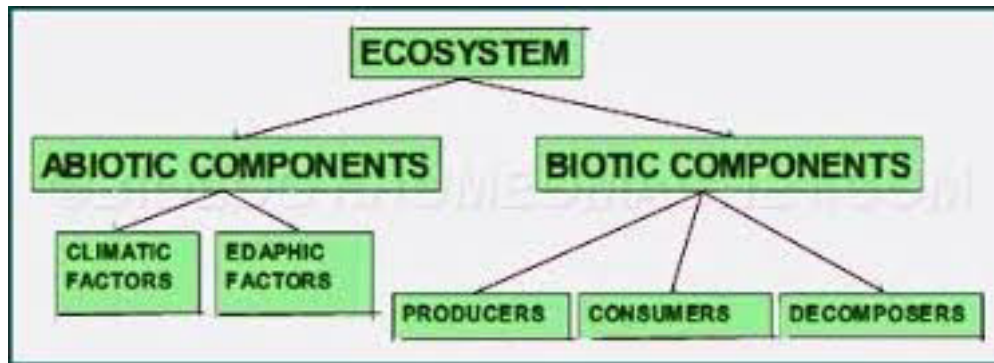


- 1.a** It is the interrelationship between living organisms and the Non living organisms.
- b.** It is a type of land degradation in which a relatively dry area of land becomes increasingly arid, typically losing its bodies of water as well as vegetation and wildlife.
- c.** i. Genetic level  
ii. Species level  
iii. Ecosystem level
- d.** It is the development that meets the needs of the present without compromising the needs of the future generations to meet their own needs.
- e.** The waste that is harmful to humans and having any one of the following characteristics  
i. Toxicity      ii. Corrosivity      iii. Reactivity      iv. Ignitibility
- f.** i. Carbondioxide (CO<sub>2</sub>)  
ii. Methane (CH<sub>4</sub>)  
iii. CFC  
iv. water vapour  
v. ozone
- g.** The presence of foreign matter in the atmosphere, which has adverse effects on humans, plants, animals and materials.
- h.** The process of biological decomposition of organic matter under controlled conditions is known as composting.
- i.** It is the process of examining the impacts of a development on the environment
- j.** Gravity settling chambers    ii. Cyclone separators    iii. Inertial separators  
iv. Electrostatic precipitators    v. Fabric filters    vi. Wet scrubbers

2.a



- **Abiotic structure** includes the **non-living things of the ecosystem** such as physical factors (soil, temperature, light & water) and chemical factors consisting the inorganic compounds (N,C, H, K, P,S) & organic compounds ( carbohydrates, proteins).
- The biotic structure of an ecosystem includes Producers, Consumers and Decomposers.

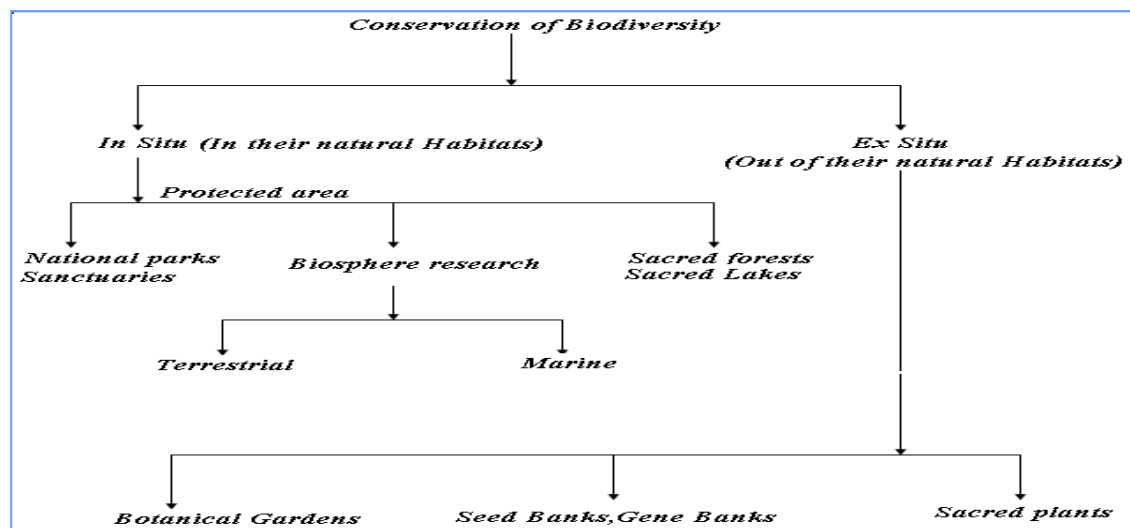
Producers: The organisms which produces the food themselves.

Eg: All green plants

Consumers: They can be further divided into

- i) Primary consumers: These organisms get their food from the Producers, Eg: Goat, cow, sheep etc.,
- ii) Secondary Consumers: These get their food from the primary consumers, Eg: Tiger, Lion, etc.,
- iii) Top Consumers: These get their food both from producers and primary consumers, Eg: Human's

**2.b** Two basic approaches have been developed for the conservation of BD: a) In situ b) Ex situ



### **In situ approach**

Conservation of animals & plants *in their native* ecosystems or even man-made ecosystem, where they naturally occur.

a) National parks, wildlife sanctuaries    b) biosphere reserve    c) Sacred lakes & forests

#### **a. National parks**

It is an area which is strictly reserved for the welfare of wildlife & where activities such as forestry, grazing and cultivation are not allowed. Private ownership right & habitat manipulation are not permitted in national **park**.

#### **b. Wild life sanctuaries**

It is an area which is reserved for the conservation of animals, those are migrated from other areas. At present there are 492 wildlife sanctuaries in our country.

#### **c. Biosphere reserve**

Which deals with the conservation of ecosystems and the genetic resources contained therein. *The Biosphere Reserves are a special category of protected areas of land or coastal environments, wherein people are an integral component of the system.*

### **Ex situ approach**

Conservation of animals & plants *out of their native* ecosystems or even man-made ecosystem, where they naturally occur.

#### **a. Seed gene banks**

- ❖ Seed gene banks are the easiest way to store germplasm of wild and cultivated plants at low temperature in cold rooms.
- ❖ Storage of germplasm at ultra low temperature (*i.e.* at a temperature of -196°C in liquid nitrogen) is called cryopreservation
- ❖ The cryopreservation is particularly useful for conserving seeds, vegetatively propagated parts, tissue culture., etc

#### **b. Botanical gardens and zoos**

Botanical gardens and zoos are the most common places for the conservation of biodiversity.

- All over the world, there are more than 1500 botanical gardens
- Similarly, there are more than 800 zoos around the world.
- These zoos are professionally managed and are harboured by about 3000 species of mammals, birds, reptiles and amphibians.

#### **3.a**

- As the forests have been increasingly felled for commerce and industry, Indian villagers have sought to protect their livelihoods through the Gandhian method of Satyagraha (non-violent resistance).
- In the 1970s and 1980s this resistance to the destruction of forests spread throughout India and became organized and known as the Chipko Movement.
- The first Chipko action took place spontaneously in April 1973 and spread to many districts of the Himalaya in Uttar Pradesh.
- The name of the movement comes from a word meaning 'embrace': the villagers hug the trees, saving them by interposing their bodies between them and the contractors' axes.

- The Chipko protests in Uttar Pradesh achieved a major victory in 1980 with a 15-year ban on green felling in the Himalayan forests of that state by order of India's then Prime Minister, Indira Gandhi.
- In addition to the 15-year ban in Uttar Pradesh, the movement has stopped clear felling in the Western Ghats and the Vindhyas and generated pressure for a natural resource policy which is more sensitive to people's needs and ecological requirements.
- One of the most prominent leaders has been Sunderlal Bahuguna, a Gandhian activist and philosopher, whose appeal to Mrs Gandhi resulted in the green-felling ban and whose 5,000-kilometre trans-Himalayan foot march in 1981-83 was crucial in spreading the Chipko message.

### **3.b Scope of environmental studies:**

- i. Study of Ecosystems, cause effects and relationship between the components.
- ii. This study creates awareness among the people know about various natural resources of a region and their conservation.
- iii. It provides necessary information about biodiversity richness and the potentials dangers to the species of plants, animals and micro organisms in the environment.
- iv. This study enables one to understand the causes and consequence of natural and man induced disasters, pollution and measures to minimize these effect.
- v. It enables one to evaluate social issues and the environment

### **Importance:**

1. World population is increasing at an alarming rate especially in developing countries.
2. The natural resources and endowment in the earth are limited.
3. The methods and techniques of exploiting natural resources are advanced.
4. The resources are over-exploited and there is no foresight of leaving the resources to the future generation.
5. The unplanner exploitation of natural resources lead to pollution of all types and at all levels.

#### **4.a Causes of Deforestation**

- Encroachment of forest land for agricultural use
- Expansion of cities
- Construction of dams, canals, and highways
- Establishment of industrial areas
- Demand for firewood
- Mining
- Forest fires

#### **Effects of Deforestation**

- Loss of natural habitat of wild animals and plants
- Increased intensity and frequency of floods
- Land degradation
- Loss of forest products
- Change in climatic conditions
- Change in water cycle and reduced rainfall
- Loss of revenue

#### **4.b Benefits of Dams**

- Irrigation: Dams are necessary for irrigation projects. In arid zones, dams and reservoirs play an important role in meeting irrigation requirements.
- Production of electricity
- Promote navigation
- Recreation
- Control of floods
- Acts as a source for domestic uses

#### **Problems of Dams**

- Deforestation and loss of biodiversity
- Sinking of agricultural and forest land
- Displacement of tribal people from their home land
- Growth of aquatic weeds
- Increase in water borne and soil borne diseases
- Increase in water logging and salinity

**5.a** Threatened again - a power project proposal that threatens to put the Kerala biodiversity hotspot at risk.

It is a First major 'environment versus development' controversy.

- a) Situated in the Kundai Hills of the Western Ghats in Kerala.
- b) The Silent Valley ecosystem comprises of 8,952 hectares of forestland on the Nilgiris plateau closed on all sides by mountains of the Western Ghats, some as high as 2000 metres.
- c) A high degree of floral and faunal endemism. Rare, endangered and new biological species continue to be discovered from the Silent Valley National Park.
- d) In the late 1970's, the Kerala government decided to build a hydel power project in the area, on the Kuntipuzha river, the Kuntipuzha drops 857 meters, making the valley an attractive site for generation electricity to generate 240 MW of power and irrigate 1,00,000 hectares of land and provide 2000 jobs.
- e) The proponents argued that Kerala lacked industry at least partly because it was short of power.

#### **Draw backs**

- a) The project would have, however, submerged 500 hectares of the forest, Deforestation and Ecological balance will be disturbed

#### **Agitation against the project**

- Several organizations like the Bombay Natural History Society and Kerala Sastra Sahitya Parishad formed a 'Save Silent Valley' movement to urge the state government to abandon the project.
- International organizations like the World fund for Nature and the World Conservation Union Supported the Struggle.

**5.b** Rainwater harvesting is a technique used for collecting, storing, and using rainwater for landscape irrigation and other uses. The rainwater is collected from various hard surfaces such as roof tops and/or other types of manmade above ground hard surfaces.

#### **Methods of Rainwater Harvesting**

Broadly there are two ways of harvesting rainwater.

- (i) Surface runoff harvesting
- (ii) Roof top rainwater harvesting

##### **i. Surface runoff harvesting**

In urban area rainwater flows away as surface runoff. This runoff could be caught and used for recharging aquifers by adopting appropriate methods.

## ii. Roof Top rainwater harvesting

It is a system of catching rainwater where it falls.

In rooftop harvesting, the roof becomes the catchments, and the rainwater is collected from the roof of the house/building.

It can either be stored in a tank or diverted to artificial recharge system.

This method is less expensive and very effective and if implemented properly helps in augmenting the ground water level of the area.

### RAIN WATER HARVESTING TECHNIQUES

There are two main techniques of rain water harvestings.

1. Storage of rainwater on surface for future use.
2. Recharge to ground water.

The storage of rain water on surface is a traditional techniques and structures used were underground tanks, ponds, check dams, weirs etc

## 6.a

- **Reduce:** to make something smaller or use less, resulting in a smaller amount of waste.
  - "Source reduction" is reducing waste before you purchase it, or by purchasing products that are not wasteful in their packaging or use.
  - A key part of waste "reduction" is "conservation" - using natural resources wisely, and using less than usual in order avoid waste.
- **Reuse:** to use again or more than once
  - Reuse materials and items so that they have longer life spans and don't get thrown away after the first use.
  - Many items found around the home can be used for different purposes.
  - So before you throw those items away, think about how they can be reused.
- **Recycle:** to convert materials/waste into reusable material
  - Recycling puts objects through a process that allows them to be used again.

### Benefits of Recycle

- Recycling reduces the need for land filling and incineration
- Recycling prevents pollution

- Recycling saves energy
- Recycling decreases emissions of greenhouse gases that contribute to global climate change
- Recycling conserves natural resources
- Recycling helps sustain the environment for future generations

## 6.b

### **Objectives:**

This act has been passed to provide for the following objectives

- a) Protection and conservation of forests from being diverted in to non forest lands.
- b) To ensure judicious use of forest products

### **Powers:**

- 1) Power to issue notification declaring protected forests and making rules for such forests
- 2) Power to stop ways and water courses in reserved forest
- 3) Granting and cancellation of license
- 4) Power of entry, search, arrest and detention.

### **Penalties:**

A person violating any provision of this act, shall be punished with imprisonment for six months or a fine of Rs. 500/- or both.

## 7.a

- Eye irritation
- Nose and throat irritation
- Irritation of the respiratory tract
- Increase in mortality rate and morbidity rate
- Carbon monoxide combines with the haemoglobin in the blood and consequently increases stress on those suffering from cardiovascular and pulmonary diseases.
- Carcinogenic agents cause cancer
- Dust particles cause respiratory diseases.
- A variety of particulates particularly pollen, initiate asthmatic attacks.
- Gases like H<sub>2</sub>S, ammonia cause odour nuisance even at low concentrations.
- Certain heavy metals like lead may enter the body through the lungs and cause poisoning.

## 7.b Objectives:

This act has been passed to provide for the following objectives

- Protection and improvement of environment (water, air, land)
- Prevention of hazards to all living creatures (humans, plants, animals) and property



- Maintenance of harmonious relationship between human beings and their environment

**Functions:**

- Restricting area in which industries, operation or processes shall not be carried out.
- Laying down procedures and safeguards for handling of hazardous substances
- Examination of manufacturing processes, materials and substances likely to cause environmental pollution

**Features:**

- Restricting area in which industries, operation or processes shall not be carried out.
- Laying down procedures and safeguards for handling of hazardous substances. Emissions and Effluent standards in respect of 61 categories of industries have been evolved and notified so far.

**8.a**

Greenhouses are special buildings usually made from glass and steel. They are used to grow plants that need humidity, tropical temperatures, and constant growing conditions.

In a glass greenhouse, heat builds up and gets trapped due to presence of CO<sub>2</sub> and other heat trapping gases in the upper atmosphere.

It offers plants a warm and humid environment, even if the outside weather is dry, windy, or cold.

When the sunrays enters the earth's atmosphere which is made up of several layers of gases and reach the planet Earth, the Earth's surface land, water and biosphere absorb the solar energy.

Once absorbed, this energy gets recycled into the atmosphere.

The gases like water vapour, CO<sub>2</sub>, nitrous oxide, methane and ozone, which are present in the atmosphere, trap energy from the sun and prevent the heat from escaping back into space.

These gases are known as greenhouse gases and this natural process of maintaining the earth's average temperature and keeping the Earth warm is known as the Greenhouse effect.

**Effects of the Greenhouse Effect:**

In some parts of the world, due to rise in the winter and summer temperatures, the weather will become very hot. It may rain more in winters, while summers will become extremely hot.

Increase in the temperature may cause melting glaciers, which will increase the water in the seas and oceans, rising the sea levels up to 20 to 40 cm all over the world.

The changes in the weather may also cause changes in the amount of rainfall in different of the world. Hence, this will affect the crop growth throughout the world.

Due to these weather and temperature changes, many plants and animals will not be able to cope up and will die eventually.

## 8.b

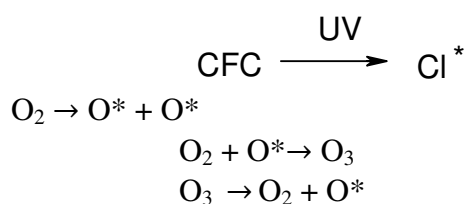
- The tragedy, which occurred in Bhopal on the night of 2 December 1984, has been described as the worst environmental disaster in the world.
- What Bhopal witnessed that night as chemical Hisoshima. The poisonous gas which came out of the Union Carbide Pesticide factory formed a huge white cloud that moved to the densely populated areas of the city causing deaths and devastation.
- More than 40 tons of toxic liquid stored in Union Carbide tanks got converted into deadly methyl isocyanate gas and escaped into the atmosphere in a short span of 90 minutes.
- The temperature and pressure of the tank containing 40 tonnes MIC began rising at around 10.30 p.m. on 2 December 1984.
- The temperature in the tank rising to 100°C turning the liquid MIC to gas and increasing pressure in the tank to 55 PSI.
- This caused bursting of the shaft valves. The gas rushed through an 8 inch pipe to an open ventilator high above the ground and escaped as a white cloud.

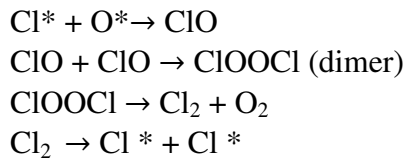
## Effects of the Tragedy:

- Approximately 2 lakh people suffered serious health effects ranging from temporary blindness, burning sensation in lungs, and permanent disabilities.
- Vegetation in an area of 3 to 5 square km radius around the factory was severely affected.

## 9.a

- Ozone (O<sub>3</sub>) is a tri atomic form of oxygen. It is found largely in the stratosphere.
- Ground level ozone is harmful to the human respiratory system and acts as eye irritant.
- If present in the stratosphere, ozone acts as a protective layer shielding the earth from harmful UV rays.
- Ozone hole was first discovered by Dr. Joe E. Farman and his associate in British Antarctic survey in 1985.
- Chlorofluorocarbons (CFC's also known as Freons) are mainly responsible for ozone depletion in the stratosphere.
- One CFC molecule destroys 1, 00,000 ozone molecules through catalytic chain reactions.





Hence CFC's do not destroy the ozone layer directly, but they act as carriers for the chlorine to the upper atmosphere.

### Effects of Ozone layer depletion:

1. **Effect on terrestrial plants:** Increased UV radiation affects plants by reducing leaf size and increasing germination time. This could decrease crop yield of corn, rice, soya bean, peas, sorghum, and wheat
2. **Effect on aquatic community:** UV radiation kills many planktonic organisms. Death of phytoplankton adversely affects the aquatic food chain.
3. **Effect on human beings:** Ozone depletion may increase the rate of skin cancer. The ability of the human system to fight diseases (immune system) is also weakened.
4. **Effect on materials:** Degradation of paints, fabrics, plastics, and other polymer materials will result in economic loss due to effect of UV radiation resulting from Ozone depletion.

### Controlling measures:

1. Proper care and maintenance of equipment to enough that the CFC's.
2. Dump about 50,000 tonnes of ethane or propane in to the Antarctic Stratosphere in each spring the chemicals would transform active ozone-depleting chlorine would transform in to non-ozone depleting hydrochloride.

### 9.b

- The term **Green Revolution** is used to describe the transformation of agriculture in many developing nations that led to significant increases in cereal production between the 1940s and 1960s.

The Green Revolution cannot be considered to be a 100 percent success

- 1950-1965 – first Green revolution-high yielding varieties-requires high water, pesticides, and fertilizers
- 1967-1996 - second green revolution – development of seed for pest and draught resistant

- 2000- third green revolution – biotechnology

### **Statistical Results of the Green Revolution**

1. The Green Revolution resulted in a record grain output of 131 million tons in 1978-79. This established India as one of the world's biggest agricultural producers.
2. By implementing green revolution there is a drastic increased production rate in wheat but the most suppressed crops are cereals.

### **Effects**

- a) Excessive use of fertilizers and pesticides had their detrimental impact on
  - 1) air 2) land 3) fresh water 4) Oceans
- b) Depletion of natural nutrients
- c) Loss of fertility
- d) Water logged
- e) Water scarcity
- f) Global climate change