

## Chapter 15 - Our Environment

### 1. What happens when we add our waste to the environment?

The environment of an organism means the physical and biological conditions in which it lives. The physical conditions include soil, light, temperature, etc. And the biological conditions include the other plants, animals and microorganisms around it. A change in any of these conditions can affect the organism.

When the wastes are added to our environment it disrupts the ecological balance. Substances or wastes are of two types. Substances that are broken down by biological processes are said to be **biodegradable**. Substances that are not broken down by biological processes are said to be non-biodegradable. These substances may be inert and simply persist in the environment for a long time or may harm the various members of the eco-system.

### 2. Eco system- What are its components?

All organisms such as plants, animals, microorganisms and human beings as well as the physical surroundings interact with each other and maintain a balance in nature.

The ecosystem is a community of organisms and their physical environment interacting with each other as an ecological unit, involving the flow of energy. An ecosystem consists of biotic components including living organisms and abiotic components, the physical factors like temperature, rainfall, wind, soil and minerals.

An ecosystem can be natural or artificial. Ponds, forests and lakes are natural ecosystems while garden and crop fields are human made or artificial ecosystems. In both the ecosystems all living organisms interact with each other and their growth, reproduction and other activities are affected by the abiotic components of ecosystem.

Organisms in the ecosystem can be categorised into producers, consumers and decomposers according to the manner in which they obtain their substance from the environment.

Producers are the organisms that produce their own food without the help of any other organism. These are also known as autotrophs. They make their food from inorganic substances through a process called photosynthesis. Autotrophs are green plants, phytoplankton and blue green algae.

Consumers are the organisms which cannot produce food but depend directly or indirectly on producers for the same. These are also known as heterotrophs. Consumers can be classified into herbivores, carnivores, omnivores and parasites. Eg: Humans, Snake, Eagle

Decomposers are the organisms which feed on dead and decaying matter. They break down the complex organic substances into simple inorganic substances that go into the soil and are sued up once more by the plants. Eg: Bacteria and fungi

#### 2.1 Food chains and Webs:

The series of organisms taking part at various biotic levels form a **food chain**. Food chains describe the feeding relationship between the organisms of an ecosystem. The flow of energy from one species to another at various biotic levels forms a food chain. A food chain always starts with producers.

The successive levels in the food chains of a community are called as **trophic levels**. From autotrophs the energy goes to the heterotrophs and decomposers. When one form of energy is change to another, some energy is lost to the environment in forms which cannot be used again. Some common food chains are mentioned below.

Plants  $\longrightarrow$  Deer  $\longrightarrow$  Lion

Plants  $\longrightarrow$  Grasshopper  $\longrightarrow$  Frog  $\longrightarrow$  Snake  $\longrightarrow$  Hawk

Algae  $\longrightarrow$  Small animal  $\longrightarrow$  Small fish  $\longrightarrow$  Big fish  $\longrightarrow$  Bird

Food chains generally consist of only three or four steps. The loss of energy at each step is so great that very little usable energy remains after four trophic levels. There are generally a greater number of individuals at the lower trophic levels of an ecosystem; the greatest number is of the producers.

The length and complexity of food chains vary greatly. Each organism is generally eaten by two or more other kinds of organisms which in turn are eaten by several other organisms. The relationship can be shown as a series of branching lines called a **food web**. Food web is a web of cross-linked food chains.

There is a flow of energy in the form of food within an ecosystem. 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.

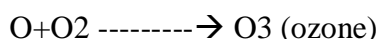
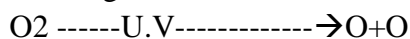
Also, some harmful chemicals enter our bodies through the food chain. One of the reasons is the use of several pesticides and other chemicals to protect the crops from diseases and pests through which they enter the food chain.

**Biological magnification** is a phenomenon by which toxic substances accumulate from one trophic level to another. As human beings occupy the top level in any food chain, the maximum concentration of these toxic chemicals gets accumulated in our body which becomes toxic to us.

### 3 How do our activities affect the environment?

#### 3.1 Ozone layer and how it is getting depleted.

Ozone (O<sub>3</sub>) is a molecule formed by three oxygen atoms. There is a layer of ozone in the stratosphere. It is a deadly poison. It is known to cause skin cancer in human beings. However, at the higher levels of the atmosphere, it acts as a natural sun-block and shields us from UV radiations of the sun which are dangerous to living organisms. Ozone depletion is the sharp reduction of ozone in the stratosphere due to chlorofluorocarbons (CFC's) used as refrigerants and in fire extinguishers.



To limit the damage to the ozone layer the release of CFC s into the atmosphere must be reduced. These CFCs should be replaced with environmentally safe alternatives.

#### 3.2 Managing the garbage we produce:

Improvements in our lifestyle have resulted in greater amounts of waste material generation. Changes in packaging have resulted in much of our waste becoming non biodegradable. Increased use of non-biodegradable items have left the environment polluted with them.

## **Chapter 16 - Management of Natural Resources**

We often hear or read about environmental problems. These are often global-level problems and we feel helpless to make any changes. There are international laws and regulations and then there are our own national laws and acts for environmental protection. There are also national and international organizations working towards protecting our environment.

Natural resources are the materials provided by nature. They include forests, water, coal and petroleum reserves. Day-by-day we are exploiting our natural resources. River Ganga features an example for the exploitation of natural resources. The coliform bacteria are usually found in the human intestine whose presence in the Ganga water indicates contamination by faeces and disease-causing micro-organisms. The Ganga Action Plan project was launched in 1985 to clean the Ganga and make its water free from pollution.

The 3R's in conserving resources are Reduce, Recycle and Reuse. We can make environment friendly decision by knowing more about how our choices affect the environment. The concept of sustainable development encourages forms of growth that meet current basic human needs, while preserving the resources for the needs of future generations. Economic development is linked to environmental conservation. Thus sustainable development implies a change in all aspects of life.

### **1. Why do we need to manage our resources?**

All the things we use or consume are obtained from resources on the earth. The only thing we get from outside is energy which we receive from the Sun. Our resources are not unlimited. With the human population increasing at a tremendous rate due to improvement in health care, the demand for all resources is increasing at an exponential rate. The management of natural resources requires a long term perspective so that these will last for the generations to come and will not merely be exploited to the hilt for short term gains.

Another factor to be considered while we exploit these natural resources is the damage we cause to the environment while these resources are either extracted or used. For eg: mining. Hence sustainable natural resource management demands that we plan for the safe disposal of these wastes too.

### **2. Forests and Wild life:**

Forests are 'biodiversity hotspots' due to the sheer number as well as the variety of species of flora and fauna that live in them.

#### **2.1 Stakeholders:**

Stakeholders are

- (1) The people who live in or around forests are dependent on forest products for various aspects of their life.
- (2) The forest department of the government which owns the land and controls the resources from forests.
- (3) The industrialists who use various forest products but are not dependent on the forests in any one area.

(4) The wild life and nature enthusiasts who want to conserve nature in its pristine form.

We have to conserve forests which are of greater use to the environment. The conservation of forests by the Bishnoi community in Rajasthan became well known because of Amrita Devi Bishnoi, who sacrificed her life in 1731 for the protection of the Khejri trees in Khejrali village near Jodhpur Rajasthan.

We need to accept that human intervention has been very much a part of the forest landscape. Forest resources ought to be used in a manner that is both environmentally and developmentally sound. The environment must not be regarded as a pristine collection of plants and animals. It is a vast and complex entity that offers a range of natural resources for our use. We need to use these resources with due caution for our economic and social growth and to meet our material aspirations.

## **2.2 Sustainable Management:**

Sustainable development is not only about the resources we use but also ensures that they are equally distributed. Stakeholders together help in sustainable management. The Chipko Andolan ('Hug the Trees Movement') originated in the 1970's, in a village called Reni in Garhwal high up in the Himalayas. It was to save trees from being cut down. The Chipko movement quickly spread across communities and media and forced the government, to whom the forest belongs, to rethink their priorities in the use of forest products. Experience has taught people that the destruction of forests affected not just the availability of forest products, but also the quality of soil and the sources of water. Participation of the local people can indeed lead to the efficient management of forests.

Government should control the industries in using raw materials. Government should also control illegal activities. Industries should play an important role in the management of natural resources.

## **3. Water for all:**

Water is an essential form of life. It is a basic necessity for all terrestrial forms of life. Water is useful in agriculture, industries, cooking and various domestic activities. Most of us depend on rainfall for water.

The rainfall pattern in India differs in different geographical regions. Rains in India are largely due to the monsoons. Tropical regions receive more rainfall as compared to desert regions.

Despite nature's monsoon bounty, failure to sustain water availability underground has resulted largely from the loss of vegetation cover, diversion for high water demanding crops, and pollution from industrial effluents and urban wastes. Irrigation methods like dams, tanks and canals have been used in various parts of India since ancient times. These were generally local interventions managed by local people and assured that the basic minimum requirements for both agriculture and daily needs were met throughout the year.

### **3.1 Dams:**

Dams are the structures constructed to divide and retain river water in a particular area. Large dams can ensure the storage of water not just for irrigation but also for generating electricity. Some famous dams in India are the Bhakra Nangal Dam, the Sardar Sarovar Dam and the

Tehri Dam. Water from dams is distributed through canal systems that transport stored water to great distances. The disadvantages of dams are deforestation, sedimentation, erosion of river beds, and disruption of animal and plant life. Also, they displace large number of peasants and tribals without adequate compensation or rehabilitation. The construction of large dams swallows up huge amounts of public money without the generation of proportionate benefits.

### **3.2 Water Harvesting:**

Watershed management emphasises scientific soil and water conservation in order to increase the biomass production. The aim is to develop primary resources of land and water to produce secondary resources of plants and animals for use in a manner which will not cause ecological imbalance.

Watershed management not only increases the production and income of the watershed community but also mitigates droughts and floods and increases the life of the downstream dam and reservoirs.

Water harvesting techniques are highly locale specific and the benefits are also localised. Giving people control over their local water resources ensures that mismanagement and over exploitation of these resources is reduced.

The advantages of water stored in the ground are many. It does not evaporate, but spreads out to a recharge wells and provides moisture for vegetation over wide area. It does not provide breeding grounds for mosquitoes like stagnant water collected in ponds or artificial lakes. The ground water is also relatively protected from contamination by human and animal waste.

### **4. Coal and petroleum:**

Other important resources are fossil fuel that is coal and petroleum which are important resources of energy for us. These are non-renewable sources of energy. Coal and petroleum were formed hundreds of million years ago as a result of the action of heat and pressure on decaying, buried plants in the swampy areas of the earth. The disadvantages of fossil fuels are that they release carbon dioxide, oxides of nitrogen and oxides of sulphur on combustion. Carbon dioxide causes global warming. Thus we need to use these resources judiciously.

Some alternative sources of energy are wind, solar, thermal and hydroelectric energy. These are all viable options since they are more environment-friendly. Energy conservation can be done by recycling and reusing plastic bags, switching off lights, and also by using CFL bulbs. Fuel is most commonly used in internal combustion engines for transportation and recent in this field concentrates on ensuring complete combustion in these engines in order to increase efficiency and also reduce air pollution.

### **5. An overview of natural resource management:**

Sustainable management of natural resources is a difficult task. In addressing this issue, we need to keep an open mind with regard to the interests of various stakeholders. Going beyond laws, rules and regulations, we need to tailor our requirements, individually and collectively, so that benefits of development reach everyone now and for all generations to come.