
biodiversity
CONSERVATION

INTRODUCTION

- In strategies of biodiversity conservation mainly two basic strategies have been proposed to ensure the future survival of endangered species.

in situ conservation : it mean that the conservation of plants and animals in their natural environments

ex situ conservation: conservation of animals and plants out side their natural habitats

In situ conservation

(onsite conservation)

- Site of conservation of plants and animals in their natural environments
- So ,it involves the conservation of total ecosystems in protected areas.
- Protected areas --- national game parks , wild life sanctuaries , Biosphere reserves , Ramsar sites & world heritage centers.

37,000 protected areas around the world

In India

- Ramsar sites ----- 19
- World heritage centers ----- 5
- National game parks ----- 94
- Wild life sanctuaries ------ 502
- Biosphere reserve ------- 18

Ramsar sites

- Oldest of the global environmental conventions
- The only global convention focusing attention on an wetlands
- Ramsar , Iran – where 18 countries signed the convention on 2 February 1971
- World wetland day---- February 2
- Eg : Ashtamudi kayal

  Vebbanattu kayal

So….Ramsar covers

- *Natural and human-made wetlands*
- *inland/freshwater:*
  - marshes, rivers, lakes, reservoirs etc.
- *coastal/marine*
  - lagoons, estuaries, mangroves, coral reefs, seagrass beds etc.
- *above ground and underground*
  - karst and caves
- *but not deep oceans*

National game parks

- National parks are protected areas , where all kinds of organisms are given legal protection.
- So they are strictly reserved for the protection , preservation and propagation of wild life.
- Human activities , such as grazing , cultivation , hunting, harvesting of the forest wealth etc.. Are strictly forbidden.
- Private ownership and habitat manipulation are not permitted.
- 94 national parks in India
- Eg: Eravikulam National Parks (Idukki)

  Silent Valley National park (PKD) etc.....


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SILENT VALLEY NATIONAL PARK

Wildlife sanctuaries

- Wildlife sanctuaries are protected areas where legalized protection is offered only for animals.
- Private ownership is permitted to a limited extent .
- Currently 502 sanctuaries present in india.
- Eg : Thattekad Sanctuaries

  Parambikulam Sanctuaries etc.....


SALIM ALI BIRD TRIAL


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Biosphere reserves

- Biosphere reserves are protected areas where all biological species are given protection , & multiple land use is permitted.
- The protected species include wild populations native tribals , cultivated plants & domesticated animals.
- The concept of “Biosphere reserve” was launched in 1975 as a part of the “Man and Biosphere (MAB) programme” of the UNESCO.
- Eg : Agasthyamala (kerala)

  Nilgiris Biosphere Reserve (23-09-1987) in india 1st declared

A Biosphere reserve has three zones or areas

1. **core zone** : no human activity is permitted

2. **buffer zone** : limited human activity is permitted

3. **manipulation zone** : free human activities are permitted
(transitional zone)

World heritage sites

- These are internationally well known biodiversity areas , identified by the world heritage committee.
- They are characterized by certain geologically , biologically & evolutionarily distinctive features.
- Eg : Nanda Devi Biosphere Reserve (U . P)

  Kazhiranga National Park (Assam)

Features of world heritage sites

- Wilderness areas : large areas , protected less stringently them biosphere reserves.
- Natural monuments : small areas , selected to protect natural monuments & the surrounding areas.
- Species management areas : specific areas , selected for the conservation of certain habitats or species which require constant protection.
- Protected landscapes & seascapes : specific areas of land or sea , selected for the protection & interaction of neighbouring communities


WILDERNESS AREA

NATURAL MONUMENTS

PROTECTED LANDSCAPE AND SEASCAPE

Ex situ conservation

(offsite conservation)

- This is the off site conservation of animals and plants outside their natural habitats.
- This is particularly important for some endangered species

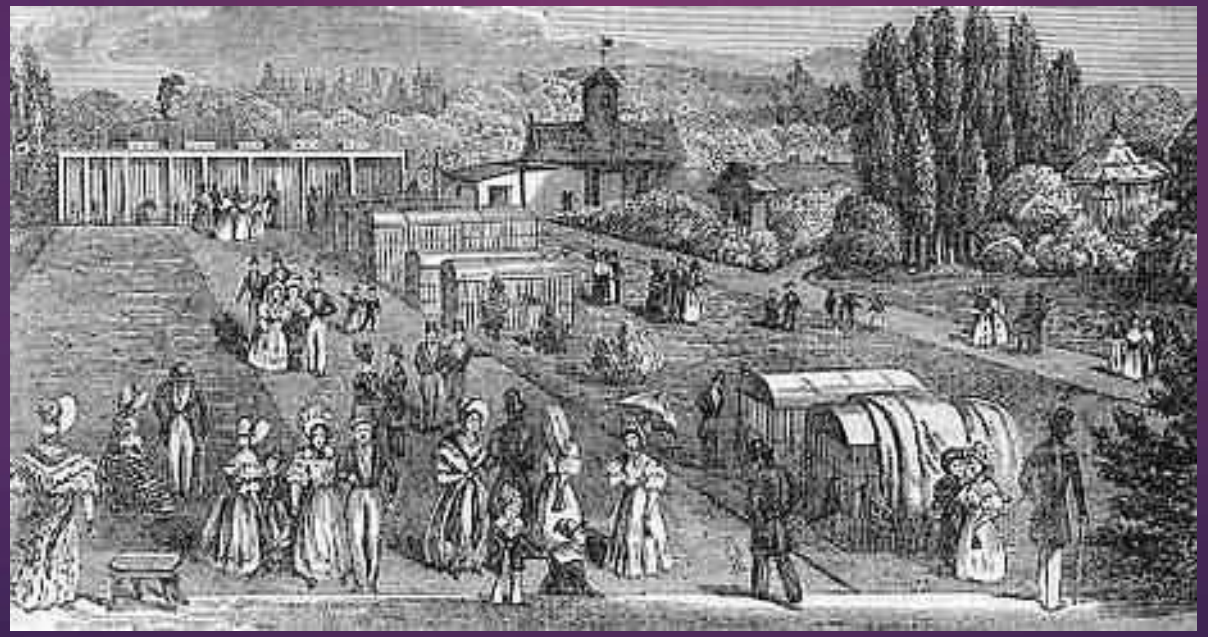
- Eg : zoos , botanical gardens , gene banks , pollen banks , seed banks ,germ plasm banks , tissue culture centers , cryopreservation centers , etc.....

The history of zoos

- The emperor Wen- Wang constructed a 600 hectare ‘Garden of intelligence’ in the 12th Century BC
- Alexander the great kept tigers and parrots in his court
- The Romans took many animals out of the wild for their amphitheater antics

The history of zoos

- London zoo in Regents Park was opened on 27th of April 1828



The aims of zoos

- The main aim of a zoo is to house whole animals for breeding and re-introduction
- A secondary aim is to educate the public
  - The world zoos conservation strategy estimates that there are 1100 zoos in the world and they receive over 600 million visitors annually

Zoo successes – The Arabian Oryx

- The first deliberate use of a zoo was to prevent extinction of the Arabian Oryx
- These animals were hunted by the Bedouin as a test of manhood
- When spears were swapped for machine guns the numbers declined


WWW.SANTABANTA.COM

Other zoo successes

- Peter Davids Deer
- Przewalskis wild horse
- Mauritius kestrel
- Hawaiian goose
- European bison

PETER DAVIDS DEER

PRZEWALSKIS WILD HORSE

MAURITIUS KESTREL

HAWAIIN GOOSE


ARKive
www.arkive.org
EUROPEAN BISON
© Artur Tabor / naturepl.com

Botanical Gardens

- There are estimated to be around 1600 botanical gardens throughout the world and these receive over 150 million visitors a year .
- The Botanic Gardens Conservation Institute (BGCI) was set up in 1987 and its role is to collect and make available information on plant conservation ·
- These botanical gardens are important as it is estimated that 60,000 plant species could be lost in the next 50 years

Botanical Gardens

- Botanical gardens tend to look after plants in one of the five categories below
  - Rare and endangered
  - Economically important
  - Species that are needed for the restoration of an ecosystem
  - Keystone species
  - Taxonomically isolated species

Botanical Gardens successes – Torrey pine

- In 1988 there were only 4000 to 5000 individuals of the Torrey pine (*Pinus torreyana*) in the wild

www.blueplanetbiomes.org/torreypine

The Torrey pine

Botanical Gardens successes – Torrey pine

- In 1989 there was an outbreak of Ips beetles (*Ips paraconfusus*)

Ips paraconfusus

- By 1991, 840 trees had died due to the Ips beetle
- 30,000 seeds from 149 trees were collected
- Before the trees could be re-introduced the Ips beetles had to be exterminated

Botanical Gardens successes – Torrey pine

- In the first 6 months of 1991, 280,000 Ips beetles were caught in funnel traps and the Ips were eliminated by 1992
- In 1992 trees were returned
- Returning progeny to correct area genetically
- Seeds only had a 2% germination rate
- Container grown seedlings did well
- Now there are 6000 individuals in the wild

Seed Banks

- Seed banks allow the storage of genetic diversity of whole plant populations
- Preserving the seeds for use later is a long process, it involves;
  - Cleaning
  - X-ray analysis
  - Drying, packaging and storage
  - Germination monitoring

Seed Banks – cleaning

- Occasionally clean seed is collected in the field
- More often seed is collected still in its fruit
- Seed must be taken from the fruit undamaged
- This reduced bulk and disease risk
- Seeds are often liberated by hand

Seed Banks – X-ray analysis

- A few seeds are taken and X-rayed
- This is done to see how many of the sample are empty seeds and find any insect larvae hiding in the seeds
- The X-rayed seeds are often thrown away afterwards as they may be genetically damaged

Seed Banks – Drying, Packaging and Storage

- Drying and freezing the seed increases the time that the seed will last
- Seeds are dried in cool conditions (15-18°C) with the relative humidity at 11-15%
- This takes about a month
- The seed is then put into an airtight container and kept at -20 °C

Seed Banks – Germination Monitoring

- A few seeds are tested for viability once they have been frozen
- If they do not germinate they are either dead or dormant, to distinguish between the two states the vital stain Tetrazolium is used
- A few seeds are tested every ten years to check germination


219
258
267
250
652
268
269
270
253
262

Gene banks

- Gene banks are the collections of DNA samples , together with the samples of the somatic material of organisms.
- Gene banks preserve the stocks of both seeds and vegetative materials.

Major gene banks in India

- National Bureau of Plant Genetics Resources , New Delhi
  for crop plants , medicinal plants etc..
- Tropical Botanical Garden & Research Institute (TBGRI) ,Palode , TVM
  for medicinal plants , spices
- Central Institute for Medical & Aromatic Plants (CIMAP) , Lucknow
  for medicinal plants & spices
- Central Drug Research Institute , Lucknow
  for experimental animals

Germplasm banks

- Primarily considers the conservation of the genetic material which may be lost through genetic erosion
- In practice , germplasm is a plant part from which new plants can be generated.
- Applications are ***tissue culture*** and ***cryopreservation*** *techniques.*
- Cryopreservation is the preservation of germplasm at an ultra low temperature of -196°C liquid nitrogen.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Yuca in vitro
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Yuca in vitro


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