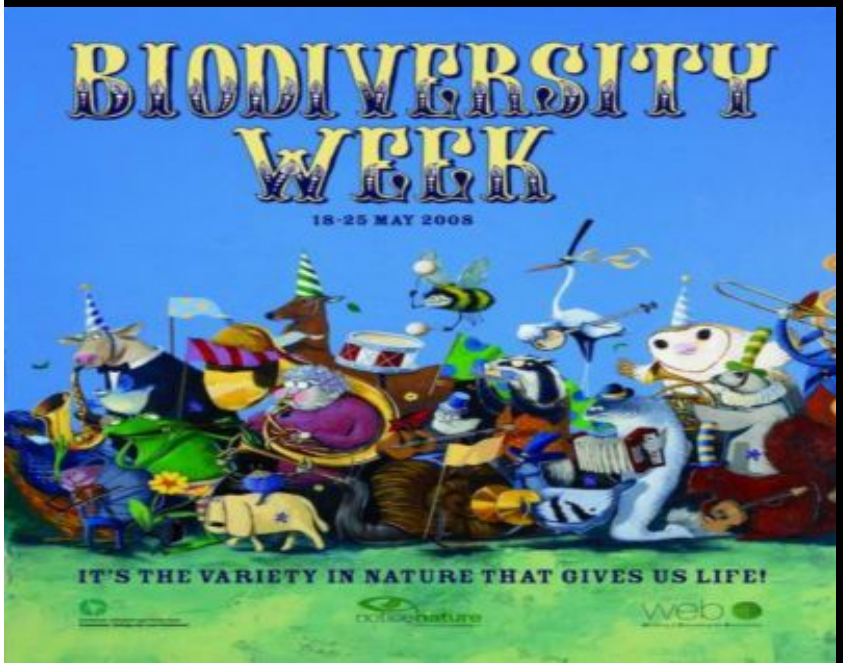
BIODIVERSITY



Biodiversity is defined as

"the variety and variability among all the groups of living organisms and the ecosystem in which they occur."

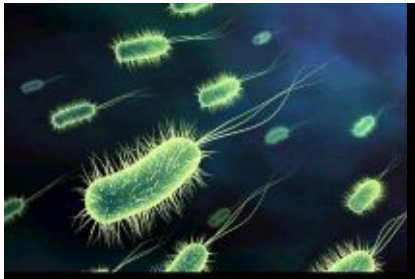
Unit 4: Biodiversity and Conservation

- Levels of biological diversity: genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots.
- India as a mega-biodiversity nation; Endangered and endemic species of India.
- Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.
- Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

BIODIVERSITY

- The variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes within species, between species and of ecosystems.
- Biodiversity is the degree of variation of life forms within a given ecosystem, biome, or an entire planet.
- Biodiversity is a measure of the health of ecosystems.

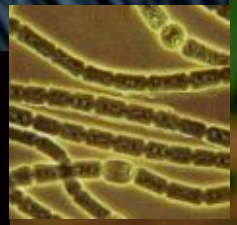
Earth's biodiversity





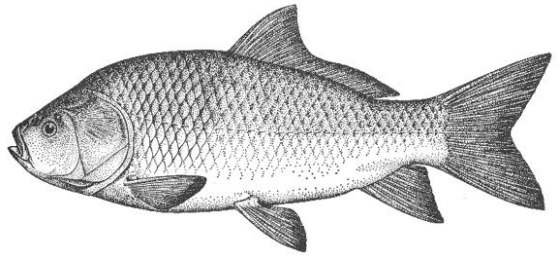




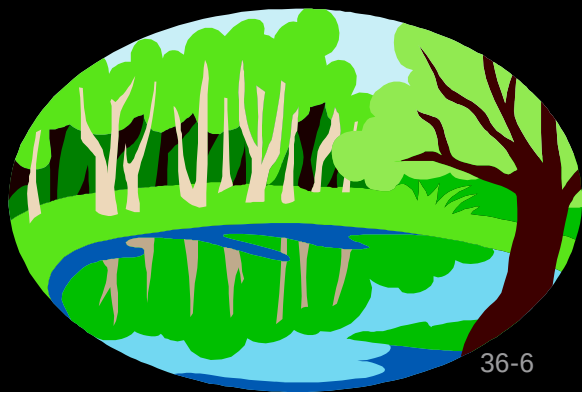






Biodiversity

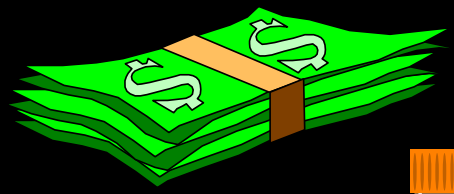


- *Biodiversity* is the variety of life on earth.
- There are between 5 to 15 million species in existence.
- Totality of genes, species, and ecosystem of a region
- Environmental conditions and range of tolerance determine diversity



Biodiversity

- Biodiversity maintains the health of the earth and its people.
- It provides us food and medicine and contributes to our economy.
- It tells us a lot about the health of the biosphere.
- The greater variety of species, the healthier biosphere.

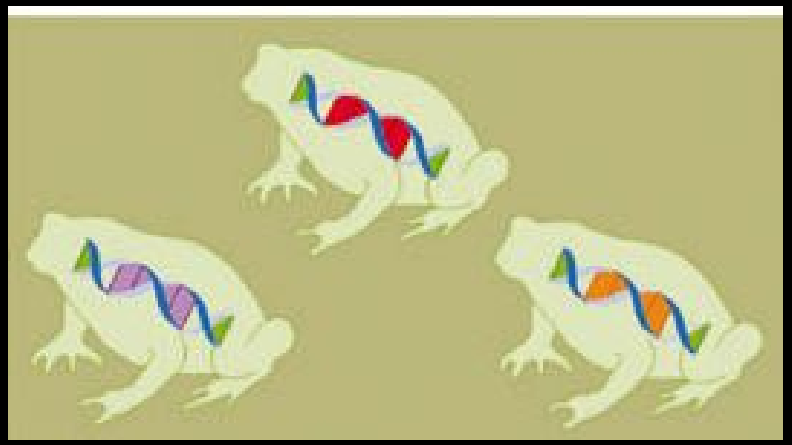


SIGINIFICANCE OF BIODIVERSITY

- Biodiversity is very important for human life, as we depend on plants, micro organisms, earth's animals for our food, medicine and industrial products.
- It protects the fresh air, clean water and land.
- It is important for forestry, fisheries and agriculture, which depend on rich variety of various biological resources available in nature.
- Loss of biodiversity has serious economic and social cost for any country.

Levels of biodiversity

- Biodiversity exists on several levels:



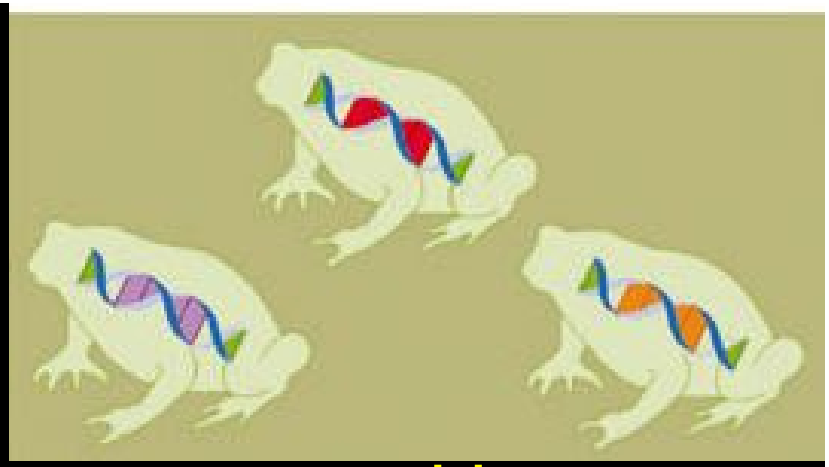
Genetic diversity

Species diversity

Ecosystem diversity

Figure 15.2

Genetic diversity



- Includes the differences in DNA composition among individuals within a given species
- Adaptation to particular environmental conditions may weed out genetic variants that are not successful.
- But populations benefit from some genetic diversity, so as to avoid inbreeding or disease epidemics.

Figure 15.2

Diversity of genes

Chippiparai , Rajapalayam, Indian Pariah Dog, Kombai

are all dogs—but they're not the same because their genes are different.

Genetic Diversity

- Variation of Genes
- Number of Genes

Mycoplasma	450-700
E.Coli	4000
Drosophila	13000
Rice	32000-50000
Man	35000-45000

- Genome Project

Genetic diversity.

- A species with different genetic characteristics is known as sub-species or “genera”.
- **Genetic diversity is the diversity within species**
- within individual species, there are number of varieties, which are slightly different from one another. These differences are due to differences in the combination of genes.
- Genes are the basic units of hereditary information transmitted from one generation to other.

Examples:

1. Rice varieties : All rice varieties belong to the species “oryza sativa” but there are thousands of rice varieties, which show variation at the genetic level differ in their size, shape, color and nutrient content.
2. Teak wood varieties:

   There are number of teak wood varieties found available.

Examples:

Indian teak, Burma teak, malasian teak etc

Species diversity

- The number or variety of species in a particular region

- Species = a particular type of organism; a population or group of populations whose members share certain characteristics and can freely breed with one another and produce fertile offspring.

Species diversity

Species : A discrete group of organisms of the same kind is known as species

Species diversity is the diversity between different species. The sum of varieties of all the living organisms at the species level is known as species diversity.

EXAMPLE

- PLANT SPECIES: APPLE.MANGO,GRAPES,WHEAT,RICE.
- ANIMAL SPECIES : LION,TIGER, ELEPHANT, DEER.

Species diversity

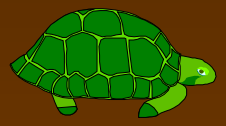
For example, monkeys, dragonflies, and meadow beauties are all different species.

Saki Monkey

Golden Skimmer

Meadow Beauty

Known Species



12,000 species of amphibians and reptiles

4,000 species of bacteria

4,500 species of mammals

5,000 species of viruses

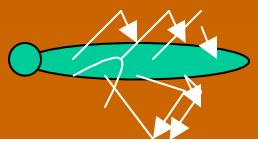
10,000 species of birds

22,000 species of fish

70,000 species of fungi

270,000 species of plants

400,000 species of invertebrates



960,000 species of insects, approximately 600,000 of which are beetles

Ecosystem diversity

- Includes diversity above the species level
- Biologists have viewed diversity above the species level in various ways. Some alternative ways to categorize it include:
  - Community diversity
  - Habitat diversity
  - Landscape diversity

Variety of ecosystems

Grasslands, Ponds, and tropical rain forests are all ecosystems. Each one is different, with its own set of species living in it.

Grassland

Rain Forest

Pond

BIO GEOGRAPHICAL CLASSIFICATION OF INDIA

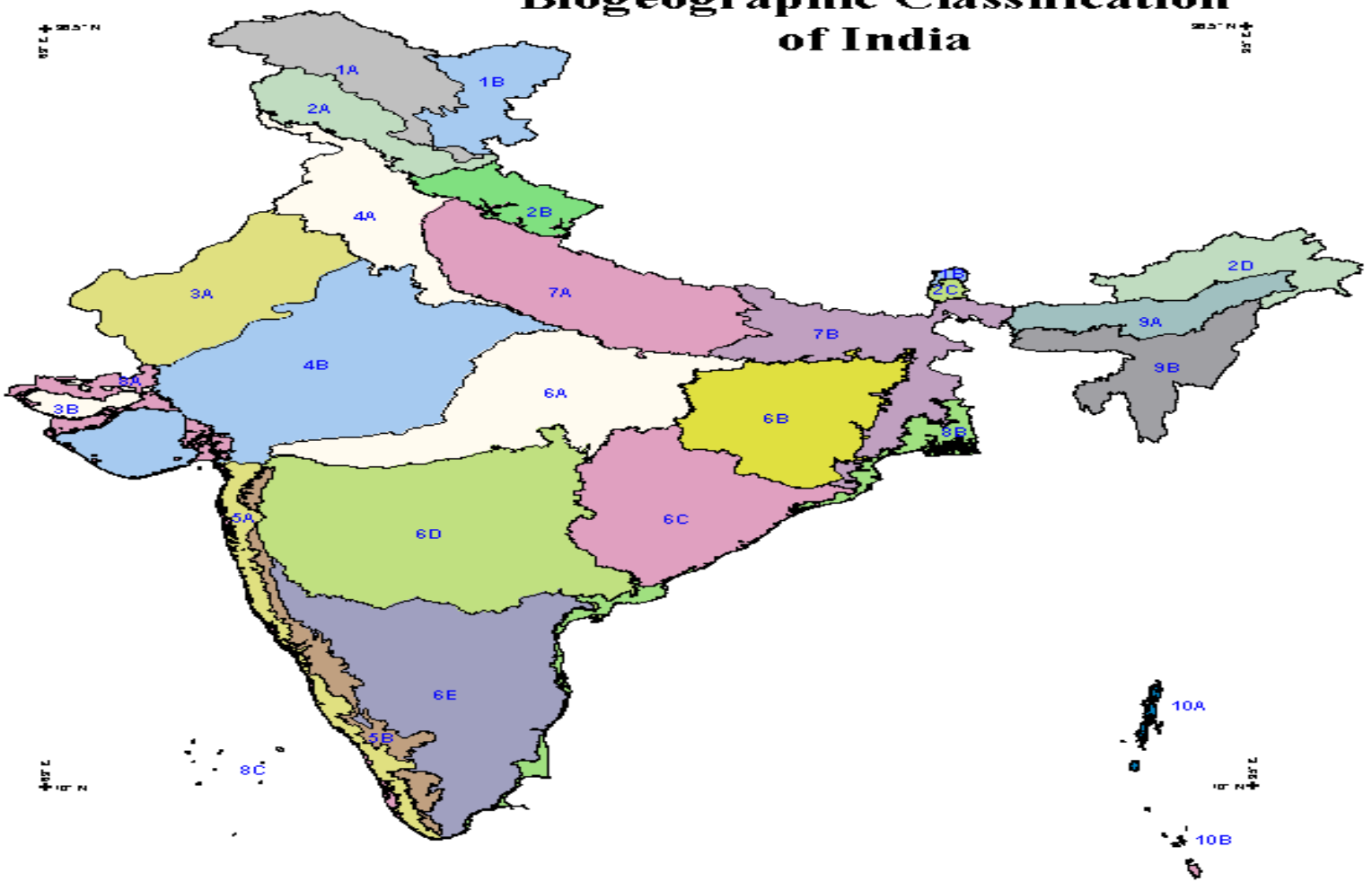
- India is a mega diversity nation with different climatic conditions and topography in different parts of it
- Occupies 10th position in plant richness
- It important to study the distribution evolution and environmental relationship of plants and animals in time space.
- Bio geographers classified our country in to ten bio geographic zones to study about it. Each zone has its own characteristic climate, soil and bio diversity

Bio-Geographical Classification of India

- There are 10 bio-geographic zones witch are distinguished clearly in India.
- They are as follows—

a) **Trans Himalayan zone.**
b) **Himalayan zone.**
c) **Desert zone.**
d) **Semiarid zone.**
e) **Western ghat zone.**
f) **Deccan plateau zone.**
g) **Gangetic plain zone.**
h) **North east zone.**
i) **Islands present near the shore line.**

Biogeographic Classification of India



1A: Trans-Himalaya-Ladakh Mtns.
1B: Trans-Himalaya--Tibetan Plateau
2A: Himalaya--North-West Himalaya
2B: Himalaya--West Himalaya
2C: Himalaya--Central Himalaya
2D: Himalaya--East Himalaya
3A: Desert--Thar
3B: Desert--Katchchh
4A: Semi-Arid--Punjab Plains
4B: Semi-Arid--Gujarat Rajputana
5A: Western Ghats--Malabar Plains
5B: Western Ghats--Western Ghats Mtns.
6A: Deccan Peninsula--Central Highlands
6B: Deccan Peninsula--Chotta-Nagpur
6C: Deccan Peninsula--Eastern Highlands
6D: Deccan Peninsula--Central Plateau
6E: Deccan Peninsula--Deccan South
7A: Gangetic Plain--Upper Gangetic Plain
7B: Gangetic Plain--Lower Gangetic Plain
8A: Coasts--West Coast
8B: Coasts--East Coast
8C: Coasts--Lakshadweep
9A: North-East--Brahmaputra Valley
9B: North-East--North-East Hills
10A: Islands--Andamans
10B: Islands--Nicobars

What do we get from biodiversity?

Oxygen

Food

Clean Water

Medicine

Aesthetics

Ideas

How many species are there?

Measuring biodiversity

- We are still profoundly ignorant of the number of species that live on our planet.
- Roughly 1.75 million species have been formally described by science.
- But many more exist: Estimates range from 3 million to 100 million.

Magnitude of Biodiversity in India : Animals

Mammals	390
Birds	1332
Reptiles	456
Amphibians	209
Fishes	2546
Insects	68389
Molluscs	5070
Protozoa	2577

Comparative statement of recorded number of animal species in India and the World

Taxa	Species	World	Percentage
Protista	2577	31259	8.24
Mollusca	5070	66535	7.62
Arthropoda	68389	987949	6.9
Other Invertebrates	8329	87121	9.56
Protochordata	119	2106	5.65
Pisces	2546	21723	11.72
Amphibia	209	5150	4.06
Reptilia	456	5817	7.84
Aves	1232	9026	13.66
Mamalia	390	4629	8.42

Reason for rich biodiversity in the tropics

- The tropics have a More stable climate.
- Warm temperatures and high humidity in the tropical areas provide favorable conditions.
- No single species can dominate and thus there is an Opportunity for many species coexist.
- Among plants, rate of out-crossing appear to be higher in tropics.

HOT-SPOTS OF BIODIVERSITY

- The most remarkable and threatened areas, many of them have been reduced to less than 10% of their original vegetation. These areas are called hot-spots of biodiversity.
- The hot spots are the geographic areas which possess high endemic species.
- These hot spots covering less than 2% of the worlds land are found to contain 50,000 endemic species.
- According to myers et al., (2000), an area is designated as a hot spot when it contains at least 0.5% of the endemic plant species.

Hotspots of biodiversity

- Norman Myers-first to develop ‘Hot spot’ concept
- **Two criteria: endemism and degree of threat**
- Geographical regions that deserved conservation priority.
- High numbers of endemic (rare) species in relatively small areas
- High species number or high degree of endemism or under huge threat or combination of factors.

CRITERIA FOR RECOGNISING HOT SPOT

- The Richness of endemic species is the primary criterion for recognizing hot spots.
- Significant percentage of specialized species.
- Site is under threat.
- It should contain important Gene pools plants of potentially useful plants.
- About 40% of terrestial plants and 25% of vertebrate species are endemic and are found in these hot spots.
- These are the areas of high diversity, endemism and are also threatened by many human activities.

34 Terrestrial Hotspots

1) Atlantic Forest
2) California Floristic Province
3) Cape Floristic Province
4) Caribbean Islands
5) Caucasus
6) Brazilian Cerrado
7) Central Chile
8) Coastal Forests of Eastern Africa
9) East Melanesian Islands
10) Eastern African Afromantane
11) Guinean Forests of West Africa
12) Himalayas
13) Horn of Africa
14) Indo-Burma
15) Irano-Anatolia
16) Japan
17) Madagascar and Indian Ocean Islands
18) Madrean Pine-Oak Woodlands
19) Maputaland-Pondoland-Albany
20) Mediterranean Basin
21) Mesoamerica
22) Mountains of Central Asia
23) Hengduan Mountains of Southwest China
24) New Caledonia
25) New Zealand
26) Philippines
27) Polynesia-Micronesia
28) Southwest Australia
29) Succulent Karoo
30) Sundaland
31) Tropical Andes
32) Tumbès-Chocò-Magdalena
33) Wallacea
34) Western Ghats and Sri Lanka


Portrayals of political boundaries are for reference only and are NOT in support of ANY position.
PAKISTAN
NEPAL
BHUTAN
INDIA
BANGLADESH
INDIA
MYANMAR
[BURMA]
LAOS
THAILAND
CAMBODIA
VIETNAM
CHINA
SOUTH CHINA SEA
BAY of BENGAL
GULF of THAILAND
MALAYSIA
0 20,000
kilometers
© CI / CABS
January 2005


INDIA
0 400
kilometers
© CI / CABS
January 2005
Arabian Sea
Bay of Bengal
SRI LANKA
INDIAN OCEAN

Eastern Himalayas:

35,000 plant species found in the Himalayas, of which 30% endemic. The eastern Himalayas are also rich in wild plants of economic value . Examples: rice, banana, citrus, ginger, chilly, jute and sugarcane.

Western Ghats :

The area comprises Maharastra, Karnataka, Tamilnadu, and Kerala. Nearly 1500 endemic dicotyledon plant species are found from western ghats. 62% amphibians and 50% lizards endemic in western ghats.

India as a Mega-Diversity Nation

- India has a very rich diversity of wild plants and animals, and is considered to be one of the mega-diversity country.
- Its share of the global biodiversity is about 8.6% of wild plant animal species respectively.
- Estimates for the number of micro-organism species are not available. Parallel to this enormous diversity in domesticated animal such as buffalo, goat, sheep, pig, poultry, horse, ponies, camels, and yak.
- A great variety also exists among our crops. For example, Indian farmers probaly grew over 30,000 varieties of rice alone.

Magnitude of Species diversity over the world : Plants

Higher plants	2,70,000
Flowering plants	2,00,000
Gymnosperms	500
Pteridophytes	10,000
Mosses and Liverworts	16,000
Algae	40,000
Fungi	72,000
Bacteria	4,000
Viruses	1,550

Why Should we concerned about biodiversity?

What we know:

The Earth is losing species at an alarming rate

- Some scientists estimate that as many as **3 species per hour are going extinct and 20,000 extinctions occur each year.**
- when species of plants and animals go extinct, many other species are affected.

ENDEMISM OR ENDEMIC SPECIES

- The species which are confined to a particular are called endemic species.
- Our country has a rich endemic flora and fauna.
- About 33% of the flowring plants, 53% of fresh water fishes, 60% amphibians , 36% reptiles and 10% mammalian are endemic species.
- 1.Plant diversity: 5000 flowering plants and 166 crop plant species have their origin in India.
- 2.marine diversity: More than 340 coral species of the world are found here. Mangrove and sea grasses are also found in our country.

ENDEMIC SPECIES

- ***The species which are found only in a particular region are known as endemic species.***
- India is rich in plant and animal endemic species
- Western Ghats rich in 60% amphibians, 50%,reptiles endemic species
- FAUNA- e.g. monitor lizards, reticulated python, Indian salamander
- Out of 47,000 species,7,000 –endemic
- 62% endemic found in Himalayas and western Ghats

ENDANGERED AND ENDEMIC SPECIES OF INDIA

- According to IUCN the species are classified into various types.
- Extinct species: A species is said to be extinct, when it is no longer found in the world.
- Endangered species: A species is said to be endangered, when its number has been reduced to a critical level.
- Vulnerable species: A species is said to be vulnerable when its population is facing continuous decline due to habitat destruction or over exploitation.
- Rare species: A species is said to be rare, when it is localized within restricted area.

Endemic species in India

Plants

- Pteridophyta- 200
- Angiosperms - 4950

Animals

- Land-878
- Freshwater-89
- Insecta-16214
- Reptilia-214

Endangered and Endemic Species in India

Group	Species
Reptiles	Gharial, Green sea turtle, Star Tortoise
Birds	Great Indian Bustard, Hornbill
Carnivore (Mammals)	Indian Wolf, Red Fox, Sloth Bear, Tiger, Panthers, Asiatic Lion
Primates	Hoolock Gibbon, Lion Tailed Macaque
Plants	Orchids, medicinal plants

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 100 mammals and 150 birds are endangered species.
- India's biodiversity is threatened due to habitat destruction, degradation and over exploitation of resources.

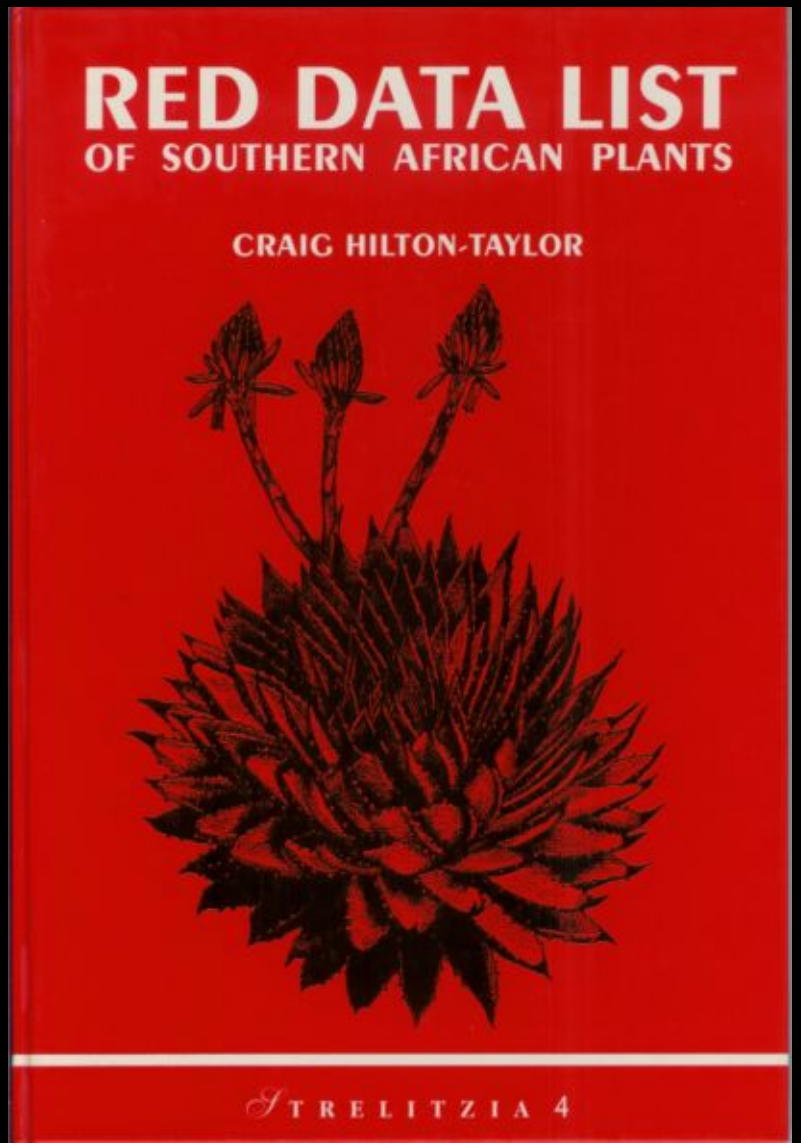
IMPORTANT ENDANGERED SPECIES

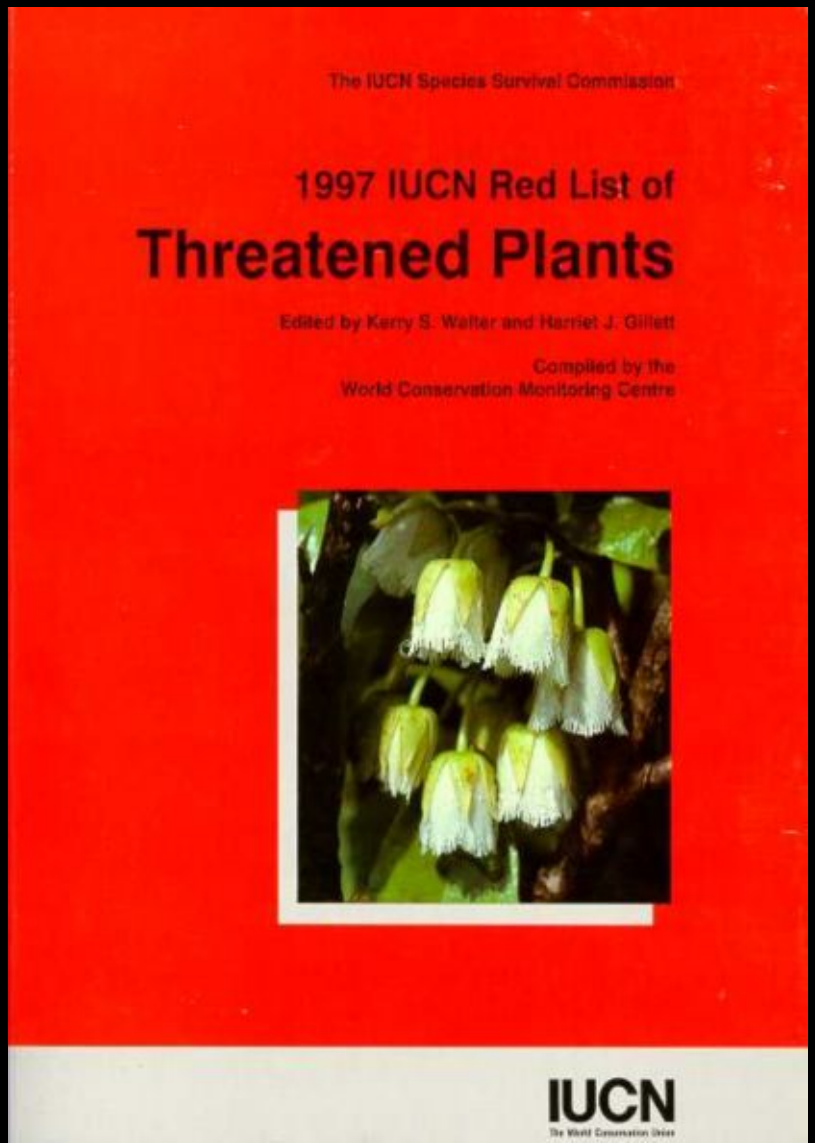
- Reptiles - tortoise,green sea turttle, python
- Birds - peacock, pelican,indian bustard
- Mammals - indian wolf,red fox,tiger,indian lion golden cat, desert cat
- Primates - hoolock gibbon, capped monkey, golden monkey
- Plants - sandal wood, medicinal plants

FACTORS AFFECTING ENDANGERED SPECIES

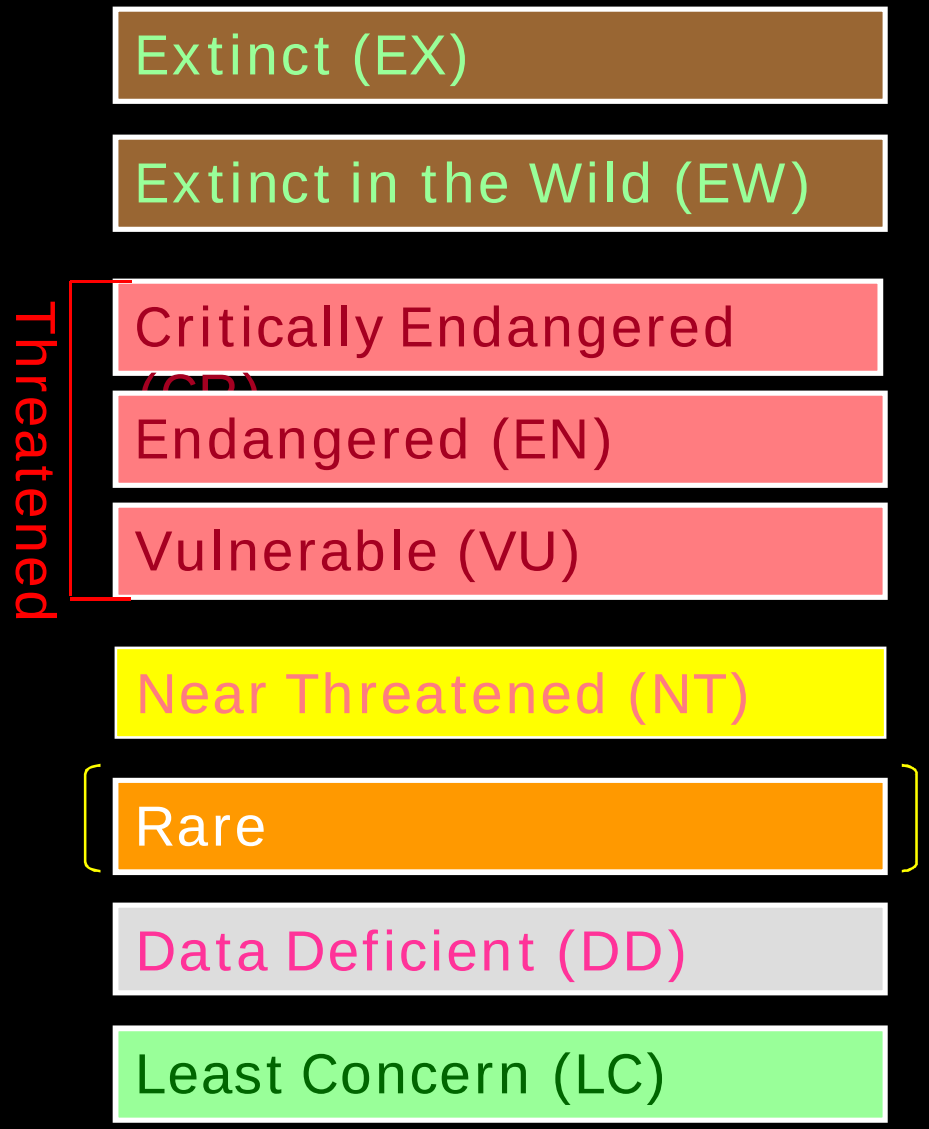
- POLLUTION
- OVER-EXPLOITATION
- CLIMATIC CHANGE

IUCN Red Data Lists



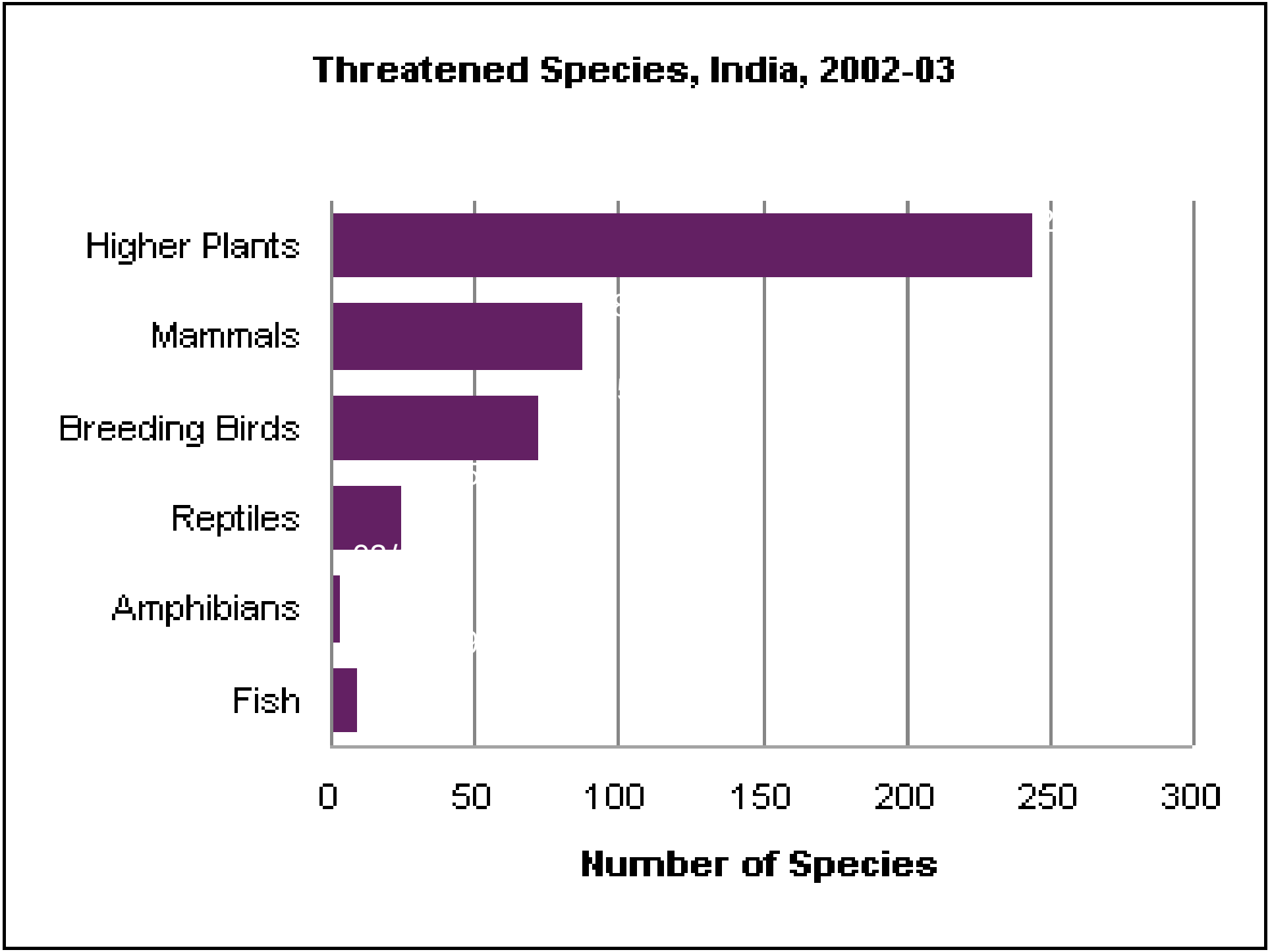


IUCN Criteria



Red List Categories – India

- Extinct in the wild
- Critically endangered 44 plants
- Endangered 113 plants
- Vulnerable 87 plants
- Lower risk 73 plants


Threatened Species, India, 2002-03
Higher Plants
Mammals
Breeding Birds
Reptiles
Amphibians
Fish
0
50
100
150
200
250
300
Number of Species

Threats to biodiversity

Habitat destruction

Pollution

Species Introductions

Climate Change

Exploitation

Some examples of Extinct..

Dodo Bird, 17th cent.

Passenger Pigeon, 1914

Tasmanian Tiger, 1930

Quagga, 1738

Bali Tiger, 1937

Golden Toad, 1989

Endangered Bird species of India

Rufous - tailed Lark, India


Grey Jungle Fowl, India

Black & Orange Flycatcher, India

Tibetan Lark, India

Malabar Trogon, India

Laughing Thrush, India

Brown Parrot Bill, India

Mottled Wood Owl, India

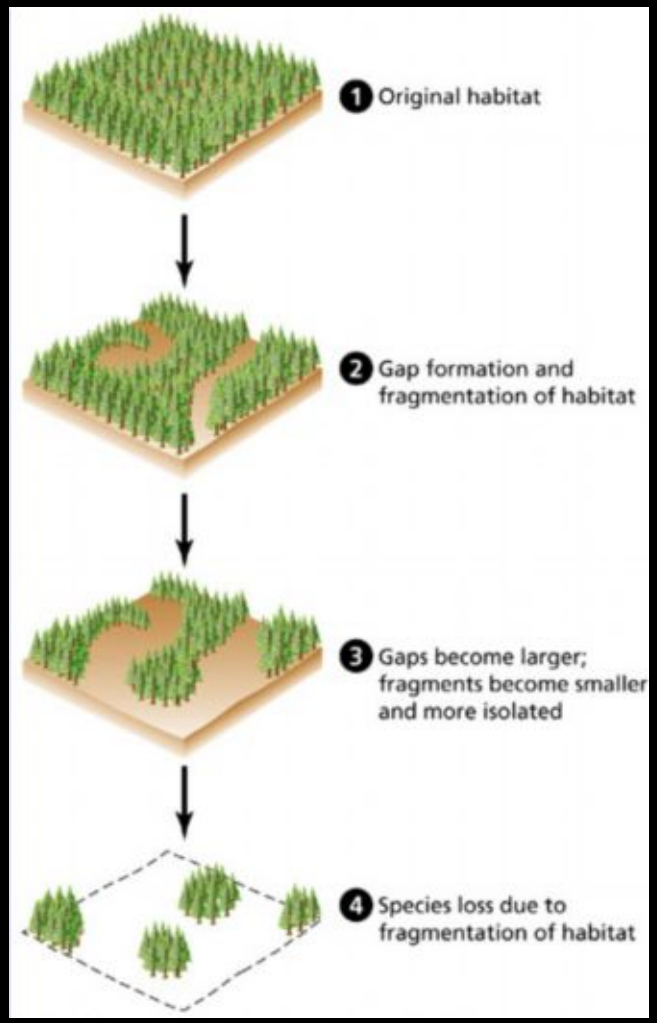
Causes of species extinction

- In most cases, extinctions occur because of a combination of factors.

e.g., **current global amphibian declines are due to a complex combination of:**

- ***Chemical contamination***
- ***Disease transmission***
- ***Habitat loss***
- ***Ozone depletion and UV light***
- ***Climate change***
- ***Synergistic interaction of these factors***

Fragmentation



- Forest fragmentation occurs as continuous forest habitat gets broken up gradually.
- The separation of an ecosystem into small pieces of land is called habitat fragmentation.
- Fragmentation reduces the opportunities for individuals in one area to reproduce with individuals from another area.
- This leads to local extirpations of forest species, as fragments become too small to support them, and too distant to allow immigration.

Habitat Loss

- Habitat loss has occurred in all ecosystems.
- If a habitat is destroyed or disrupted, the native species might have to relocate or they will die.
- Loss of habitat also affects freshwater and marine biodiversity.
- The destruction of habitat, such as the clearing of tropical rain forests, has a direct impact on global biodiversity.

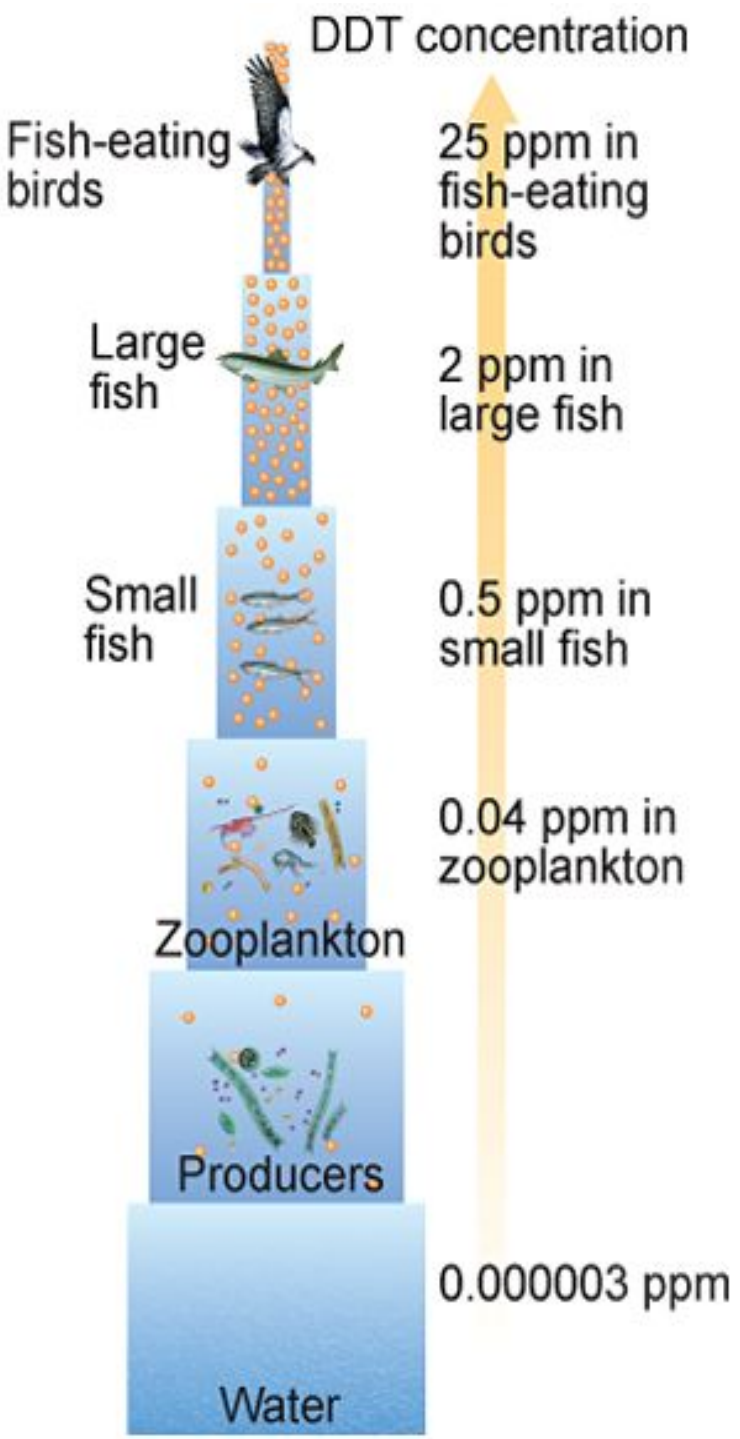
Alien Species

- *Alien species* (exotics) are nonnative species that migrate into new ecosystems or are *introduced* there by humans.
- Introduction of alien species by humans has been due to:
  - *Human colonization of new areas*
  - *Horticulture and agriculture*
  - *Accidental transport*
- Alien species disrupt food webs.

Pollution

- *Pollution* is any environmental change that adversely affects the lives and health of living things.

- Biological magnification is the increasing concentration of toxic substances in organisms as trophic levels increase in a food chain or food web.



Overexploitation

- *Overexploitation* occurs when too many individuals are taken and population size is severely reduced.
- Overexploitation occurs in:
  - *Decorative plants*
  - *Exotic aquarium fish*
  - *Oceanic fishing areas*
- Overexploitation, or excessive use, of species that have economic value is a factor increasing the current rate of extinction.
- e.g. Passenger pigeons, Bison

Rhinoceros

Ocelot

Threats to Reefs

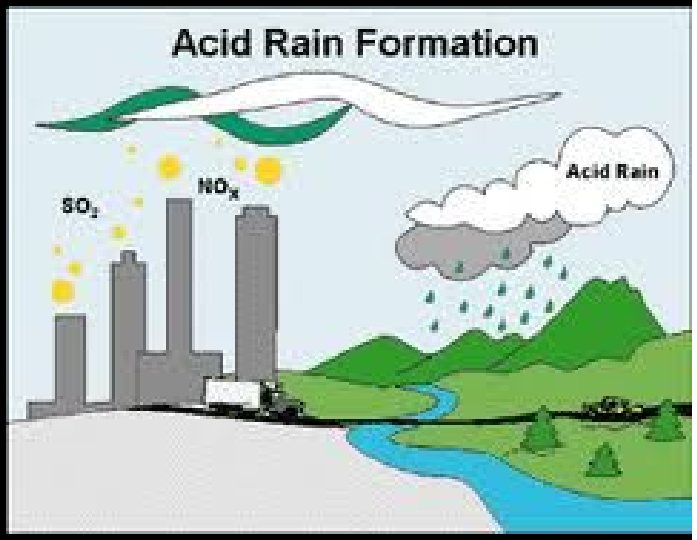
10% of the coral reefs around the world are already dead. Coral bleaching is another manifestation of the problem and is showing up in reefs across the planet.

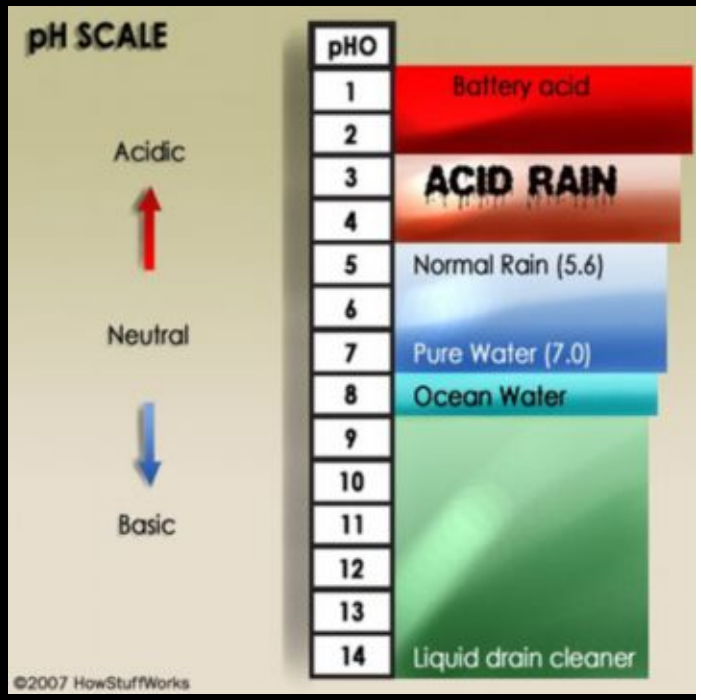
Threatened Tropical Forests

A world imperiled- forces behind the forest losses

Acid Precipitation

- Sulfur and nitrogen compounds react with water and other substances in the air to form sulfuric acid and nitric acid.
- Acid precipitation removes calcium, potassium, and other nutrients from the soil, depriving plants of these nutrients.





Eutrophication

- Eutrophication occurs when substances rich in nitrogen and phosphorus flow into waterways, causing extensive algae growth.
- The algae use up the oxygen supply during their rapid growth and after their deaths during the decaying process.
- Other organisms in the water suffocate.

Habitat preservation

a. Grizzly bear, *Ursus arctos horribilis*

b. Old-growth forest

c. Northern spotted owl, *Strix occidentalis caurina*

CONSERVATION OF BIO DIVERSITY

- ***Conservation is 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.***
- Factors affecting biodiversity:
- Human activities like construction, pollution, urbanization
- poaching, over exploitation, degradation of habitats etc.,
- oil spills, discharge of effluents disturb marine ecosystem
- Global warming , ozone hole , acid rain etc.,

Need for bio diversity conservation

- Immediate benefit like recreation and tourism
- Drugs, herbs, food, raw materials derived easily
- Preserve genetic diversity of plants and animals
- Ensures sustainable utilization
- Conserve ecological diversity and life supporting systems
- To prevent environmental deterioration

Conservation of Biodiversity

- In situ conservation
  - Protected areas
  - Biosphere reserves
  - Sacred forests

India – 89 National Parks

- 492 Wildlife Sanctuaries

IN – SITU CONSERVATION

- *It involves protection of fauna and flora within its natural habitat, where the species normally occurs*
- The natural habitats or ecosystems maintained under in – situ conservation are called protected areas.
- Biosphere reserves, national parks, wildlife sanctuaries, gene sanctuary etc., are some of in – situ conservation
- 4% geographical area of a country used for this
- It is best method for long term conservation

BIOSPHERE RESERVES

- Cover large area, more than 5000 sq.km
- Gives long term survival of evolving ecosystem
- Protects endangered species
- Protect max. no of species and communities
- Site for recreation and tourism
- Used for educational and research purposes
- Remains as open system and changes in land use restricted

BIO SPHERE RESEVES OF INDIA

Biosphere Reserves	Location
Nilgiri	Karnataka, Kerala, Tamil Nadu
Nanda Devi	Uttar Pradesh
Uttar Khand (Valley of flowers)	Uttar Pradesh
Nokrek	Meghalaya
Kaziranga	Assam
Sunderbans	West Bengal
Thar Desert	Rajasthan
Kanha	Madhya Pradesh
Namdapha	Arunchal Pradesh
Gulf of Mannar	Tamil Nadu
Rann of Kutch	Gujarat
Great Nicobar	Andaman and Nicobar
North Islands of Andamans	Andaman and Nicobar
Manas	Assam

WILDLIFE SANCTUARIES

- Area reserved for conservation of animals only.there are 492 in our country
- It protects animals only
- Allows timber extraction and collection of forest products
- Private ownership rights and forestry operations which will affect animals adversely are allowed
- Killing, hunting, shooting, or capturing of wildlife is prohibited except under the control of higher authority

OTHER PROJECTS FOR CONSERVATION OF ANIMALS:

- Project tiger
- GIR lion project
- Crocodile breeding project
- Project elephant

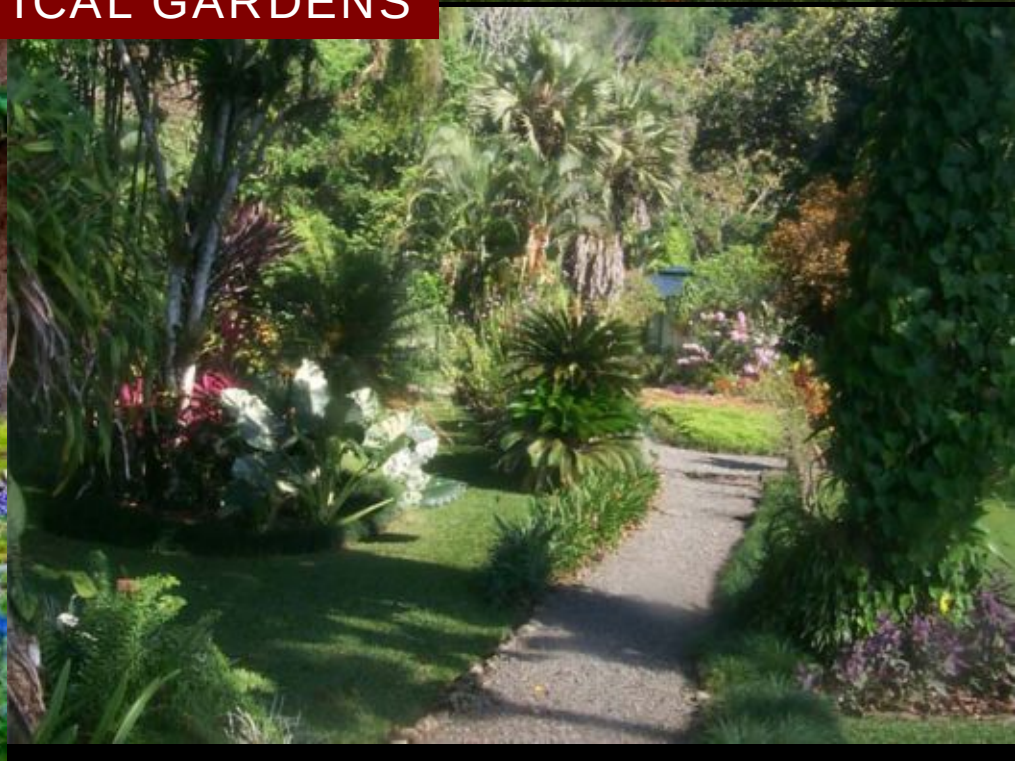
Conservation of Biodiversity

- **Ex situ conservation**
  - Cryopreservation
  - Botanical Gardens
  - Zoological parks
  - Seed banks
  - Tissue culture
  - Aquaria
  - Arborata

EX – SITU CONSERVATION

- It involves the protection of fauna and flora outside the natural habitats
- It involves maintenance and breeding of endangered species in controlled conditions
- It identify the species under risk of extinction
- It prefers species of more important for mankind in near future
- Botanical gardens seed banks microbial culture collections tissue and cell cultures museums zoological gardens are the places where it is carried out

BOTANICAL GARDENS



METHODS OF EX – SITU CONSERVATION

- **NBPGR:** National bureau of plant genetic resources is located in Delhi using cyropreservation technique to preserve agricultural and horticultural crops.
- Seeds and pollens of certain plants are preserved in liquid nitrogen at a temperature of -136^{0}C for several years
- **NBAGR:** National bureau of animal genetic resources is located in karnal Haryana. It preserves the semen of domesticated bovine animals
- **NFPTCR:** National facility for plant tissue culture repository develops varieties of plants or trees by tissue culture

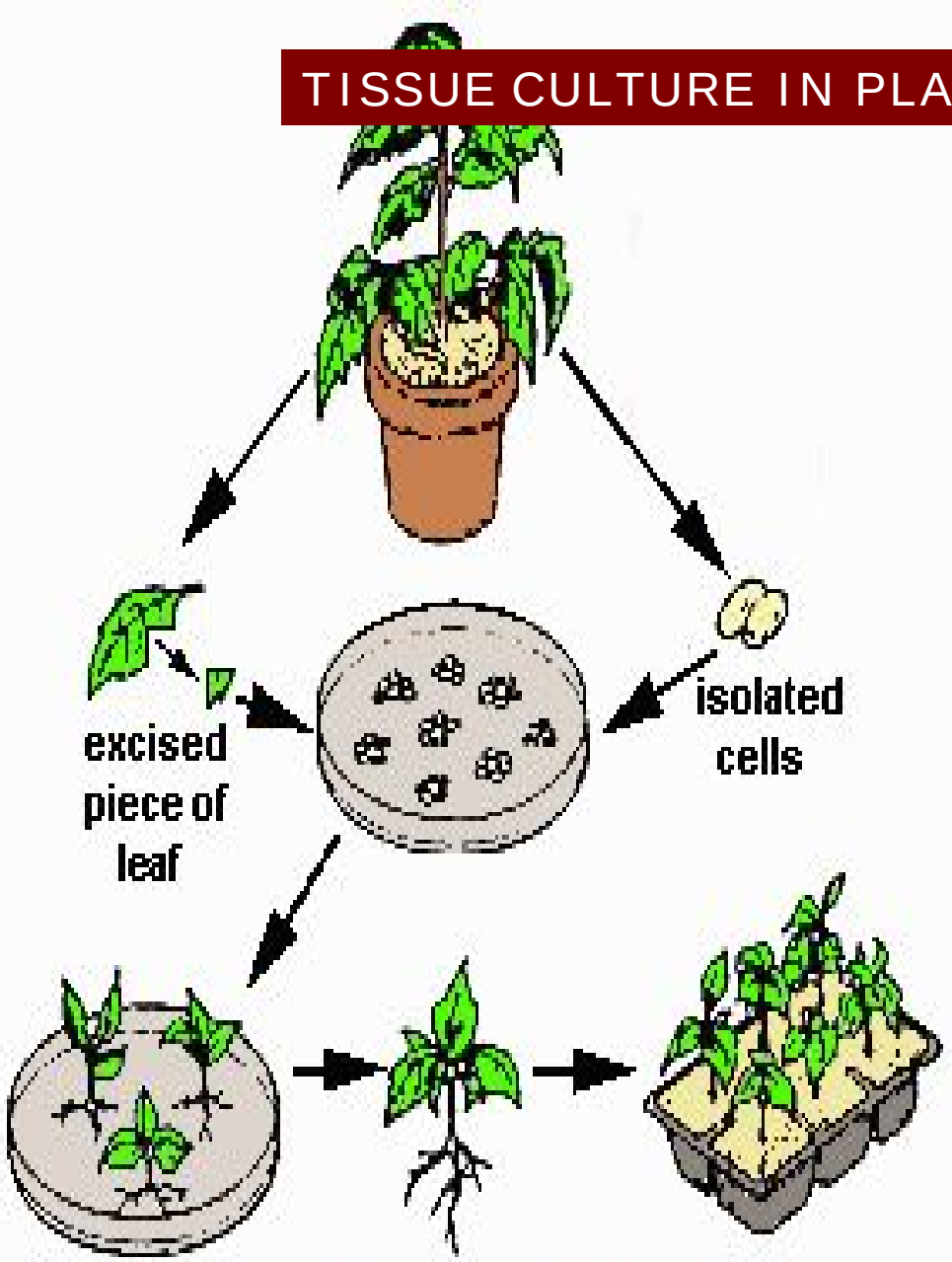
Merits of Ex- situ conservation:

- Special care and attention increased no of endangered species. In captive breeding animals are assured food water shelter and security for longer time. Ususally carried out for endangered species which do not have chance of survival

Demerits

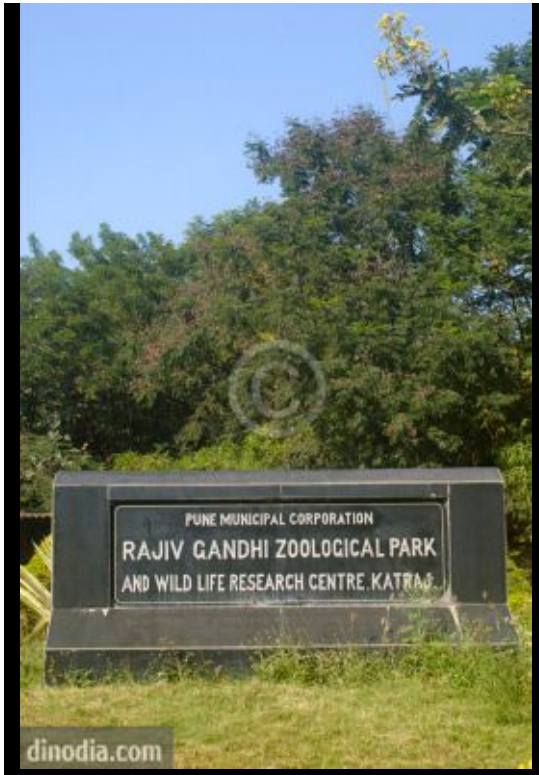
- Expensive, freedom of wildlife lost, cannot survive in natural environments and adopted only for certain species

TISSUE CULTURE IN PLANTS



Overview of the Tissue Culture Process

Indian Botanic Garden - Kolkata


PUNE MUNICIPAL CORPORATION
RAJIV GANDHI ZOOLOGICAL PARK
AND WILD LIFE RESEARCH CENTRE, KATRAJ.
dinodia.com


அறிஞர் அண்ணா உயிரியல் பூங்கா
ARIGNAR ANNA ZOOLOGICAL PARK


PADMAJA NAIDU HIMALAYAN ZOOLOGICAL PARK
& HIMALAYAN MOUNTAINEERING INSTITUTE
ENTRY
EXIT
TICKET COUNTER
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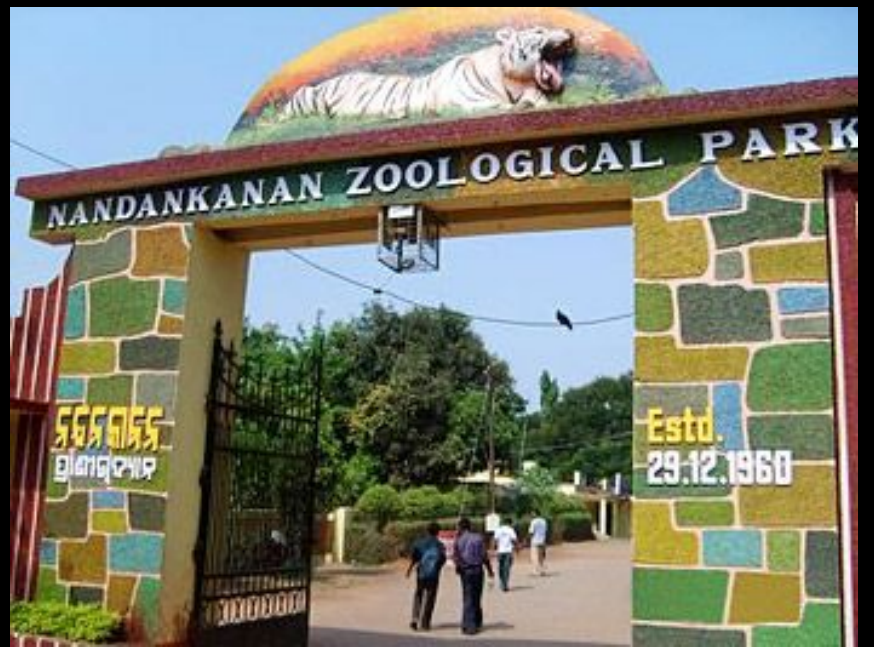
NANDANKANAN ZOOLOGICAL PARK
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Human-wildlife conflict

- As human population extends to wild animal habitats, natural wildlife territory is displaced.
- overlaps increasing their interaction thus resulting in increased physical conflict.
- By-products of human existence offer un-natural opportunity for wildlife in the form of food and shelter, resulting in increased interference and potentially destructive threat for both man and animals.

Human-wildlife conflict

- **Human-wildlife conflict refers to the interaction between wild** animals and people and the resultant negative impact on people or their resources, or wild animals or their habitat.
- It occurs when growing human populations overlap with established wildlife territory, creating reduction of resources or life to some people and/or wild animals.

MAN-WILDLIFE CONFLICTS

- Man-wildlife conflicts arise, when wildlife starts causing immense damage and danger to the man.

- Under such condition is very difficult for the forest department to compromise the affected villagers and to gain the villagers support for wildlife conservation.

Examples:

- In Sambalpur ,Orissa-195 humans were killed by elephants. Villagers killed 98 elephants and badly injured 30 elephants.
- Man-eating tiger killed 16 Nepalese
- Two men were killed by leopards in Powai, Mumbai
- 14 persons were killed during 19 attacks by leopards in Sanjay Gandhi National park at Mumbai


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MAN-WILDLIFE CONFLICTS

- Often the villagers put electric wiring around their crop fields. The elephants get injured, suffer in pain and start violence.
- The cash compensation paid by the government for damage caused by the wild animal is not enough. So farmers revengeful and kill the wild animals.
- Garbage near human settlements or food crops near forest areas attracts wild animals.

Factors influencing man-animal conflicts

- Shrinking of forest cover compels wildlife to move outside the forest and attack the fields and humans.
- Human encroachment into the forest area induces a conflict between man and the wildlife.
- Injured animals have a tendency to attack man.
- Earlier, forest departments used to cultivate sugarcane paddy, coconut trees, in the sanctuaries.

POACHING (OVER HARVESTING) OF WILD LIFE

- Poaching means killing of animals (or) commercial hunting. It leads to loss of animal biodiversity.
- SUBSISTENCE POACHING: To provide enough food for their survival and killing.
- COMMERCIAL POACHING: hunting and killing animals sell their products .

Glory to reserve

- PTR is one of the favourite eco-tourism destinations of the State, which is visited by around seven lakh people annually

- The tiger population of the reserve is estimated to be around 35

- Periyar is also one of the elephant reserves of the country

Migration memory loss – Wooping Crane

Uses of Biodiversity

- Source of food (20 plants)
- Medicines (7500-9000 plants)
- Pharmaceutical drugs (120 plants)
- Fibres
- Rubber
- Timber
- Textiles
- Aesthetic and cultural benefits
- Ecosystem services

Why is it important?

Biodiversity functions include:

- the regulation of climatic processes
- breakdown of wastes and recycling of nutrients
- filtering of water
- buffer against flooding
- maintenance of soil fertility
- the provision of natural resources
- ecosystem services
- environmental monitoring indicators
- biodiversity has an intrinsic value

Value of Biodiversity

Biodiversity is a resource of immense value.

Direct values include:

Medicinal value

Agricultural value

Consumptive use value

Indirect Value of Biodiversity

Indirect value of biodiversity includes:

1. *Biogeochemical cycles*
2. *Waste disposal*
3. *Provision of fresh water*
4. *Prevention of soil erosion*
5. *Regulation of climate*
6. *Ecotourism*

CLASSIFICATION OF VALUES OF BIODIVERSITY

- CONSUMPTIVE USE VALUE
- PRODUCTIVE USE VALUE
- SOCIAL VALUES
- ETHICAL VALUES
- AESTHETIC VALUES
- OPTION VALUES

DRUGS

- Around 70% of modern medicines are derived from plant and plant extracts.
- 20,000 plant species are believed to be used medicinally, particularly in the tration system of unani, ayurvedha and sidha.

Examples:

1. Germany; 2,500 species of plants for medicine in Homeopathy
2. India ; 3,000 species of plants for medicine in Ayurvedha, Homeopathy and unani
3. Primary health care; 85% of global community plants

BIODIVERSITY AT NATIONAL LEVEL

- India is a second largest- 5% of world's biodiversity and 2% of the earth surface.

Rank of India biodiversity:

- 10 rank- plant rich of world
- 11 rank- endemic species of higher vertebrates.
- 6 rank- centers of diversity and origin of agricultural crops

Commercial value

- Sandal wood. It is sold in abroad.
- Tobacco- Indian tobacco-high nicotin
- Edible mushrooms
- Ornamental plants flowers and fruits
- More than100 species microorganisms were collected from Indian soils and cultured, developed and formulated in the abroad laboratories.

PRODUCTIVE USE VALUES

- Bio diversity products have obtained a commercial value.
- These products are marketed and sold.
- These products may be derived from the animals and plants.

- ANIMAL PRODUCTS

- SILK- SILK WORM
- WOOL- SHEEP
- MUSK- MUSKDEER
- TUSK – ELEPHANTS
- LEATHER- ALL ANIMALS
- FOOD- FISH AND ANIMALS

- PLANT PRODUCTS
  - WOOD- PAPER, PLYWOOD, PULP, RAILWAYSLEEPER INDUSTRY.
  - COTTON- TEXTILE INDUSTRY
  - FRUITS,VEGETABLES- FOOD INDUSTRY.
  - LEATHER- LEATHER INDUSTRY
  - IVORY- IVORY WORKS
  - PEARL- PEARLS INDUSTRY.

- (a) Rice accounts for 22% of the cropped area and cereals accounts for 39% of the cropped area
- (b) Oil seed production also helped in saving large amount of foreign exchange spent on importing edible oils.

SOCIAL VALUES

- Social value of the biodiversity refers to the manner in which the bio-resources are used to the society.
- These values are associated with the social life, religion and spiritual aspects of the people.

Examples:

- HOLY PLANTS- TULSI, PEEPAL, LOTUS.
- HOLY ANIMALS- COW ,SNAKE, BULL, PEACOCK,RAT.

ETHICAL VALUES

- It involves ethical issues like “all life must be preserved”
- In India and in other countries biodiversity is considered to have great value on religious and cultural basis.
- Our rich heritage teaches us to worship plats, animals, rivers and mountains.
- It is existence in nature gives as pleasure.
- Examples:
- The river ganga is holy river.
- Vembu, tulsi, vengai are worshipped by tamilians
- Kangaroo,zebra,giraffe exist in nature.

AESTHESTIC VALUE

- The beautiful nature of plants and animals insist us to protect the biodiversity.
- The most important aesthetic value of biodiversity is eco-tourism.

Examples:

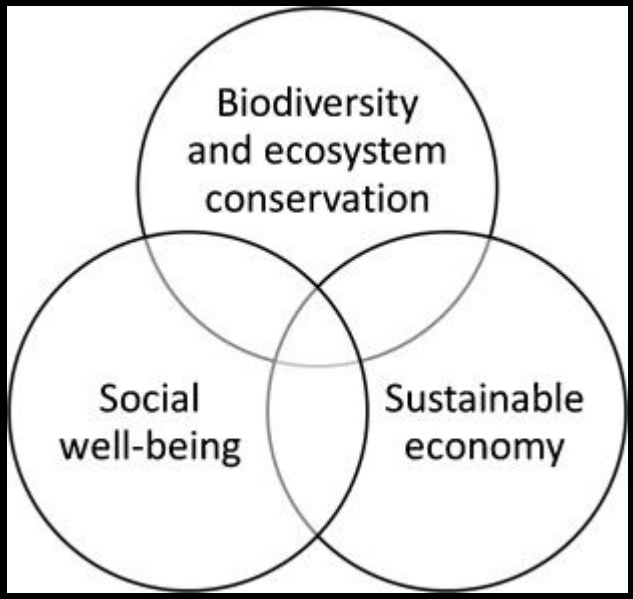
1.Eco-tourism: people from far place spent a lot of time and money to visit the beautiful areas, where they can enjoy the aesthetic value of biodiversity. This type of tourism is called eco-tourism.

The pleasant music of wild birds

- colour of butterfly
- colour of flowers
- colour of peacocks. Are very important aesthetic value.

OPTION VALUES

- The option values are the potentials of biodiversity that are presently unknown and need to be known.
- The optional values of biodiversity suggests that any species may be proved to be a valuable species after someday.



Examples:

- The growing biotechnology field is searching a species for causing the disease of cancer and AIDS.
- Medicinal plants and herbs play a very important role in our Indian economic growth.