UNIT 1

BIODIVERSITY

Biodiversity

- In our biosphere immense diversity (or heterogeneity) exists not only at the species level but at all levels of biological organisation ranging from macromolecules within cells to biomes.
- Biodiversity is the term popularised by the sociobiologist Edward Wilson to describe the combined diversity at all the levels of biological organisation.

Biodiversity Contd...

- Variation is the law of nature. It occurs everywhere and every moment. The variations take place at micro levels. The variations may be linear or cyclic.
- The variety and variability of organisms and ecosystems is referred to as biological diversity.
- The world Commission on Environment and Development (WCED) constituted by the UN General Assembly published a report in 1987 which provided a boost and endorsement to the need for conserving the world's rich biodiversity.
- Despite conflicting views among nations, a broad consensus was reached after bitter negotiations, and 170 countries signed the Biodiversity Convention.

Biodiversity hotspot

- A biodiversity hotspot is a biogeographic region that is both a significant reservoir of biodiversity and is threatened with destruction.
- The term biodiversity hotspot specifically refers to 25 biologically rich areas around the world that have lost at least 70 percent of their original habitat.
- The remaining natural habitat in these biodiversity hotspots amounts to just 1.4 percent of the land surface of the planet, yet supports nearly 60 percent of the world's plant, bird, mammal, reptile, and amphibian species.

Strategies of Conservation

Future strategy for Conservation has 4 goals

- Maintenance of adequate resources
- Conservation of resources through reduction in demand and achievement of greater end use
- Maximum use of renewable resources
- Reduction in dependency of non-renewable resources

In situ strategy

- This strategy emphasizes on the conservation work at original site of biodiversity i.e. in wild.
- Conservation of overall diversity of genes, populations, species, communities and the ecological processes comes under this strategy.
- There are 37,000 protected area in the world (World Conservation Monitoring Centre , WCMC).
- India has 17 biosphere reserves, and 19 Ramsar wetlands. Amongst the protected areas, India has 102 national parks and 490 sanctuaries covering an area of 1.53 lakh sq. km.

Ex situ Strategy

- This strategy says that conservation work should be done outside the natural habitat in form of botanical and zoological gardens, conservation stand, seed and seedling banks, pollen banks, germ plasm banks, tissue culture banks, gene and DNA banks etc.
- In India, conservation of genetic diversity of cultivated plants and their wild relatives is done by NBPGR (National Bureau of Plant Genetic Resources).

Reduction of Anthropogenic Pressure

- Increasing population and it's demands pose remarkable threat to taxa important to human being.
- About 70% of identified medicinal plants of Indian Himalaya are exposed to destructive harvesting.
- Cultivation of such plants elsewhere would contribute to their conservation.

Restoration of endangered species

- It is tough and difficult strategy. It requires specific knowledge about species and its surrounding.
- This strategy includes diagnosis of factors responsible for the decline of species, habitat conservation, captive breeding and restriction of harvesting etc.

The strategy include:

- Reintroduction programs in the original site of living.
- Augmentation programs to increase the existing population size and genetic diversity of a species.
- Introduction programs for a new area.

Endemic species

- Endemic species are the plants, which are limited in their distribution i.e. they are restricted to a small area and are not found elsewhere in the world.
- Endemism of Indian biodiversity is significant.
- About 4,900 species of flowering plants and 33% of the recorded floras are endemic to the country.
- These are distributed over 141 genera belonging to 47 families.
- These are concentrated in the floristically rich areas of North East India, the western Ghats, North West Himalayas and the Andaman and Nicobar Islands.
- The Western Ghats and the Himalayas have two of the 18 hot spots identified in the world.

Endemic species Contd...

- It is estimated that 62% of the known amphibian species are endemic to India of which a majority occur in Western Ghats.

Endemism may be due to:

- Poor adaptability of a species in a wide range of ecology
- Presence of some geographical barrier
- Failure of dispersal of reproductive organs
- The species might have comparatively been young and not have time to spread.

Biosphere Reserves

- Biosphere reserve program was launched by UNESCO in 1971 under its MAB (Man and Biosphere Program).
- Biospheres are sites where protection is granted not only to the flora and fauna of the protected region, but also to the human communities who inhabit these regions, and their ways of life.
- Biosphere reserves are sites established by countries and recognized under UNESCO's Man and the Biosphere (MAB) Program to promote sustainable development based on local community efforts and sound science.
- Currently there are 580 sites across 114 countries. The Indian government has established 17 Biosphere Reserves of India.
- Seven of the seventeen biosphere reserves are a part of the World Network of Biosphere Reserves, based on the UNESCO Man and the Biosphere (MAB) Program list.

Biosphere reserves of India

S.No	Name of Biosphere Reserve	Location
1.	Great Rann of Kutch	Gujarat
2.	Nokrek	Meghalaya
3.	Manas	Assam
4.	Gulf of Mannar	Tamil Nadu
5.	Sundarban	West Bengal
6.	Nandadevi	Uttrakhand
7.	Nilgiri	Tamil Nadu, Kerala and Karnataka
8.	Dehang Debang	Assam

Biosphere reserves of India Contd...

S.No.	Name of Biosphere Reserve	Location
9.	Panchmani Andhra Pradesh	Madhya Pradesh
10.	Amarkantak	Madhya Pradesh and Chattisgarh
11.	Kanchenjunga	Sikkim
12.	Agasthyamalai Biosphere Reserve	Kerala and Tamil Nadu
13.	Great Nicobar Biosphere Reserve	Andaman and Nicobar
14.	Dibru-Saikhowa	Assam
15.	Cold Desert	Himachal Pradesh
16.	Seshachalam Hills	Andhra Pradesh
17.	Simplipal	Orissa

Important National parks and wild life sanctuaries in India

- Andra Pradash – Pakhal, Povharam, kawal, kollaeru, pelicanary wild life sanctuary
- Arunachal Pradesh – Namidapha Wild life sanctuaries
- Assam – Kaziranga National Park, Manas Wild life sanctuaries
- Bihar – Hazaribagh National park
- Gujarat – Gir National Park
- Karnataka – Bandipur National park, Silent Valley National park
- Kerala – Periyar Wild life sanctuarie, Wyanad Wild life sanctuarie
- Orissa – Chilka Lake Bird sanctuary
- Tamil Nadu – Mudumalai Wild life sanctuarie, Vedanthangal Bird Sanctuary
- Uttar Pradah – Corbett National park
- West Bengal – Jaldapara Wild life sanctuarie

Policies for biodiversity conservation

- Identifying and monitoring the important components of biological diversity that needs to be conserved and used sustainably.
- Establishing protected areas to conserve biological diversity while promoting environmentally sound development around these areas.
- Respecting, preserving and maintaining traditional knowledge of the sustainable use of biological diversity with the involvement of indigenous peoples and local communities.

Policies for biodiversity conservation contd…

- Educating people and raising awareness about the importance of biological diversity and the need to conserve it
- Promoting public participation, particularly when it comes to assessing the environmental impacts of development projects that threaten biological diversity and protecting the biodiversity hot spots from alien species.
- Biodiversity conservation is an important step towards a successful disaster management and if policies are implemented to protect it, then we can get one step closer in making a Disaster Free World.

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