

## Module I

### Ecology and Biodiversity

1.5 Threats to Biodiversity

1.6 Conservation of bio diversity

In-situ conservation

Ex-situ conservation



## 1.5 Threats to Biodiversity

Despite the numerous benefits and advantages gotten from biodiversity, it is under serious threats as a result of human activities. The main dangers worldwide are population growth and resource consumption, climate change and global warming

Habitat conversion, urbanization etc.,

Some of the main threats to biodiversity are:

1. Human Activities and Loss of Habitat
2. Deforestation
3. Desertification
4. Marine Environment
5. Climate Change

### 1. Human Activities and Loss of Habitat

Human activities are causing a loss of biological diversity among animals and plants globally estimated at 50 to 100 times the average rate of species loss in the absence of human activities. Two most popular species in rich biomes are tropical forests and coral reefs.

### 2. Deforestation:

Forest ecosystems contain as much as 80 percent of the world's terrestrial biodiversity and provide wood fiber and biomass energy as well as critical components of the global cycles of water, energy and nutrient. Forest ecosystems are being cleared and degraded in many parts of the world. In addition to threats to biodiversity and potential shortages in the supply of forest products, the degradation of forests represents an enormous potential source of greenhouse gas emissions.

### **3. Desertification:**

Desertification and deforestation are the main causes of biodiversity loss. Both processes are decisively influenced by the extension of agriculture. The direct cost of deforestation is reflected in the loss of valuable plants and animal species. Desertification process is the result of poor land management which can be aggravated by climatic variations. Decreasing soil organic matter is always a clear indication of soil degradation, and often is accompanied by reductions in water infiltration, fertility, and ability to retain fertilizers.

### **4. Marine Environment:**

Oceans play a vital role in the global environment. Covering 70 per cent of the earth's surface, they influence global climate, food production and economic activities. Despite these roles, coastal and marine environment are being rapidly degraded in many parts of the globe. In coastal areas, where human activities are concentrated, pollution, over-exploitation of resources, development of critical habitats such as wetlands, and mangroves, and water-flow from poor land-use practices have led to drastic reductions in near shore fisheries production and aquatic biodiversity.

### **5. Climate Change:**

As climate warms, species will migrate towards higher latitudes and altitudes in both hemispheres. The increase in the amount of CO<sub>2</sub> in the air affects the physiological functioning of plant and species composition. Moreover, aquatic ecosystems, particularly coral reefs, mangrove swamps, and coastal wetlands, are vulnerable to changes in climate.

### **Poaching of wildlife**

Poaching is the illegal killing of animals.

Poaching and hunting of wild animals are the main reason of wildlife depletion.

### **Causes of poaching**

- 1) **Flesh:** Flesh of wild animals is the tasty protein food. So they are hunted. (ex) rabbit, deer, wild pig.
- 2) **Trade:** the animal parts and products are sold in the market at high price. (Ex) elephant tusks, wild animals skin
- 3) **Drugs:** Animals are killed for drugs. (Ex) peacock, varanus
- 4) **Fishing:** Catching fishes during their breeding season is a threat to fish population
- 5) **Population explosion:** Increase of human population increases the demand for food.

## MAN WILD LIFE CONFLICTS

The struggle and fight between man and wild animals constitute main wild life conflicts. Man is afraid of wild animals like elephant tiger, lion, snake. But wild animals are afraid of man.

Forest is the home of wild animals. Man exploits the forest. When they are disturbed in their houses they enter human dwelling areas and destroy the properties of man. Man becomes angry and attack wild animal. so there is a continuous war between man and wild animals.

### Examples for man wild life conflicts.

- 1) In SAMBALPUR, Orissa, 195 human beings were killed in 5 years by elephants. In vengence, man killed 98 elephants and injured 30 elephants.
- 2) In the Royal Chit national park, Kathmandu, 16 Nepalese people and one 4 years old baby were killed by a tiger in 2004.
- 3) In the Sanjay Gandhi national park, Mumbai 14 persons were killed by leopards in 19 attacks.

## Causes of man-wild life conflicts

- 1) Man is the primary cause for man- wild life conflicts. He encroaches the forest area for his benefits, disturbing the home of wild animals. So, wild animals enter into human beings habitats.
- 2) The villagers put electric fences, to safeguard their crop plants. The electric wires kill and injure the wild animals.
- 3) The injured animals are angry and they have a tendency to attack man.
- 4) The wild animals damage agricultural crops. So man kills them.
- 5) Formerly the forest department cultivated paddy, sugar cane, etc. in the sanctuaries for wild animals as food. But this practice is not followed by nowa day. Hence wild animals enter human areas.

The compensation given by the Government to the farmers for damages is very less. So farmers take revenge and kill the wild animal

## 1.6 Conservation of Biodiversity

It refers to the maintainance and preservation of biodiversity.

The management of biosphere so that it will yield the greatest sustainable benefit to present generation while maintaining its potential to meet the needs of future generation.

### Types

- 1) In-situ conservation (within habitat)
- 2) Ex-situ conservation (outside habitat)

### Insitu conservation

In-site conservation involves protection of fauna and flora within its natural habitat,

where the species normally occurs is called in-situ conservation.

### **Important in-situ conservation**

Biosphere reserve, national parks, wild life sanctuaries, gene sanctuary.

### **Methods of in-situ conservation**

#### **Biosphere reserves**

India has 7 biosphere reserves all over the state. It covers large area, more than 5000 sq.km. It is used to protect species for long time.

(Ex) Gulf of mannar, Nilgiri - Tamilnadu

Sundarbans - West Bengal

#### **Role of biosphere reserves**

- 1) It gives long terms survival of evolving ecosystem
- 2) It protects endangered species.
- 3) It acts as a site of recreation and tourism
- 4) It is useful for educational and research purpose.
- 5) It protects maximum number of species and communities
- 6) Tourism and explosive activities are not permitted in the biosphere reserves.

#### **National Park**

India has 80 national parks all over the state. A national park is a protected area to conserve plants, animals together in a natural habitat.

It is usually a small reserves covering an area of about 100-500 sq.kms. within the biosphere reserves, one (or) more national parks are also exists.

(Ex) Gir national park - Gujarat

Periyar Park - Kerala

Bandipur Park - Karnataka

## Role of national Parks

1. It is used for enjoyment through tourism without affecting environment.
2. It is used to protect, develop the wild life.
3. Grazing of domestic animals inside the national park is prohibited.
4. All private rights, and forestry activities are prohibited within a national park.

## Wild life sanctuaries

At present, 492 wild life sanctuaries in our country.

(Ex) Vedanthangal bird sanctuary -Tamilnadu

Mudumalai Wild life sanctuary -Tamilnadu

Nalsarover bird sanctuary -Gujarat.

## Role of wild life sanctuaries

- 1) It protects animals only
- 2) It allows the operations such as harvesting of timber collection of forest products.
- 3) Killing, hunting (or) capturing of wildlife is prohibited.

## Gene sanctuary

2 gene sanctuary are found in northern India. A gene sanctuary is an area, where the plants are conserved.

(Ex)gene sanctuary for citrus – Lemon family

Gene sanctuary for pitcher plant – an insect eat plant.

## Advantage of Insitu conservation

- 1) It is very cheap and convenient method.
- 2) The species gets adjusted to the natural disasters like drought, floods, forest fires.

## Disadvantage of Insitu conservation

- 1) 1) A large surface area of the earth is required to preserve the biodiversity

2) Maintenance of the habitats is not proper due to shortage of staff and pollution.

### **Ex-situ conservation**

It involves the protection of fauna and flora outside the natural habitat.

#### **Role**

- 1) It involves maintenance and breeding of endangered plant and animal species under controlled conditions.
- 2) It identifies the species, which are in more risk condition of extinction
- 3) It prefer the species which are more important to man in near future among the endangered species.

#### **Methods:**

It is maintained in the following way.

- Zoos (for animals)
- Botanical gardens (for plants)
- Culture collections (for micro organisms)
- Cryobanks (for gametes, cells and tissues)
- Germplasm banks (for seeds, semen, cells, ovum)

#### **1) National Bureau of plant Genetic Resources (NBPGR)**

It is located in New Delhi. It used cryo preservation techniques to preserve agricultural and horticultural crops.

#### **Cryo preservation techniques**

It involves the preservation of seeds, pollen grains of some important agricultural and horticultural crops by using liq. Nitrogen at temp as low as  $196^{\circ}\text{C}$  Varieties of rice pearl millet, turnip, radish, tomato, onion, carrot, chills, tobacco have been preserved successfully for several years.

#### **National Bureau of Animal Genetic resources (NBAGR)**

It is located at Haryana. It preserves the semen of domesticated bovine animals.

### **National Facility for plant tissue culture Repository (NEPTCR)**

It is used for conservation of varieties of crop plants (or) trees by tissue culture.

### **Advantage of Ex-situ conservation**

1. Survival of endangered species are increasing due to special care and attention.
2. Animals are assured for food, water, shelter and also security and hence longer life span.

### **Disadvantages of ex-situ conservation**

- 1) It is expensive method
- 2) The freedom of wild life is lost
- 3) The animals cannot survive in natural environment
- 4) It can be adopted only for few selected species.

