

BIODIVERSITY

- DEFINITION
- TYPES
- SIGNIFICANCE
- THREATS
- MANAGEMENT STRATEGIES

- BIOPROSPECTING
- IPR
- CBD
- NATIONAL BIODIVERSITY ACTION PLAN

BIODIVERSITY - TYPES

- Species Diversity
- Genetic Diversity
- Ecosystem Diversity
- Landscape Diversity
- Alpha Diversity
- Beta Diversity
- Gamma Diversity
- Omega Diversity



MEASURING BIODIVERSITY

- **Alpha Diversity** – The diversity within a particular area or ecosystem: usually expressed by the number of species in that ecosystem.
- **Beta Diversity** – A comparison of diversity between two ecosystems: this involves comparing the number of taxa that are unique to each of the ecosystems.
- **Gamma Diversity** – A measure of the overall diversity with in a large region that includes many ecosystems.
- **Omega Diversity** – Phylogenetic diversity or diversity with in the taxa.



BIODIVERSITY - SIGNIFICANCE

- Ecological Values
- Human Values
- Aesthetic Values



BIODIVERSITY - SIGNIFICANCE

○ Ecological Values

- Regulates the earth's atmosphere, climate, hydrologic and biogeochemical cycles - *Essential for continuance of life*
- Recycling nutrients, retarding erosions, protecting watersheds, buffering pollutants, purifying the atmosphere - *Additional life supporting functions*

BIODIVERSITY - SIGNIFICANCE

○ Human Values

- Source of species on which human race depends for food, fodder, fuel, fibre, shelter, medicine etc.

○ Aesthetic Values

- Stimulus for literacy and artistic expression throughout human history. Scenic views are the major attraction to many wild areas

BIODIVERSITY - THREATS

- Habitat Modification**
- Over Exploitation**
- Exotic Species Establishment**
- Pollution**
- Global Climate Change**

**Biodiversity is an irreplaceable resource:
Its extinction is forever**



BIODIVERSITY – MANAGEMENT STRATEGIES

- Why should we **Conserve Biodiversity?**
- Conservation Strategies.
- Conservation Methods.
- Benefits of *In Situ* Conservation.
- Benefits of *Ex Situ* Conservation.
- Limitations of *Ex Situ* Conservation.



CONSERVATION STRATEGIES



- **Conservation of Ecosystems –**
- **Reverse the decline of species -**
- **Conservation of all biological aspects -**
- **Efficient utilization of natural resources -**
- **Strict laws on deforestation and preventions of deforestation by every means -**
- **Prevention of poaching and killing animals in the wild**
- **Creating public awareness about conservation of biodiversity and its importance -**



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HOW CAN WE CONSERVE BIODIVERSITY ?

In-Situ Conservation


- **Protected Areas**
Eg. National Parks ,
Wildlife Sanctuaries
and **Biosphere**
Reserve.
- **Sacred Forests and**
Sacred Lakes
- **Ramsar Sites**
- **World Heritage**
Sites

Ex-Situ Conservation

Botanical Gardens
Seed Bank
Germplasm Bank
Field Gene Bank
Cryopreservation




BIOSPHERE RESERVE

- Biosphere reserves are a special category of protected areas of land and/or coastal environments, wherein people are an integral component of the system.
 - The concept of Biosphere Reserves was launched in 1975 as a part of UNESCO's 'Man and Biosphere Programme, dealing with the conservation of ecosystems and the genetic resources contained therein.
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ZONATION

A biosphere reserve is a specified area in which multiple use of the land is permitted by dividing it into certain zones, each zone being specified for a particular activity.

- **(a) Core Zone:** It lies at centre where no human activity is allowed. It is legally protected.
 - **(b) Buffer Zone:** In this zone limited human activities are allowed. It surrounds core area. Accommodate a greater variety of resource use strategies, and research and educational activities.
 - **(c) Manipulative Zone (Transition Zone):** In this zone multiple human activities are allowed but ecology is not permitted to be disturbed. It is the outermost part of biosphere reserve.
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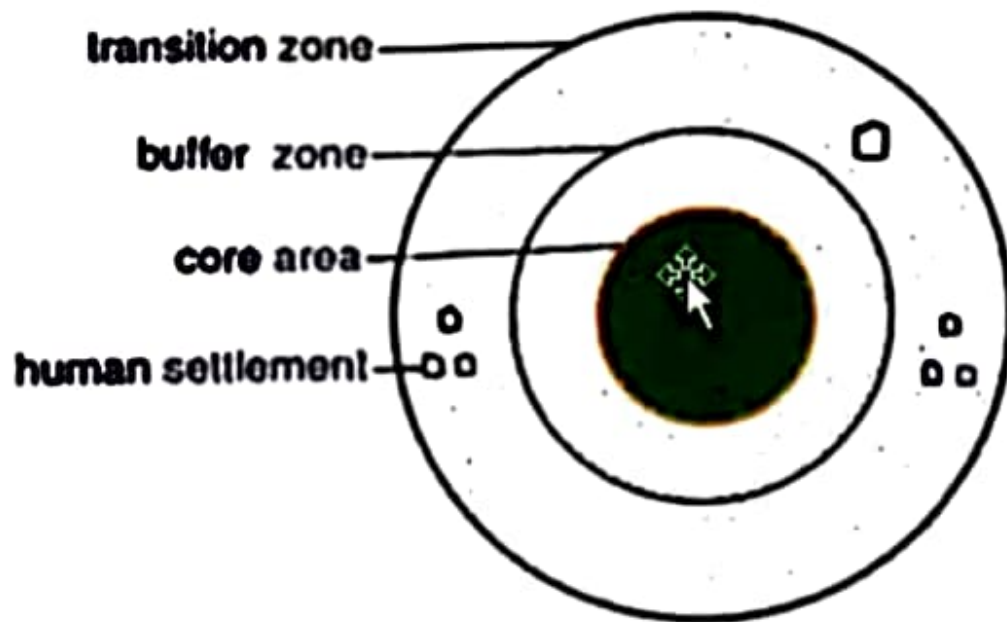


Fig. 14.5. Zonation in a terrestrial biosphere reserve.

The purpose of declaration of biosphere reserve is to conserve bio-diversity in-situ along with its supporting system. First biosphere reserve established in India, was Nilgiri Biosphere Reserve (1986).

Significance:

The concept of Biosphere Reserves is of immense value for conserving the gene-pool resources of flora and fauna in the country and to serve as bench-marks for future studies.

FUNCTIONS

(i) Conservation:

- **Conservation of landscapes, species and genetic resources on which their continuing evolution depends.**

(ii) Eco-Development: I

- **Ecological and economic parameters for sustained conservation of ecosystems by involving the local people with the maintenance of earmarked regions.**

(iii) Scientific Research Programme:

- **Scientific management and wise use of fragile ecosystem. Specific programmes for management and conservation of wetlands, mangroves and coral reef systems are also being implemented.**




SACRED FORESTS AND SACRED LAKES:

- Traditional Strategy for the protection of biodiversity has been in practice in the form of sacred forests or groves. These forest patches of varying dimensions are protected by local people due to their religious sanctity. Generally, they are most undisturbed forests without any human impact. Serve as refuge for a number of rare and endangered taxa.**
- Similarly several water bodies are declared sacred by the people, e.g., Khecheopalri lake in Sikkim. Such water bodies protect aquatic flora and fauna.**



BIOPROSPECTING

- Definition
 - Why Bioprospecting?
 - What is important to Bioprospecting?
 - Where Bioprospecting can happen?
 - Process of Bioprospecting.
 - Who does Bioprospecting?
 - Issues and Challenges.
 - Comprehensive Bioprospecting Policy.
 - **WHAT IS BIOPIRACY?**
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BIODIVERSITY ?

Ecosystem services, such as

- Protection of water resources**
- Soil formation and protection**
- Nutrient storage and recycling**
- Pollution breakdown and absorption**
- Contribution to climate stability**
- Maintenance of ecosystems**
- Recovery from unpredictable events**


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PROCESS OF BIOPROSPECTING

- As a process, it generally consists of four phases:
 - **Phase 1:** on-site **collection** of samples;
 - **Phase 2:** isolation, **characterisation** and culture of specific compounds;
 - **Phase 3:** **screening** for potential uses, such as pharmaceutical or other uses; and,
 - **Phase 4:** **product development** and commercialization, including patenting, trials, sales and marketing
- 


WHY IS IT NEEDED?

- The underlying **aim of bio prospecting** is to find new resources and products from nature that can be used by humans.
- Improving human health, through both medicine and better nutrition are key focal areas.
- It plays a **dominant role in discovering leads for drug development**, since existing/known compounds for developing drugs for human use are limited.

WHO DOES B**I**O**P**R**O**S**P**E**C**T**I**N**G**?

- Pharmaceutical, agribusiness (biotechnology, seed, crop protection and horticulture), cosmetic and personal care, fragrance, botanicals, and the food and beverage industries.
- The **pharmaceutical and agri-business sectors are more involved.**

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WHO DOES BIOPROSPECTING?

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KEY ISSUES & CHALLENGES

- Conservation versus exploitation:**
- Lack of legal clarity**
- Greater sector involvement**


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INTELLECTUAL PROPERTY RIGHT (IPR)

- o Definition**
- o Types of IP's**
- o Why IPR is Important?**
- o Problems associated with IPR regime in India.**

WHY IPR IS IMPORTANT?

- Intellectual Property Rights are important to stimulate and promote research and development. **If the inventions and ideas of individuals and organizations are not protected then the concerned people or organizations will not reap the benefits of their hard work and naturally, it will lead to discontent and reduce the efforts in the field of research and development, which is extremely important for the growth and development of humanity.**
 - Protection of innovative spirit
 - Economic growth
 - Investment in Research and Development–
 - Balance between Individual/organizational zeal and societal benefits–
 - Synergy
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CONVENTION ON BIODIVERSITY (CBD)

- What is CBD? – An Agreement of Action..
- **History of the Convention.**
- Objectives.
- Major issues dealt with under the CBD.
- India and CBD.
- International Day of Biodiversity.

NATIONAL BIODIVERSITY ACTION PLAN

NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN

- o What is NBAP?**
- o Objectives of NBAP.**
- o India and NBAP.**
- o Strategic Plans for Biodiversity 2011-20 (SPB 2011-20)**
- o AICHI Biodiversity Targets.**

WHY SHOULD WE CONSERVE OUR BIODIVERSITY ?

We should conserve biodiversity because:

- Biodiversity boosts ecosystem productivity where each species have an important role to play.**
- A larger number of plant species means a greater variety of crops.**
- Greater species diversity ensures natural sustainability for all life forms.**
- Healthy ecosystems can better withstand and recover from a variety of disasters.**
- A healthy biodiversity provides a number of natural services for everyone.**



HISTORY OF THE CONVENTION

- o UNEP convened the Ad Hoc Working Group of Experts on Biological Diversity in November 1988 to explore the need for an international convention on biological diversity.**
- o May 1989, it established the Ad Hoc Working Group of Technical and Legal Experts to prepare an international legal instrument for the conservation and sustainable use of biological diversity.**
- o February 1991, the Ad Hoc Working Group had become known as the Intergovernmental Negotiating Committee.**

HISTORY OF THE CONVENTION

- 22 May 1992 with the Nairobi Conference for the Adoption of the Agreed Text of the Convention on Biological Diversity.
- The Convention was opened for signature on 5 June 1992 at the United Nations Conference on Environment and Development (the Rio "Earth Summit").
- It remained open for signature until 4 June 1993, by which time it had received 168 signatures.
- The Convention entered into force on 29 December 1993, which was 90 days after the 30th ratification.
- The first session of the Conference of the Parties was scheduled for 28 November – 9 December 1994 in the Bahamas.



OBJECTIVES

- **The conservation of biological diversity**
- **The sustainable use of the components of biological diversity**
- **The fair and equitable sharing of the benefits arising out of the utilization of genetic resources**

SOME OF THE MANY ISSUES DEALT WITH UNDER THE CONVENTION INCLUDE:

- **Measures and incentives for the conservation and sustainable use of biological diversity.**
- **Regulated access to genetic resources.**
- **Access to and transfer of technology, including biotechnology.**
- **Technical and scientific cooperation.**
- **Impact assessment.**
- **Education and public awareness.**
- **Provision of financial resources.**
- **National reporting on efforts to implement treaty commitments.**



- **India** is one of the earliest signatories of the **Convention on Biological Diversity (CBD)** and became Party in early 1994. **Ministry of Environment, Forest and Climate Change (MOEFCC)** has been designated as the nodal Ministry for **CBD** in our country.

INTERNATIONAL DAY FOR BIOLOGICAL DIVERSITY (IBD)

- The UN has proclaimed 22nd May, the date when CBD's text was adopted in 1992, as the International Day for Biological Diversity (IBD) to enhance awareness about the threats to and importance of biodiversity in sustaining life on this planet. Every year, the CBD identifies a theme for IDB. The Day is celebrated all over the country on 22nd May.



NATIONAL REPORT

- India submitted its Sixth **National Report (NR 6)** to the CBI on 29 December 2018. The Report comprehensively covers the progress in implementation of India's NBAP.

INDIA & NBSAP

- India prepared its **first NBAP** (National Biodiversity Action Plan) entitled “National Policy and Macro Level Action Strategy on Biodiversity” **in 1999.**
- **Enactment of Biological Diversity Act, 2002.** followed this exercise to create the required legislative support base for the implementation of the Convention.
- **Section 36(3) of the Act** obligates the Central Government to “as far as practicable wherever it deems appropriate, **integrate the conservation, promotion and sustainable use of biological diversity** into relevant sectoral or cross-sectoral plans, programmes and policies.”

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In order to bring the action plan in consonance with the National Environment Policy, 2006, a second generation National Biodiversity Action 2008 was prepared.

- The Strategy, 1999 was revised and updated into NBAP, 2008 to bring the biodiversity agenda in alignment with the NEP, 2006.
- This second generation of NBAP was further updated with Addendum 2014 to NBAP, 2008 in order to integrate the **Strategic Plan for Biodiversity 2011-20 (SPB 2011-20)** in NBAP which was adopted by CoP, held at Nagoya in the Prefecture of **Aichi (10th October 2010)** in Japan.

STRATEGIC PLAN FOR BIODIVERSITY 2011-20 (SPB 2011-20)

- The **SPB 2011-20** includes 20 Aichi Biodiversity Targets (ABTs) covered under five strategic goals to be implemented during 2011-20.

CBI BIODIVERSITY TARGETS

- **Strategic Goal A:** Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society (Targets 1 to 4).

Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use (Targets 5 to 10).

Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity (Targets 11 to 13).

Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services (Targets 14 to 17).

Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building (Targets 18 to 20).