



Chapter – 13.

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Our Environment

ECOSYSTEM

An ecosystem is a self-contained unit of living things (plants, animals and decomposers), and their non-living environment (soil, air and water).

All the interacting organisms in an area together with the non-living constituents of the environment form an ecosystem. Thus, an ecosystem consists of biotic components comprising living organisms and abiotic components comprising physical factors like temperature, rainfall, wind, soil and minerals.

For example, if you visit a garden you will find different plants, such as grasses, trees; flower bearing plants like rose, jasmine, sunflower; and animals like frogs, insects and birds. All these living organisms interact with each other and their growth, reproduction and other activities are affected by the abiotic components of ecosystem. So a garden is an ecosystem. Other types of ecosystems are forests, ponds and lakes. These are natural ecosystems while gardens and crop-fields are humanmade (artificial) ecosystems

Organisms depend on the producers either directly or indirectly for their sustenance? These organisms which consume the food produced, either directly from producers or indirectly by feeding on other consumers are the consumers. Consumers can be classed variously as herbivores, carnivores, omnivores and parasites.

FOOD CHAINS & FOOD WEB

The food (or energy) can be transferred from one organism to the other through food chains.

The sequence of living organisms in a community in which one organism consumes another organism to transfer food energy, is called a food chain. In simple words, a list of organisms (living beings) showing “who eats whom” is called a food chain.

Each step or level of the food chain forms a trophic level. The autotrophs or the producers are at the first trophic level. They fix up the solar energy and make it available for heterotrophs or the consumers. The herbivores or the primary consumers come at the second, small carnivores or the secondary consumers at the third and larger carnivores or the tertiary consumers form the fourth trophic level

the food we eat acts as a fuel to provide us energy to do work. Thus the interactions among various components of the environment involves flow of energy from one component of the system to another

the autotrophs capture the energy present in sunlight and convert it into chemical energy. This energy supports all the activities of the living world.

From autotrophs, the energy goes to the heterotrophs and decomposers.

FOOD WEB

The inter-connected food chains operating in an ecosystem which establish a network of relationships between various species, is called a food web. In simple words, the network of a large number of food chains existing in an ecosystem is called a food web. The food

web has many inter crosses and linkages among the various species (producers and consumers) present in it

From the energy flow diagram two things become clear. Firstly, the flow of energy is unidirectional. The energy that is captured by the autotrophs does not revert back to the solar input and the energy which passes to the herbivores does not come back to autotrophs. As it moves progressively through the various trophic levels it is no longer available to the previous level.

Secondly, the energy available at each trophic level gets diminished progressively due to loss of energy at each level.

Another interesting aspect of food chain is how unknowingly some harmful chemicals enter our bodies through the food chain. One of the reasons is the use of several pesticides and other chemicals to protect our crops from diseases and pests.

These chemicals are either washed down into the soil or into the water bodies. From the soil, these are absorbed by the plants along with water and minerals, and from the water bodies these are taken up by aquatic plants and animals.

This is one of the ways in which they enter the food chain. As these chemicals are not degradable, these get accumulated progressively at each trophic level. As human beings occupy the top level in any food chain, the maximum concentration of these chemicals get accumulated in our bodies.

This phenomenon is known as biological magnification. This is the reason why our food grains such as wheat and rice, vegetables and fruits, and even meat, contain varying amounts of pesticide residues.

How do Our Activities Affect the Environment

DEPLETION OF OZONE LAYER

Ozone (O₃) is a molecule formed by three atoms of oxygen. While O₂, which we normally refer to as oxygen, is essential for all aerobic forms of life. Ozone, is a deadly poison. However, at the higher levels of the atmosphere, ozone performs an essential function. It shields the surface of the earth from ultraviolet (UV) radiation from the Sun. This radiation is highly damaging to organisms, for example, it is known to cause skin cancer in human beings.

Ozone at the higher levels of the atmosphere is a product of UV radiation acting on oxygen (O₂) molecule. The higher energy UV radiations split apart some molecular oxygen (O₂) into free oxygen (O) atoms. These atoms then combine with the molecular oxygen to form ozone as shown



MANAGING THE GARBAGE, WE PRODUCE

The household wastes (or rubbish) is called garbage. Every household produces a lot of garbage (or wastes) daily. This garbage includes left-over food, fruit and vegetable peels, fallen leaves of potted plants, waste paper, unwanted plastic objects (such as plastic bottles, polythene bags, toys, etc.), glass articles (like glass bottles, broken window panes, etc.), metal objects (like aluminium foils, rusted iron grills, etc.), old wooden objects, rags (old, torn clothes), discarded shoes, and sewage. Some of the garbage (or waste) is biodegradable whereas a major part of it is non-biodegradable. If the household garbage or waste is not disposed of properly, it can pollute the environment like soil, water and air.

Some of the important modes of waste disposal are

- (i) Recycling**
- (ii) Preparation of compost**
- (iii) Incineration**
- (iv) Landfill**
- (v) Sewage treatment**