Population

Unit 1 Contents

Population and Family Life Education

Unit 1 : Population

Unit Introduction

In this unit you will be introduced to the study of population, and the effect of overpopulation on development, with special reference to productivity and natural resources. Population explosion can be regarded as one of the prime reasons for environmental degradation and indiscriminate depletion of natural resources. Rapid growth of human numbers may breed economic and social inequality, and in turn poverty. Overpopulation is a serious concern, not only for demographers and human biologists who are involved in the study of population, but to every well-meaning citizen. This unit will help you to comprehend the dynamics of population growth and its impact on social and economic development of nations.

Learning outcomes for this unit

After studying this unit, you should be able to :-

- conceptualise population growth in relation to developmental, environmental and social issues
- provide information on how population is measured
- discuss the relationship between population and developmental issues in Asian region

Definition of population

The Concise Oxford Dictionary (sixth edition) defines population as 'total number of inhabitants of a town, country etc.,'. Biologists define population as 'members of a species living in a particular area and capable of interbreeding'. Population can also be defined as 'a community

of morphologically or physiologically similar individuals belonging to a same species'. Essentially the word population can be used to describe a group of similar individuals of any species, such as, a bird population, a tiger population, a frog population or a human population. And the term population refers to all the members- infants, young and old, and all the males and females of a particular species and does not include the members of any other species. In this unit, word population refers to human population only.

Population and its relationship with environment and development

You may be aware that many countries in Asian region are overpopulated. What does one mean by overpopulation ? For instance, in the Asian region, which is part of the old world, many races, cultures and religions have flourished and disappeared in the known history of about five thousand years. Most of the land resources have been used up and the population density (the number of people occupying per square unit of area) has increased. Essentially when resources such as land, forests, plants and wild life get depleted to the extent that it can not support the people living in a region, then the region can be said to be overpopulated. But there are also a few countries in the Asia Region who have not yet become over populated.

Population and environment

One of the direct effects of overpopulation is that it causes a number of environmental problems. In most of the western countries, environmental problems are a direct result of development. But in developing countries in general, and in the Asian region in particular, the combined pressure of three factors, accelerated population growth, excessive exploitation of natural resources for economic development and limited resource base has led to a number of environment related problems. Further, inadequate institutional infrastructure for the management of natural resources has accelerated the environmental degradation.

There is a widespread negative impact of the extensive degeneration of soil, waterways, plants and wildlife on weaker segments of the society, namely, women and people living in the rural and remote areas. All environmental changes, whether it arises out of dwindling natural resources, pollution or displacement through development projects directly affect the weaker sections of the society.

Population and development

"Development", as manifested in huge infrastructure projects, industrialisation without safety measures, indiscriminate exploitation of natural resources, commercial competition and increasing restrictions on common resources, has disrupted traditional livelihood systems and impacted on women more severely as they used to be more reliant on

natural resources and the subsistence economy. The massive displacement that has followed the development process in Asian Region has had economic, psychological and social repercussion on quality of life. Coupled with this is the rapid depletion of natural resources. This has given rise to a global population problem for which two major causes are attributed.

- Uneven distribution of the world population in relation to land and natural resources, and
- Uneven utilisation of resources in response to increasing human needs owing to uneven pace of development of scientific knowledge, skill, organisation and productive energy in various parts of the world.

Case Study 1.1

Pakistan is an agricultural country and about 70% of its population lives in villages. In recent years farming practices are becoming more and more mechanised. Use of tractors and harvesters is more and more common and they have replaced the conventional equipment used and farm labour employed for such purposes. This has rendered the land-less village population which depended on seasonal work for their livelihood jobless. Further the women who participated in harvesting process and collected enough grains to feed their families are deprived of their source of income. And the few vacancies of drivers and thrashers are grabbed by men, as women are considered too weak for operating heavy equipment. The net result is that big farmers make huge profits, but the weaker sections of the society are affected adversely.

Theories of population

In 1796 Thomas Robert Malthus propounded a population theory "The Principle of Population". The theory was based on two observable facts and a questionable deduction. That food is necessary for the existence of women and men, and that passion between sexes is natural and will remain nearly in its present state, are the two indisputable facts of his theory. From these two facts, he made a disputable deduction, that the power of population is infinitely greater than the power of earth to produce subsistence for man. You may be aware that population, when unchecked, increases in a geometrical ratio (1, 2, 4, 8, 16, 32 and so on) but subsistence increases only in arithmetical ratio (1, 2, 3, 4 ,5, 6, 7 and so on). A slight acquaintance with numbers will enable you to understand the immensity of the first power in comparison with the second. According to Malthus population would double every 25 years, provided the growth is not impeded by any other factor. But you should remember that food production would only double in the first 25 years. Malthus held the view that it was the race between population and the food supply which helped keep down the standard of living and give rise to famine, pestilence and war. No doubt that Malthus's theory was logical but it was inadequate. The theory failed to forecast and recognise

the technological advances that would be made in food production, migration to vacant lands, birth control and contraceptive practices.

Essentially Malthus's theory focussed on the theme of the pressure of population on resources. The theory implied that wages could never depart very far or for very long from the level of required for subsistence. If wages rose, population would grow faster, and the increased labour supply would push wages back toward subsistence. Malthus's theory of population together with the shortage of cultivable land during the period provided the background to the theory of differential rent. Ricardo model of differential rents states that the surplus earned by the owners of land is equal to its differences of more productive than the least productive land under cultivation. Two implications follow from this statement.

- If the employment of capital and labour increases, the profits must fall; for not only does the average product of capital and labour fall but the share taken by rents increases.
- If the wage rate increases, there will be lowering of profits.

The classical theories of Malthus and Ricardo have provided groundwork for later theories of growth and development vis a vis population.

Does high population growth impede development?

How does population growth affect the development process? It can affect both positively and negatively. It can act both as stimulus as well as an impediment to growth and development. On one hand, increase in population size reduce living standards owing to the adverse effect of population growth on savings and capital per head. This is what is commonly observed in many developing countries. On the other hand, increase in population numbers leads to increase in labour force of the nation. This in turn may lead to better standards of living, wider markets and a higher volume of output. The potentially conflicting role of population growth in the development process is highlighted by the difference in attitude toward population increase between the developing and developed countries. Developed countries prefer a higher population growth, as low population growth is detrimental to development. Many developing countries also favour a higher rate of population growth as a low population growth would not contain the pressure to urbanisation and industrialisation, both of which are essential for economic development.

Optimum population

The question therefore is, at what point of population growth do the economic disadvantages begin to outweigh the advantages. Here, let us introduce the concept of **optimum population.** The term optimum population can be interpreted in different ways. Sometimes it is referred to as the size of population which maximises the average product of income per head. A second interpretation would refer optimum population as total welfare maximisation. Total welfare maximisation refers to a

condition at which all incomes are equalised at the welfare subsistence level. A third definition of optimum population would be that it is the level at which the average product in an economy falls below the level of production necessary for the subsistence on the assumption that the total product is equally shared. In this case, the term optimum simply refers to the maximum population that can be supported with existing resources and is the point of Malthusian equilibrium. In yet another definition, the term optimum population is used to describe a state of affairs where a country's population is so large that any further increase can only be detrimental to development. This definition is linked with the notion of population density and attempts to define underpopulation and overpopulation in terms of population and resources.

We will conclude our discussion on population theories here. In the next section you will study the details of the scientific study of population, the demography. But before you do so, you attempt the following self-assessment questions.

Self-help questions

Malthus's theory of population put forward in 1796 is called simplistic because it did not take into account certain important factors. List at least three factors.

Ricardo's theory of differential rent is based on the Malthus theory which proposes an equilibrium between the food production and increase in population by the people. According to Ricardo, the land rent is based on the difference between consumption and production. A simple example will be that landlord will get that much share from tenants which is equivalent of surplus grain left with the tenant after the consumption. According to Ricardo's theory of differential rent the market forces between production and consumption determine the rent on profit of the middle man. Very much Malthus, Ricardo's theory is also very simplistic as it does not take into account the quality of life. The consumption level of developed society is much higher than the developing societies which live on marginal subsistence level. Similarly the role of technology in production increases the profit many times making room for higher wages and higher consumption levels and not necessarily dissipating the profits in rents only.

What are the three useful insights that you observe in the market economy of Raicardo's theory?

Study of population

Although philosophers from Confucius to Aristotle and Plato were concerned about population growth, the scientific study of population called demography began much later when epidemics decimated large populations. Patterns of death and life table were drawn to calculate the chances of death occurring to a member of population. The analysis of

population dynamics depended greatly on statistics. Certain essential bits of knowledge were required to enable the governments to plan ahead to improve health, education, employment etc., of the population. Information needed for such planning are about the size of the population, its composition by age and sex, the area of living, the vital events like numbers of births and deaths, marriage and divorces, the movement of people in and out of the country etc.

Measurement of population data

Two parameters that are commonly utilised in the study of population are ratios and rates. A ratio indicates the relative size of two numbers. For instance, the more children in a population make its size grow more rapidly as children would grow up, marry and have their own children again. This information can be obtained by finding the child-woman ratio which is defined as :

$$\text{Ratio} = \frac{\text{The number of children aged 0-5 in the population}}{\text{The number of women aged 15-49 in the population}}$$

Rate is a special form of ratio. It has an additional characteristic of referring to what happened during a certain period of time. The most commonly used rates in population dynamics relate to births and deaths known as vital rates. Vital rates answer the question: how much per unit of what per year? Since the rates relate to the whole population they are termed as crude rates. For instance, in 1996, the crude birth rate of India was 26 per 1000 of the population. This was obtained by the calculation :

$$\text{Crude Birth Rate (CBR)} = \frac{\text{Total number of births during the year}}{\text{Total estimated population at mid year}} \times 1000$$

The crude death rate (CDR) and the crude marriage rate (CMR) are calculated in a similar manner.

Such crude rates give valuable indication about the rate of reproductive change - which is the difference between CBR and CDR. The greater the difference, the more rapid is the population growth. Similarly, the smaller the difference, the more stable is the population. To be more accurate, demographers want to measure the fertility rate of women. For instance, taking into account the fertile age of women as lying between 15-49, the General Fertility Rate is calculated as :

$$\text{General Fertility Rate (GFR)} = \frac{\text{Live births to women aged 15-49}}{\text{Mid year female population aged 15-49}} \times 1000$$

The General Fertility Rate serves as a reliable information index of population dynamics. This can be improved further by computing age-specific fertility rates.

Age and sex composition of a population

Another important demographic factor is the age and sex composition of a population as it will have significant socio-economic impact on the community and the country concerned. A country where the birth rate is high and the death rate is low and where people in general live longer, a larger number of people have to be dependent on others, particularly the children and the elderly. They would require to be fed, clothed and housed. The dependency ratio of such a population measures the impact of the age composition on the economy of the country.

$$\text{Dependency ratio} = \frac{\text{Population under 15 or over 65 years}}{\text{Population aged between 15-65}}$$

From the above one can see that the ratio has two parts, each of which can be calculated separately. The first part measures the dependency load of youth, the second part measures the dependency load of the aged on a country's economy and its families.

Activity 1.1

The following data were obtained from an imaginary country, the Wonderland.

Population	:	0.2 million
Land area	:	0.3 sq.kms
GDP 1993	:	US$ 13 million
Per capita GNP	:	US$ 820
Infant mortality rate	:	158
Under five mortality rate	:	170
Number of births per year	:	6800
Population under 15 years	:	80000
Population above 65	:	10000
Male/female ratio	:	100/94

Calculate the following from the data given above.

CBR =

Dependency ratio =

Self-help questions

a. The scientific study of population is called _____.

b. How many areas are included in the study of population dynamics.

c. Please make a tick ( ) mark on the correct answers only:-

i) birth rates _____ ii) death rates _____

iii) divorce rate _____ iv) Male/Female ratio _____

v) rural/urban ratio _____ vi) literate/illiterate ratio _____

vii) tall/short ratio _____

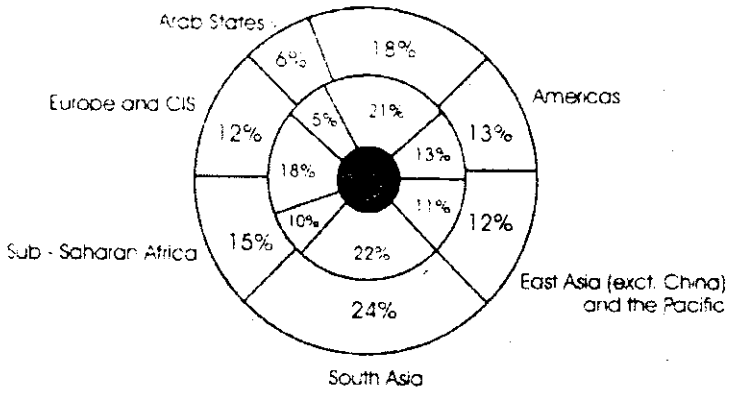
Population profile in Asia

The current annual increment of the global population has exceeded 90 million. According to United Nations projections, this rate would continue to rise until the year 2025. The share of Asia in world population is 58.5%. South Asia contains one fifth of humanity and this population of 1.2 billion is growing rapidly. There are clear divisions within the Asian region regarding population projections. While China will maintain its decreasing trend thus lowering its sharing in the world population, South Asian share is projected to further increase from 22% in 1993 to 24% in 2025 in the next twenty five years. The social and economic imbalances in Asia have resulted from non-utilisation of rich natural resources which has led to little industrialisation barring Russia, Japan and a few other nations.

Human Development in South Asia report of 1997 while discussing various aspects of human resource development in the world has identified South Asia as the most deprived region in the world. It is now the most illiterate region in the world. Its adult literacy rate is 48 percent as compared to 77 percent for rest of the developing world. It is also not surprisingly the poorest region in the world with a GNP per capita of US$ 309 which is one third of the per capital income for the rest of the developing world and less then one fifth of the industrial world.

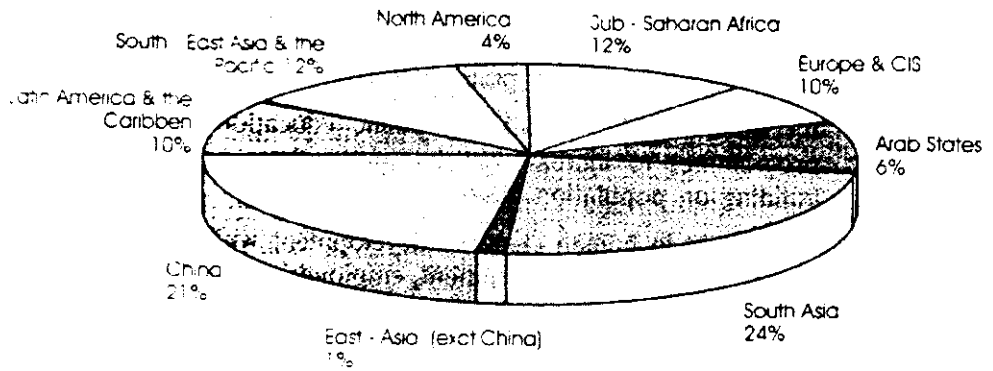
It is evident that population change is closely related to our lives. Population growth, structures and distribution have a great bearing on economic, social and gender inequality. Many political and non political bodies have been concerned about the growth of global population. As an attempt to address the issue, the International Conference of Population and Development was held in Cairo in 1994 wherein certain recommendations had emerged. In the following page (basis for action) is a summary of the recommendations which can serve as the groundwork for future action. They have special relevance to the Asian region where problems such as unemployment, gender inequality, environmental degradation are high, contributing to the existing population problem.

Fig. 1.1 Share of South Asia in world population



(Outer circle is 2025 projection)

% Share in additional world population 1960-1993



SOUTH ASIA : THE MOST POPULOUS REGION IN THE WORLD

Source: Human Development in South Asia, 1997 by Mahbub-ul-Haq.

Accurate information on these matters are important for the following reasons :

- It provides an inventory of human resources of the country
- The data enables demographers to describe the population
- Information about births, death, marriage, divorce, age and sex helps to analyse and anticipate probable changes in the population
- The information can because to effects socio-economic changes.

Table 1.1 South Asia in Global Framework

	Population (millions)		Real GDP billion		Absolute Poverty (millions)		Illiterate Adults (million)	
	1960	1993	1960	1993	1960	1993	1960	1993
World	22,996	5,508	5,303	30,542	N/A	1,314	735	853
South Asia	564	1,191	365	1,632	N/A	527	234	396
Share of South Asia in the World %	19	22	6.9	5.3	N/A	40	32	46

Basis for action - a perspective

- Population issues should be integrated with development strategies. Governments should establish mechanisms to ensure population control are reflected in policy decisions.
- Increased resource allocation, public education and information programmes to increase the knowledge base and local capacity building on population issues.
- Investment in human resource development with increased access to information, skill development, employment opportunities, sexual and reproductive health services.
- Women's participation in all policy making and implementation processes. Protect women from economic and social discrimination and domestic violence. Promote the health, nutrition and education of the girl child.
- Promote men's shared responsibility and active involvement in sexual and reproductive health and behaviour and responsible parenthood.
- Keeping control on demographic factors leading to excessive consumption, wasteful production and resource depletion.
- Measures for creating and strengthening food security at all levels.
- Aim to reduce high levels of infant, child and material mortality to lessen the need for high fertility and high risk births.
- Promote educational and counselling services for the adolescents in areas of life skills, responsible and positive lifestyles.

Self-help questions

1. What is population?

2. Explain how population is related to development?

3. What are the common measures of population? Describe them.

4. What are the necessary steps that can be taken to address the population issue ?

Unit Summary

In this unit we have :

- defined the word 'population'
- discussed the impact of population increase on development and environment
- briefly outlined the theories of population and defined certain terminology associated with population studies
- analysed the Asian perspective on the role of population in development

Asia is a thickly populated continent in the world. More specifically, south Asia harbours nearly 22% of the world population. Naturally, increasing population has exerted pressure both on environment and development.

Malthusian theory of population made it known that increasing population would exercise tremendous pressure on resources. Another opinion is that a high population growth need not essentially be an impediment to growth, rather it could be a stimulus. The concept of optimum population and the different interpretations to this term are also discussed in this unit. The various demographic terminology, such as crude birth rate, crude death rate, crude marriage rate, general fertility rate and dependency ratio are defined.

The trend in population growth in south-east Asia suggests that while China maintains a declining trend in its population, the rest of south Asia continues to show an increasing trend. To a certain extent it is true that deprivation, high illiteracy rate, low GNP and per capita income are some of the result of high population growth in South Asia.