MODULE 25 – THREATS TO BIODIVERSITY

OBJECTIVES

By the end of the session students shall be able to learn about:-

1. The threats to biodiversity, mostly due to habitat loss and poaching of wild life.
2. Reasons for Poaching of wild life.
3. Adverse effects of the introduction of exotic plants & animals.
4. Threats due to overexploitation, pollution, intensive agriculture silvicuture and use of animals for experiments.

SUMMARY

This film deals with the threats to biodiversity. Loss of habitat and poaching the wildlife for fur, fear, feathers, flesh and finery are the major reasons.
Introduction of exotic plants and animals also threatens biodiversity in the Long run. Atmospheric pollution intensive agriculture & silviculture, use of wild animals for experimental purposes also impose a threat to biodiversity.

TRANSCRIPTION

Introduction: - Biodiversity means plants, animals & microbes occurring as an interacting system in a given habitat. It is also called biological diversity. Biodiversity is different in different natural habitats.

Due to industrialization, urbanization and population explosion, biologically rich & unique habitats are being destroyed, fragmented & degraded.

Some of the industries, they are releasing polluted water without any proper treatment and this water ultimately reaches to the water bodies. We have a lot of our plants which were growing earlier in those water bodies. They have disappear sue to various types of pollutants which have harm their growth. Therefore air pollution and water pollution both are adversely affecting the biodiversity of our local area.

Natural resources are consumed non judiciously. Threat to biodiversity is world's most pressing crisis. In some habitats biodiversity is being lost even before its size is known. Loss of biodiversity would check the evolutionary capability of biota to cope up with environmental changes.

Recently we have seen that climate change is taking place and this change can be defined in the form of sudden increase in mean temperature, abrupt rainfall as well as you know some time sudden storm and storm wells. So naturally the loss of biodiversity is directly concerned or related with the climate change. This climate change has shown at many places there are several plants and animal species which have disappear. There was study made somewhere in northern region where they have found the during last 20 years more that 25% to 35% plant species, they have disappear from the natural habitats.

Threat to biodiversity is one of the major challenges to science.

Threats to biodiversity are due to the following:-

1. Habitat loss & fragmentation.
2. Poaching of wild life.
3. Introduction of non native species.
4. Over exploitation.
5. Soil, water and atmospheric pollution.
6. Intensive agriculture and forestry.
7. Use of animals for experimental purposes.
8. Pest & predator relationships.

1. **Habitat loss & fragmentation:-** This is the greatest threat to biodiversity. When people cut down trees, fill a wetland, plough a grass land or burn a forest the natural habitat of a species is changed or destroyed. Just as a man becomes a refugee in the same way wild animals also become homeless and invade other areas where their survival is not certain. Several species became extinct. During the construction of dam on Narmada river of M.P. Persons of Harsood were offered land at Chhanera (New-Harsood) but nobody thought about the plants & animals. The result is that several species have been exterminated.

The interaction amongst various organisms is also disturbed. A forest patch surrounded by cropland, orchards, plantations or urban areas is an example of fragmented habitat. Species occupying deeper parts of forest are first to disappear.

Over exploitation of a particular species reduces the size of its population to such an extent that it becomes vulnerable to extinction.

Due to overuse or misuse of desirable plant species, forests & grasslands have been turned into deserts. Wastelands have increased all over the world. Mangroves have been cleared for fuelwood and prawn farming, therefore habitat for breeding fishes has decreased. Wetlands have been drained to increase agricultural land. At present tropical forests and coral reefs are facing the problem of habitat destruction. It is estimated that by 2050 about 10 million species of plants will be eliminated.

The number of known species of flowering plants at present is 250,000 (Two lac fifty thousands). If habitat loss continues at present rate then it is estimated that about 25% species will undergo extinction by the end of 21st century. It has also been estimated that extinction of one plant species of higher plants or flowering plant is related to the extinction of 20 to 30 animal species because green plants are producers while animals are consumers. Animals depend upon plants for their survival. A major part of extinction occurs due to the change in land use or loss of natural habitat to adjust to the increasing human population. Projects like taming rivers for irrigation, draining of marshes for agriculture have either altered or even destroyed the natural habitat of wild animals causing great reduction in their population size.

To protect and preserve biodiversity it is essential to preserve the natural habitats like forests, grasslands, mountain areas, wetlands coral reefs and other ancient ecosystems.

2. **Poaching of wild life or illegal killing of wild animals:-** Poaching of wild life by man is done to obtain food, fat, finery (fur & feathers) & financial gain or for fun or out of fear. Man because of his vanity and greed has become the greatest enemy of wild life. Man has tried to control all the adverse factors for his survival without any concern for the other animals living around him.

Animals provide for one of the most lucrative black markets in the world. Worldwide trade in animals takes a toll of about 40000 primates, 40 lac birds 35 crores of ornamental fishes and innumerable lizards & snakes.
Animal products which are traded include 5 crore furs, about 500 tonnes of ivory one crore reptile skins and 3 crore manufactured leather items. The declared worldwide wildlife trade amounts to about 7500 crores a year and involves poaching of 20000 different animal species.

Several important Indian saints prefer to sit on lion skin or tiger skin or the skin of spotted deer. They preach non violence which is contradictory to their deeds.

In Africa about 95% of Black Rhino population has been exterminated by poachers for the horns.

In Africa elephants have been wiped out for some 3000 tonnes of ivory.
The scarlet Macaw once common throughout South America has been eliminated from most of its ranges in Central America.

Several species of spotted cats such as ocelot & jaguar have been jeoparadised for the demand of fur.

In 1962 about 70,000 whales were slaughtered for their different products. Now whaling industry has almost disappeared in America but Japan, Ireland, Norway carryout whaling in the name of research. Actually bones of whale are used to prepare combs and other products.
In China different organs of Tiger are used to prepare medicines.

Snakes are killed out of fear. Most of the snakes are non poisonous but the moment any person observes a snake he kills it, out of fear.

Poaching is done for food requirements also. In Madagaskar, Dodo bird became extinct because its flesh was considered as delicacy by man.
Bears are killed for their gall bladders. Musk deer is killed for perfume which has a good market in foreign countries.

On the beaches of Chennai, Kanyakumari & Andman & Nicobar, shells are sold. Tortoise, exotic birds and other small animals are packed into tiny containers and smuggled around for the pet trade.
Orchids and ferns are exploited for illegal trade.

3. **Introduction of non native species: -** New species entering a geographical region are called exotic or foreign or alien or invasive species. The niche of foreign species may overlap that of native species. The newcomer may out compete the native species, resulting in the extinction of native species. Invasive species are considered second only to habitat destruction as a major cause of extinction of species. Exotic species are have a large impact, specially in island ecosystems, which harbor much of the world's threatened biodiversity. Though species are often intentionally introduced to improve fishing & hunting they can lead to problems also. A few examples are:-

    1. Nile Perch an exotic predatory fish introduced into Lake Victoria of South Africa, has threatened the entire ecosystem of the lake by eliminating several native species of the small Cichild fish species that were native to this fresh water aquatic ecosystem.
    2. Water hyacinth introduced as an exotic aquatic plant introduced from America & tropical Africa, has become an obnoxious water weed that threatens the survival of many aquatic species in lakes & rivers. This is a free floating plant whose roots remain inside water, leaves are found above water surface, therefore it carries on transpiration and causes dystrophy of the Lake. The lakes at Bhopal & Sagar of M.P. and Dal lake of Srinagar reveal decrease in catchment area because of the rapid and heavy, dense growth of water hyacinth.

    3. Lantana camara, a forest weed, is an exotic plant that has been introduced in India from America. It is now a great nuisance for local forest plants.

    4. Argemone mexicana is an exotic plant introduced in India from Mexico. It is a nuisance for field crops like Mustard. Not only that, Mustard oil is adulterated with the seed oil of Argemone Mexicana,causing dreadful diseases like glaucoma and dropsy.

    5. Parthenium hysterophorus or Carrotweed, native of Central America got introduced in India when wheat was purchased from America under PL 480 scheme. Now the plant is a headache for cultivated crops such as sugarcane, pulses and cotton. It causes skin allergy and asthma in human beings. In skin allergy the skin develops scales like crocodile and the appearance is so ugly that few persons have committed suicide.

    6. Putranjiva roxburghii, introduced under the scheme of social forestry, causes pollen allergy or hay fever. Forest department should be cautious about this fact before the introduction of any plant in new area.

4. **Over exploitation**:- Dodo a non flying bird of madagaskar was hunted by man for its flesh to such an extent that the bird has now become extinct. Not only that, a plant known as Calveria major has also become extinct. When scientist tried to known the reason they were surprised to note that the seeds of Calveria could germinate only when the fruits of this tree were eaten by Dodo. When these seeds came out along with the faeces of Dodo they germinated. Since Dodo was over exploited as a delicacy the regeneration of Calveria stopped. By over exploiting one animal the biodiversity of a plant was also disturbed.
   In Africa there were 13 million elephants in 1980. Due to their exploitation for ivory their number has decreased to less than half.
   Antelope is over exploited for its decorative horns.
   Cod fish is over exploited for cod liver oil.
   In West Bengal, frogs were exported for their flesh. Within few years there was sudden outbreak of Malaria because number of mosquitoes increased in view of over exploitation of frogs. Govt. was forced to put ban on export of frogs.
   In Mysore , Karnataka sandal wood is over exploited for obtaining scent and other products . In Pachmarhi Madhya Pradesh the plant Psilotum has been over exploited for educational studies to such an extent that it is not possible now to observe any living specimen of this plant even in the remote areas.
   In Indore of M.P. medicinal plants like Tinospora & Centella (Brahmi) have been over exploited due to their medicinal value.

5. **Soil, Water & atmospheric pollution:-**Pollution alters the habitat of plants & animals and plays a very important role in disturbing the biodiversity. Water pollution is harmful to organisms living in estuaries & coastal zones.
   Natural pollution agents such as forest fire, leaffall and defoliation by insects also affects biodiversity.
   Man made pollution such as setting the large area of forest on fire is more dangerous than natural forest fire.
   Toxic waste added by man reaches the animals through food chain and has devastating effects on population. Spraying DDT is considered to be one of the reasons for reducing the number of Tigers because DDT, through grass, enters in herbivores like Rabit or deer and from here it enters, Fox, then Wolf and ultimately in Tiger. Concentration of DDT increases ten times at each level, the result is that Tiger is the greatest sufferer.
   Pesticides are linked with decline of fish eating birds such as Pelican & falcon In ponds Eutrophication ornutrient enrichment of the water body drastically reduces species diversity.
   Addition of detergent containing wastewater to lakes and ponds disturbs the biodiversity of swans, ducks & cranes because their wings are unable to function as the wax on their wings gets dissolved in the detergent in the water.

6. **Intensive agriculture & forestry:-** In India grasslands are continuously being changed to agricultural land to meet out the food demand of the growing population.

Under silviculture and social forestry trees like Eucalyptus, Sal & rubber are cultivated after deforesting the natural forests. Growing several members of a single tree for obtaining timer or rubber or any other forest product is called monoculture. Monoculture plantations do not support the same biological diversity as a multistored forest which has a conopy & a rich undergrowth of vegetation, nor do they nourish the soil.

We should remember that man can plant trees, but he cannot grow a forest, because forest is an Ecosystem which develops after thousands of years when it gets occupied by its own consumers and decomposers and establishes its own food chains.

7. **Use of animals for experimental purpose & for Zoo collection: -** Researchers throughout the world use a variety of animals for their studies. Frogs are dissected in laboratory for teaching anatomy. Monkey is used to prepare vaccine of polio. Chimpanzees are used for drug Trial. Rabbits are used for the trial of intravenous fluids and pharmacology of different drugs.

   Animals like Lion, Tiger, Deer, Antelope, Monkey, Gorilla, Chimpanzee, Gibbon, Bear, Peacock are captured alive and kept in zoos. Animals in captivity generally do not breed. They also have a high mortality resulting in loss of biodiversity. It is estimated that in Delhi alone, out of 15 species of frogs 13 have become extinct. Lions are captured by circus people.

8. **Pest & predator relationship**: - Natural predators remove the aged sick and injured members of the prey population. In contrast human beings always remove the strongest specimens. Such predation decreases the genetic vigour of a population. Thus human beings and natural predators have effects on population of prey. Natural predators make prey population stronger while human beings make it weaker. Predators and pests are important biotic components of ecosystem therefore great care should be taken while dealing with these components. Human beings hunt, trap & poison predators and pests such as bears, wolves, lions. This leads to the thining of biodiversity.

GLOSSARY

1. Poaching- Piercing
2. Habitat- Natural abode of a plant or animal
3. Invade- make an attack
4. Survival- Continued existing
5. Extinct- No longer existing
6. Exterminate- To root out
7. Coral- Hard submarine substance secreted by polyps
8. Lucrative- Profitable
9. Ivory- The tusk of an elephant
10. Eliminate- To get rid of
11. Ocelot- American leopard like cat

12. leopardized- To endanger
13. Orchid- A beautiful her with brilliantly colored flowers
14. Exotic- of foreign origin
15. Alien- Foreign
16. Impact- Effect
17. Dystrophy- Defective nutrition
18. Adulterated- Contaminated
19. Hay fever- Poller Allergy fever
20. Estuary- A small gulf

F.A.Q.s

Q.1 What is the most important threat to biodiversity?
Ans. Loss of Habitat.

Q.2 List Seven important threats to biodiversity.
Ans. 1. Habitat loss
2. Poaching of wild life.
3. Introduction of alien species.
4. Over exploitation.
5. Pollution.
6. Use of animals for experimental purposes.
7. Pest & predator relationship.

Q.3 List some important natural habitats which need protection in order to maintain biodiversity.
Ans. Forests, Grasslands, Wetlands, Coral reefs and Mountain areas.

Q4. What is the purpose of behind illegal killing of wild animals?
Ans. Illegal killing of wild animals is done to obtain flesh, feathers, fur and financial gain. It is also done for fun as well as out of fear.

Q.5 Approximately how many animals are killed at world level every year?
Ans. About 40,000 primates, 40 Lac birds and 35 crores of ornamental fishes.

Q.6 What is purpose behind illegal killing of Tigers?
Ans. To obtain skin of tigers.

Q.7 What is purpose behind killing of elephants?
Ans. To obtain ivory.

Q.8 Which animals are killed out of fear?
Ans. Snakes.

Q.9 Which animal is killed to obtain perfume?
Ans. Musk Deer.

Q.10 Name an obnoxious aquatic weed introduced in India from America & Tropical Africa?
Ans. Eichhornica Crassipes or water hyacinth.

Q.11 Which terrestrial weed has entered in India from America when wheat was purchased under PL 480 scheme?
Ans. Parthenium hysterephorus or Carrot weed or Congress Grass.

Q.12 What is the cause of Hay fever?
Ans Pollen allergy.

Q.13 Name a bird which has become extinct due to over exploitation by man?
Ans. Dodo.

Q.14 Name a plant which has become extinct due to extinction of Dodo.
Ans. Calveria major having fruits similar to Achras Sapota.

Q.15 Name a tree over exploited in Karnataka?
Ans. Sandal wood tree.

Q.16 To what extent atmosphere is responsible for disturbing biodiversity?
Ans. 1%.

Q.17 How spraying DDT on crop plants causes death of Tiger?
Ans. DDT sprayed on crop plants enters herbivares carnivores and top carnivores through food chain Tiger being the top carnivore gets maximum concentration of DDT hence its death occurs.

Q.18 What type of extinction took place during extinction of Dinosaurs in Mesozoic era?
Ans. Mass extinction.

Q.19 What is anthropogenic extinction?
Ans. Disappearance of a plant or animal species due to human activities is called Anthropogenic extinction. E.g. extinction of non flying bird Dodo and extinction of the plant calveria major.

CASE STUDY

Kailadevi wild life Sanctuary:- Sawai Madhopur Rajasthan

This sanctuary was initided in 1989 as a part of Ranthambore Tiger reserve in Sawai Madhopur district of Rajasthan.
The biodiversity of this Sanctuary was disturbed by migrant grazers from mewar region of Rajsthan with herds of sheep in huge groups of 150,000 (One Lac fifty thousands).

The Villagers of Meena & Gurjar Communities of the blocks where Kaila devi Sanctuary is located formed " Van Suraksha Samitis" with the help of forest department & started" Bhed Bhagao Andolan" in 1990. This resulted not only in protection of the grasses, herbs & shrubs from getting grazed by sheep but also stopped illegal felling of trees and banning of mining activities in this area.
The village people not only have opposed the threat to the biodiversity of this sanctuary but are using the forest resources of this area judiciously.