

Biodiversity

These notes are your ultimate revision weapon to revise Biodiversity. We've distilled years of previous exam questions (PYQs) into one powerful, concise resource. Everything you need to know, nothing you don't.

- **PYQs, Decoded:** All key concepts from past exams, organized and simplified.
- **Revise in Record Time:** Short, precise, and designed for last-minute review.
- **Focus on What Matters:** Master high-probability topics and boost your confidence.

1. Biodiversity: Definition, Measurement, and Importance

- **Definition:**
 - The variety of living things (plants and animals) found in an ecosystem.
 - Specifically described as the range of different species in an environment.
- **Measurement (Proposed by Whittaker, 1960):**
 - **Alpha (α) diversity:** Diversity within a specific area/ecosystem.
 - **Beta (β) diversity:** Diversity between ecosystems.
 - **Gamma (γ) diversity:** Overall diversity across a large region.
- **Importance:**
 - The most significant aspect is the **maintenance and balance of the ecosystem**.

2. Threats to Biodiversity

- **Primary Cause: Destruction of natural habitats** (e.g., deforestation for agriculture, wetland destruction for construction, dam building). This is the largest threat.

- **Other Major Threats:**
 - Habitat fragmentation.
 - Environmental pollution.
 - Introduction of exotic (alien) species.
 - Over-exploitation of resources.
 - Climate change and global warming.
 - Unsustainable practices like **Jhum cultivation** (shifting cultivation).
- **General Consensus:** Biodiversity loss is due to a combination of all the above factors.

3. Conservation of Biodiversity

- **In-situ Conservation (On-site):**
 - Conservation of species in their natural habitat.
 - **Methods:** Biosphere Reserves, National Parks, Wildlife Sanctuaries, Sacred Groves.
 - **Note:** Botanical Gardens are **NOT** an example of in-situ conservation.
- **Ex-situ Conservation (Off-site):**
 - Conservation of species away from their natural habitats.
 - **Methods:** Zoos, Aquaria, Botanical Gardens, Seed Banks.
 - **Cryopreservation:** Storing seeds, pollen, tissue, etc., in liquid nitrogen at CryoBanks.
- **Policy and Law:**
 - The Government of India and the Norwegian Government established a "**Centre for Biodiversity Policy and Law**" in **Chennai** at the National Biodiversity Authority.

4. Biodiversity Hotspots

- **Definition:** Regions with a high degree of **endemic species** (not found anywhere else) that are under threat.
- **Global Context:**
 - Cover only **2.5% of the Earth's landmass**.

- Contain over **half of the world's plant species** and nearly **43%** of bird, mammal, reptile, and amphibian species.
- Are **NOT** located only in tropical regions.
- **India's Hotspots (Four):**
 - The Himalayas (Eastern Himalayas) - a confirmed hotspot.
 - Indo-Burma region (includes North-Eastern India and the Andaman Islands).
 - Sundaland (includes the Nicobar Islands).
 - Western Ghats - regarded as the **most biodiversity-rich area** in India.
 - *Clarification:* The statement that India's hotspots are only the Eastern Himalayas and Western Ghats is incomplete.

5. Species Extinction & Endangerment

- **Factors Leading to Extinction:**
 - **Factors that increase risk:** Large body size, **narrow niche** (being a specialist, e.g., Koala), lack of genetic variability.
 - **A broad niche (being a generalist) is NOT responsible for extinction;** it helps species survive.
 - **Human activities** causing population decline (especially in birds): Large-scale reduction in habitats; large-scale use of pesticides, chemical fertilizers, and mosquito repellents (e.g., DDT).
- **Conservation Status (Red Data Book):**
 - Published by the **IUCN (International Union for Conservation of Nature)**.
 - Contains lists of **threatened and endangered species**.
 - Does **NOT** contain lists of endemic species or protected sites.
- **Examples of Endangered Species in India:**
 - **Birds:** Great Indian Bustard, Siberian Crane, Sociable Lapwing.
 - **Mammals:** Musk Deer, Red Panda, Asiatic Wild Ass, Snow Leopard, Lion-tailed Macaque, Asiatic Wild Dog, Hoolock Gibbon, Golden Langur.

- **Note:** The **Desert Cat** is **not** classified as endangered (it is vulnerable).

6. Ecosystems and Patterns

- **Regions of High Biodiversity:**
 - **Maximum biodiversity** is found in **Tropical Rainforests**.
 - **Tropical Evergreen Forests** have the maximum plant diversity among forest types.
 - **Coral Reefs** also have very high diversity.
- **Global Pattern: Latitudinal Gradient**
 - Biodiversity generally **increases towards the equator**.
 - Influenced by climate, elevation, soil, and geography.
- **Important Biodiversity Sites in India:**
 - **Silent Valley (Kerala):** In the Western Ghats; considered the richest biodiversity in India; a National Park.
 - **Valley of Flowers (Uttarakhand):** In the Chamoli region.
 - **Sambhar Lake (Rajasthan):** India's largest inland saline wetland.
 - **Coral Reefs:** India has four main areas (Andaman and Nicobar Islands, Gulf of Kachchh, Gulf of Mannar, Lakshadweep) covering approx. **5,790 km²**.

7. Wetlands and the Ramsar Convention

- **The Ramsar Convention:**
 - An international treaty (signed in **1971, Ramsar, Iran**) for the conservation and sustainable use of wetlands.
 - **World Wetlands Day** is observed on **February 2nd**.
- **Ramsar Sites in India:**
 - India has **49** designated Ramsar sites (as of provided data).
 - Examples: Chilka Lake (Odisha), Keoladeo (Rajasthan), Wuller Lake (J&K), Loktak Lake (Manipur).
 - **Kabartal Wetland (Begusarai, Bihar)** is Bihar's first Ramsar site (designated July 21, 2020).

8. Additional Conservation Mechanisms & Facts

- **Biosphere Reserves:** Scientifically significant areas for conserving genetic diversity; the most important strategy for conserving biodiversity together with traditional human life. India has 18.
- **The Cartagena Protocol:**
 - A global agreement on **biosafety** for Living Modified Organisms (LMOs).
 - Adopted in 2000, came into force in 2003. India is a party.
- **Land Degradation Neutrality (LDN):**
 - India aims to achieve LDN by **2030** (balancing degradation with restoration).
- **Regional Example: Sikkim**
 - Became part of India in **1975**.
 - Considered a "**botanist's paradise**" with high biodiversity.
 - Main population: Lepchas, Bhotias, and Nepalis.
- **General Facts:**
 - **International Biodiversity Day:** Celebrated on **May 22nd** (commemorates the adoption of the Convention on Biological Diversity in 1992).
 - **Defining Extinction (IUCN):** A species is considered extinct if not seen in its natural habitat for **50 years**.
 - **Tallest Tree: Sequoia (Redwood)** in California, U.S.A., up to 115.5 meters (379 feet).
- **Specific Threat: Coral Bleaching**
 - The most effective factor is a **rise in the normal temperature of seawater**.

Know More About Biodiversity:

- [Biodiversity – Old Year Questions](#)
- [Biodiversity One Liner Questions & Answers](#)