Protection of Biodiversity in India-
Role of protected areas

Prof. (Dr.) S. L. Kothari,
Pro-Vice-Chancellor and Director
Amity Institute of Biotechnology
Amity University Rajasthan, Jaipur
Email: slkothari@jpr.amity.edu

International Center for Environment Audit and Sustainable Development
iCED, Jaipur

01-July-2015
PART-I

- What is biodiversity?
- Why is biodiversity important?
- Status of biodiversity in India
Biodiversity

Bio $\equiv$ Life

Diversity = Variety
Biodiversity?

• Biodiversity is the variety of all life forms: the different plants, animals and micro-organisms, their genes and the ecosystems of which they are a part.
The Atmospheric zones

- Weather related changes occurs only in troposphere.

- Stratosphere has negligible changes.

- When ozone layer depletes then influx of UV increases, which support increase in temperature of earth, it result in global warming and finally climate change.
Natural process of global warming and climate change is very slow.

But, human interference raised the pace of climate change.
Origin and evolution of Human
Why is biodiversity important?

Everything that lives in an ecosystem is part of the web of life, including humans. Each species of vegetation and each creature has a place on the earth and plays a vital role in the circle of life. Plant, animal, and insect species interact and depend upon one another for what each offers, such as food, shelter, oxygen, and soil enrichment.

Maintaining a wide diversity of species in each ecosystem is necessary to preserve the web of life that sustains all living things. In his 1992 best-seller, "The Diversity of Life," famed Harvard University biologist Edward O. Wilson -- known as the "father of biodiversity," -- said, "It is reckless to suppose that biodiversity can be diminished indefinitely without threatening humanity itself."
Genetic diversity

• Includes the differences in DNA composition among individuals within a given species.

• Adaptation to particular environmental conditions may weed out genetic variants that are not successful.

• But populations benefit from some genetic diversity, so as to avoid inbreeding or disease epidemics.

SPECIES DIVERSITY

species = a particular type of organism; a population or group of populations whose members share certain characteristics and can freely breed with one another and produce fertile offspring

› Species diversity = the number or variety of species in a particular region

› Species richness = number of species

› Evenness, or relative abundance = extent to which numbers of different species are equal or skewed

includes diversity above the species level. Biologists have viewed diversity above the species level in various ways. Some alternative ways to categorize it include:

› Community diversity
› Habitat diversity
› Landscape diversity

Ecosystem diversity

Includes diversity above the species level. Biologists have viewed diversity above the species level in various ways. Some alternative ways to categorize it include:

› Community diversity
› Habitat diversity
› Landscape diversity
Summary of the biodiversity

Biosphere
13 500 000 species

Figure 15.1 Representing global biodiversity: proportionate number of species of major taxa of plants, invertebrates and vertebrates
• India is known for its rich heritage of biodiversity.
• India is one of the 17 mega-diverse countries in the world.
• With only 2.4 % of the world’s area, India accounts for 7–8 % of the world’s recorded plant and animal species.
• India’s ten biogeographic zones possess an exemplary diversity of ecological habitats like alpine forests, grasslands, wetlands, coastal and marine ecosystems, and desert ecosystems.
• Amongst the existing biota, 91,307 species of animals of which 2,557 Protista, 12,470 general invertebrates, 69,903 arthropods, 4,994 vertebrates, and 45,500 species of plants as well as 5,650 microbial species have been documented in its 10 bio-geographic regions.
• India has four out of thirty-four global biodiversity hotspots, which is an indicator of high degree of endemism (of species) in India.
• About 5,150 plant species and 1,837 animal species are endemic to India.
• India’s biodiversity includes wild relatives of agricultural crops and domesticated animals.
Causes of BIODIVERSITY

- Evolution
- Adaptation
BENEFITS OF BIODIVERSITY

**Consumptive value:**
- Food/Drink
- Fuel
- Medicine
- Batter crop varieties
- Industrial Material

**Non-Consumptive Value:**
- Recreation
- Education and Research
- Traditional value

**Ecological services:**
- Balance of nature
- Biological productivity
- Regulation of climate
- Degradation of waste
- Cleaning of air and water
- Cycling of nutrients
- Control of potential pest and disease causing species
- Detoxification of soil and sediments
- Stabilization of land against erosion
- Carbon sequestration and global climate change
- Maintenance of Soil fertility
Flora and fauna diversity depends on-
- Climate
- Altitude
- Soils
- Presence of other species

Most of the biodiversity concentrated in Tropical region.

**BIODIVERSITY HOTSPOTS:**
- A region with high biodiversity with most of spices being Endemic.
- India have two Biodiversity Hotspots- East Himalayan Region and Western Ghat
Main causes of biodiversity loss

More than 16,000 species are threatened with extinction, almost wholly as a result of human action.

**Global warming**
- Habitat and food loss from temperature change.
- Disruption of migration patterns. (Wellington’s Solitary Coral, bleaching)

**Habitat destruction**
- Agriculture, infrastructure (industry, urbanisation, etc).
- Sumatran Orang-utan (palm oil plantations)

**Pollution**
- (air, land, water)
  - Fossil fuels, pesticides, sewage, waste, oil slicks, sonars, etc.
  - Yangtze River Dolphin (pollution, river traffic)

**Non-native species**
- eg. cats and rats on islands; water hyacinth in US, Africa, Middle East.
- Echo Parakeet (introduction of rats and pigs)

**Over-exploitation**
- Species hunted for food, pet trade, medicines.
- Logging, mining, fishing, groundwater extraction.
- Great Hammerhead Shark (killed for its fins)

**Accidents / persecution**
- Ensnarement in fishing nets.
- Traps, “pest” control, shooting, poisoning.
- Red-headed Vulture (poisoned by drug used on cattle)

Source: IUCN
THREATS TO BIODIVERSITY

Natural causes:
- Narrow geographical area
- Low population
- Low breeding rate
- Natural disasters

Anthropogenic causes:
- Habitat modification
- Overexploitation of selected species
- Innovation by exotic species.
- Pollution
- Hunting
- Global warming and climate change
- Agriculture
- Domino effect
Species and taxonomy

Each species is classified within a hierarchy reflecting evolutionary relationships.

Two related species might be in the same genus; two related genera in the same family, etc.
Threatened Endangered species In India
Diversity of subspecies

Within species, diversity exists in subspecies, or geographic variations.

The tiger, *Panthera tigris*, had 8 subspecies. 5 persist today, including *Panthera tigris altaica*, the Siberian tiger.

Endangered golden lion tamarin, endemic to Brazil’s Atlantic rainforest, which has been almost totally destroyed.
Conservation of Biodiversity
Conservation approaches:

International treaties

• Various treaties have helped conserve biota.


• It bans international trade and transport of body parts of endangered organisms.
Conservation approaches: International treaties

The Convention on Biological Diversity (CBD), from the Rio Conference in 1992, aims to:

- Conserve biodiversity
- Use it sustainably
- Ensure fair distribution of its benefits

The CBD has been signed by 188 nations, but not by the United States.

- Biodiversity is the variety of life forms on earth and the essential interdependence of all living things.
- As defined in convention on Biological diversity signed at Rio De Jenerio (Brazil) in 1992 by 154 countries, the Biodiversity defined as “the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic eco-systems and the ecological complexes of which the area part- this include diversity with in species, between species and of ecosystem.”
- According to IUCN in 1998, “the variety and variability of species of their population, the variety of species of their life forms, the diversity of the complex association with species with their interaction and their ecological process which influences perform.”
The first convention on biodiversity organized at Rio De Janerio, capital of Brazil from June 5 to 16, 1992 named as United Nation Conference On Environment and Development (UNCED), better known as Rio Summit to maintain ecological balance and enrich biodiversity. The agreement on biodiversity signed by 150 countries including three programmes -

- To ensure conservation of biodiversity
- Sustainable use of biodiversity
- Rational and equitable share of profit to accrue from use of genetic resources.

The second convention organized at Johannesburg in 2002 called World Summit On Sustainable Development (WSSD) where the Biodiversity and Sustainable Ecosystem Management was the issue.
The International Conference held on **Biodiversity in Relation to Food & Human Security in a warming planet** 15-17 February, 2010 in **Chennai**.

International Conference on **Wildlife & Biodiversity Conservation** held on 3 to 5 June, 2010 at Dal lake, **Srinagar, Kashmir**.

Indian Biodiversity Congress (IBC) & Indian Biodiversity Expo(IBE) will be held on 27-31 December at **Thriuvananthapuram, Kerala**
Biodiversity loss and species extinction

- **Extinction** = last member of a species dies and the species vanishes forever from Earth

- **Extirpation** = disappearance of a particular population, but not the entire species globally

- These are natural processes. *On average one species goes extinct naturally every 500–1,000 years—this is the background rate of extinction.*

- 99% of all species that ever lived are now extinct.
Ethics?

Do we have an ethical responsibility to prevent species extinction?

*On one hand, as humans we need to use resources and consume other organisms to survive.*

*On the other hand, we have conscious reasoning ability and are able to make conscious decisions.*
Conservation biology

• Scientific discipline devoted to understanding the factors, forces, and processes that influence the loss, protection, and restoration of biological diversity within and among ecosystems.

  • Applied and goal-oriented: conservation biologists intend to prevent extinction.

• This discipline arose in recent decades as biologists grew alarmed at the degradation of natural systems they had spent their lives studying.
Conservation approaches: Captive breeding

- Many endangered species are being bred in zoos, to boost populations and reintroduce them into the wild.

- This has worked so far for the California condor (in photo, condor hand puppet feeds chick so it imprints on birds, not humans).

- But this is worthless if there is not adequate habitat left in the wild.
Conservation approaches: Umbrella species

• When habitat is preserved to meet the needs of an “umbrella species,” it helps preserve habitat for many other species. (Thus, primary species serve as an “umbrella” for others.)

• Large species with large home ranges (like tigers and other top predators) are good umbrella species.

• So are flagship species, or charismatic species that win public affection, like the panda.
Conservation approaches: Biodiversity hotspots

**Biodiversity hotspot**

= an area that supports an especially high number of species **endemic** to the area, found nowhere else in the world
Conservation approaches: Biodiversity hotspots

Global map of biodiversity hotspots, as determined by Conservation International.

CONCLUSION

Biodiversity is our life. If the Biodiversity got lost at this rate then in near future, the survival of human being will be threatened. So, it is our moral duty to conserve Biodiversity as well our Environment. Long-term maintenance of species and their management requires co-operative efforts across entire landscapes. Biodiversity should be dealt with at scale of habitats or ecosystems rather than at species level.
Biodiversity Conservation

In situ

Sacred groves and lakes
Biosphere Reserves
Terrestrial
Marine

National parks, wildlife sanctuaries

Ex situ

Sacred plant home garden
Seed Bank, Gene bank, Cryopreservation
Botanical garden, Zoological garden, Aquaria
To be continue in part- II
Protection of Biodiversity in India - Role of protected areas

Part- II
What are protected area?

Protected areas are a cultural artefact, and have a long history. For example, some historians claim that areas were specifically set aside in India for the protection of natural resources over two millennia ago (Holdgate, 1999). In Europe, some areas were protected as hunting grounds for the rich and powerful nearly 1,000 years ago. Moreover, the idea of protection of special places is universal: it occurs among the traditions of communities in the Pacific (“tapu” areas) and parts of Africa (sacred groves), for example.

Where human occupation or at least the exploitation of resources is limited.

Definition International Union for Conservation of Nature (IUCN) in its categorization guidelines for protected areas.

There are several kinds of protected areas, which vary by level of protection depending on the enabling laws of each country or the regulations of the international organizations involved.

The term "protected area" also includes Marine Protected Areas, the boundaries of which will include some area of ocean, and trans-boundary Protected Areas that overlap multiple countries which remove the borders inside the area for conservation and economic purposes.
Importance

United Nations Environment Programme (UNEP) convened the Ad Hoc Working Group of Experts on Biological Diversity and Convention on Biological Diversity was established.

The Conference of the Parties is the governing body of the Convention, and advances implementation of the Convention through the decisions it takes at its periodic meetings.

The 157 representatives to Seventh Meeting of the Conference of the Parties (COP-7) agreed in February 2004 to establish and maintain “comprehensive, effectively managed, and ecologically representative systems of protected areas” that, collectively, will significantly reduce the rate of global biodiversity loss.

- Now, Protected areas are included in the international arena as part of the Millennium Development Goals.

- Protected areas are expected to directly contribute to national development and poverty reduction.
The Millennium Development Goals

In September of the year 2000, leaders of 189 countries met at the United Nations in New York and endorsed the Millennium Declaration, a commitment to work together to build a safer, more prosperous and equitable world. The Declaration was translated into a roadmap setting out eight time-bound and measurable goals to be reached by 2015, known as the Millennium Development Goals, namely:

1. **Eradicate extreme poverty and hunger**
   - Reduce by half the proportion of people whose income is less than $1 a day
   - Achieve full and productive employment and decent work for all, including women and young people
   - Reduce by half the proportion of people who suffer from hunger

2. **Achieve universal primary education**
   - Ensure that all boys and girls complete a full course of primary schooling

3. **Promote gender equality and empower women**
   - Eliminate gender disparity in primary and secondary education preferably by 2005, and in all levels of education no later than 2015

4. **Reduce child mortality**
   - Reduce by two thirds the mortality of children under five
5. Improve maternal health
- Reduce maternal mortality by three quarters
- Achieve universal access to reproductive health

6. Combat HIV/AIDS, malaria and other diseases
- Halt and reverse the spread of HIV/AIDS
- Achieve, by 2010, universal access to treatment for HIV/AIDS for all those who need it
- Halt and reverse the incidence of malaria and other major diseases

7. Ensure environmental sustainability
- Integrate principles of sustainable development into country policies and programmes; reverse the loss of environmental resources
- Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss
- Halve the proportion of people without access to safe drinking water and basic sanitation
- Improve the lives of at least 100 million slum dwellers by 2020

8. Develop a global partnership for development
- Develop further an open, rule-based, predictable, non-discriminatory trading and financial system
- Address special needs of the least developed countries, landlocked countries and small island developing States
- Deal comprehensively with developing countries’ debt
- In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries
- In cooperation with the private sector, make available the benefits of new technologies, especially information and communications technologies

For more information, please visit: www.un.org/millenniumgoals
To which extent PAs?

As of today, >100,000 protected areas under legal protection have been established encompassing 17.1 million km², or 11.5% of the planet’s terrestrial surface.

The World Database on Protected Areas

Map showing protected areas in the WDPA

February 2015
### INTERNATIONAL STATUS OF PROTECTED AREAS as on February 2015

The World Database on Protected Areas (UNO)

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**Total number of records in the WDPA**

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India: Biodiversity hub

- India is one of the 17 mega diverse countries of the world.
- It has 2.4% of the world’s land area.
- It contributes about 8% of the known global biodiversity.
- India is home to world’s largest wild tigers population.
- It is habitat of globally important endangered species like Asiatic lion, Asian Elephant, One-horned Rhinoceros, Gangetic River Dolphin, Snow Leopard, Kashmir Stag, Dugong, Gharial, Great Indian Bustard, Lion Tailed Macaque etc.
Current status of Protected area in India

• We have a network of 668 Protected Areas (PAs).
• Extending over 160096.09 sq. kms. (4.86% of total geographic area) comprising:
  ➢ 103 National Parks
  ➢ 528 Wildlife Sanctuaries
  ➢ 65 Conservation Reserves and
  ➢ 4 Community Reserves
  ➢ 14 Biosphere Reserves
## Protected Areas of India (as on April, 2015)

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Geographical Area of India (FSI, 2011) = 32,87,263 km²  
Recorded Forest Area of India (FSI, 2011) = 692,027 km²  
Forest Area = 21.05 % of Geographical Area of India
### Protected Areas of India from 2000 to 2013 (as on April, 2015)

**Source: National Wildlife Database Cell, Wildlife Institute of India**

*Note: All areas are in km²*

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<th>No. of Communit Reserves</th>
<th>Area Under Communit Reserves</th>
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1. Wildlife Sanctuaries (WLSs) 528

It is an area which is of adequate ecological, faunal, floral, geomorphological, natural or zoological significance.

The Sanctuary is declared for the purpose of protecting, propagating or developing wildlife or its environment.

Certain rights of people living inside the Sanctuary could be permitted.

Further, during the settlement of claims, before finally notifying the Sanctuary, the Collector may, in consultation with the Chief Wildlife Warden, allow the continuation of any right of any person in or over any land within the limits of the Sanctuary.
Kailadevi Wildlife Sanctuary, Karauli

Background

The Kailadevi Wildlife Sanctuary (KWS) is the northern extension of the Ranthambore National Park and falls within the buffer zone of the Ranthambore Tiger Reserve. The sanctuary is located in the Karauli district of Rajasthan and falls within the Karauli and Sapotra blocks. It is spread over a total area of 674 sq km, falling within the longitudes 76°37’ E to 77°13’ E and latitude 26°2’ N and 26°21’ N. The sanctuary is bounded on the west by the river Banas and on the south by the river Chambal.

Even prior to the declaration of the sanctuary in 1983, the forest area that now comprises the sanctuary has been home to several pastoral and agricultural communities who are dependent substantially on its resources for their livelihood.
Sariska wild life sanctuary

- This lies in the Aravalli hills and is the former hunting preserve of the Maharaja of Alwar.
- Sariska includes the ruins of the Kankwari Fort, the 10th century Neelkanth temples, the Budha Hanumab Temple near Pandupol and the Bharthari Temple. The forests are dry deciduous, with trees of Dhak, Acacia, Ber and Salar.
- It also has good populations of Nilgai, Sambar and Chital. In the evenings, Indian Porcupine, Striped Hyaena, Indian Palm Civet and even Leopard are sometimes seen.
2. National Parks (NPs)  

- It is quite similar to sanctuaries. However, differences are as follows:

- Unlike a Sanctuary, where certain rights can be allowed, in a National Park, no rights are allowed.

- No grazing of any livestock shall also be permitted inside a National Park.

- Any removal or exploitation of wildlife or forest produce from a Sanctuary requires the recommendation of the State Board for Wildlife, removal etc., from a National Park requires recommendation of the National Board for Wildlife (However, as per orders of Hon’ble Supreme Court dated 9th May 2002 in Writ Petition (Civil) No. 337 of 1995, such removal/ exploitation from a Sanctuary also requires recommendation of the Standing Committee of National Board for Wildlife).
Jim Corbett National Park, Nainital

Corbett Tiger Reserve has captured the imagination of many with its diverse wildlife and breathtaking landscapes. The natural uniqueness of the area was recognised long ago and so in 1936 Corbett attained the distinction as the first Tiger Reserve to be established in mainland Asia.

Tiger Reserve lies in two districts Nainital and Pauri in the hill state of Uttaranchal in northern India. It covers an area of 521 sq. km and together with the neighbouring Sonanadi Wildlife Sanctuary and Reserve Forest areas, forms the Corbett Tiger Reserve over 1288 sq. km. geographical location between the Himalayas and the terai, and the streams, rivers and ridges crisscrossing the terrain, present Corbett with a remarkable variety of landscapes. This vivid mosaic of habitats wet and dry, plain and mountainous, gentle and rugged, forests and grasslands supports numerous plant and animal species, representing Himalayan as well as plains kinds. The most famous of Corbett's wild residents are the Bengal Tiger and the Asiatic Elephant, but with about 600 species of avifauna Corbett is one of the richest bird regions of India.
DUDHWA NATIONAL PARK

- **Dudhwa** National Park or the Dudhwa Tiger Reserve residing the areas of Lakhimpur & Kheri district of Uttar Pradesh.
- It is adjacent to the Indo-Nepal border bringing together two most incredible sanctuaries of the area namely, Kishanpur and Katerniaghat Wildlife Sanctuaries to represent the excellent natural forests and greenery along the Terai region.
3. Conservation Reserves (CR) 65

- CR can be declared by the State Governments in any area owned by the Government, particularly the areas adjacent to National Parks and Sanctuaries and those areas which link one Protected Area with another.

- Such declaration should be made after having consultations with the local communities.

- Conservation Reserves are declared for the purpose of protecting landscapes, seascapes, flora and fauna and their habitat.

- The rights of people living inside a Conservation Reserve are not affected.
Conservation Reserves (CRs)

These 65 conservation reserves extends in following states:

- Gujarat
- Haryana
- Himachal Pradesh
- Jammu & Kashmir
- Karnataka
- Maharashtra
- Punjab
- Rajasthan
- Tamil Nadu
- Uttarakhand
Conservation Reserves (CRs)

Tiger Reserves:
Project Tiger was launched by the Government of India in the year 1973 to save the endangered species of tiger in the country. Starting from nine (9) reserves in 1973-74 the number is grown up to forty eight (48). A total area of 69793.24 km² is covered by these project tiger areas.
Conservation Reserves (CRs)

Elephant Reserves

The Indian elephant *Elephas maximus* occurs in the central and southern Western Ghats, North-east India, eastern India and northern India and in some parts of southern peninsular India.


These occur in 16 of the 28 states in the country and is showing an increasing trend across its distributional range.

Its population in 2007 was estimated to be in the range from 27,657 to 27,682, whereas in 2012 the population was estimated to be between 27,785 and 31,368.

Arunachal Pradesh, Assam, Meghalaya, Nagaland, Tripura, West Bengal, Jharkhand, Odisha, Chattisgarh, Uttarakhand, Uttar Pradesh, Tamil Nadu, Karnataka, Kerela, Andhra Pradesh and Maharashtra
4. Community Reserves

- It can be declared by the State Government in any private or community land, not comprised within a National Park, Sanctuary or a Conservation Reserve, where an individual or a community has volunteered to conserve wildlife and its habitat.
- Community Reserves are declared for the purpose of protecting fauna, flora and traditional or cultural conservation values and practices.
- As in the case of a Conservation Reserve, the rights of people living inside a Community Reserve are not affected.

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Name</th>
<th>Year of Estd.</th>
<th>Area (km²)</th>
<th>Distt./State Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Lalwan</td>
<td>2007</td>
<td>12.67</td>
<td>Hoshiarpur, Punjab</td>
</tr>
<tr>
<td>3.</td>
<td>Kadalundi</td>
<td>2007</td>
<td>1.50</td>
<td>Malappuram, Kerala</td>
</tr>
<tr>
<td></td>
<td><strong>Total Area</strong></td>
<td></td>
<td><strong>20.69</strong></td>
<td></td>
</tr>
</tbody>
</table>
Keshopur Chhamb, Punjab: CR
An important habitat of birds

Plate 1. Black winged stilt, Pintail, Gadwall, Wigeon, Mallard in Keshopur CR

Plate 2. Ruff and Reeves, Gray lag Geese have a gathering in Keshopur CR
Kokkare Bellur world famous by knowing as “Village of Storks”.
A marine protected area (MPA) is essentially a space in the ocean where human activities are more strictly regulated than the surrounding waters - similar to parks we have on land.

These places are given special protections for natural or historic marine resources by local, state, territorial, native, regional, or national authorities.

These areas are located in
✓ Andaman & Nicobar
✓ Lakshadweep
✓ Andhra Pradesh
✓ Dadra & Nagar Haveli
✓ Daman & Diu
✓ Goa
✓ Gujarat
✓ Kerala
✓ Maharashtra
✓ Odisha
✓ Tamil Nadu
✓ West Bengal
What is a biosphere reserve?
Biosphere reserves are areas of terrestrial and coastal ecosystems promoting solutions to reconcile the conservation of biodiversity with its sustainable use. They are internationally recognized, nominated by national governments and remain under sovereign jurisdiction of the states where they are located. Biosphere reserves serve in some ways as 'living laboratories' for testing out and demonstrating integrated management of land, water and biodiversity. Collectively, biosphere reserves form a world network: the World Network of Biosphere Reserves (WNBR). Within this network, exchanges of information, experience and personnel are facilitated. There are over 500 biosphere reserves in over 100 countries.

How did the biosphere reserve concept start?
The origin of Biosphere Reserves goes back to the "Biosphere Conference" organized by UNESCO in 1968. This was the 1st intergovernmental conference examining how to reconcile the conservation and use of natural resources, thereby foreshadowing the present-day notion of sustainable development. This Conference resulted in the launching of the UNESCO "Man and the Biosphere" (MAB) Programme in 1970. One of the original MAB projects consisted in establishing a coordinated World Network of sites representing the main ecosystems of the planet in which genetic resources would be protected, and where research on ecosystems as well as monitoring and training work could be carried out. These sites were named as "Biosphere Reserves", in reference to the MAB programme itself.
What are the functions of biosphere reserves?
Each biosphere reserve is intended to fulfil 3 basic functions, which are complementary and mutually reinforcing:

- a conservation function - to contribute to the conservation of landscapes, ecosystems, species and genetic variation;
- a development function - to foster economic and human development which is socio-culturally and ecologically sustainable;
- a logistic function - to provide support for research, monitoring, education and information exchange related to local, national and global issues of conservation and development.

What are the biosphere reserve zones?
Biosphere reserves are organized into 3 interrelated zones:

- the core area
- the buffer zone
- the transition area
### A) List of Biosphere reserve, their area, date of Notification and location

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the Biosphere Reserve &amp; total geographical area (km²)</th>
<th>Date of Notification</th>
<th>Location (State)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Nilgiri (5520)</td>
<td>1.8.86</td>
<td>Part of Wynad, Nagarhole, Bandipur and Madumalai, Nilambur, Silent Valley and Siruvani hills (Tamil Nadu, Kerala and Karnataka)</td>
</tr>
<tr>
<td>2.</td>
<td>Nanda Devi (5860.69)</td>
<td>18.1.88</td>
<td>Part of Chamoli, Pithoragarh &amp; Almora Districts (Uttaranchal)</td>
</tr>
<tr>
<td>3.</td>
<td>Nokrek (820)</td>
<td>1.9.88</td>
<td>Part of Garo Hills (Meghalaya)</td>
</tr>
<tr>
<td>4.</td>
<td>Manas (2837)</td>
<td>14.3.89</td>
<td>Part of Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamrup and Darang Districts (Assam)</td>
</tr>
<tr>
<td>5.</td>
<td>Sunderbans (9630)</td>
<td>29.3.89</td>
<td>Part of delta of Ganges &amp; Brahmaputra river system (West Bengal)</td>
</tr>
<tr>
<td>6.</td>
<td>Gulf of Mannar (10500)</td>
<td>18.2.89</td>
<td>Indian part of Gulf of Mannar between India and Sri Lanka (Tamil Nadu)</td>
</tr>
<tr>
<td>7.</td>
<td>Great Nicobar (885)</td>
<td>6.1.89</td>
<td>Southern most islands of Andaman and Nicobar (A&amp;N Islands)</td>
</tr>
<tr>
<td>8.</td>
<td>Similipal (4374)</td>
<td>21.6.94</td>
<td>Part of Mayurbhanj district (Orissa)</td>
</tr>
<tr>
<td>9.</td>
<td>Dibru-Saikhowa (765)</td>
<td>28.7.97</td>
<td>Part of Dibrugarh and Tinsukia districts (Assam)</td>
</tr>
<tr>
<td>10.</td>
<td>Dehang Debang (5111.5)</td>
<td>02.09.98</td>
<td>Part of Siang and Debang valley in Arunachal Pradesh</td>
</tr>
<tr>
<td>11.</td>
<td>Kanchanjunga (2619.92)</td>
<td>07.02.2000</td>
<td>Parts of North and West Sikkim.</td>
</tr>
<tr>
<td>12.</td>
<td>Pachmari (4926.28)</td>
<td>03.03.99</td>
<td>Parts of Betur, Hoshangabad and Chhindwara, Distt. of Madhya Pradesh.</td>
</tr>
<tr>
<td>14.</td>
<td>Achanakmar Amarkantak</td>
<td>30.3.05</td>
<td>Parts of Anuppur and Dindori Distt. of M.P. and Bilaspur Distt. of Chattisgarh.</td>
</tr>
</tbody>
</table>

- Sites with bold letter have been recognized by UNESCO on World Network of Biosphere Reserves and proposals in respect of S.No. 4, 8, 11 and 12 are under consideration.
Role of protected area in conservation

- Protect flora, fauna and microorganisms
- Conserve habitat
- Protect ecosystem and its services
- Reduces conflicts between man and environment
- Protect rights of native people
- Provide a safe place for increasing numbers of rare and endangered species
- Collect revenue
- Recreation value
- Scientific and research value
- Aesthetic value
Role of protected areas in conservation

• Protected areas are crucial for the conservation of terrestrial, freshwater and marine environments.
• Protected area networks helps to reduce biodiversity loss and provides significant contributions to global conservation efforts.
• However, area of designated protected areas has steadily increased since 1970, the rate of biodiversity loss continues to increase.
• The discrepancy between the trends in increasing protected area coverage but declining biodiversity over the last four decades may relate to two key factors:
  (1) the degree to which protected areas deliver biodiversity outcomes
  (2) the degree to which significant biodiversity is represented within protected areas
Just before protection related legal implications

• Many people are under the impression that India does not have strong wildlife conservation laws.
• On the contrary, we have some of the most stringent legislations to protect wildlife and habitats.
• It is imperative that all conservationists familiarize themselves with these laws, so that they can contribute effectively.
• It is also vital to understand which institutions control land in India before any conservation interventions can be attempted in any landscape.
• The legal status of the land must first be ascertained so that one can engage with the correct authorities or agencies.
Legal framework on protection of biodiversity in India

The Government of India has introduced various types of legislation in response to the growing destruction of wildlife and forests.


The Wildlife (Protection) Act (WLPA), 1972 is an important statute that provides a powerful legal framework for:

- Prohibition of hunting
- Protection and management of wildlife habitats
- Establishment of protected areas
- Regulation and control of trade in parts and products derived from wildlife
- Management of zoos.

The WLPA provides for several categories of Protected Areas/Reserves:

- National Parks
- Wildlife Sanctuaries
- Tiger Reserves
- Conservation Reserves
- Community Reserves
Prohibition of hunting

- No wild mammal, bird, amphibian, reptile, fish, crustacean, insects, or coelenterates listed in four Schedules of the WLPA can be hunted either within or outside protected areas.
- On conviction, the penalty for hunting is imprisonment for a period ranging from a minimum of three to a maximum of seven years with fines not less than 10,000 rupees.
- National parks and Tiger Reserves are by law more strictly protected, allowing virtually no human activity except that which is in the interest of wildlife conservation.
- Grazing and private tenurial rights are disallowed in National Parks but can be allowed in sanctuaries at the discretion of the Chief Wildlife Warden.
Protection and management of wildlife habitats

• The amended WLPA does not allow for any commercial exploitation of forest produce in both national parks and wildlife sanctuaries, and local communities can collect forest produce only for their bonafide needs.

• Community reserves and conservation reserves are two new categories of protected areas that have been included under the WLPA.

• These two categories provide a greater role for local communities, stakeholders and civil society as well as the opportunity to protect many areas of conservation value that cannot be designated under strict categories such as wildlife sanctuaries or national parks.
Protection and management of wildlife habitats

• It prohibits the **destruction or diversion of wildlife and its habitat** by any method unless it is for improvement or better management and this is decided by the state government in consultation with the National and State Boards for Wildlife.

• It provides procedures for dealing with legal rights in proposed protected **areas and acquisition of any land** or interest under this law is deemed as an acquisition for a public purpose.

• It ensures **community rights of** The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006.

• Apart from protected area establishment, other important aspects of the WLPA include **procedures for the appointment of state wildlife authorities and wildlife boards**, the regulation of trade in wildlife products and the prevention, detection and punishment of violations of the WLPA.
Protection and management of wildlife habitats

• The 2006 amendment introduced a new chapter (IV B) for establishment of the National Tiger Conservation Authority and notification of Tiger Reserves (before this amendment, Tiger Reserves were not defined under the law, but were merely administrative designations to enable funding under Project Tiger).

• The Wildlife Crime Control Bureau (WCCB) was constituted vide the 2006 amendment to monitor and control the illegal trade in wildlife products.

• The WLPA provides for investigation and prosecution of offences in a court of law by authorized officers of the forest department and police officers.
2. The Indian Forest Act (1927) and Forest Acts of State Governments

- The main objective of this was to secure exclusive state control over forests to meet the demand for timber. Most of these untitled lands had traditionally belonged to the forest dwelling communities. The Act defined state ownership, regulated its use, and appropriated the power to substitute or extinguish customary rights. The Act facilitates three categories of forests, namely
  - Reserved forests
  - Village forests
  - Protected forests
- Reserved forests are the most protected within these categories. No rights can be acquired in reserved forests except by succession or under a grant or contract with the government. Felling trees, grazing cattle, removing forest products, quarrying, fishing, and hunting are punishable with a fine or imprisonment. Although the Indian Forest Act is a federal act, many states have enacted similar forest acts but with some modifications.
3. The Forest Conservation Act (1980)

- In order to check rapid deforestation due to forestlands being released by state governments for agriculture, industry and other development projects (allowed under the Indian Forest Act) the federal government enacted the Forest Conservation Act in 1980 with an amendment in 1988. The Act made the prior approval of the federal government necessary for de-reservation of reserved forests, logging and for use of forestland for non-forest purposes.
- This powerful legislation has, to a large extent, **curtailed the indiscriminate logging and release of forestland for non-forestry purposes** by state governments.
- While the federal government imposed such strict restrictions, it did not simultaneously evolve a mechanism to compensate state governments for loss of timber logging revenues.
- This anomaly coupled with increasing pressure for land due to a burgeoning population has generated considerable resentment within state governments resulting in growing pressure to dilute the restrictive provisions of the Act.
- **The Supreme Court of India has currently imposed a complete ban on the release of forestland for non-forestry activities without the prior approval of the federal government.**
4. The Environment (Protection) Act (1986)

The Environment Protection Act is an important legislation that provides for coordination of activities of the various regulatory agencies, creation of authorities with adequate powers for environmental protection, regulation of the discharge of environmental pollutants, handling of hazardous substances, etc. The Act provided an opportunity to extend legal protection to non-forest habitats (‘Ecologically Sensitive Areas’) such as grasslands, wetlands and coastal zones.
5. Biodiversity Act 2002

• In order to implement this Act, in accordance with its section 8, a National Biodiversity Authority (NBA) was established in the year 2003.

• The BD Act provides provisions for regulated access to biological resources by bonafide end-users for various purposes including scientific research, commercial activities and sustainable use of non-timber forest produce.

• The Act is implemented through three functional bodies viz., NBA at the national level, State Biodiversity Boards (SBBs) in different states, and Biodiversity Management Committees (BMCs) at the level of local community (Panchayat).
5. Biodiversity Act 2002

• At the national level, NBA is responsible for decisions pertaining to access and benefit sharing (ABS), approval for access to and transfer of biological resources, results or technology of scientific research to foreign citizens, companies or non-resident Indians and several other matters related to conservation of India’s biodiversity.

• The Act insists upon appropriate benefit sharing under mutually agreed terms related to access and transfer of biological resources or knowledge occurring in or obtained from India for various purposes.
Take home message

LIVE AND LET OTHERS LIVE