



(Management Topic in Environmental Studies)

B. Tech 7TH Semester

BIODIVERSITY (PART-2)



Department: Chemistry
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Threats to Biodiversity



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What is Biodiversity



- The term Biodiversity was first coined by Walter G. Rosen in 1986.
- The word Biodiversity originates from the Greek word BIOS = LIFE and Latin word DIVERSITAS = VARIETY or DIFFERENCE.
- The whole word BIO DIVERSITY generally therefore means: VARIETY OF LIFE.
- Biodiversity is the degree of variation of life. It is a measure of the variety of organisms present in different ecosystems.

Biodiversity: It is concerned with the **variety of individuals within populations**, the **diversity of species within communities**, and the **range of ecological roles within ecosystems**

Recent Issues on Biodiversity

- Some 75 per cent of the genetic diversity of crop plants been lost in the past century.
- Some scientists estimate that as many as 3 species per hour are going extinct and 20,000 extinctions occur each year.
- Roughly one-third of the world's coral reef systems have been destroyed or highly degraded.
- About 24 per cent of mammals and 12 per cent of bird species are currently considered to be globally threatened.
- More than 50 per cent of the world's wetlands have been drained, and populations of inland water and wetland species have declined by 50per cent between 1970 and 1999.

One of the estimates by the noted ecologist, E.O. Wilson puts the figure of extinction at 10,000 species per year or 27 per day

THREATS TO BIODIVERSITY

There are different threats to biodiversity because of which their population is going on decreasing day by day. The threats may be natural or anthropogenic. Some of the causes are discussed below;

1. HABITAT LOSS, DEGRADATION, FRAGMENTATION.

- 2. Causes of habitat loss:** Agriculture activities, Mining, large Hydro power plants, Urbanization and industry etc.

Habitat loss & degradation are major causes of species extinction, affecting

89% of all threatened birds,

83% of mammals &

91% of all threatened plants assessed globally (IUCN, 2000).

2. POACHING OF WILDLIFE

- Poaching is another threat that has emerged in recent decades as one of the primary reasons for decline in number of species.

Illegal wildlife trade

- Wildlife is sold and traded in many countries for i) live specimens, ii) folk medicines, iii) furs, skin, and other products such as Ivory, horns etc amounting to millions of dollars.

THREATS TO BIODIVERSITY



Poaching



Poaching is not limited to animals its also for plant

Three of the most often poached species in the park are galax, black cohosh, and ginseng.

Menopause problem,
Black Cohosh)



GALAX



BLACK COHOSH



GINSENG

The cost of **elephant tusks** can go upto \$ 100 per kg; the **leopard fur coat** is sold at \$ 100,000 in Japan \$ 10,000 for a rare hyacinth macaw , a beautiful coloured bird, from Brazil.

Mental disease, Low BP,
Diabetes (Ginseng)

THREATS TO BIODIVERSITY

➤ 3. MAN – WILDLIFE CONFLICTS

Due to the **lack of stable food, shelter** and disruption of movement, wild animals came out of forest area and attack the agricultural field and humans and in turn got killed by the humans.

➤ 4. INTRODUCTION OF EXOTIC SPECIES

Organisms introduced into new habitats where they are not native are termed as exotics are also considered as Biological Pollutants.

➤ 5. CLIMATE CHANGE AND ENVIRONMENTAL POLLUTION

- A changing global climate threatens species and ecosystems.
- The **air, water and soil pollution** are the major factor to extinct number of species in both terrestrial and aquatic ecosystems.
- Spread disease

Example :

The impact upon china's panda, ones found across the nation. Now it's only found in fragmented and isolated regions in the south west of the country as a result of wide spread deforestation in the 20th century.

There are natural causes too..

Habitat destruction through natural processes such as volcanism, fire and climate change is well documented in the fossil record. One



ENDANGERED SPECIES IN INDIA

According to The International Union of Conservation of Nature and Natural Resources (IUCN), the species that considered in imminent danger of extinction and whose survival is unlikely, if factors causing their decline continue to operate.

Classification of plant and animal as per Red Data Book (IUCN 1964)

- Endangered (E)
- Vulnerable (V)
- Rare (R)
- Threatened (T)
- Out of danger (O)
- Indeterminate (I)

- **Endangered (E):** Species whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.
- **Vulnerable (V):** Species believed likely to move into the endangered category in the near future if the casual factors continue operating.
- **Rare (R):** Species with, small world populations that are not at present endangered or vulnerable, but are at risk.
- **Threatened (T):** Threatened is used in the conservation context for species which are in one of the categories Endangered, Vulnerable and Rare.
- **Out of danger (O):** Species formerly included in one of the above categories, but which are now considered relatively secure because effective conservation measures have been taken
- **Inderterminate (I):** Species that are suspected of belonging to one of the first three categories, but for which insufficient information is currently available.

ENDANGERED SPECIES IN INDIA

450 plant species are endangered, threatened or rare in India
about 150 mammals and 150 species of birds are threatened
unknown number of species of insects are endangered

- (a) Reptiles : Gharial, green sea turtle, tortoise, python
- (b) Birds : Great Indian bustard, Peacock, Pelican,
Great Indian Hornbill, Siberian White Crane
- (c) Carnivorous Mammals : Indian wolf, red fox, Sloth bear, red panda,
tiger, leopard, striped hyena, Indian lion,
golden cat, desert cat, dugong
- (d) Primates : Hoolock gibbon, lion-tailed macaque,
Nilgiri langur, Capped monkey, golden monkey
- (e) Plants : A large number of species of orchids,
Rhododendrons, medicinal plants like
Rauvolfia serpentina, the sandal wood tree
Santalum, *Cycas beddomei* etc.

The Zoological Survey of India reported that **Dodo**, **Passenger pigeon**, **Pink headed duck** and mountain quail have already become extinct from India.

Some important endangered & extinct species



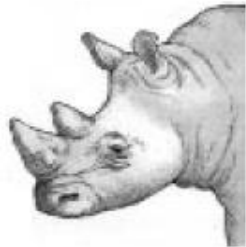
Spotted owl



Tortoise



The Great Indian Bustard



Black rhinoceros



Dugong



Red panda



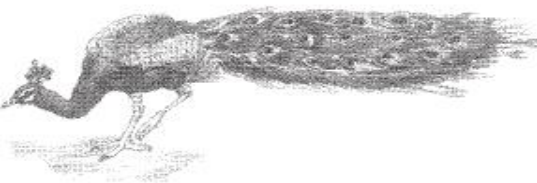
Green sea turtle



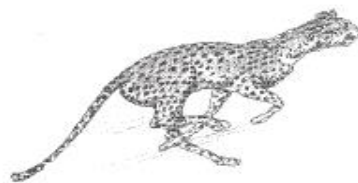
Tiger



Snow leopard



Peacock



Cheetah

Endangered



Passenger pigeon



Dodo

Extinct

➤ In India, 53 species of mammals, 69 birds, 23 reptiles and 3 amphibians are considered as threatened species.

➤ As many as 3,000- 4,000 higher plants may be under high degree of threat in India.

ENDEMIC SPECIES OF INDIA

Out of about 47,000 species of plants in India 7000 are endemic.
62% endemic flora, restricted mainly to Himalayas, Khasi Hills and Western Ghats. Example;



Nepenthes khasiana



Tooth brush Orchid



Platynerium alcinorne



Sapria himalayana

About 62% amphibians and 50% lizards are endemic to Western Ghats.
Different species in India as below



Viviparous toad



monitor lizards



Reticulated python



Indian Salamander

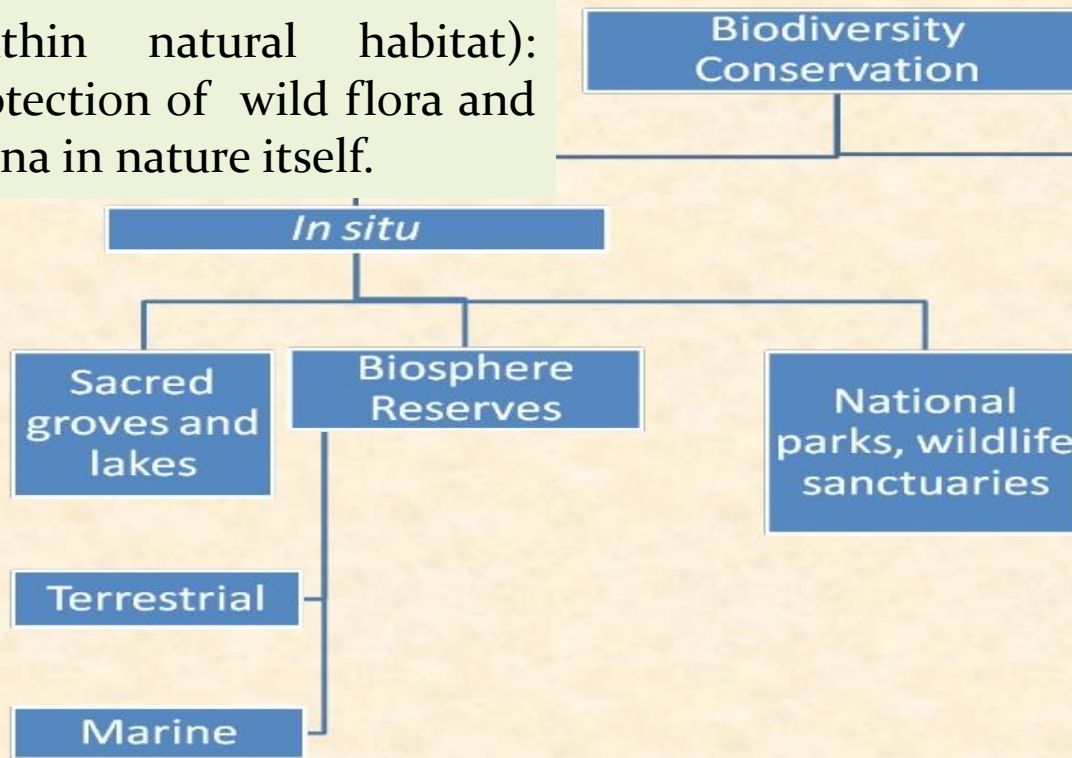
Biodiversity Conventions

- The first convention on biodiversity organized at Rio De Janerio, capital of Brazil from June 5 to 16, 1992 named as United Nation Conference On Environment and Development (UNCED), batter known as Rio Summit to maintain ecological balance and enrich biodiversity. The agreement on biodiversity signed by 150 countries including three programmes-
 - ❖ To ensure conservation of biodiversity
 - ❖ Sustainable use of biodiversity
 - ❖ Rational and equitable share of profit to accrue from use of genetic resources.
- The second convention organized at Johannesburg in 2002 called World Summit On Sustainable Development (WSSD) where the Biodiversity and Sustainable Ecosystem Management was the issue.

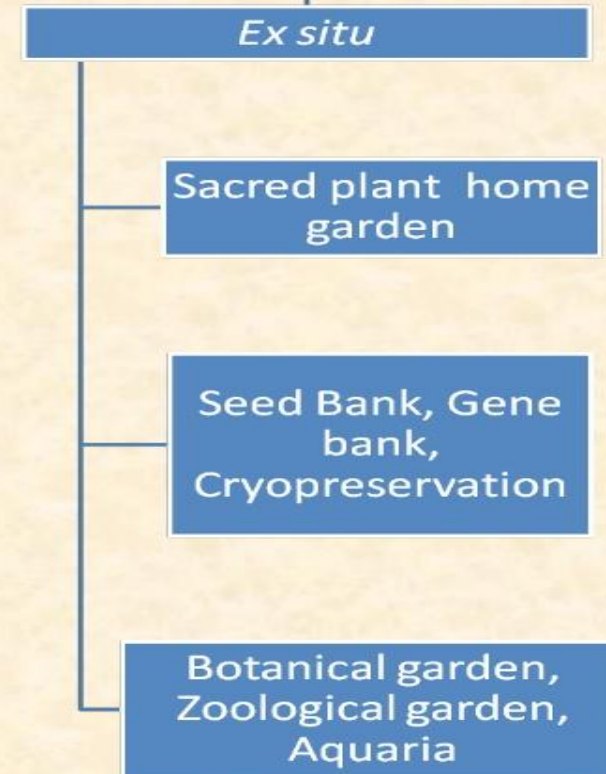
CONSERVATION OF BIODIVERSITY

Conservation is defined as “the management of human use of the biosphere so that it may yield the greatest sustainable benefit to the present generation while maintaining its potential to meet the needs and aspirations of the future generations”.

(a) **In situ** conservation (within natural habitat): protection of wild flora and fauna in nature itself.



(b) **Ex situ** conservation (outside habitats)



In- Situ conservation

It simply means conservation of species **in its natural ecosystem or habitat** through a network of “protected area”.diversity and managed **through legal** effective means.

At present we have **7** major Biosphere reserves, **80** National Parks, **420** wild-life sanctuaries and **120** Botanical gardens in our country covering 4% of the geographic area.

These include:-

- Biosphere reserves
- National parks
- Wild Life Sanctuaries etc.



Bandhavgarh National Park

Biosphere

Biosphere Reserves have been described as undisturbed natural areas for scientific study as well as areas in which conditions of disturbance are under control. These serve as the centre for ecological research and habitat protection, The "Biosphere Reserve consists of two main zones as: as a whole for long-term in situ conservation.

1. Core zone (**undisturbed area**)
2. Buffer zone(open for tourism)

. Objectives :

- Conserve biological diversity
- Safeguard genetic diversity
- Provide areas for basic and applied research
- Opportunity for Environmental Science and training
- Promote international cooperation
- Promote management of biotic resources.

Preserve and protection of local tribal people

Indian Government has established 18 Biosphere Reserves

Nanda Devi (U.P.), Nokrek (Meghalaya), Manas (Assam), Sunderbans (West Bengal), Gulf of Mannar (Tamil Nadu), Nilgiri (Karnataka, Kerala, Tamil Nadu), Great Nicobars and Similipal (Orissa) biosphere Reserves.

National park in India

A National Park is an area dedicated for the conservation of wildlife along with its environment facilitate truism



Tiger, Bandhavgarh National Park

Bandhavgarh National Park

Grazing of domestic animals, all private rights and forestry activities are prohibited . conservation specifically of some particular species of wildlife along with others.

Name of National Park	State	Important Wildlife
Kaziranga	Assam	One horned Rhino
Gir National Park	Gujarat	Indian Lion
Dachigam	J & K	Hangul
Bandipur	Karnataka	Elephant
Periyar	Kerala	Elephant, Tiger
Kanha	M.P.	Tiger
Corbett	U.P.	Tiger
Dudwa	U.P.	Tiger
Ranthambore	Rajasthan	Tiger
Sariska	Rajasthan	Tiger

India's first national park was established in 1936 as Hailey National Park, now known as Jim Corbett National Park.

Wildlife sanctuary

The Indian Board for Wild Life has defined a sanctuary as, 'An area where killing, hunting, shooting or capturing of any species of bird or animal is prohibited except by or under the control of highest authority in the department responsible for the management of the sanctuary and whose boundaries and character should be very important as far as possible.

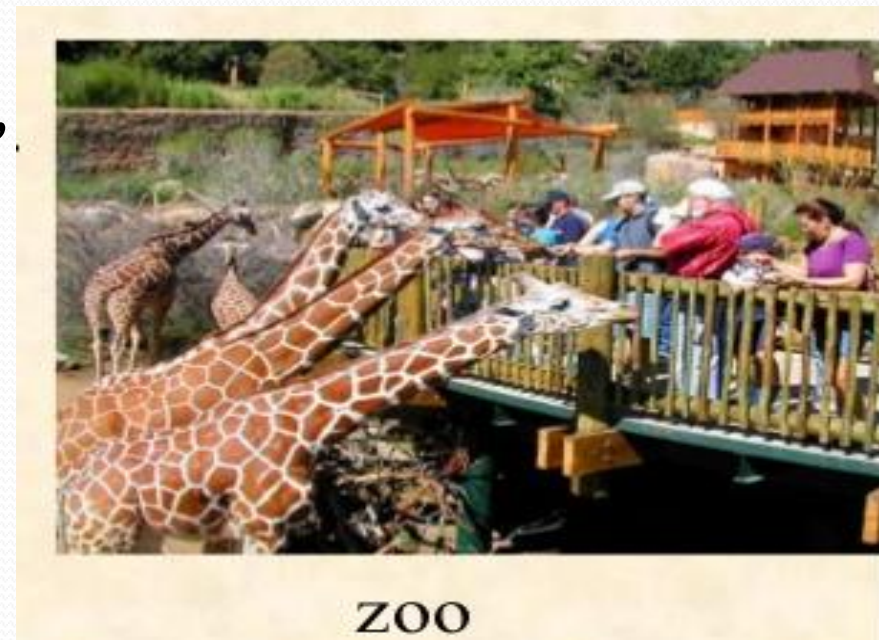
Some major wildlife sanctuaries of our country

Name of Sanctuary	State	Major Wild Life
Ghana Bird Sanctuary	Rajasthan	300 species of birds (including migratory)
Hazaribagh Sanctuary	Bihar	Tiger, Leopard
Sultanpur Bird Sanctuary	Haryana	Migratory birds
Nal Sarovar Bird Sanctuary	Gujarat	Water birds
Abohar Wildlife Sanctuary	Punjab	Black buck
Mudamalai Wildlife Sanctuary	Tamil Nadu	Tiger, elephant, Leopard
Vedanthangal Bird Sanctuary	Tamil Nadu	Water birds
Jaldapara Wild Life Sanctuary	W. Bengal	Rhinoceros, elephant, Tiger
Wild Ass Sanctuary	Gujarat	Wild ass, wolf, nilgai, chinkara

Private ownership rights are permissible and forestry operations are also permitted to an extent that they do not affect the wildlife adversely

Sanctuary

- **For plants**, there is one gene sanctuary for **Citrus** (Lemon family) and one for **pitcher plant** (an insect eating plant) in Northeast India.
- **Project for the protection and conservation of certain animals, e.g.**
 - Project Tiger, Gir Lion Project,
 - Crocodile Breeding Project,
 - Project Elephant,
 - Snow Leopard Project



Ex- Situ conservation



Gene Bank

It is defined as “the conservation of component of biological diversity (Sample of **genetic diversity, particularly of endangered species**) **outside their natural habitats**”.

1. Botanical/ zoological gardens, aquarium and research centre.

- (i) There are more than 1500 Botanical gardens in the world containing more than 80,000 species. There are more than 800 zoos around the world with about 3,000 species of mammals, birds, reptiles and amphibians.
- (ii) **National Bureau of Plant Genetic Resources (NBPGR)** New Delhi. Here agricultural and horticultural crops and their wild relatives are preserved by cryo-preservation of **seeds, pollen etc. by using liquid nitrogen** at a temperature as low as -196°C .
- (iii) **National Bureau of Animal Genetic Resources (NBAGR)** Karnal, Haryana. It preserves the **semen of domesticated bovine** animals.
- (iv) **National Facility for Plant Tissue Culture Repository (NFPTCR)** for the development of a facility of conservation of varieties of crop plants/trees by tissue culture.



Thank You