# BIODIVERSITY

**THREATS TO BIODIVERSITY- Habitat loss, Poaching, Man made life conflicts**

**CONSERVATION – *In situ & Ex situ.***

## The various threats caused to Biodiversity:

- **Overuse & misuse of natural ecosystems : unsustainable resource use by man.**
- **Important factors leading to extinction of species and consequent loss of biodiversity are:**
  - **Habitat loss and fragmentation.**
  - **Introduction of non- native species(Exotic Species)**
  - **Overexploitation.**
  - **Soil, water and atmospheric pollution, and**
  - **Intensive agriculture.**
  - **Deforestation**

# i). Habitat Loss and Fragmentation

- The destruction of habitats is the primary reason for the loss of biodiversity.
- When people cut down trees, fill a wetland, plough a grassland or burn a forest, the natural habitat of a species is changed or destroyed.
  - These changes can kill or force out many plants, animals, and microorganisms, as well as disrupt complex interactions among the species.
- Ex*: A forest patch* surrounded by croplands, orchards, Plantations, or urban areas.
- With the fragmentation of a large forest tract, species occupying deeper parts of forests are the first to disappear.

## ii).Man made life conflicts: Disturbance and Pollution

- Communities are affected by natural disturbances, such as fire, tree fall, and defoliation by insects.
- Man - made disturbances differ from natural disturbances in intensity, rate and spatial extent.
- For example, man by using fire more frequently may change species richness of a community.
- Then, some human impacts are new, never before faced by biota
  - e.g. the vast number of synthetic compounds, massive releases of radiation or spillover of oil in sea.
- These impacts lead to a change in the habitat quality.
- Pollution may reduce and eliminate populations of sensitive species.

## ii).Disturbance and Pollution

- For example: Pesticides cause decline of fish eating birds and falcons.
- Lead poisoning is another major cause of mortality of many species, such as ducks, swans and cranes, as they ingest the spent shotgun pellets that fall into lakes and marshes.
- Eutrophication (nutrient enrichment) of water bodies drastically reduces species diversity.

# iii).Introduction of Exotic Species

- New species entering a geographical region are called exotic or alien species.
- Introduction of such invasive species may cause disappearance of native species through changed biotic interactions.
- Invasive species are considered second only to habitat destruction as a major cause of extinction of species.
- Exotic species are having large impact especially in island ecosystems, which harbor much of the world ’s threatened biodiversity.
- A few examples are :

## Examples of Exotic Species

- 1). Nile perch, an exotic *predatory fish* introduced into Lake Victoria (South Africa) threatens the entire ecosystem of the lake by *eliminating several native species* of *the small Cichlid* fish species that were endemic to this freshwater aquatic system.
- 2).Water hyacinth clogs rivers and lakes and threatens the survival of many aquatic species in lakes and river flood plains in several tropical countries including India.
- 3).Lantana camara invaded many forest lands in different parts of India, and strongly competes with the native species .

# Lantana camara

# Water hyacinth

- 4). The purposely or accidentally introduced organisms (Eupatorium, Lantana , Hyacinth, Congress grass or Parthenium ) - led to the

- Extinction of Species:
- Extinction is *a natural process*. Species have disappeared and new ones have evolved to take their place over the long geological history of the earth.
- There are distinguish three types of extinction processes.
- *A).Natural extinction:*
- With the change in environmental conditions, some species disappear and others, which are more adapted to changed conditions, take their place.
- This loss of species which occurred in the geological past at a very slow rate is *called natural or background extinction.*

## B). Mass extinction :

- There have been several periods in the earth's geological history when large number of species became extinct because of catastrophes.
- Mass extinctions occurred in millions of years.

## C). Anthropogenic extinction:

- An increasing number of species is disappearing from the face of the earth *due to human activities.*
- This man-made mass extinction represents a very severe depletion of biodiversity, particularly because it is occurring within a short period of time.

- The World Conservation Monitoring Centre has recorded that :

  >> 533 animal (mostly vertebrates) and

  >> 384 plant species (mostly flowering plants) have become extinct since the year 1600.

- More species have gone *extinct from the islands than from the mainland or the oceans.*

- The current rate of extinction is 1000 to 10000 times higher than the background rate of extinction. Some examples are :
- (1) From ten high -diversity localities in tropical forests covering 300,000 km  some 17,000 endemic plant species and 350,000 endemic animal species could be lost in near future.
- (2). The tropical forests alone are losing roughly 14000 - 40000  species per year (or 2 -5 species per hour).
- (3). The earth may lose up to 50% of the species by the end of the 21 st century, if the current rate of loss continues.

## The biggest threat to biodiversity:

# Loss of Keystone Species

A keystone species is a species that has a disproportionate effect on its environment relative to its abundance. Such species affect many other organisms in an ecosystem and help to determine the types and numbers of various others species in a community.

The prairie dog has long been hated by farmers, but it is vital to many prairie species.

This gopher-tortoise is a an endangered keystone species, under protection .

# Modern Threats to biodiversity

Human actions now threaten species and ecosystems to an extent rarely seen in earth history.

The CAUESE of threats:

- Over-harvest
- Exotic species
- Habitat loss
- Climate change
- Pollution
- Domino effects

# Over-Exploitation


>> Hunting, especially commercial hunting and poaching, has driven many species to extinction.

>>Passenger pigeon for meat, snowy egret for fashion, rhinos for their horns.

>>Bushmeat harvest is a crisis of tropical forests today

# Bushmeat trade

- For the tropical forests of central and west Africa (the Congo Basin rainforests), greatest threat to vertebrate species is over-hunting for subsistence and commerce
- For people living in these areas, up to 90% of total animal protein may be derived from wild animals

## Endangered species:

A species at risk of extinction because of human activity, changes in climate, changes in predator-prey ratios, etc., especially when officially designated as such by a governmental agency.

( OR)

A plant or animal species existing in such small numbers that it is in danger of becoming extinct, as a result of human activity is called ***Endangered Species***

EX: Royal Bengal tiger, Asiatic Lion, Indian Bustard.

One of the *principal factors* in the endangerment or extinction of a species is the destruction or pollution of its native habitat. &

***overhunting, intentional extermination,*** and the accidental or intentional ***introduction of alien species*** that outcompete the native species for environmental resources

# ENDANGERES IN INDIA

- Critically endangered species in India According to the Red Data Book of International Union for Conservation of Nature (IUCN), there are 47 critically endangered species in India.
- **Critically endangered**
- **Birds**
- White-bellied heron (*Ardea insignis*)
- Great Indian bustard (*Ardeotis nigriceps*)
- Forest owlet (*Athene blewitti*)
- Baer's pochard (*Aythya baeri*)
- Spoon-billed sandpiper (*Eurynorhynchus pygmeus*)
- Siberian crane (*Grus leucogeranus*)
- White-rumped vulture (*Gyps bengalensis*)
- Indian vulture (*Gyps indicus*)

# Great Indian bustard

- The Great Indian bustard is one of the world's heaviest flying birds is one of such rarest birds of Indian Sub continent.
- The Bird is found only in some parts of Gujarat, Maharashtra, and Rajasthan.
- Less than a thousand survive today and the species is threatened by hunting and loss of its habitat.

# ENDANGERED SPECIES IN INDIA

- **Mammals**
- Asian black bear (*Ursus thibetanus*)
- Asian elephant (*Elephas maximus*)
- Bengal tiger (*Panthera tigris tigris*)
- Blue whale (*Balaenoptera musculus*)
- Banteng (*Bos javanicus*)
- Barasingha (*Rucervus duvaucelii*)
- Clouded leopard (*Neofelis nebulosa*)
- Central Kashmir vole (*Alticola montosa*)
- Dhole (*Cuon alpinus*)
- Dugong (*Dugong dugon*)
- Fin whale (*Balaenoptera physalus*)
- Four-horned antelope (*Tetracerus quadricornis*)
- **Fish**
- Asian arowana (*Scleropages formosus*)
- **Birds**
- Narcondam hornbill (*Rhyticeros narcondami*)
- **Reptiles**
- Olive ridley sea turtle (*Lepidochelys olivacea*)

# *Asian blackbuck bear*

# ENDEMIC SPECIES

- Endemic species are geographically constrained to one particular place on the planet.
- They often live on islands, animals PRONE to an endemic state through hunting and habitat loss.
- Endemic species are more likely to form in biologically isolated areas such as islands and large bodies of water.
- Endemic species run a higher risk of extinction because of their geographic isolation.

# ENDEMICS OF INIDA
## Lemur of Madagaskar

**Endemics in India**

LEMUR – Madagskar.

There are five families of lemurs with 99 species and subspecies.

The smallest lemur would easily fit in your hand, while the largest can top 25 pounds.

# ENDEMICS IN INDIA

Black-and-rufous Flycatcher
Broad-tailed Grassbird
Forest Owlet
Green Avadavat
Grey Junglefowl
Grey-breasted Laughingthrush
Grey-headed Bulbul
Intermediate Parakeet
Jerdon's Courser
Malabar Grey-Hornbill
Malabar Lark
Malabar Parakeet
Malabar Whistling-Thrush
Nilgiri Flycatcher
Nilgiri Pipit
Nilgiri Wood-Pigeon
Painted Bush-Quail
Red Spurfowl
Rock Bush-Quail

- Rufous Babbler
  Rufous-breasted Laughingthrush
  Rufous-tailed Lark
  Rusty-throated Wren-Babbler
  Snowy-throated Babbler
  Spot-breasted Fantail
  Tawny Lark
  Tawny-breasted Wren-Babbler
  White-bellied Blue-Flycatcher
  White-bellied Shortwing
  White-bellied Treepie
  White-cheeked Barbet
  White-naped Tit
  Wynaad Laughingthrush

# INDIAN TIGER

- The All members of *Felide family,* includes three great cats :
  - Asiatic Lion, Bengal Tigers, wild cats and leopard,
  - Are not in the so good population, Because of the excessive poaching, big cats in India are on the verge of extinction.
  - There is only 1411 Royal Bengal Tiger left in India,
  - Asiatic or great India lion only found in Gir national park.
  - One of the most endangered species of felide family *is snow leopard,* found only in Himalaya Ranges.
  - *Snow leopard* along with another felide member *clouded leopard* are the two highly endangered species of big cats found now only with great range of Himalayas.

# *The royal bengal tiger*

# *Asiatic lion*

# Wild dog

# Indian wild ass_endangered

# CONSERVATION OF BIODIVERSITY: IN-SITU & EX-SITU

- **In-situ** conservation:
- Conservation of a species is best done by protecting its habitat along with all the other species that live in it in nature. This is known as *in-situ conservation.*
- i.e is conserving a species in its own environment by creating National Parks and Wildlife Sanctuaries ,these are ' Protected Areas'
- Species cannot be protected individually as they are all inter dependent on each other HENCE protected as whole ecosystems.

- Ex- situ conservation:
- Conservation of biodiversity at outside of its natural habitat in a carefully controlled situation such as a *botanical garden for plants or a zoological park for animals,* where species are multiplied artificially.
- Preservation of any plant or animal by *germ plasm preservation through gene banks.*
- It must be carefully bred so that inbreeding does not lead to the genetic makeup becoming weak.

## Ex- situ conservation…

- In India, successful ex situ conservation programs have been done successfully for all our three species of crocodiles.
- Another recent success has been the breeding of the very rare pygmy hog in Gauhati zoo.
- Delhi zoo has successfully bred the rare Manipur brow antlered deer.

## Ex- situ conservation…

- The most important step of a successful breeding program is the reintroduction of a
- species into its original wild habitat. This requires rehabilitation of the degraded habitat and removal of the other causes such as poaching,
- disturbance, or other manmade influences

# Wildlife Sanctuaries and National Parks of India

- There are 589 Protected Areas in India
  - of which 89 are National Parks and
  - 500 are Wild-life Sanctuaries.
- They include a variety of ecosystems and habitats.
- Great Himalayan National Park : is the largest sanctuary in this ecosystem and is one of the last homes of the beautiful snow leopard.
- Dachigam sanctury.:only place where rare Hangul or Kashmir stag is found
- Kaziranga national park: elephant wild buffallow, gaur, hog deers.
- The manas sanctury

- Bharathpur bird sanctury: famous for birds – ducks, geese, herons.
- Siberian cranes migrates to this palce.
- Great and little Rann of kutch.: FLAMINGOS, wild ass.
- Gir sanctury- gujarath: Asiatic lion found
- Chilka lake
- Bhandipur national park.
- Sunderbans.

# DO IT !!

- Ban hunting .
- Enforce WILD LIFE PROTECTION ACTS & laws strictly
- Save forest
- Increase afforestation
- SAVE WILD LIFE ..

- Do you want to shoot animal ?

Then SHOOT IT WITH A CAMERA !!!