

Biodiversity part II

1. Warm and humid region lies between Tropic of Cancer and tropic of Capricorn and are provided w/ a rich and diverse plant life.(more than 1/2 species).
2. Countries lying between this region = Mega diversity countries. And countries sharing similar conditions = mega diverse nations.
3. India=mega diverse country.
4. To address biodiversity loss and guide investments in conservation
 - Biodiversity hotspots.

The idea was first developed by Norman Myers in 1988 to identify tropical forest ‘hotspots’

5. Dr Sabrina virk- first used “hotspot” and concept of “Norman Myer” coined Biodiversity hotspots
6. Biodiversity Hotpost-is a region with high level of endemism that is under threat from humans.
7. Conditions:- 0.5% or 1500 vascular plants as endemics and 70% of its

natural vegetation destroyed.(a hotspot is irreplaceable)

8. They are imp because they are the habitat of endemic species.
9. India-Biodiversity hotspot-Western ghats
10. Currently 36 hotspots
11. Conserve Biodiversity- In-situ and ex-situ
12. **In-situ:** conservation of biodiversity in its natural form
13. **Ex-situ:** keep endangered species in special protected areas separated from its natural habitat.
14. IUCN REDLIST - weakness- underestimates the problems
15. India is one of the 17 megadiversity nations of world
16. Indias biodiversity hotspots:
Himalayas , western ghat,sundaland,northeast-indo-burma region)
17. Current rate of extinction is 1000x the natural rate,
18. Permian Triassic extinction - killed

over 90% of species.

19. Factors leading to biodiversity loss:
natural hazards, global catastrophe,
introduction of non native species,
pollution ,hunting poaching, habitat
degradation.

20. **Loss of biodiversity at a species level leads to extinction.**

Artificial insemination in wolfs first then
gorilla

What makes some species more prone to extinction?

- Small population
- Specialized habitat
- Restricted food source
- Low reproductive potential (large mammals)
- Accumulation of toxins (whales)
- A prominent predator so killed by humans (e.g., cheetahs)
- Migrates long distances

22. Poaching-illegal hunting

23. Most extinctions over past years due to over harvesting of food.

24. In India ,Sport or recreational hunting is banned where as in western

countries it is viewed as the principal basis for protection of wildlife.

25. Dodo-extinct flightless bird endemic to the island of Mauritius

The last physical evidence of the Asiatic cheetah in India was three shot by the Maharajah of Surguja in 1947 in eastern Madhya Pradesh, a man also noted for holding a record for shooting 1,360 tigers.

- 26.

27. Result of climate change: Snow caps receding; water level rising; costal areas going to be underwater.

28. During green revolution wild crops replaced by genetic modified crop loss in valuable genetic resources and micro flora and fauna associated with it and loss of microbial species diversity due to pesticides and fertilisers.

29. **Habitat Destruction:** is the process in which habitat is rendered functionally unable to support the species present.

30. **Habitat Destruction is ranked no 1 reason for the primary cause for species extinction worldwide.** Also results in reduction of genetic

biodiversity.

31. Giant Panda: habitat loss
32. Environment pollution Is one of the immediate causes affecting the current levels of biodiversity.
33. **Phytosociology:** branch of science which deals with plant communities; interactions between the species within them and theyr composition and development.(quadrant used for assessment)
34. Important Value Index(IVI) quantifies the impoartance of individual species in plant community.

Indices used for Phyto-sociological studies

1. **Frequency :** it provides information on the number of times a species encountered

$$\text{Frequency (\%)} = \frac{\text{Total number of Quadrats in which species occur}}{\text{Total Number of Quadrats studied}}$$

2. **Density or plants per unit area:** The reciprocal of density provides an estimate of the mean growing space per plant and be of interest in some ecological studies

$$\text{Density} = \frac{\text{Total number of individuals of a species} \times \text{Area of Quadrats}}{\text{Total number of Quadrats studied}}$$

35. **Abundance:**Individuals per quadrant.

4. Relative randomness of Species (R) : The abundance divided by frequency

5. Basal Cover (Dominance): The area of coverage is used to express the dominance. The higher the coverage area, the greater the dominance.

$$\text{Total Basal Cover} = \text{Mean Basal Cover} \times \text{Density}$$

6. Relative Frequency:

$$\text{Relative Frequency} = \frac{\text{Frequency of the species}}{\text{Total Frequency of All species}} \times 100$$

7. Relative Density:

$$\text{Relative Density} = \frac{\text{Dominance of the Species}}{\text{Total Density of All species}} \times 100$$

8. Relative Dominance:

$$\text{Relative Dominance} = \frac{\text{Dominance of the Species}}{\text{Total Dominance of all Species}} \times 100$$

$$\text{IVI} = (\text{Relative Frequency} + \text{Relative Dominance} + \text{Relative Density})$$

36. Man wildlife conflict occurs when growing human population overlaps with the established wildlife territory creating reduction of resources or life to some people or wild animals.

37. Main reasons for man wildlife conflict is “growing anthropogenic pressure on wildlife habitats”

38. Solutions to man wildlife conflicts :

electric fencing; land use planning; community based natural resource management; eco tourism; compensation etc

39. Past extinctions due to ionising radiation but current rate of extinction is only induced by human activity.

40. Non avian dinasours:that are not part of the group that evolved into modern birds.

41. **Red list:** a critical indicator of the health of the worlds biodiversity(trends in overall extinction risk of species)

42. **Evil quartet:**is a concept that describes the reason that cause biodiversity loss.

1. Overexploitation
2. Co-extinction
3. Alien species invasion
4. Habitat loss and fragmentation

43. Nambia plans to cull(selective killing) hundreds of animals to provide meal for its population who are facing the

worst drought in the whole century.

44. IUCN:international union for conservation of nature.

- Conserving biodiversity is central to the mission of IUCN providing quantification of species and their risk categories.

45. Biodiversity is not reversible

Conserving biodiversity becomes a problem when there is **lack of resources** and a need to use the land for human activities, especially in **HOT SPOT regions of high conservation priority with their biodiversity richness and high endemism and a high threat.**

46. Sacred grooves: conservation of species in its own natural habitat.

47. Protected areas: human activities are restricted and hunting, timber collection an such activities are not allowed.

48. The boundaries in biosphere reserves and national parks are defined by legislation whereas boundaries of wildlife sanctuaries are not demarcated by the authorities.

49. IN SITU CONSERVATION:

National Park	Scantuary	Biosphere reserves
Habitat for particular wild animal species.	Many Species oriented	Ecosystem oriented
Fixed boundaries	Not fixed	Fixed boundaries usually more than 5000sq km
No human activities in core zone	Limited & controlled interference	Core , buffer and manipulation zones
Buffer region tourism		No human interference in core an buffer zone

49. National parks have two regions: buffer an core (no human activity in core region)

50. Attention to GENE pool is given in

Bioreserves

51. Indias first national park : Hailey national park (now Jim corbet national park)

In Situ:

ADVANTAGES	DISADVANTAGES
Cheap and convenient	Human settlements near the protected areas are often detrimental to the cause of wildlife conservation. (human and wildlife conflict)
Entire natural habitat / ecosystem is protected	In highly populated area it is difficult to find areas of wilderness devoid of people or human settlements

<p>Organism not only survive and multiply but also evolve(free play of natural agencies floods droughts etc)</p>	<p>Conflicts with the local people which highly depend on the natural resources from the forests.</p>
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53. Indigenous people are hardly asked to participate in conservation efforts: many of the world healthiest ecosystem occurs in the regions under their control having knowledge of nature and wildlife.

Ex Situ:

1. Involves maintenance and breeding of endangered plants and animals **in a region under wholly or partially controlled conditions.(out of their natural habitats)**
2. Methods of ex situ conservation: Long term breeding & Short term breeding.

Long term	Short term	Animal Translocation	Animal Reintroduction
For species who have lost their natural habitats permanently or there are factors which will make them extinct (poaching etc)	Short term breeding and released in the wild	It is the release of animal in the new locality other than with animals really come from.	Animals are breaded under captivity and then reintroduced to their natural habitat from which they have declined or disappeared.

In zoos captive breeding .sustaine d genetic diversity	(Immedi ate populati on increase)		
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3. Rehabilitation: animals have to be trained about their survival in will before they are released in the wild.
4. One of the biggest problems of ex situ conservation:**LOSS OF GENETIC BIODIVERSITY** because genetic biodiversity plays a key role in the survival of species in nature.
5. Repeated inbreeding causes homogenisation(uniformity) of the species genetic make up and results in decrease of fertility and high infant mortality and birth defects.
6. Artificial insemination: introduction of semen in the vagina
7. Embryo Transfer Technology: Embryo transfer technology is a reproductive

technique where embryos are collected from a donor female and implanted into a recipient female, allowing for the transfer of desirable genetic traits and the breeding of multiple offspring from a single female.

8. Cryopreservation of gametes and embryos: preservation and maintenance of tissues at very low temperatures under liquid nitrogen (both semen and ova and embryos are preserved like this)

9. African lions are founders of almost all the lions in captivity.

Botanical Garden

A botanical garden is dedicated to collection, cultivation and display of wide range of plants labelled with their botanical names.

Purpose: research and education

Botanical gardens specialised in trees: arboreta (usually associated with zoos)

First university botanical garden in Europe: **university of Pisa** by botanist **Luca Ghini**.

Zoological gardens or zoos

They help in wildlife conservation efforts; study and research

Zoos have done excellent work in restocking, replenishing and re-strengthening the natural populations of a large number of species which occur as small fragmented populations. But for this many of the species could have become extinct such as:

Why is biodiversity important?

Every species has a right to exist because it has *intrinsic value* – that is completely independent of its usefulness to others

Plants animals and the microorganisams sustain and recreate the quality of water we drink and the air we breathe and the soil which we grow food on.

Human beings and animals are completely dependent on biodieversity.

Until the emergence of humans, the earth supported more biodiversity than any other period in geological history.

However, since the dominance of humans, biodiversity has begun a rapid decline, with one species after another suffering extinction.

MONSOON 2024

Importance of biodiversity

1. ECOLOGICAL STABILITY-each species has a particular function in a n

ecosystem(capture and store energy, decomposition , recycle water etc) without which humans can't survive.The los of a species decrease the ability of the system to maintain itself.

Research show that the **more diverse an ecosystem the better it can withstand environmental stress and the more productive it is.**

2.

3. ECONOMIC BENEFITS TO HUMANS:

first agro-biodiversity or crops ; biodiversity is the reservoir of resources; **resource shortages may be related to the erosion of the biodiversity. (Quinine -chinchona & morphine-poppy)**

- According the National Cancer Institute of the USA, **over 70 % of the promising anti-cancer drugs come from plants** in the tropical rainforests.

4.

5. TOURISM AND RECREATION: it is a source of economic wealth for many areas such has many parks where wild nature and animals are a joy for many people.

6. ETHICAL REASONS :

