

# Biyani's Think Tank

*Concept based notes*

## Man and Natural Environment

MA

Dept of Arts

Biyani Group of Girls College,

Jaipur



*Published by :*

**Think Tanks**

**Biyani Group of Colleges**

*Concept & Copyright :*

□ **Biyani Shikshan Samiti**

Sector-3, Vidhyadhar Nagar,

Jaipur-302 023 (Rajasthan)

Ph : 0141-2338371, 2338591-95 □ Fax : 0141-2338007

E-mail : acad@biyanicolleges.org

Website :www.gurukpo.com; www.biyanicolleges.org

**Edition : 2011**

While every effort is taken to avoid errors or omissions in this Publication, any mistake or omission that may have crept in is not intentional. It may be taken note of that neither the publisher nor the author will be responsible for any damage or loss of any kind arising to anyone in any manner on account of such errors and omissions.

*Leaser Type Setted by :*

**Biyani College Printing Department**

## *Preface*

I am glad to present this book, especially designed to serve the needs of the students. The book has been written keeping in mind the general weakness in understanding the fundamental concepts of the topics. The book is self-explanatory and adopts the “Teach Yourself” style. It is based on question-answer pattern. The language of book is quite easy and understandable based on scientific approach.

Any further improvement in the contents of the book by making corrections, omission and inclusion is keen to be achieved based on suggestions from the readers for which the author shall be obliged.

I acknowledge special thanks to Mr. Rajeev Biyani, *Chairman* & Dr. Sanjay Biyani, *Director (Acad.)* Biyani Group of Colleges, who are the backbones and main concept provider and also have been constant source of motivation throughout this Endeavour. They played an active role in coordinating the various stages of this Endeavour and spearheaded the publishing work.

I look forward to receiving valuable suggestions from professors of various educational institutions, other faculty members and students for improvement of the quality of the book. The reader may feel free to send in their comments and suggestions to the under mentioned address.

**Author**

# **SYLLABUS**

## **Man and Natural Environment**

### **Section-A**

**Perspective human and environment relationship, symbiosis between man and environment, the effect of environment on man: biophysical, perceptual and behavioural related to resource availability. The effect of man on environment.**

**a. Direct and indirect**

**b. Man's capacity to modify the environment.**

### **Section-B**

**The environmental crises, nature and causes or environmental protection some case studied of India. Environment pollution—Air, Water, Noise, Soil pollution.**

### **Section-C**

**Criteria for environmental quality, Evolution of balanced and healthy environment, sustainable of ecosystem. Ecological basis of environmental bases.**

# Chapter 1

## Ecology

---

**Q1. Define Ecology and meaning of ecology?**

**Ans:** Ecology in a very simple term is a science that studies the interdependent, mutually reactive and interconnected relationship between the organisms and their physical environment on the one hand and among the organisms on the one hand and among the organisms on the other hand. The term ecology was first coined and used by the German biologist.

‘Oeconomy ‘ was later on developed into ‘Economics’ which means the law or rule of people ‘s management of business while ‘Oecology’ become ‘Ecology’ as the entire science of the relations of the organisms to the surrounding exterior world, to which relations we can count in the boarder sense all the condition of existence. These are partly of organic, partly of organic nature’.

**Q2. Explain the aim and scope of Ecology.**

**Ans:** The scope of ecology and its aim have explained enormously with development of ecological concept and thoughts consequent upon growing interest in man-environment relationship due to increasing pressure on nature/ecological resources to sustain and enhance economic development in view of ever-increasing human population . The traditional view of ecology as the science of living things in relation to their environment has helped to place it in a valuable strategic position from which it can make it important contribution to their environmental management.

The concept of ecology now has been extended from single phenomenon to set of phenomenon occupying a definite space in the biosphere at a definite time interval. Forest ecology, agriculture, ecology, industrial ecology, rural, ecology, urban ecology, population ecology, social ecology etc.

**Q3. Explain the types of Ecology?**

**Ans** The field and the scope of ecology have changed during various phases of methodological development of the subject and therefore major sub-division of ecology should be determined according to different approaches which include taxonomic affinities, habitat, level of organization and modern social and economic situations at global and regional levels.

**Sub-division based on taxonomic affinities-** in the beginning ecology was exclusively associated with biological science-botany and zoology and this plants and

animals. His approaches led to the division of ecology into (i) plant ecology and (ii) animal ecology.

**Sub-division on the basis of Habitat-** the basic tenet of the division of ecology on the basis of habitat is that there are variations in habitats in terms of their physical characteristics and therefore there are definite effects of a particular habitat on the organism and general characteristics of biotic communities vary from one habitat to the other. This approach of ecological study led to the development of 'habitat ecology' the habitat ecology is further sub-division on the basis of habitat and their relationship with the organism inhabiting a particular habitat into forest ecology, grassland ecology, fresh water ecology, estuarine ecology, island ecology, marine ecology, coral reef ecology etc.

**Sub-division on the basis of Organization-** the third approach to ecological studies is to study either individual organism or group of organisms of a particular ecosystem in other words, ecology studies may be accomplished at two levels (i) study of ecological relationship between the species and (ii) ecological relationship within the ecosystem involving all the organisms present there. This approach led to the development (i) Autecology's (ii) Synecology.

**Q 4. Throw light on Ecological Concept and Principal.**

**Ans:** There are certain basic fundamental principal which govern various aspects of organisms e.g. evolution and distribution of plants and animals, extinction of species, biological succession, consumption and transfer of energy in different components of biological communities, cycling and recycling of organic and inorganic substances through various bio-geochemical cycle, life cycle of organism, interaction and interrelationship among the organism and between organism and among physical environment etc. the following fundamental concept and principal of ecology in terms of ecosystem may highlighted. Ecosystem is a fundamental units of ecological study because it comprises both biotic and abiotic components. In other words, ecosystem being a monistic concept, bring physical environment, plant and animal together in a single framework which facilitates the study of interaction between biotic and abiotic components. Ecosystem are well structured and organized units through biotic and abiotic components.

At the largest scale. The whole biosphere becomes an ecosystem. The biotic and abiotic components of biospheric ecosystem are intimately related to a series of large-scale cyclic mechanism. E.g. water cycle, chemical elements cycle. Sediment cycle and unidirectional flow of energy. These cycles help in the transfer of energy, water, chemical elements and sediments in various components of the biosphere.

'Sustained life on the earth is characteristic of ecosystem, not of individual organism or population.

M.J. Olliman has formulated the following four 'Environment principles' of holistic nature of natural environment which largely affect the biological communities in a biospheric ecosystem.

'Nothing actually disappears when we throw it away' because all the material is rearranged and cycled and recycled through a series of cyclic pathways in the natural environment.

'All systems and problems are ultimately if not intimately inter-related. It does not make sense to squabble over which crisis is most urgent we cannot afford the luxury of solving problems one by one. That is both obsolete and ecologically unsound anyway.

We live on planet earth whose resources are finite.

Nature has spent literally millions of years refining a stable ecosystem.

The physical and biological processes follow the principle of 'uniformitarianism' which states that the same physical and biological processes which operate today, operated in the past not necessarily with constant magnitude and frequency with time and will operate in the future but 'at rates that will vary as the environment is influenced by human activity'.

Natural hazards adversely affect biological communities in general and man in particular. When biological processes are associated with physical events, yet several hazards are created. e.g. After floods mainly in urban areas, water is contaminated by bacteria and thus diseases spread at a faster rate.

All living organisms and physical environment are naturally reactive. In other words, living organisms interact among themselves and affect each other on the one hand and living organisms and physical environment are interrelated through reciprocal interactions and these affect each other on the other hand. The varying degrees of interaction among organisms, at both inter- and intraspecific, are positive, negative and sometimes neutral.

Ecosystem function through the input of energy mainly solar radiation which is trapped by green plants and is used to prepare food through the process of photosynthesis. Thus the solar radiation is the main driving force of the ecosystem.

## Multiple Choice Questions

- 1. Biotic environment includes**  
(a) producers (b) consumers  
(c) decomposers (d) all the above
- 2. Decomposers include**  
(a) bacteria (b) fungi  
(c) both (d) animals
- 3. Abiotic environment does not include**  
(a) air (b) water  
(c) soil (d) plants
- 4. Vermicomposting is done by**  
(a) fungus (b) bacteria  
(c) worms (d) animals
- 5. The group of organisms which convert light into food are called**  
(a) autotrophs (b) heterotrophs  
(c) decomposers (d) omnivores
- 6. Which one the following is not biodegradable?**  
(a) vegetables (b) fruits  
(c) earthworm (d) aluminium foil
- 7. Animal(s) which is/are active at night.**  
(a) owl (b) rat  
(c) cockroach (d) all the above
- 8. An animal that can tolerate the heat of the desert is**  
(a) rats (b) camel  
(c) cow (d) lion
- 9. Air pollution is caused by**  
(a) Insecticides (b) Sewage  
(c) Smoke (d) Loud speakers
- 10. If waste materials contaminate the source of drinking water which of the following diseases will spread?**  
(a) Scurvy (b) Typhoid  
(c) Malaria (d) Anaemia

Answer Key: 1. (d) 2. (c) 3. (d) 4. (c) 5. (a) 6. (d) 7. (d) 8. (b)  
9. (c) 10. (b)



## Chapter 2

# Ecosystem

---

### Q1. What do you mean by Ecosystem?

Ans: The term 'Ecosystem' was first used by A.G Tansley in 1935 who defined ecosystem as 'a particular category of physical system, consisting of organisms and inorganic components in a relatively stable equilibrium, open and of various size and kinds'. According to Tansley the ecosystem is comprised of two major parts viz. biotic and abiotic. Thus 'all parts of such an ecosystem—organic and inorganic, biotic and abiotic—may be regarded as approximate equilibrium, it is through their interaction that the whole system is maintained.

In some more style ecosystem is defined as a fundamental functional unit occupying spatial dimension of 'earth-space ship' characterized by total assemblage of biotic community and abiotic components and their mutual interactions within a given time unit. The following are the properties of an ecosystem. Ecosystem of any given space time unit represents the sum of all living organisms and physical environment.

It is composed of three basic components: energy, biotic and abiotic components.

It occupies a central well-defined area on the earth-space ship.

It is viewed in terms of time-unit.

There are complex sets of interaction between biotic and abiotic components on the one hand and between and among the organisms on the other hand.

It is an open system which is characterized by continuous input and output of matter and energy.

It is powered by energy of various sorts but the solar energy is the significant.

### Q2. Explain the types of Ecosystem?

Ans: There are essentially two kinds of ecosystem.

#### 1. Aquatic

Terrestrial: Terrestrial ecosystem can be found anywhere apart from heavily saturated places. They are broadly classified into the forest ecosystem, they are the ecosystem in which an abundance of flora, or plant, is seen so they have a big number of organisms is quite high. A small change in this ecosystem could affect the whole

balance, effectively bringing down the whole ecosystem. You could see a whole fantastic diversity in the fauna of the ecosystem too. They are further divided into:

**Tropical evergreen forest:** these are tropical forest that receive a mean rainfall of 80 for every 400 inches. The forest are characterized by dense vegetation which comprise tall trees at different heights. Each level is shelter to different types of animals.

**Tropical deciduous forest:** there, shrubs and dense brushes rule along with a broad selection of trees. The types of forest is found in quite a few parts of the world while a large variety of fauna and flora are found there.

**Temperate evergreen forest:** those have quite a few number of trees as mosses and ferns make up for them. Trees have developed spiky leaves in order to maximize transpiration.

**Temperate deciduous forest:** the forest is located in the moist temperate places that have sufficient rainfall. Summers and winters are clearly defined and the trees shed the leaves during the winter months.

**Taiga:** situated just before the arctic region., taiga is defined by evergreen conifers. As the temperature is below zero for almost half a year, the remainder of the month, it buzzes with migratory birds and insect.

**The desert Ecosystem:** are located in region that receive an annual rainfall less than 25. they occupy about 17 percent of all the land on our planet. Due to the extremely high temperature, low water availability and intense sunlight, fauna and flora are scarce and poorly developed. The vegetation is mainly shrubs, bushes, few grasses and rare trees. The stems and leaves of the plants are modified in order to conserve water as much as possible. The best known desert ones are the succulents such as the spiny leaved cacti. The animal organisms include insects, birds, camels, reptiles all of which are adapted to the desert conditions.

**The grass land ecosystem:** grassland are located in both the tropical and temperate region of the world through the ecosystem vary slightly. The area mainly comprises grass with a little number of trees and shrubs. The main vegetation includes grasses, plants and legumes that belong to the composite family. A lot of grazing animals insectivores and herbivores inhabit the grassland. The two main kinds of grassland ecosystem are;

**Savanna:** the tropical grassland are dry seasonally and have few individual trees. They support a large number of predators and grazers.

**Pariries:** it is temperate grassland, completely devoid of large shrubs and trees. Parairis could be categorized as mixed grass, tall grass and short grass prairies.

The mountain ecosystem: mountain land provides a scattered and diverse array of habitats where a large number of animals and plants can be found. At the higher altitudes, the harsh environmental conditions normally prevail, and only the treeless alpine vegetation can survive. The animals that live there have thick fur coats for protection from cold and hibernation in the winter months. Lower slopes are commonly covered with coniferous forest.

Aquatic ecosystem: the aquatic ecosystem is the ecosystem found in a body of water, it encompasses aquatic flora, fauna and water properties, as well. There are two main types of aquatic ecosystem-marine and freshwater.

The marine ecosystem: marine ecosystems are the biggest, which cover around 71% of Earth's surface and contain 97% of our planet's water. Water in marine ecosystems features high amounts of minerals and salts dissolved in them. The different divisions of the marine ecosystem are.

**oceanic:** A relatively shallow part of ocean which lies on the continental shelf.

**profundal:** deep or bottom water.

benthic Bottom substrates.

Inter-tidal: the place between low and high tides.

estuaries

Coral reefs

Salt marshes.

Hydrothermal vents where chemosynthetic bacteria make up the food base.

many kinds of organisms live in marine ecosystems: the brown algae, corals, cephalopods, echinoderms, dinoflagellates and sharks.

**The fresh water ecosystem:**

Contrary to the marine ecosystem, the freshwater ecosystem covers only 0.8% of Earth's surface and contains 0.009 of the total water, three basic kinds of freshwater ecosystems exist.

**lentic:** slow-moving or still water like pools, lakes or ponds.

**Lotic:** fast –moving water such as streams and river.

**Waterlands:** places in which the soil is inundated or saturated for some lengthy period of time.

The ecosystem are habitats to reptiles, amphibians and around 41% of the world's fish species. The faster moving turbulent water typically contain a greater concentrations of dissolved oxygen, supporting a greater biodiversity than slow moving water in pools.

### **Q3 What are the functions of Ecosystem?**

**Ans: Ecosystem Functions are:**

Ecosystem function is the capacity of natural processes and components to provide goods and services that satisfy human needs, either directly or indirectly (de Groot et al 2002). By following this definition, ecosystem functions are conceived as a subset of ecological processes and ecosystem structures. Each function is the result of the natural processes of the total ecological sub-system of which it is a part. Natural processes, in turn, are the result of complex interactions between biotic (living organisms) and abiotic (chemical and physical) components of ecosystems through the universal driving forces of matter and energy.

**There are four primary groups of ecosystem functions**

(1) regulatory functions, (2) habitat functions, (3) production functions and (4) information functions. This grouping concerns all ecosystems, not only for forests, but it is interesting how well it fits into forest ecosystem functions.

**General characterization of ecosystem functions are:** (for more detail see Table F1)

(1) **Regulatory functions:** this group of functions relates to the capacity of natural and semi-natural ecosystems to regulate essential ecological processes and life support systems through bio-geochemical cycles and other biosphere processes. In addition to maintaining the ecosystem (and biosphere health), these regulatory functions provide many services that have direct and indirect benefits to humans (i.e., clean air, water and soil, and biological control services).

(2) **Habitat functions:** natural ecosystems provide refuge and a reproduction habitat to wild plants and animals and thereby contribute to the (in situ) conservation of biological and genetic diversity and the evolutionary process.

(3) **Production functions:** Photosynthesis and nutrient uptake by autotrophs converts energy, carbon dioxide, water and nutrients into a wide variety of carbohydrate structures which are then used by secondary producers to create an even larger variety of living

biomass. This broad diversity in carbohydrate structures provides many ecosystem goods for human consumption, ranging from food and raw materials to energy resources and genetic material.

(4) **Information functions:** Since most of human evolution took place within the context of an undomesticated habitat, natural ecosystems provide an essential 'reference function' and contribute to the maintenance of human health by providing opportunities for reflection, spiritual enrichment, cognitive development, recreation and aesthetic experience.

**Q 4 What are main components of Ecosystem?**

**Ans** A Ecosystems consist of life forms existing in a symbiotic relationship with their environment. Life forms in ecosystems compete with one another to become the most successful at reproducing and surviving in a given niche, or environment. Two main components exist in an ecosystem: abiotic and biotic. The abiotic components of any ecosystem are the properties of the environment; the biotic components are the life forms that occupy a given ecosystem.

**Abiotic Components**

Abiotic components of an ecosystem consist of the nonorganic aspects of the environment that determine what life forms can thrive. Examples of abiotic components are temperature, average humidity, topography and natural disturbances. Temperature varies by latitude; locations near the equator are warmer than are locations near the poles or the temperate zones. Humidity influences the amount of water and moisture in the air and soil, which, in turn, affect rainfall. Topography is the layout of the land in terms of elevation. For example, according to the University of Wisconsin, land located in the rain shadow of a mountain will receive less precipitation. Natural disturbances include tsunamis, lightning storms, hurricanes and forest fires.

**Biotic Components**

The biotic components of an ecosystem are the life forms that inhabit it. The life forms of an ecosystem aid in the transfer and cycle of energy. They are grouped in terms of the means they use to get energy. Producers such as plants produce their own energy without consuming other life forms; plants gain their energy from conducting photosynthesis via sunlight. Consumers exist on the next level of the food chain. There are three main types of consumers: herbivores, carnivores and omnivores. Herbivores feed on plants, carnivores get their food by eating other carnivores or herbivores, and omnivores can digest both plant and animal tissue.

**Multiple Choice Questions**

1. Rubbish Heap hypothesis was suggested by.
  - a. Baker
  - b. Zohary

- c. Hawkes
  - d. Volvilov
2. The stimulus diffusion and migration hypothesis was proposed by.
    - a. Volvilov
    - b. Zohary
    - c. Hawkes
    - d. Baker
  3. Which one of the following period displayed the highest mobility of people.
    - a. Bronze
    - b. Neolithic
    - c. Upper Palaeolithic
    - d. Lower Palaeolithic
  4. In which one of the following periods there was greater use of fire by man as a tool.
    - a. Upper Palaeolithic
    - b. Lower Palaeolithic
    - c. Neolithic
    - d. Bronze Age
  5. When was the Bronze for making agriculture more intensive.
    - a. 5000 BC
    - b. 6000 BC
    - c. 2000 BC
    - d. 8000 BC
  6. Where is the sheep understood to have been domesticated first of all about 10,000 years.
    - a. Turkey
    - b. Iraq
    - c. Sahara
    - d. Central Asia
  7. Where is the camel understood to have been domesticated around 4000 years BC.
    - a. Egypt
    - b. India
    - c. Arabia
    - d. None of the above
  8. Where the buffalo is understood to have been domesticated first about 1000 yers ago.
    - a. South Asia
    - b. Central Asia
    - c. Southerwest Asia

d. Far East

9. Which one of the following rivers is considered to be southern most boundary of India valley civilization.
- a. Ganga
  - b. Narmada
  - c. Godavri
  - d. Mahanadi
10. In Mesopotamia's oldest civilization the term Ard was used to connote.
- a. Iron Plough
  - b. Wooden plough
  - c. Ploughing
  - d. Brozze hammer

**Answer Key:**

1. (c) 2. (b) 3. (d) 4. (a) 5. (c) 6. (b) 7. (a) 8. (b) 9. (b)  
10. (a)

# Chapter 3

## Soil System

---

**Q 1 Explain the meaning & importance of soil system.**

**Ans** Soil is formed of rocks that been reduced to small fragments and have been more or less changed chemically, together with remains of plants or animals that live on or in it. Soil system has been defined soil that 'the soil is the natural body of animals, mineral & organic constituents differentiated into horizons of variable depth, which differ from the material below in morphology, physical make-up, chemical properties and composition and biological characteristics'. Thus the whole depth or zone of materials included in the category of soil is differentiated into (i) true or topsoil which represents the uppermost layer of the soil and supports all types of plant life and (ii) the subsoil which represents the weathered materials of the parent rocks but does not carry the nutrients and other properties of topsoil or true soil.

**Q 2 Explain the components of soil system.**

**Ans** The composition of soil is generally studied through its vertical sections which are termed as SOIL PROFILES and these extends from the ground surface down to the unweathered parent rocks. There are four major components of which need consideration for understanding the composition & characteristics of soil in given area.

### **FLOORA, FUNA AND ORGANIC MATTER**

Living organisms and organic matter together constitute 5 and 12% of the total composition of the soil system. The organisms living in the ground or soil are called EDAPHONS. It is very difficult task to differentiate the organisms living in the soils & in the ground because most of the major groups of organism are common to both the environments. The animals living in the soils vary in size, from 20cm in length to less than 20micro meters.

### **MINERAL MATTER**

Mineral are very important constituents of the soil zone because they help in the formation of soil. Minerals are included in the category of inorganic matter of the soil it may be stated that soils are form due to weathering of parent rocks. But it is not always necessary that the mineral composition of a particular soil resting over a parent rock may confirm to the mineral composition of the said parent rock because in many cases more than 90% of the parent materials are not related to the parent rocks rather they have been brought and deposited by water, wind, ice etc. There are continuous process of reorganisation of texture and content of minerals, breakdown of primary minerals,



formation of secondary minerals and regrouping of organic matter and minerals into aggregates. The size of minerals increases with the increasing depth of the soil zone.

### **SOIL SOLUTION**

The quantity of water present in the soil zones affects the flora and fauna of the soil zones and the organisms mainly plants above the ground but having their roots in the soils. The presence of water in the soils is must because it helps in the preparation of soil solution containing nutrients which are taken up by the plants through their roots through the process of Root Osmosis. The amount of water held by the soils is determined by the rate of infiltration of rainwater and melts water and the water retention capacity of soil. The collating into the soil per unit time which is controlled by the structured and texture of soil, nature of organic matter and the amount of moisture already present in the infiltration.

### **SOIL ATMOSPHERE**

The soil atmosphere component of he soil system includes the consideration of the presence of different gases and air. The movement of air within the soil and temperature distribution. It is important that there is variation in the propitiation of oxygen and carbon dioxide of the aboveground atmosphere and soil atmosphere.

### **Q3 Explain Soil Profile and Horizon?**

Ans Through the interactions of these four soil processes, the soil constituents are reorganized into visibly, chemically, and/or physically distinct layers, referred to as horizons. There are five soil horizons: **O, A,E, B, and C.** (**R** is used to denote bedrock.)

There is no set order for these horizons within a soil. Some soil profiles have an A-C combination, some have an O-E-B, an O-A-B, or just an O. Some profiles may have all the horizons, O-A-E-B-C-R. And some profiles may have multiple varieties of one horizon, such as an A-B-E-B. There are some generalized concepts of how soil layers develop with time; these are expressed below, but due to the variability of natural processes over geologic time, generalized concepts are sometimes overly general. Knowing something about the geomorphic history of the area being investigated helps unlock the landscape history the soils show.

**A:** An A horizon is a *mineral horizon*. This horizon always forms at the surface and is what many people refer to as topsoil. Natural events, such as flooding, volcanic eruptions, landslides, and dust deposition can bury an A horizon so that it is no longer found at the surface. A buried A horizon is a clear indication that soil and landscape processes have changed some time in the past. Compared to other mineral horizons (E, B, or C) in the soil profile, they are rich in organic matter, giving them a darker color. The A horizon, over time, is also a zone of loss – clays and easily dissolved compounds

being leached out – and A horizons are typically more coarse (less clay) compared to underlying horizons (with the exception of an E horizon). *Additions* and *losses* are the dominant processes of A horizons.

**B:** A B horizon is typically a mineral subsurface horizon and is a zone of accumulation, called *eluviations*. Materials that commonly accumulate are clay, soluble salts, and/or iron. Minerals in the B horizon may be undergoing transformations such as chemical alteration of clay structure. In human modified landscapes, processes such as erosion can sometimes strip away overlying horizons and leave a B horizon at the surface. Such erosion is common in sloping, agricultural landscapes. A bulldozer preparing land for a new subdivision can also leave a B horizon at the surface. The dominant processes in a B horizon are *transformations and additions*.

**C:** A C horizon consists of parent material, such as glacial till or lake sediments that have little to no alteration due to the soil forming processes. Low intensity processes, such as movement of soluble salts or oxidization and reduction of iron may occur. There are no dominant processes in the C horizon; minimal additions and losses of highly soluble material (e.g., salts) may occur.

**O:** An O horizon has at least 20% organic matter by mass. Two main scenarios result in the formation of an O horizon: saturated, anaerobic conditions (wetlands) or high production of leaf litter in forested areas. Anaerobic conditions slow the decomposition process and allow organic material to accumulate. An O horizon can have various stages of decomposed organic matter: highly decomposed sapric; moderately decomposed, hemic; and minimally decomposed, fibric. In a fibric O layer, plant matter is recognizable (e.g., it is possible to identify a leaf). Sapric material is broken down into much finer matter and is unrecognizable as a plant part. Hemic is in between sapric and fibric, with some barely recognizable plant material present. It is possible to have multiple O horizons stacked upon one another exhibiting different decomposition stages. Because of their organic content, these horizons are typically black or dark brown in color. The dominant processes of the O horizon are *additions* of organic matter, and *transformations* from fabric to fabric.

**E:** An E horizon is a zone of strong leaching, or eluviations. The chemistry and hydrology of this horizon are such that constituents such as clay, organic matter, and minerals like iron oxides are removed, leaving behind the un-pigmented soil particles. This represents a loss of soil constituents from the E horizon. If the materials enrich an underlying B horizon, that process is considered translocation. The E horizon appears lighter in color than an associated A horizon (above) or B horizon (below). An E horizon has lower clay content than an underlying B horizon, and often has lower clay content than an overlying A horizon, if an A is present. E horizons are more common in forested areas because forests are in regions with higher precipitation and forest litter is acidic.

However, landscape hydrology, such as perched water tables, can result in the formation of an E horizon in the lower precipitation grasslands, as seen in the profile below. The dominant processes of an E horizon are *losses*.

**R:** An R layer is bedrock. When a soil has direct contact with bedrock, especially close to the soil surface, the bedrock becomes a variable when developing land use management plans and its presence is noted in the soil profile description.

#### **Q4 How the Soil Forming Processes function?**

Ans The physical and chemical properties of a soil are determined by the soil forming process under which they form. Though all soils are created by the various horizon development processes of additions, transformations, translocation and removals, it is the soil forming or, pedogenic processes that determines the kind of soil that is ultimately formed.

#### **Laterization**

The deep red to bright orange-red soils of the tropics is a product of laterization. Laterization occurs in the hot, rainy tropics where chemical weathering proceeds at a rapid rate. Soils subject to laterization tend toward the acidic and lack much organic matter as decomposition and leaching is extreme. Exposure of the soil to the hot tropic sun by deforestation bakes the soil dry, reducing infiltration, increasing runoff, and reducing fertility.

#### **Calcification**

Calcification occurs in warm, semi-arid environments, usually under grassland vegetation. Soil tends to be rich in organic matter and high in soluble bases. The B horizon of the soil is enriched with calcium carbonate precipitated from water moving downward through the soil, or upward by capillary action of water from below.

#### **Podzolization**

Podzolization occurs in cool and moist climates under pine forests. They are typical of the colder portions of the humid continental and sub arctic climates. The E horizon is heavily leached and basically composed of a light colored layer of sand. The upper portion of the B horizon is stained reddish color from the accumulation of sesquioxides. The profile gets lighter in color as depth increases. Podzolization of sandy soils in the southern United States has been the result of planting pine plantations.

#### **Salinization**

Salinization occurs in warm and dry locations where soluble salts precipitate from water and accumulate in the soil. Saline soils are common in desert and steppe climates. Salt

may also accumulate in soils from sea spray. The rapid evaporation of salt-rich irrigation water has devastated thousands of acres of land world-wide

### **Gleization**

.Gleization occurs in regions of high rainfall and low-lying areas that may be naturally waterlogged. Bacterial activity is slowed in the constantly wet environment thus inhibiting the decomposition of dead vegetation allowing it to accumulate in thick layers. Peat is found in the upper portion of the soil. Decaying plant matter releases organic acids that react with iron in the soil. The iron is reduced rather than oxidized giving the soil a black to bluish - gray color.

## **Multiple Choice Questions**

**1. In our country the Van Mahotsav Day is observed on**

- (a) Second of October
- (b) First of December
- (c) Tenth of August
- (d) First of July

**2. Which of the following wastes cannot be decomposed by bacteria to form compost?**

- (a) Kitchen wastes
- (b) Plastic and polythene bags
- (c) dead plants
- (d) bodies of insects living in the soil

**3. Which of the following problems is not created by noise pollution ?**

- (a) Diarrhoea
- (b) Hypertension
- (c) Deafness
- (d) Irritation

**4. Plants are green because of the presence of a pigment called:**

- (a) glucose
- (b) nitrogen
- (c) chlorophyll
- (d) oxygen

**5. Air is composed of gases, water vapours and**

- (a) dust particles
- (b) rainfall
- (c) snowfall
- (d) light

**6. Medicine of quinine is provided by**

- (a) Eucalyptus plant
- (b) aconite plant
- (c) cinchona plant
- (d) money plant

**7. Chief source of energy in environment is**

- (a) fire
- (b) moon
- (c) sun
- (d) stars

**8. When trees are cut, amount of oxygen**

- (a) decreases
- (b) increases
- (c) both (a) and (b)
- (d) remains same

**9. Process through which plants reproduce:**

- (a) Eating
- (b) Evaporation
- (c) Pollination
- (d) Condensation

**10. 71% of earth surface is covered with:**

- (a) land
- (b) air
- (c) water
- (d) coal

**Answer Key:**

1. (d) 2. (b) 3. (a) 4. (a) 5. (a) 6. (c) 7. (c) 8. (a) 9. (c) 10.(c)

## Chapter 4

# Ecological Production and Energy flow in the Ecosystem

---

**Q 1. Explain the types of Ecological Pyramids.**

**Ans:** The ecological pyramids are of three types:

Pyramid of energy

Pyramid

Pyramid of numbers

### **The Pyramid of Energy**

The energy pyramids give the best picture of the overall nature of the ecosystem.

Here there will be gradual decrease in the availability of energy from the autotrophs higher trophic levels. In other words, there is decrease in energy flow from autotrophs on at successive trophic levels.

In the course of energy flow from one organism to the other, is considerable loss of energy in the form of heat. More energy is available in the autotrophs than in the primary consumers. The least amount of available energy will be in the tertiary consumer. Therefore, shorter the food chain, greater is the amount of energy available at the top.

The energy pyramid always upright and erects.

It shows the rate of energy flows at different trophic levels.

It shows that energy is maximum at producer level and minimum at the carnivores' level.

At every successive trophic level there is a loss of energy in the form of heat, respiration etc.

### **The Pyramid of Biomass**

They are comparatively more fundamental, as they, instead of the geometric factor, show the quantitative relationships of the standing crops. Here there will be gradual decrease in the biomass from the autotrophs to the higher trophic levels. This may be illustrated by studying the trophic levels in a pond.

The biomass in autotrophs like algae, green flagellates, green plants etc. is the maximum. The biomass is considerably less in the next trophic level occupied by secondary consumers like small fishes. The least amount of biomass is present in the last trophic level.

This pyramid shows the total biomass at each trophic level in a food chain.

Pyramid is erect.

It indicates a decrease in the biomass at each trophic level from the base to apex of pyramid.

Example: Total biomass than herbivores, which is again more than carnivorous.

### **The Pyramid of Numbers**

They show the relationship between producers, herbivores and carnivores at successive trophic levels in terms of their number. Here there will be a gradual decrease in the number of individuals from the lower to the higher trophic levels. This may be studied by taking the example of trophic levels in grassland.

The grasses occupy the lowest trophic level and they are abundantly present in the grassland ecosystem. The deers occupy the second level; their number is less than compared to the grasses.

The wolves, which feed upon the deers, are far less in number when compared to the number of deers. The lions, which occupy the next trophic level, feed upon wolves, and the number of individuals in the last trophic level is greatly reduced.

In the parasitic food chain, the pyramid of numbers is found to be inverted. Here, a single plant or tree might support varieties of herbivore. These herbivores like birds in turn, support varieties of parasites like lice, bugs that outnumber the herbivores.

Subsequently each parasite might support a number of hyperparasites like bacteria and fungi, which will outnumber the parasites. Thus from the producer level onwards, towards the consumers, in the parasitic food chain there is a gradual increase in the number of organisms, instead of the usual decrease.

As a result of this, the pyramid becomes inverted in the parasitic food chain. There is a gradual increase in the numbers of individuals from autotrophs to the higher trophic levels.

It shows the number of organism at different levels.

The pyramid is erect.

The smaller animals are preyed upon larger animals and smaller animals increase faster in number of organism at each stage of food chain, makes a triangular figure that is known as pyramid of number.

## Multiple Choice Questions

1. The increase in the concentration of CO<sub>2</sub> in our environment in last fifty years; since 1960 is about
  - a) 20%
  - b) 10%
  - c) 14%
  - d) 6%
  
2. The depletion in the Ozone layer is caused by
  - a) nitrous oxide.
  - b) carbon dioxide.
  - c) chlorofluorocarbons.
  - d) methane.
  - e) all of the above.
  
3. A major in-stream use of water is for
  - a) producing hydroelectric power.
  - b) dissolving industrial wastes.
  - c) agricultural irrigation.
  - d) domestic use.
  - e) none of the above.
  
4. Which of the following are the example of Municipal and industrial discharge pipes
  - a) nonpoint sources of pollution.
  - b) violations of the Clean Water Act.
  - c) point sources of pollution.
  - d) irrigation.
  - e) none of the above.
  
5. The presence of high coliform counts in water indicate
  - a) contamination by human wastes.
  - b) phosphorus contamination.
  - c) decreased biological oxygen demand.
  - d) hydrocarbon contamination.
  - e) none of the above.
  
6. How the biological oxygen demand gets affected with the increased presence of organic matter in water?
  - a) the oxygen demand increases
  - b) the oxygen demand decreases
  - c) the oxygen demand remains unchanged
  - d) None of the above



7. Which of the following is not a major source of groundwater contamination?
- a) agricultural products
  - b) landfills
  - c) septic tanks
  - d) underground storage tanks
  - e) all of the above are major sources of groundwater contamination
8. Which of the following is not considered as part of water use planning?
- a) waste water treatment
  - b) water diversion projects
  - c) storm sewer drainage
  - d) salinization
  - e) Water use planning considers all of the above issues
9. The stage in which the biological processes is used to purify water in a wastewater treatment plants is called
- a) secondary sewage treatment
  - b) primary sewage treatment
  - c) wastewater reduction
  - d) biochemical reduction
  - e) none of the above

**Answer Key:**

1. (c) 2. (c) 3. (a) 4. (c) 5. (a) 6. (c) 7. (a) 8. (e) 9. (e) 10. (a)

## Chapter 5

# Circulation of Element in the Ecosystem and Biogeochemical Cycles

---

Q 1. What is Biochemical Cycle?

Ans:

### BIOCHEMICAL CYCLES

A **biochemical cycle** is the transport and transformation of chemicals in ecosystems. These are strongly influenced by the unique hydrologic conditions in wetlands. These processes result in changes in the chemical forms of materials and also the movement of materials within wetlands. These, in turn, determine overall wetland **productivity**. Materials cycle both within the wetland and between a wetland and its surroundings. Few of these processes are unique to wetlands, but some are more dominant in wetlands than in upland or aquatic ecosystems. For example, anaerobic conditions are the norm in wetlands, whereas they are unusual in both terrestrial and aquatic systems. The cycling between the wetland and outside refers to the degree to which chemicals are transported to or from wetlands.

**open System**-abundant exchange of materials between the wetland and surrounding habitats (typical when the water moves)

**closed System**-little exchange of materials between the wetland and surrounding habitats (typical when water is more stagnant)

### Soil Chemistry

When water fills the pore spaces in soil, the rate at which oxygen can diffuse through the soil is greatly reduced and anaerobic (or **reduced** as opposed to **oxidized**) conditions result in several hours to several days. This lack of oxygen prevents plants from carrying out normal aerobic root respiration and affects nutrient availability and the presence of toxic materials in the soil.

Usually on the surface of wetland soil there is a thin layer of oxidized soil. How thick this is depends on:

rate of oxygen transport across the atmosphere-surface interface

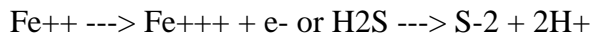
population of oxygen consuming organisms

photosynthetic oxygen production by algae in the water

surface mixing

This aerobic layer would tend to be reddish because of the ferric iron ( $\text{Fe}^{+3}$  = oxidized form) versus the gray-green soil beneath, the ferrous iron ( $\text{Fe}^{+2}$  = reduced form)

Note: In **oxidation**, oxygen is taken up or hydrogen is removed or the chemical gives up an electron (remember that an electron has a negative charge)



**Reduction** is the opposite where oxygen is given up, hydrogen is gained, or an electron is gained

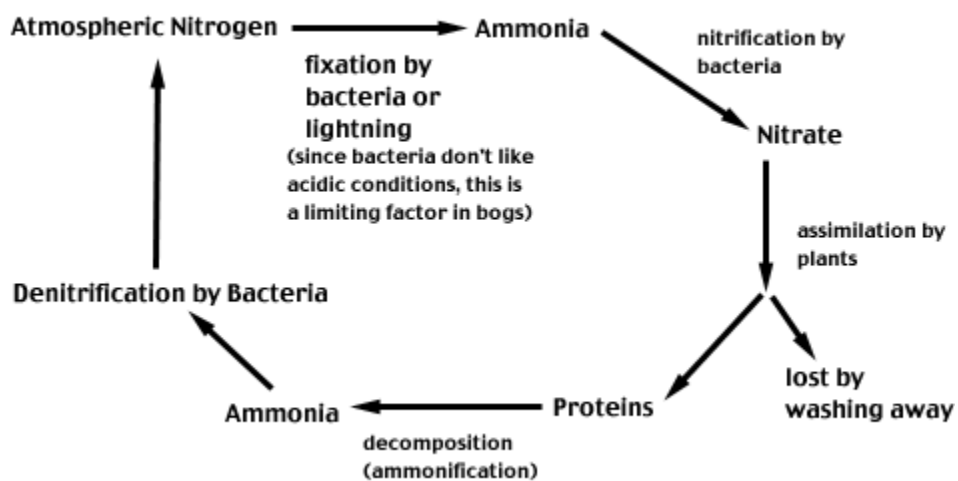
Generally wetland soils are acidic while mineral soils tend to be neutral to alkaline.

## Nutrients

Nitrogen

Nitrogen is usually the limiting nutrient meaning it is the one in short supply so it limits plant growth. If there were more, plants would grow more.

### The Nitrogen Cycle



## Iron

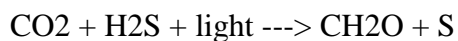
Iron is oxidized to its ferric form in aerobic soils and this gives a characteristic red color. This process can be speeded up by microbial activity of so called iron bacteria. Iron is reduced to the ferrous form in anaerobic environments where it has a characteristic gray or gray-green color (gleying or gleyization). Interestingly, there are iron bacteria that can oxidize ferrous iron from anaerobic groundwater back to the ferric form. These "bog iron" deposits form the basis of the ore that is used in the iron and steel industries. Also, ferrous iron can be toxic to plants in high concentrations. It diffuses to the surface of the roots of wetland plants where it can be oxidized by oxygen leaking from root cells. The resulting iron oxide (rust, essentially) coats the roots and acts as a barrier to nutrient uptake.

## **Sulfur**

Sulfur is very common in wetlands, and the hydrogen sulfide (H<sub>2</sub>S) characteristic of anaerobic wetland soils can be very toxic to plants and microbes. This is released when soils are disturbed and accounts for that rotten-egg wetland smell.

In wetland soil that contain high concentrations of ferrous iron, Fe<sup>2+</sup>, sulfides can combine with the iron to form ferrous sulfides which give the black color characteristic of many anaerobic wetland soils. One of the common mineral forms of this is pyrite, FeS<sub>2</sub>, which is commonly found in coal deposits.

Photosynthetic bacteria such as the purple sulfur bacteria found in salt marshes and mud flats can produce organic matter using sulfur and light:



## **Carbon**

Wetlands depend on decay of organic matter for nutrient cycling (remember that the detrital food web is the main source of energy flow in most wetlands). Aerobic respiration is limited by anaerobic conditions but several anaerobic processes are at work:

**fermentation:** This is the breakdown of carbohydrates to alcohol.



This is carried out by facultative or obligate anaerobes and is one of the major ways that high molecular weight (big) carbohydrates are broken down to low molecular weight (small) organic compounds which can then be taken up by the smallest microbes.

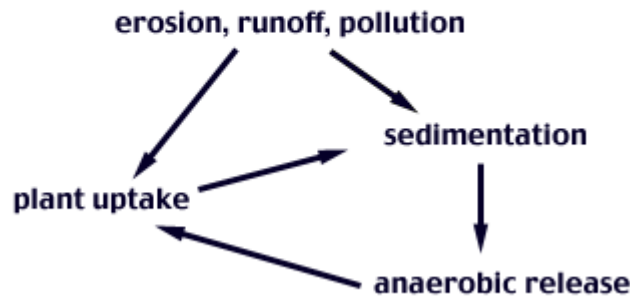
**methanogenesis:** Methanogenesis also breaks down carbohydrates. **Methanogens** are bacteria that use CO<sub>2</sub> to produce CH<sub>4</sub> (methane). This is then released when sediments are disturbed. The production of this has been extensively studied because of implications for global warming.

## Phosphorus

Phosphorus is one of the most important chemicals in ecosystems because it is vital for plant growth. It is often a limiting nutrient but wetlands can also be very good at retaining phosphorus. At any one time, most P in a wetland is tied up in organic litter and peat and inorganic sediments. Since it is a pollutant in high concentrations this ability of wetlands to retain it can be important and is one reason why wetlands can be good for wastewater treatment. Since P is a major ingredient in fertilizer, it is also a reason why it's good to leave a boundary of wetlands between farm fields and rivers, streams, or lakes.

There is no gaseous form of P so the cycle is sedimentary.

### The Phosphorous Cycle



### Chemical Transport in Wetlands

Materials enter wetlands via the same geologic, hydrologic, and biologic pathways typical of other ecosystems.

Geologic includes weathering and erosion

Biologic includes photosynthetic uptake of carbon, nitrogen fixation, and biotic transport of materials by mobile animals such as birds.

Except for gaseous exchanges like photosynthesis and nitrogen fixation, elemental inputs to wetlands are dominated by the hydrologic inputs:

#### Precipitation

Generally inputs from this are very dilute, but with increasing human inputs, such as those resulting from burning fossil fuels, there can be high levels of sulfates and nitrates (this would be "acid rain")

## Rivers, Streams, and Groundwater

When precipitation reaches the ground in a **watershed** it infiltrates into the ground, passes back to the atmosphere through evapotranspiration, or flows along the surface as runoff. Flowing on or through the ground changes the content from the original precipitation. This is basically erosion, except in the case of human interference. For example, sewage effluent or runoff through farms or construction or logging sites can greatly increase concentrations of sediments, nutrients (fertilizers), herbicides, and pesticides.

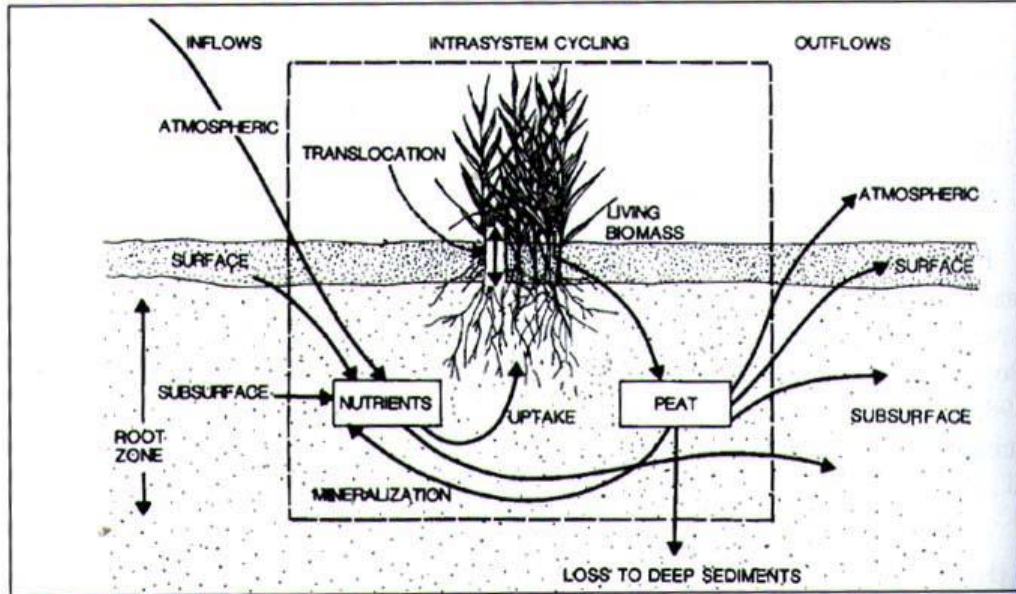
Tides

## Chemical Mass Balances of Wetlands

A **mass balance** of a habitat is basically the inputs versus the outputs.

Inputs include precipitation, surface water, groundwater, and tides. Outputs equal surface water, groundwater, tides, and deep sedimentation.

### 148 *Biogeochemistry of Wetlands*



**Figure 5-14.** Generalized diagram of components of a wetland mass balance including inflows, outflows, and intrasystem cycling.

(from Mitsch and Gosselink, 1993)

Within the wetland there is **intrasystem cycling** among **pools** or **standing stocks**.

Wetlands can be **sources**, **sinks**, or **transformers** of chemicals

**source** = supplier of nutrients to other habitats

**sink** = "holder" of nutrients from other habitats

**transformer** = takes nutrients in one form and gives them up as another

Typically there are seasonal patterns. For example, during the temperate growing season, certain chemicals may be retained better in plant tissue.

Wetlands are often coupled to adjacent ecosystems through chemical exchanges that affect both systems. For example, wetlands can retain excess nutrients and this may benefit downstream aquatic systems. Or an upstream aquatic system may supply nutrients to a wetland.

Some wetlands are extremely productive and some aren't, depending on nutrient supply.

*Chemical Mass Balances of Wetlands*      161

**Table 5-10. Characteristics of High-Nutrient (Eutrophic) and Low-Nutrient (Oligotrophic) Wetlands**

<i>Characteristic</i>	<i>Low-Nutrient Wetland</i>	<i>High-Nutrient Wetland</i>
Inflows of nutrients	Mainly precipitation	Surface and ground water
Nutrient cycling	Tight closed cycles; adaptations such as carnivorous plants and nutrient translocations	Loose open cycle; few adaptations to shortages
Wetland as source or sink of nutrients	Neither	Either
Exporter of detritus	No	Usually
Net primary productivity	Low (100–500 g m <sup>-2</sup> yr <sup>-1</sup> )	High (1,000–4,000 g m <sup>-2</sup> yr <sup>-1</sup> )
Examples	Ombrotrophic bog; cypress dome	Floodplain wetland; many coastal marshes

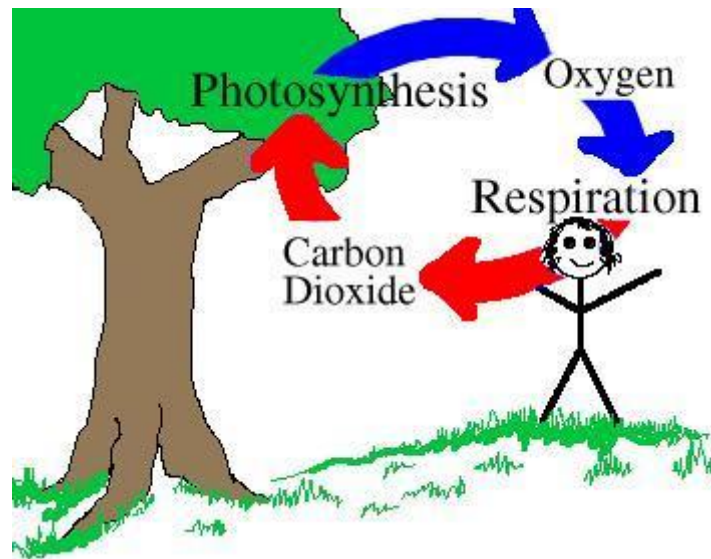
(from Mitsch and Gosselink, 1993)

Nutrient cycling in wetlands is different from both terrestrial and aquatic systems. More nutrients are tied up in sediments and peat in wetlands than in most terrestrial systems. Deepwater aquatic systems have autotrophic activity more dependent on nutrients in the water column than nutrients in the sediments.

Anthropogenic changes have led to considerable changes in chemical cycling in many wetlands.

**Q 2. What is oxygen Cycle?**

**Ans:** Oxygen plays an significant role in the biosphere and is very essential elements for the living organism because it support life and arise from it. The circulation of oxygen also helps in the cycling of other element in the biosphere. Oxygen is chemically very active because it combines with majority of the elements in the biosphere, during the process of creating energy in living cells.



Just as water moves from the sky to the earth and back in the hydrologic cycle, oxygen is also cycled through the environment. Plants mark the beginning of the oxygen cycle. Plants are able to use the energy of sunlight to convert carbon dioxide and water into carbohydrates and oxygen in a process called photosynthesis.



This means that plants "breathe" in carbon dioxide and "breathe" out oxygen.

Animals form the other half of the oxygen cycle. We breathe in oxygen which we use to break carbohydrates down into energy in a process called respiration.



Carbon dioxide produced during respiration is breathed out by animals into the air.

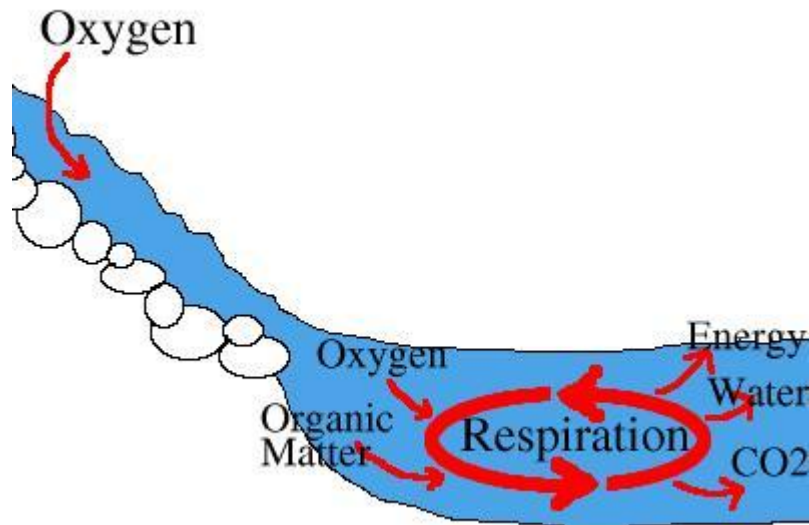
So oxygen is created in plants and used up by animals, as is shown in the picture above. But the oxygen cycle is not actually quite that simple. Plants must break carbohydrates down into energy just as animals do. During the day, plants hold onto a bit of the oxygen which they produced in photosynthesis and use that oxygen to break down carbohydrates. But in order to maintain their metabolism and continue respiration at night, the plants must absorb oxygen from the air and give off carbon dioxide just as animals do. Even though plants produce approximately ten times as much oxygen during



the day as they consume at night, the night-time consumption of oxygen by plants can create low oxygen conditions in some water habitats.

### Oxygen in Water

Oxygen in water is known as dissolved oxygen or DO. In nature, oxygen enters water when water runs over rocks and creates tremendous amounts of surface area. The high surface area allows oxygen to transfer from the air into the water very quickly.



When the water in a stream enters a pond, microorganisms in the pond begin to metabolize (break down) organic matter, consuming oxygen in the process. This is another form of oxygen cycle - oxygen enters water in rapids and leaves water in pools.

Oxygen uptake rate (O.U.R.) is the rate at which oxygen is consumed by living organisms in the water. Since organisms are constantly using up oxygen in the water and oxygen is constantly reentering the water from the air, the amount of oxygen in water remains relatively constant. In a healthy ecosystem, the rates of oxygen transfer (being used up) and oxygen uptake are balanced in the water.

### Q3. Explain Phosphorous Cycle.

Ans: Phosphorus enters the environment from rocks or deposits laid down on the earth many years ago. The phosphate rock is commercially available form is called apatite. Other deposits may be from fossilized bone or bird droppings called guano. Weathering and erosion of rocks gradually releases phosphorus as phosphate ions which are soluble in water. Land plants need phosphate as a fertilizer or nutrient.

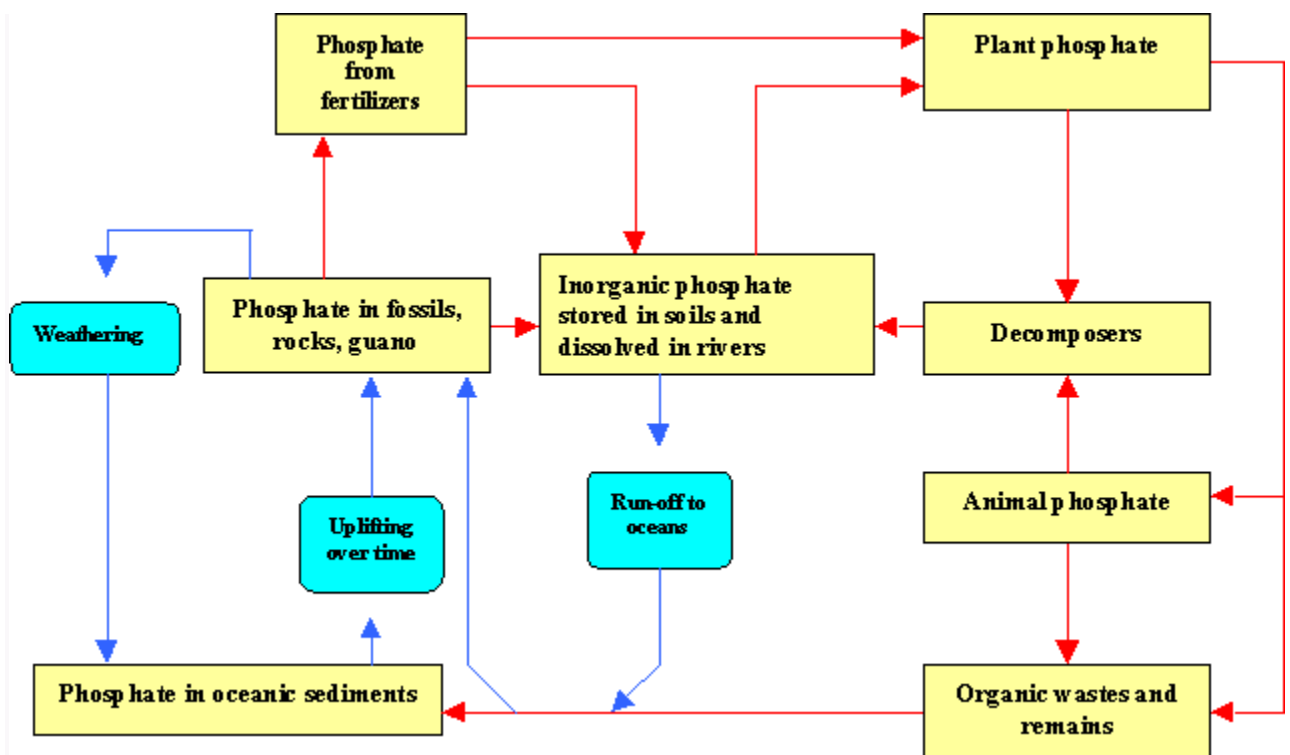
Phosphate is incorporated into many molecules essential for life such as ATP, adenosine triphosphate, which is important in the storage and use of energy. It is also in the backbone of DNA and RNA which is involved with coding for genetics.

When plant materials and waste products decay through bacterial action, the phosphate is released and returned to the environment for reuse.

Much of the phosphate eventually is washed into the water from erosion and leaching. Again water plants and algae utilize the phosphate as a nutrient. Studies have shown that phosphate is the limiting agent in the growth of plants and algae. If not enough is present, the plants are slow growing or stunted. If too much phosphate is present excess growth may occur, particularly in algae.

A large percentage of the phosphate in water is precipitated from the water as iron phosphate which is insoluble. If the phosphate is in shallow sediments, it may be readily recycled back into the water for further reuse. In deeper sediments in water, it is available for use only as part of a general uplifting of rock formations for the cycle to repeat itself.

A schematic representation of the phosphorus cycle:



**Q 4. What are Human Inputs in Phosphorus Cycle?**

**Ans: Human Inputs to the Phosphorus Cycle:**

Human influences on the phosphate cycle come mainly from the introduction and use of commercial synthetic fertilizers. The phosphate is obtained through mining of certain deposits of calcium phosphate called apatite. Huge quantities of sulfuric acid are used in the conversion of the phosphate rock into a fertilizer product called "super phosphate".

Plants may not be able to utilize all of the phosphate fertilizer applied, as a consequence, much of it is lost from the land through the water run-off. The phosphate in the water is eventually precipitated as sediments at the bottom of the body of water. In certain lakes and ponds this may be re dissolved and re cycled as a problem nutrient.

Animal wastes or manure may also be applied to the land as fertilizer. If misapplied on frozen ground during the winter, much of it may be lost as run-off during the spring thaw. In certain areas very large feed lots of animals, may result in excessive run-off of phosphate and nitrate into streams.

Other human sources of phosphate are in the out flows from municipal sewage treatment plants. Without an expensive tertiary treatment, the phosphate in sewage is not removed during various treatment operations. Again an extra amount of phosphate enters the water.

### **Multiple Choice Questions**

Q1. Molten rock found within the Earth's mantle.

- a) metamorphic rock
- b) igneous rock
- c) magma
- d) sedimentary rock

Q2. The zone of hot, partly melted rock which can be deformed by heat and pressure allowing plate movement.

- a) core
- b) crust
- c) mantle
- d) lithosphere
- e) asthenosphere

Q3. Surrounds the core and most is solid rock.

- a) core
- b) crust
- c) mantle
- d) asthenosphere

Q4. outermost and thinnest zone of the Earth that lies under the continents and ocean.  
core

- a) crust
- b) mantle
- c) lithosphere
- d) aesthenosphere

Q5. All of the following allow for natural cooling of buildings EXCEPT.

- a) awning of planting of deciduous trees in front of windows
- b) planting of living roofs
- c) geothermal heat pumps
- d) high efficiency windows
- e) heliostats

Q6. A common means of reducing dependence on fuel wood biomass and thereby reduce deforestation is to implement the use of:

- a) photovoltaic solar system to generate home heating needs
- b) solar cookers
- c) hydrogen fuel cell stoves
- d) hybrid electric heaters
- e) wind powered refrigeration

Q7. Micro-hydropower generators can be used.

- a) to produce energy using the thermal pollution byproducts of the nuclear and coal powered electricity generation.
- b) Can be used in smaller rivers and even water pipe systems to capture the energy in the moving water without disrupting the flow
- c) Are found on sailboats and convert wind energy in a turbine on the mast to a rotor to aid in the boats propulsion
- d) Is a new nano technology to capture hydrogen fuel from water
- e) All of the above

Q8. Tidal energy;

- a) uses a hydroelectric dam across the opening of a bay to capture the ebb and flood water movement.
- b) Floating turbines that move in and out of bays with the tide.
- c) Kinetic pads which can be placed off shore and capture the energy of water movement
- d) Flippers attached to buoys which capture the kinetic energy of waves which push them up and down
- e) Attached to off shore oil rigs to aid in the running of drills.

Q9 In addition to the rock particles, the soil contains.

- a) air and water
- b) water and plants
- c) minerals, organic matter, air and water
- d) water, air and plants

Q10 the water holding capacity is the highest is.

- a) sandy soil
- b) clayey soil
- c) lomy soil
- d) mixture of sand and loam

Q 11 Soil profile refers to an arrangement within a soil of.

- a) it horizontal layout
- b) vertical layout
- c) size of soil particles
- d) none of theses

Answer Key:

1. (c) 2. (d) 3. (a) 4. (a) 5. (d) 6. (b) 7. (b) 8. (a) 9. (c) 10.  
(a)

## Chapter 6

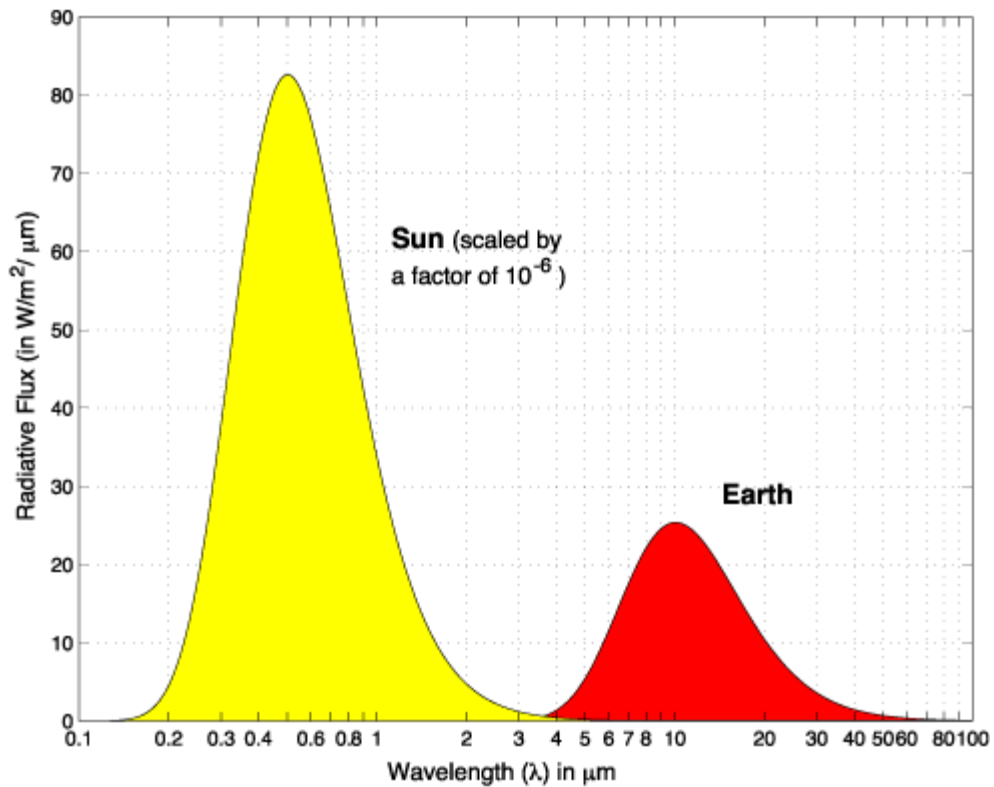
# Man, Atmospheric Environment And Global Warming

---

**Q 1. What is global heat energy of the earth's and the atmosphere?**

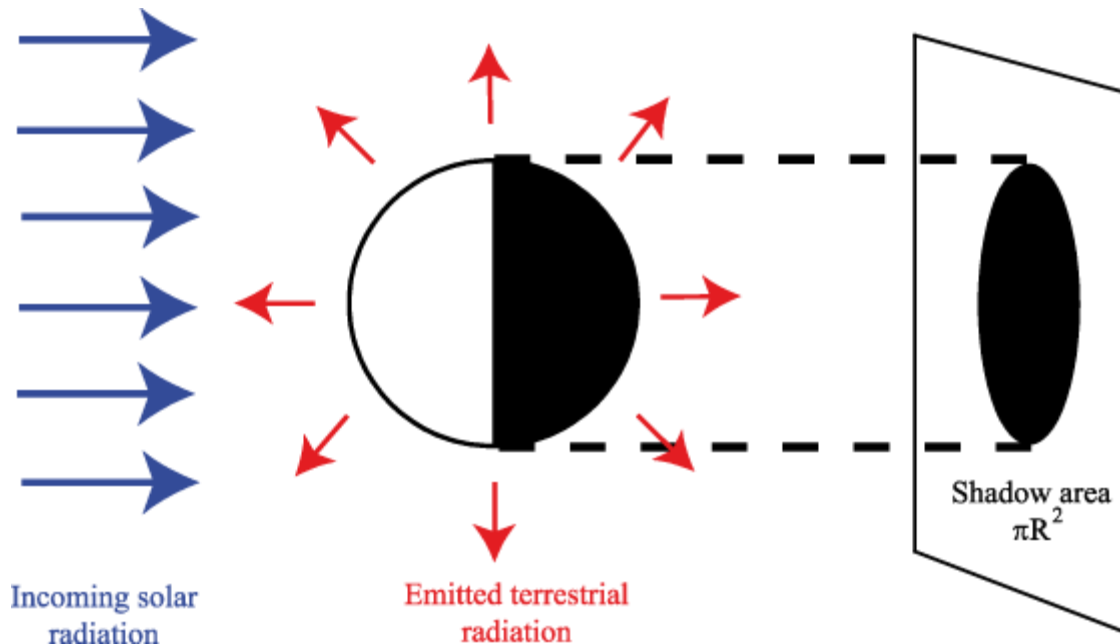
Ans: Nearly all the energy entering the climate system comes from the Sun in the form of electromagnetic radiation. Additional sources are present, such as geothermal heating for instance, but their contribution is so small that their influence can safely be neglected. At the top of the Earth's atmosphere, a surface at the mean Earth-Sun distance perpendicular to the rays receives about  $1368 \text{ W/m}^2$ . This is often called the Total Solar Irradiance (TSI) or solar constant  $S_0$ . A bit less than half of this energy comes in the form of radiation in the visible part of the electromagnetic spectrum, the remaining part being mainly in the near infrared, with a smaller contribution from the ultraviolet part of the spectrum .

## Black Body Emission Curves of the Sun and Earth



Spectrum of the energy received from the Sun and emitted by the Earth at the top of the atmosphere.

On average, the total amount of incoming solar energy outside the Earth's atmosphere is the constant times the cross-sectional surface (i.e., the surface that intercepts the solar rays, which corresponds to a surface  $\pi R^2$  where  $R$  is the Earth's radius of  $6371 \text{ km}^2$ ). For simplicity and because it is a reasonable approximation, we will neglect the thickness of the atmosphere compared to the Earth's radius in our computations of distances or surfaces. Some of this incoming flux is reflected straight back to space by the atmosphere, the clouds and the Earth's surface. The fraction of the radiation that is reflected is called the Albedo of the Earth or planetary albedo. In present-day conditions, it has a value of about 0.3.



Heat absorbed and emitted by the Earth.

In order to achieve a heat balance, the heat flux coming from the Sun must be compensated for by an equivalent heat loss. If this were not true, the Earth's temperature would rapidly rise or fall. At the Earth temperature, following Wien's Law, this is achieved by radiating energy in the infrared part of the electromagnetic spectrum. As the radiations emitted by the Earth have a much longer wavelength than those received from the Sun, they are often termed longwave radiation while those from the Sun are called shortwave radiation. Treating the Earth as a black body, the total amount of energy that is emitted by a  $1 \text{ m}^2$  surface ( $A_{\uparrow}$ ) can be computed by Stefan-Boltzmann's law:

$$A_{\uparrow} = \sigma T_e^4$$

Where  $\sigma$  is the Stefan Boltzmann constant ( $\sigma = 5.67 \cdot 10^{-8} \text{ W m}^{-2} \text{ K}^{-4}$ ). This equation defines  $T_e$ , the effective emission temperature of the Earth. The Earth emits energy in all directions, so the total amount of energy emitted by the Earth is times the surface of the Earth,  $4\pi R^2$ . To achieve equilibrium, we must thus have .

$$\text{Absorbed solar radiation} = \text{emitted terrestrial radiation} \quad \pi R^2 (1 - \alpha) S_0 = 4\pi R^2 \sigma T_e^4$$

This leads to

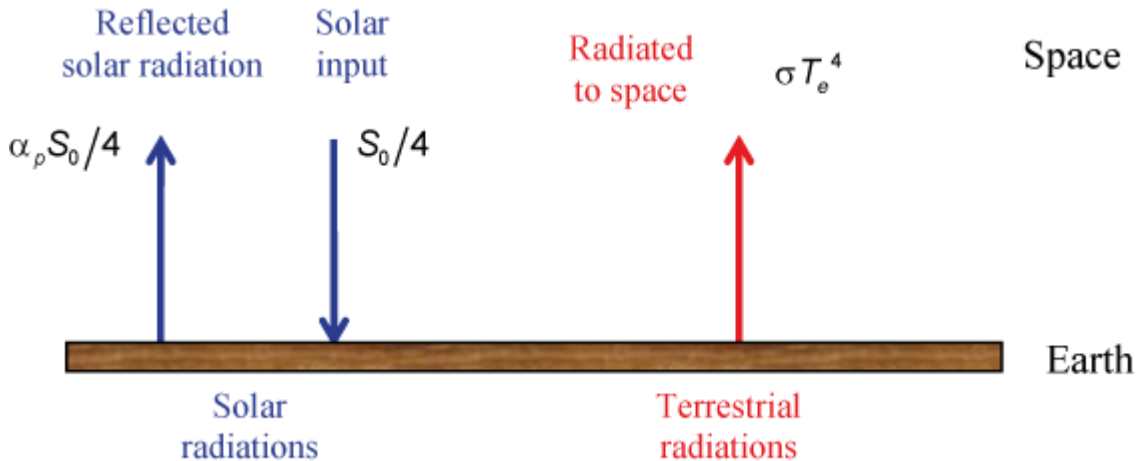
$$(1 - \alpha) S_0 = 4\sigma T_e^4$$

and finally to

$$T_e = \left( \frac{(1 - \alpha) S_0}{4\sigma} \right)^{1/4}$$



This corresponds to  $T_e=255\text{K}$  ( $=-18^\circ\text{C}$ ). Note that we can interpret as the mean balance between the emitted terrestrial radiation and the absorbed solar flux for  $1\text{ m}^2$  of the Earth's surface. As shown above, the factor  $1/4$  arises from the spherical geometry of the Earth, because only part of the Earth's surface receives solar radiation directly.



Simple heat balance of the Earth (assuming it behaves like a perfect blackbody).

The temperature  $T_e$  is not a real temperature that could be measured anywhere on Earth. It is only the black body temperature required to balance the solar energy input. It can also be interpreted as the temperature that would occur on the Earth's surface if it were a perfect black body, there were no atmosphere, and the temperature was the same at every point.

**Q2. What are effects of ozone depletion?**

Ans: The most important function of the stratospheric ozone is to protect the troposphere and the earth's surface from most of the ultraviolet solar radiation by absorbing ultraviolet. Stratospheric ozone filters out most of the sun's potentially harmful shortwave ultraviolet (UV) radiation. If this ozone becomes depleted, then more UV rays will reach the earth. Exposure to higher amounts of UV radiation could have serious impacts on human beings, animals and plants, such as the following:

**Harm to human health:**

More skin cancers, sunburns and premature aging of the skin.

More cataracts, blindness and other eye diseases: UV radiation can damage several parts of the eye, including the lens, cornea, retina and conjunctiva.

Cataracts (a clouding of the lens) are the major cause of blindness in the world. A sustained 10% thinning of the ozone layer is expected to result in almost two million new cases of cataracts per year, globally (Environment Canada, 1993).

Weakening of the human immune system (immunosuppression). Early findings suggest that too much UV radiation can suppress the human immune system, which may play a role in the development of skin cancer.

**Adverse impacts on agriculture, forestry and natural ecosystems:**

Several of the world's major crop species are particularly vulnerable to increased UV, resulting in reduced growth, photosynthesis and flowering. These species include wheat, rice, barley, oats, corn, soybeans, peas, tomatoes, cucumbers, cauliflower, broccoli and carrots.

The effect of ozone depletion on the Canadian agricultural sector could be significant.

Only a few commercially important trees have been tested for UV (UV-B) sensitivity, but early results suggest that plant growth, especially in seedlings, is harmed by more intense UV radiation.

**Damage to marine life:**

In particular, plankton (tiny organisms in the surface layer of oceans) are threatened by increased UV radiation. Plankton are the first vital step in aquatic food chains.

Decreases in plankton could disrupt the fresh and saltwater food chains, and lead to a species shift in Canadian waters.

Loss of biodiversity in our oceans, rivers and lakes could reduce fish yields for commercial and sport fisheries.

**Animals:**

In domestic animals, UV overexposure may cause eye and skin cancers. Species of marine animals in their developmental stage (e.g. young fish, shrimp larvae and crab larvae) have been threatened in recent years by the increased UV radiation under the Antarctic ozone hole.

**Materials:**

Wood, plastic, rubber, fabrics and many construction materials are degraded by UV radiation.

The economic impact of replacing and/or protecting materials could be significant.

**Effects on Plants**

Physiological and developmental processes of plants are affected by UVB radiation, even by the amount of UVB in present-day sunlight. Despite mechanisms to reduce or repair

these effects and a limited ability to adapt to increased levels of UVB, plant growth can be directly affected by UVB radiation.

Indirect changes caused by UVB (such as changes in plant form, how nutrients are distributed within the plant, timing of developmental phases and secondary metabolism) may be equally, or sometimes more, important than damaging effects of UVB. These changes can have important implications for plant competitive balance, herbivory, plant diseases, and biogeochemical cycles.

### **Effects on Marine Ecosystems**

Phytoplankton form the foundation of aquatic food webs. Phytoplankton productivity is limited to the euphotic zone, the upper layer of the water column in which there is sufficient sunlight to support net productivity. The position of the organisms in the euphotic zone is influenced by the action of wind and waves. In addition, many phytoplankton are capable of active movements that enhance their productivity and, therefore, their survival. Exposure to solar UVB radiation has been shown to affect both orientation mechanisms and motility in phytoplankton, resulting in reduced survival rates for these organisms. Scientists have demonstrated a direct reduction in phytoplankton production due to ozone depletion-related increases in UVB. One study has indicated a 6-12% reduction in the marginal ice zone.

Solar UVB radiation has been found to cause damage to early developmental stages of fish, shrimp, crab, amphibians and other animals. The most severe effects are decreased reproductive capacity and impaired larval development. Even at current levels, solar UVB radiation is a limiting factor, and small increases in UVB exposure could result in significant reduction in the size of the population of animals that eat these smaller creatures.

### **Q 3. What is Green house effects?**

Ans: In a greenhouse, energy from the sun passes through the glass as rays of light. This energy is absorbed by the plants, soil, and other objects in the greenhouse. Much of this absorbed energy is converted to heat, which warms the greenhouse. The glass helps keep the greenhouse warm by trapping this heat.

The earth's atmosphere acts somewhat like the glass of a greenhouse. About 31 % of the incoming radiation from the sun is reflected directly back to space by the earth's atmosphere and surface (particularly by snow and ice), and another 20 % is absorbed by the atmosphere. The rest of the incoming radiation is absorbed by the earth's oceans and land, where it is converted into heat, warming the surface of the earth and the air above it.

Particular gases in the atmosphere act like the glass of a greenhouse, preventing the heat from escaping.

These greenhouse gases absorb heat and radiate some of it back to the earth's surface, causing surface temperatures to be higher than they would otherwise be. The most important naturally occurring greenhouse gas is water vapour and it is the largest contributor to the natural greenhouse effect. However, other gases, although they occur in much smaller quantities, also play a substantial and growing role in the greenhouse effect. These include carbon dioxide, methane, and nitrous oxide.

Without this natural greenhouse effect, the earth would be much colder than it is now - about 33 °C colder - making the average temperature on the planet a freezing -18 °C rather than the balmy 15 °C it is now. The warmth of our climate is crucial because on earth and in the atmosphere, water can exist in all three of its phases - frozen as snow or ice, liquid as water, and gaseous as water vapour. The cycling of water from one phase to another is critical to sustaining life since it is this cycling of water through the land-ocean-atmosphere system that replenishes the water available to life on earth. The water cycle is also an important part of what drives our weather and the climate system generally.

### **Multiple Choice Questions**

1. A form of water pollution coming from the rainwater carrying toxins out of the mines and mines wastes is known as:
  - a) thermal mine pollution
  - b) acid mine drainage
  - c) pit mine plumes
  - d) toxic mine shock
  - e) mercury poisoning
  
2. Type of mineral extraction that is LEAST likely to disturb as much land area is:
  - a) open pit mining
  - b) mountain top removal
  - c) contour mining
  - d) strip mining
  - e) subsurface mining
  
3. The new technology of in-situ mining using bacteria to extract mineral is also known as:
  - a) Biomining
  - b) Reverse osmosis
  - c) Bacterial reduction
  - d) microbial spoiling

4. The rock that contains a large enough concentration of a metal that it can be mined for economic value.
  - a) A gem
  - b) An ore
  - c) A mineral
  - d) Inorganic compounds
  - e) Continental crust
  
5. The weathering of rocks from wind, water, and thermal expansion is known as:
  - a) kinetic weathering
  - b) biological weathering
  - c) external weathering
  - d) chemical weathering
  - e) physical weathering
  
6. When two continental convergent plates collide the subduction zone creates what formation?
  - a) mountain ranges
  - b) oceanic trenches
  - c) ocea ridges
  - d) transform fault lines
  - e) continental trenches
  
7. The san Andreas faults line that lies in California is the result of what type of plate boundary?
  - a) divergent plate boundary
  - b) transform faults
  - c) subduction zones
  - d) convergent plate boundary
  - e) mid-oceanic faults lines
  
8. What type of formation would you expect to find at a divergent plate boundary in the ocean?
  - a) Mid- oceanic trench
  - b) Volcanoes
  - c) Oceanic Ridges
  
9. Forms when pre-existing rock is exposed to high heat and pressures.
  - a) Metamorphic rock
  - b) ingneou rock
  - c) magma
  - d) sedimentary rock
  
10. Examples would include sandstone and limestone.
  - a) metamorphic rock
  - b) igneous rock

- c) magma
- d) sedimentary rock

**Answer Key:**

1. (d) 2. (e) 3. (a) 4. (b) 5. (e) 6. (a) 7. (b) 8. (c) 9. (a) 10. (d)

## Chapter 7

# Man-induced soil erosion and sedimentation

---

**Q1. How man induced effect soil erosion?**

**Ans:** Erosion or to be more specific, soil erosion, is the gradual wearing away of soil particles from natural processes such as wind, water and other elements. This also includes rocks and other geological materials.

is used in filling the lower part and a small bund is also raised along the outer edge of the terrace to check the downward flow of rainwater and also soil erosion.

**Channel terrace:** It consists of making of wide but shallow channels across the slope of the land either exactly on contour line or with a slight grade (0.1 to 0.2 per cent). In this process, the excavated soil is placed along the lower edge of the channel in the form of low ridge.

**Narrow based terrace:** It consists of making a number of narrow based ridges or bunds at a distance of 1m to 2m across the slope of the land at suitable intervals in high rainfall areas.

**Broad based ridge terrace:** It consists of making wide but low bunds on the contour lines by excavating soils from both sides of terrace. This is practiced in areas where the rainfall is relatively low.

**Contour trenching:** It consist of making a series of deep pit (i.e. 2ft. wide and 1ft. deep) or trenches across the slope at convenient distance. The soil excavated from the trenches is deposited on the lower edge of the trenches where forest trees are planted.

### Multiple Choice Question

1. Which of the following is a macro nutrient?
  - a. Sulphur
  - b. Iron
  - c. Sodium
  - d. Copper
  
2. which of the following is a renewable source of energy.

- a. Crude oil
  - b. Geothermal energy
  - c. Natural Gas
  - d. None of the above
3. when was the Stockholm Environmental conference held.
- a. 1992
  - b. 1982
  - c. 1972
  - d. 1962
4. when was the earth Summit II held
- a. 1992
  - b. 1982
  - c. 1962
  - d. 1972
5. which one of the following is not a renewable source of energy.
- a. Geothermal energy Biomass energy
  - b. Hydropower
  - c. Petroleum Oil
6. Which one of the following is green house gas.
- a. Nitrogen
  - b. Hydrogen
  - c. Methane
  - d. None of the above.
7. Which one of the following is greenhouse gas.
- a. Oxygen
  - b. Hydrogen
  - c. Oxides of Nitrogen
  - d. Hydrogen
  - e. None of the above.
8. What is the latitudinal extent of the Savanna Biome.
- a. 0 to 20° N
  - b. 0 to 20° N & S
  - c. 0 to 20° S
  - d. 20 to 40° N to 7° S
9. which one of the following is known as closed savanna.
- a. woodland savanna
  - b. shrub savanna



- c. grass savanna
- d. none of the above

10. Which one of the following is known as Xenomorphic Structure?

- a. Grass Savanna
- b. Tree savanna
- c. Mediterranean Biome
- e. Woodland Savanna

Answer Key:

1. (a) 2. (b) 3. (c) 4. (a) 5. (d) 6. (c) 7. (c) 8. (b) 9. (a) 10. (c)

# Chapter 8

## Environment Degradation

---

### Q1 What is Environmental Degradation?

Ans Environment is comprehensive term which in general reference to the surrounding s but in geographical perspective environment includes a biotic or physical and biotic components of the life supporting layer . The dynamic evolving earth system in general and the biosphere earth system or natural environmental system in particular are governed by discernible process, both physical and biological. Various physical, chemical and biological processes are countinously engaged in the creation, maintenance, and destruction of surface material of the earth's surface. these earth material e.g. mineral, rocks, soils, water etc. are not only created but are maintained changed in their , transferred from one place to another and even destroyed by geologic cycle but these material even while passing through aforesaid pathways remain initially uncontaminated and are very useful for man but when ever these material are used or dispersed by man, they become contaminated and are seldom available for human use because either yhey are dispersed to such locations which may not be reached by man for fairly long period of time or they become so contaminated that they are not reusable.

Physical and biological processes of the natural environmental system operate is such a way that any changes in any part of the environment at any place in a specific time period is suitably compensated by negative feedback mechanism in a natural condition.

### **Environmental Degradation and Pollution:**

To most of the people environmental degradation and pollution are synonym as both are concerned with the lowering of the quality of the environment. But a distinction between these two aspects of the lowering and deterioration of the basis of causative factor and scale of deterioration of environmental quality in terms of magnitude/intensity and covered area. To my mind environmental pollution means lowering of the quality of environment at local scale caused exclusively by human activities whereas enviourment quality at local , regional and global scale by both Natural processes and Human activities.

Types of Environmental Degradation: It is apparent form there preceding discussion that enviourmental degradation is much bigger and comprehensive tern which includes lowering and deterioration of enviourmental quality caused by both natural factor and anthropogenic factor from local level through regional level to global level. The events

caused by either natural processes or anthropogenic processes, which bring immediate changes in the natural environment and inflict colossal damage and loss to the environmental quality and living organisms are called Extreme Hazards.

### **Environmental Degradation:**

Divided into two categories on the basis of factors responsible for the lowering of environmental quality and the level and magnitude of lowering/deterioration of environmental quality

### **Extreme Events and Hazards**

#### **Pollution**

### **Extreme Events and Hazards:**

divided into 3 sub-categories on the basis of causative factor.

#### **Natural Hazards**

Terrestrial Natural Hazards

Atmospheric Natural Hazards

Cumulative Atmospheric Hazards

#### **Man-induced Hazards**

Physical Man-induced Hazards

Chemical and Nuclear Hazards

Biological Hazards induced by man

#### **Biological Hazards (not caused by man)**

### **POLLUTION:**

**is caused by human activities and is generally divided into two broad categories**

#### **Physical Pollution**

Is caused due to lowering of the quality of physical or abiotic components of the environment by human activities and is further divided into three subtypes.

## **Land Pollution**

Example: Accelerated rate of soil erosion through rill and gully erosion, Decortications, soil pollution, Stalinization etc.

## **Water Pollution**

Pollution of sea water, pollution of ground water, pollution of streams, pollution of lakes etc.

## **Air Pollution**

Depletion of ozone layer, increase in the concentration of greenhouse gases in the atmosphere, decrease in the quality of air etc.

## **Social Pollution**

Pollution caused in different aspects of the society due to cumulative effects of extreme events/hazards and pollution. Social pollution may be further divided into several sub types.

Population Explosion

## **Sociological Pollution**

Educational and social back wardens, crimes, perpetual quarrels, wars, communal riots etc.

Economic Pollution

Poverty

## **CAUSES OF DEFORESTATION:**

The major cause of deforestation is global and regional levels are.

## **CONVERSION OF FOREST LAND INTO AGRICULTURAL LAND:**

Increasing population growth at fast rate mainly in the developing countries has put enormous pressure on forested land because it became necessary to clear the virgin forest covers and convert them into agricultural land so that agricultural production may be substantially increased and food may be provided to hungry human pollution.

## **SHIFTING OR JHUMING CULTIVATION:**

Is a major cause of forest loss in the hilly and mountainous area of south and south-east Asia. The loss of virgin forest cover due to shifting cultivation is increasing every year in the different parts of India.

### **TRASFORMATION OF FORESTS INTO PASTYRES:**

Has been responsible for rapid rate of loss of virgin forest in the Mediterranean and temperate areas mainly in North America, South America and Africa. The main factor behind large-scale conversion of woodland into pasture land is expanding dairy farming and cattle reaching for meat.

### **OVERGRAZING:**

Of forest of moderate cover by animal mainly in the tropical and sub tropical and arid semi arid areas has resulted into large-scale degradation of natural vegetation if not the complete.

## **Multiple Choice Question**

1. Which one if the following is a micro-nutrient.
  - a. Copper
  - b. Nitrogen
  - c. Calcium
  - d. Phosphorus
  
2. Which one of the following is a macro-nutrient.
  - a. Sulphur
  - b. Magnesium
  - c. Potassium
  - d. Zinc
  
3. Which one of thefollowing is a macro-nutrient.
  - a. nitrogen
  - b. iron
  - c. sodium
  - d. manganess
  
4. Which one of the following is a macro-nitrient.
  - a. zinc
  - b. calcium
  - c. copper
  - d. sodium

5. Which one of the following is a macro-utrient
  - a. cobalt
  - b. vanadium
  - c. sodium
  - d. potassium
  
6. Which on of the following elements is required in large quantities by plants and animals.
  - a. phosphorus
  - b. zic
  - c. molybdenum
  - d. iron
  
7. Which one of the following elements is required in lagr quantities by plants and animals.
  - a. Nitrogen
  - b. Phosphourus
  - c. molybdenum
  - d. calcium
  
8. Which one of the following elements is required in large quantities by plants and animals.
  - a. sodium
  - b. potassium
  - c. chlorine
  - d. boron
  
9. which one of following elements is required in small quantities by plants and animals.
  - a. calcium
  - b. phosphorus
  - c. iron
  - d. sulphur
  
10. Which one of the following elements is required in large quantities by plants and animals.
  - a. sulphur
  - b. iron
  - c. chlorine
  - d. Zinc

Answer Key:

1. (a) 2. (d) 3. (a) 4. (c) 5. (b) 6. (b) 7. (d) 8. (a) 9. (a) 10. (c)

## Chapter 9

# Extreme events, Hazards and Disaster

---

### Q 1. Explain the types of natural hazards

Ans: Natural environment hazards and disaster involve comparatively rare high-intensity process and extreme events.

#### Earthquakes

Earthquakes are caused by the sudden release of slowly accumulated strain energy along a fault in the earth's crust. Earthquakes and volcanoes occur most commonly at the collision zone between tectonic plates. Earthquakes represent a particularly severe threat due to the irregular time intervals between events, lack of adequate forecasting, and the hazards associated with these: Ground shaking is a direct hazard to any structure located near the earthquake's center. Structural failure takes many human lives in densely populated areas.

Faulting, or breaches of the surface material, occurs as the separation of bedrock along lines of weakness.

Landslides occur because of ground shaking in areas having relatively steep topography and poor slope stability.

Liquefaction of gently sloping unconsolidated material can be triggered by ground shaking. Flows and lateral spreads (liquefaction phenomena) are among the most destructive geologic hazards.

Subsidence or surface depressions result from the settling of loose or unconsolidated sediment. Subsidence occurs in waterlogged soils, fill, alluvium, and other materials that are prone to settle.

Tsunamis or seismic sea waves, usually generated by seismic activity under the ocean floor, cause flooding in coastal areas and can affect areas thousands of kilometers from the earthquake center. Ground shaking is a direct hazard to any structure located near the earthquake's center. Structural failure takes many human lives in densely populated areas.

Faulting, or breaches of the surface material, occurs as the separation of bedrock along lines of weakness.

Landslides occur because of ground shaking in areas having relatively steep topography and poor slope stability.

Liquefaction of gently sloping unconsolidated material can be triggered by ground shaking. Flows and lateral spreads (liquefaction phenomena) are among the most destructive geologic hazards.

Subsidence or surface depressions result from the settling of loose or unconsolidated sediment. Subsidence occurs in waterlogged soils, fill, alluvium, and other materials that are prone to settle.

Tsunamis or seismic sea waves, usually generated by seismic activity under the ocean floor, cause flooding in coastal areas and can affect areas thousands of kilometers from the earthquake center

## **Volcanoes**

Volcanoes are perforations in the earth's crust through which molten rock and gases escape to the surface. Volcanic hazards stem from two classes of eruptions:

Explosive eruptions which originate in the rapid dissolution and expansion of gas from the molten rock as it nears the earth's surface. Explosions pose a risk by scattering rock blocks, fragments, and lava at varying distances from the source.

Effusive eruptions where material flow rather than explosions is the major hazard. Flows vary in nature (mud, ash, lava) and quantity and may originate from multiple sources. Flows are governed by gravity, surrounding topography, and material viscosity.

Hazards associated with volcanic eruptions include lava flows, falling ash and projectiles, mudflows, and toxic gases. Volcanic activity may also trigger other natural hazardous events including local tsunamis, deformation of the landscape, floods when lakes are breached or when streams and rivers are dammed

## **Landslides**

The term landslide includes slides, falls, and flows of unconsolidated materials. Landslides can be triggered by earthquakes, volcanic eruptions, soil saturated by heavy rains or groundwater rise, and river undercutting. Earthquake shaking of saturated soils creates particularly dangerous conditions. Although landslides are highly localized, they can be particularly hazardous due to their frequency of occurrence. Classes of landslide include:

Rock falls, which are characterized by free-falling rocks from overlying cliffs. These often collect at the cliff base in the form of talus slopes which may pose an additional risk.



Slides and avalanches, a displacement of overburden due to shear failure along a structural feature. If the displacement occurs in surface material without total deformation it is called a slump.

Flows and lateral spreads, which occur in recent unconsolidated material associated with a shallow water table. Although associated with gentle topography, these liquefaction phenomena can travel significant distances from their origin.

The impact of these events depends on the specific nature of the landslide. Rockfalls are obvious dangers to life and property but, in general, they pose only a localized threat due to their limited areal influence. In contrast, slides, avalanches, flows, and lateral spreads, often having great areal extent, can result in massive loss of lives and property. Mudflows, associated with volcanic eruptions, can travel at great speed from their point of origin and are one of the most destructive volcanic hazards.

## **Flooding**

Two types of flooding can be distinguished: (1) land-borne floods, or river flooding, caused by excessive run-off brought on by heavy rains, and (2) sea-borne floods, or coastal flooding, caused by storm surges, often exacerbated by storm run-off from the upper watershed. Tsunamis are a special type of sea-borne flood.

### **Coastal flooding**

Storm surges are an abnormal rise in sea water level associated with hurricanes and other storms at sea. Surges result from strong on-shore winds and/or intense low pressure cells and ocean storms. Water level is controlled by wind, atmospheric pressure, existing astronomical tide, waves and swell, local coastal topography and bathymetry, and the storm's proximity to the coast.

Most often, destruction by storm surge is attributable to:

Wave impact and the physical shock on objects associated with the passing of the wave front.

Hydrostatic/dynamic forces and the effects of water lifting and carrying objects. The most significant damage often results from the direct impact of waves on fixed structures. Indirect impacts include flooding and undermining of major infrastructure such as highways and railroads.

Flooding of deltas and other low-lying coastal areas is exacerbated by the influence of tidal action, storm waves, and frequent channel shifts.

## **River flooding**

Land-borne floods occur when the capacity of stream channels to conduct water is exceeded and water overflows banks. Floods are natural phenomena, and may be expected to occur at irregular intervals on all stream and rivers. Settlement of floodplain areas is a major cause of flood damage.

## **Tsunamis**

Tsunamis are long-period waves generated by disturbances such as earthquakes, volcanic activity, and undersea landslides. The crests of these waves can exceed heights of 25 meters on reaching shallow water. The unique characteristics of tsunamis (wave lengths commonly exceeding 100 km, deep-ocean velocities of up to 700 km/hour, and small crest heights in deep water) make their detection and monitoring difficult. Characteristics of coastal flooding caused by tsunamis are the same as those of storm surges.

## **Hurricanes**

Hurricanes are tropical depressions which develop into severe storms characterized by winds directed inward in a spiraling pattern toward the center. They are generated over warm ocean water at low latitudes and are particularly dangerous due to their destructive potential, large zone of influence, spontaneous generation, and erratic movement. Phenomena which are associated with hurricanes are:

Winds exceeding 64 knots (74 mi/hr or 119 km/hr), the definition of hurricane force. Damage results from the wind's direct impact on fixed structures and from wind-borne objects.

Heavy rainfall which commonly precedes and follows hurricanes for up to several days. The quantity of rainfall is dependent on the amount of moisture in the air, the speed of the hurricane's movement, and its size. On land, heavy rainfall can saturate soils and cause flooding because of excess runoff (land-borne flooding); it can cause landslides because of added weight and lubrication of surface material; and/or it can damage crops by weakening support for the roots.

## **Multiple Choice Questions**

1. Leaching of soil is caused by.
  - a. removal of debris by running water
  - b. changes in the soil through organic activity
  - c. removal of organic matter
  - d. removal of soluble matter by percolating water

2. Which one of the following is major passive soil former.
  - a. parent material
  - b. moisture
  - c. temperature
  - d. micro-organisms
  
3. The horizontal layers of soils are known as.
  - a. soil structure
  - b. soil horizons
  - c. soil profile
  - d. soil composition
  
4. What does pH value of soil stand for.
  - a. fertility of soil
  - b. soil maturity
  - c. soil chemistry
  - d. cation exchange capacity
  
5. Which one of the following has terra-rossa type of soils.
  - a. equatorial region
  - b. Mediterranean region
  - c. tropical region
  - d. wetland
  
6. Which one of the following derives their energy only from the Herbivores.
  - a. Autotrophs
  - b. Carnivores
  - c. Omnivores
  - d. Detritivores
  
6. Which one of the following constitutes the trophic level I of the food chain.
  - a. Autotrophs
  - b. Omnivores
  - c. Carnivores
  - d. Detritivores
  
7. Which one of the following constitutes the second trophic level of the food web.
  - a. Omnivore
  - b. Carnivores
  - c. Herbivores
  - d. Autotrophic
  
8. Which of the following constitutes the second trophic level of the food chain.
  - a. Omnivore

- b. Carnivores
- c. Herbivores
- d. Autotrophic

9. Which one of the following constitute the third trophic level of food chain.

- a. Herbivores
- b. Carnivores
- c. Autotrophs
- d. Omnivores

10. Which one of the following constitute the primary producer.

- a. Omnivores
- b. Carnivores
- c. Herbivores
- d. Autotrophs

Answer Key:

1. (d) 2. (a) 3. (b) 4. (d) 5. (a) 6. (b) 7. (a) 8. (c) 9. (b) 10. (a)

# Chapter 10

## Environmental Pollution

---

**Q1 What do you mean by air pollution?**

Ans: Air pollution is a mixture of solid particles and gases in the air. Car emissions, chemicals from factories, dust, pollen and mold spores may be suspended as particles. **Ozone**, a gas, is a major part of air pollution in cities. When ozone forms air pollution, it's also called smog. Air pollution is contamination of the indoor or outdoor environment by any chemical, physical or biological agent that modifies the natural characteristics of the atmosphere. Household combustion devices, motor vehicles, industrial facilities and forest fires are common sources of air pollution. Pollutants of major public health concern include particulate matter, carbon monoxide, ozone, nitrogen dioxide and sulfur dioxide. Outdoor and indoor air pollution cause respiratory and other diseases, which can be fatal.

**Q2. Explain the types of pollutants?**

Ans: Air pollution ,several division can be made.

**Primarily air pollutants** can be used by primary sources or secondary sources. The pollutants that are a direct result of the process can be called primary pollutants. A classic example of a primary pollutants would be the sulfur-dioxide emitted from factories.

Secondary air pollutants are the ones that are caused by the inter mining and reactions of primary pollutants. Smog created by the interaction of several primary pollutants is known to be a secondary pollutant.

**Q3. Explain the cause of air pollution.**

Ans: There are many causes of air pollution which are as follows:

1. **Burning of fossil pollution:** sulfur dioxide from the combustion of fossil fuels like coal, petroleum and other factory combustibles is one the major cause air pollution. Pollution emitting from vehicles including rucks, jeeps, cars, trains, airplanes cause immense amount of pollution. We rely on them to fulfill our daily basic needs of transportation. Carbon monoxide caused by improper or incomplete combustion and generally emitted from vehicles is another major pollution along along with nitrogen oxides. That is produces from both natural man made processes.
2. **Agricultural activities:** ammonia is a very common by product from agriculture related activites and is one of the most hazardous gases in the atmosphere. Use of insecticides, pesticides, pesticides and fertilizers in agriculture activities has grown quite a lot. They emit harmful chemical into the air and can also cause water pollution.

3. Exhaust from factories and industries: manufacturing industries release large amount of carbon monoxide, hydrocarbon, organic compound, and chemical into the air there by depleting the quality of air .manufacturing industries can be found at very corner of the earth and there is on area that has not been affected it. Petroleum refineries also release hydrocarbon and various other chemical that pollute the air and also cause land pollution.
4. Mining operation: mining is a process where in mineral below the earth is extracted using large equipments. During the process dust and chemical are released in the air causing massive air pollution. This is one of the reason which is responsible for the deteriorating health condition of workers and nearby residents.
5. indori air pollution: household cleaning products, painting supplies emits toxic chemicals in the air and cause air pollution. It creates some sort of smell which makes it literally impossible for you to breath.

#### **Q 4. How air pollution effects?**

Ans: Air pollution effects in many ways:

Respiratory and heart problem:: the effects of air pollution are alarming. They are known to create several respiratory and heart condition along with cancer, among other thrusts to the body. Several millions are known to have died due to direct or indirect effects of air pollution. Childers in areas exposed to air pollutants are said to community suffer from pneumonia and asthma.

Global warming: Another direct effect is the immediate alteration that the world is witnessing due to global warming. With increased temperature world wide. Increase in sea level and melting of ice from colder region and iceberg, displacement and loss of habitat have already signaled an impending disaster if action for preservation an normalization aren't undertaken soon.

Acid Rain: harmful gases like nitrogen and sulfur oxides and released into the atmosphere during the burning of fossil fuels. When it rain, the water droplets combines with these air pollutants, becomes acidic and then fall on the ground in the form of acid. Acid rain can cause great damage to human, animals and crops.

Eutrophication: eutrophication is a condition where high amount of nitrogen present in some pollutants gets developed sea's surface and turns itself into algae and adversely affects fish, plants and animal species. The green colored algae that is present on lakes and pounds is due to presence of this chemical only.

Effects on Wildlife: just like humans, animals also grace some devastating affects of air pollution. Toxin chemical present in the air can force wildlife species to move to new place and change their habitat. The toxic pollution deposit over the surface of the water and can also effects sea animal.

Depletion of ozone layer: ozone exists in earth's stratosphere and is responsible for harmful ultraviolet rays. Earth's ozone layer is depleting due to the presence of chlorofluorocarbon, hydro chlorofluorocarbons in the atmosphere. As ozone layer will go thin, it will emit harmful rays back on earth and can cause skin and eye related problem.

**Q.5 Suggest some solution for air pollution.**

Ans: some solution of air pollution:

**Use public mode of transportation:** encourage people to use more and more public modes of transportation to reduce pollution. Also try to use of car pooling.

**Conserve energy:** switch off fans and lights when you are going out. Large amount of fossil fuels are burnt to produce electricity. one can save environment from degradation by reducing the amount of fossil fuels to be burned.

**Understand the concept of reduce, reuse and recycle:** do not throw any items that are of no use to you. In fact reuse them for some purpose. Eg. You can use old jars to store cereals or pulse.

**Emphasis on clean resources:** clean energy resources: Clean energy technologies like solar energy, wind and geothermal are on high these days. Government of various countries has been providing grants to consumers who are interested in installing solar panels for their home. This will go a long way to curb air pollution.

**Use energy efficient devices:** CFL lights use less electricity as against counterpart. They do not longer consume less electricity, lower electricity bills and also help you to reduce pollution by consuming less energy.

## Chapter -19

# Water pollution

---

**Q 1. Explain Water pollution?**

**Ans Definition of water pollution**

Water is most important element in the biosphere because on one hand it is vital for the maintenance of all forms of life and on the other hand it help in the movement , circulation and cycling of nutrients in the biosphere. It is found in various phases and in various storage such as (i) in liquid phase (ii) in solid phase

The term water pollution refers to deterioration in chemical, physical and biological properties of water brought about by human activities and natural.

### **SOURCES OF WATER POLLUTANTS:**

**NATURAL SOURCES:** of water pollutants includes soil erosion, landslides, coastal and life erosion, volcanic eruption and decay and decomposition of plant and animals. Excessive soil erosion in the catchments area of Particular River increases the sediment load of the river and thus increases the salinity of river and lake water.

**Anthropogenic Sources:** it may be pointed out that natural water system is capable of taking care of pollutants and therefore it is the anthropogenic sources which are the real sources of water pollution. The anthropogenic sources of water pollution include industrial source, urban source, agricultural source, cultural sources generation of large number of people during pilgrimage, religion fairs etc.

### **Types of Water Pollution:**

Water pollution is divided on different bases as given below:

**ON THE BASIS OF SOURCES OF POLLUTANTS:** water pollutant are divided into

**Industrial Pollutants:** industrial waste water includes several chemical pollutants such as chlorides, sulphides, carbonates, ammoniac nitrogen, nut rates, and heavy metals such as mercury. Lead, zinc, arsenic, baron etc

**Agricultural Pollutants:** chemical fertilizer, pesticides, insecticides and herbicides and several other synthetic chemical compounds, weed and plant remains.



**Urban Pollutants:** various types of ion such as sulphate ion, nitrate ion, chlorine ion and sodium ion deicing salts used to melt ice spread over roads, calcium ions and bicarbonate ions etc.

**Natural Pollutants:** volcanic dusts, sediments due to weathering and erosion, debris caused by landslides, decayed and decomposed organic matter etc.

### **ON THE BASIS OF PHYSICAL AND CHEMICAL PROPERTIES:**

**Physical Pollutants:** colors, taste, turbidity, sediments, volcanic dust, oil and grease, dissolved and suspended solids, total solids.

**Chemical pollutants:** chlorides, sulphides, car borates, ammoniac nitrogen, nitrites, insecticides, herbicides, several other synthetic chemical compounds etc.

### **Q.2 How Water pollution effects?**

Ans: Water pollution causes irreparable damage to both plants and animals including man, The most suffers are human beings and micro-organisms. Polluted water is the major cause for the spread of epidemics and several dangerous diseases such as cholera, tuberculosis, jaundice, dysentery, typhoid, paratyphoid, diarrhea etc. The use of water polluted with solid minerals for drinking purpose cause fatal diseases. Water pollution mainly caused by toxic chemical cause deaths of aquatic organisms including both plants and animals. The use of polluted water of river, lakes, and ponds and even polluted ground water for irrigating agricultural fields severally images crop and decreases agriculture production. Heavily polluted water also pollutes soils, decreases their fertility and kills soil micro-organisms such as useful bacteria.

### **Q.3 How Water pollution can be controlled?**

Ans: Control of water pollution requires several remedial measures involving individuals, community, and government at national and international levels. The individuals must be educated enough to understand the nature of water pollution and its adverse effects of human health and wealth. There must be mass awareness and right perception at community level about various aspects of water pollution. Thus people must restrain themselves from throwing human and animal excreta and garbage's into any water body. The industrial units must be obliged to treat industrial effluents before discorporate must arrange for sewage treatment plants and government should provide adequate funds for water pollution control programmers.

## **Multiple Choice Question**

1. Which of the following is of volcanic origin.
  - a. Andaman & Nicobar Island
  - b. Lakshdeep Island

- c. Reunion Island
- d. Maldives

2. Which one of the following is Continental Island?

- a. Andaman & Nicobar
- b. Maldives
- c. Laksheepweep
- d. Reunion Island

3. Which one of the following is continent; island.

- a. Madagascar
- b. Maldives
- c. Lakshdeep weep
- d. Reunion Island

4. Which one of the following submarine trenches is in the South Pacific Ocean?

- a. Aleutian
- b. Kuril
- c. Bonin
- d. Mariana

5. The tonga and atacama submarine trenches are located in which one of the ocean.

- a. Indian Ocean
- b. Atlantic Ocean
- c. Northern Pacific
- d. Southern pacific

6. Which one of the following submarine trenches is located in Northern Pacific Ocean.

- a. Aleutian
- b. Mariana
- c. Mindanao
- d. Atacama

7. Which one of the following is a detached elevation with shallow depths.

- a. Reef
- b. Shoal
- c. Seamount
- d. Guyots

8. Which one pf the following is Farthest from the sea shore.

- a. Continentsl Shelf
- b. Abyssal Plain

- c. Continental Slope
- d. Continental Rise.

9. Which one of the following are coral island.

- a. Andamans
- b. Nicobars
- c. Bermuda
- d. Mauritius

10. Which one of the following has largest number of submarine trenches.

- a. Northern Pacific Ocean
- b. Southern Pacific Ocean
- c. Atlantic Ocean
- d. Indian Ocean

Answer Keys:

1. (c) 2. (b) 3. (a) 4.(d) 5. (d) 6. (a) 7. (b) 8. (b) 9. (c) 10. (a)

# Chapter 11

## Soil pollution

---

**Q1. What is Land Pollution and also explain the types of land pollution?**

**Ans:** Land pollution is the deterioration of the earth's land surface, often directly or indirectly as a result of man's activities and their misuse of land resources. It occurs when waste is not disposed off properly, or occur when human throw chemicals up to the soil in the form of pesticides, insecticides and fertilizers during agriculture practices. Exploitation of mineral has also contributed to the destruction of the earth's surface. Industrial revolution, nature habitats have been destroyed, and environments have been polluted, causing diseases in both human and many other species of animals. There are different types of land pollution.

**1.Solid waste:** these include all the various kind of rubbish we make at home, school, hospitals, market and work places. Thing like paper, plastic containers, bottles, cans food and even used cars and broken furniture and hospital waste are all examples of solid waste. Some of these are biodegradation . examples includes food droppings, paper products as well as vegetation. Other are not biodegradable, and they includes plastics, metals and aluminum cans, broken computer and car parts.

**2.Pesticides and Fertilizers** Many farming activities engage in the application of fertilizers, pesticides and insecticides for higher crop yield. This is good because we get more food, but can you think of what happens to the chemicals that end up on the crops and soils. Sometimes, insects and small animals are killed and bigger animals that eat tiny animals (as in food chains) are also harmed. Finally, the chemicals may be washed down as it rains and over time, they end up cause's water pollution

### **3.Chemicals**

Chemical and nuclear power plants produce waste materials that have to be stored somewhere. Fertilizer, insecticides, pesticides, pharmaceuticals manufacturers also produce lots of solid and liquid waste. In many cases they are stored in an environmentally safe way, but there are some that find their way into landfills and other less safe storage facilities. Sometimes they also find their way into leaking pipes and gutters. They end up polluting soils and making crops harmful to our health.

### **Deforestation**

Humans depend on trees for many things including life. Trees absorb carbon dioxide (a green house gas) from the air and enrich the air with Oxygen, which is needed for life. Trees provide wood for humans and a habitat to many land animals, insects and birds. Trees also, help replenish soils and help retain nutrients being washed away. Unfortunately, we have cut down millions of acres of tree for wood, construction,

farming and mining purposes, and never planted new trees back. This is a type of land pollution.

**Q2. What are the sources of land Pollution?**

Ans: **Sources of land pollution.**

Below are some sources of solid and semi-solid pollutants:

**Agricultural sources:**

These include waste matter produced by crop, animal manure, and farm residues. They also include the chemical left over of all pesticides, fertilizers and insecticides used for agricultural activities.

**Ashes:** The residual matter that remains after solid fuels are burned. When waste is burned in incinerators, two types of ashes are produced. **Bottom ash** is the debris from burnt metal and glass waste. Bottom ash are not bio-degradable. The second type of ash is called **fly ash**. This is the ash that is trapped by filters in the chimney of the incinerators. It is known to be very toxic (poisonous). Every four trucks of waste burnt produces about one truck of ashes that end up in the landfill too. Ashes easily leak into the soil and water tables causing land and water pollution.

**Mining sources:** This includes piles of coal refuse and heaps of slag and underground debris. Mining and forestry activities that clear the land surfaces (clearcutting) and use 'skid trails' often leave the land unrestored. The surface is exposed to erosion which destroys the quality of the land. Additionally, iron and other chemicals such as copper, mercury and lead from mining practices leach into the soil, polluting it and leaving it exposed to water bodies as well.

**Industrial sources:** These include paints, chemicals, metals and aluminum, plastics and so on that are produced in the process of manufacturing goods.

**Sewage Treatment:** Wastes that are left over after sewage has been treated, biomass sludge, and settled solids. Some of these are sent directly to landfills while others treatment plants burn them to generate electricity. Both end up polluting the environment.

**Garbage or waste:** These include household or municipal waste such as glass, metal, cloth, plastic, wood, paper, and so on. Some of these can decay and others cannot. They are usually collected and sent to landfills where the pollution action begins.

**Construction sources:** These include waste like debris, wood, metals and plastics that are produced from construction activities.

**Deforestation:** This is when trees are cut down for economic purposes, mining, farming and construction. In forests areas, trees absorb and reflect about 20% of the intense heat from the sun, protecting and preserving its surface soils. Cutting down trees mean that the

land is exposed to direct sunlight and rain, resulting in soil erosions, desertification and land degradation

**Chemical And Nuclear Plants:** These include chemical waste from chemical industries that are disposed off into landfills.

**Oil Refineries:** When crude oil is refined into usable petrol, gas or diesel, there are by products that end up as waste.

**Q3. What are the Effects of land pollution?**

Ans There can be catastrophic consequences of land pollution in relation to humans, animals, water and soils. The effects are even worse if the garbage is not separated into organic, re-usable and recyclable waste.

**Contaminated lands and environments can:**

Cause problems in the human respiratory system.

Cause problems on the skin.

Cause various kinds of cancers.

**The toxic materials that pollute the soil can get into the human body directly by:**

Coming into contact with the skin.

Being washed into water sources like reservoirs and rivers.

Eating fruits and vegetables that have been grown in polluted soil.

Breathing in polluted dust or particles.

**How to prevent land pollution**

Like many other challenges, the best way to solve problems is to understand it. This means learning about it (like what you are doing now) is the greatest step forward.

Here are a few other tips on how you can help reduce land pollution:

People should be educated and made aware about the harmful effects of littering. Discuss with friends and family and talk about it.

Reuse any items that you can. Items like clothing, bottles, wrapping paper and shopping bags can be used over and over again, rather than buying new things.

The greatest prevention to land pollution is in the three 'R's' ...

**Reduce Waste, Re-use** things and

**Recycle** things. This is true even for governments. They can also use the three 'R' rule to minimize the amount of waste that ends up in landfills. After the three 'R's, remember to turn the rest of the garbage into compost.

Personal litter should be disposed properly. We can separate household waste at home for recycling. More than half of our household waste could be recycled or re-used but once it is mixed up, it becomes more difficult to separate different components for recycling.

This is also true for waste we make at school or hospitals.

### **Buy biodegradable products.**

- Store all liquid chemicals and waste in spill-proof containers.
- Eat organic foods that are grown without pesticides. Look out for fertilizer or pesticide free products when you go to the market.
- Don't use pesticides if you can.
- Use a drip tray to collect engine oil.
- Buy products that have little packaging.
- Don't dump motor oil on the ground.
- Governments can also ensure that there are incentives for people to recycle and re-use things.

### **Multiple Choice Questions**

1. Which one of the following has highest salinity.
  - a. Black sea
  - b. Great Salt lake
  - c. Dead Sea
  - d. Lake Van
  
2. Which one of the following has the lowest salinity.
  - a. Great Salt Lake
  - b. Lake Van
  - c. Black Van
  - d. Dead Sea
  
3. The northern equatorial current in pacific ocean starting from west coast of central American forms near the Philippines.
  - a. Kuroshio current
  - b. North Pacific current
  - c. Alaska current
  - d. Californian current
  
4. What is the direction of movement of conter equarorial current of the pacific ocean in the equatorial region.
  - a. East to West
  - b. Sourtheast of Northeast
  - c. West to East
  - d. Morth to South
  
5. What is the direction of movement of north equatorial current of the pacific ocean in the equatorial region.

- a. East to West
- b. west to East
- c. North to South
- d. South to North

6. The Labrador current flows from
- a. North Atlantic to South Atlantic Ocean
  - b. Artic ocean to Atlantic ocean
  - c. Atlantic ocean to Artic ocean
  - d. South Atlantic to North Atlantic ocean

7. Which one of the following ocean current is common to pacific, Atlantic and Indian ocean.

- a. Labrador current
- b. Kuroshio current
- c. Gulf Stream
- d. West wind Drift

8. What is the time interval between the two tides of the day?

- a. 10 hours 30 min
- b. 12 hours 25 min
- c. 11 hours 30 min
- d. 12 hours

9. The in and out movement of water into gulf through a channel is known as.

- a. Tidal Bore
- b. Neap Tide
- c. Tidal current
- d. Spring Tide

10. When a tide enters a narrow and shallow estuary of a river, the front of tidal wave is know as.

- a. Tidal Bore
- b. Tidal Current
- c. Tidal Buldge
- d. None of the above.

Answer Key:

1. (d) 2. (c) 3. (a) 4. (c) 5. (a) 6. (b) 7. (d) 8. (b) 9. (c) 10. (a)



# Chapter 12

## Noise pollution

---

### Q.1 What is Noise Pollution?

Ans: Noise is generally regarded as an unwanted sound or sound, which produces unpleasant effects on the ears. Noise is produced by household gadgets, vehicles on the road, jet planes, loud speakers etc. Noise produces severe adverse effects on the quality of mans surrounding and is, therefore, considered to be polluting the environment. It is the loudness and duration of the noise which is disturbing and causes physical discomfort and damage to hearing.

#### Sources

Household gadgets like mixer, grinder, vacuum cleaner, washing machine, cooler, air conditioners, greatly enhance the levels of sound and are deleterious to health.

Loud speakers not only disturb the students in their studies but also the peace of the locality. Loud radios, stereos and televisions are also a major source.

Printing presses, industries, vehicles on road, aero planes contribute to noise pollutions in large cities.

#### Effects of Noise Pollution

##### Hearing

The immediate and acute effect of noise pollution is impairment of hearing. Damage to the eardrum can be caused by impulsive loud sounds or by prolonged exposure to noise. Long exposure to loud noise may result in hearing loss which may become permanent.

##### Effects on general health

Apart from hearing impairment, the first effects are **anxiety and stress reaction** and in extreme cases **fright**. The physiological manifestations are:

Increase in the rate of heart-beat, increased cholesterol and blood pressure.

Constriction of blood vessels

Digestive spasms and stomach disorders

Dilation of the pupil of the eye

It interferes with proper communication, peace of mind and behavior

It causes headache, irritability and nervousness, feeling of fatigue and decreases work efficiency.

Noise also affects the developing embryo in mother's uterus.

### **Control of Noise Pollution**

Construction of sound proof rooms for noisy machines in industries.

Use of horns with jarring sounds to be banned.

Noise producing industries, aerodromes, and railway stations to be shifted away from the inhabited areas.

Proper law should be enforced to check the misuse of loudspeakers and public announcements systems.

To enforce silence zones near schools / colleges, hospitals etc.

Growing green plants/trees along roadside to reduce noise pollution as they absorb sound.

Loud speakers are banned from 10pm to 6am. India enacted Air (Prevention and Control of Pollution) Act, 1981 and noise pollution has been declared an offence.

### **Q.2 Explain the effects of Noise pollution?**

Ans: Noise pollution exposure of human beings to noise of level higher than recommended level causes a number of adverse effects ranging from mild annoyance to permanent hearing loss. The effects of noise pollution of human are generally of noise pollution of human are generally of four types which are as follows.

**General Effects-** of noise pollution on humans includes speech interference, annoyance sleep interference and related aftereffects and problem. Speech interference is generally caused by community noise. Speech interference simply means non-audibility of speech to a particular person due to loud community noise.

**Auditory Effects-** include the damages done to hearing mechanism in human due to various type of noise. Noise pollution causes hearing damages in a number of ways. The problem has been thrown with sharp focus by the discovery that some teen-agers were suffering from permanent hearing loss following long exposures to amplified rock music and by public concern about the effects of sonic booms that would be caused by supersonic transport if they were put into commercial services.

**Psychological Effects**-High level noise cause many behavioural changes among human as well as animals. Unwanted noise very often causes annoyance, irritation, and fatigue which result into low performance, low efficiency and frequent errors.

**Physiological effects**- annoyance irritation, anxiety, strains and stresses caused by noise pollution may cause changes in hormone content of blood which in turn may introduce changes in human bodies. Noise pollution of various sorts caused by varying level of noise may cause high blood pressure, heart diseases, dilation of pupils of the eyes, tensing of the voluntary and involuntary muscles, diminution of gastric secretion, neuromuscular tension, nervousness, stomach etc.

### Multiple Choice Questions

1. The tidal bulge is caused by.
  - a. Gravitational pull of the moon
  - b. Gravitational pull of the Sun
  - c. Centrifugal Force
  - d. None of the above.
  
2. When is the Spring tide caused.
  - a. At the first day of spring
  - b. At the last day of spring
  - c. New Moon Day
  - d. None of the above
  
3. When is the spring tide caused.
  - a. Full moon day
  - b. First day of spring
  - c. Last day of spring
  - d. None of the above
  
4. When is the neap tide caused.
  - a. Full moon day
  - b. New moon day
  - c. Half moon Day
  - d. At the first quarter of the moon
  
5. At which one of the following places, the tide occurs four times a day.
  - a. Southampton (England)
  - b. New York (USA)
  - c. Mumbai
  - d. Chennai

6. Which one of the following is considered ideal depth for the growth of coral reefs.
- Top to 10m below the surface.
  - 100 m to 120 m below the surface
  - 55m to 100m below the surface.
  - 45m to 55m below the sea surface
7. Which one of the following is ideal temperature for the growth of coral reef.
- 30 degree C
  - 40 degree c
  - 20 degree c
  - 10 degree c
8. Which one of the following types of water is most suitable for polyp growth.
- Fresh water
  - Clear salt water
  - Highly saline water
  - None of the above
9. Which one of the following propounded glacial control theory of development of coral reefs.
- Davis
  - Daly
  - Darwin
  - Agassiz & Semper.
10. Who gave the physiographic explanation for the development of coral reef.
- Darvis
  - Daly
  - Darwin
  - Agassiz & Semper

Answer Key:

1. (a) 2. (c) 3. (a) 4. (d) 5. (b) 6. (a) 7.(d) 8. (c) 9. (b) 10. (b)

# Chapter 13

## Plant kingdom

---

### Q1. What is Vertical Stratification?

Ans: The vertical stratification of vegetation community means the composition of plants assemblages from the soil surface or ground surface to the upper most forest canopy. Thus the different strata of the vertical profile of plant community in a given region represent different layer of habitat of different plant group. Stratification result from competition between species for favorable location which, in turn ,exerts control over micro climate and other factor affecting the habitat of plant and animals . there are five layer or strata from the ground surface to the uppermost canopy of the tropical evergreen rainforest biome out of which three upper layers consist of tree.

**FIRST OR TOP LAYER( STRATUM):** represents the uppermost canopy of the tallest tree of the forest. The top surface of the uppermost stratum is like an umbrella but the level of the top surface is not uniform, rather it is discontinuous and wavy in character. This layer receive maximum amount of sunlight and intercepts the rain drop. The height of the topmost layer range between 30m and 60m. This layer is also called as **DOMINANT LAYER**.

**SECOND LAYER-** is formed below the first layer and uppermost most layer of the forest canopy at the height of 25m to 30m . it is also called as the **CODOMINANT LAYER** or the **SECOND DOMINANT LAYER**. The upper crown of this layer is mob shaped.

**THIRD LAYER-** is formed and smaller trees, the crown of which is at the height of 15-20m from the ground surface. The trees of this layer have a typical characteristics of their leaves in that they are much larger than the leaves of the aforesaid forest two layer because of the fact that these layer leaves trap more sunlight which is very low in this layer.

**FOURTH LAYER-** represents the shrub layer which is below the aforesaid three layer. This layer is not continuous rather it is fragmented and sporadic in nature. The layer also includes the saplings but these are not permanent member of this layer because after growing they reach the upper layer. This **HERBACEOUS** or **SHURB LAYER** also includes some pygmy tree but of less than 5m height. The crown of this layer is usually 5m from the ground surface.

**FIFTH or LOWEST or GROUND LAYER:** represent the plant growing at the ground surface but seldom gains height of more than a meter or two. This layer is dominated by herbaceous plants and fern. These herbaceous plants do not form dense cover and have fewer species because the absence of light doesn't allow much growth of herbaceous plants.

### Multiple Choice Question

1. Which one of the following is not the cause of short term sea level changes.
  - a. Melting of ocean currents
  - b. Marine water density.
  - c. Atmosphere pressure
  - d. Velocity of ocean currents.
  
2. Molten rock found within the Earth's mantle.
  - a. metamorphic rock
  - b. igneous rock
  - c. magma
  - e. sedimentary rock
  
3. The zone of hot partly melted rock which can be deformed by heat and pressure allowing plate movement.
  - a. core
  - b. crust
  - c. mantle
  - d. lithosphere
  - e. asthenosphere
  
4. Surrounds the core and most is solid rock.
  - a. core
  - b. crust
  - c. mantle
  - d. asthenosphere
  
6. Outermost and thinnest zone of the Earth that is under the continents and ocean.
  - a. core
  - b. crust
  - c. mantle
  - d. lithosphere
  - e. asthenosphere
  
7. All of the following allow for natural cooling of buildings EXCEPT.
  - a. awning of planting of deciduous trees in front of windows

- b. planting of living roofs
- c. geothermal heat pumps
- d. high efficiency windows ANS
- e. heliostats

8. A common means of reducing dependence on fuel wood biomass and thereby reduce deforestation is to implement the use of:

- a. photovoltaic solar system to generate home heating needs
- b. solar cookers ANS
- c. hydrogen fuel cell stoves
- d. hybrid electric heaters
- d. wind powered refrigeration

9. Micro-hydropower generators can be used.

- a. to produce energy using the thermal pollution byproducts of the nuclear and coal powered electricity generation.
- b. Can be used in smaller rivers and even water pipe systems to capture the energy in the moving water without disrupting the flowANS
- c. Are found on sailboats and convert wind energy in a turbine on the mast to a rotor to aid in the boats propulsion
- d. Is a new nano technology to capture hydrogen fuel from water
- e. All of the above

10. Tidal energy.

- a. uses a hydroelectric dam across the opening of a bay to capture the ebb and flood water movement.ANS
- b. Floaing turbines that move in and out of beaches with the tide.
- c. Kinetic pads which can be placed off shore and capture the energy of water movement
- d. Flippers attached to buoys which capture the kinetic energy of waves which push them up and down
- e. Attached to off shore oil rigs to aid in the running of drills.

Answer Key

1. (a) 2. (c) 3. (d) 4. (a) 5. (b) 6. (d) 7. (d) 8. (b) 9. (b) 10. (a)

# Chapter 14

## Animal kingdom

---

### Q1 Explain the Stratification of Animal?

Ans This has been divided the animal of the tropical rainforest biome into the following 6 categories:

**UPPER AIR ANIMAL COMMUNITY:** the upper surface of the canopy of the topmost stratum of the rainforest is dominated by insectivorous birds and the bats but a few species are also carnivores. These birds belong to the category of fast flying species such as Asian falconet, swifts, seviftlet etc.

**MAIN CANOPY ANIMAL COMMUNITY:** includes those birds and fruit bats which live in the canopy of the tallest trees forming the uppermost stratum. The important animals of the topmost canopy of the Amazonian rainforest are toucans, parakeets, barbets, contingas, curassows, bill birds etc. A few small mammals, such as squirrels, herbivorous monkeys etc, are also found in this topmost stratum.

**MIDDLE-ZONE FLYING ANIMAL COMMUNITY-** includes mostly flying birds and insectivorous bats.

**MIDDLE ZONE CLIMBING ANIMAL COMMUNITY-** the animal of this zone have various climbing mechanisms and they reach the topmost stratum through the stems and branch of trees and climb down to the ground stratum. These belong to both categories of carnivorous and herbivorous animals. Squirrelss and civents which belong to the category of mammals. The binding ,circuitous and criss-crossing networks of various types of climbers facilitate easy movement of these climbing animals through all the vertical start. These creepers also provide ideal habitats for these animals.

**LARGE GROUND ANIMAL COMMUNITY:** includes mostly animals are also some birds in the ground stratum. These animals have large but sturdy bodies and lack in climbing qualities and mechanism.

### Q.2 What do you understand by the word Coral Bleaching?

Ans: Coral Bleaching refers to loss of algae from the corals resulting into white color which is indicative of death of coral. Global warming caused by ozone depletion and emission of greenhouse gases has been reported as the major factor of coral bleaching. The coral bleaching during 1997-98 has been recorded as the most catastrophic events as it



accounted for large-scale death of coral in the accal oceans of 60 countries and island nations. Through coral bleaching was observed by Alfred Mayer .

## Multiple Choice Question

Q1. which topsoil is bet siited for growing plants.

- a) sandy soil
- b) loamy soil
- c) clayey soil
- d) one of these

Q2. which soil horizon contains humus?

- a) A-horizone
- b) B-horizone
- c) C-horizone
- d) Bedrock

Q3. Which of the following is negative effects on the soil and water due to conventional, mechanized farming practices?

- a) soil compaction
- b) reduction in soil organic matter
- c) soil erosion
- d) leaching of pesticides and fertilizers into the groundwater
- e) all of the above

Q4. What is the harm from the depletion of Earth's ozone layer

- a) The average temperature of earth's surface will increase gradually
- b) The oxygen content of the atmosphere will decrease
- c) Increased amount of Ultra violet radiation will reach earth's surface
- d) Sea levels will rise as the polar ice caps will gradually melt

Q5. Acid rain is formed due to contribution from the following pair of gases

- a) Methane and ozone
- b) Oxygen and nitrous oxide
- c) methane and sulpher dioxide
- d) Carbon dioxide and sulpher dioxide

Q6. Which of the following is a prime health risks associated with greater UV radiation through the atmosphere due to depletion of stratospheric ozone?

- a) Damage to digestive system
- b) Increased liver cancer
- c) Neurological disorder
- d) Increased skin cancer

Q7. The most serious environmental effect posed by hazardous wastes is

- a) air pollution.

- b) contamination of groundwater.
- c) increased use of land for landfills.
- d) destruction of habitat.
- e) none of the above.

Q8. The concentration of which gas is highest in our environment?

- a) Oxygen
- b) Hydrogen
- c) Nitrogen
- d) Carbon dioxide

Q9. Which of the following is not as a consequence of global warming?

- a) rising sea level
- b) increased agricultural productivity worldwide
- c) worsening health effects
- d) increased storm frequency and intensity

Q10. Which of the following is not a primary contributor to the greenhouse effect?

- a) carbon dioxide
- b) carbon monoxide
- c) chlorofluorocarbons
- d) methane gas

Answer Key:

1. (b) 2. (a) 3. (e) 4. (c) 5. (b) 6. (d) 7. (b) 8. (c) 9. (b) 10. (c)

# BIOMES

---

## **Q1. Explain Marine Biomes.**

Ans: Main biomes account for about two third of the total area of all the biomes of the globe as sea water cover about 71% of the total geographical area of the world. The marine biomes have certain such typical characteristics which affects the biological communities of the marine biomes. E.g.

the marine biomes provide a wide range of habitats for the marine plants and animal organisms can live in the shallow seawater, deep sea water near and even at the deepest bottoms; they can live in coldest water near the polar zone but the terrestrial organisms cannot live beyond certain height and near the poles expect a few species of penguins and other animal.

The sea water is characterized by more or less uniformity in the distribution of temperature and therefore marine organisms have not to adapt to extreme temperature condition. Various forms of sea movements such as sea waves. tidal waves oceanic current, upwelling and subsidence

## **Multiple Choice Question**

1. Groundwater mining in coastal areas can result into
  - a) increase in the salinity of groundwater.
  - b) decrease in the toxicity of groundwater.
  - c) decrease in the salinity of groundwater.
  - d) increase in the water table.
  - e) none of the above.
2. Which of the following is not an important characteristic of the Green Revolution?
  - a) mechanized agriculture
  - b) hybrid seeds
  - c) slash and burn
  - d) monoculture
3. The three primary soil macronutrients are
  - a) carbon, oxygen, and water.
  - b) copper, cadmium, and carbon.

- c) potassium, phosphorus, and nitrogen.
- d) boron, zinc, and manganese.
- e) none of the above.

4. Which two of the following statements regarding ISO 14000 series of standards are true?

- (i) ISO 14000 standards are based on a principle assumption that better environmental management will lead to better environmental performance.
  - (ii) ISO M<sup>o</sup>C/u standards are regulatory standards developed by ISO
  - (iii) ISO 14000 standards are market driven and therefore are based on voluntary involvement of all interests in the market place.
  - (iv) The adoption of ISO 14000 is a one time commitment
- A (i) and (ii)
  - B. (ii) and (iii)
  - C. (i) and (iii)
  - D. (iii) and (iv)

5. Organisms that generate energy using light are:

- A. oligotrophs
- B. chaemorganotrophs
- C. chaemolithotrophs
- D. photoautotrophs

6. Land use pattern is usually studied by the following technique:

- A. Aerial photography
- B. Satellite imaging
- C. Satellite imaging and G. I. S.
- D. Satellite imaging, G. I. S. and G. P. S.

7. To conserve coral reefs the Govt, of India declared one of the following as Marine Park:

- A. Gulf of Kutch
- B. Lakshadweep islands
- C. Gulf of Mannar
- D. Andaman Islands

8. Which one of the following does not contribute to conservation of water?

- A Waste water treatment
- B. Waste land development
- C. Water shed protection
- D. Rain water harvesting

9. Particle size in soil can be classified as clay: 1-4 micron. Silt: 4-62 micron. Sand: 62-1000 micron; Boulder: >1000 micron. It is hence correct to suggest that in nature particle size distribution follows:

- A. Binomial distribution
- B. Lognormal distribution

- C. Linear distribution
- D. Normal distribution

Answer Key:

1. (a) 2. (c) 3. (c) 4. (b) 5. (a) 6. (d) 7. (b) 8. (b) 9. (b) 10. (d)

# Key Terms

---

1. **Krivoy Rog**- it is a major iron ore production area of Ukraine.
2. **Lignite**: it is also known as brown coal. It has carbon content of 45 to 70 %.
3. **Line-haul Cost**: the cost that is incurred in the process of moving a commodity from one place to another is known as line –haul cost. It includes mainly labour and fuel costs.
4. **Llanos**: the tropical grassland in Orinoco of Venezuela are known as Llanos these have 2to3 meters tall grass.
5. **Lorraine**: it is an important iron producing area of France.
6. **Mesabi**: It is major iron ore producing area of U.S.A
7. **Monazite**: it is major ore of thorium in the world.
8. **Normandy**: it is one of the iron ore producing areas of France.
9. **Relative Spread Index**: It is a ratio between proportion of area under a crop in an areal unit to the similar proportion for the entire region. It is used for determining the suitability of a crop in an area.
10. **Relative yield Index**: it is ratio between yield of a crop in an areal unit and the average yield of the same crop for the total area of the concerned region . it is used for determining the suitability of crop for an area.
11. **Renewable Resources**: these include the biotic resources exploited in farming, fishing, forestry and the in-coming energy coming from sun, which is used directly in charging modern solar batteries or more extensively, directly through older methods of harnessing the power of wind and water.
12. **Resources**: All those elements of earth which are useful or necessary to man can be considered as resources as resources and the resources process takes place when these elements are extracted and used by man and returned as wastes.
13. **Salzgitter**: it is one of iron ore producing areas of Germany.
14. **Secondary Activity**: these activities are concerned with processing, fabrication and manufacturing of the primary products.
15. **Seigen**: it is one of iron ore producing area of Germany.

- 16. Selvas:** the equatorial forests in South America are locally known as Selvas.
- 17. Shaduf:** it is a term used to connote the practice of irrigation followed by people of west Asia and Egypt during ancient times.
- 18. Ore-Dressing:** It involve crushing of the ore and separating the valuable minerals from gangue by gravitation, floatation or chemical process.
- 19. Overhead Cost:** it is the cost that represents the cost of equipment involved such as terminal facilities, ships, railways tracks, repair, shops, and offices and so on.
- 20. Pampas:** the temparte grassland in Argentina are locally known as pampas.
- 21. Peat:** it is the most inferior quality of coal which is youngest in age which is of not much industrial use. It ihas the lowest carbon content of less than 45%.
- 22. Petroleum:** it is very much fuel of 20<sup>th</sup> century. The first oil well was drilled at Titusville. Pennsylvania in 1859 but only a small proportion of curde oil could be used then due to limitation of technology for refiningit.
- 23. Plantation Agriculture:** it is practiced in tropical areas to grow cash crop. It is a specialized agriculture with high degree of sophistication in term of adermis of administration. Large varities of plantation cop includes rubber, oil-plams, cotton, copra, tea, plantation agriculture are high quality production, high yield, lagr output, mostly for export purpose, extensive use of pesticides and insecticides, large sized farms, hired labour, highly qualifeief technical managerial staff.
- 24. Primiray activity:** these activity are concerned with the production of raw material for foodstuff nd for industrial aue. These may include fishing, forestry, agriculture and mining activities.
- 25. Pumping or Dredging:** placer deposit are normally worked by the pumping or dreging and mining activities.
- 26. Pyrenees:** it is one of the iron ore producing sands and gravels.
- 27. Quaternary Activities:** Recently the economic organization is sail to be consisting of four types of activities- primary, secondary, tertiary and quarternary activities.
- 28. Spread Effects:** when the national economy expands, the benefit of growth being to affect all region and this spread effect of an expanding economy may encourage the cumulation causation process and other region may also experience self-sustaining growth.

- 29. Steppes:** in semi-arid temperate grassland are known as Steppes. These are usually short grass being 10 to 20 cms high. And are more extensive in the Northern Hemisphere.
- 30. Tertiary Activities:** these activities are basically concerned with the distribution of primary and secondary products through system of transport , wholesaling and retailing. This group also includes the provision of personal services through the service trades and professions.
- 31. Thermal Power:** it is produced from wide range of fuels which power the steam, turbines or internal combustion engines to drive generation. Thermal power is providing an increasing share of world production and the industry is the most rapidly expanding the market for primary fuels.
- 32. Transfer Cost:** it includes costs such as insurance coverage cost etc.
- 33. Tungus:** Along the southern margins of Tundra land in Eurasia, the nomadic herders who rear reindeers are known as Tungus.
- 34. Veld/Veldt:** the temperate grassland in South Africa are known as Veld/Veldt.
- 35. Water Transportation:** Water has been the cheapest and most convenient form of transporting bulky or large quantities of goods ever since earliest known history of man. It continues to provide the longest binding links of the world economy. The greatest advantages of ocean transportation lies in its lowline-haul costs.
- 36. Median Value:** it is a middle value that divides the array of data arranged in descending order in two equal halves.
- 37. Mode:** Mode is the most frequently occurring value in an array of data.
- 38. Moshavim:** it is an extreme form of cooperative organization found in Israel in which small family farms of cooperative organization found in Israel in which small family farms share centralized cooperative services.
- 39. Aircraft Manufacturing:** Government owned industry has its manufacturing centers at Bangalore, Hyderabad, Lucknow, Kanpur, Koraput, Nasir.
- 40. Alluvial Soil:** The entire Indo-Gangetic plain and coastal belt of India has, by and large, alluvial soil that has been brought down by the river systems of India. The coastal alluvium is of tidal region , while the desert loess is of Aeolian origin. These are considered to be good soils for agriculture purpose for a variety of crop.
- 41. Hamlet:** if 5-10 dwellings are concentrated at a point , it is known as a hamlet. Hamlets are found in India in the Himalayas and the western Region.



- 42. Indicators of Agriculture development:** index of cropping intensity, percentage of gross cropped area irrigated, amount of fertilized consumption, use of high yielding varieties of seeds, use of tractors, use of puppets, etc. are some of the indicators of agriculture development. Different states in India compared in terms of these indicators would reveal the regional disparities in their agricultural development.
- 43. Iron Ore Areas:** India possesses world's about one-fifth iron reserves. These ARE MAINLY CONFINED TO (I) Chota Nagpur Plateau, (ii) Bastar-Chanderpora belt, and Tamil Nadu, Kerala and Rajasthan have some iron ore reserves to their verdict. Iron ore in India is associated with Dharwarian system of rocks.
- 44. Irrigation Pattern:** India has largest pattern acreage under irrigation and also the largest acreage under canal irrigation. Canal irrigation accounts for 39% of total irrigated area in India. Well/tube-well irrigation accounts 46% of acreage under irrigation in India.
- 45. Jute Textile:** Rishra had the first jute textiles of India in 1855. It is unique example of concentration of an industry in a very narrow belt. About 9 out of 10 jute mills in India are concentrated in 3 kms. Wide and 100 kms. Long belt along the Hooghly river from Bansaria in North to Birlanagar in the South.
- 46. Karewas:** these are thick deposits of boulder clay and other debris embedded with moraines that occur in Kashmir at a height of 1500 to 1800 meters. These are believed to have been originated at a consequence of Himalayas up heaving during the Pleistocene times.
- 47. Khadar:** it is flood plain, comparatively newer alluvium. It is light colored. It is poor in calcareous matter. It is said to be of upper Pleistocene origin.
- 48. Khols:** the intervening slopes between the upland plain and flood plain wherever quite pronounced are known as Khols.
- 49. Detour Index:** it is a ratio between shortest route between two points and the shorter distance between them. It measures the degree of detour of the shortest route connecting the two nodes. Higher the detour index (DI) greater is the sinuosity of route.
- 50. Digital Interment Plotter:** It is a device used for drawing line segments. The length and direction of the line segments are specified by a series of commands in machine-usable form.
- 51. Digital:** it refers to the instrument to the representation of a quality by a number code, contrasted with the analog.
- 52. Digitizer:** it is an instrument that converts graphically represented information into machine-readable form.

- 53. Disc:** it is a rotating magnetic storage device (in a computer) for digital information.
- 54. Drum Plotter:** it is a digital incremental plotter in which the output material is mounted on a rotating drum or cylinder.
- 55. Feature Code:** it refers to a numeric label attached to a line or point.
- 56. File:** It refers to an organized collection of records or information.
- 57. Flatbed Plotter:** IT is digital instrumental plotter in which the output material is mounted on a fixed or moveable plane..
- 58. Format:** it refers to the specific arrangement of data and their descriptions, identifier or labels.
- 59. Harmoni Mean:** the harmonic mean is based upon the reciprocals of number averaged . It is defined as the reciprocal of the arithmetic mean of the reciprocal of individual observations, Is is calculated as under.
- 60. Abiotic Elements:** Abiotic element includes space, landforms, waterbodies, climate, soils, rocks, mineral, wealth etc.
- 61. Abyssal Floor:** it is the deep , relatively flat surface of the ocean floor location on both sider of the oceanic ridge. It includes the abyssal plains and the abyssal hills.
- 62. Abyssal Hills;** it is that part of the ocean floor which consist of hills rising as much as 1000m above the surrounding floor.
- 63. Abyssal Plains:** it is the almost featureless or flat region of the ocean floor, most abyssal plains area simply areas where abyssal hills are completely covered with sediment. They occupy about 40% of the ocean floor.
- 64. Abyssal:** **This term pertains to the great depths of the oceans, generally 3300m or more below sea level.**
- 65. Aid Rain** Acid rain is believed to occur because of the end way of the atmosphere t cleanse itself of various pollutants which gets introduced into the atmosphere as a result of industrial activity. The industrially generated sulphur dioxide and nitrogen oxide when mix up with sunlight. Free oxygen and water get converted into sulpheric acid and nitric acid. Such chemical reaction takes place in troposphere. Usually, sulfuric acid nitric acid fall on the ground and on trees as acid rain.
- 66. A forestation:** if the trees are planted on a piece of land, which was formerly not under any plant cover, for commercial or other purpose, it is known as a forestation.

- 67. Agro-forestry:** it refers to deliberate growing of trees and shrubs along with the crop in the cropped land. Agro-forestry encompasses a wide range of traditional land use strategies as well as recently developed approaches to agricultural production. Among other benefits, it reduces the pressure on forest for fuel wood.
- 68. Agulhas Current:** It is warm current of the Indian Ocean flowing past the coast of southern Africa.
- 69. Alaska/ British Columbia Current:** this warm current is a branch of the North Pacific current that flows northward along the coast of British- Columbia and Alaska.
- 70. Alf sols:** These soils are moist, mineral rich, grey to brown surface soils which have medium to high productivity status.
- 71. Algae:** it is one of the vital organic matters among the soil constituents. it helps the binding of soil particles together, protects the soil from leaching and erosion, nutrients to the upper layer, help aeration of poorly drained soils and helps fixing the nitrogen.
- 72. Aridisols:** there are basically desert soils with minimum organism content, high base status and lack of leaching.
- 73. Atmosphere:** it is another vital abiotic component of the environment . It performs many crucial functions for the sustenance of life on earth. The organic life requires four basic elements in large quantities for its survival-carbon, oxygen, hydrogen, and nitrogen. The atmosphere is the main reservoir of nitrogen, the most accessible reservoir of carbon and oxygen and an essential of nitrogen the most accessible reservoir of carbon and oxygen and an essential link in the continuous recycling of hydrogen in the form of water. The height of the effective atmosphere varies between 16 and 29 kms. From sea level.
- 74. Atoll:** an atoll is a ring-shaped reef that encloses a lagoon. Atolls are most common in the Pacific Ocean. A large number of atolls in the Lakshadweep Island in India.
- 75. Australian Biome:** Eucalyptus dominates the landscape in the Australian biome karri is the tallest species of eucalyptus. The height of Australian eucalyptus reaches 70 or more meters.
- 76. Autogenic Succession:** when a set of habitats paves the way for another, it is known as autogenic succession.
- 77. Automorphic Succession:** it refers to the biotic changes on a predominantly inorganic site.
- 78. Autotrophs:** of the three biotic components of biosphere environment ecosystem-plants, animals includes man and micro-organism-plants are most important. Plants are

primary producers as they are capable of producing their own food through the process called photosynthesis and hence are known as Autotrophy.

79. **Backwash:** the water returns seaward after moving up the shore is called backwash.
80. **Bank:** It is more or less flat-topped elevation located in the continental margins the depth of water over a bank is relatively small, but it is adequate for navigation.
81. **Barrier Reef: this of reef** is located at a distance from the coast or the island. Thus it is separated from the land by a broad and deep lagoon. It is the largest type of coral reef. The best example of a barrier reef is the Great Barrier reef off the north-east coast of Australian.
82. **Bengneia Current:** it is a cold current in the South Atlantic Ocean that flows northwards along the west coast of Southern Africa.
83. **Biodiversity:** it refers to diversity of plant and animal species. The extent of biodiversity decreases as we move from equator to the poles. Tropical belt has the maximum biodiversity and Arctic and Antarctic belt have the minimum of biodiversity. It is corroborated by the fact the more than 50% of the species are confined to only 7% of the land surface.
84. **Bio-geochemical Cycle:** the cyclic circulation of matter in the ecosystem is known as bio-geochemical cycle. It involves large cycles, wherein the inorganic substances pass through a biotic phase before finally returning to the inorganic state. Atmosphere, oceans and sediments, wherein various geological and biological cycles affect their circulation.
85. **Biomass Energy: Biomass** fuel are produced from plant and animal matter waste and residues. The natural degradation of wastes dumped in landfill sites releases energy which can easily be tapped. It is estimated that the biodegradation of 1 tonne of refuse can ideally produce 400 cubic meters of biogas, methane.
86. **cation Exchange:** the function of exchange ions in the soil is a crucial determinant of its fertility. The humus and clay particles in the soil are negatively charged particles therefore they are able to attract positively charged nutrients which get bound to the negatively charged clay and humus particles. From there these generally get released to the plants when these ions get replaced by hydrogen ions from the soil. This is known as cation exchange.
87. **Carnivores:** these are flesh eating animals at trophic level III of the food web. These depend upon other animals for their food. These are big animals and require a lot of energy for building up their tissues. These receive their energy from trophic level II through food consumption.

88. **Canary Monoxides:** it refers to the cold branch of the North Atlantic Drift that flows past the Spanish Coast.
89. **Californian Current:** this cold current is a branch of the North Pacific current that moves southward along the coast of California.
90. **Californian Biome:** the topmost layer of natural vegetation is dominated by oak precipitation. In this case the material moves upward due to capillary action, bringing calcium rich compound upward.
91. **Calcareous Ooze:** it consists of two types (a) Pteropod and (b) Globigerina ooze
92. **Clay Soil:** in a clay soil the size of individual soil particles has a diameter of less than 0.002 mm. clay particles in a soil are like a plate having a layered internal structure.
93. **Coast:** It refers to the zone of contact between land and sea.
94. **Coastline:** coastline is the boundary between the coast and the sea. Coastlines are mainly of two types: (i) coastline of submergence and (ii) coastline of emergence.
95. **Coastline of Emergence:** Such coastlines are formed either by an uplift of the land or by the lowering of the level of the sea.
96. **Composition Of Environment:** there are three basic components of environment. These include abiotic components; biotic and the component of energy.
97. **Composition of Soil:** the major constituents of the soil include Flora, fauna, and organic matter.. inorganic material, water and gases.
98. **Environment:** environment could be defined as an inseparable whole, consisting of mutually interacting system of physical called abiotic and biological called biotic elements.
99. **Equatorial current:** this current is present in all the three oceans as the north and south equatorial current. These flow from east to west across the ocean.
100. **Ecology:** The study of interaction between organism and their environment is known as ecology.

# Case Study

---

1. The River Yamuna is the direct impacted by human being and it is the direct source of which pollution , by which natural enviourmental and surrounding area is effected very much, what are your views on it?
2. One of the great reason of global warming are we human being , this time monsoon have arrived before time what do you think by which reason this is happening?
3. There is disaster in Ultra-khand it is natural or man made?

# Bibliography

---

**Ager,D.V.,1963:Principles of Palaeocolony, McGraw Hill, London.**

**Allen,D.V.,1976: The nature of fossil record,Proceedings of the Geologist Association.87,pp.131-60.**

**Batisse,S,990: Tehri- the damof discontent inventory and planning system for wildlifelife area, yogna,Vol 34(10),pp-9-12**

**Cain,S.A., and de Oilverio Castro,G.M.,1959:Manual of vegetation Analysis, Harper,New York.**

**Cariquist,R.,1962:Silent Spring, Penguin, Harmondsworth.**

**Cariquist,S 1974”: Island Biology, columbia, niversity\_Press.**

**Dassman,R.F.,1947:Conservation,counter-culture ans sparate realities, Enviourmental Conservation,Vol.1, pp.**

**Dassaman, R.F., 1976: Enviourmental Conservation, Wiley, New York.**

**Davies,B.E nd Pincent,R.J.F.H., 1975: Mineral an dmorbidity, Cambia, Vol.2,pp.85-93**

**Detwiyer, TR. And Marcus,M.G., 1972:Urbanization and enviourment: The Physical Gepgraphy of the city.Duxbury Press,Belmont, California.**

**Sing Savindra, 1989: Enviourmental management: some new dimensions, in enviourmental mahagement edited by. L.R.Singh et al.Allahabad Geographical Society**

**Singh, Savindra and Tiwari, RC: 1990. as assessment and vision „yogna, Vol.34, pp, 5-8**

**Singh. S.P 1990 report of the study of man’s impact on climate,MIT,Cambridge, Mass and London.**

**Smith,DDand Wischmeler 1963: rainfall erosin, Advance in Agronomy, Vol. 14.pp. 109-48**

**Soil survey staff,soil Conservation Service, 1951: soil survey Manual, Washigton**

