

Population and Environment

After studying this unit the students will be able to:

- Describe the rate of human population growth in Pakistan and neighbouring countries.
- Assess how the size and rate of growth of human population are determined by birth rate, death rate, immigration, emigration, urbanization and carrying capacity of the environment.
- Explain the impact of over population on environment.
- Describe how over population is the major hindrance in the sustainable development of any region.

Introduction

Human population growth has become a source of concern for the modern day world. The population is increasing rapidly. The reason why it is regarded as a major concern is because it has affected the economic, political, environmental, and social spheres of life. Although we see this problem more significant in the poor and developing countries of the world yet the rich and developed nations are also equally affected by this problem. For example all of us living in this world share the same planet earth. Our atmosphere is the same; our resources are the same and environmental hazards see no rich or poor. So in this context over population may be a problem in one part of the world but its environmental impacts may be obvious in other parts of the world.

World Scientists Warning to Humanity

Pressure resulting from unrestrained population growth put demands on the natural world that can overwhelm any efforts to achieve a sustainable future. If we are to halt the destruction of our environment, we must accept limits to that growth.



Some of the common factors like unemployment, poverty and the restriction of economic expansion results from overpopulation. When the population increases, the cost on health, education, and other areas of urban growth are affected. In this chapter you will explore various issues related with human population and its growth.

4.1 Growth of Human Population

Before and during the 19th Century the world's population was growing steadily but it remained in a stable state. The 20th Century brought advancements in agriculture and technology, which caused dramatic increases in human population growth. These increases have continued through to the 21st Century.

The most basic (though not necessarily easiest or most accurate) way to measure population is simply to count everyone. This is known as a census and is usually undertaken by government officials. In the past, religious organizations carried out censuses, but usually on a local or regional level. The Roman Empire conducted censuses in order to measure the pool of military-age men and for taxation purposes. In Islamic world the first census was conducted by Hazrat Umar Farooq (R.A.A).

For Your Information

The human population has increased almost continually throughout history. In 10,000 B.C., there were between one and 10 million humans. By 1,000 B.C. there were 50 million. In A.D. 600, worldwide population had reached 200 million. At the dawn of the 20th century, 1.5 billion humans lived on the planet.

[source: Historical Estimates of World Population]

In modern world no body can deny the importance of census as it is a prerequisites in any country's successful planning. This has paved way for a systematic study of various elements of population.

Demography (from the Greek word meaning "description of people") is the study of human populations. The discipline examines the size and composition of populations, as well as their movement of people from one region to another region. Demographers also analyze the effects of population growth and its control. Several demographic variables play central roles in the study of human populations, especially fertility, mortality and life expectancy, migration, urbanization, and carrying capacity of the environment.

a. Birth Rate

To determine a country's fertility rate, demographers use governmental records to figure the crude birth rate (the number of live births for every thousand people in a population).

a. Table: 4.1 Analysis of birth rate of different countries.



Demographers calculate this rate by dividing the number of live births in a year by the total population, and then multiplying the result by 1,000.

b. Mortality and expectancy

Mortality, or the number of deaths in a society's population, also influences population size. Similar to the crude birth rate, demographers calculate the crude death rate, or the number of deaths annually per 1,000 people in the population. Demographers (persons working on different aspects of population) calculate this figure by dividing the number of deaths in a year by the total population, and then multiplying the result by 1,000.

Table 4.2 Comparison of highest death rate in the world.



Infant mortality rate, which is the number of deaths among infants under age one for each 1,000 live births in a year, provides demographers with another measure. A low infant mortality correlates with a higher life expectancy, which is the average lifespan of a society's population.

c. Migration

Migration (the movement of people from one place to another) affects population size. While some migration is involuntary, such as when slaves were brought to America, other migration is voluntary, such as when families move from cities into suburbs.

Migration into an area, called immigration, is measured as the immigration rate, which is the number of people entering a region per each 1,000 people in the population. Migration out of an area, or emigration, is measured as the emigration rate, which is the number leaving per each 1,000 people in the population. Internal migration is the movement from one area to another within a country's borders.

d. Carrying Capacity

As population density in a given area increases, it approaches what's known as the carrying capacity. This is the maximum number of humans an area is capable of supporting in terms of available resources.

For animals, this is easy to calculate. A goat, for example, might need 50 square yards of grass to survive. An area of 200 square yards therefore has a carrying capacity of four goats.

Calculating carrying capacity for humans is much more complex. We can use technology to improve our resource production. We can ship in resources from other areas. We can create sanitation systems and other infrastructure to support higher density. What happens when we reach carrying capacity in an area? There are several options:

- People leave for a different area.
- People become generally less healthy, and thus less able to reproduce.
- Population pressure leads to war.
- Unsanitary conditions and close proximity lead to a disease outbreak.

For Your Information

World Population Day is observed on July 11. Its purpose is to raise awareness about various global population issues.



4.2 Population Growth

Fertility, mortality, and migration all influence the size of a population. Poorer countries tend to grow almost completely from internal causes (for example, high birth rates), while richer countries tend to grow from both internal causes and migration.

Demographers determine a population's natural growth rate by subtracting the crude death rate from the crude birth rate. The world's low-growth nations tend to be more industrialized, such as the United States and European countries. The high-growth countries tend to be less industrialized, such as countries of Africa and Latin America. Table 4.3 gives an overview of the various figures about the different demographic variables of Pakistan along with some of its neighbouring countries.

Table 4.3: Demographics of selected countries

Country	Births per 1,000 population	Deaths per 1,000 population	Population million	Growth rate (percent)
CHINA	12.2	6.9	1,300	0.49
PAKISTAN	25.1	7.1	177.2	1.51
BANGLADESH	23.8	9.1	158.1	1.27
INDIA	21.3	7.5	1,100	1.38
AFGHANISTAN	40	15	29.121	2.21

4.3 The Impacts of Overpopulation on the Environment

Over the last hundred years there has been a sharp rise in population. This problem is more serious in the developing world as compared to the developed world. Consistent rise in the population is posing serious challenges to the developing world.

Unfortunately, due to bad governance and lack of strong economic growth people living in these areas are suffering from poverty, hunger, and disease.

Any area has a limited carrying capacity in terms of resources and space. Once that carrying capacity is taken over by over population then slowly and gradually degradation takes its root.

Environment of such area gives a clear picture of how overpopulation devastates and affects the lives of the people living in such areas. In the following section we will see how overpopulation has its impacts on the environment.

Effects of Agriculture

The ever-increasing human population growth requires an effective method for more food growth, which has resulted, in extensive agriculture. Bringing more land under cultivation results in the destruction of habitats.

Extensive agriculture requires supply of water and development of canals, which inturn causes water- logging and salinity.



Fig. 4.1 Salinity : One of the side effects of extensive development of canal system



Fig: 4.2 One of the tools of modern day agricultural practices. These and other types of extensive sprays of insecticides and pesticides are a potential threat for different types of pollution.

In order to increase the yield of agricultural products use of fertilizers and pesticides is a common practice these days. Over-use of fertilizers has polluted soil and water. In the same way over-use of pesticides and herbicides can make water toxic, which can affect aquatic life.

Plants in which genes have been altered absorb more nutrients, making soil depletion a problem. Forests are destroyed for cultivation.

Cutting forests and clearing land for agriculture results in soil erosion. Excessive irrigation can cause loss of top fertile soil. Soil erosion results in silting which decrease the life span of dams.



Fig 4.3 Sixty square miles of rain forest are destroyed each year to make way for expanding coca farms.

In this way different activities aimed for increasing agriculture some how is resulting in the destruction of natural environment of an area.



Fig: 4.4 Tehbela dam because of which the reservoir has lost the storage capacity to a reasonable level and now the dam is left with two-third capacity to store water.

b. Urbanization

More and more people are migrating from rural areas to urban environment. People migrate from rural areas to big cities in search of jobs and comforts of life.

The shortage of housing facilities becomes acute with this influx of people. About 80 % of the housing units in big cities are substandard.



Fig: 4.5 One of the significant consequences of urbanization is that most of big cities of Pakistan are faced with long queues of never ending traffic jams.

The influx of the people puts great pressure on the basic facilities such as water, electricity, gas and public transport. The traffic hazards increase, health care facilities fall short and the sewage system is distributed. The migration from rural areas creates shortage of labour in agriculture sector.



Fig: 4.6 Poor city planning: Easy way for disposal of domestic waste is to open sewerage lines directly into the nearby passing irrigation canals and polluting the precious irrigation water. Rapid trend of urbanization has put tremendous pressure on the old and out dated sanitation system in most of big cities of Pakistan.

c. Overgrazing

With fast growing population the demand for meat and dairy products are also increasing. However, there are number of other products which we can get form them. Can you name few such products?

Cattle raring is a profitable business. Cattle are fed mainly on plants. Grassland can support a specific numbers of cattle. It is called the carrying capacity of that grassland. Animals consume the upper portion of grasses. The roots are alive, holding the soil particles together and absorbing water and minerals. The plants recover and again grow to their normal size. However, when more then required number of animals graze, plants are not able to recover and they ultimately die.

Overgrazing results in barren and exposed soil which is easily eroded and results in desertification.

d. Deforestation

One of the important aspects of rapidly increasing population is the deforestation. The unwise and unplanned destruction or removal of trees is called deforestation. Overpopulation put a direct impact on environment. Urbanization requires more land, thus forests are cut to build roads and houses etc. More land is required for cultivation. Trees are removed to develop pastures for grazing. Wood is used both as timber or fuel wood. All these activities lead to removal of trees.

Forests are our most precious wealth. Our life is greatly dependent on forests. They are the natural factories for the production of oxygen. Forests provide green cover to the earth, a living place to wildlife, fuel, timber and recreation to man. They control floods, prevent formation of deserts and keep the air clean.

Deforestation leads to, soil erosion, destruction of habitats, extinction of many species, floods, climatic changes and desertification (the process of formation of deserts)

4.4 Overpopulation and Sustainable Development

Planet earth has limited resources like fossil fuels, water, forests, food etc and these are being constantly used and depleted with every passing moment. Excessive and unwise use of these resources have convinced conservationists and planners that if some urgent measures are not taken in this regard then the world may face extreme shortage or these resources may vanish forever.

One strategy to cope this situation is to use the resource in such a way that it can be used for the present generation but at the same time it is conserved for the coming generations.

The idea of sustainable development grew from numerous environmental movements in earlier decades. Summits such as the Earth Summit in Rio, Brazil, 1992, were major international meetings which introduced the concept of sustainable development to the world.

According to the World commission on Environment and development sustainable development is defined as a development that meets the needs of the present without compromising the ability of future generations to meet their own needs



Fig: 4.7 Heads of state and government gather for a group photograph as the media, delegates and staff members look on at the United Nations Earth summit in Rio de Janeiro, Brazil, on 13 June 1992.

Population is key factor in planning. Every country makes its long term and short term plans keeping in view its population. Any plan for sustainable development requires proper system of check and control of population.

In the present world the idea of sustainable development is facing serious challenges due to rapid growth in population especially in the developing and poor countries of the world.

With limited resources and increase in poverty rapid population growth in the world's poorest countries is a major obstacle to poverty reduction. People living below the poverty line are increasing on daily basis.

Unwise and unmanaged environmental exploitation by rapidly growing population is a major hurdle in sustainable management of environmental resources which ultimately lead to environmental degeneration and degradation.

Health facilities and availability of balanced and nutritious diet are some of the problems to which people in the developing world are faced with. Governments in these countries have to invest more in health and infections and epidemics seriously affect their economic development.

One of the significant effects of overpopulation is the rising levels of unemployment and inflation in the third world countries of the world which can increase the risks of political instability and conflict and can impact the development process in any region of the world.

So in these types of circumstances the concept of sustainable development face serious threats from overpopulation and countries facing this problem must realize that until and unless they are not able to control their population prosperity will remain a dream never to be achieved.

KEY

POINTS

- Rapidly growing population is regarded as a major concern because it affects economic, political, environmental, and social spheres of life.
- The 20th Century brought advancements in agriculture and technology, which caused dramatic increases in human population growth.
- Census simply means counting everyone in a particular area and is usually undertaken by government officials.
- Demography is the study of human populations.
- Crude birth rate (the number of live births for every thousand people in a population). It is calculated by dividing the number of live births in a year by the total population, and then multiplying the result by 1,000.
- Crude death rate, or the number of deaths annually per 1,000 people in the population. calculate this figure by dividing the number of deaths in a year by the total population, and then multiplying the result by 1,000
- Migration into an area is called immigration and migration out of an area, is called emigration.
- Carrying capacity is the maximum number of humans an area is capable of supporting in terms of available resources.

KEY

POINTS

- Demographers determine a population's natural growth rate by subtracting the crude death rate from the crude birth rate.
- Consistent rise in the population is posing serious challenges to the environment.
- Sustainable development is defined as a development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

EXERCISE

A Select the correct answers for the following questions.

1. A population with birth rate equal to death rate is:
a. Increasing
b. Decreasing
c. Stable
d. Growing
2. Each environment supports a limited population depending upon its:
a. Biotic potential
b. Carrying capacity
c. Birth rate
d. Reproductive potential
3. Number of births per 1000 is:
a. Growth rate
b. Conception rate
c. Reproduction rate
d. Crude birth rate
4. The study of population is called
a. Demography
b. Population explosion
c. Population dynamics
d. Census
5. Removing natural resources and adding to environmental problems through pollution are major factors in a process called _____.
a. The green revolution
b. Environmental degradation
c. The biotechnological revolution
d. The greenhouse effect
6. The changes in population take place primarily due to the changes in:
a. Births
b. Migration
c. Death
d. All of the above

7. Crude death rate is
- Total death in a specific year / total population in that year multiplied by 1000
 - Total population in that year - total death in a specific year
 - Total population in that year + total death in a specific year
 - Total death in a specific year / total population in that multiplied by 100 year
8. Crude death rate is also known as
- Mortality rates
 - Infant mortality rate
 - life span
 - None of these
9. The maximum number of year that an individual could live
- Life span
 - Life expectancy
 - Birth rate
 - Fertility
10. What is the official definition of Sustainable Development?
- Reducing environmental impact
 - Using less energy in production
 - Economic development that takes future generations into account
 - None of these

11. Why is the rate of urban growth in the world's less developed regions so much higher than elsewhere?
- a. Rates of population growth are higher in developing countries as compared to industrialized nations.
 - b. Rates of population growth are lower in developing countries than they are in industrialized nations.
 - c. There is widespread internal warfare in rural areas.
 - d. There is lack of education in the developing countries
12. As the population of developing countries undergoes a demographic transition in the years to come, what is likely to be the consequence?
- a. The population of these countries will steadily fall.
 - b. There will be rapid growth of cities as more people migrate there in search of employment.
 - c. There will be less famine and food shortages will decrease.
 - d. There will be a decrease in religiosity.
13. Urbanization mean:
- a. The overcrowding of immigrant neighborhoods
 - b. The result of what happens to an individual when exposed to city life.
 - c. Decisions reached about the use of available land in a city
 - d. Rapid growth of cities

14. Deforestation brings about:

- a. Increased sunlight
- b. Weeds or unwanted plants Control
- c. Soil erosion
- d. Increased grazing area

B. Write answers to the following questions.

- Q.1 Define demography?
- Q.2 Differentiate between birth rate and death rate.
- Q.3 What do you mean by infant mortality rate?
- Q.4 Define the term migration. Differentiate between immigration and emigration.
- Q.5 What is the significance of carrying capacity of an area?
- Q.6 What do you mean by population growth? Give a comparative account of population growth of Pakistan and its neighbors.
- Q.7 How do overpopulation has its impact on the agriculture and forests?
- Q.8 Sustainable development is key to survival in this modern day world. Evaluate the statement critically.