13 Our Environment

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Fastrack Revision

- **Ecosystem:** It is a structural and functional unit of biosphere. An ecosystem consists of biotic components comprising living organisms and abiotic components comprising physical factors like temperature, water, air, soil and minerals.

MNEMONICS

Concept : *Abiotic components*
Mnemonic: WASTe
Interpretation: *W – Wind* *A – Air* *S – Soil*
Te – Temperature

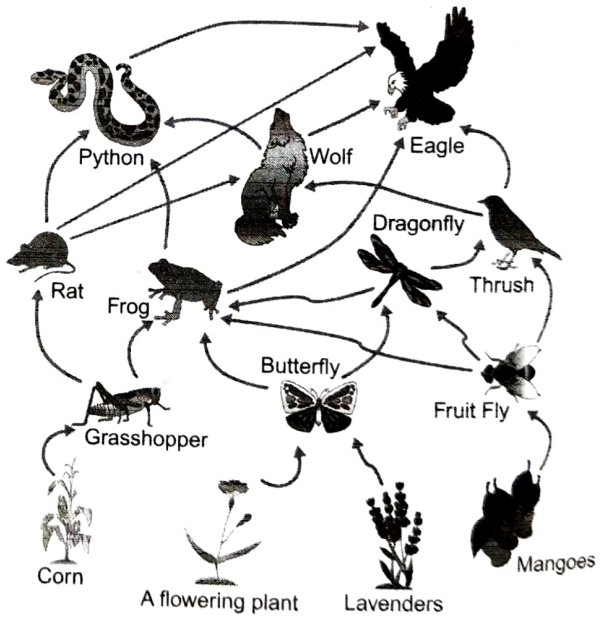
The ecosystem is of the following two types:

(i) **Natural Ecosystems:** These are the ecosystems which develop in nature without human support. Depending upon the habitats, natural ecosystem may be **terrestrial**, *i.e.,* present on land, *e.g.,* desert, grassland and forest or **aquatic**, *i.e.,* found in water bodies, *e.g.,* ponds, lakes and marine.

(ii) **Artificial Ecosystems:** These are the ecosystems which have been created and are maintained by human beings. The artificial ecosystems are also called man-made or anthropogenic ecosystems, *e.g.,* aquarium, botanical gardens, parks, etc.

- The biotic components of an ecosystem are primarily made up of three kinds of organisms: (i) Producer, (ii) Consumer and (iii) Decomposers.
- **Producers:** These are organisms which can make organic compounds (sugar and starch) from inorganic substances by photosynthesis, *e.g.,* all green plants and certain bacteria.
- **Consumers:** These are organisms which depend upon the producers for food, either directly or indirectly by feeding on other consumers for their sustenance. They are also called heterotrophs.

  Herbivores, carnivores, omnivores and parasites are the various types of consumers.
  Herbivores–eat only plants, *e.g.,* goat, sheep, deer, rabbit etc.
  Carnivores–eat only other animals, *e.g.,* lion, tiger etc.
  Omnivores–eat both plants and animals, *e.g.,* man, dog, bear, crow etc.
  Parasites are organisms that live on or inside the body of another organism, *i.e.,* host from which it obtains its nutrients, *e.g.,* parasites of man includes fleas and lice.
- **Decomposers:** These are micro-organisms that obtain energy from the chemical breakdown of dead remains and waste products of animals or plants. Decomposers break down the complex organic substances into simple inorganic substances that go into the soil and are used up once more by the plants. Decomposers act as cleansing agents of environment.
- **Food Chain:** It is a sequence of living organisms in a community in which one organism eats other and is itself eaten by another organism to transfer energy. It helps to understand the food relationship and interactions among various organisms in an ecosystem. Each step of food chain is called trophic level. Flow of energy in a food chain is unidirectional.
- **Food Web:** The various food chains operating within an ecosystem cannot function in isolation. They form a network having intercrosses and linkages. A network of interconnected food chains is called a food web. It has many populations of different species.



Food Web

- **10 Per cent Law:** 10 per cent law states that, 'only 10 per cent of the total energy entering a particular trophic level is available for transfer to the next trophic level.' Thus, there is a gradual decline in the amount of energy available as we move from producer level to the next trophic level.

  For Example,

  Grass (10,000 J) → Grasshopper (1,000 J) → Frogs (100 J) → Snakes (10 J)
- **Biological Magnification:** It is an increase in the concentration of harmful chemicals like pesticides in the body of an organism per unit mass at each successive trophic level in a food chain.
- **Ozone Layer:** Ozone (O_3) is a molecule consisting of three atoms of oxygen whereas molecules of oxygen (O_2) contain only two atoms. Major part of it is present in higher levels of the atmosphere (stratosphere). Ozone has a characteristic pungent smell and is deadly poisonous.

It shields the surface of the Earth from ultraviolet (UV) radiations of the Sun.

$$O_2 \xrightarrow{UV} O + O$$

$$O + O_2 \longrightarrow \underset{\text{(Ozone)}}{O_3}$$

- **Ozone Depletion:** It refers to thinning of ozone layer. Ozone layer gets depleted due to the use of chemicals called aerosol, spray propellants like chlorofluorocarbons, oxides of nitrogen, methane, carbon tetrachloride, etc.
- **Biodegradable Wastes:** The waste materials which can be broken down to non-poisonous or harmless substances by the action of certain microorganisms (like bacteria and fungi) are called biodegradable wastes. The enzymes released by microorganisms help to break them. They are generally organic wastes, *e.g.*, garbage, sewage, livestock waste etc.
- **Non-biodegradable Wastes:** The waste materials which cannot be broken down to non-poisonous substances by the action of microorganisms are called as non-biodegradable wastes.

Some non-biodegradable wastes are—plastic, polythene bags, synthetic fibres, glass, aluminium, iron nails and radioactive (nuclear) wastes.

Some methods of waste disposal may be Biogas plant, sewage treatment plant, composting, recycling and reuse. Landfill and incineration (means reducing to ashes) are also the methods of waste disposal.