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SAIRAM
DIGITAL RESOURCES

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II

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ENVIRONMENTAL SCIENCE AND ENGINEERING

UNIT NO 5

HUMAN POPULATION AND THE ENVIRONMENT

5.1 Definition and factors affecting population size.

5.1.1 Population Growth-Introduction, Causes, Effects and Characteristics.

5.1.2 Population Growth-Variation among nations.

5.1.3 Population explosion-Definition, Doubling time, Causes, Effects and Remedy.

SCIENCE & HUMANITIES



POPULATION

Definition:

Population is defined as a group of individuals belonging to the same species, which live in a given area at a given time.

It is expressed as the number of individuals of the population per unit area or per unit volume.

This varies in response to changes in the environment and introduction with other living organism.

Parameters affecting Population size

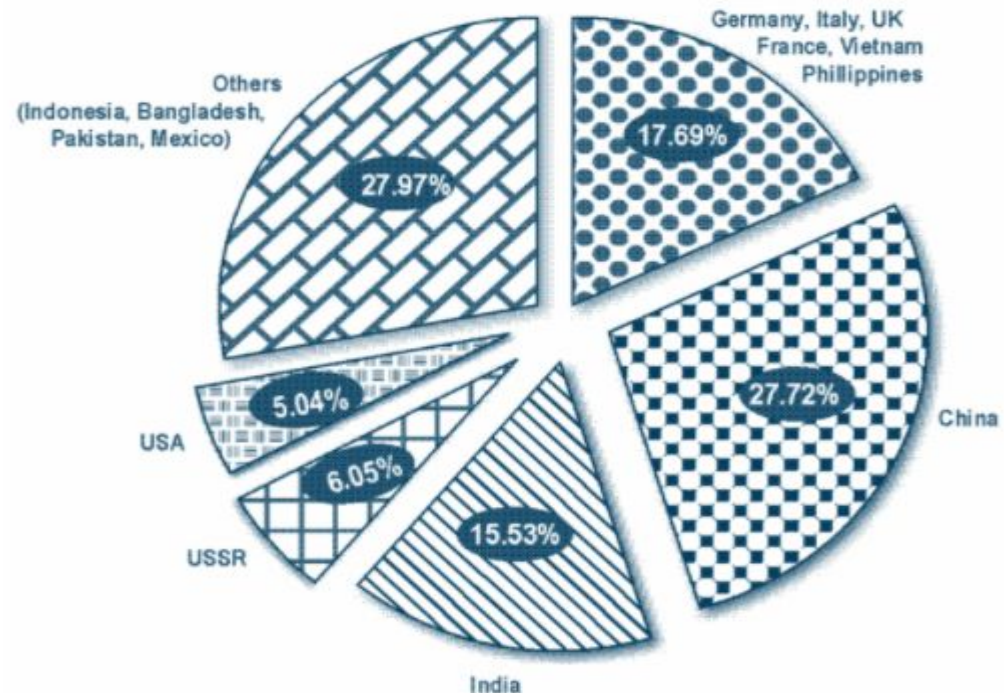
Changes in population size are governed by 4 main parameters. They are

1. **Birth Rate or Natality:** It is the number of the live birth per 1000 people in a population in a given year.
2. **Death Rate or Mortality:** It is the number of deaths per 1000 people in a population in a given year.
3. **Immigration:** It denotes the arrival of individuals from neighbouring population.
4. **Emigration:** It denotes the dispersal of individuals from the original population to new area.

POPULATION GROWTH

Introduction

The rapid growth of the global population for the past 100 years results from the difference between the rate of birth and death. The general trend in the population growth is explained graphically as shown in the following graph,



Causes of rapid population growth

1. The rapid population growth is to decrease in death rate and increase in birth rate.
2. The availability of antibiotics, immunisation, increased food production, clean water and air decreases the famine-related deaths and infant mortality.
3. In agricultural based countries, childrens are required to help parents in the fields that is why population increases in the developing countries.

Characteristics of Population Growth:

- 1. Exponential growth:** Now population growth occurs exponentially like 10 , 10^2 , 10^3 , 10^4 etc.,
- 2. Doubling time:** It is the time required for a population to double its size at a constant annual rate. It is calculated as follows
$$T_d (\text{Doubling time}) = 70/\gamma$$
Where γ = annual growth rate
- 3. Infant mortality rate:** It is the percentage of infants died out of those born in one year. Even though this rate has decreased in the last 50 years, the pattern differs widely in developing and developed countries.
- 4. Total fertility rate (TFR) :** It is the average number of children delivered by a women in her life time. The TFR value varies from 2 in developed countries to 4.7 in developing countries.

5. Replacement level: Two parents bearing two children will be replaced by their off spring. Due to infant mortality this replacement level is changed. But, due to high infant mortality the replacement level is generally high in developing countries.

6. Male-Female ratio: The ratio of girls and boys should be fairly balanced in a society to flourish. But the ratio has been upset in many countries including China and India. In China the ratio of girls and boys is 100 : 140. Variation of population is now explained based on the above three classes.

Effects of population growth:

1. Increasing demand for food and resources.
2. Unemployment.
3. Environmental Pollution.
4. Inadequate health services.
5. Loss of agricultural land.

Variation of population among nations:

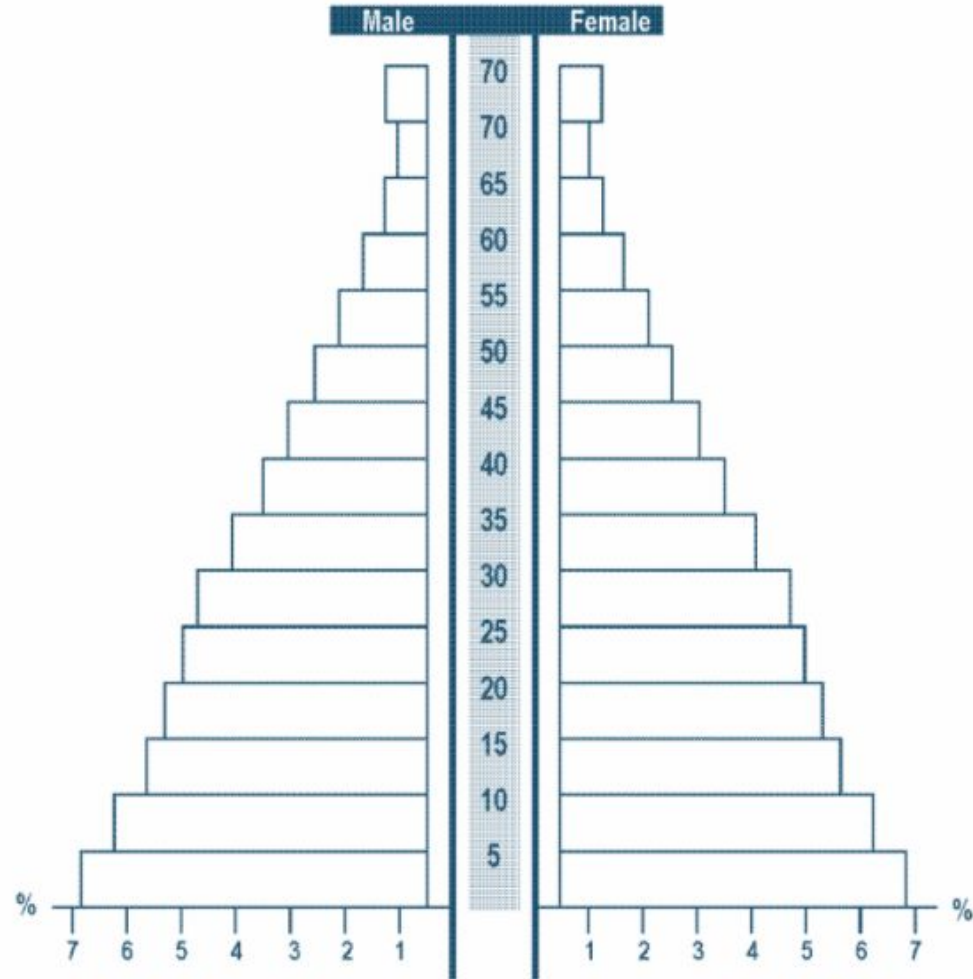
Age structure of population can be classified into three classes

1. Pre productive population (0-14 years)
2. Reproductive population (15-44 years)
3. Post reproductive population (above 45 years)

1.PYRAMID SHAPED (INCREASE):

Example: India, Bangladesh, Ethiopia etc.,

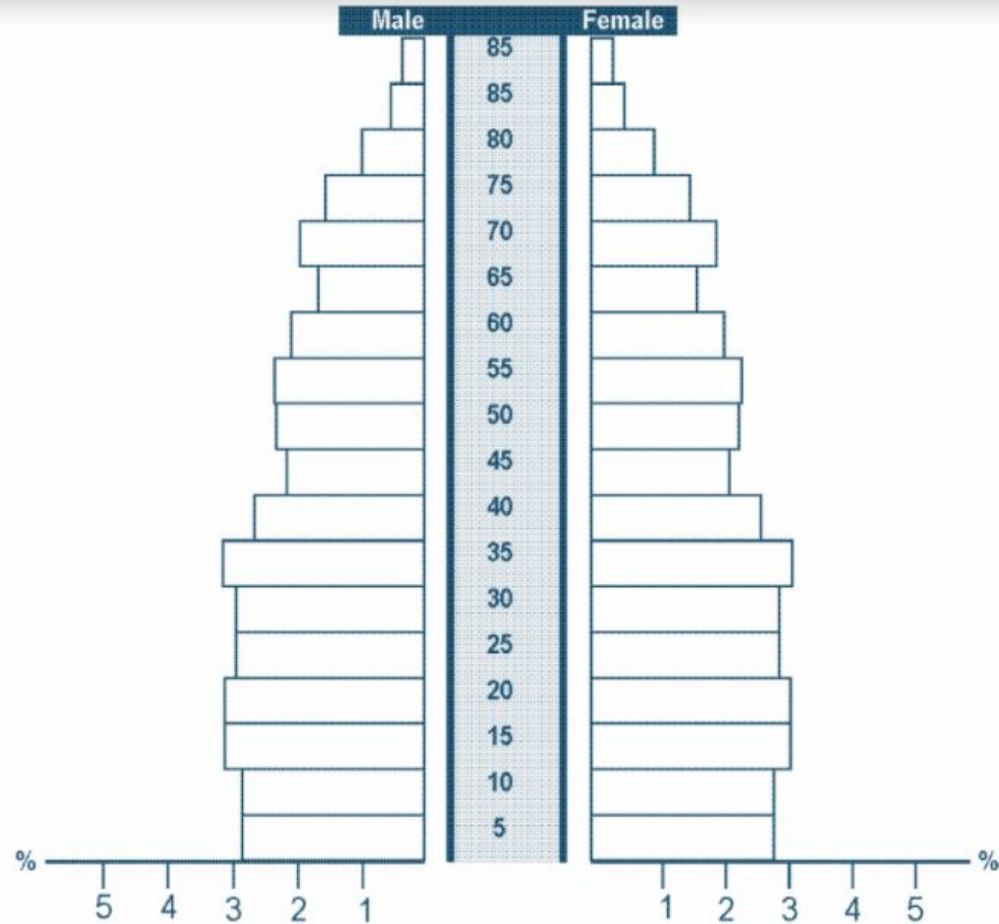
0-14 years population indicated at the base of the pyramid is more, and post reproductive age group population (above 45 years) is less, indicated at the top of the pyramid. The large number of young age people will soon enter into reproductive age group population , which increase the population growth. But the less number of old age people indicates loss of population due to death.



2. BELL SHAPED VARIATION (STABLE)

Example: France, U.S.A, UK, Canada etc.,

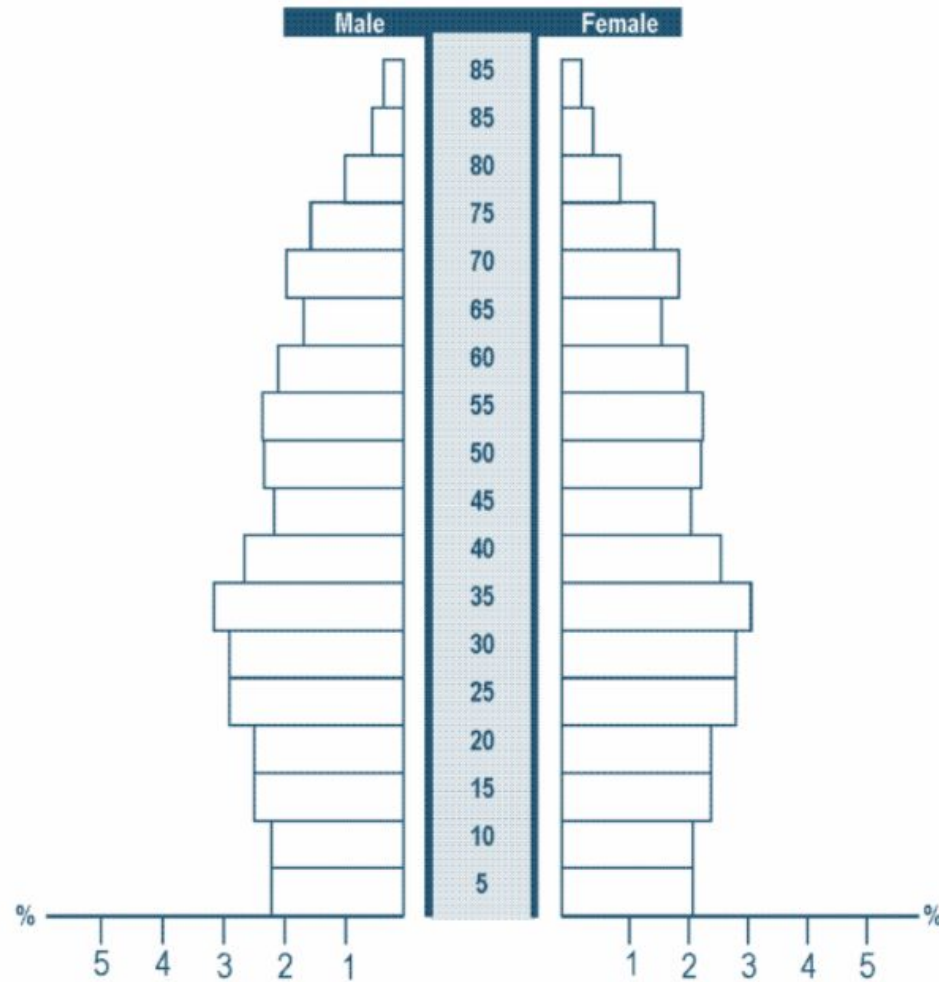
0-14 years population and reproductive age group population are more or less equal. So people entering into the reproductive age group will not change the population, and thus the population growth is stable.



3. URN SHAPED (DECREASE):

Example; Germany, Italy, Sweden, Japan etc.,

0-14 years population is smaller than the reproductive age group population . In the next ten years, the number of people in the reproductive age group is less than before, resulting in a decrease of population growth.



POPULATION EXPLOSION

The sudden increase in population is termed as population explosion. The various factors affecting population explosion are

A. NATALITY:

It refers to rate of reproduction or number of births per unit time.

Factors responsible for high birth rate:

1. Poverty:

Rural people consider that additional children means additional earnings

2. Early marriage:

As a result of early marriage the reproductive period is more.

3. Universality of Marriage:

There is a normal belief that everyone should necessarily get married.

4. Resistant to adopt Family Planning method:

A number of people do not have confidence an about the safety of the methods.

5. Religious belief:

Children are considered to be gift of God and people have no right to refuse.

6. Desire to have male child:

People in their desire to have male child end up with many children.

7. Illiteracy:

Many people who are illiterate do not realize the advantage of small family.

B. MORTALITY:

Mortality refers to the number of deaths per unit time.

Factors decreasing mortality:

1. Improvement in medical facilities.
2. Improvement in sanitary facilities.
3. Discovery of life saving machines.
4. Transport facilities.

EFFECTS OF POPULATION EXPLOSION

1. Unemployment
2. Low living standard
3. Pressure on agriculture land
4. Low per capita income
5. Lack of sanitation,
6. Lack of Education
7. High crime rate
8. Migration to urban area in search of job.
9. Overcrowding of cities leads to development of slums.

In order to overcome this problem of population explosion India launched **POPULATION POLICY** with the following objectives:

1. Quick economic development.
2. Raising the per capita income.
3. Reduction in birth rate by legal motivation like raising age of marriage.
4. Legalizing abortion.
5. Integrating population planning with economic planning.

VIDEO LINK

<https://youtu.be/Jzsz3e5Z4kg>

<https://www.youtube.com/watch?v=Opoy7rdOtsk>

<https://www.youtube.com/watch?v=RLmKfXwWQtE>

<https://www.youtube.com/watch?v=NMo3nZHVrZ4>

THANK YOU

Sairam