



# 13

## NATIONAL ENVIRONMENTAL ISSUES

By now you are familiar with the term environment. You are also aware that the environment has no geographical boundaries. Whatever damage is done to the environment at a place it affects nearby or even distant places. These effects show up immediately or slowly.

The explosive growth of the human population has been accompanied by rising expectations and increase in the standard of living. More food, more houses, more transport, more energy and more of everything is required. This growing human need has resulted in depletion of natural resources; deforestation, loss of biodiversity, water and energy scarcity, increasing exploitation of mineral resources etc. have led to the degradation of the environment. It is important to identify and address important issues to conserve and improve the environment. Some major national environmental issues such as land and forest management, water scarcity, energy, fast depletion of natural resources and many other will be discussed in the lesson.



### OBJECTIVES

After completing this lesson, you will be able to:

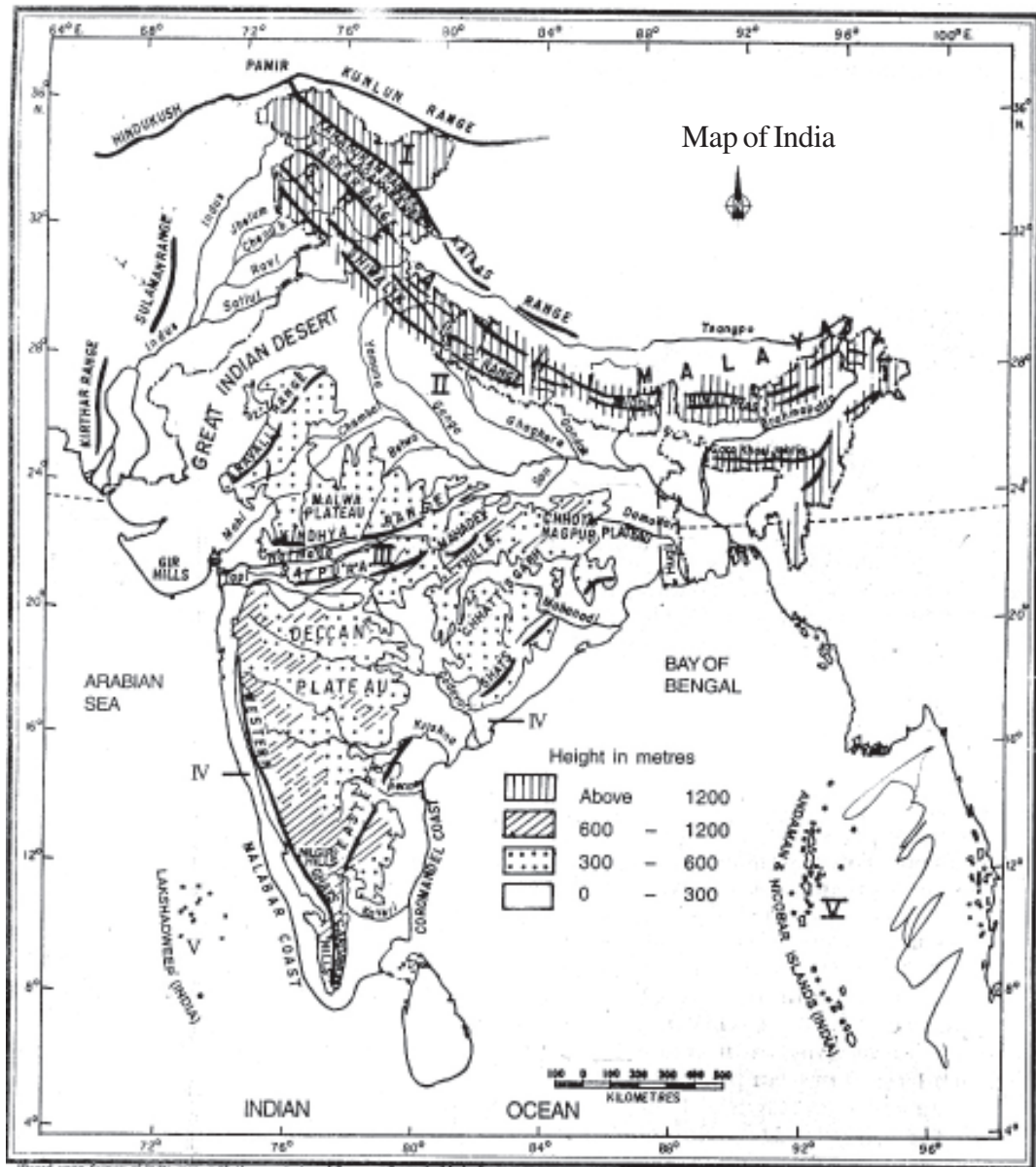
- *provide statistics of land and forests of India;*
- *define growth and analyze the shifts in population growth curves;*
- *analyse the demographic factors that influence the changes in human population;*
- *trace the pattern of human population growth;*
- *explain the impact of increasing human population on the environment;*
- *correlate urbanization with the changing environmental patterns;*
- *appreciate the importance of fresh water as a resource;*
- *describe the natural resource degeneration in terms of desertification, deforestation, soil-degradation and biodiversity loss in brief.*



**Notes**

**13.1 LAND AND FORESTS OF INDIA**

Our country occupies south central peninsula of Asia. India consists of the main land and two groups of islands Andaman and Nicobar in the Bay of Bengal and Lakshadweep islands in the Arabian Sea. The physical map of India (Fig. 13.1) shows the relief (physical features) and coastline of India. India has a total of about 32,87,263 sq. km of land and more than 7500 km long coastline. Being situated totally north of the equator, India belongs to the Northern Hemisphere. Though India is the seventh largest country in the world, it occupies only 2.42% of the world's total area.



*Fig.13.1: Physical map of India*



Notes

### 13.1.1 Land

India is characterized by a great diversity of physical features. In the North, there is a vast expanse of terrain, consisting of sedimentary and metamorphic rocks, a chain of lofty peaks of mountains, enclosing plateaus and deep and narrow valleys.

The surface of north Indian plains along the expanse of the river Indus, the Ganga, and the Brahmaputra is made up of alluvium. The northern plains are the granaries of the country. The peninsular plateau in the south is made up of igneous and metamorphic rocks. This peninsular plateau is rich in minerals. The coastal region, and the islands provide sites for fishing and port activities and oceanic wealth. In addition, the island groups have vast coral deposits, rich bio-diversity and are of great strategic importance for defence purposes.

### 13.1.2 Forests

A forest is a community of living trees or plants and associated organisms covering a considerable area, utilizing sun-shine, air, water and material from the soil to sustain and reproduce itself. Forests provide wood canes, gums, resins, dyes, tannins, fibres, medicines, food etc., to humans.

#### • Flora and fauna

India has very rich flora and fauna. It is home to about 8100 animal species and 49,000 plant species of which 15000 are flowering plants. Most of the Himalayan and peninsular regions are covered with indigenous flora. Some of them are totally endemic (local, not found elsewhere). The forests and the vegetation therein, is classified and determined by climatic factors such as temperature, heat, precipitation, soil, relief, drainage etc. The following major types of forests may be identified in India.

- i) Tropical rain forests
- ii) Tropical deciduous forests
- iii) Temperate broad leaf forests
- iv) Temperate needle – leaf or coniferous forests
- v) Alpine and Tundra Vegetation

You have already studied the details of the various types of forest in lesson 5 and lesson 9.

Table 13.1 provides data on covered areas under forests of different types.

**Table 13.1: Forest cover in India\***

Class of forest	Area in sq. Km	Percent of geographical area
Dense Forest	3,77,358	11.48
Open Forest	2,55,064	7.76
Mangrove	4871	0.15
Scrub	51,896	1.58
Non-Forest	25,98,074	79.03
Total	32,87,623	100.00

\* As per 1999 assessment done with the help of imageries produced by IRS-1B; IRS-1C and IRS-1D



Of the total forest cover in India, seven North-East states together have 25.7% followed by Madhya Pradesh (20.68%) and Arunachal Pradesh (10.8%).

**INTEXT QUESTIONS 13.1**

1. What does the statement, “some Indian flora and fauna are endemic”, mean?  
\_\_\_\_\_
2. Which part of India holds the ‘granaries’ and which part is mineral – rich?  
\_\_\_\_\_
3. List five major forest types of India.  
\_\_\_\_\_
4. Name any three materials that forest provide to us.  
\_\_\_\_\_

**13.2 POPULATION GROWTH**

The large human population issue is one of the most important issues of the environment. The human populations pose danger to the environment through two main factors: (1) the number of people and (2) the impact of each person on the environment. You know that in last 40 years world human population has doubled from 2.5 billion to more than 6 billion. In the same period in our country it has risen from 431 million to 1027 million.

Population is defined as a group of individuals living in the same given area and capable of interbreeding and sharing genetic material.

**Why study population?**

On economic terms a population constitutes both consumers as well as producers. It's study helps us to:

- provide data on the total manpower available now and in future;
- estimate the total amounts of goods/ services required currently and in future;
- to promote cultural/regional/linguistic harmony.

**13.2.1 Major periods of human population growth**

Through history, four major periods of human population growth worldwide can be traced:



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- (1) **An early period of hunters and gatherers:** At that time the total population was less than a few million.
- (2) **The period of rise of agriculture:** This period led to greater density of people and caused the first major rise in the human population.
- (3) **The industrial revolution:** This resulted in better food supply, improved healthcare which, in turn, led to rapid rise in the population, and
- (4) **The present:** When the population is slowing down in the wealthy and industrialized nations but is still growing rapidly in poorer and developing and underdeveloped nations.

On economic terms, population can be categorized as follows: if the resources of a region are more than adequate for its people, the region is called (i) **under populated** -If these are just enough, then the region is said to have (ii) **optimum population**. However, if the resources get overused and it is not possible to produce the same amount of goods or services for every individual of the region, the region is termed (iii) **over populated**.

Therefore, it is not only the number of individuals but also the quality of life of each of them in a region is very important. Disparities in such qualities are quite often the cause of social tension/ imbalances.

### 13.2.2 Demographic features

The study of various aspects of a population is called **demography**. The major parameters used for study of demography are size; growth; age structure; demographic transactions; fertility; birth rate; death rate; standard of living and growth rates and migration.

#### (i) Size

The size of the population is measured in terms of the number of persons of a region/ country. The population count by census 2001, by the Registrar General of India shows that India's population is 102 crore. The absolute rise in the last decade 1991-2001 has been more than 18 crores. Compare this when the absolute rise in 1901-1911 decade was just 1.36 crores

Are we as a Nation providing every individual essential goods/services? This is a very important environmental issue that our country faces today.

**(ii) Growth of the population:** The growth of population at different times can be expressed in terms of growth rates. The growth rate, that is the rate of change per 1000 individuals, determines the changes in population.

#### Calculation of growth rate of population

For the calculation of growth rates, we have to first calculate the birth rate and death rate.



**Notes**

We can calculate them as follows:

**Birth rate:** Rate at which births occur in a population

Let  $N$  = Total number of individuals in the population,  $B$  = Number of births per unit time by the total population 'N',  $b$  = birth rate

Then,  $b$  = Birth rate or Total no of individual added in the population  $N$  = number of births per unit time by the total population

$$b = \frac{B}{N}$$

**Death rate:** Rate at which death occur in population

Let  $N$  = Total number of individuals in the population

$D$  = Total number of deaths per unit time in the population 'N'

$d$  = death rate

Then,  $d$  = death rate – total number of individual in the population

$N$  Total number of deaths per unit time in the population

$$d = \frac{D}{N}$$

**(iii) Growth rate**

The growth rate ( $g$ ) is the result of the number of births **minus** the number of deaths per unit time divided by the total number of individuals in the population.

To calculate the growth rate,

Let  $B$  = total number of births per unit time.

$D$  = total number of deaths per unit time

$G$  = the difference between the total births and the deaths of the individuals per unit time.

$N$  = The total number of individual in the population.

$g$  = growth rate for that per unit time

then 
$$g = \frac{(B - D)}{N} \text{ i.e. } g = \frac{G}{N}$$

i.e.  $g = G/N$  or the difference between the total births and the deaths of the individuals per unit time. The total number of individual in the population

**(iv) Mortality**

Mortality refers to the death of individuals. In a population, members die due to various causes, such as, malnutrition, disease, old age, accidents, natural calamities and war etc. It is equal to death rate.

**(v) Natality**

Natality is an expression of the addition of new individuals in a population. It is equivalent to birth rate.

**(vi) Migration**

**Migration** means the movement of individuals of a population. The movement of the individuals out of one's own country is called **emigration**. Emigration may occur because of various reasons, viz: better job opportunities elsewhere; better education facilities elsewhere; illegal transfer; war; natural calamities; internal disturbances in the host country. For example, **emigration** of youth of our country to USA, New Zealand, Australia. The movement of individual from one region of a country into another region of the same country is called **internal immigration**. Does internal immigration affect the population size of the country?

*Table 13.2: Distribution of migration by reason (percentage)*

Reasons	1981		1991	
	Male	Female	Male	Female
Employment	1.9	31.8	1.8	27.0
Education	1.0	5.1	0.8	4.8
Family Moved	14.3	30.3	11.0	26.6
Marriage	73.4	3.3	76.1	4.0
Others	9.4	29.5	10.3	37.6
Total Migration (Crore)	14.52	62.5	16.78	64.3

The **internal migration (look at the table 13.2)** within the country is usually from rural areas to urban sector. The population in rural areas rise sharply as compared to urban areas. Lack of demand for labour for agriculture, increased job opportunities in cities and better education facilities in cities, better health care in cities, better living conditions are some of the key factors deciding internal migration from rural areas to urban areas. Why do you think that internal emigration from rural area to cities is a very important environmental concern in our country? (Hint: pressure on essential resources; slums)

**Exponential growth rate**

Whenever something increases in such a way that the increase is a fixed proportion of its own size at any time, the increase is called **exponential**.

Population growth of human beings also follows the same pattern as seen for bacteria (See box and Fig. 13.2), you would find similar J-shaped curves in both bacteria and human growth rates. You shall also note the decrease in time it took to add each additional billion

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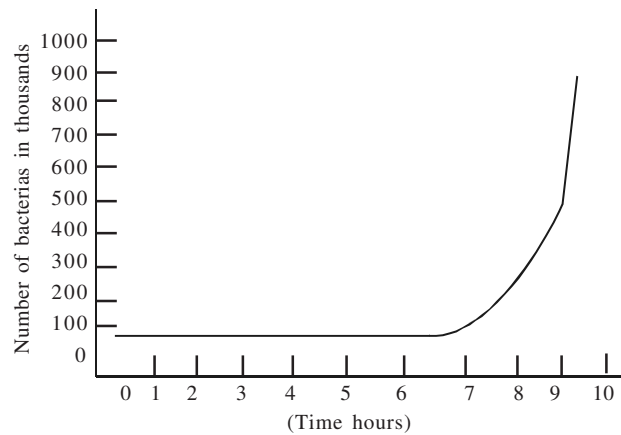
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in human population. It took thousands of years to reach a billion of human population. It took, further, 130 years to reach 2 billions, only 30 years to reach 3 billion, and only 11 years to add another billion (Fig. 13.3). When the population approaches the full carrying capacity (the capacity sustain itself at equilibrium), the growth rate decreases and the growth changes from J-shaped curve to S-shaped curve. (Sigmoid curve).

When bacteria divide every 30 minutes, their number increases exponentially. This set of figures assumes a zero death rate, but even if a certain percentage of each generation of bacteria died, exponential growth would still occur, it would only take a bit longer to reach the high number. When data is graphed, the curve of exponential growth has a characteristic “J” shape.

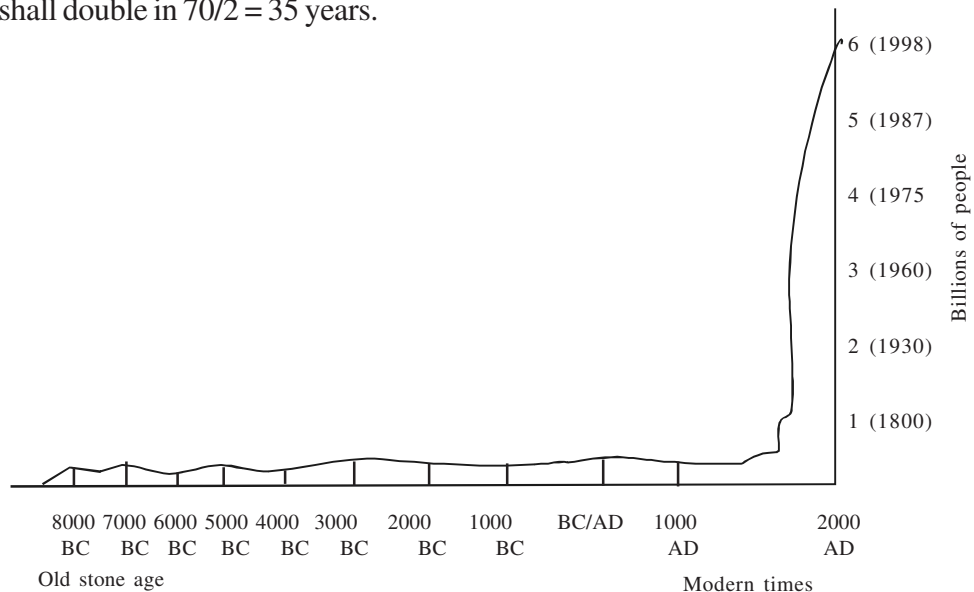


**Fig. 13.2:** Exponential growth in bacteria

If we know the growth rates in percentage for years, we can easily calculate/predict the time ‘t’ in years for a population to double by using formula

$$T = 70/\text{annual growth rate in percentage}$$

For example: If a population is growing at the rate of 2% annually, the population shall double in  $70/2 = 35$  years.



**Fig. 13.3:** The human population has been increasing exponentially from the New Stone Age to the present. It also represents a J-shaped curve.





## INTEXT QUESTIONS 13.2

1. Define population

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2. List four major periods of human population growth

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3. List major parameter for the study of demography

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4. Define exponential growth

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5. Why internal migration within a country does not affect its total population size? What kind of migration does affect the population size of a country?

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## 13.3 STRUCTURE OF POPULATION

In population studies, the structure of a population is determined by certain characteristics such as population density, dispersion, age structure and sex ratio. Let us understand these terms.

### 13.3.1 Density

Density represents the number of individuals of a species inhabiting a unit area. It reflects the success of a population. The complete count of the individuals in an area is called **census**. Such censuses have been regularly conducted in our country. The last census was completed in the year 2001. The process for Census 2011 has already been initiated. The density map of India is shown in fig. 13.4. Some countries with higher density than India are: Japan (332 sq km<sup>-2</sup>), The Netherlands (456 sq Km<sup>-2</sup>), Bangladesh (915 sq km<sup>-2</sup>), islands of Malta (1163sq km<sup>-2</sup>). Why should the density of population be of some concern to us? Look at the table 13.2 and box 13.2 to appreciate the problems associated with increased population density.




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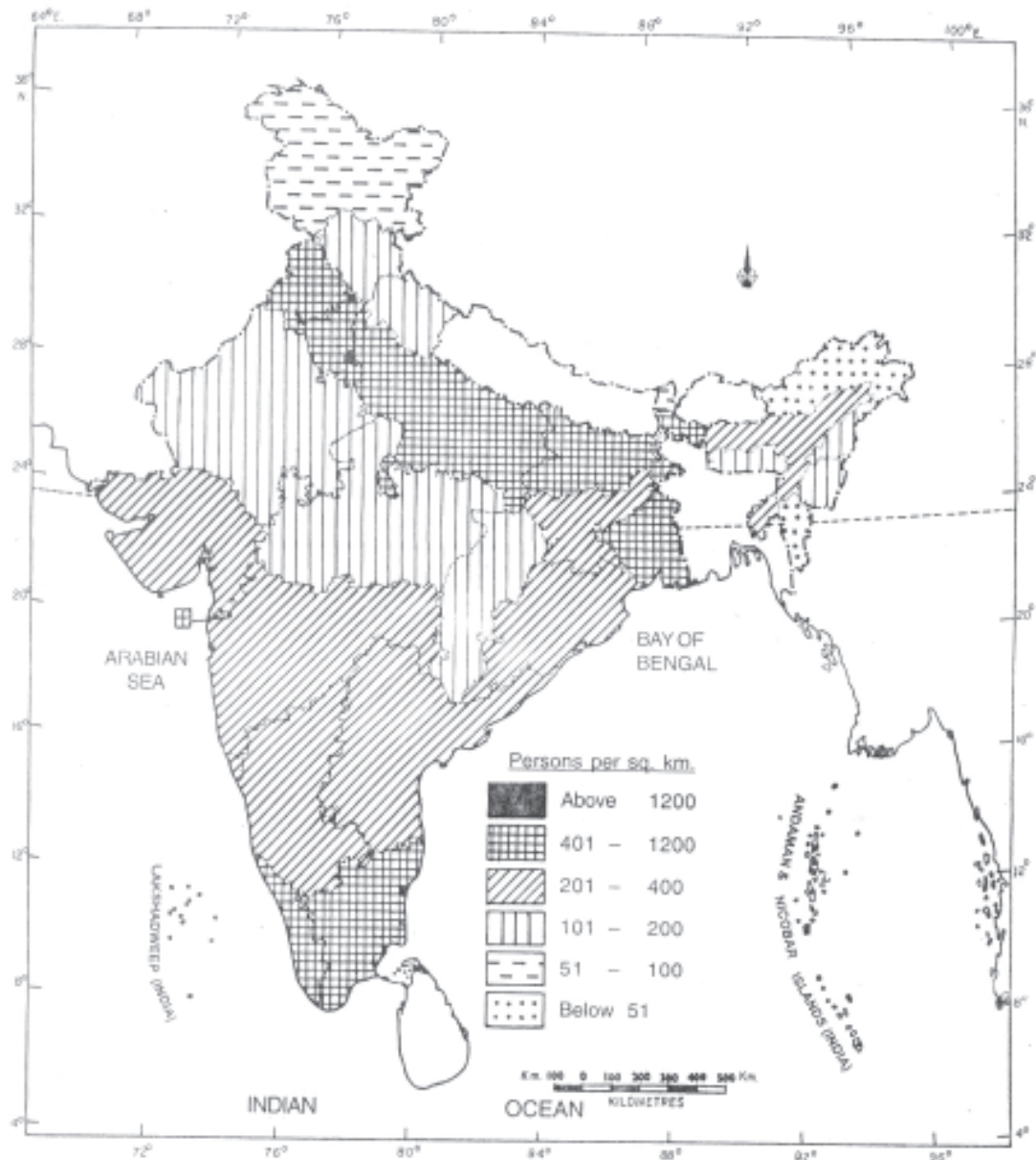
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*Fig. 13.4: Density Map of India as per census 2001*

#### **Box-13.2**

The problems arising out of increase in population density are very alarming. Some of them are:

- per capita income decreases;
- basic needs of life can become limited;
- available natural resources such as water, land, fuel decreases;
- shortage of essential goods results in rise of prices;



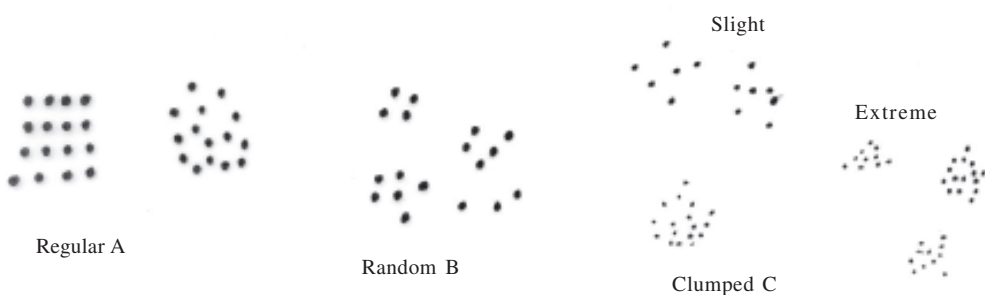
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- non-availability of essential goods leads to disparity/interest;
- land mass used for housing/industry;
- agricultural space decreases;
- fall in farm output as well as decreased forest cover;
- lack of balanced diet to all the members of the family; leading to malnutrition; loss of efficiency, increased susceptibility to disease;
- increased demand for healthcare services;
- fall in job ratio leading to unrest;
- lack of adequate educational facilities, lowering of standards, increased number of uneducated people;
- severe stress on sanitation; increased pollution of air, water and soil
- overall harmful effects on human health.

### 13.3.2 Dispersion

Dispersion pattern of a population is the dispersion of its individual members relative to one another in a given area. For example, human population, it is not uniformly dispersed. Only one third of the total land area is inhabited by humans. Even out of this one-third, some areas are thinly and others are very heavily populated. (Fig. 13.5)

The distribution variation depends on availability of the requirements of life. About 56 percent of world population resides in Asia. Prepare a dispersion map for your locality. (Expand this activity)



*Fig. 13.5: Dispersion patterns in population in clumped, clumps may themselves be regularly or randomly dispersed*

### 13.3.3 Age structure

In a population, individuals are of different ages. The proportion of individuals in each age group is called **age structure** of that population. Look at the age structure of India in fig.13.6 and table 13.3.

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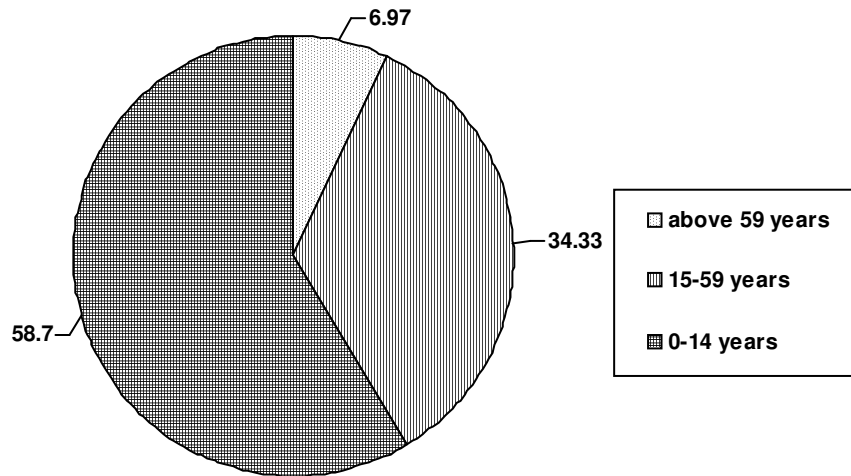
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*Table 13.3: Age structure of population by selected groups (per cent)*

Group	Age group	1911	1921	1931	1961	1971	1981	1991
Children	0-14	38.8	39.2	38.3	41.0	41.4	39.7	36.5
Adults	15-60	60.2	59.6	60.2	53.3	54.4	54.1	57.1
Old	60+	1.0	1.2	1.5	5.7	5.2	6.2	6.4



*Fig. 13.6: Age Structure of Indian Population*

Box 13.3 provides you information as to why study of age structure is so important.

Study of age structure is important because:

It provides

- current and future status of age profile;
- possible effects on environment;
- insights in to population history;
- available and future work force (15-59 years)/manpower;
- status of elderly people needing social support, now and in future;
- projection for current, future educational needs;
- projection for job needs
- projection for medical/social/housing/healthcare needs;
- economic status of the society.

### 13.3.4 Sex ratio

Ideally there should be a balance in number of males and females in a population. However, in Nature, there are more male births than female births. If there is no discrimination on the



part of the society, the sex ratio of a population should remain more or less constant or balanced. Any deviation from this balance is not desirable for the population. In our country, there were 972 females per every 1000 male (i.e. sex ratio is 972) in 1901. By 2001, the sex ratio has fallen to 933 to every 1000 male. There are, however, very sharp regional differences. For example: in Kerala and Pondicherry, the sex ratio is 1058 and 1001 respectively, it is very poor in Delhi(821), Haryana (861), Punjab (874), Chandigarh (773). What is a poor sex-ratio with much fewer women compared to men suggestive of? (Hint: discrimination against female child, social presume, female feticide etc.)

*Table 13.4: Sex Ratio of Indian Population during past century*

Year	1901	1911	1921	1931	1941	1951	1961	1971	1981	1991	2001
Sex Ratio	972	964	955	950	945	946	941	930	934	927	933



### INTEXT QUESTIONS 13.3

1. Name atleast three countries which have higher density population than India.  
\_\_\_\_\_
2. Prepared a dispersion map of your locality.  
\_\_\_\_\_
3. Why is age structure data of a population so important.  
\_\_\_\_\_
4. What does poor sex-ratio of a state / country suggestive of?  
\_\_\_\_\_

## 13.4 HUMAN POPULATION AND THE ENVIRONMENT

Human beings are part of the environment and important components of biosphere. Like any other living organism humans exchange materials with the surroundings. Besides this give and take from the environment, human influence on other life forms and ability to change and control the environment to some degree, has affected the global environment drastically. Hence, one can say that humans population and human activity has immense impact on the environment.

### 13.4.1 Impact on environment

Human activities have had lasting impact on the environment. Some of such activities that have modified or degraded the environment are:

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- ability to produce food through agriculture.
- transfer excess food to regions of food shortage.
- store excess food in warehouses, cold storage and canneries, thereby preventing food-deterioration.
- impressive and innovative efficiency of energy utilization has caused shift from wood energy to fossil energy to electric energy to atomic energy.
- ability to provide shelter for self (housing), elderly and the young, protection against for unfavourable weather or enemies.
- ability to destroy animal enemies e.g. lions, tigers, wolves, snakes, rats, mice, household insects etc.
- ability to reduce competition from other animals by fencing crops and live-stock.
- reducing the mortality rate by controlling a number of life threatening diseases through proper sanitation, medication, immunization etc.

In spite of all the intelligence at its source, human beings have not been able to conquer the environment completely. Natural as well as human-made modifications in the environment have, through various periods, offered fatal blows to the human population. Some such problems confronting us are:

- (1) **Food shortage or famine:** It could be because of less agricultural production; transfer of agricultural land for utilization; improper and inadequate storage, transport- facilities; economic poverty to purchase food etc.
- (2) **Inadequate shelter:** Every individual is not provided with safe shelter and is exposed to extremes of high and cold temperatures of atmosphere, and falling prey to tigers, lions, wolves, leopards, rats, snakes etc.
- (3) **Diseases :** Malnutrition, inadequate sanitation, lack of medical facilities, increased susceptibility to disease especially among young and old, as well as invasion and mutation of the pathogens leads to epidemic/fatal attacks of bubonic plague, malaria, yellow fever, typhoid, tuberculosis, HIV-AIDS, dengue, influenza etc.
- (4) **Calamities:** Natural calamities such as floods, cyclones, earthquakes, volcanoes, tsunami, avalanches etc. uproot human settlements and damage property.
- (5) **Miscellaneous:** Various mostly human-made, accidents involving explosions, fire, pollution, ship wrecks, air and road accidents wipe out lives.

Thus, you should be able to imagine the tussle between man to change environment to his liking and the environment striking back in one form or the other.

If, humans are able to interact with the environment judiciously, an environment friendly life can be led by them.



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### 13.4.2 Standard of living

A population is also characterized by certain parameters, such as:

- life expectancy (should be high)
- infant mortality rate (should be low)
- income per head (should be high)
- literacy (maximum of individuals be literate)
- consumption of food, natural resources (should be balanced)
- kind of energy used (eco-friendly)
- eco-friendly activity.

Such parameters decide the standard of living of a population. The developed rich countries have better standard of living and underdeveloped, poor countries have a poor standard of living.



### INTEXT QUESTIONS 13.4

1. Enumerate atleast three human activities that cause lasting impact on the environment.  
\_\_\_\_\_
2. List three parameters that characterize the standard of living of a population.  
\_\_\_\_\_
3. When we modified environment, what are the problems generally failing by us?  
\_\_\_\_\_

## 13.5 URBANISATION AND ENVIRONMENTAL PROBLEMS

With economic development comes urbanization and with urbanization comes destruction of the environment.

### What happens when cities grow?

Urbanization causes environmental and social upheaval. Some of them are listed in box 13.4 and 13.5.

**Notes****Box 13.4 Urbanisation and environmental degradation**

- Since cities are located near rivers, along coastlines, the expanded urban inhabitants often overtake the good agricultural land for housing, industry etc.
- Loss of such an important and delicate habitat effects many rare and endangered species.
- Forests are cut.
- Wetlands are filled with soil.
- Soil is removed from productive use.
- Many hazardous materials are released into surroundings.
- Air, water and soil are polluted.

**Box 13.5 Urbanisation and socio-economic factors**

- Population is redistributed;
- Peasant society changes to factory/business dependent community;
- Automobiles/industries pollute air;
- Civic amenities are unable to cope with increased sewage disposal;
- Poor sanitation leads to water and soil pollution
- Poor sanitation breed pathogens/vectors resulting in rise of communicable diseases;
- Over crowding, unemployment lead to unbalanced urban life which causes, in turn, a number of social evils.

The urban population in our country has grown 11.1 times over the last century. From 254 lakh in 1901 to 2850 lakh in 2001. In relative terms the rural and urban population ratio has decreased from 8.1:1 to 2.6:1. During the same period. Presently, 27.8 percent of the Indian population is urban. During the period 1991-2001, 678 lakhs people were added to the urban population (Census of India 2001; The figures exclude the population of Jammu and Kashmir and Assam).

**13.5.1 Urbanization and limited energy resources**

Energy is a critical input for most of the production processes and consumption activities. With urbanization comes increased need for energy sources. In last sixty years we have had more than four-fold increase in total energy use for less than one-third rise in the population. However, the commercial activity has shown a 10 fold rise during the same period. This shows that the bulk of non-commercial energy use has had shifted to commercial use (mostly, due to urbanization). Of the various sectors that use commercial energy around 70-75% is consumed by industry and transport.





Our country has three major kinds of generating plants: hydroelectric, thermal and nuclear. They roughly contribute about 21%, 75% and 4% of our energy requirement. As of now, non conventional resources of energy such as solar, garbage, wind are negligible and insignificant. With growing population and increasing rural migration to cities, our country must cope with increased energy requirement. Production of energy is very costly. At individual levels prevention of wasteful expenditure of energy can contribute to national cause.

India is world's 6<sup>th</sup> largest energy consumers accounting for 3.4% of global energy consumption. This demand is growing at an average of 3.6% per year over past 30 years.

Although India generated 680 billion kwh of power during the year 2006, about 5000 million Indians still have no access to electricity. As compared to the world's average of 2200kwh per capita power consumption, in our country the per capita power consumption is about 600 kwh. The total demand for electricity in India is expected to cross 9,50,000 MW by the year 2030.

If we have to succeed as a nation, we must attain the capability to either generate or purchase the required per capita power consumption comparable to a developed, industrialized country. In the mean time, we must optimize the use of the power available and minimize the wasteful expenditure. What measures do you suggest to save the wasteful expenditure of energy?

### 13.5.2 Urbanisation and scarcity of water

Regular supply of water on earth is maintained through its circulation in the atmosphere. Precipitation of water vapour, in the form of rain, snow, dew, hail etc. is the main source of water in the environment. Water vapours present in the atmosphere, in turn, come from the water bodies such as lakes, streams, oceans, ponds, moist earth as well as from living organisms.

Of the total water present on the earth, oceans have 97% and only 3% of total water is available as fresh water.

Water on earth is classified into following three types:

- a) Fresh water: It is inland water and its salt content is less than 5 ppt or 0.5%;
- b) Marine water: It occurs in seas, oceans and its salt content is more than 35 ppt or 3.5%.
- c) Brackish water: It's salt content is more than 5 ppt but less than 35ppt. It is present in estuaries, salt marshes and salt lakes. A lot of underground water in Rajasthan, Gujarat, Haryana and Punjab is brackish.

With rapid population growth and rising migration from villages to cities, expectation for better life, the natural resources of our earth face even increasing pressure. Along with air



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and land, water especially the fresh water resource is the one that we must protect for our own survival. Of all the 3% fresh water resource that we have glaciers and ice-caps account for about 2%. The rest of the fresh water is beneath the earth surface. Rivers and lakes contain only 1/5<sup>th</sup> of the total 1% of earth's fresh water (i.e. about 37 million km<sup>3</sup>).

The ultimate source of this water is rainfall. India receives about 2750 km<sup>3</sup> of rainfall per year. About 600 km<sup>3</sup> of it seeps into the ground and about 900 km<sup>3</sup> evaporates water vapour back into environment. Can you imagine how precious is our fresh water resource?

As per 2001 census India's population is 1027 million. It is expected to rise and stabilize around 1640 million by the year 2050. The gross per capita water availability in year 2001 was ~1820 m<sup>3</sup>/yr. By the year 2050 the per capita availability of water is expected to decline to as low as ~1140 m<sup>3</sup>/yr. The total water requirement of the country for various activities around the year 2050 has been assessed to be 1459 km<sup>3</sup>/yr. The current availability is about 500km<sup>3</sup>/yr. It is apparent that by the year 2050 our water availability has to be trebled.

The scarcity of urban water is due to:

- (i) **Careless attitude:** Release of untreated sewage and other waters into rivers and lakes;
- (ii) **Lowering of water table:** Due to excessive pumping of ground water;
- (iii) **Waste in agriculture:** Water is lost due to seepage or evaporation during irrigation and poor water management practices;
- (iv) **Increase in water demand:** Due to increased urbanization and increased population and increase in per capita water consumption.
- (v) **Water pollution:** Pollution of ground water by nitrates, fertilizers, toxic chemicals, sewage, industrial effluents, domestic wastes etc.

To meet the growing requirements of water, it is imperative not only to develop the new water resources but also to conserve, recycle and reuse water whenever or wherever possible. It has also been shown that conservation of water through rain water harvesting and artificial ground water recharge can generate about 125km<sup>3</sup>/yr of additional water. Augmentation of existing water supply through desalination of sea water in an additional possibility.

Similarly, recycling of municipal and industrial waste water can, regenerate another 177km<sup>3</sup>/yr water.

How does the water gets polluted? Can you imagine? Drinking, bathing, swimming, recreation, irrigation, all require good, uncontaminated, potable water. Domestic effluents too cause water pollution. It develops foul smell and create unhygienic condition in the surrounding affecting our health. In most of our cities and towns, the liquid waste produced



daily in kitchen, bathroom and toilet are discharged directly or indirectly without any treatment, into rivers or any other water bodies.

Even in our cities only half of the population has access to sewage system. Therefore, raw sewage affluent are discharged into fresh water bodies. The conditions in the villages is not better.

Such domestic wastes (effluents) contain pathogens that cause various viral, bacterial and other parasitic diseases. Cholera, dysentery, typhoid, jaundice, worm-related diseases affect the health of the population.

House–hold effluents are also rich in nitrates and phosphates (from laundry detergents). These deteriorate the water quality and promote growth aquatic organism making water unfit for human consumption.

Therefore, India as a nation has to now initiate action on all fronts for developing its water resource. Can you imagine the consequences for not meeting this challenge in the next few decades? Our well-being depends on combined efforts of all citizens of the nation?

### 13.5.3 Flood and drought

Floods and drought are also important events connected with water that affect our lives.

**Flood:** Flood is a body of water that covers normal dry lands. Consequences of most floods are as follows. They -

- destroy homes and valuable property.
- carry top fertile soil, leaving the land barren.
- destroy both food and cash crops.
- cause huge losses to human –lives and cattle.
- cause landslide in the hilly-areas.
- cause dam burst.

How the flood occurs? Floods occur when there is too much rain. Heavy rains cause flash-floods. Sudden melting of ice also results in flood. In deserts the floods are caused by thunderstorms. Certain human activities such as deforestation and over-intensive farming are also the causes of flood.

Floods along the sea-coasts are caused by hurricane, cyclones or development of low pressure zones in the atmosphere. Floods can be controlled by building dams to store water; planting trees on eroded land and by building dykes, flood walls, hurricane-barriers along the coast line.

Floods, however can be controlled by proper planning involving (a) storage of water when it is in plenty; (b) migrating people from the affected areas; (c) storing plentiful stocks

**Notes**

of food and fodder during good times; (d) cloud seeding; (e) proper and effective watershed/catchment area management' (f) afforestation etc.

**Drought**

Drought is the condition that results when the average rainfall for an area drops below the normal amount for a long time. The consequences of drought are:

- streams/ponds/well dry up;
- water supply for agriculture, industry, personal use is greatly reduced;
- dry top soil is blown away by hot, dry winds;
- livestock die;
- increase susceptibility to vulnerable diseases especially diarrhoea.

**13.6.3 Urbanisation and Pollution**

With urbanization population gets unevenly dispersed.. This results in unbalanced demand for resources and even unbalanced release of harmful matter into the surroundings. Such harmful and often hazardous material comes from industrial, domestic, transport, vehicles etc. When released, they severely affect the soil, water and air. The management of pollutants is discussed in detail in lesson-10 pollutants can prove to be dangerous to human beings and other organisms.

**13.7 NATURAL RESOURCE DEGRADATION**

Deforestation, desertification, soil degradation and biodiversity loss are all closely related phenomenon. Urbanization and unsustainable development has largely been responsible for these events. Varied aspects about them are discussed in detail in the next lesson.

**INTEXT QUESTIONS 13.5**

1. How does one classify water as fresh, brackish or marine?  
\_\_\_\_\_
2. List four major causes those results in scarcity of fresh water in urban areas?  
\_\_\_\_\_
3. How do the improper sewage system in the cities affect quality of water?  
\_\_\_\_\_
4. Define flood. How does it affect human lives?  
\_\_\_\_\_



Notes

5. List three preventive methods to over come the miseries caused by flood.  
\_\_\_\_\_
6. Name three major kind of energy generating plants in our country. What are their relative contributions towards our electric energy needs?  
\_\_\_\_\_
7. List some of measures that you would adopt to prevent the wasteful expenditure of electrical energy in your household.  
\_\_\_\_\_
8. How does urbanization leads to pollution?  
\_\_\_\_\_



### WHAT YOU HAVE LEARNT

- India exhibits a great diversity of relief and physical features. Its people, land, forests, oceans constitute abundant natural resource.
- Human population study both as consumer as well as producers help us to provide data for economic planning, conservation of nature, promotion of cultural, regional and linguistics harmony.
- Study of population is called demography. Demography helps to know about size, growth rates, mortality, natality, migration patterns, density, dispersion, and age structure of the population..
- People shift from rural areas to urban cities for better education, prosperity, better health care, and overall increased standard of living, but however urbanization in itself results in large-scale environmental damage such as river-flood plains, coastal wetlands and resultant loss of delicate habitats; deforestation, desertification, loss of biodiversity, contribute towards pollution of air, soil, water leads to scarcity of water and increased energy consumption.
- We all must try to protect and improve our delicate environment.



### TERMINAL EXERCISE

1. “Environment has no geographical boundaries” Explain.
2. How does increase in population leads to depletion and degeneration of natural resources?

## MODULE - 4

### Contemporary Environmental Issues



#### Notes

3. List major environmental issues that confront us?
4. Enumerate the various climate factors that determine vegetation of a region?
5. Look at the figure 13.2 and answer the following questions:
  - a. What kind of forest-type dominate Western India?
  - b. Which region of our country has alpine/tundra vegetation?
  - c. Which kind of forest type is maximally distributed in India?
  - d. In which part of the country tropical rain-forest found?
6. Define: Death rate, birth rate, natality, mortality, growth rate, migration.
7. When would a region be called over populated?
8. Draw the population curve and explain the different phases of the curve?
9. Define census. How does this help a country?
10. Why should the sex-ratio of a population remain more or less constant/balanced?
11. Discuss urbanization and social-economical factors.
12. Visit the various house-holds in you locality (a) and interact with people, interview them and prepare status of energy/water requirement/need and availability. (b)What measures would you propose at local level so that wasteful expenditure of energy and water is avoided?
13. (a) List as many as possible the harmful and hazardous materials from different sources that occur/accumulate in your locality and (b) Suggest measures to minimize this kind of pollution in your locality.
14. Differentiate between floods and drought.
15. List four diseases caused by contaminated home discharged water.
16. How is regular supply of water is maintained on earth?



### ANSWER TO INTEXT QUESTIONS

#### 13.1

1. Those plant and animal species that are local i.e. not found anywhere else.
2. The northern plains (granaries) and peninsular plateau (mineral rich)
3. Tropical rain forest, tropical deciduous forest, temperate broad leaf forests, temperate needle leaf or coniferous forest alpine and tundra vegetation



4. Wood, gums, dyes, tannins, fibres, medicines, food (any three)

**13.2**

1. As a group of individuals living in the given area and capable of inbreeding and sharing genetic material.
2. Hint: 13.2.1
3. Size, growth, age-structure, fertility, birth rate, death rate, standard of living, Migration etc.
4. Growth at a constant rate of increase per unit time is termed as exponential growth.
5. Because it is still within a country; emigration, and immigration.

**13.3**

1. Hint: Box 13.2
2. Japan, Netherlands, Bangladesh, Island's of Malta.
3. Hint: 13.3.2
4. Hint: discrimination against female child, social pressure; female foeticide, etc.

**13.4**

1. Refer: 13.4.1
2. Refer 13.4.2
3. Provide analytical answer.
4. Provide analytical answer.
5. Provide analytical answer.

**13.5**

1. Salt content <5 ppt: Fresh water  
Salt content >5 but more than <35 ppt Brackish water  
Salt content >35 ppt: Marine water
2. Careless attitude, waste in agriculture, lowering of water table; increase in demand; water pollution.
3. Hint: a) domestic effluents contain pathogens that cause diseases.  
b) effluent contain nitrates and phosphates; these help growth of aquatic organisms; make water unfit for human consumption.

## MODULE - 4

### Contemporary Environmental Issues



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#### Notes

4. Hint: See section 13.5.3
5.
  - i. Improper water, storage capacity.
  - ii. Migrate people to safer places.
  - iii. Store enough tool and fodder in good times
  - iv. Aggressive afforestation
  - v. Effective /proper water shed/catchments area management
6. Hydroelectric (21%), Thermal (75%), Nuclear (3%)
7. Refer to text
8. Hint: refer section 13.6.