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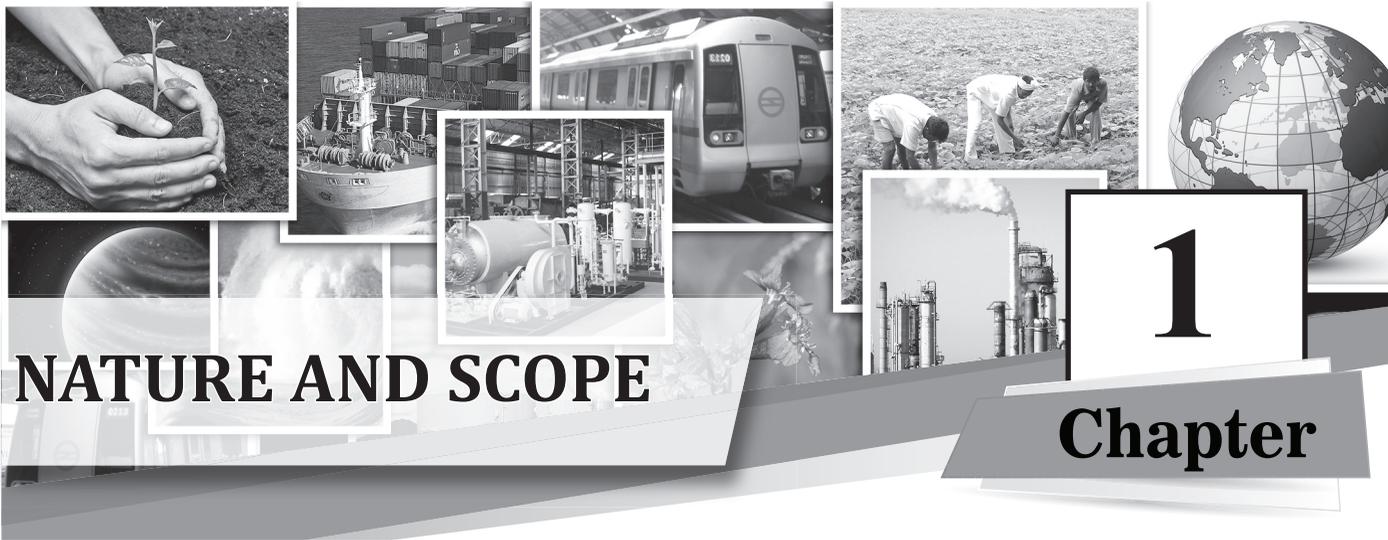
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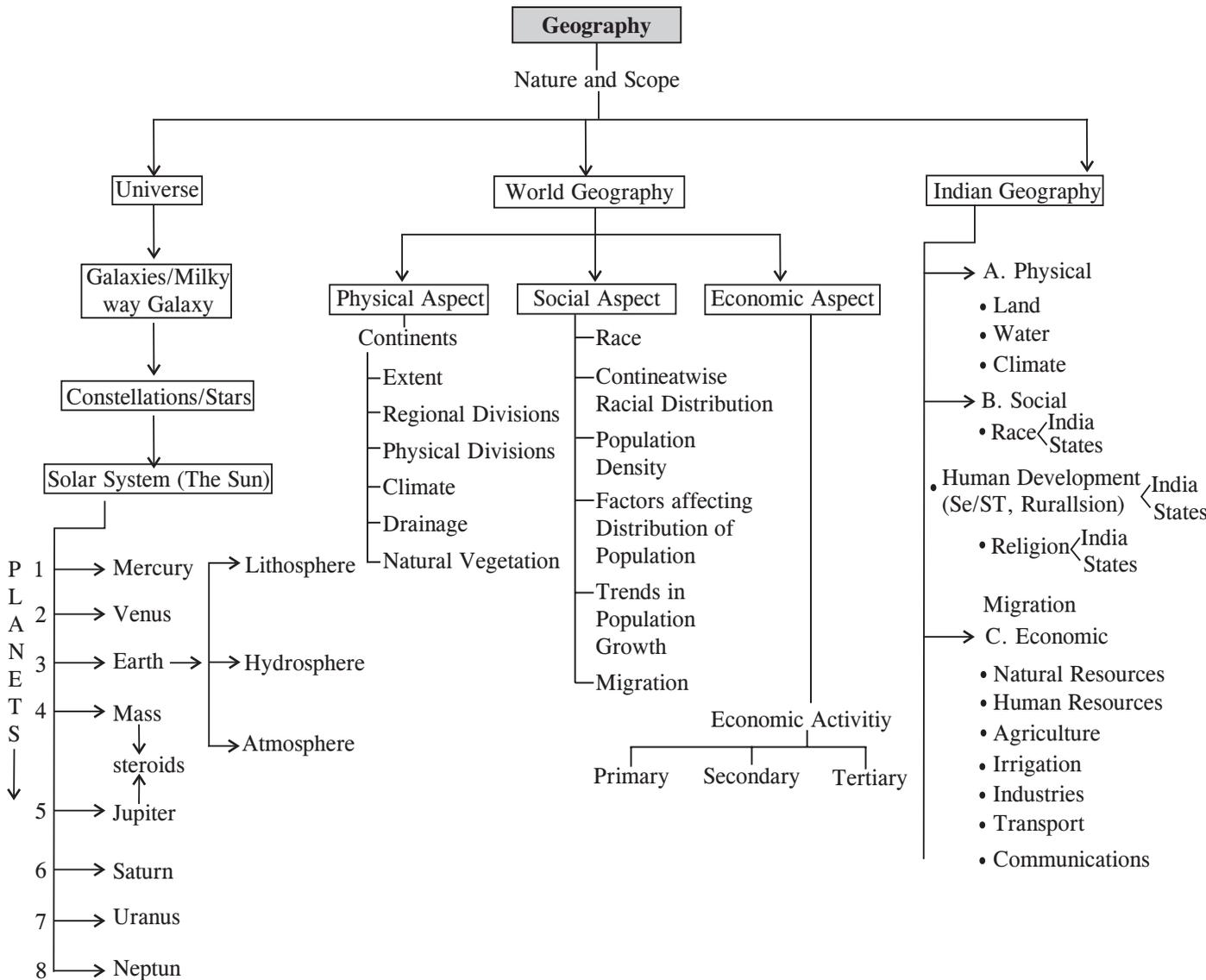
GEOGRAPHY

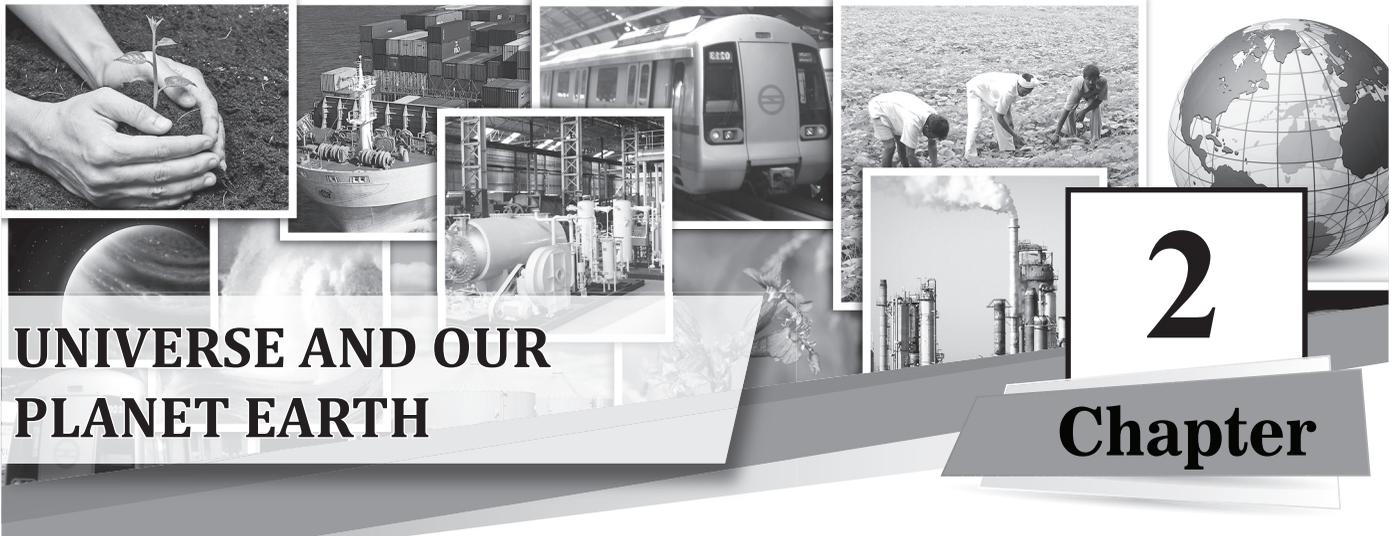


NATURE AND SCOPE

1

Chapter



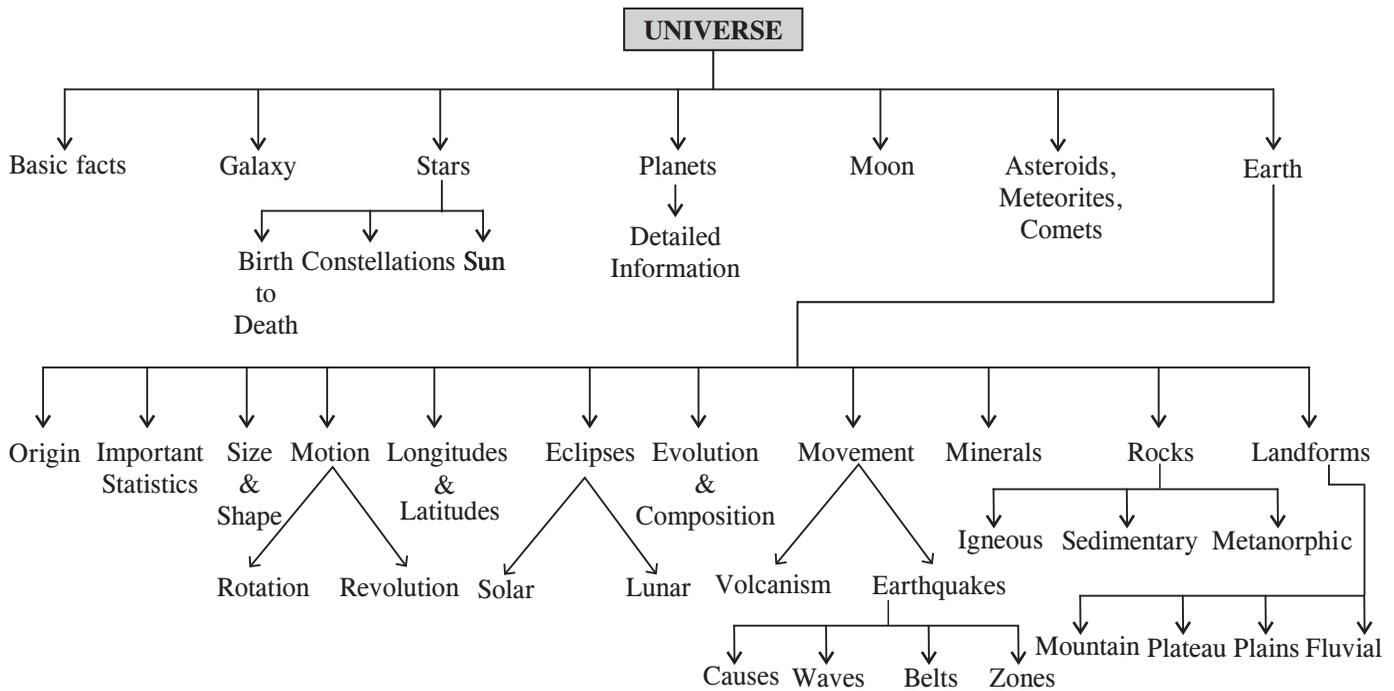


UNIVERSE AND OUR PLANET EARTH

Chapter 2

Introduction

Astronomy is a science that asks fundamental questions about the very basic of things, the universe. The **Universe** is all of time and space and its contents. The Universe includes planets, stars galaxies, the contents of intergalactic space, the smallest subatomic particles, and all matter and energy. The observable universe is about 28 billion parsecs (91 billion light-years) in diameter at the present time. The size of the whole Universe is not known and may be either finite or infinite. Observations and the development of physical theories have led to inferences about the composition and evolution of the Universe.



UNIVERSE

- Everything that exists, from the Galactic Megaclusters to the tiniest subatomic particles, comprises the **Universe**.
- As for the **age of Universe**, scientists agree that it is about 13.79 billion years old as 2015.
- The universe comprises of a number of galaxies.
- Optical and radio telescope studies indicate the existence of about 100 billion galaxies in the visible universe.
- The Big Bang Theory is most accepted for the origin of Universe in comparison to the Steady State and the Pulsating Universe Theory.



HYDROSPHERE

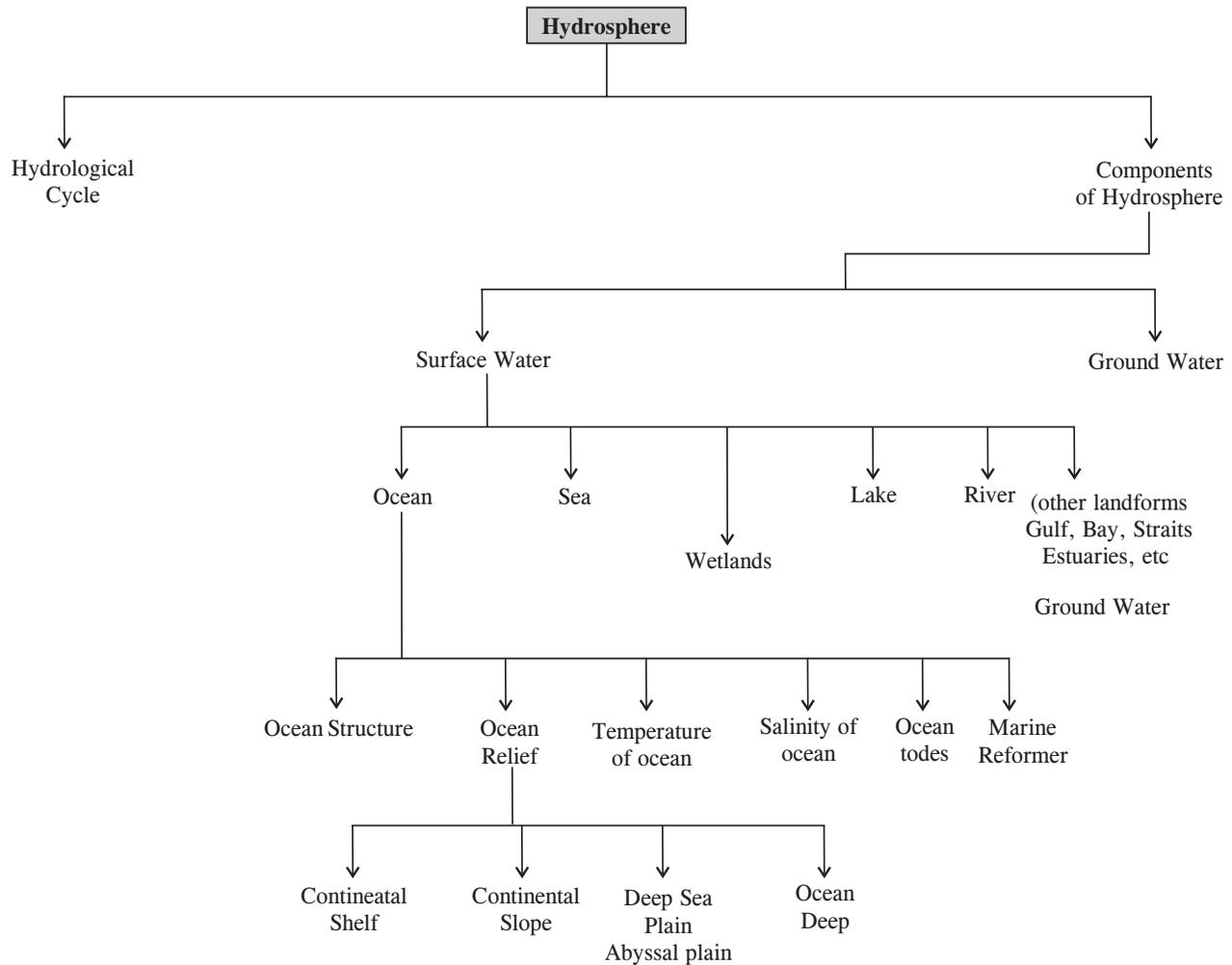
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Chapter

Introduction

Hydrosphere refers to the total amount of water present on or under the surface of a planet. Around 70% of the earth surface is covered by water and it is present in all the three state of matter, i.e. solid as glaciers and ice caps, liquid in the form of oceans, seas, lakes and rivers and gas in the form of cloud, and water vapour. Hydrosphere plays significant role in the biosphere as :

- It has the ability to dissolve almost everything.
- It has the potential to store heat for quite a long period of time.
- It nourishes the organism.
- It helps to maintain the flow of elements in the biosphere.



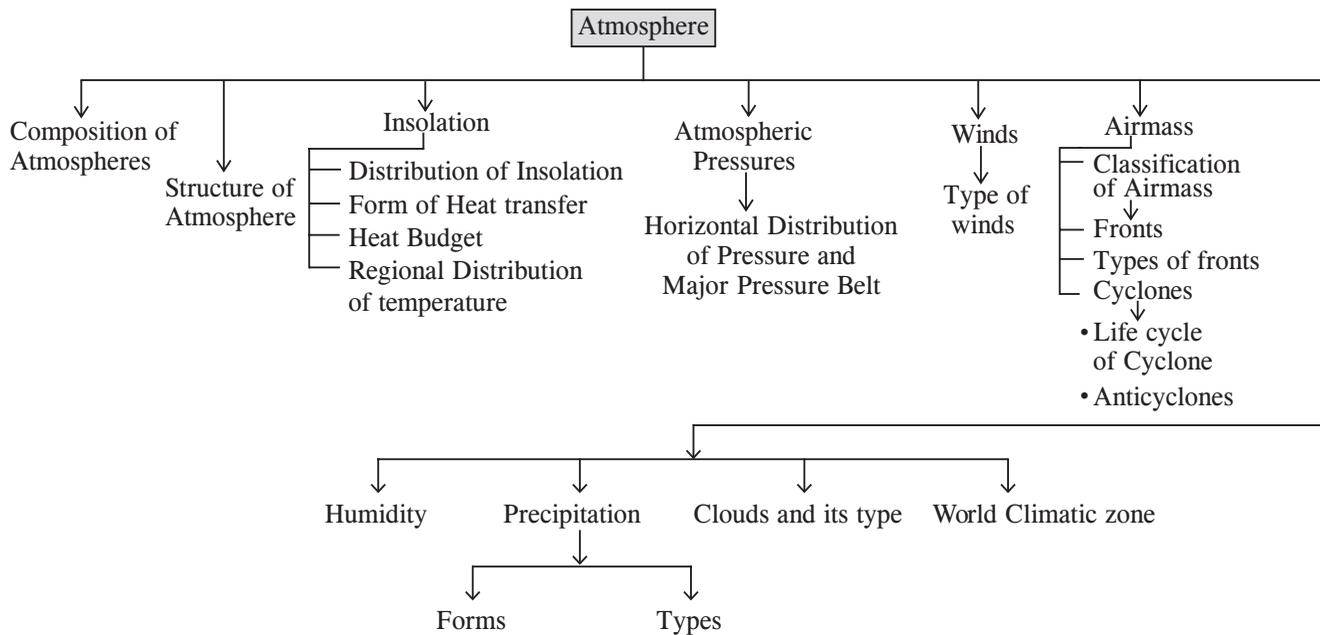


ATMOSPHERE

Chapter 4

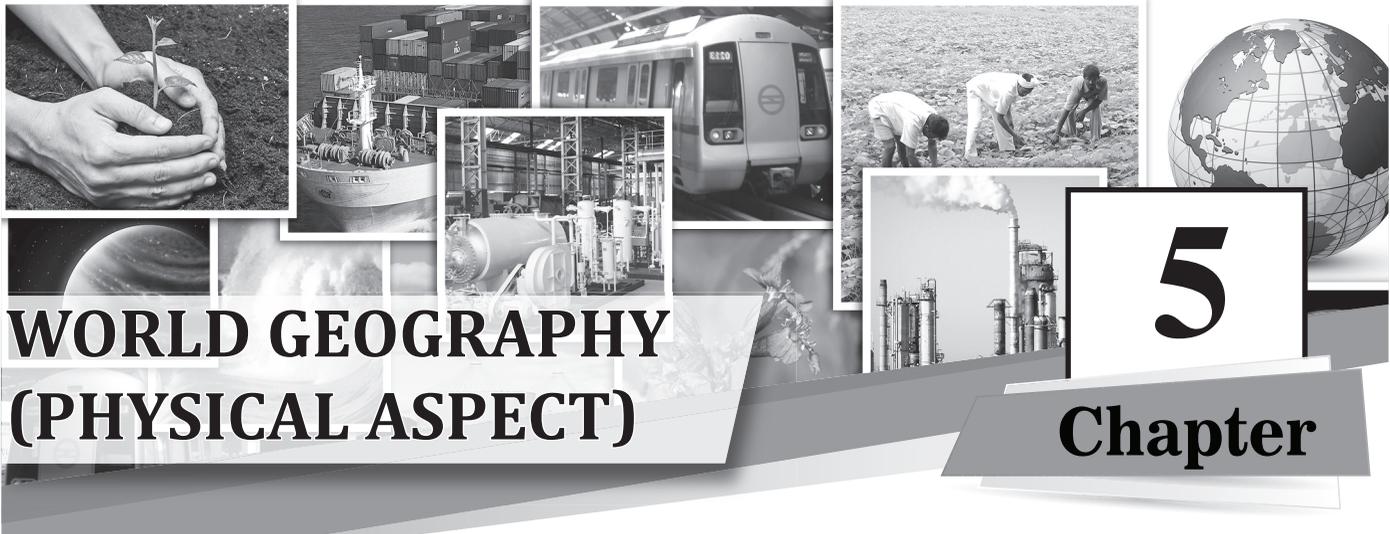
Introduction

Atmosphere is a gaseous envelope surrounding the earth extending thousands of kilometers above the earth's surface. Life on earth exists at the bottom of the atmosphere where it meets with the lithosphere and the hydrosphere. The atmosphere directly or indirectly influences the vegetation pattern, soil type and topography of earth. Of the total mass of the atmosphere, 99% is found within 32 km from earth's surface. The atmosphere is held close to earth because of the earth's gravity and is energized by the sun.



COMPOSITION OF THE ATMOSPHERE

- Atmosphere is a mixture of gases containing huge amount of solid and liquid particles collectively known as aerosols. Pure dry air consists of nitrogen, oxygen, argon, carbon dioxide, hydrogen, helium and ozone. Besides them, water vapour, dust particles, smoke, salts, etc. are also present in the air.
- Nitrogen and oxygen comprise 99% of the total volume of the atmosphere. Nitrogen does not form a chemical union with other substances. It is an agent of dilution and regulates combustion.
- Oxygen combines well with all other in the atmosphere elements. It is easily combustible.
- Carbon dioxide exists in a very small percentage in the atmosphere.
- It absorbs most of radiant energy emitted by earth and reradiates it back to the earth, creating green house effect. This increased the temperature of lower atmosphere.
- It is also called as green house gas effect.



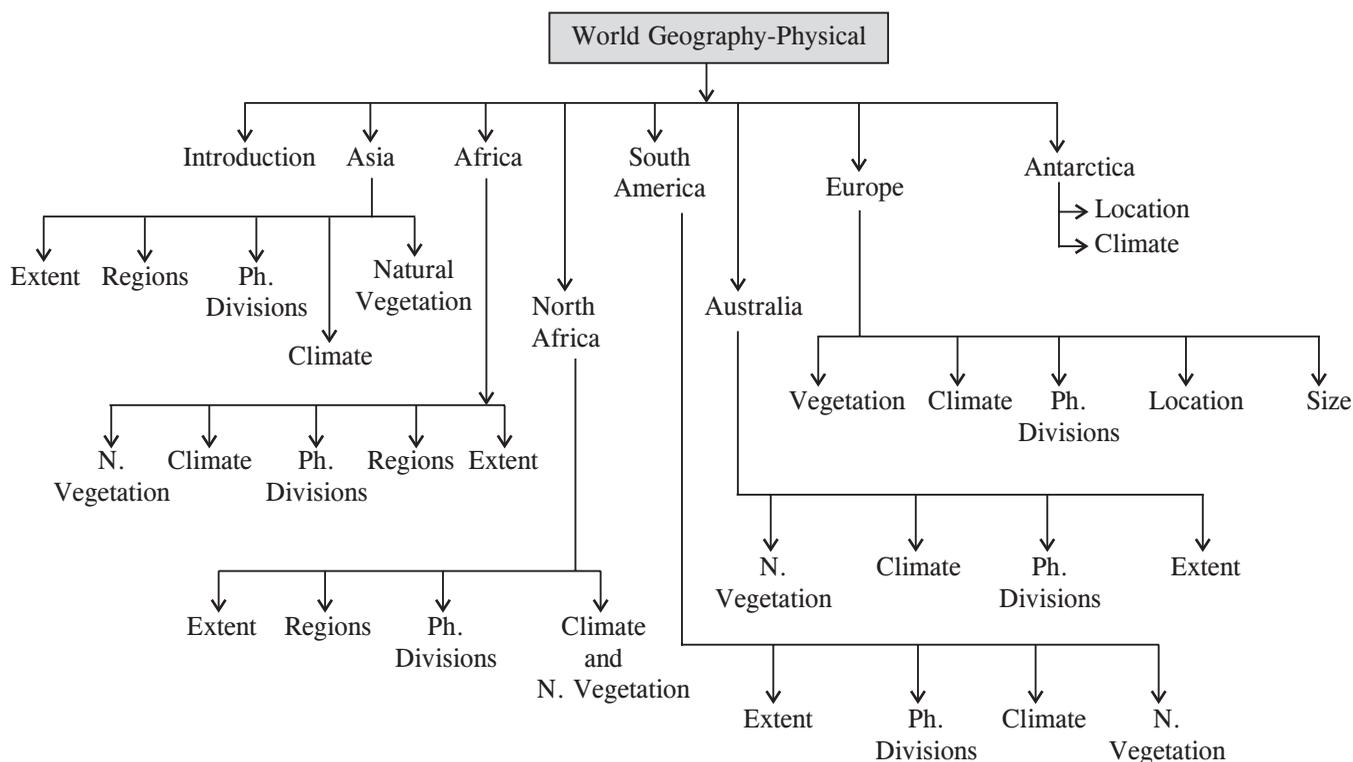
WORLD GEOGRAPHY (PHYSICAL ASPECT)

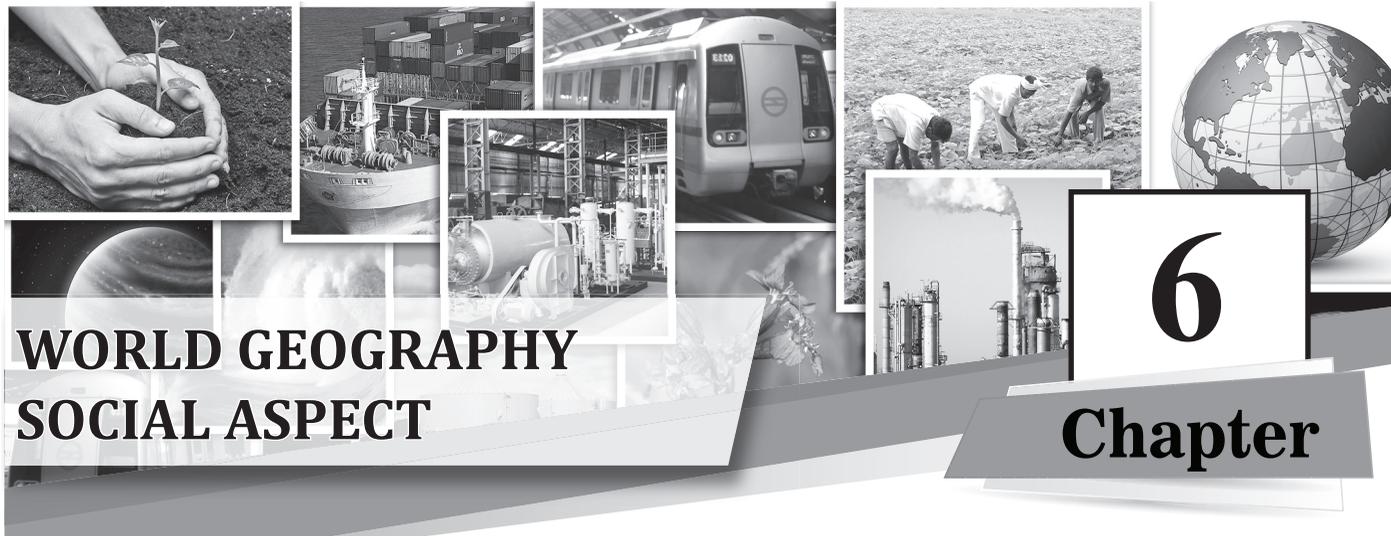
5 Chapter

Introduction

In the previous chapters we have discussed the basic elements of Geography which in general deals with nature and scope of Geography, the Universe, the solar system, and its various branches of Geography. In this special branch of Geography we have also discussed development of earth, its lithosphere, hydrosphere and atmosphere in details.

Moving on to next important branch of Geography, we are now going to discuss Regional Geography which deals with the studies of the world's regions. In general it is called as World Geography which can be further categorised into three important segments such as **physical segment** dealing with unique characteristics of earth's relief, their spatial extent, drainage, climate, natural vegetation; **social segment** that deals with human development, their race and ethnicity and the relationship with their own physical environment; and finally the **economic segment** which deals with the natural resources, livelihood, transport, communications, etc. Let's start with physical segment.





WORLD GEOGRAPHY

SOCIAL ASPECT

6

Chapter

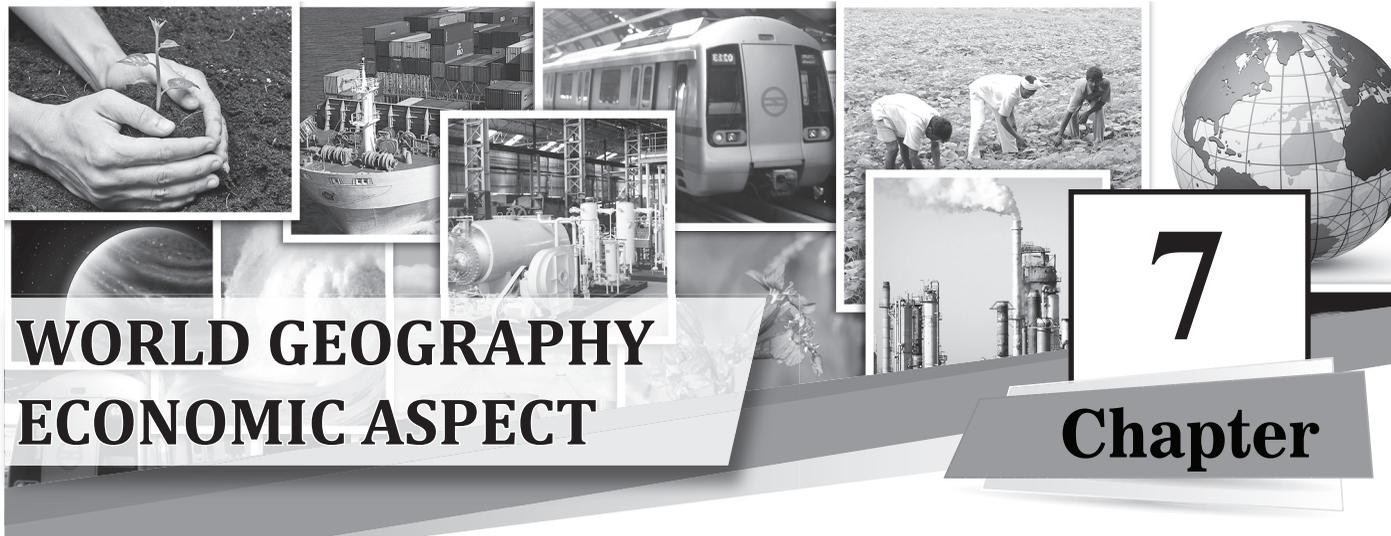
As a part of *Human geography*, Cultural geography deals with the socio-cultural aspect of various human groups based upon their geographic location which includes their habitat, clothing, food, shelter, Skills, tools, language, religions, social organization and life style. Basing upon the above criteria each continent has some unique ethnic groups which are otherwise called as *Human Race*, who are confined to a particular region of that continent only.

Race

Race is biologically defined as a geographically isolated population of organisms that differs from other populations of the same species in certain heritable traits. As to clarify it further it is a categorization of humans based on their physical characteristics such as skin colour, stature, head form, face, hair, eye, nose, body type, blood group etc along with regional variations. Accordingly three major human races are identified which are distributed across the world. They are *Caucasoid*, *Mongoloid* and *Negroid* which further sub divided into geographically viable groups. In this chapter we are going to discuss continent wise racial groups and their distribution pattern.

Racial Groups and Their Distribution Pattern

Continents	Major Ethnic Group/Race	Distribution	Remarks
Asia	Arabian	Bahrain, State of Palestine, Lebanon, Comoros, Kuwait, Qatar, Syria, United Arab Emirates, Morocco, Egypt, Jordan, Iraq, Tunisia, Yemen, Djibouti, Sudan, Algeria, Somalia, Saudi Arabia, Oman, Libya, Mauritania	This is a major Pan ethnic Group which is primarily habited in Western Asia. The primary language spoken by Arabian group is <i>Arabic</i> . Besides 15 other languages are spoken among Arabians in different parts of the World
	Indian	Most part of Indian Sub continents (India, Pakistan and Bangladesh)	On the basis of ethno linguistic composition the group is highly diversified, still the majority of population is restricted within two major linguistic groups such as <i>Indo-Aryan and Dravidian</i> .
	Mongoloids	This group is primarily concentrated in Inner Mongolia Autonomous Region and gradually spreading towards Liaoning, Jilin, Heilongjiang, Xinjiang, Qinghai, Gansu, Ningxia, Hebei, Henan, Sichuan, Yunnan and Beijing	They speak mainly the dialect of <i>Atlantic Language</i> family. The major three of them are <i>Inner Mongolian, Barag-Buryat and Uirad</i>
Africa	Pygmies	Rwanda, Burundi, Uganda, the Democratic Republic of the Congo (DRC), the Republic of Congo (ROC), the Central African Republic, Cameroon, the Equatorial Guinea, Gabon, Angola, Botswana, Namibia, Madagascar, and Zambia are populated by these group	A short height tribal group who lives on hunting, gathering fruits, nuts and honey from dense jungles and they are primarily confined to rain forests only.
	Bushmen	They are the huge inhabitant of Kalahari desert. Other than this they spread along Botswana, Namibia, South Africa, Zambia, Zimbabwe and Angola, with loosely related groups in Tanzania.	They are basically yellow-skinned nomads whose primary food intake in plant products collected from jungles which accounts for 70% of their diet and for the rest 20%-30% they depend on hunting.



WORLD GEOGRAPHY ECONOMIC ASPECT

Chapter

Economic geography deals with the economic activities of human being basing upon the location, distribution and spatial organization as parts of Human Geography. Human activities meant for earning livelihood are known as *economic activities*. On the basis of resource and techniques used for performing these activities they are divided into *primary*, *secondary* and *tertiary activity*.

Primary activities are the direct interaction of human with environment that refers to the utilisation of earth's resources such as land, water, vegetation, building materials and minerals. Agriculture, pastoral farming, fishing, forestry, mining and quarrying etc. are categorized into primary economic activity.

Secondary Activities refers to the process of the value addition to natural resources by transforming the raw materials into essential finished product. Hence secondary activities are basically manufacturing, processing and construction industries.

Tertiary Activities involve the third level of human activities such as exchange of manufactured products i.e. trade and commerce.

With the advancement of new interventions these categorization has given rise to specialized services which can be termed as Quaternary and Quinary services.

PRIMARY ACTIVITIES

Agriculture

It is the process of producing food, feed and fiber through the cultivation of plants, and rearing livestock and is also known as farming. About 50% of the world's population is engaged in agriculture. In India as the land and climatic conditions are favorable for carrying out agricultural activities more than 2/3rd of the population is dependent on agriculture for their livelihood. The land utilized for agriculture is known as *arable land*.

The system of agriculture varies based on the method of farming, type of crop grown, cropping season etc., and they are as follows.

Subsistence Agriculture is the localized agricultural practice where the agricultural products are taken up by the producers or farmers only. It can be of two types:

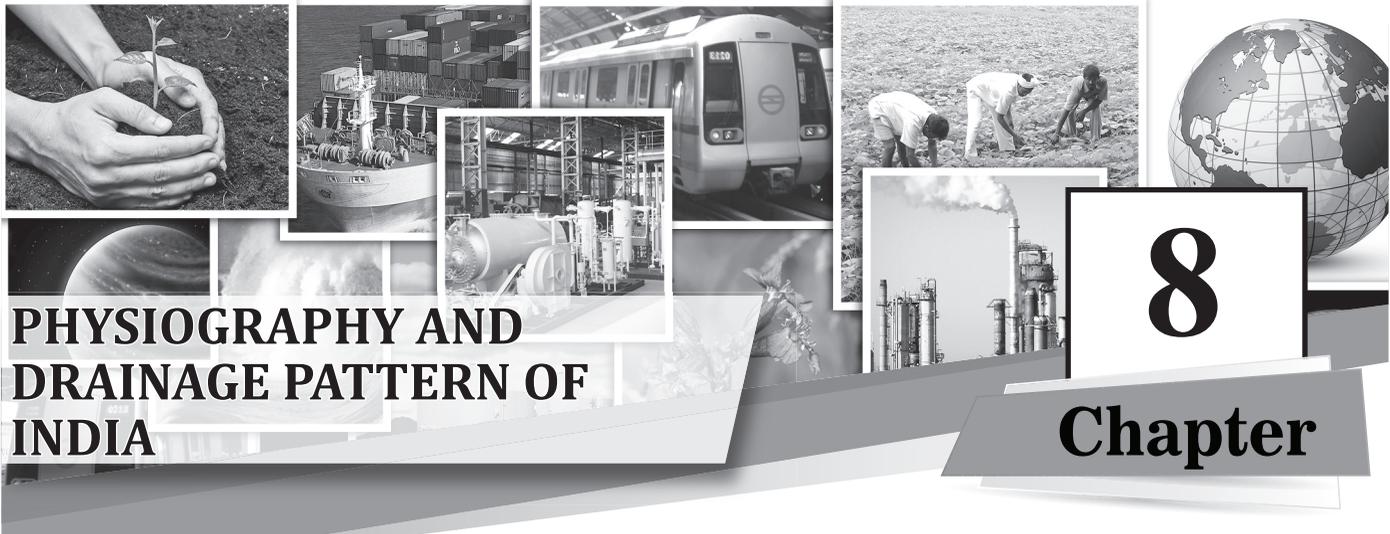
Primitive Subsistence Agriculture is the age old practice of farming where people used to burn or slash large vegetative coverage and made them usable for agriculture. After a period of two to three years when the land started losing its fertility they shifted to some other area and usually repeat the same procedure. Hence it is also called as *Shifting Cultivation*. This process was adopted by the nomads or tribes of tropics, mainly in Africa, South and Central America and South East Asia. In different parts of the world it has been named differently such

as *Jhuming* in North Eastern state of India, *Milpa* in Central America and Mexico, *Ladang* in Indonesia and Malaysia.

Intensive Subsistence Agriculture is generally monsoon driven agriculture and mainly practiced in Asia. It is further divided into two categories. They are:

- **Intensive subsistence agriculture dominated by wet paddy** where the dominant crop is rice. This is generally practiced in the areas of comparatively large population and the farm yard manure is used to maintain the fertility of the soil.
- **Intensive subsistence agriculture dominated by crops other than paddy** where the relief, climate and soil along with geographical location plays a major role in crop growth. Hence these factors are all together responsible for growing of crop other than paddy, such as wheat in western India. Wheat, shorgum, barley, soyabean in northern China, Manchuria, North Korea and North Japan.

Plantation Agriculture are the farming which are being practiced in comparatively large estates with the support of huge capital investment, advance managerial and technical aids, scientific methods of cultivation, cheap labour and well connected market. Some of the major crops of plantation agriculture are tea, coffee, cotton, oil palm, sugarcane, banana, and pineapple.

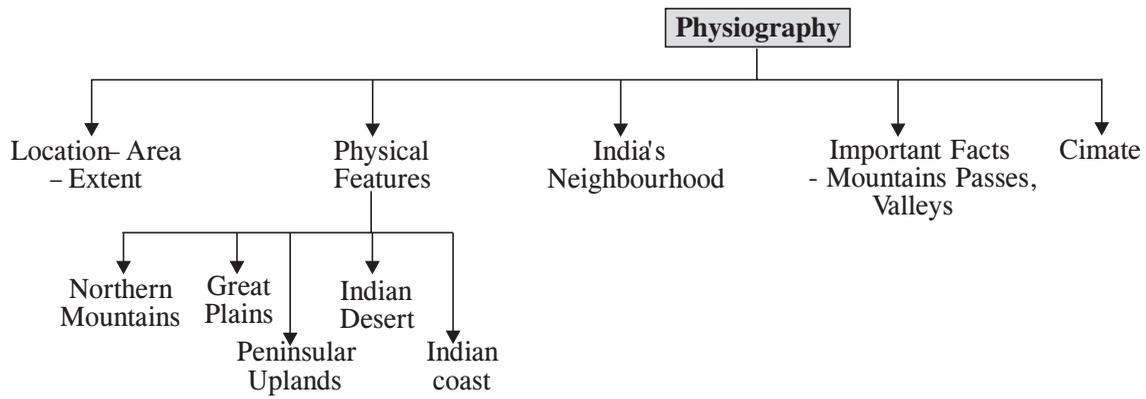


PHYSIOGRAPHY AND DRAINAGE PATTERN OF INDIA

8 Chapter

Introduction

‘Physiography’ of an area is the outcome of structure, process and the stage of development. The land of India is characterised by great diversity in its physical features. The North has a vast expanse of rugged topography consisting of series of mountain ranges with varied peaks, beautiful valleys and deep gorges. The South consists of stable table land with highly dissected plateaus and denuded rocks. In between these two lies the vast North Indian plain.

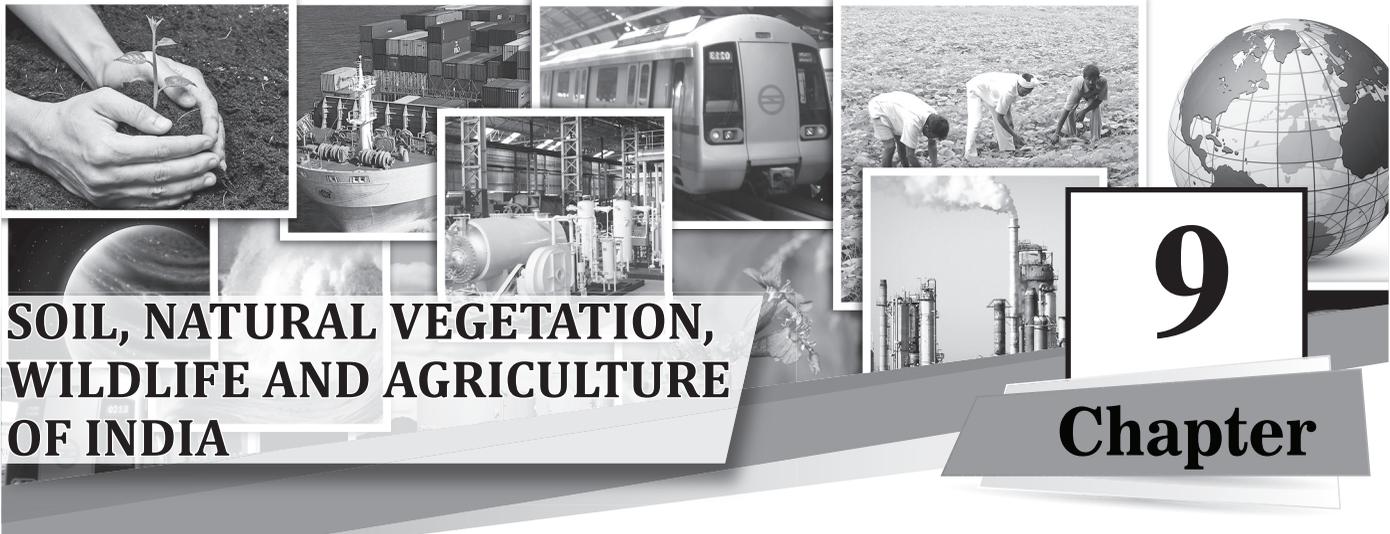


LOCATION - AREA - EXTENT

- India lies in the northern and eastern hemispheres of the globe between 8° 4' N and 37°6' N latitudes and 68°7' E and 97°25'E longitudes.
- The southern most point extent upto 6°45' N latitude to cover the last island of the Nicobar group of islands. The southern extreme is called **Pygmalion Point** or **Indira Point**.
- The **tropic of cancer** $\left(23\frac{1}{2}^{\circ}\text{N latitudes}\right)$ passes through the middle part of India and crosses the states of Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, Jharkhand, West Bengal, Tripura and Mizoram.
- Its total length of land frontier of 15,200 kilometres passes through marshy lands, desert, level plains, rugged mountains, snow covered areas and thick forests.
- Besides land there is a maritime boundary of 6,100 kilometres along the main land mass which increases to

7,516 kilometres of the coastlines of Andaman-Nicobar and Lakshadweep Islands are added to it.

- India-Afghanistan and Pakistan-Afghanistan international boundary is called the **Durand Line**, determined as a “militarily strategic border between British India and Afghanistan”.
- The India-China boundary (4,225 km) is a natural boundary running along the Himalayan ranges and is based on various treaties. Its eastern part (1,140 km) is called the **Mc Mahon Line**.
- The boundary with Pakistan and Bangladesh (the East Pakistan) was finalized at the time of partition in 1947 through the ‘Redcliffe Award’.
- **The Tin Bigha Corridor** is a strip of land belonging to India is a part of West Bengal and lies adjacent to the Bangladesh border. In 1947, the border between India and Bangladesh was also demarcated by Sir Redcliffe.

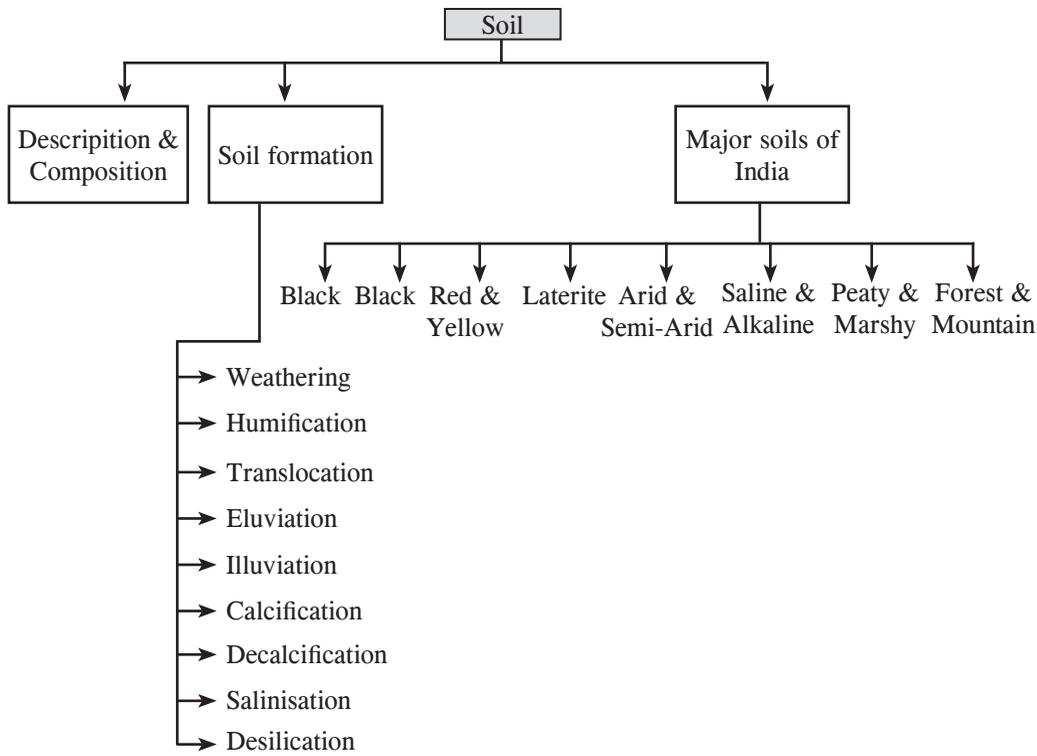


SOIL, NATURAL VEGETATION, WILDLIFE AND AGRICULTURE OF INDIA

9 Chapter

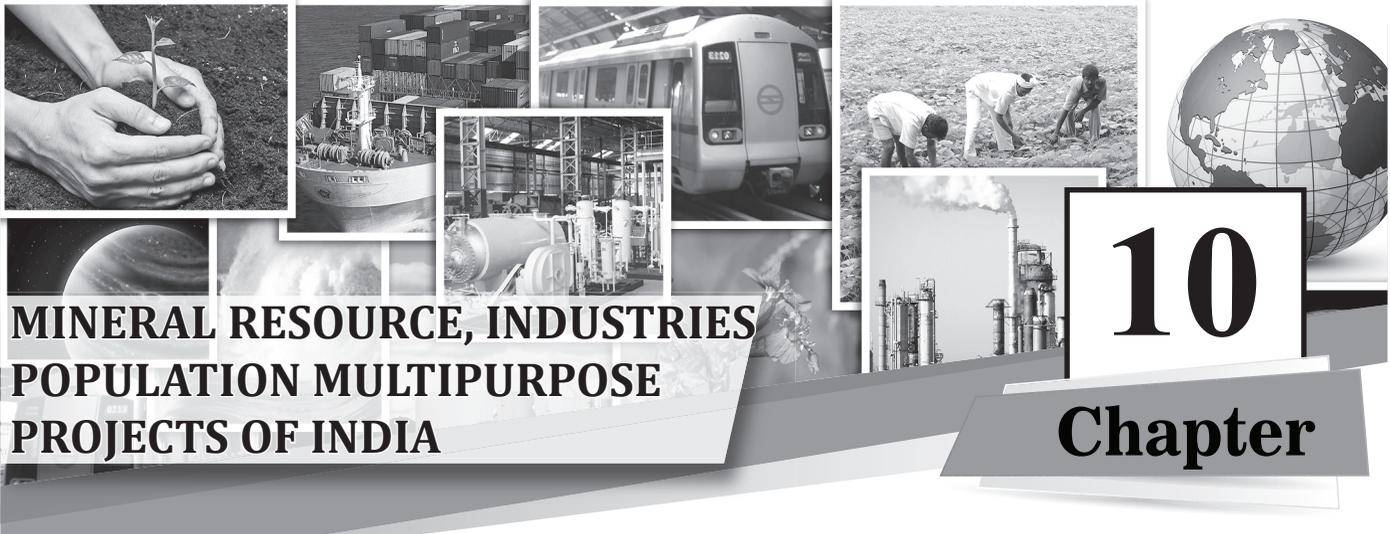
Introduction

Soil is the mixture of rock debris and organic materials which develop on the earth's surface. Soil forms different layers of particles of different sizes. A vertical section that shows different layers of soil is called a Soil Profile. Each layer is called a Horizon.



Basic Facts

- Soil formation process is called **pedogenesis** and the scientific study of soils is known as **pedology**.
- Under the soil layer are gravels of parent rock and concretions formed by the accumulation of leached materials collectively known as **sub-soil**.
- There are two classes of minerals abundant in soils. **Primary minerals** and **Secondary minerals**.
- **Primary minerals** are mostly silicate minerals-compounds of silicon and oxygen, with varying proportions of aluminium, calcium, sodium, iron and magnesium. But they play no important role in sustaining plant or animal life.
- **Secondary minerals** - clay minerals, mineral oxides, etc. are essential for soil development and for soil fertility.
- The nature of the clay minerals in a soil determines its base status. If the clay minerals can hold abundant base ions, the soil is of high base status and generally will be highly fertile, and vice versa.



**MINERAL RESOURCE, INDUSTRIES
POPULATION MULTIPURPOSE
PROJECTS OF INDIA**

**10
Chapter**

MINERAL RESOURCE OF INDIA

Minerals are the natural resources which are used in many industries as raw materials. Iron ore, manganese, bauxite, copper, etc. are such minerals.

Minerals are of two types: **metallic** and **non-metallic**. Iron ore and copper are metallic minerals while limestone and dolomite are non-metallic minerals.

Metallic minerals are further sub-divided into ferrous and **non-ferrous minerals**. Those metallic minerals which have iron content belong to ferrous group. The metallic minerals belonging to non-ferrous group do not have iron content.

India is rich in iron, mica, manganese, bauxite; self sufficient

in antimony, building materials, cement materials, clay, chromite, lime, dolomite, and gold, but deficient in copper, lead, mercury, zinc, tin, nickel, petroleum products, rock phosphate, sulphur, and tungsten.

Mineral resources like potassium are totally absent and have to be imported. Minerals like crude petroleum (which accounts for about 80 per cent of the total value of Indian imports) diamonds (uncut), sulphur, and rock phosphorus are imported.

The state with the highest mineral output is Jharkhand. India is rich in ferrous metals but its reserves of non-ferrous metals are poor.

Mineral	Ore	Found in	Features
Iron	Magnetite —the best quality of iron ore and contains 72% pure iron. Haematite -contains 60 to 70% pure iron. Limonite -contains 40 to 60% pure iron. Siderite -contains many impurities and has just 40 to 50% pure iron.	Odisha (Sonai, Mayubhanj, Keonjhar), Jharkhand and Bihar (Singhbhum Hazaribagh, Palamau, Shahbad), Chhattisgarh and Madhya Pradesh (Raipur, Durg, Bastar, Raigarh, Bilaspur, Jabalpur, Balaghat), Andhra Pradesh (Krishna, Kurnool, Chittor, Cuddapha, Warangal, Guntur), Tamil Nadu (Salem, Tiruchirapalli), Karnataka (Ballary, Chitradurg, Chikmagalur), Maharashtra (Ratnagiri, Chanda), Goa	India has the world's largest reserves, approximately one-fourth of world's known reserves; Jharkhand has the largest reserves accounting for about 25% of the total reserves of iron ore in India.
Coal (Black Gold)	Anthracite Coal —the best quality of coal and contains 80 to 95% carbon. It is found only in Jammu and Kashmir in small quantity. Bituminous coal —The most widely used coal and contains 40 to 80% carbon. It is found in Jharkhand, Orissa, West Bengal, Chhattisgarh and Madhya Pradesh. Lignite - Also known as brown coal. It is a lower grade coal and contains about 40 to	Bihar-Jharkhand-Bengal belt (Raniganj, Jharia, Giridih, Bokaro, Karanpur), Madhya Pradesh and Chhattisgarh belt (Singrauli, Korba, Raigarh, Sonhat, Sohagpur. Umaria), Odisha (Desgarh, Talcher), Maharashtra (Chand), Andhra Pradesh (Singreni), Assam (Makum, Lakhimpur); in small quantities in Arunachal Pradesh, Meghalaya, Jammu and Kashmir, and Nagaland	“About one-fourth of India's coal reserves lie in the DamodarValley, across Bihar, Jharkhand, and West Bengal. India is the fourth largest coal producing country in the world according to 1992 coal production in the country.”

ECOLOGY AND ENVIRONMENT



1

Chapter

ECOLOGY AND ENVIRONMENT

Introduction

In this chapter we will study about Environment, their biodiversity, i.e. different species of plants and animals in their habitats and their relation and interaction with environments. We will also learn about different environmental issues and their effects on ecosystem, i.e. plants, animals, their habitats and climates all around them.

Ecosystem

An ecosystem is a functional unit of nature consisting of abiotic and biotic factors, where the living organisms interact among themselves and also with their physical environment (abiotic factors).

I. Abiotic Component (Habitat and Environment)

Abiotic components of ecosystem are the nonliving features of ecosystem on which the living organism depends. It is basically referred to the physical environment and its numerous interacting variables, e.g. inorganic substances and climatic factors.

A. Inorganic Substances

Inorganic substances are generally associated with nonliving things.

Bio-geochemical Cycle

It refers to the circulation of chemical nutrients such as carbon, oxygen, nitrogen, phosphorus, calcium, and water etc. through the biological and physical world. In other words the chemical element get recycled while moving through both biotic (biosphere) and abiotic (lithosphere, atmosphere, and hydrosphere) compartments of Earth. It's a circular series of reaction where the chemical element gets back to its original position for joining the cycle again and again. The most well known cycles in the lists are:

- Nitrogen Cycle
- Oxygen Cycle
- Carbon dioxide Cycles
- Water Cycle
- Phosphorous Cycles

(a) Nitrogen & (N₂) Cycle

Nitrogen cycle is a process by which nitrogen is converted between its various chemical forms. 78% of earth atmosphere is nitrogen. Nitrogen cycle is necessary because plants cannot absorb nitrogen directly; they can only absorb in the form of *nitrate*. Nitrogen cycle have 5 important processes, i.e. fixation, ammonification, nitrification, assimilation and denitrification.

1. Nitrogen fixation

It is the process of conversion of nitrogen(N₂) to ammonia (NH₃) because it is the only method by which organisms can attain nitrogen through atmosphere. Bacteria called *Rhizobium* fix nitrogen, be residing in the roots of plants making root nodules

2. Nitrification

It is the process of conversion of ammonia (NH₃) to nitrate (NO₃-)



3. Assimilation

It is done by plants roots. Since nitrogen is present in nitrate form it is absorbed along with water from the soil and then converted into organic matter by plants.

4. Ammonification

It is the process of conversion of organic nitrogen compounds to NH₃. Urea and uric acid are excreted by animals in soil along with nitrogen components, these components are converted into ammonia by bacteria, like-Bacteria→ nitrification→assimilation

5. Denitrification

It is the reduction of NO₃- to gaseous nitrogen N₂. It is done by denitrifying bacteria(*Pseudomonas*) which convert nitrates/nitrites into elemental nitrogen, which escapes to atmosphere completing the cycle.



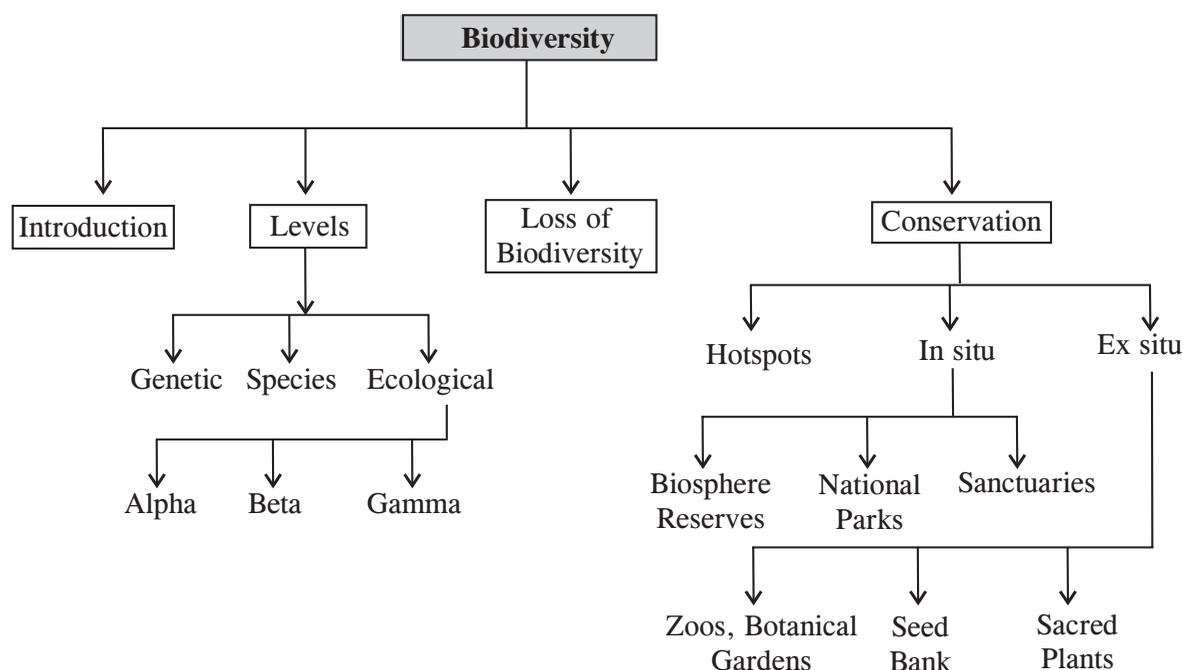
BIODIVERSITY

2

Chapter

Introduction

Biodiversity mean diversity of heterogeneity at all levels of biological organisation, i.e from Micro molecules of the cells to the Biomass. The word Biodiversity was popularized by the sociologist Edward Wilson.



Biodiversity is the existence of a wide variety of plant and animal species in their natural environments, which is the aim of conservationists. Who are mainly concerned about indiscriminate destruction of rainforests and other habitats.

Important Levels of Biodiversity are

1. Genetic diversity

It is the diversity at genetic level, or at subspecies level, i.e. below species level, in a single species.

The genetic diversity helps the population to adapt. If a population has more diversity it can adapt better to the changed environmental conditions. The low diversity leads to uniformity. The genetic variability is therefore, considered to be the raw material for speciation.

2. Species diversity

The measurement of species diversity is its richness, i.e. the number of species per unit area. The greater is the species richness the more will be the species diversity. In nature, the number and kind of species, as well as the number of individual per species, vary, and this leads to greater diversity.



ENVIRONMENTAL ISSUES

3

Chapter

Introduction

Environmental issues are harmful effects of human activity on the biophysical environment. Environmentalism, a social and environmental movement, addresses environmental issues through advocacy, education and activism.

Our environment is constantly changing, which no one can deny. With these great environment changes, it becomes highly important for us to become increasingly aware of the environmental problems as well. With a monumental inundation of natural disasters, warming and cooling periods, different types of weather forms and much more, people should be aware of what types of environmental problems our Earth is facing.

Our planet is on the verge of a severe environmental crisis. Current environmental problems make us susceptible to disasters and tragedies, now as well as in the future. We are in a phase of planetary emergency, with environmental problems blooming around us. Unless we address the various issues proactively and sincerely we are surely going to be wrecked with these disasters. All the current environmental problems need urgent attention.

DIFFERENT ENVIRONMENTAL ISSUES AND ITS EFFECT ON CLIMATE

Environmental issues are increasing day by day and it has a very adverse effect on climate. Some of the Environmental issues are discussed below:

Global Warming

Climate changes like global warming are the result of human practices like emission of Greenhouse gases. Global warming leads to rising temperatures of the oceans and the earth's surface causing melting of polar ice caps, rise in sea levels and also unnatural patterns of precipitation such as flash *floods*, excessive snow or desertification.

Effects of Global Warming

The **Intergovernmental Panel on Climate Change (IPCC)** was established in 1988 by the World Meteorological Organization (**WMO**) and the United Nations Environment Programme (**UNEP**) in recognition of the problem of global warming. IPCC has estimated the following effects of global warming:

- Earth's temperature will rise by 1-30°C in next few decades, leading to extreme weather changes (heat waves, hurricanes and severe winters), changes in ocean currents and marine life. The largest glacier chain in the tropics is melting fast because of rising temperatures and peaks are turning brown. This trend is endangering future water supplies. Glaciers serve agriculture, hydel plants and feed rivers that supply water to the sprawling cities and shanty towns on Peru's bone-dry Pacific coast. **Quelccaya**, in southern Peru, the world's largest tropical ice-cap, is retreating at about 200 feet per year, up from 20 feet per year in the 1960s. **Lonnie Thompson**, a leading glacier expert of Ohio State University, monitoring glacier retreat on the Andes, Himalayas and Kilimanjaro, said that the rate of ice loss in glaciers all over the world is actually accelerating.
- If CO₂ concentration doubles, Earth's temperature may rise by 50°C. Coastal areas will see a rise in water levels by 0.5 - 5.0 feet due to melting of mountain glaciers, polar ice-caps, etc.

46. (c) The dugong is a medium-sized marine mammal. Dugong is listed under schedule 1 of India Wildlife Protection Act, 1972. In 2008, a MoU was signed between the Ministry of Environment and Forests and the Government of India, in order to conserve dugongs. In fact the highest level of legal protection is accorded to dugongs in India.
47. (d) 48. (d)
49. (c) Nitrous Oxide (NO₂) (5%) arises from coal burning, biomass burning, and breakdown of chemical fertilizers.
50. (b)
51. (c) Photosynthesis would decrease as increased UV radiations (due to ozone depletion) would make it difficult for leaves of green plants to exchange gases with the atmosphere. Due to increased temperature consequent upon increased UV radiation, the evaporation rate of surface water will increase and soil moisture would decrease leading to drying of agricultural crops and hence reduced yield.
52. (d)
53. (d) CFCs and HCFCs destroy ozone in the stratosphere. These chemicals are inert, non-flammable, non-toxic, and lighter than air and can remain intact for years. They contain Chlorine and Fluorine, common being CFC-11, CFC-12, CFC-22 and CFC- 13.
54. (d) The process of clearance of forest by burning or logging is called deforestation. The main reasons for deforestation are trees or derived charcoal are used as, or sold, for fuel or as (a) commodity, while cleared land is used as grassland for livestock, plantations of commodities, and settlements. Deforested areas usually sustain extensive adverse soil erosion and regularly damage into wasteland.
55. (d) Deforestation is the removal of vegetation in (a) forest to the extent that it no longer supports its natural flora and fauna. Deforestation is (a) very broad term, which consists of cutting of trees including repeated lopping, felling, and removal of forest litter, browsing, grazing and trampling of seedlings.
56. (c) The six main greenhouse gases are – • Carbon dioxide (CO₂); • Methane (CH₄); • Nitrous oxide (N₂O); • Hydrofluorocarbons (HFCs); • Perfluorocarbons (PFCs); and • Sulphur hexafluoride (SF₆). Methane (CH₄) is the second most important greenhouse gas. CH₄ is more potent than CO₂ because the radiative forcing produced per molecule is greater. In addition, the infrared window is less saturated in the range of wavelengths of radiation absorbed by CH₄, so more molecules may fill in the region.
57. (c)
58. (a) CO₂ is largest contributor towards global warming.
59. (b) 60. (d) 61. (b) 62. (c)
63. (c) spraying of DDT in soil results in the pollution of soil and water.
64. (d) Agro chemicals are developed by the use of modern technology that depends on inorganic fertilizers and pesticides. Excess use of these fertilizers can lead to immediate harmful effect or can also be long lasting. Although many benefits are there by the use of agro chemicals which are related to increase yield of plants and animal crops and less wastage during storing. These profits are substantial.
65. (d)
66. (b) Acid rain reacts with calcium to form calcium bicarbonate, which can be easily washed away.
67. (d) 68. (b) 69. (c) 70. (c)
71. (c) Domestic as well as industrial effluents that contaminate river water if allowed to flow unchecked.
72. (a) Refuse storage: which may sometimes require delivery of refuse by the householder over (a) considerable distance. Where the householder delivers the refuse to the vehicle at the time of collection. Door-to-door collection, where the collector enters the premises and collects the refuse and the householder is not involved in the collection process.
73. (d) Radioactive waste which arises from civil nuclear activities as well as from defense related nuclear weapon activities, poses a terrible problem for handling and keeping the environment to be safe to the present and future generations. The techniques used emphasizes on waste minimization and volume reduction. Nuclear waste is categorized into high, intermediate and low levels depending on the level of radioactivity in it.
74. (d) High level waste produced from the reprocessing plant is vitrified into a glassy form, enclosed in multiple barrier vessels and stored for a temporary period of three to four decades in engineered vaults with essential observation services. After cooling down in these storage facilities, waste vessels will be stored for long term in deep geological repositories.
75. (d) Plastics have become an indispensable part of our daily lives. Invented in 1935, they are wonderful products of polymer chemistry produced from the by- products of petroleum refining. They are classified as into two main categories
76. (a) All the varieties of plastics are manufactured from petrochemical based hydrocarbons. These hydrocarbons, and the plastic manufacturing processes involved possess environmentally critical characteristics. The raw materials and intermediate products used in the manufacture of Polyvinyl chloride (PVC) - Ethylene, Chlorine, Hydrogen chloride, Vinyl Chloride Monomer (VCM), and Ethylene Dichloride (EDC) — are known hazardous materials. Additives, fillers, and coloring pigments used in plastic goods can also exhibit hazardous properties.
77. (d) 78. (b) 79. (d)
80. (d) No vendor shall use carry bags and containers of recycled plastics for storing carrying and / or packaging of foodstuffs, Carry bags and Container used for packaging of foodstuff shall be made of virgin plastic and of natural shade or white, Carry

bags and Container made from recycled plastics must be manufactured using pigments and colorants as per IS: 9833/ 1981 notified by the Bureau of Indian Standards (BIS), Minimum thickness of Carry bags made of virgin or recycled plastics must not be less than 20 microns.

81. (b)
82. (c) The bio-degradable plastics will add to the already piling up municipal garbage. The immediate benefits of recovery and recycle of normal plastics is also lost if bio-degradable plastics are introduced. As of now, compared to normal plastic, the bio-degradable plastics are expensive and the technology for manufacture is not easily available. It may be possible to treat bio-degradable plastics in countries where solid waste management systems are working satisfactorily and extensively.
83. (c)
84. (c) The main function of the ozone gas found in the ozonosphere is to absorb the ultraviolet solar radiation. Ozone absorbs the ultraviolet solar radiation and through this process, the most harmful ultraviolet radiation is effectively filtered, thus safeguarding life at earth.
85. (d) Methane (CH_4), also called "Marsh gas", arises from rice paddies, wetlands, enteric fermentation in cattle, burning of wood, and landfills. It is responsible for about 4-9% of Greenhouse effect.
86. (a) Chlorofluorocarbons (CFCs) and their replacements (15%) are 1000 times more heat absorbent than carbon dioxide. They reach the atmosphere from refrigeration & air conditioning, aerosol sprays, and foam packaging industry
87. (d) Ozone contributes to 3-7% of Greenhouse effect. The largest net source of tropospheric ozone is influx from the stratosphere. Large amounts of ozone are also produced in the troposphere by photochemical reactions, the amounts increasing with high levels of air pollution.
88. (d) There are numerous causes of current deforestation such as dishonesty of government institutions, the imbalanced distribution of wealth and power, population growth and overpopulation, and urbanization. Globalization is also main cause of deforestation, though there are cases in which the effects of globalization have supported localized forest recuperate.
89. (c) Acid rain is a rain or any other form of precipitation that is unusually acidic, meaning that it possesses elevated levels of hydrogen ions (low pH). The term "acid rain" was coined in 1872 by Robert Angus Smith, after a link was established between sulfur dioxide (SO_2) emissions from the burning of coal in Manchester and acidification of nearby rainfall. Rainfall with pH less than 5.6 is called Acid rain.
90. (d) Lead and cadmium compounds are added as stabilizers in PVC. These chemicals are used in the manufacture of soft plastic items such as vinyl flooring sheets, soft toys etc. to increase their durability. Lead and cadmium can leach out during human contact, or when disposed in land-fills. Incineration of such rejected plastic items produces ash with high heavy metal content. Use of lead compounds in the manufacturing process can be (a) potential hazard to workers in the PVC industry. Lead and cadmium are known neurotoxins and nephrotoxins respectively