

Biotic: Biotic components may be classified as follow:

1. **Producers:** These are all the green plants that prepare their own food by the process of photosynthesis.
2. **Consumers:** These include all the animals, i.e. herbivores (Feed on herbs) and carnivores (feed on herbivorous animals)
3. **Producers:** These are microorganisms that act on dead and decaying organic matter to form simpler compounds. Thus, they help in recycling in the ecosystem.

Abiotic: These are non-living components like air, water, soil, temperature, etc.

Ecosystem can be large or small. The two adjoining ecosystem may be interacting to each other and exchanging the materials and energy. So they are interconnected and interrelated.

Biosphere: It is the global ecosystem where all the life supporting components, i.e. lithosphere, hydrosphere and atmosphere interact to provide conditions for the living organism to survive. Although atmosphere is found up to 500 km altitude from sea level yet life is found only up to 6 km. height of atmosphere. Similarly life is found up to 8 km sea depth. Thus, the total region of biosphere is 14 km only.

Deforestation

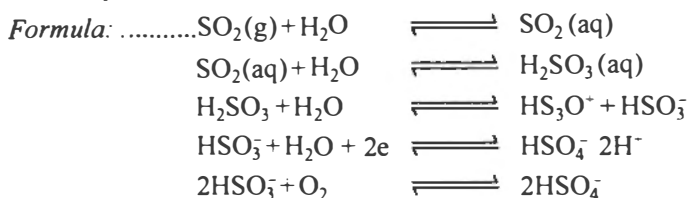
A forest is a natural ecosystem having trees of different species and vegetation of different kinds.

Deforestation is the reverse of forestation, i.e. removal of trees, bushes and vegetation of a forest. Deforestation occurs due to the following reasons.

1. For agricultural purposes
2. Fuel
3. Urbanisation—To help growing population by setting up town ships and cities.
4. Industrial purposes—A general sources of raw materials of paper, ply wood, timber, boats, railway sleepers, etc.
5. Bamboos—As a source of bamboos which are used for making rafts, roofing, flooring, cart-wood, matting, etc.
6. Economic products—Honey, essential oils, drugs, waxes, rubber, latex, sandal wood, etc.
7. Other products—Like construction of road, dam, railways, etc.

Acid Rain

The presence of excessive acids in rain water is called acid rain. It is one of the factors of the air pollution. Most of the fuels have sulphur and nitrogen which on burning with atmospheric oxygen, are converted to their respective oxide, i.e. sulphur dioxide and nitrogen dioxide. The oxides are highly soluble in water. During rain sulphur dioxide and nitrogen oxides react with water vapor of atmosphere to form acids like sulphuric acid, sulphurous acid, nitric acid and nitrous acid. These acid come down to the earth's surface with rain water or may remain in atmosphere in clouds.



The pure rain water has a pH around 5–3.7 but due to acid rain can drop as low as two.

Effects of Acid Rain

1. It causes a number of adverse effects on soil. It tends to increase acidity in the soil reducing agricultural productivity.
2. *Effect on materials:* It corrodes buildings, monuments, statues, bridges, railings, etc.
3. *Effect on human:* It creates a serious threat to human health as it contaminates food, drinking water and breathing air. It also causes neurological diseases.
4. *Effect on aquatic ecosystem:* It kills fish, bacteria and algae.
5. *Effect on plants:* In acidic soil plants can absorb cadmium more easily and high levels of cadmium in plants has been dangerous for animals and human beings.
6. *Air pollution:* Acidic air pollutants cause corrosion of metals, disintegration of textiles, paper and marble. Tajmahal is being affected due to pollutants released from Mathura refinery. It also reduces visibility due to smog. Industrial area with the pH value of rain below the critical value had been recorded in Delhi, Nagpur, Pune, Mumbai and Kolkata.

chains. Thus they are injurious to aquatic life. Inorganic compounds include alkalies, acids, soluble and insoluble substances. They impart a high chemical oxygen demand (COD) resulting in reduction of dissolved oxygen. Acids or alkalies change the pH of the water where as soluble salts of heavy metals such as Pb, Hg, Cd, Zn, Cu, Ni, Ar, etc. are highly toxic, stable and have high tendency of accumulation in food chains.

EFFECT OF WATER POLLUTION

1. *Effect on public health:* The polluted water produces serious health hazards. Pathogenic organisms cause a variety of waterborne diseases like cholera, typhoid, fever, dysentery, poliomyelitis, hepatitis, etc. The chemically polluted water accumulate in food chains and in human organs and therefore are injurious to human beings, animals and plants.
2. *Effect of aquatic and marine life:* The turbid water containing suspended particles reduces light penetration in the river beds. This affects the survival of bottom living invertebrate animals. Suspended matters affect the breathing process of fish by clogging their gills. Thermal pollution also kills various aquatic life like fish, crabs, etc. The acidic pH and floatable oils and fats of water also interfere with the survival of aquatic life. Similarly organic waste matters or industrial wastes directly affect the aquatic organism by causing depletion of oxygen from the water.
3. *Effect on plants and animal life:* Pesticides and toxic metals may restrict growth of some of plants and kill algae, cattle, animals and birds. The toxic metals may accumulate in their fatty tissue and thus affect the food chains.
4. *Effect on land and properties:* The polluted water (metals, suspended matter, detergent, etc) increases the salinity in the soil resulting in decrease of productivity of soil. The soil becomes infertile. The acidic industrial effluents are corrosive in nature. Steel objects like ships, navigation aids, etc. of rivers are prone to corrosive attack and get damaged. The plants of industry, pipes, pumps and other equipments are more prone to corrosion if polluted water is used in industries.
5. *Social and economic effect:* The polluted water affects the economy since it causes damage to properties, land, crops, productivity, loss of plants and animals of economical importance. Industries may have to suffer added costs of treatment of polluted water.

Contd.

<i>Characteristics</i>	<i>World Health Organization</i>		<i>Indian Council for Medical Research</i>	
Fluoride	1.0	1.5	1.0	2.0
Nitrate	45	50	20	50
Zinc	05	15	05	15
Arsenic	-	0.05	-	0.05
Chromium	-	0.01	-	0.05
Cyanide	-	0.01	-	0.01
Lead	-	0.1	-	0.1
Cadmium	-	0.01	-	0.01
Mercury	-	0.001	-	0.001
Radioactivity (µg/L)	-	0.2	-	0.2
Bacteriological Coliform count if disinfected	Zero count/100 ml. of sample		Zero count/100 ml. of sample	

Indian standards for quality of treated waste water—A large quantity of waste water from cities, industries, houses, agriculture are thrown to fresh water everyday. This water contains a wide variety of pollutants. This water must be treated properly before dumping it into the rivers. The tolerance limits of different parameters are being given below.

<i>Sl. No.</i>	<i>Characteristics</i>	<i>Tolerance limit</i>		
		<i>Discharge of sewage into inland surface water</i>	<i>Industrial waste water in inland surface water</i>	<i>Industrial waste water in public sewers</i>
1.	pH	—	5.5 to 9.0	5.5 to 9.0
2.	BOD (20° C)	20	30	500
3.	COD	—	250	—
4.	TSS	30	100	600
5.	Temperature °C	—	40	45
6.	Oil and grease	—	10	100
7.	Phenolic compounds	—	01	05