

Biodiversity

Types of Biodiversity



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INTRODUCTION

- ❑ The great variety of life forms on earth has developed since thousands of years.
- ❑ This diversity of living creates a support system for each civilization on the earth for its growth and development.
- ❑ However man has become consumerist.
- ❑ Negative effect on the diversity of biological resources upon which it is based.
- ❑ The diversity of life on earth is so great that if we use it sustainably we can go on developing new products from biodiversity for many generations.

INTRODUCTION

This is only possible when we manage, maintain & treated 'biodiversity' as a precious resource and prevent the extinction of species.

What is biodiversity?

- ❑ Biological diversity deals with the degree of nature's variance in the life forms.
- ❑ This variety can be studied at three levels; the genetic, Species and community.
- ❑ The organization of species in an area into distinctive plant and animal communities constitutes ecosystem diversity.

Types of Biodiversity

- Species diversity
- Genetic diversity
- Ecological diversity
- Agricultural diversity

Species Diversity

“The number of species of plants and animals that are present in a region constitutes its species diversity.”

- ❑ This diversity is seen both in natural ecosystems and in agricultural ecosystems. Natural undisturbed tropical forests have much greater species richness.
- ❑ A natural forest ecosystem provides a large number of non-wood products that local people depend on such as fruit, fuel wood, fodder, fiber, gum, resin etc.
- ❑ Many new species are being identified, especially in the flowering plants and insects. Areas that are rich in species diversity are called ‘hotspots’ of diversity.
- ❑ India is among the world’s 15 nations that are exceptionally rich in species diversity.

Genetic Diversity

“Every individual species either of plants or animals differs by its genetic makeup, this variety in genetic setup is known as Genetic Diversity”.

- ❑ This change is due to; large numbers of combinations are possible in the genetic setup, which expresses as specific characters.
- ❑ The diversity in wild species forms the '**gene pool**' from which our crops and domestic animals have been developed over thousands of years.
- ❑ Recombinant DNA technology can manipulate genes for developing better varieties of crops and domestic animals. Also it helps in production of various types of medicines and industrial products of human interest.

Ecological / Ecosystem Diversity

- ❑ Ecosystem diversity can be described for a specific geographical region, or a political entity such as a country, a State or a taluka.
- ❑ Distinctive ecosystems include landscapes such as forests, grasslands, deserts, mountains, etc., as well as aquatic ecosystems such as rivers, lakes, and the sea.
- ❑ An ecosystem is referred to as 'natural' when it is relatively undisturbed by human activities or 'modified' when it is changed to other types of uses, such as farmland or urban areas.
- ❑ India is exceptionally rich in its ecosystem diversity.

Agricultural Diversity

- India is an important center of crop diversity. It is considered to be the house of 167 important cultivated plants species and 320 species of their wild relatives.
- India is also considered to be the center of origin for 30,000-50,000 varieties of Rice, pigeon pea, mango, turmeric, ginger, pepper, banana, coconut, cardamom, jack fruit, sugarcane, bamboo, taro, indigo, hemp, amaranths, gooseberries, etc.
- If summarized, India has invented over 49,000 species of plants, which represents the 12% of the recorded worlds flora and 81,000 species of animals, which represents 6.67% of the faunal species recorded in the world.

Biodiversity in India

India – Mega-Diversity Nation

- According to Hooker (1907) the flora of India is “more varied than any other country of equal area in the eastern hemisphere, if not in the globe”.
- This is due to its geographical expanse and varied physical features, but also due to huge barriers such as the lofty Himalayas on the north and the Arabian Sea in the west and Indian Ocean on south.
- In spite of this the flora of India is dominated by the migratory elements, particularly from the Malaya, SE Asia, Europe, Africa, Arabia, Tibet, Burma, China and Japan.

Biodiversity in India

- ❑ The Indian region is quite rich in biodiversity with 33% of endemic flora and sizable percentage of fauna. India is one of the **Twelve (12) Mega Diversity Nations** of the globe.
- ❑ There is an abundance of wild varieties of crops, cereals, millets, pulses, spices, condiments, etc in India.
- ❑ Biogeography is the branch of biology, which deals with the distribution of plants and animals in the present and past.
- ❑ Climate is the most far reaching of the natural elements that controlling the life of an organism.

Biodiversity in India:

Eastern Himalayas

- ❑ This is the most humid tract of the Himalayan ranges and includes Sikkim, Bhutan and the whole Arunachal Pradesh.
- ❑ The flora is disposed in three altitudinal regions: Tropical Temperate and Alpine.
- ❑ The trees of about 250 species belonging to different families dominate the tropical zone. Lower non-coniferous belt, upper coniferous belt and the highest *Rhododendron* belt dominate the temperate zone.
- ❑ The alpine zone is dominated by herbaceous species. Dominating fauna is Red panda, hog badgers, porcupines, goats, antelopes, etc.

Biodiversity in India: Western Himalayas

- ❑ This range includes Kashmir, the Punjab and the northern part of the Haryana, Himachal Pradesh and Uttar Pradesh.
- ❑ The climate is cooler and dryer. The chief dominant species are mostly herbaceous and many species common to the European flora.
- ❑ Dominating fauna is Wild ass, wild goats, antelopes, deer, golden eagle, snow leopard, wolf, fox, vultures, etc.

Biodiversity in India: The Indus Plain

- ❑ This part includes Punjab, Rajasthan and Gujarat and other regions of West of Aravali range.
- ❑ The climate is dry and the vegetation is dominated by the desert shrubs and herbs. The total species estimated are about 1500 belonging to 11 families.
- ❑ Grasses and legumes are most dominant components. Dominating fauna is rodents, wild ass, black buck, desert cat, caracal, red fox, reptiles, camels, etc.

Biodiversity in India:

The Gangetic Plain

- ❑ The entire plain stretching towards the eastern side from River Yamuna forms an Alluvium of the Ganga.
- ❑ It includes East and West Bengal and Bangladesh. The dominant species are mostly shrubs and trees.
- ❑ Dominating fauna is elephants, wild boar, deers, antelopes, wild dogs, panthers, tigers, lion, wild pigs, monkeys, jackals, gaur, etc.

Biodiversity in India: Assam

- ❑ This region receives heaviest rainfall, with Cherapunji as much as more than 1000cm.
- ❑ The temperature and wetness promotes the dense growth of tropical evergreen trees along with shrubby insectivorous plants and some conifers.
- ❑ Dominating fauna is elephants, sambar, nilgai, swamp deer, barking deer, tigers, panther, wild dogs, hyena, black bear, sloth bear, rhinos, etc.

Biodiversity in India: Central India

- ❑ It comprises Madhya Pradesh, Parts of Orissa and Gujrat.
- ❑ Forests developed in these regions are dominated by dry deciduous tree species and also shows thorny shrubs and bushes.
- ❑ Dominating fauna is Elephants, Deers, Nilgai, Barshinga, Leopards, Tigers, etc.

Biodiversity in India: Malabar

- A narrow strip of land west of Sahyadris extending from Bombay southwards being relatively more humid by receiving heavy precipitation.
- The evergreen as well as semi evergreen forests along the Sahyadris and coastal vegetation
- Together have about 4000 species belonging to 150 families, dominated by tree species.

Biodiversity in India: The Deccan

- It includes Andhra Pradesh, Tamilnadu and Karnataka. This region is dry with 10cm rainfall.
- It shows the combination of dry deciduous species and tropical dry evergreen species like Sandal Forests.
- Trees and shrubs dominate this region. Dominating fauna is wild elephants, gaur, hoolock gibbon, golden langur, Loris, giant squirrel, civets, flying squirrels, nilgiri mongoose, etc.

Biodiversity in India: Andamans

- ❑ It has a wide range of spreading coastal vegetation like mangroves, beach forests with tall trees.
- ❑ These islands are dominated with trees, shrubs and herbs but now a days most of the area is cleared for paddy and sugarcane cultivation.
- ❑ Dominating fauna is bats, rats, reptiles, Andaman pigs, deers, pythons, white breasted swiftlet, sea eagle, tigers, etc

Biodiversity in India

- ❑ In flora, the country can boast of 45000 species, which accounts for 15% of the known world plants.
- ❑ Of the 16000 species of the flowering plants, 33% are endemic and located in the 26 endemic centers.
- ❑ Among the monocots, out of 588 genera in the country, 22 are strictly endemic.
- ❑ There are no clear estimated about marine biota but we can note that abundance of seaweeds, crustaceans, mollusks, corals, reptiles and mammals.
- ❑ It is estimated that almost one third of the animal varieties are found in Western Ghats of Kerala & Maharashtra only.

Recorded Biota of India

Category	Taxon	No. of Species	Category	Taxon	No. of Species
Flora	Bacteria	850	Fauna (Contd.)	Mollusks	5042
	Algae	2500		Echiura	33
	Fungi	23000		Annelids	1093
	Lichens	1600		Onychophora	1
	Bryophyta	2700		Arthropods	57525
	Pteridophyta	1022		Phoronida	3
	Gymnosperms	64		Bryozoan's	170
	Angiosperms	17000		Entoprocta	10
	Total	48736		Brachiopods	3
Fauna	Protozoan	2577	Chaetognatha	30	
	Porifera	519	Echinodermata	765	
	Cnidarians	237	Hemichordates	12	
	Ctenophore	10	Protochordata	116	
	Platyhelminthes	1622	Fishes	2546	
	Nematodes	2350	Amphibians	204	
	Rotifers	310	Reptiles	428	
	Kinoryncha	10	Birds	1228	
	Gastrotriches	88	Mammals	372	
	Acanthocephalans	110	Total	126188	
	Sipuncula	38			

Hotspots of Biodiversity

- ❑ Norman Meyers coined the term “Hotspots” in 1988. Hotspots are the areas where the rich abundance of plants and animals, but are threatened by human activities.
- ❑ Most hotspots are substantially endangered already having lost $\frac{3}{4}$ of their total original vegetation.
- ❑ Only terrestrial hotspots are identified but many remains to be accessed and identified in marine areas, especially coral reefs, which are thought to contain more than a million species living on less than 1% of the earth’s surface.

Hotspots of Biodiversity

- ❑ Out of total 25 hotspots, nine (9) are in tropical rain forests, five (5) covers both dry and wet tropical forests, five (5) consists of temperate Mediterranean type of forests, six (6) includes tropical rain forests, dry forests and arid systems.
- ❑ About 75% of all estimated endangered and threatened animals live in these hotspots. Human induced environmental changes are constantly putting pressure on hotspots.

Hotspots of Biodiversity

List of Terrestrial Hotspots

1. Tropic of Islands
2. Meso-America
3. Caribbean
4. Atlantic Forest Region
5. Choco-Darlen Western Ecuador
6. Brazilian Carrado
7. Central Chillie
8. California Floristic Province
9. Madagascar & Indian Ocean Islands
10. Wallacea
11. Cape Floristic Province
12. Eastern Arctic's & Coastal Forests
13. Genuine Forests of W. Africa
14. Succulent Kamo
15. Mediterranean Basin
16. Sunderland
17. Philippines
18. Mountains of South Central China
19. Western Ghats & Srilanka
20. Indo-Burma
21. Caucasus
21. South West Australia
22. New Caledonia
23. Newzeland
24. Polynesia/Micronesia