Human Population and Growth

Continued.....

- **Human population growth** can be explained by following geographic terms:

(i) Population Density:

- It is a measurement of population per unit area or unit volume and is a quantity of type number density.
- It is frequently applied to living organisms and particularly to humans.
- It is a key geographic term.

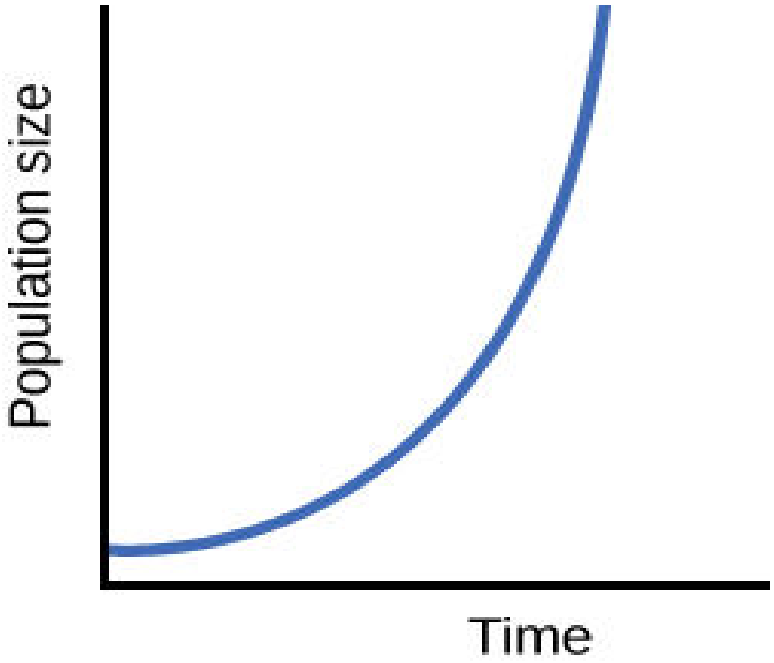
(ii) Carrying Capacity:

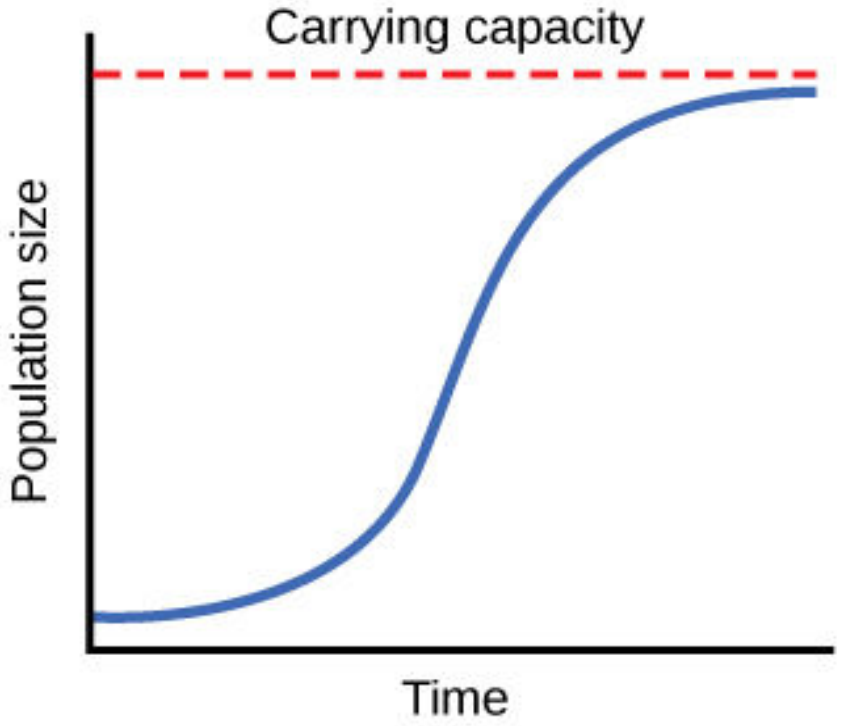
- **Carrying capacity** is maximum population size that can be supported by environment.

- It can be increased by:
  - Clever use of science and technology.
  - Limit to max population size in given space and resource base.
- Population has been able to maintain **Exponential Growth** during past 100 years.

(iii) Exponential and Logistical Population Growth:

- When resources are unlimited, populations exhibit **exponential growth**, resulting in a J-shaped curve.
- When resources are limited, populations exhibit **logistic growth**.
- In logistic growth, population expansion decreases as resources become scarce, levelling off when the carrying capacity of the environment is reached, resulting in an S-shaped curve.





Exponential growth **Logistic growth**

Population Growth Rate

- **Human population growth** rate is measured as annual average growth rate, as:

$$\text{Average annual growth rate (\%)} = \frac{\frac{(P_2 - P_1)}{P_1}}{N} \times 100$$

- Where, P_1 and P_2 are population sizes in previous and present Census, respectively. N = No of years between two Census.

Example:

In 1980, the population in Lane County was 250,000. This grew to 280,000 in 1990. What is the annual percentage growth rate (PR) for Lane County?

Solution:

$$PR = \frac{\frac{(280{,}000 - 250{,}000)}{250{,}000}}{10} \times 100 = \frac{\frac{(30{,}000)}{250{,}000}}{10} \times 100 = 1.2\%$$

The population of Lane County grew 12 percent between 1980 and 1990 or at a rate of 1.2 percent annually.

Problems:

1. Total population of Delhi as per 2001 census was found to be 1.39×10^7. This grew to 1.68×10^7 in 2011 census. What is the annual percentage growth rate for Delhi?
2. Total population of India as per 2017 census was 1339 million. This will grow to 1628 million in 2050 census. What is the annual percentage growth rate for India?
3. Total population of the world as per 2000 census was 6.1 billion. This will grow to 9.1 billion in 2050 census. Calculate the annual percentage growth rate for the world?

Factors affecting Population Growth Rate:

- Population growth rate depends on several factors:

1. Rate of Birth (Fertility):

(a) Birth Rate:

- It is the number of babies produced per 1000 individuals.

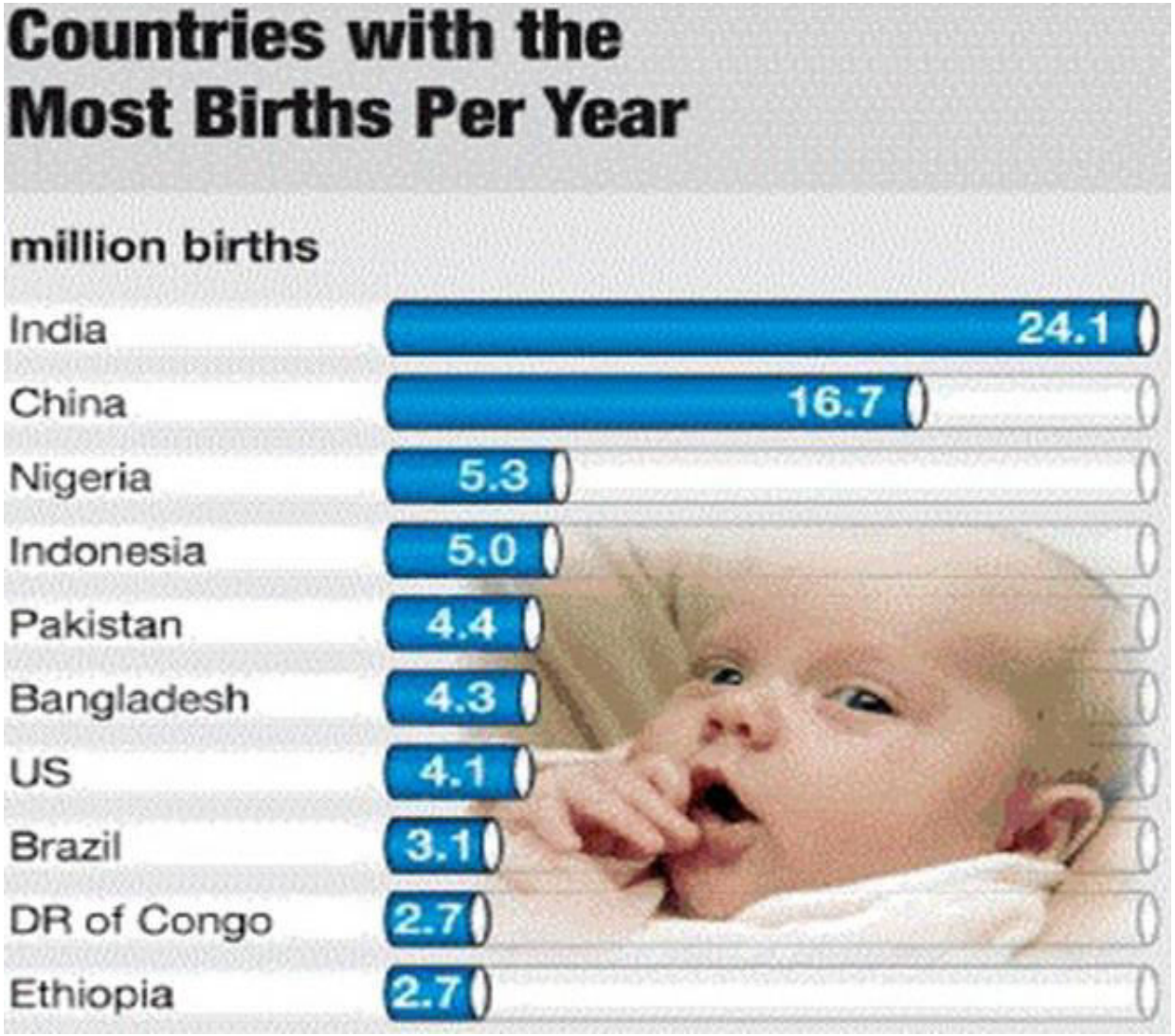
(b) Total Fertility Rate:

- It is the average number of children that would be born to women in her lifetime.

(c) Replacement Level:

- It is the number of children a couple must produce to replace them.

- It is always higher than two, since some children die before reaching reproductive age.



2. Mortality Rate:

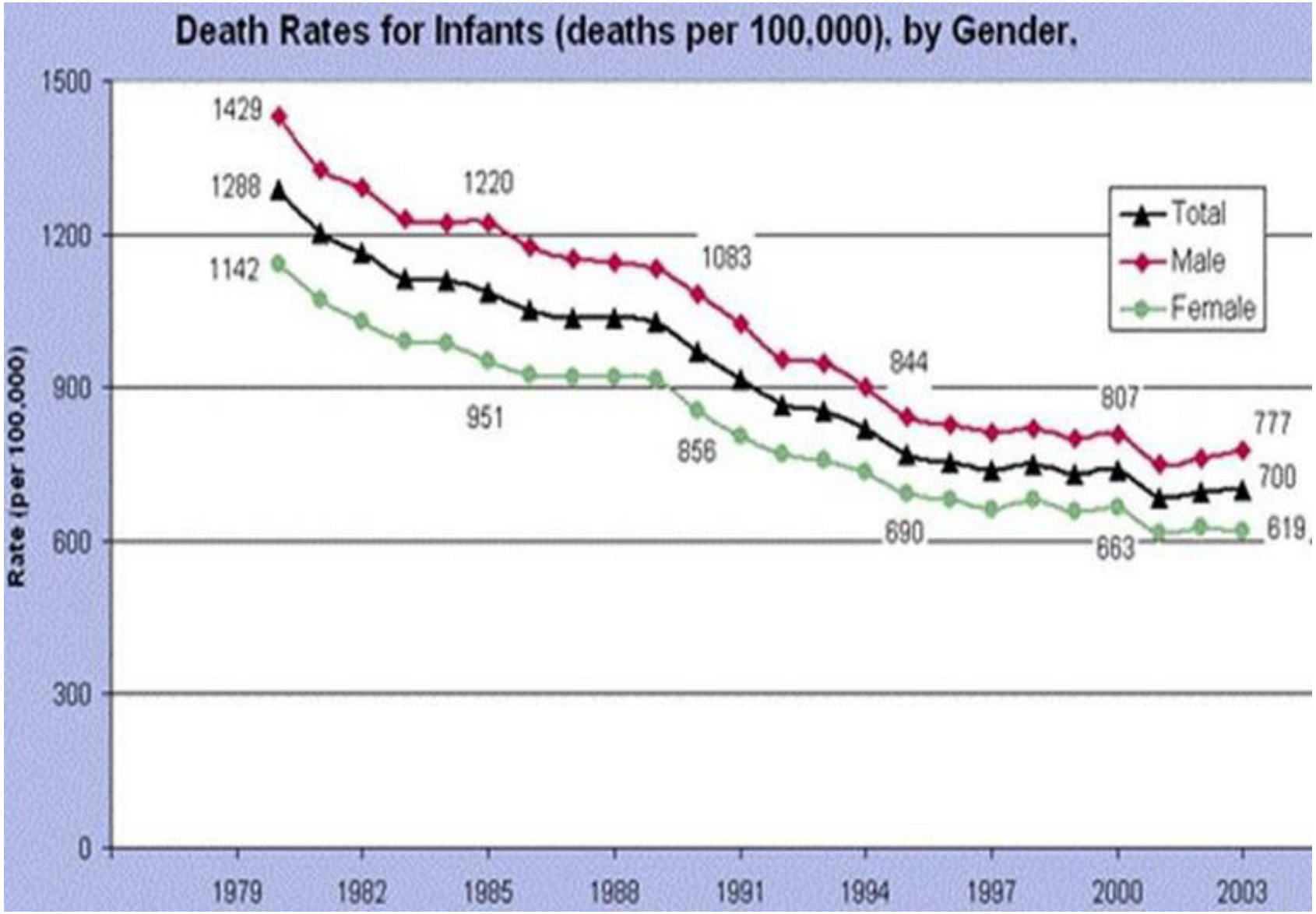
- **Mortality** is death rate per thousand individuals.
- **Mortality rate** is decreasing because of industrial revolution, improved personal hygiene, modern medicines, *etc*.

3. Migration:

- It is the movement of individuals into or out of place/country (within country).

4. Age and Sex Structure:

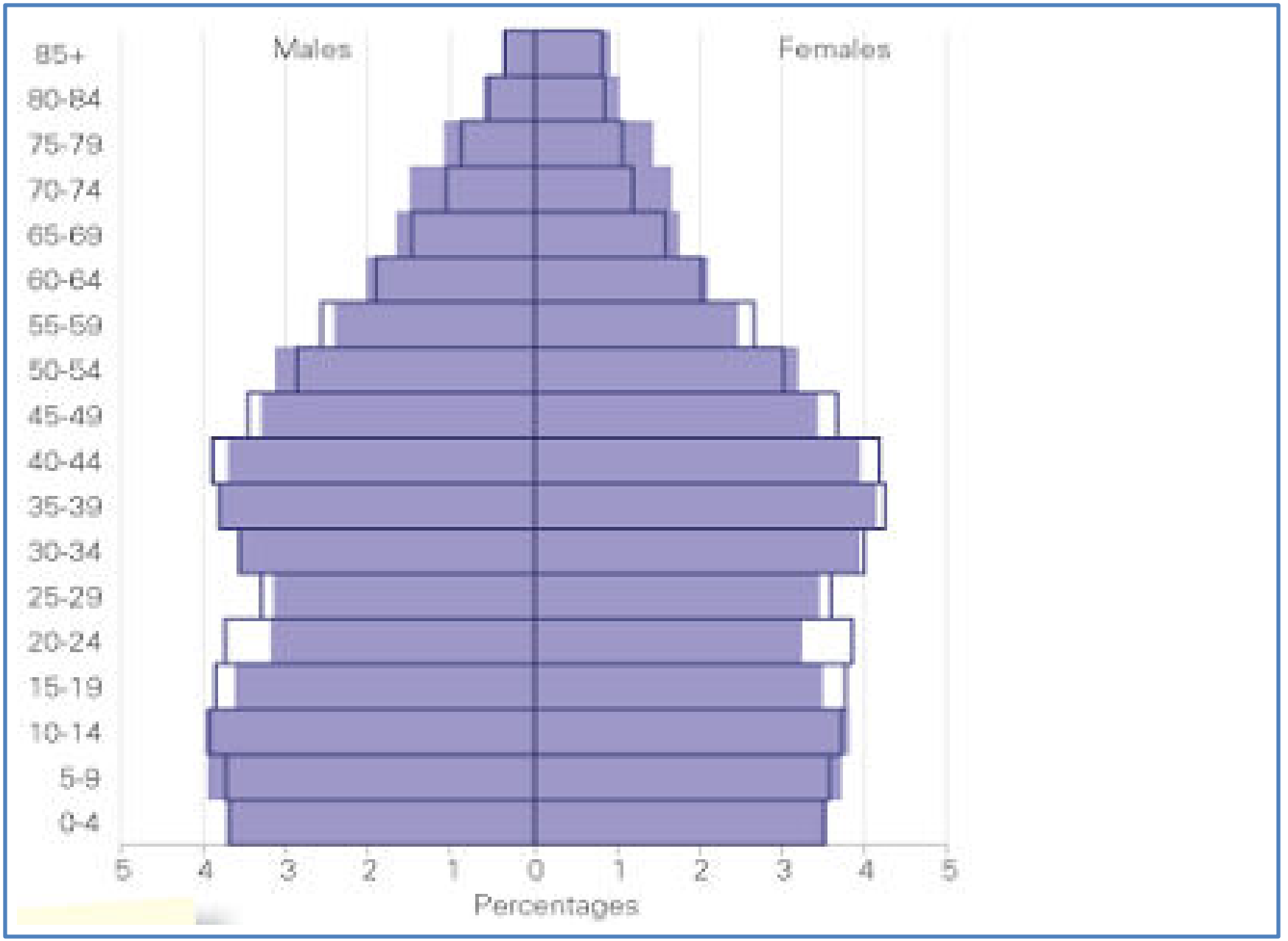
- **Age structure** is proportion of individuals of different ages within that population is.
- Proportion of active males and females in a population influence the population growth.


Death Rates for Infants (deaths per 100,000), by Gender.
Rate (per 100,000)
1500
1200
900
600
300
0
1429
1288
1142
1220
951
1083
856
844
690
807
663
777
700
619
Total
Male
Female
1979
1982
1985
1988
1991
1994
1997
2000
2003

Impact of Human Population Growth on the Environment:

- The rapid increase of **human population** is putting an incredible strain on our environment.
- Developed countries continue to pollute the environment and deplete its resources while developing countries are under increasing pressure to compete economically and their industrial advancements are damaging as well.

- One of the largest environmental effects of human population growth is the problem of global warming which will lead to rising sea levels and extreme weather conditions in the future.
- Many non-renewable resources are being depleted due to the unrestrained use of fuel and energy.
- Many parts of the world also suffer from a shortage of food and water.
- The huge population pressurizes and degrades the environment physically, chemically and biologically.


Males
Females
85+
80-84
75-79
70-74
65-69
60-64
55-59
50-54
45-49
40-44
35-39
30-34
25-29
20-24
15-19
10-14
5-9
0-4
5
4
3
2
1
0
1
2
3
4
5
Percentages

- The environment on earth is suffering from the growth of global population.
- The depletion of resources and biodiversity, the production of waste and the destroying of natural habitat are serious problems that must be addressed in order to ensure that life on earth will be sustainable throughout the next century.
- Effects of **human population growth** on our environment results:

(i) Generation of Waste:

- Due to the destructive activities of humans, wastes are dumping into the environment which causes degradation and the capacity of environment to absorb more waste is reduced.

Further, waste leads to air and water pollution.

(ii) Threats to Biodiversity:

- Due to his destructive activities, man has extracted more and more minerals from the earth.
- Animals have been hunted and plants have disappeared.
- There has been loss of biodiversity.
- These have led to ecological imbalance.

(iii) Strain on Forests:

- Man has established new housing colonies.
- National highways and hydropower projects have been built and forests have been wiped out.
- These destructive activities have increased and led to ecological imbalance.

(iv) Urbanization:

- Rapid growth of population has led to urbanization which has adversely affected environment.

- Due to population pressure, natural resources in the cities are depleted at a fast rate due to population pressure.
- Population does not have proper sanitation facilities and pure drinking water.
- As a result, the health of the people is adversely affected.

(v) Industrialisation:

- Underdeveloped countries are following the policy of heavy industrialization which is causing environmental degradation.
- The establishment of such industries as fertilizers, iron and steel, chemicals and refineries has led to land, air and water pollution.

(vi) Land Degradation:

- Intensive farming and excessive use of fertilizers and pesticides have led to over-exploitation of land and water resources.
- These have led to land degradation in the form of soil erosion, water logging and salination.

(vii) Transport Development:

- Environmental degradation is also due to transport development in the different parts of the world.
- The automobiles release huge quantities of poisonous gases such as carbon monoxide, nitrogen oxides and hydrocarbons.

(viii) Climatic Change:

- Climatic changes are irregular due to green house gases.
- The thin skin of air that surrounds the planet is being affected by human activities.
- Urban people are still being exposed to unaccepted levels of toxic pollutants.
- Further, forests are still being degraded by acid deposition generated by faraway industries and greenhouse gases continue to accumulate in the atmosphere.

(ix) Productivity:

- Environmental degradation not only harms health but also reduces economic productivity.
- Dirty water, inadequate sanitation, air pollution and land degradation which cause serious diseases on an enormous scale in developing countries like India.
- These, in turn, reduce the productivity levels in the country.
- Soil and hazardous wastes have polluted ground water resources which cannot be used for agricultural and industrial production.

- Soil degradation leading to soil erosion, drought, etc. have led to siltation of reservoirs and blocking of river and canal transport channels.
- Deforestation has led to soil erosion and consequent loss of sustainable logging potential.

(x) Technology:

- Presently, environmental pollution is caused by old technology which releases gases and pollutants causing chemical and industrial pressure on environment.