • Discharges. • Noise, smell, air pollution.	• Eutrophication, • Contaminants in the soil, • Landscape changes due to mining or agriculture.	• Eutrophication • Acidification • Environment Contaminants • Radioactivity	• Change of the climate due to ozone depletion and the green-house effect.

Source: Central Statistical Organization (1999)

4.3.3 Effects on Welfare Measures

Adverse consequences of rapid growth of population have also diluted the effect of different welfare measures taken up by the government. This calls for additional welfare measures to increase the quality of people's welfare. In this sub-section (4.3.3) we present in brief the different welfare measures taken up by the government and how their effects were not so visible because of growing population.

4.3.3.1 Mid-day Meal Programme

The Mid-day Meal Programme was launched in 1995 to enhance enrolment, retention and participation of children in primary school and simultaneously improving their nutritional status. The number of children covered under this programme has risen from 3.34 crores in 1995 to 12 crores in 2006-2007 (Planning Commission of India, 2008). It is believed that Mid-day meal programme had a positive impact on school attendance and nutritional status of children. Rapid growth of population puts great pressure on the government and the public in meeting the growing demand in this regard. Thus, it will affect the programme, both qualitatively and quantitatively.

4.3.3.2 National Rural Health Mission (NRHM)

The National Rural Health Mission was launched to address the problems across primary health care and to bring about improvement in the health system in rural areas. The mission aims to provide universal access to equitable, affordable and quality health care, and accountable and responsive to the local needs. To achieve these goals, NRHM facilitates increased access and utilization of quality health services by forging partnership between central, state and local governments; and sets up a platform involving the Panchayati Raj Institutions (PRIs) and the community in the management of primary health programmes and infrastructure. However, the increasing population pressure on health facilities is causing a serious and ever growing concern.

4.3.3.3 Rashtriya Swasthya Bima Yojana (RSBY)

In order to provide accessible, affordable and accountable quality health services to households in rural areas, the government has launched NRHM. The RSBY

was launched to cover people BPL, unorganized sector workers and their families. The beneficiary will be required to pay Rs.30/= per annum as registration/renewal fee. The premium will be borne by the central and state governments. The package of benefits will include: i) cashless attendance to all covered ailments, ii) hospitalization expenses taking care of most common illnesses, iii) all existing diseases to be covered, and iv) transportation costs subject to prescribed limits payable to the beneficiary. Here also, the increasing number of population is adding to severity of the problems.

4.3.3.4 Sarva Shiksha Abhiyan (SSA)

The SSA has brought primary education to the doorstep of millions of children and enrolled them through successive fast-track initiatives to unserved and underserved habitations. Household survey, school-mapping, constitution of Village Education Committees (VECs), setting-up of Parent-Teacher Associations and a series of campaigns for enrolment were undertaken. The SSA intervention has brought down the number of out-of-school children from 32 million in 2001-2002 to seven million in 2007-2008 (Planning Commission of India, 2008). The SSA stipulates that 50% of additionally recruited teachers should be women. It has given the emphasis on improving girl's enrolment, which is critically dependent upon increasing the proportion to 75% in educationally fragile states. To make SSA a success it is essential that additional pressure on it is avoided due to population growth and consequent non-schooling population and school drop-outs.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under "Answers to 'Check Your Progress' Questions".

2) i) What are the various types of environmental degradation?

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ii) What is eco-feminism?

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4.4 LET US SUM UP

In this Unit, we have provided broader perspective of theories of population change such as pre-Malthusian thinking, Malthusian theory and post-Malthusian theories. It has highlighted the consequences of population change on education, social and economic development, environmental degradation and welfare measures.

4.5 ANSWER TO 'CHECK YOUR PROGRESS' QUESTIONS

- 1)
 - i) The basic assumption of Malthusian population theory is that reproduction is faster than production. According to Malthus, population increases in geometric progression while production increases by arithmetic progression.
 - ii) The supposed basic determinants of an optimum population are:
 - a) the available natural resources;
 - b) the skill, knowledge and habits of population; and
 - c) the capital and technological progress.Given these factors there is one "right population" that is the optimum population.
 - iii) Different demographic stages in the theory of demographic transition, according to C. P. Blacker (1947), are as given below.
 - a) The high stationary stage – characterized by high birth rates and high death rates;
 - b) The early expanding stage – characterized by high birth rates and high but decreasing mortality;
 - c) The late expanding stage – characterized by falling birth rates but more rapidly decreasing mortality;
 - d) The low stationary stage – characterized by low birth rates balanced by equally low mortality; and
 - e) The declining stage – characterized by low mortality and lower natality but deaths exceeding births.
- 2)
 - i) The various types of environmental degradations are: a) land degradation, b) water pollution, and c) air pollution.
 - ii) The environmental issues are also taken up actively by women. This is called as eco-feminism. They argue that plundering of Nature is the result of men's greed and amounts to the increased suffering of women as it depletes sources of day-to-day sustenance like food, water, fuel, and fodder for which women are put to more drudgery to acquire them in the event of their depletion in their vicinity.

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UNIT 5 POPULATION AND DEVELOPMENT EDUCATION: RELEVANT TERMS, MISCONCEPTIONS AND CLARIFICATIONS

Structure

- 5.0 Introduction
- 5.1 Objectives
- 5.2 Evolution of 'Population Education' into 'Population and Development Education': Conceptual Overview
 - 5.2.1 Population Education
 - 5.2.2 Population and Development Education
- 5.3 'Demography', 'Population Dynamics', 'Population Studies', & 'Population Science' and 'Population Education': Conceptual Comparison for Clarity
 - 5.3.1 Demography
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 - 5.4.1 Family Planning
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- 5.5 'Population Education', 'Population and Development Education', 'Population Studies' and 'Population and Development Studies'
- 5.6 A Holistic Comparative Perspective of the above Terms/Concepts: Towards Clarity
- 5.7 Let Us Sum Up
- 5.8 Answers to 'Check Your Progress' Questions
- 5.9 References

5.0 INTRODUCTION

In Unit-1 of this Block, we presented you the concept of population education, its significance, origin, growth and development. We discussed different

demographic concepts in Unit 2. We have focussed on 'Determinants of Population Change' and 'Consequences of Population Change' in Units 3 and 4 respectively. These four Units have together presented you a comprehensive picture of different aspects and issues of population and related matters.

During the course of discussion we have explained certain terms and concepts related to population matters. It is quite possible that you might have developed some confusion or perceived some overlap between these terms in your attempt to comprehend them in comparative perspective. Therefore, in Unit 5, we attempt to present a comparative perspective of closely related terms such as demography, population dynamics, population studies, family planning, family planning education, family welfare, sex education, family life education, and population education, and population and development education, with the purpose of highlighting the relationships, similarities and differences between them. In fact, these terms/concepts are often misconceived by many and are used interchangeably/vaguely by some without clarity of these concepts. Therefore, the focus of discussion in this unit will be to bring in clarity on these concepts/terms with a view to promote their vogue use or application in the academic discourses on and in practice of population and development education.

5.1 OBJECTIVES

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

- Explain the terms/concepts of demography, population dynamics, population studies, family planning, family planning education, family welfare, sex education, family life education, population education, and population and development education in their comparative perspective;
- Identify the similarities and differences between the above terms/concepts and distinguish between them; and
- Analyse and apply these terms/concepts with clarity and distinction in the discussions on matters related to population and development education in their comparative perspective.

5.2 EVOLUTION OF 'POPULATION EDUCATION' INTO 'POPULATION AND DEVELOPMENT EDUCATION': CONCEPTUAL OVERVIEW

In this section we attempt to provide you a picture of how the term population education became popular at national and international level and how this term got popularly renamed as 'population and development education'.

5.2.1 Population Education

Regarding the concept of population education, you may revisit Unit-1 for revision of your memory about it. As you may recall, the first ever United Nations Population Conference held in 1954 in Rome (Italy) has drawn the attention of the international community to the problems and issues of population. Since then, every ten years the United Nations has been organizing international conferences on population issues. Each conference brought forth issues relevant to that decade for discussion. Accordingly, the second conference was held in

1965 in Belgrade (Yugoslavia) like the first one, in collaboration with the International Union on the Scientific Study of Population (IUSSP) and comprised of technical experts aimed at expanding the scientific knowledge and understanding on population issues. The third conference held in 1974 in Bucharest (Romania) and the fourth one held in 1984 in Mexico City, were, however, organized by the United Nations alone and composed of government representatives. These conferences benefitted from extensive preparations, scientific symposia, regional meetings, and meetings of preparatory committees involving technical experts and focused on development of policies (<http://www.rhrealitycheck.org/reader-diaries/2010/01/11/international-conference-population-and-development-icpd-a-historical-account-and-future-trajectory>). Since the first UN Population Conference held in 1954 the Governments, donors and the practitioner-agencies involved in promoting the scientific knowledge and understanding on population matters popularly used the term 'population education' in their official and policy documents.

Since there is intricate relationship between population and development that influence the quality of life of the individuals, family, community, nation and the world, the first 'United Nations Population Conference' held in 1954 in Rome had rightly drawn global attention towards population problems. As a result, different countries began their efforts in the form of population policies and programmes, which later have been revised time and again in tune with the international developments.

Of course, India is the first country to have its official population policy during the first Five Year Plan (1951-56) itself – when National Family Planning Programme was launched by focussing on 'clinical approach'. But, the beginning of population education in India can be traced to the third Five Year Plan (1961-66) when this programme was given extension-orientation with 'cafeteria approach' to family planning. Thus, population education has emerged as an indirect means to strengthen direct intervention strategies and approaches aimed at attaining the national demographic goals.

Educating people on population matters has become democratic and popular means of influencing population change towards desirable direction. Population education covers wide range of information related to different aspects of population: a) its size, structure, distribution, density, and change; b) its determinants, trends and causes at different levels; c) its consequences on different aspects of human life – physical, social, economic, political, cultural, environmental, etc; and d) measures to control population change (individual, national and international). With increase in national measures such as national population policy and programmes, and international measures such as involvement of international agencies in providing different types of support — financial, material, human, technical, etc — to the policies and programmes of different countries, the scope of population education and its importance in terms of its linkage with developmental issues got well understood leading to its renaming as population and development education, which is highlighted below.

5.2.2 Population and Development Education

The fifth International Conference on Population and Development (ICPD) held from 5-13 September, 1994 in Cairo (Egypt) had, at the end of nine days of intense debate, adopted a wide-ranging 20-year action plan that delegates and

commentators hailed as opening of a “new era in population”. The programme contained highly specific goals and recommendations in the mutually reinforcing areas of infant and maternal mortality, education, reproductive health and family planning. This Programme of Action has the potential to change the world with its far wide-ranging effect (<http://www.unfpa.org/swp/2004/english/ch1/index.htm>). The ICPD, 1994 had given due recognition to sexual and reproductive health, and reproductive rights and freedom of individuals in the overall context of simultaneously and comprehensively addressing the issues of both population and development. Underpinned by a commitment to human rights and gender equality, the Cairo agreement called on countries to ensure reproductive health and rights for all as a critical contribution to sustainable development and the fight against poverty, illiteracy and gender disparity, which the ICPD saw as inseparable from addressing population concerns. It is at this conference that the concepts of reproductive rights, sexual and reproductive health were officially incorporated in the programme of action to serve as a blueprint for population programmes of the United Nations and individual countries until 2015.

The ICPD, 1994 was, thus, a milestone in the history of population and development, as well as in the history of women’s rights. The Programme of Action agreed to at the ICPD along with benchmarks added at the ICPD+5 review, informed the eight Millennium Development Goals (MDGs) derived from Millennium Summit, 2000. These mutually reinforcing development blueprints continued to guide United Nations Fund for Population Activities (UNFPA) in its efforts to improve lives, support reproductive health and rights, and advance gender equality. UNFPA, governments and development partners marked the 15th anniversary of the ICPD, in 2009 by taking stock of how much has been accomplished and how much more has been left to be done. A series of expert meetings and events helped to identify gaps and challenges, to consolidate lessons learned over the last 15 years, and to come up with practical recommendations for accelerating progress (<http://www.unfpa.org/public/icpd>).

At the Millennium Summit in 2000, a framework for progress consisting of eight Millennium Development Goals (MDGs) was derived from the Millennium Declaration adopted by the world leaders from 189 Member States who agreed to help the world’s poorest countries significantly by the year 2015. These goals are:

- 1) Eradicate extreme poverty and hunger;
- 2) Achieve universal primary education;
- 3) Promote gender equality and empower women;
- 4) Reduce child mortality rates;
- 5) Improve maternal health;
- 6) Combat HIV/AIDS, malaria, and other diseases;
- 7) Ensure environmental sustainability; and
- 8) Develop a global partnership for development.

All the eight MDGs are intricately linked to population and development related matters only. The MDGs serve as a time-bound, achievable blueprint for reducing poverty and improving lives agreed to by all countries and all leading development institutions. They guide and focus development priorities for governments, donors and practitioner-agencies worldwide (<http://www.unfpa.org/public/icpd>).

One can see the close linkages between the 10-year programme of action prepared by ICPD held in Cairo in 1994 and its follow-up that informed the MDGs. In 2010, the UN system reviewed progress, identified gaps and explored ways to accelerate progress in a series of events leading up to the MDG 10-Year Review. Thus, 1994 International Conference on Population and Development (ICPD) was a milestone in the history of population and development, and accordingly the Governments, donors and the practitioner-agencies, in tune with the above declaration, have changed its nomenclature of ‘population education’ to ‘population and development education’. But, the definition of ‘population and development education’ remained largely the same as the definition of ‘population education’ but with a change in emphasis from population matters to population and development matters in an integrated manner.

There is technically no difference between ‘population education’ and ‘population and development education’, except that the former has been renamed as the latter by the donors and the practitioners or implementing agencies after international adoption of 20-year action plan at the fifth International Conference on Population and Development (ICPD) held at Cairo in 1994 for addressing the issues of population and development in holistic perspective.

In the process of studying population problems and finding solutions as well as in evolving the policies and implementing them, different individuals, institutions and nations have introduced, applied and expanded different terms/concepts such as demography, population dynamics, population studies, population science, family planning, family planning education, family welfare, sex education, family life education as a part of population education/population and development education and independently as well. However, these terms/concepts are often misconceived and used interchangeably or vaguely by many personnel at different levels in the field of adult and population education. Therefore, in the following sections we attempt to present these terms/concepts in an analytical and critical manner with a view to compare, contrast and provide a comprehensive perspective of the same so as to promote their vogue use or application by the adult educators and others involved either in the academic discourse / discussion on population and development education or in promoting it at the field level.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

- 1) Highlight the difference, if any, between ‘population education’ and ‘population and development education’.

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5.3 'DEMOGRAPHY', 'POPULATION DYNAMICS', 'POPULATION STUDIES', 'POPULATION SCIENCES' AND 'POPULATION EDUCATION': CONCEPTUAL COMPARISON FOR CLARITY

In this section, we will focus our discussion on the relationship, similarities and differences between the terms/concepts 'demography', 'population dynamics', 'population studies', and 'population science' and 'population education'.

5.3.1 Demography

The word 'demography' comes from the Greek words 'demos', which means population, and 'graphy', which means to describe or to draw. In its most simplistic terms, demography is the study of how human population changes. Demography can be studied as a study of the Earth's entire population, or by its specific groups based on geographic area, age, gender, race, nationality and a variety of other aspects (Luczkovich, see <http://www.grin.com/en/e-book/60766/demography>).

Demography is 'the statistical and mathematical study of the size, composition and spatial distribution of human population, and of the changes over time in these aspects through the operation of the five processes of fertility, mortality, marriage, migration and social mobility (Bogue, 1969). But, according to Mehta (1982, pp.36-37) demography is the static and dynamic description of population situation at the micro and macro levels.

From the above definitions, it is very clear that demography is the static and dynamic description of population situation and *does not include the study of consequences of population situation*. This serves as the *link between the determinants of population change and its consequences*.

5.3.2 Population Dynamics

The terms 'demography' and 'population dynamics' are sometimes used interchangeably. For instance, according to wikipedia.org (see <http://en.wikipedia.org/wiki/Demography>) *demography*, as the *statistical study of human population*, can be a very general science that can be applied to any kind of dynamic human population, that is, one that changes over time or space (i.e. *population dynamics*). It encompasses the study of the size, structure and distribution of these populations, and spatial and/or temporal changes in them in response to *birth, migration, aging and death*.

However, there is subtle, but clear difference between these two terms. 'Population dynamics' explains broadly the determinants and consequences of population trends. It includes population growth, situation, trends, consequences, etc. (Nagda, 1984, p.4). It means *population dynamics includes in it demography as well*. In other words, population dynamics is demography plus consequences of population growth and trends.

5.3.3 Population Studies

For proper understanding of the levels and trends in vital events such as fertility, mortality, migration and marriages, knowledge of the various socio-economic,

cultural, psychological, political and other factors of the human population affecting these vital events is very essential. This requires systematic studies on the relationships between different population aspects and the influencing factors, which are effectively studied under 'population studies'.

Sometimes, demography and population studies are vaguely used interchangeably. In fact, population studies is broader than the former and is concerned, on the one hand, with the quantitative study of the size, structure, characteristics and territorial distribution of human populations and the changes occurring in them, and on the other hand, with *the study of the underlying causes of population phenomena and their consequences*. Thus, its scope is still wider than population dynamics. It is multi-disciplinary in nature drawing its subject-matter from several disciplines such as psychology, sociology, economics, cultural anthropology, statistics, mathematics, geography, politics, biology, genetics, medicine, public health, ecology, etc (Jayarami Reddy, 1984, p.12). So, it may be noted that, *while demography is quantitative study, 'population studies' is both quantitative and qualitative*.

'Population studies' includes the descriptive and analytical studies on the interrelationships between and among different aspects, changes, determinants, trends, consequences, causes and all other factors related to population situation. The key word 'studies' in the term 'population studies' clearly indicates that, unlike demography and population dynamics, it is more research-oriented or research-based than simply being descriptive. These studies are wide and varied and can, for example, be suitably divided into the following categories.

- Demographic studies
 - Fertility studies
 - Mortality studies
 - Migration studies
 - Studies on other determinants/causes of population change
- Studies on population dynamics (includes demographic studies plus studies on consequences and interrelations between various aspects and factors of population change and development)
- Family life education studies
 - Studies on family life
 - Family planning (education) studies
 - Sex education studies
 - Family welfare studies
- Population education studies (include studies on needs, aims, objectives, curriculum, methodology, impact, policies, programmes and so on of population education).

Then, what is 'population sciences' and how is it different from 'population studies'?

5.3.4 Population Sciences

According to Population Sciences Special Interest Group (Pop Sci SIG): “Population Sciences are an integral component of cancer research and represent key elements in the bridge between clinical/basic research and cancer control. The Population Sciences SIG aims to advance the various disciplines of population sciences including Epidemiology, Surveillance, Behavioral Science, Prevention, Cancer Control, Biostatistics, Cohort Studies, and Health Outcomes Research by creating data standards and developing tools that operate within The cancer Biomedical Informatics Grid® (caBIG®) and leveraging existing caBIG® activities and resources to address the common needs of these disciplines” (<https://cabig.nci.nih.gov/workspaces/ICR/popscisig/>).

It means, ‘population sciences’ is much broader than ‘population studies’ and includes advanced scientific research, among other things, that have any relevance to or bearing on human population. It not only includes all such studies mentioned under ‘population studies’ above, but also scientifically advanced research related to any aspect of population as a whole or its individual unit. Then, how is population sciences different from population education?

5.3.5 Population Education

Population education, in simple terms, can be defined as the education on or related to population matters. It refers to the conceptual understanding of both ‘population’ and ‘education’ and encompasses all that is related to population matters – population situation, its aspects, trends, determinants, causes, consequences, issues, problems, etc and their relevance to or impact on quality of life. The term ‘population’ can be defined as the people living in specified geographical area, be it a village, taluk, district, country or the world as a whole. “Education” is the process that imparts, improves or changes the knowledge, information, understanding, attitudes, skills, abilities, practices and so on of the people for their effective functioning in life as an individual and as a member of the family, society, nation and the world. Having considered the two terms, ‘population’ and ‘education’ as above, deciding on what sort of education can be imparted to whom, on what population matters and to what extent poses a serious challenge to population educators (Lakshmi Reddy, 1994, pp.29-30). It means, its scope varies depending upon different target groups.

According to UNESCO (1971, p.13): “Population education is an educational programme which provides for the study of the population situation in the family, community, nation and the world with the purpose of developing in the students rational and responsible attitudes and behaviour towards that situation”. Here, the term ‘students’ broadly refers to any intended target group at any level. This definition has been accepted by majority of the countries in the world. From this definition one can understand two important attributes of population education. *Firstly*, it is an educational programme that provides for a study of population situation at different levels. *Secondly*, it is intended to develop rational and responsible attitudes and behaviour towards that situation.

Lane and Wileman (1974, p.10) defined population education as “the study of human population and how it affects and is affected by several aspects of life: physical, social, cultural, political, economic and ecological”. This definition gives us an understanding of the scope of population education; it encompasses

all that falls under demography, population dynamics, population studies and population sciences discussed above.

Population education can be defined as an educational process which assists persons: a) to learn the probable causes and consequences of population phenomena for themselves and their communities (including the world); b) to define for themselves and their communities the nature of the problems associated with population processes and characteristics; and c) to assess the possible effective means by which society as a whole and the person as an individual can respond to and influence these processes in order to enhance the quality of life now and in the future (Viederman, 1974, p.319). This definition provides us the enlarged scope of population education as it also takes into account the individual and collective means of influencing population phenomena for a sustainable and better quality of life of the present generation and also of the future generations.

Of course, the content level and the scope of population education shall vary from one target group to the other depending upon their context and the level – international, national, local/community, familial and individual. It can, thus, be summed up that population education encompasses demography, population dynamics, population studies, population science, among other things such as family planning, family planning education, sex education and family life education – plus the national and international policies and programmes of population control aimed at addressing the population and development issues and problems for better quality of life of the population at present and in the future.

5.3.6 Distinction between ‘Demography’, ‘Population Dynamics’, ‘Population Studies’, ‘Population Sciences’ and ‘Population Education’

Based on the preceding discussion, these concepts mentioned above can be distinguished as follows:

- a) ‘Demography’ includes static and dynamic description of population and *does not include the study of consequences of population situation*. This serves as the *link between the determinants and consequences*.
- b) ‘Population dynamics’ is demography plus consequences of population growth and trends. Population dynamics thus is broader concept than demography.
- c) ‘Population studies’ is multi-disciplinary in nature and draws its subject matter from several disciplines such as psychology, sociology, economics, cultural anthropology, statistics, mathematics, geography, politics, biology, genetics, medicine, public health, ecology, etc. It is concerned with the quantitative and qualitative study of population — its size, structure, characteristics, territorial distribution, changes, causes and consequences as well as interrelationships between various aspects and influencing factors. Thus, it is more research-oriented and its scope is wider than population dynamics.
- d) ‘Population sciences’ is still broader and subsumes in it ‘population studies’ including the scientifically advanced studies related to population – be it related to aspects of population as a whole or of its individual unit.

- e) 'Population education' draws its content from all the above concepts — demography, population dynamics, population studies and population sciences, among others.

5.3.6.1 Distinction between 'Population Education' and 'Population Studies'

'Population education', as the term indicates, has educational orientation while 'population studies' indicates that it is more of research-oriented. The distinction between 'population education' and 'population studies' becomes very clear from the following.

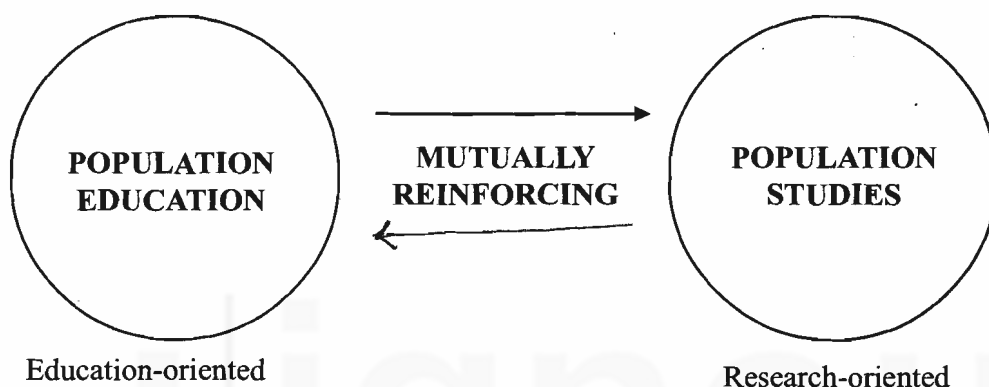


Figure 5.1: Interrelationship between Population Education and Population Studies

- Population education includes the entire content of demography, population dynamics, population studies and the population sciences. Further, the population policies and programmes including all types of measures of controlling population also form part of the content of population education. In addition, the findings or conclusions of population studies (which is research-based) become the enriched content of population education. For example, the population of a place underwent a significant change in its size over a period of time. Spreading information on the population situation of that place in the beginning, during and at the end of that time period falls within the scope of population education. But, the answer to the question “why the change has occurred in population during that particular time period?” falls within the scope of population studies. If population study identified or discovered particular causes for the change in population of that particular area then the knowledge and information on those causes for the change in population provides a meaningful content for explaining the change, and thereby supplements, enriches and complements the content of population education.
- Any number of studies can be conducted on many population matters at different times. As a research activity, population studies is an endless and ever needed exercise helpful in providing a basis for short-term and long-term planning for development – social, economic, cultural, environmental and so on. Population studies is, thus, a process of conducting research into population matters, issues, problems, etc., while population education is a programme intended to impart education on all these, among other things as well. However, the outcome of population studies continues to enrich the content of population education.

- Both ‘population studies’ and ‘population education’ precede and succeed each other: a) ‘Population studies’ precedes ‘population education’ in the sense that the former provides a strong content base for the latter. ‘Population studies’ succeeds ‘population education’ in the sense that the former can study, among other things, the content, curriculum, methods, impact, etc of population education; b) ‘Population education’ precedes ‘population studies’ in the sense that the former imparts education on whole range of matters related to population. It succeeds ‘population studies’ in the sense that it assimilates the outcome of population studies into it to enrich its content for dissemination. Here, population education works as an effective follow-up activity of population studies as far as dissemination of the findings of these studies is concerned; and thus, it makes population studies more meaningful. At the same time, population education enriches itself by taking the up-to-date findings of population studies as a part of its content.
- Both *population studies* and *population education* are continuous and mutually reinforcing processes. Population education promotes changes in knowledge, attitudes, skills and practices or behaviour of the people towards population matters. In turn, the nature, quality and quantity of the changes, for instance, form the subject matter for population studies – as to how and to what extent these changes happened. ‘Population studies’ will remain relevant in any population situation – static or dynamic – at all times. Similarly, population education also remains relevant in any given situation of population and development.

As mentioned elsewhere above, population education includes in it the population policies and programmes, and also draws its content from family planning, family planning education, family welfare, sex education and family life education. Since the entire content of population education is subject matter for population studies, the latter also includes family planning studies, family planning education studies, sex education studies, family life education studies and population education studies.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

2) Draw the distinction between the following terms/concepts.

i) ‘Demography’ and ‘population dynamics’.

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ii) 'Population education' and 'population studies'.

**5.4 'FAMILY PLANNING', 'FAMILY PLANNING
EDUCATION', 'FAMILY WELFARE', 'SEX
EDUCATION', 'FAMILY LIFE EDUCATION'
AND 'POPULATION EDUCATION':
CONCEPTUAL COMPARISON FOR CLARITY**

In this section, we will discuss the concepts of family planning, family planning education, family welfare, sex education, family life education and population education and draw the distinction between and among them.

5.4.1 Family Planning

Family planning, in general, refers to limiting or controlling the size of the family for better quality of life. It means and includes whether to have or not to have children, and if at all to have, how many and with what spacing. Calister (1973) defines family planning as "the intricate process by which persons, if they wish, can determine for themselves the timing, spacing and number of children to be born to them".

Family planning is possible through fertility control/regulation by the concerned persons or couple. Fertility control, in fact, refers to patterns of human behaviour that have as their primary objective: a) the prevention of unwanted pregnancies and births by the fertile person; b) having at least one child by those willing to have children, but suffering from temporary sterility, by getting any temporary obstacles to conception removed through any scientific method or technique to regulate their fertility. In other words, it means regulation or facilitation of conception or contraception to have desired number of child-births with suitable spacing between the births.

Family planning is now recognised as a basic human right. Its ultimate aim is to ensure that every child is a wanted one and that its coming into the world is the result of a responsible decision on the part of its parents. Family planning helps people in many ways: a) it helps a woman to space her pregnancies in order to safeguard her health and that of her children; b) it protects a woman from pregnancy until her baby has been weaned and she wants to have another child; c) it gives parents the opportunity to provide a better start in life for each of their children; d) it helps men and women to enjoy their married life without fear of unwanted pregnancy; and e) it provides for future well-being of the families (Mishra, 1992, p.109).

Nevertheless, it is not ingenious to say that large/big families are unplanned ones. Some couples, despite all their sound knowledge and well foreseen advantages, strengths, weakness and problems of small and big families, choose and plan their families to be big. In other words, if the objective of family planning by a couple is to have big family for being 'happy family' with better quality of life, for them, in their environment/context, that is perfectly a planned family.

Family planning is a practice having relevance to married people/couples. Without marriage true family does not form and without family the question of 'family planning' does not arise at all. It is, thus, a matter primarily concerned with responsible parenthood – when to have or not to have conception, contraception or even abortion, as far as the responsibility in planning the family is concerned (Lakshmi Reddy, 1994). Family planning, thus, refers to adoption of suitable methods and techniques for implementing the decisions taken to regulate the size of the family, to be big or small. Thus, *family planning refers to practical aspects of planning the family — adoption of the family planning methods and techniques, with or without full knowledge of the methods/techniques.*

5.4.2 Family Planning Education

Couples can plan their families irrespective of their knowledge of different methods / techniques of conception, contraception and abortion. If they are aware of different methods and techniques of family planning they can effectively choose the relevant method or technique that is most suitable to their context. Then, their choice will be a result of an analysis and assessment of merits and demerits of different alternative methods/techniques. However, even the couples without any knowledge of family planning methods/techniques can also plan their families effectively by simply following the expert advice or recommendation of qualified doctors in family planning (welfare) hospital, centre, clinic, etc. Usually, the doctor, while advising, educates the target individual or couple in advance on post-adoption risks, side effects, problems, etc, if any, associated with particular method or technique. All this falls under family planning education which throws open to the target couples all the methods and techniques along with their relative advantages and disadvantages so as to enable them choose the suitable one for adoption at right time.

5.4.2.1 Distinction between 'Family Planning' and 'Family Planning Education'

From the above discussion, it is clear that family planning is associated with birth control, birth planning, child-spacing, fertility control / regulation, planned parenthood, etc which refer to *practicalities* involved in controlling the size of

the family. Family planning education is a broader concept than family planning in the sense that the former subsumes the latter and includes the whole range of education related to different aspects and issues such as the following: What are the methods and techniques of family planning? What is their nature, structure and composition? Where can they be availed and at what cost, if at all priced? How to adopt and when to adopt them? How do they work? What are their relative advantages and disadvantages including the likely side effects, post-adoption risks and problems? Which is the ideal contraceptive among the available contraceptives? What are the incentives, if any, given by the Government as associated with adoption of particular method/technique, and so on? Family planning and family planning education can be precisely distinguished as follows.

- The practice of family planning starts with or after marriage of individuals. But, family planning education, on the other hand, can precede, continue during and after marriage or even after adoption of family planning method(s) or technique(s).
- Family planning ends when the desired family size has been effectively achieved while family planning education precedes and succeeds family planning.

However, family planning education would be more meaningful and useful if it is given to would be couples and the target couples, than to those who have already achieved their desired family size.

What, then, is *family planning studies*? How is it different from 'family planning' and 'family planning education'? To be precise, family planning education is a part of educational activity related to family planning, while family planning is a matter of practicalities in so doing. And family planning studies is a part of research related to both family planning as well as family planning education falling under population studies.

5.4.3 Family Welfare

Family welfare refers to the well-being, happiness, safety and security of the entire family. It subsumes in it family planning and family planning education. It forms part and parcel of the larger concept of social welfare, since the family is the unit of the society.

Family welfare is a broader concept than family planning/family planning education in the sense that the former subsumes the latter. It means the former aims at the welfare of the entire family, not simply controlling/limiting the births or the size of the family. It takes into account the health, prosperity and happiness (at present and in the future) not only of the mother and children (already born and to be born) but also of the other existing members of the family in the overall context of their physical, psychological, social, economic, and other conditions for improving the standard of life. Family welfare assumes great relevance in the larger context of social welfare.

5.4.4 Sex Education

Sex education is another term which is often confused with family planning or family planning education by many. Preparation of youth for healthy sexual and married life requires a basic understanding of sex, sexuality, sexual behaviour

and social interactions associated with them. Again the terms sex, sexuality and sexual behaviour are perceived as mutually confusing, though they differ significantly from one another.

Sex actually indicates individual identity as male or female based on clear depiction of characteristics of particular sex that is identifiable by the opposite or the other sex. It refers to the 'stand-alone biological characteristic features' of particular individual, hence, the expressions used such as sexy female, sexy male, etc. But, many people when confronted with the word 'sex' often misconceive it as doing something such as sexual intercourse or coitus; or use it in reference to the vagina, penis, orgasm, secondary sex organs, etc.

Sexuality is more than indicating one's sex. It involves not only drawing attention or attraction of others, be of same sex or other sex, but also many other aspects. It includes many things and means different things to different people.

Wasta (1991, pp.237-238) lists out different perceptions of people on sexuality as:

- a form of communication and merging in which tenderness, mutual concern, love and affection are expressed;
- muscular activity ending in orgasm;
- a means to control and manipulate another person;
- a form of recreation;
- a way to support one's ego;
- a spiritual union;
- an integral part of one's personality affecting all aspects of one's life;
- an expression of one's maleness or femaleness.
- a method of procreation.

So, one can see that sexuality involves complex phenomena, and hence, it is difficult to define, but, perhaps, easy to understand.

- Sexuality is expressed in many physical and other ways and it is not seen only in the bedroom as is commonly believed. It is rather important that the individuals express their sexual selves and share intimacies with another person in different healthy, possible and acceptable ways.
- Sexuality includes various things and can be seen as expressed in all our daily activities and actions ranging from expression of feelings and sexual selves in different ways, means and modes of communication to sharing of love, affection, etc. Sexuality involves physical, emotional, intellectual and social expressions of maleness or femaleness and includes various types of communication through gestures, talking, writing, looks, fantasising, kissing, caressing, touching, holding hands, caring, sharing and so on or doing various acts involving sexual organs such as sexual act or sexual intercourse, child-bearing, child-rearing – procreation to responsible parenthood.

Sex education is more than sexuality and includes many other aspects. The Carolina Population Education Centre working group says that the concept of sex education is broad enough to encompass not only the sex and family life approaches but also population awareness. Arnold and Associates sub-divided sex education into four areas, namely, family dynamics, human reproductive biology and contraception, social interactions and social science aspects of population. However, there is a considerable overlap and area of agreement. Human physiology and reproduction, contraception, and social interactions associated with human sexuality are considered as the major components of sex education (UNESCO, 1970 in Mehta, 1982, p.37).

Sex education can, thus, be defined as the education on physical, emotional, intellectual, and social aspects of an individual's sexuality with a purpose of developing in the individual rational and responsible attitudes and behaviour towards one's own sex, to the other sex and related matters for promoting harmonious sexual and social relationships for better quality of life.

5.4.5 Family Life Education

Family is the basic unit of society and the individual is an integral part of both the family and the society. Family, in general, includes wife, husband, children and other dependents, if any, living together. Family may be nuclear or extended with agamous, monogamous or polygamous individuals. They may be bound together either by birth, marriage, adoption, love and affection or economic or social advantage. The forms which families take are historical products of the culture in the societies in which the functions of families have evolved and the means by which they attempt to meet the physical, social and emotional needs of their members (Wasta, 1991).

The structure, roles and functions of family have been subject to change depending upon the need, necessity and demand of the individuals and the society. Each member of the family performs different roles in and outside the family. Family is a social institution established as a means for reproduction and continuation of human race; for cultural heritage; for physical security, protection and material opportunities for growth and development (physical, social, emotional, intellectual, spiritual, etc); for developing socially desirable character traits and acceptable moral standards; for orderly living, and for developing desirable social relationships among its members and their neighbours. It is the bridge connecting the child to society. Families with strong mutual respect, loving concern and a sense of personal responsibility to others help their members develop into citizens who contribute to their own and others' happiness and are willing to use their potential for the benefit of the larger society.

Traditional values are increasingly being challenged, often resulting in conflict between adolescents and older people. The reasons include: increasing demand of young people for greater personal freedom than their predecessors had with a view to have more access to family support systems; changes in their lives, their attitude towards sexual relationships, traditional systems of preparation for sexual life, marriage, etc; their attempts to face the challenges, problems and opportunities in their educational, social, and economic development and so on. The younger generations are increasingly becoming aware of all these intricacies and hence leading to conflict with the older generations for more freedom, rights

and responsibilities. Thus, the customs, norms and values of every society are subject to constant change, a process of transition, which may be rapid in some societies and slow or very slow in other societies. Hence, family's educational role is one which is particularly subject to change.

Family life is the structure and process by which individuals live together and perform their individual and collective functions. It is the environment in which children are reared, young people learn how to be adults – men and women. It is, in fact, the individual's most important environment, and successful family life is not universal nor is it possible always for all families or all of its members. Inter-family diversities are quite common in any given society or culture. Deprivation of family life to any individual leads to perversions, inhibitions, emotional stress and anti-social behaviour.

Family life education helps the people to address the above challenges in a desirable manner. It encompasses all stages of life – infancy, childhood, adolescence, adulthood, and the old-age – and all facets of human relationships leading to marriage, parenthood and responsible citizenship. Every society has evolved its own ways of preparing its younger members for adulthood basically through education, a process of socialization. It means that most part of family life education is acquired traditionally, informally at home, places of work, education, worship and recreation/entertainment and in every day contacts and interactions in life with a variety of people. The family life education, in whatever form is provided, is largely based on the experience of several generations. This has been inherent in every society which is now generally termed as family life education.

The formal definition adopted at the International Planned Parenthood Federation / WCOTP (World Conference of Teachers and Practitioners) Seminar on Teachers and National Development with special reference to Family Life Education, Lesotho, 1978 reads as follows: "Family life education includes a study of self-awareness, understanding of others, of sexuality, of marriage and parenthood. The knowledge gained and skills developed will contribute to the individual's ability to cope both with social change and with relationships in society as a citizen, spouse or parent."

This definition is comprehensive and focuses on life of the individual as a family member (child, adult, spouse and parent), as a member of a society and as a citizen of a country vis-à-vis social change and development. Family life education, thus, is broader than sex education and provides education related to all aspects of family life in a given society.

In view of the above, the important dimensions and contents of Family Life Education can be enunciated as follows:

- 1) *General and Reproductive Health*: includes family hygiene and nutrition, marriage, sexual life, maternal and child health;
- 2) *Psychological and emotional*: includes interpersonal relationships among the family members and with others;
- 3) *Social*: includes social implications of family, population growth and need for its regulation;

- 4) *Moral*: includes a study of different values of family life and their compliance with social values, and implications of their denial by members; and
- 5) *Welfare*: includes providing for basic needs of the family, family planning, budgeting, and management to improve the standard of family life.

5.4.5.1 Distinction between 'Sex Education' and 'Family Life Education'

Sex education forms part and parcel of family life education. Sex education focuses largely on self-awareness, human sexual development, reproduction and sexual behaviour and interpersonal relationships in and outside family and social interactions including ethical and moral issues associated with sexual and married life of an *individual*.

Family life education, on the other hand, is a concept broader than sex education as the former has family as a unit in which individual is member. Sex education, however, is an essential component (aspect) of family life education, which encompasses many other aspects of life. Sex education enables the individual's participation in his/her sexual and married life and hence individual is focus of it. Whereas, family life education aims at promoting the quality of life of the entire family as a unit, and hence family life is the focus of family life education.

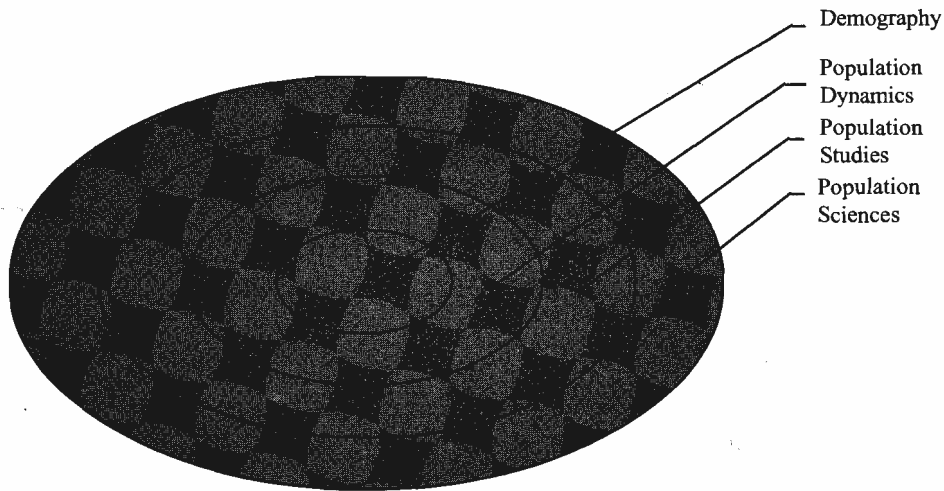
5.4.5.2 Distinction between 'Family Life Education' and 'Population Education'

As discussed under '5.2.1 population education', demography and population dynamics are essential and undisputed components of population education. Family life education, however, forms a supplementary and complementary component of population education as the former helps in bringing out desirable changes in the population situation at the micro (family) level that has its implications at the macro level. Unlike population education, family life education may not necessarily include in it the components of demography and population dynamics. Thus, *population education subsumes family life education and not vice versa*.

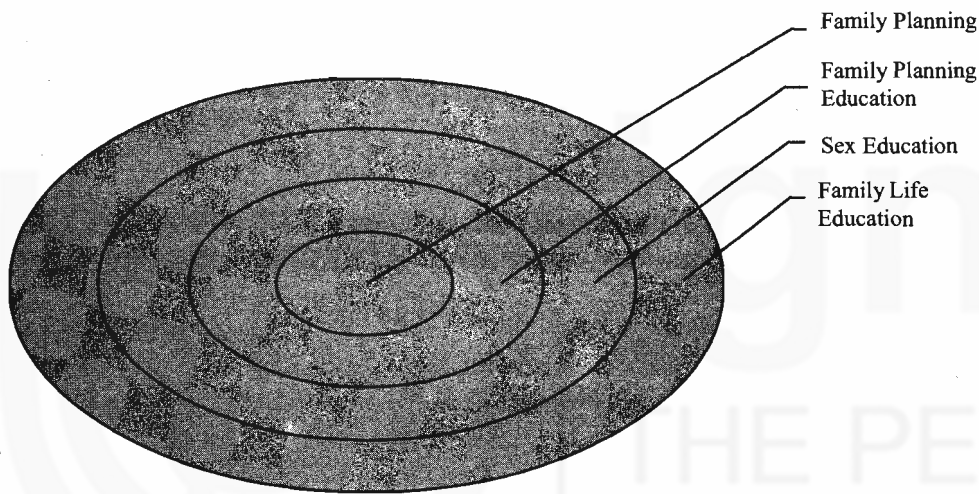
In view of the above discourse on family life education vis-à-vis population education, they can be distinguished briefly and precisely as follows.

- i) Family Life Education = Sex Education + Family Planning Education + Interpersonal relationships, values and functions of an individual as a citizen, spouse or parent vis-à-vis social change and development.
- ii) Population education includes demography, population dynamics, population studies, and family life education plus national and international policies and programmes of population control.

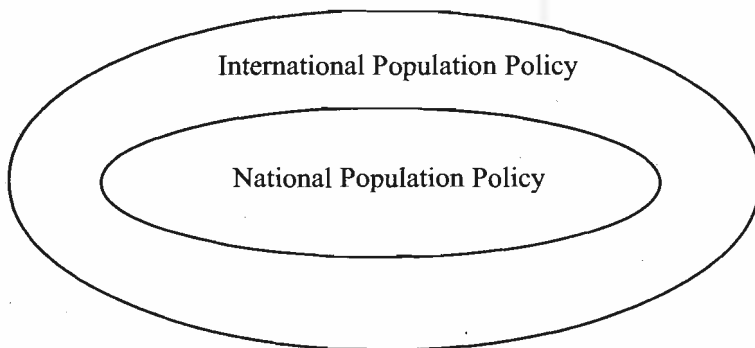
The foregoing discussion on all the above clearly indicates that demography, population dynamics, population studies and the population policy and programmes are essential sources of content for population education programme of a country. And the content of family planning, family planning education, sex education and family life education form optional content to the extent of their desirability and acceptability in a given country.



2 a) Population Studies/Sciences



2 b) Family Life Education



2 c) Population Policies and Programmes

Figure 5.2: Scope of Population Education: Population Studies/Sciences, Family Life Education and Population Policies

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

3) Draw the distinction between the following terms/concepts.

i) ‘Family planning’ and ‘family planning education’.

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ii) ‘Sex education’ and ‘family life education’.

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iii) ‘Family life education’ and ‘population education’.

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5.5 'POPULATION EDUCATION', 'POPULATION AND DEVELOPMENT EDUCATION', 'POPULATION STUDIES' AND 'POPULATION AND DEVELOPMENT STUDIES'

In Section 5.2, we have already presented an overview of how population education has been renamed as population and development education. You must have got clarity on them that there is technically no difference between 'population education' and 'population and development education', except that the former has been renamed as the latter after international adoption of 20-year action plan at the fifth International Conference on Population and Development (ICPD) held at Cairo in 1994 for addressing the issues of population and development in holistic perspective.

Further, we have highlighted the differences and distinctions between the concepts 'population education' and 'population studies' under sub-sub-section 5.3.6.1. The same differences and distinction hold good in the case of 'population and development education' and 'population and development studies'. As mentioned above, since the term 'population education' has been renamed as 'population and development education' in tune with same 'population studies' can be broadly renamed as 'population and development studies'.

In view of the above discussion, it can be concluded as follows.

- What was earlier called 'population education' since 1954 became popular as 'population and development education' after ICPD held in 1994 at Cairo. Similarly, what was earlier called 'population studies' has now gained currency as 'population and development studies'.
- The terms 'population and development education' and 'population and development studies' are, thus, more current terms which have respectively replaced the terms 'population education' and 'population studies'.

5.6 A HOLISTIC PERSPECTIVE OF THE ABOVE TERMS / CONCEPTS: TOWARDS CLARITY

In this section, we will consider all the above mentioned terms/concepts together and compare one with the others so as to understand which of them is wider / broader one than the others with a view to arrive at clear conclusion, and accordingly put them in proper perspective, thus, providing for elimination of confusion between and among these concepts/terms.

Based on the discussion in preceding sections on different terms/concepts, it is now easy for us to put them together in holistic perspective so as to highlight the gist of the relationships, differences and similarities between them with a view to dispel the misconceptions among many about the same. It can be done in comprehensive, comparative, concise and precise manner as follows:

- i) Demography = Static and dynamic description of population situation + determinants/causes of population change.

- ii) Population dynamics = demography + consequences of population change, including interrelationships between different aspects and factors of population change and development.
- iii) Family Planning Education = Methods and techniques of conception, contraception and abortion, along with their advantages, disadvantages and side effects + Family planning and social interactions associated with it including the implications for family size and quality of life.
- iv) Sex education = Human physiology and reproduction + Family Planning Education.
- v) Family Life Education = Sex Education + Interpersonal relationships, values, roles and functions of an individual as a citizen, spouse or parent vis-à-vis social change and development.
- vi) Population Education = Population dynamics + Population studies + Family Life Education + Population Control Measures (individual measures, national population policy and programmes, and international measures) = Population and Development Education.

Further, in terms of their scope, the above concepts can be summed up and shown as under:

- i) Demography < Population dynamics < Population Studies < Population Education.
- ii) Family Planning < Family Planning Education < Sex Education < Family Life Education < Population Education.
- iii) Population (and Development) Education $\Leftrightarrow$ Population (and Development) Studies (Mutually reinforcing and precede and succeed each other).
- iv) Population Education = Population dynamics (Demography plus) + Population Studies + Family Life Education + Population Control Measures (Individual, national and international) = Population and Development Education.

Therefore, it can be concluded that, if the above discussed terms/concepts are studied independently there is likelihood of confusion arising in those who are not familiar with other terms/concepts. However, if these terms/concepts are looked at in their holistic and comparative perspective it is easy to understand and differentiate them clearly.

5.7 LET US SUM UP

In the process of their efforts to address the issues of population and development the individuals, institutions and nations have introduced the terms such as demography, population dynamics, population studies, population sciences, family planning, family planning education, sex education, family life education, population education, population and development education and population and development studies. But, depending upon the level of understanding of the subject, these terms/concepts have been used by some with clarity and by others with vagueness causing overlap and confusion between related terms. In the emerging fields, it is but natural that such confusions and overlaps do arise in

reading certain terms/concepts independently. But, when the same are studied together in a comprehensive and holistic perspective such confusions are least likely to arise. Therefore, we have presented the related terms/concepts together in this unit to make the relationships, similarities and differences between and among them very clear so as to eliminate vagueness, overlaps and misconceptions among various people – the population and development educationists and educators; teachers, students, researchers, field functionaries and others engaged in population education; various functionaries of adult and population education as well as health and family welfare programmes. We also hope you are now in better position to effectively discuss with your colleagues and contribute to elimination of each others' misconceptions about these terms/concepts and also promote clarity of these concepts among others.

5.8 ANSWERS TO 'CHECK YOUR PROGRESS' QUESTIONS

- 1) There is technically no difference between 'population education' and 'population and development education', except that the former has been renamed as the latter by the donors and the practitioners or implementing agencies at national and international levels. Since there is intricate relationship between population and development that influence the quality of life of individuals, family, community, nation and the world, the first 'United Nations Population Conference' held in 1954 in Rome had rightly drawn global attention towards population problems. Since then, the term 'population education' was used popularly in the educational efforts taken up by different countries as a part of their population policies and programmes. But, after international adoption of 20-year action plan at the fifth International Conference on Population and Development (ICPD) held at Cairo in 1994 for simultaneously addressing the issues of population and development in holistic perspective 'population education' has got renamed 'population and development education'. But, the definition of 'population and development education' remained same as the definition of 'population education', yet with a change in emphasis shifted from pure population matters to population and development matters.
- 2)
 - i) Demography is the static and dynamic description of population situation – the size, composition and spatial distribution of human population, and of the changes over time in these aspects through the operation of the five processes of fertility, mortality, marriage, migration and social mobility. It does not include the study of consequences of population situation. But, population dynamics, besides describing the population situation, explains broadly the determinants and consequences of population trends. This serves as the link between the determinants of population change and its consequences.
 - ii) 'Population education' has educational orientation while 'population studies' is more of research-oriented. Both population education and population studies are multi-disciplinary in nature. However, they differ from each other in the following way.
 - 'Population studies' is a process of conducting research into interrelationship between different population matters – aspects,

issues, problems, etc., while population education is a programme intended to impart education on all these matters, among other things. Both *population studies* and *population education* precede and succeed each other and are thus continuous and mutually reinforcing processes.

- Population education includes the entire content of demography, population dynamics and also population studies. Further, population policies and programmes including all types of measures of controlling population also form the part of the content of population education. Since the entire content of population education is subject-matter for population studies, the latter also includes family planning studies, family planning education studies, sex education studies, family life education studies and population education studies. However, the outcome of population studies continues to enrich the content of population education.
- 3) i) Family planning is a matter primarily concerned with responsible parenthood – when to have or not to have conception, contraception or even abortion, as far as the responsibility in planning the family is concerned. It is a practice having relevance to married people/couples, because without marriage true family does not form and without family the question of ‘family planning’ does not arise at all. Family planning, thus, refers to adoption of suitable methods and techniques for implementing decisions taken to regulate the child-birth and size of the family, to be big or small. Family planning education is broader than family planning and the former subsumes the latter. Family planning and family planning education can be precisely distinguished as follows.
- The practice of family planning starts with or after marriage of individuals. But, family planning education, on the other hand, can precede, continue during and after marriage or adoption of family planning method(s) or technique(s).
 - Family planning ends when the desired family size has been effectively achieved while family planning education precedes and succeeds family planning. It includes education related to all methods and techniques of family planning – temporary and terminal – including their advantages and disadvantages.
- ii) The distinction between sex education and family life education is as follows.
- Sex education focuses largely on self-awareness, human sexual development, reproduction and sexual behaviour and interpersonal relationships in and outside family and social interactions including ethical and moral issues associated with sexual and married life of an *individual*. Family life education, on other hand, is a concept broader than sex education as the former has family as a unit in which individual is member. Sex education is an essential component (aspect) of family life education, and thus, forms part and parcel of family life education.

- Sex education enables the individual's participation in his/her sexual and married life and hence individual is the focus of it. Whereas, family life education aims at promoting the quality of life of the entire family as a unit, and hence family life is the focus of family life education.

- iii) Demography and population dynamics are essential and undisputed components of population education. Family life education, however, forms an optional, supplementary and complementary component of population education. While the former helps in bringing out desirable changes in the population situation at the micro level, though it has its implications at the macro level which population education aims at. Unlike population education, family life education may not necessarily include in it the components of demography and population dynamics. Thus, population education subsumes family life education and not vice versa.

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