Module I

Environment, Eco System &Biodiversity

1.5 Biodiversity at global level

Biodiversity at national level

Biodiversity at local level (in Tamil Nadu)

India as a mega diversity nation

Hot spots of biodiversity

Endangered species of India

Endemic species of India

1.5 BIODIVERSITY AT GLOBAL LEVEL

There are 20 million species are living in the world. But we found and given scientific names to 1.5 million species only.

Tropical deforestation reduces 0.5% of biodiversity every year.

Terrestrial bio diversity

1)Tropical rain forest

i) It is the store house of biodiversity.

ii) 50-75% global diversity present in these tropical rain forest.

iii)It consists of millions of animals, birds, amphibians, mammals, insects.

iv)25% the medicinal drugs are obtained from tropical forest.

v)1,30,000 plant species are present in tropical rain forest.

(Ex) Silent valley in Kerala is the only one tropical forest in India.

1.Temperate forest

These forest have less biodiversity. It consists of:

1,70,000 flowering plants, 30,000 vertebrates, 2,50,000 other species.

Marine diversity

It has high biodiversity than terrestrial. Estuaries, coastal waters, oceans are biologically diverse.

BIODIVERSITY AT NATIONAL LEVEL

Bio diversity at national level

i) India is second largest nation containing 5% of world's biodiversity.

ii) India gets 10th rank among plant rich countries

iii) 11th rank among endemic species of higher vertebrates.

iv) 6th rank among the centers of diversity and origin of agricultural crops.

v) India is 'mega-diversity' nation, because it is rich in both founa and flora.

vi) The Indian species has more value in abroad

Medicinal value

(vii) 2000 plant species are cultivated for medicinal purpose for curing the diseases.

(viii) (Ex) Neem, Tulsi, Turmeric

Commercial value

(ix) Indian sandal wood, Tobacco has high commercial value, if it is sold in abroad.

(x) several species of non-edible mushrooms are cultivated and exported to advanced countries.

(xi) More than 100 species of microorganisms were collected from Indian soils are cultured, developed and formulated in the abroad laboratories.

Biodiversity at Local Level (In Tamil Nadu)

Distribution of plants and animals among different districts of Tamilnadu is uneven.

i) (Ex) there are some dense forest in Selam District.

ii) Western Ghats has 1500 species of plants, 50 species of mammals and 90 reptiles

iii) The elephant sanctuary at Anaimalai

iv) Tiger sanctuary at Mundanthurai

v) Birds sanctuary at Vedanthangal

Measurement of Bio diversity

Based on their spatial distribution, bio diversity level is split into 4 types.

1) **Point richness**

   It refers to the number of species present at a single point in a given space.

2) **Alpha richness**

   It refers to the number of species present in a small homogeneous area.

3) **Beta richness**

   It refers to the rate of change of species composition across different habitats.

4) **Gamma richness**

   It refers to the rate of change across large landscape.

RED Data Book

Red Book is a catalogue, which give

i) The information about the species in extinction condition.
ii) Provide awareness to the degree of threat to biodiversity.
iii) Help in conservation action
iv) Information about international agreements

According to Red data book, 44 plant species are critically endangered, 54 endangered and 143 are exposed to damage**.**

India as a Mega diversity nation

1) India is one among the 12-mega diversity countries in the world.
2) Out of 7.31% of global fauna species, 89,450 animal species present in India.
3) Out of 10.8% of global floral species, 47,000 plant species present in India.
4) Endemic species

   The species which are present at a particular area are called endemic species.

   33% flawering plants

53% fresh H2O fishes

50% amphibians

35% reptiles

10% mammals are endemic species in India.

5) **Plant diversity**: 5000 flowering plants, 166 crop plant species are origined in India.
6) **Marine diversity**: Several species of mangrove plants, Sea grasses are found in our country.
7) **Agro-bio diversity**: India is the centre of origin of 30000-50000 varieties of rice, mango turmeric, ginger and sugarcane.

HOT SPOTS OF BIODIVERSITY

Hot spots are bio rich areas. The geographical area which is rich in plant and animal species, of which many are endemic and endangered is called hot spot.

Criteria for the designation of hotspots.

- Plant diversity is the basis for the designation of hotspots.
- The area must support at least 1500 endemic plant species.
- The endemic vertebrate species must be high.
- The region must have lost 70% of its original habitats
- The area must be under threat.
- It should have a wealth of useful plants.

Reason for rich bio diversity in the tropics

1) The tropics have more stable climate
2) Warm temp, high humidity providefavourable conditions.
3) There is an opportunity for many species to coexist.
4) Among plants, rate of out-crossing appear to higher in tropics.

1)Western ghats

The western ghats is one of the diversity hotspots in India. The area comprises Maharastra, Karnataka, Tamilnadu and Kerala and Sri Lanka.

It covers a total area of 1,70,000 sq.km.

The Western ghats shows high level of endemics for plants, invertebrates and vertebrates.

12 species of mammals

13 species of birds

89 species of reptiles

88 species of amphibians

108 species of fresh water fishes.

It is a serious threat to the biodiversity of the western ghats due to land cleaning for different purposes. So many species face the danger of extinction. Therefore the Western ghats is said to be a biodiversity hotspot.

1) Eastern Himalayas

The eastern Himalayas are also rich in wild plants of economic value. The area comprises Nepal, Bhutan and neighbouring states of northern India. Huge wealth of fungi, insects, mammals, birds have been found in this region.

60% of Indian birds

63% of mammals are from Eastern Himalayas.

Endangered species of India

A species is said to be endangered, when its number has been reduced to a critical level. Unless it is protected and conserved, it is in immediate danger of extinction.

In India 450 plant species have been identified as endangered species. About 100mammals, 150 birds are estimated to be endangered species.

Factors affecting endangered species

Endangering of a species may be caused by

1) Habitat loss
2) Clearing of forest areas
3) Deforestation
4) Pollution
5) Quarrying in forest areas
6) Climate change
7) Poaching and Hunting
8) Export to other countries
9) Over exploitation of natural resources
10) Lake ofAwarness.

Examples for endangered species

Reptiles	-	Tortoise, Python
Birds	-	Peacock, Pelican
Mammals	-	Indian wool, red fox, desert cat
Plants	-	A large number of medicinal plants, sandal wood tree

Remedial measures

1. Several international organizations and conventions help to protect endangered species in the world.
2. Convention on international trade in endangered species 1975, restricts international trade of 2900 species, because they are endangered.

1.45 Endemic species of India

The species, which are found only in the particular region are known as endmic species.

In India, 47,000 species, 7000 plants are endemic. Nearly 62% our endemic species are found in Himalaya and Western ghats.

Factors affecting endemic species

1) Habitat loss
2) Deforestation
3) Poaching and hunting
4) Pollution
5) Climate change.

Examples of endemic species

Amphibians - (frogs, toads)

Reptiles - lizards, crocodiles

62% amphibians, 50% lizards are endemic in western ghats.

Birds - Nilgiri wood pigeon, Nilgiri pipit.

Insects - Chloroneura, Esme etc.