

# 2018

INTEGRATED LEARNING PROGRAMME, ILP

**IASBABA**



## **[ENVIRONMENT: PART 3]**

Integrated Learning Programme 2018 is a step towards 'Enabling a person located at the most remote destination a chance at cracking AIR 1 in UPSC/IAS'

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## PROTECTED AREA NETWORK

**Note-** Details of respective acts and policies will be covered in future Blocks as given in full plan. So need not worry about them 😊

Protected areas are those in which human occupation or at least the exploitation of resources is limited. The definition that has been widely accepted across regional and global frameworks has been provided by the International Union for Conservation of Nature (IUCN) in its categorization guidelines for protected areas. [Check here](#)

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 adoption of a National Policy for Wildlife conservation in 1970 and the enactment of the Wildlife (Protection) Act in 1972 lead to a significant growth in the protected areas network.
- It was further strengthened by a number of national conservation projects, notably Project Tiger, Project Elephant, Crocodile Breeding and Management Project, etc.
- **National Board for Wildlife (NBWL)**, chaired by the Prime Minister of India provides for policy framework for wildlife conservation in the country.
- The Indian Constitution entails the subject of **forests and wildlife** in the **Concurrent list**.

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

**We will look into them one by one**

- Wildlife Sanctuaries
- National Parks
- Conservation Reserves
- Community Reserves
- Marine Protected Areas

## Wildlife Sanctuary (WLS)

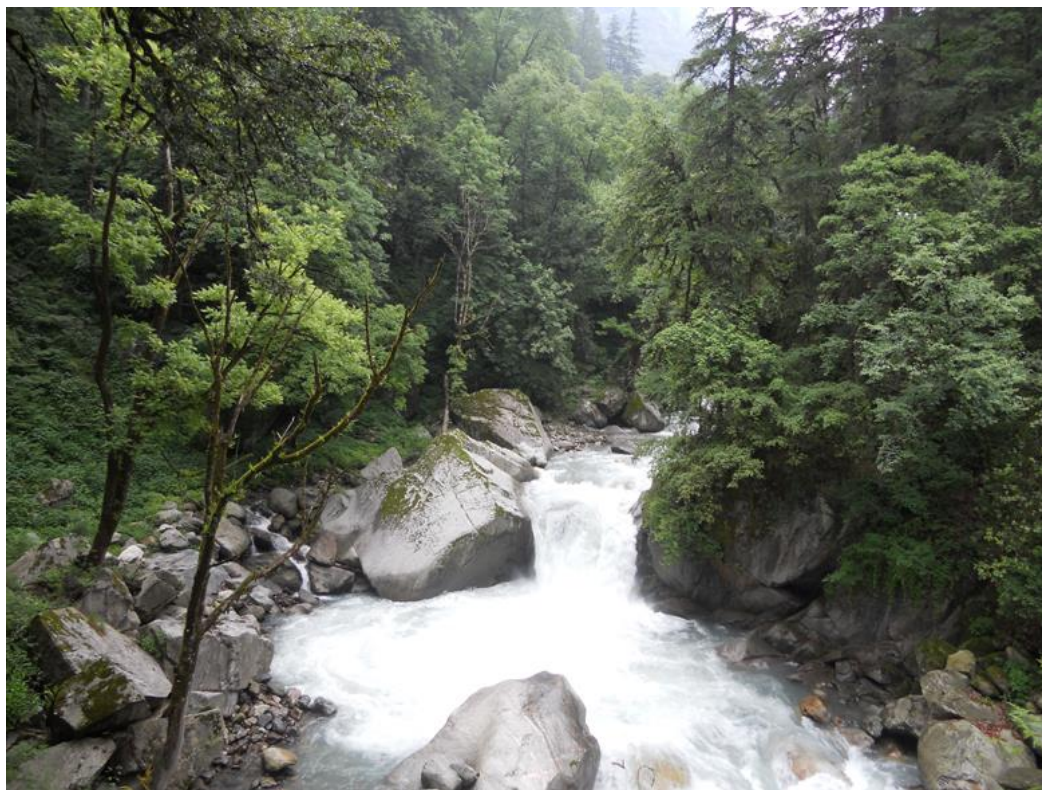


*Kedarnath Wildlife Sanctuary*

- A **wildlife refuge**, also called a **wildlife sanctuary**, is a naturally occurring sanctuary, such as an island, that provides protection for species from hunting, predation or competition.
- It is a protected area, a geographic territory within which wildlife is protected or an area which has ecological, faunal, floral, geomorphological, natural or zoological significance
- **Purpose of WLS** - protect, propagate or develop wildlife or its environment.
- Comes under IUCN category 4.
- The **Wild life (Protection) Act of 1972** provided for the declaration of certain areas by the State Government as wildlife sanctuaries if the area was thought to be of adequate ecological, geomorphological and natural significance.
- Certain rights of people living inside the Sanctuary could be permitted.
- Grazing, firewood collection by tribal is allowed but strictly regulated.
- Settlements not allowed (few exceptions - tribal settlements do exist but efforts are made to relocate them).
- A Sanctuary can be promoted to a National Park.
- There are 543 existing wildlife sanctuaries in India covering an area of 118,918 km<sup>2</sup>, which is 3.62 % of the geographical area of the country



## National Park



*Great Himalayan National Park, Himachal Pradesh*

- State government can declare a national park under Wild Life (Protection) Act (WPA) of 1972.
- National Parks are declared in areas that are considered to be of adequate ecological, geomorphological and natural significance.
- Within the law, the difference in conservation value of a National Park from that of a sanctuary is not specified in the WPA 1972.
- No human activity is permitted inside the national park except for the ones permitted by the Chief Wildlife Warden of the state under the conditions given in CHAPTER IV, WPA 1972.
- There are 103 existing national parks in India covering an area of 40,500.13 km<sup>2</sup>, which is 1.23% of the geographical area of the country

### THINK!

**Difference between Wildlife Sanctuary and National Park?**



## General Provision for Sanctuary and National Park

### Declaration of the Protected Area by the State Government

#### Initial Notification

- The State Government may, by notification, declare its intention to constitute any area within or outside any reserve forest as a sanctuary / National Park if it considers that such area is adequate for the purpose of protecting, propagating or developing wild life or its environment.

#### Final notification

- In this notification the state government specifies the limits of the area which shall be comprised within the sanctuary and declare that the said area shall be a sanctuary/ National park from such date as may be specified in the notification.

### Declaration of the Protected Area by the Central Government

- The central government may declare an area as sanctuary/National Park by notification if it is satisfied that an area is of adequate ecological, faunal, floral, geomorphological, natural or zoological significance, for the purpose of protecting, propagating or developing wild life or its environment.

#### Boundary

- Notification shall specify situation and limits of such area.
- In cases where territorial water is included, the limits shall be determined in consultation with the **Chief Naval Hydrographer** of the Central Government, after taking adequate measures to protect the occupational interests of the local fishermen.
- No alteration of boundaries of a sanctuary/ National Park shall be made except on recommendation of the **National Board for Wild Life**.

#### Settlement of Rights

- Responsibility of state government to make alternative arrangements for fuel, fodder and other forest produce to the persons affected, in terms of their rights as per the Government records.
- The State Government appoints an officer as a 'Collector' under the Act to inquire into and determine the existence, nature and extent of rights of any person in or over the land comprised within the sanctuary/ National Park which is to be notified.
- After the issue of a notification no right shall be acquired in, on or over the land comprised within the limit of the area specified except by succession, testamentary or intestate.

## Claim of Rights

- Collector shall pass an order admitting or rejecting the same in whole or in part.
- If such claim is admitted in whole or in part, the Collector may either
  - a) Exclude such land from the limits of the proposed sanctuary
  - OR
  - b) proceed to acquire such land or rights
  - c) allow, in consultation with the Chief Wild Life Warden, the continuation of any right of any person in or over any land within the limits of the sanctuary

## Entry into the Protected Area

- No person other than -
  - a) A public servant on duty
  - b) A person who has been permitted by the Chief Wild Life Warden or the authorized officer to reside within the limits of the sanctuary/National Park
  - c) A person who has any right over immovable property within the limits of the sanctuary/ National Park
  - d) A person passing through the sanctuary/ National Park along a public highway
  - e) The dependents of the person referred to in clause (a), (b) or (c) above,
- Shall enter or reside in the sanctuary/National Park, except under and in accordance with the conditions of a permit granted.

## Grant of Permit for Entry

- Permission by - Chief Wild Life Warden
- Purposes for which permission can be granted –
  - Investigation or study of wildlife and purposes ancillary or incidental thereto
  - Photography
  - Scientific research
  - Tourism
  - Transaction of lawful business with any person residing in the sanctuary
- Chief Wild Life Warden - authority who shall control, manage and maintain all Protected Areas.

## Conservation Reserve and Community Reserves

Conservation reserves and community reserves in India are terms denoting protected areas of India which typically act as buffer zones to or connectors and migration corridors between established national parks, wildlife sanctuaries and reserved and protected forests of India.

Such areas are designated as conservation areas if they are uninhabited and completely owned by the Government of India but used for subsistence by communities and community areas if parts of the lands are privately owned.

- These protected area categories were first introduced in the Wildlife (Protection) Amendment Act of 2002 – the amendment to the Wildlife Protection Act of 1972.
- The act provided recognition and legal backing to the community initiated efforts in wildlife protection.
- It provides for a flexible system wherein the wildlife conservation is achieved without compromising the community needs.

### Conservation Reserves

- Can be declared by state government in any area which is owned by Central government, particularly NP and WLS adjacent area or areas which are linked with protected area.
- These areas are declared after consulting local communities.
- Purpose - protecting landscape, seascape, flora and fauna and their habitat
- Rights of people living inside area are not affected.
- First conservation reserve established in the country - **Tiruppadaimarathur Conservation Reserve in Tirunelveli, Tamil Nadu.** (to protect bird nests)-

### Recent Update

- [Allahabad to get India's first black buck conservation reserve](#)

### Community Reserves

- Can be declared by state government in any private or community land, not comprised.
- Within a NP, WLS or conservation reserve, where an individual or a community has volunteered to conserve wildlife and its habitat.
- **Purpose** - protecting fauna, flora and traditional or cultural conservation values and practices.
- Rights of people living inside area are not affected.
- **Managed through** – a community reserve management committee.



- No change in land use pattern shall be made within the community reserve, except in accordance with a resolution passed by the management committee and approval of the same by the state government.

## Coastal Protected Areas or Marine Protected Areas (MPA)

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.

- Aim - to protect and conserve the natural marine ecosystems in their pristine condition.
- IUCN MPA definition - "any area intertidal or sub tidal terrain together with its overlaying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment"
- Marine productivity in India is concentrated in small areas of coral reefs, lagoons, mangroves, estuaries and seagrass beds. They provide rich feeding and breeding for fish and other marine life.
- MPA protects the vital life support processes of the sea.
- It also ensures sustainable productivity and fish production.

### MPA Classification

- **Category-I** - covers NP & WLS and having entire areas in intertidal/ sub-tidal or mangroves, coral reefs, creeks, seagrass beds, algal beds, estuaries, lagoons.
- **Category-II** - includes Islands
- **Category-III A** - includes sandy beaches beyond intertidal line
- **Category –IIIB** - includes ever green or semi ever green forests of Islands.
- Marine National Park and Marine Sanctuary in the Gulf of Kutch form one unit (one MPA).
- Bhitarkanika National Park and Bhitarkanika Sanctuary are an integral part of one MPA.
- Cover <4.01% of the total area of all Protected Areas of India.

## Sacred Groves of India

They are patches of forests or natural vegetation - from a few trees to forests of several acres - that are usually dedicated to local folk deities. **Example – Amrapali donated mango grove to Buddha.**

- Protected by - local communities.
- Why - Because of their religious beliefs and traditional rituals that run through several generations.
- **Degree of sanctity** – varies from one grove to another. Example – in some forests even the dry foliage and fallen fruits are not touched.
- People believe any disturbance mean offend to local deity. Examples –
  - Garo and Khasi tribes of NE India completely prohibit any disturbance in the sacred grove.
  - Gonds of central India prohibit the cutting of a tree but allow fallen parts to be used.

### Classification of sacred groves

- **Traditional Sacred Groves** - It is the place where the village deity resides, who is represented by an elementary symbol.
- **Temple Groves** – Here a grove is created around a temple and conserved.
- **Groves around the burial or cremation grounds.**

### Ecological significance

- **Conservation of biodiversity** – they are important repositories of floral and faunal diversity.
- **Recharge of aquifers** – they are often associated with ponds, streams or springs which meet the requirements of local people.
- **Soil conservation** – vegetation cover of sacred groves prevents soil conservation.

### Distribution of Sacred groves in India

- Found all over India
- Abundantly along – Western Ghats in Kerala and Karnataka.

### Threats to Sacred groves

- **Disappearance of traditional belief system** (now considered mere superstition) which were fundamentals to the concept of sacred groves.
- Many groves have been destroyed due to **urbanization + developmental interventions + encroachment.**
- **“Sanskritisation** (social change)” or the transformation of the primitive forms of nature worship into formal temple worship
- Invasion by exotic weeds such as *Eupatorium odoratum*, *Lantana camara* and *Prosopis juliflora* is a serious threat to some groves.

- Pressures due to increasing livestock and fuelwood collection.

### List of sacred groves

S.no.	State	Local term for Sacred Groves	No. of sacred groves
1	Andhra Pradesh	Pavithravana	580
2	Arunachal Pradesh	Gumpa Forests (attached to Buddhist monasteries)	101
3	Goa	Deorai, Pann	55
4	Jharkhand	Sarana	29
5	Karnataka	Devara Kadu	1531
6	Kerala	Kavu, Sara Kavu	299
7	Maharashtra	Devrai, Devrahati, Devgudi	2820
8	Manipur	Gamkhap, Mauhak (sacred bamboo reserves)	166
9	Meghalaya	Ki law Lyngdoh, Ki Law Kyntang, Ki Law Niam	101
10	Orissa	Jahera, Thakuramma	169
11	Puducherry	Kovil Kadu	108
12	Rajasthan	Orans, Kenkris, Jogmaya	560
13	Tamil Nadu	Swami shola, Koilkadu	752
14	UttaraKhand	Deo Bhumi, Bugyal (sacred alpine meadows)	22
15	West Bengal	Garamthan, Harithan, Jahera, Sabitrithan, Santalburithan	39

Similarly, several water bodies are declared sacred by people. This indirectly leads to protection of aquatic flora and fauna. (e.g. Khecheoprai lake in Sikkim)

### Export-Prohibited Goods

- The prohibited items are not permitted to be exported. An export license will not be given in the normal course for goods in the prohibited category.
- Prohibited goods list -
  - All wild animals, animal articles including their products and derivatives (excluding those for which ownership certificates have been granted and also those required for transactions for education, scientific research and management under Wild Life (Protection) Act, 1972 including their parts and products).
  - Beef of cows, oxen and calf.
  - Meat of buffalo (both male and female) fresh and chilled and frozen.
  - Peacock Tail Feathers & its Handicrafts and articles
  - Shavings & Manufactured Articles of shavings of Shed Antlers of Chital and Sambhar
  - Sea shells
  - Wood and wood products
  - Fuel wood

- Wood charcoal
- Sandalwood in any form, (but excluding finished handicraft products of sandalwood, machine finished sandalwood products, sandalwood oil).
- Red Sanders wood, Value added products of Red Sanders.
- Mechanical, chemical and semi chemical wood pulp.

## Global Initiative

### The MAB (Man and Biosphere Reserve)

- Launched in 1971, **UNESCO's** Man and the Biosphere Programme (MAB) is an Intergovernmental Scientific Programme.
- **Aim** - to set a scientific basis for the improvement of the relationships between people and their environment globally.
- It wanted to promote innovative approaches to economic development that is socially and culturally appropriate and environmentally sustainable.
- Agenda of the MAB Programme is defined by **International Coordinating Council** (main governing body).
- For implementation of its interdisciplinary work on ground, MAB relies on the **World Network of Biosphere Reserves**, and on thematic networks and partnerships for knowledge-sharing, research and monitoring, education and training, and participatory decision making.
- It predicts the consequences of today's actions on tomorrow's world and thereby increases people's ability to efficiently manage natural resources for the well-being of both human populations and the environment.
- **World Network of Biosphere Reserves:** Composed of 669 biosphere reserves in 120 countries, including 20 transboundary sites, the WNBR of the MAB Programme promotes North-South and South-South collaboration and represents a unique tool for international co-operation through sharing knowledge, exchanging experiences, building capacity and promoting best practices.

## Biosphere Reserve (BR)

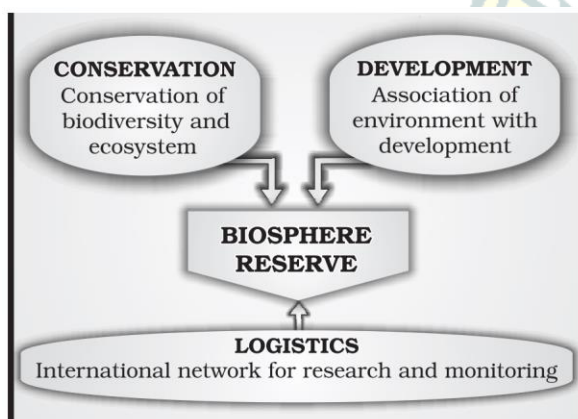
### Definition

Biosphere Reserves (BRs) are representative parts of natural and cultural landscapes extending over large area of terrestrial or coastal/marine ecosystems or a combination thereof and representative examples of bio-geographic zones/provinces

- A Biosphere Reserve is a unique and representative ecosystem of terrestrial and coastal areas which are internationally recognized within the framework of UNESCO's Man and Biosphere (MAB) Programme.
- **They are special environments for both people and the nature and are living examples of how human beings and nature can co-exist while respecting each other's needs.**
- This program wants to promote sustainable development based on local community efforts and sound science.

### Characteristics of Biosphere reserve

- Each Biosphere Reserves are protected area of land and/or coastal environments where in people are an integral component of the system.
- The network of BRs includes significant examples of biomes throughout the world.
- Each BR includes one or more of the following categories –
  - BRs are representative examples of nature biomes.
  - They conserve unique communities of biodiversity.
  - BRs have examples of harmonious landscapes resulting from traditional patterns of land use.
  - BRs have examples of modified or degraded ecosystems capable of being restored to more natural conditions.





## Biosphere Reserves of India

Year	Name	Location	State	Type	Key Fauna
1986	Nilgiri Biosphere Reserve	Part of Waynad, Nagarhole, Bandipur and Mudumalai, Nilambur, Silent Valley	Tamil Nadu, Kerala and Karnataka	Western Ghats	Nilgiri tahr, lion-tailed macaque
1988	Nanda Devi National Park & Biosphere Reserve	Parts of Chamoli District, Pithoragarh District & Bageshwar District	Uttarakhand	Western Himalayas	Snow Leopard, Himalayan Black Bear
1989	Gulf of Mannar	Indian part of Gulf of Mannar extending from Rameswaram island in the North to Kanyakumari in the South of Tamil Nadu and Sri Lanka	Tamil Nadu	Coasts	Dugong or sea cow
1988	Nokrek	Part of Garo Hills	Meghalaya	East Himalayas	Red panda
1989	Sundarbans	Part of delta of Ganges and Brahmaputra river system	West Bengal	Gangetic Delta	Royal Bengal tiger
1989	Manas	Part of Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamrup and Darrang Districts	Assam	East Himalayas	Golden langur, red panda
1994	Simlipal	Part of Mayurbhanj district	Odisha	Deccan Peninsula	Gaur, royal Bengal tiger, elephant
1998	Dihang-Dibang	Part of Siang and Dibang Valley	Arunachal Pradesh	Eastern Himalaya	Mishmi Takin, Musk Deer
1999	Pachmarhi Biosphere	Parts of Betul District, Hoshangabad District and	Madhya Pradesh	Semi-Arid	Giant squirrel, flying

	Reserve	Chhindwara District			squirrel
<b>2005</b>	Achanakmar-Amarkantak Biosphere Reserve	Part of Annupur, Dindori and Bilaspur districts	Madhya Pradesh, Chhattisgarh	Maikala Hills	Four-horned antelope, Indian wild dog, Sarus crane, White-rumped vulture, Philautus sanctisilvaticus (Sacred grove bush frog)
<b>2008</b>	Great Rann of Kutch	Part of Kutch, Rajkot, Surendranagar and Patan Districts	Gujarat	Desert	Indian wild ass
<b>2009</b>	Cold Desert	Pin Valley National Park and surroundings; Chandratal and Sarchu & Kibber Wildlife Sanctuary	Himachal Pradesh	Western Himalayas	Snow leopard
<b>2000</b>	Khangchendzonga	Parts of Kangchenjunga	Sikkim	East Himalayas	Snow leopard, red panda
<b>2001</b>	Agasthyamalai Biosphere Reserve	Neyyar, Peppara and Shendurung Wildlife Sanctuary and their adjoining areas	Kerala, Tamil Nadu	Western Ghats	Nilgiri tahr, elephants
<b>1989</b>	Great Nicobar Biosphere Reserve	Southern most islands of Andaman and Nicobar Islands	Andaman and Nicobar Islands	Islands	Saltwater crocodile
<b>1997</b>	Dibru-Saikhowa	Part of Dibrugarh and Tinsukia districts	Assam	East Himalayas	Golden langur
<b>2010</b>	Seshachalam Hills	Seshachalam Hill Ranges covering parts of Chittoor and Kadapa districts	Andhra Pradesh	Eastern Ghats	Slender Loris
<b>2011</b>	Panna	Part of Panna District and Chhatarpur District	Madhya Pradesh	Catchment Area of the Ken	Tiger, chital, sambhar and

				River	sloth bear
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## Criteria for selection of BRs

### Primary criteria

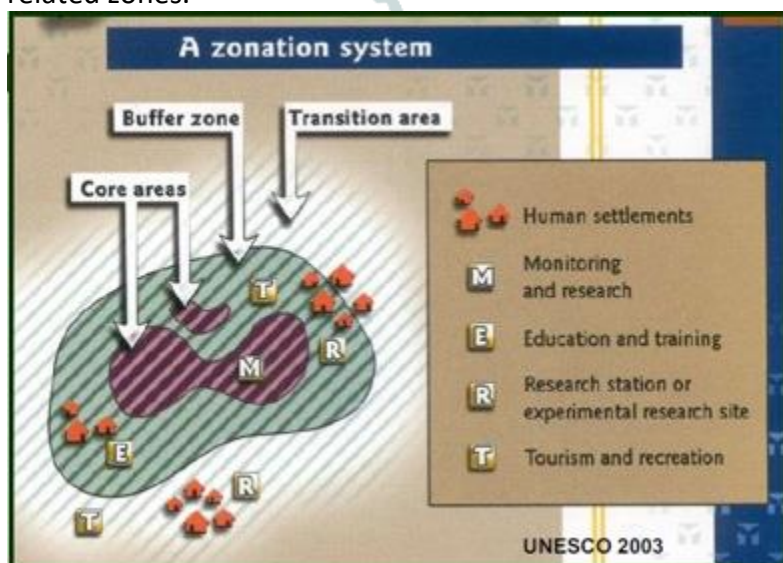
- A site that must contain an effectively protected and minimally disturbed core area.
- It should include –
  - Additional land and water suitable for research.
  - Demonstration of sustainable methods of research and management.
- Core area should be typical of a biogeographical unit and large enough to sustain viable populations representing all tropic levels in the ecosystem.

### Secondary criteria

- Areas having rare and endangered species.
- Areas having diversity of soil and micro-climatic conditions and indigenous varieties of biota.
- Areas potential for preservation of traditional tribal or rural modes of living for harmonious use of environment.

## Structure and Design of Biosphere Reserves

In order to undertake complementary activities of biodiversity conservations and development of sustainable management aspects, Biosphere Reserves are demarcated into three inter-related zones.



### The Core Zone

- It should be kept absolutely undisturbed.
- It must contain suitable habitat for plant and animal species
- It conserves the wild relatives of economic species and also represent important genetic reservoirs.
- It also contains places of exceptional scientific interest.
- It secures legal protection and management and research activities that do not affect natural processes and wildlife are allowed.
- Strict nature reserves and wilderness portions of the area are designated as core areas of BR.
- It is to be kept-free from all human pressures external to the system.

### The Buffer zone

- Surrounds the core zone.
- Its uses and activities (restoration, demonstration sites for enhancing value addition for the resources, limited recreation, tourism, fishing and grazing) are managed in ways that protect the core zone.

### The Transition Zone

- Outermost part of a Biosphere Reserve.
- This is usually not delimited one.
- It is a zone of cooperation where conservation, knowledge and management skills are applied and uses are managed in harmony with the purpose of the Biosphere Reserve.
- **Uses include** - settlements, crop lands, managed forests and area for intensive recreation, and other economic uses characteristic of the region.

### How Biosphere Reserves are different from Protected Areas?

- BR intention is not to replace existing protected areas but it widens the scope of conventional approach of protection and further strengthens the Protected Area Network.
- Existing legally protected areas (NP, WLS, Tiger Reserve and reserve protected forests) may become part of the BR without any change in their legal status.
- Inclusion of such areas in BR will enhance their national value but it doesn't mean that Biosphere Reserves are to be established only around the National Parks and Wildlife Sanctuaries.

**However, the Biosphere Reserves differ from protected areas due to their emphasis on –**

1. Conservation of overall biodiversity rather than some specific flagship species
2. Different components of BRs like landscapes, habitats, and species and land races.
3. Developmental activities, and resolution of conflicts between development and conservation.

4. Local people's participation and their training.
5. Sustainable environment friendly development.
6. Research and Monitoring.

## World Network of Biosphere Reserves

- In order to facilitate cooperation, BRs are admitted into international network by International Coordinating Council of MAB program of UNESCO on the request of participating country subject to fulfilling of criteria.
- **Participation is voluntary** and BRs remain under sole sovereignty of state.
- **Delisting** – on grounds of violation of obligation for conservation and sustainable development of BRs.
- Ten of the eighteen biosphere reserves are a part of the World Network of Biosphere Reserves, based on the UNESCO Man and the Biosphere (MAB) Programme list.

Name	States	Year
Nilgiri Biosphere Reserve	Tamil Nadu, Kerala, Karnataka	2000
Gulf of Mannar Biosphere Reserve	Tamil Nadu	2001
Sundarbans Biosphere Reserve	West Bengal	2001
Nanda Devi Biosphere Reserve	Uttarakhand	2004
Nokrek Biosphere Reserve	Meghalaya	2009
Pachmarhi Biosphere Reserve	Madhya Pradesh	2009
Simlipal Biosphere Reserve	Odisha	2009
Great Nicobar Biosphere Reserve	Great Nicobar	2013
Achanakmar-Amarkantak Biosphere Reserve	Chhattisgarh, Madhya Pradesh	2012 <sup>[3]</sup>
Agasthyamala Biosphere Reserve	Kerala and Tamil Nadu	2016 <sup>[6]</sup>

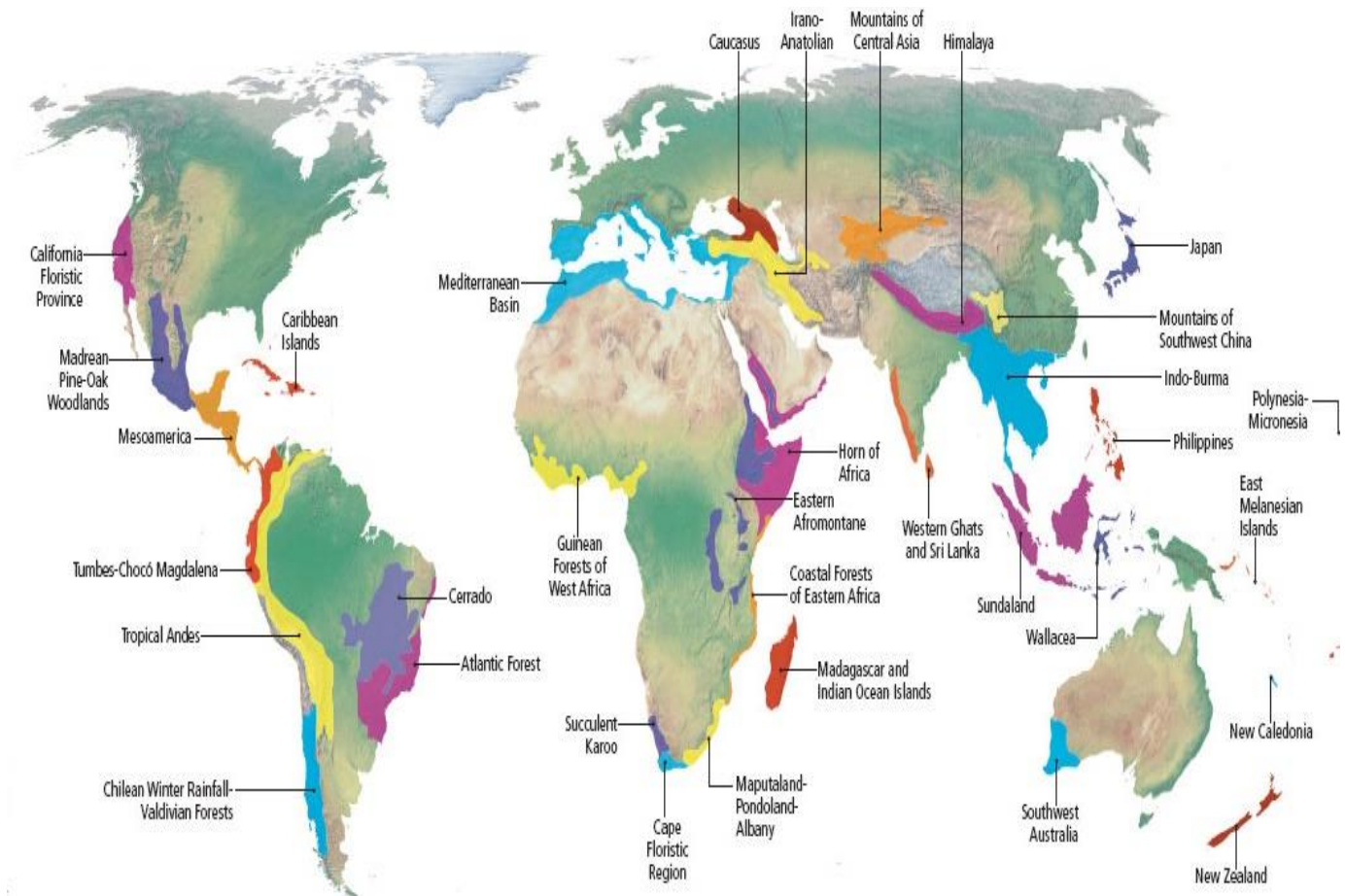


## Biodiversity Hotspots

### World's 35 Biodiversity Hotspots

<p><b>I. Africa</b></p> <ol style="list-style-type: none"> <li>1. <u>Cape Floristic Region</u></li> <li>2. Coastal Forests of Eastern Africa</li> <li>3. Eastern Afromontane</li> <li>4. Guinean Forests of West Africa</li> <li>5. Horn of Africa</li> <li>6. Madagascar and the Indian Ocean Islands</li> <li>7. Maputaland-Pondoland-Albany</li> <li>8. Succulent Karoo</li> </ol> <p><b>II. Asia-Pacific</b></p> <ol style="list-style-type: none"> <li>9. East Melanesian Islands</li> <li>10. Himalaya</li> <li>11. Indo-Burma</li> <li>12. Japan</li> <li>13. Mountains of Southwest China</li> <li>14. New Caledonia</li> <li>15. New Zealand</li> <li>16. Philippines</li> <li>17. Polynesia-Micronesia</li> <li>18. Southwest Australia</li> <li>19. Forests of Eastern Australia (new)</li> <li>20. Sundaland</li> <li>21. Wallacea</li> <li>22. Western Ghats and Sri Lanka</li> </ol>	<p><b>III. Europe and Central Asia</b></p> <ol style="list-style-type: none"> <li>23. Caucasus</li> <li>24. Irano-Anatolian</li> <li>25. Mediterranean Basin</li> <li>26. Mountains of Central Asia</li> </ol> <p><b>IV. North and Central America</b></p> <ol style="list-style-type: none"> <li>27. California Floristic Province</li> <li>28. Caribbean Islands</li> <li>29. Madresan Pine-Oak Woodlands</li> <li>30. Mesoamerica</li> </ol> <p><b>V. South America</b></p> <ol style="list-style-type: none"> <li>31. Atlantic Forest</li> <li>32. Cerrado</li> <li>33. Chilean Winter Rainfall-Valdivian Forests</li> <li>34. Tumbes-Chocó-Magdalena</li> <li>35. Tropical Andes</li> </ol>
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- **Biodiversity hot spot concept by** - Norman Myers in 1988.
- Hot spots are the areas **with high density of biodiversity or mega diversity** which are most threatened at present. There are 35 hot spots in world, out of which three are located in India namely Eastern Himalayas, Indo-Burma and Western Ghats.
- **Criteria –**
  - **Species endemism** - it must contain at least 1,500 species of vascular plants (> 0.5% of the world's total) as endemics
  - **Degree of threat** - it has to have lost at least 70% of its original habitat.
- Each biodiversity hot spot represents a remarkable universe of extraordinary floral and faunal endemism.



[Click here](#) for high resolution image

## Hottest hot spots

- Hot spots which are much richer than others in terms of their number of endemics.
- 5 key factors determine the hotness of hotspot.
  1. Endemic plants
  2. Endemic vertebrates
  3. Endemic plants/area ratio (species per 100km<sup>2</sup>)
  4. Endemic vertebrate's/area ratio (species per 100km<sup>2</sup>)
  5. Remaining primary vegetation as % of original extent
- The eight hottest hot spots in terms of five factors
  - a. Madagascar
  - b. Philippines
  - c. Sundaland
  - d. Brazil's Atlantic Forest
  - e. Caribbean
  - f. Indo-Burma
  - g. Western Ghats/Sri Lanka
  - h. Eastern Arc and Coastal Forests of Tanzania/Kenya

## Indian Biodiversity Hotspots

- The Eastern Himalayas
- Indo- Burma
- The Western Ghats & Sri Lanka

### Eastern Himalayas

#### Region

- Bhutan, NE India, Southern, eastern and central Nepal.
- Rise of Himalayas resulted in diversity of ecosystems (both in vegetation and animals)

#### Biodiversity

- They have no. of threatened species including One-horned Rhinoceros, the Wild Asian Water buffalo.
- 10000 species of plants (1/3<sup>rd</sup> are endemic)
- Even on highest riches of Himalayas plant species are found. Example – Ermania Himalayensis. (6300 meters' height)
- Threatened bird species – Himalayan quail, Cheer pheasant, western tragopan.
- Mammals – Golden langur, Himalayan tahr, Pygmy hog, Langurs, Asiatic wild dogs, sloth bears, Gaurs, Sambar, Snow leopard, Black bear, Blue sheep, Takin, Gangetic dolphi, wild water buffalo, swamp deer.

### Indo – Burma

#### Region

- North-Eastern India (south of Brahmaputra river), Myanmar, the southern part of China's Yunnan province, Lao People's Democratic Republic, Cambodia, Vietnam and Thailand.
- **Spread** - 2 million square km.
- Wide diversity of climate and habitat patterns.

#### Biodiversity

- Deterioration of wilderness with faster pace.
- Large mammals - Large-antlered muntjac, Annamite muntjac, Grey-shanked douc, Annamite striped rabbit, Leaf deer, and the Saola.
- Home to primate species – monkeys, langurs and gibbons
- Endemic species – freshwater turtles.
- 1300 bird species – many threatened - white-eared night - heron, the grey-crowned crocias, and the orange necked partridge.

## Western Ghats and Sri Lanka

### Region

- Western ghat also known as “Sahyadri Hills”.
- It encompasses the mountain forests in the SW parts of India and highlands of SW Sri Lanka.
- Extent - 1,82,500 square kms (originally), but due to tremendous population pressure, now only 12,445 square km.
  - 6.8% in pristine condition.

### Biodiversity

- Wide variation of rainfall patterns produces a great variety of vegetation types.
- It includes –
  - Scrub forests – in low-lying rain shadow areas.
  - Deciduous and tropical rainforests - up to about 1,500 meters
  - Montane forests and rolling grasslands - above 1,500 meters.
- **Important populations** - include Asian elephant, Nilgiri tahr, Indian tigers, lion tailed macaque, Giant squirrel etc.

### Sundaland

- Includes Nicobar group of Islands (and Indonesia, Malaysia, Singapore, Brunei, Philippines)

### World Heritage Sites

- A **World Heritage Site** is a place that is listed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) as of special cultural or physical significance.
- **Reason for designating sites as World heritage** – because having outstanding universal value under the convention concerning the protection of the World Cultural and Natural Heritage.

### Convention

- Adopted by the UNESCO in 1972.
- It provides a framework for international cooperation in preserving and protecting cultural treasures and natural areas throughout the world.
- It defines the kind of sites which can be considered for inscription of the World heritage list (ancient monuments, museums, biodiversity and geological heritage etc.,) and sets out the duties of the State Parties in identifying potential sites and their role in protecting them.

- 1<sup>st</sup> heritage list published – 1978.

**“Natural heritage sites are restricted to those natural areas that**

- Furnish outstanding examples of the Earth’s geologic processes.
- Provide excellent examples of ongoing ecological and biological evolution processes.
- Contain natural phenomena that are rare unique, superlative, or of outstanding beauty.
- Furnish habitats or rare endangered animals or plants or are sites of exception biodiversity”.

## **Criteria**

Nominated sites must be of "outstanding universal value" and meet at least one of the ten criteria. The criteria are given below.

1. “to represent a masterpiece of human creative genius”.
2. “to exhibit an important interchange of human values”
3. “to bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared”. Example – Harappan civilization.
4. "to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates a significant stage(s) in human history." Example – Taj Mahal
5. "to be an outstanding example of a traditional human settlement, land-use, or sea-use, which is representative of a culture {or cultures), or human interaction with the environment.
6. "to be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance”
7. "to contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance"
8. “Outstanding examples of Earth’s history or geomorphic processes”
9. “Outstanding ecological and biological processes”
10. “to contain the most important and significant natural habitats for insists conservation of biological diversity”

## **International Year of Biodiversity**

- The UN declared 2010 to be the International Year of Biodiversity.
- UN declared 22 May as International Day for Biological Diversity.



## List of World Heritage Sites in India

### Cultural (28)

- [Agra Fort](#) (1983)
- [Ajanta Caves](#) (1983)
- [Archaeological Site of Nalanda Mahavihara \(Nalanda University\) at Nalanda, Bihar](#) (2016)
- [Buddhist Monuments at Sanchi](#) (1989)
- [Champaner-Pavagadh Archaeological Park](#) (2004)
- [Chhatrapati Shivaji Terminus \(formerly Victoria Terminus\)](#) (2004)
- [Churches and Convents of Goa](#) (1986)
- [Elephanta Caves](#) (1987)
- [Ellora Caves](#) (1983)
- [Fatehpur Sikri](#) (1986)
- [Great Living Chola Temples](#) (1987,2004)
- [Group of Monuments at Hampi](#) (1986)
- [Group of Monuments at Mahabalipuram](#) (1984)
- [Group of Monuments at Pattadakal](#) (1987)
- [Hill Forts of Rajasthan](#) (2013)
- [Historic City of Ahmadabad](#) (2017)
- [Humayun's Tomb, Delhi](#) (1993)
- [Khajuraho Group of Monuments](#) (1986)
- [Mahabodhi Temple Complex at Bodh Gaya](#) (2002)
- [Mountain Railways of India](#) (1999,2005,2008)
- [Qutb Minar and its Monuments, Delhi](#) (1993)
- [Rani-ki-Vav \(the Queen's Stepwell\) at Patan, Gujarat](#) (2014)
- [Red Fort Complex](#) (2007)
- [Rock Shelters of Bhimbetka](#) (2003)
- [Sun Temple, Konârak](#) (1984)
- [Taj Mahal](#) (1983)
- [The Architectural Work of Le Corbusier, an Outstanding Contribution to the Modern Movement](#) (2016)
- [The Jantar Mantar, Jaipur](#) (2010)

### Natural (7)

- [Great Himalayan National Park Conservation Area](#) (2014)
- [Kaziranga National Park](#) (1985)
- [Keoladeo National Park](#) (1985)
- [Manas Wildlife Sanctuary](#) (1985)
- [Nanda Devi and Valley of Flowers National Parks](#) (1988,2005)
- [Sundarbans National Park](#) (1987)
- [Western Ghats](#) (2012)

### Mixed (1)

- [Khangchendzonga National Park](#) (2016)



## CONSERVATION EFFORTS

### Project Tiger

- It is a tiger conservation program.
- Launched in - 1973
- By - Government of India
- Aims –
  - Ensuring a viable population of tigers in their natural habitats.
  - To protect them from extinction, and preserving areas of biological importance as a natural heritage forever represented as close as possible the diversity of ecosystems across the tiger's distribution in the country



### Background

- From 9 tiger reserves since 1973, the Project Tiger coverage has increased to around 50 at present, spread out in 18 of our tiger range states.
- The tiger reserves are constituted on a **core/buffer strategy**.
- The **core areas** have the legal status of a national park or a sanctuary, whereas the **buffer or peripheral areas** are a mix of forest and non-forest land, managed as a multiple use area.
- Project Tiger is an ongoing **Centrally Sponsored Scheme** of the **Ministry of Environment, Forests and Climate Change** providing central assistance to the tiger States for tiger conservation in designated tiger reserves.

Due to concerted efforts under Project Tiger, at present India has the distinction of having the **maximum number of tigers in the world (2226) as per 2014 assessment**, when compared to other tiger range countries.

Consider the following pairs:

1. Dampa Tiger Reserve: Mizoram
2. Gumti Wildlife Sanctuary: Sikkim
3. Saramati Peak : Nagaland

Which of the above pairs is/are correctly matched?

- a) 1 only
- b) 2 and 3 only
- c) 1 and 3 only
- d) 1, 2 and 3









[Click here for high resolution](#)

- Tiger reserves are areas that are notified for the protection of the tiger and its prey, and are governed by Project Tiger.



- The State Government shall, on recommendation of the National Tiger Conservation Authority, notify an area as a tiger-reserve.

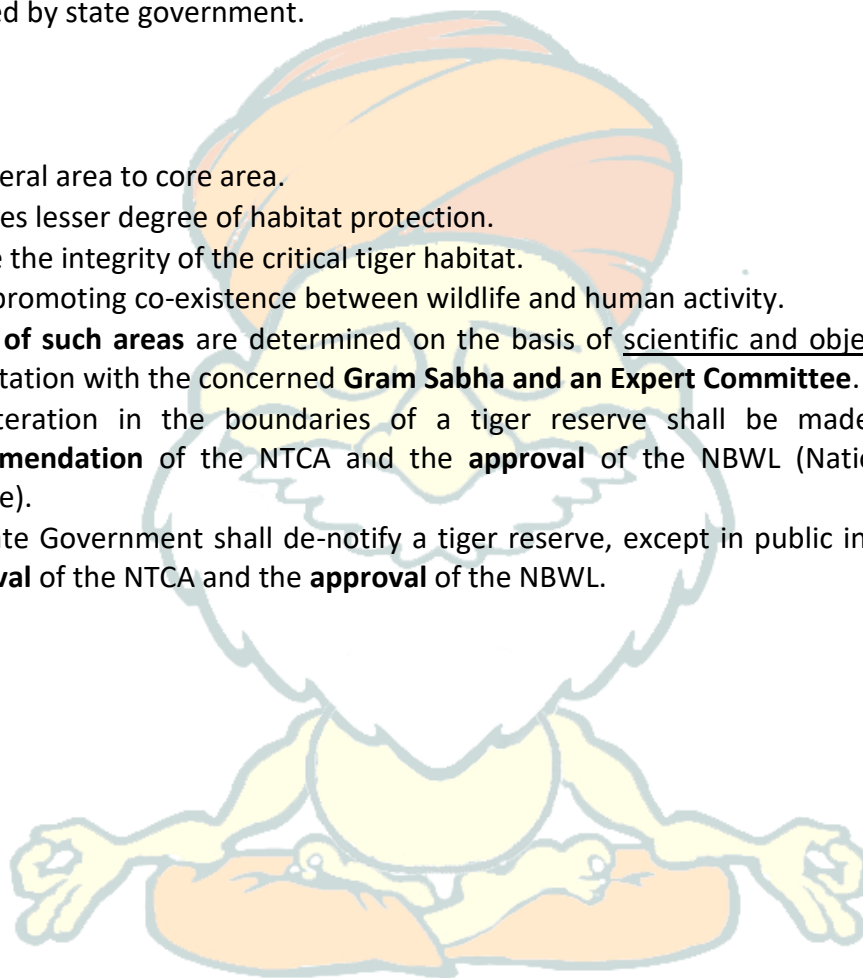
### A Tiger Reserve includes

#### Core Zone

- Established, on the basis of scientific and objective criteria.
- Kept as inviolate for the purposes of tiger conservation, without affecting ST or forest dwellers rights.
- Notified by state government.

#### Buffer Zone

- Peripheral area to core area.
- Requires lesser degree of habitat protection.
- Ensure the integrity of the critical tiger habitat.
- Aim - promoting co-existence between wildlife and human activity.
- **Limits of such areas** are determined on the basis of scientific and objective criteria in consultation with the concerned **Gram Sabha and an Expert Committee**.
- No alteration in the boundaries of a tiger reserve shall be made except on a **recommendation** of the NTCA and the **approval** of the NBWL (National Board For Wildlife).
- No State Government shall de-notify a tiger reserve, except in public interest with the **approval** of the NTCA and the **approval** of the NBWL.



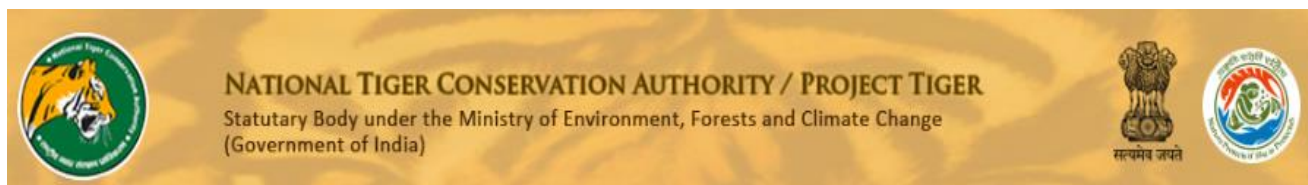
## Tiger Reserves in India

Sl. No.	Name of Tiger Reserve	State
1	Bandipur	Karnataka
2	Corbett	Uttarakhand
	Amangarh (buffer of Corbett TR)	Uttar Pradesh
3	Kanha	Madhya Pradesh
4	Manas	Assam
5	Melghat	Maharashtra
6	Palamau	Jharkhand
7	Ranthambore	Rajasthan
8	Similipal	Odisha
9	Sunderbans	West Bengal
10	Periyar	Kerala
11	Sariska	Rajasthan
12	Buxa	West Bengal
13	Indravati	Chhattisgarh
14	Namdapha	Arunachal Pradesh
15	Dudhwa	Uttar Pradesh
16	Kalakad-Mundanthurai	Tamil Nadu
17	Valmiki	Bihar
18	Pench	Madhya Pradesh
19	Tadoba-Andhari	Maharashtra
20	Bandhavgarh	Madhya Pradesh
21	Panna	Madhya Pradesh
22	Dampa	Mizoram
23	Bhadra	Karnataka
24	Pench	Maharashtra
25	Pakke	Arunachal Pradesh

26	Nameri	Assam
27	Satpura	Madhya Pradesh
28	Anamalai	Tamil Nadu
29	Udanti-Sitanadi	Chattisgarh
30	Satkosia	Odisha
31	Kaziranga	Assam
32	Achanakmar	Chattisgarh
33	Dandeli-Anshi	Karnataka

34	Sanjay-Dubri	Madhya Pradesh
35	Mudumalai	Tamil Nadu
36	Nagarahole	Karnataka
37	Parambikulam	Kerala
38	Sahyadri	Maharashtra
39	Biligiri Ranganatha Temple	Karnataka
40	Kawal	Telangana
41	Sathyamangalam	Tamil Nadu
42	Mukandra Hills	Rajasthan
43	Nawegaon-Nagzira	Maharashtra
44	Nagarjunsagar Srisaillam (part)*	Andhra Pradesh
45	Amrabad	Telangana
46	Pilibhit	Uttar Pradesh
47	Bor	Maharashtra
48	Rajaji Tige Reserve	Uttarakhand
49	Orang Tiger Reserve	Assam
50	Kamlang Tiger Reserve	Arunachal Pradesh

## National Tiger Conservation Authority (NTCA)



- It is a **statutory body** of the Ministry of Environment, Forests and Climate Change, with an overarching supervisory / coordination role, performing functions as provided in the **Wildlife (Protection) Act, 1972**.

### Objectives

- Providing statutory authority to Project Tiger.
- Fostering accountability of Center-State in management of Tiger Reserves, by providing a basis for MoU with States within our federal structure.
- Providing for an oversight by Parliament.
- Addressing livelihood interests of local people in areas surrounding Tiger Reserves.

Consider the following statements

1. Animal Welfare Board of India is established under the Environment (Protection) Act, 1986.
2. National Tiger Conservation Authority is a statutory body.
3. National Ganga River Basin Authority is chaired by the Prime Minister.

Which of the statements given above is/are correct?

- a) 1 only
- b) 2 and 3 only
- c) 2 only
- d) 1, 2 and 3



### Power and Functions of NTCA

As prescribed under section 380 of the Wildlife (Protection) Act, 1972, as amended in 2006 are as under -

1. To **approve** the tiger conservation plan prepared by the State Government.
2. To **evaluate and assess** various aspects of sustainable ecology and disallow any ecologically unsustainable land use (mining, industry and other projects) within the tiger reserves.
3. To **lay down normative standards** for –
  - a. Tourism activities
  - b. Guidelines for project tiger from time to time for tiger conservation in the buffer and core area of tiger reserves and ensure their due compliance.
4. Provide for **management focus** and **measures for addressing conflicts** of men and wild animal.

5. **Provide information on protection measures** including future conservation plan, estimation of population of tiger and its natural prey species, status of habitats, disease surveillance, mortality survey, patrolling, reports on untoward happenings and such other management aspects as it may deem fit including future plan conservation;
6. **Approve, co-ordinate research and monitoring** on tiger, co-predators, prey habitat, related ecological and socio-economic parameters and their evaluation;
7. Ensure that the tiger reserves and areas linking one protected area or tiger reserve with another protected area or tiger reserve are **not diverted for ecologically unsustainable uses**, except in public interest and with the approval of the national board for wild life and on the advice of the tiger conservation authority;
8. **Facilitate and support** the tiger reserve management in the state for biodiversity conservation initiatives through eco-development and people's participation as per approved management plans and to support similar initiatives in adjoining areas consistent with the central and state laws;
9. Ensure **critical support** including scientific, information technology and legal support for better implementation of the tiger conservation plan;
10. Facilitate ongoing **capacity building programme** for skill development of officers and staff of tiger reserves, and
11. Perform such **other functions** as may be necessary to carry out the purposes of this act with regard to conservation of tigers and their habitat.

#### **The Wild Life (Protection) Amendment Act, 2006**

- The Act provides for creating -
  - National Tiger Conservation Authority (NTCA)
  - Tiger and Other Endangered Species Crime Control Bureau (Wildlife Crime Control Bureau).

#### **Estimation of Tiger Populations**

- Process of estimating the number of tigers in a given area is called '**Tiger census.**'
- Conducted at - regular intervals.
- Other than estimating the number of tigers the method also helps to gather information on the density of tiger populations and associated prey.
- Most commonly used technique – '**Pugmark Census Technique**'.
  - Imprints of the pugmark of the tiger were recorded and used as a basis for identification of individuals.
  - Used largely.
- Recent methods - **camera trapping and DNA fingerprinting.**
  - **Camera trapping** - photographs of individual tigers are differentiated on the basis of the stripes on the body.
  - **DNA fingerprinting** – latest technique – tigers are identified from their scats.

## Phases of tiger estimation procedure

- **Phase 1** - Field data collected at the beat-level (i.e. the primary patrolling unit) by trained personnel using a standardized protocol.
- **Phase 2** - Analysis of habitat status of tiger forests using satellite data.
- **Phase 3** – Identification of tiger on basis of their photographs. (Camera trapping)
- **Phase 4** – used statistically sound procedures to estimate numbers of both tigers and their prey.

## Tiger Task Force

- On the basis of the recommendations of National Board for Wild Life, a Task Force was set up to look into the problems of tiger conservation in the country.
- Setup by - Ministry of Environment and Forests (Project Tiger)

## Terms of reference of task force

1. Suggest measures to strengthen tiger conservation in the country.
2. Suggest measures to incentivise the local community in conservation of tigers.
3. Suggest measures to incentivise local forest staff posted in sanctuaries/national
4. Parks and ensure an effective HR plan for tiger conservation/wildlife managers.
5. Suggest measures to improve the methodology of tiger counting and forecasting.
6. Suggest methods of transparent professional audit of wildlife parks and placing data on tiger conservation in the public domain.
7. Suggest a new wildlife management paradigm that shares concerns of conservation with the public at large.

## International Cooperation

- India has a **bilateral understanding with Nepal** on controlling transboundary illegal trade in wildlife
- India has signed a **protocol on tiger conservation with China**.
- A sub-group on **tiger/leopard conservation** has been constituted for cooperation with the **Russian Federation**.
- A **Global Tiger Forum of Tiger Range Countries** has been created for addressing international issues related to tiger conservation.
- **India is a party to CITES**. CITES's landmark decision states that 'tigers should not be bred for trade in their parts and derivatives'.



## Project Elephant



- Launched in – 1992.
- Launched as Centrally sponsored scheme.
- By- Ministry of Environment and Forests
- Mainly implemented in 13 States/UTs - Andhra Pradesh, Arunachal Pradesh, Assam, Jharkhand, Karnataka, Kerala, Meghalaya, Nagaland, Orissa, Tamil Nadu, Uttaranchal, UP and WB.
- 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.
- It is included in Schedule I of the Indian Wildlife (Protection) Act, 1972 and in Appendix I of the Convention on International Trade in Endangered Species of Flora and Fauna (CITES).

### Objectives

- To protect elephants, their habitat & corridors
- To address issues of man, animal conflict
- Welfare of domesticated elephants

### Aim

- Restoring the natural habitats of elephants.
- Addressing man and elephant conflict
- Developing scientific and planned management measures for conservation of elephants.
- Protecting the elephants from poachers and other unnatural causes of death
- Preventing illegal ivory trade.
- Researching on issues related to elephant
- Crating public awareness and education programs for it.
- Eco-development and Veterinary care for the elephants.
- Maintaining health care and breeding of tamed elephants.

## Elephant Corridor

Funds released to the state governments under the centrally sponsored scheme 'Project Elephant' in 2010-11

	(In ₹ lakhs)
Andhra Pradesh	15.00
Arunachal Pradesh	10.00
Assam	139.55
Chhattisgarh	75.00
Haryana	100.00
Jharkhand	80.00
Karnataka	300.76
Kerala	265.39
Maharashtra	29.00
Meghalaya	103.838
Nagaland	41.30
Orissa	113.50
Tamil Nadu	226.879
Tripura	-
Uttarakhand	206.82
Uttar Pradesh	80.15
West Bengal	410.406
<b>TOTAL</b>	<b>2,197.593</b>

Source: Wildlife Trust of India



- Stretch/narrow strips of forested land that connects larger habitats with elephant populations and forms a conduit for animal movement between the habitats.
- This movement helps in enhancing the species survival and birth rate.
- In India – 88 identified elephant corridors.
- Of total only 70% used by elephants. 1/3<sup>rd</sup> – ecologically high priority and 2/3<sup>rd</sup> – medium priority.
- Fragmentation of elephant habitat severity in following order –
  - Northern WB → NW India → NE India → central India
- South India – least fragmented because 65% corridors in south are protected areas or in reserved forests.

## Threats to Elephant Corridors

- Primary threat - Habitat loss.
- Fragmentation and destruction of habitat due to developmental activities like construction of buildings, roads, railways, holiday resorts and the fixing solar energized electric fencing, etc.
- "single biggest threats" in central India - Coal mining and iron ore mining
- Mineral-rich states Orissa, Jharkhand and Chhattisgarh also have the highest number of elephant corridors in the country, which makes them known for elephant-man conflicts.

- Poaching for extremely valuable elephant ivory
- Non-accommodation of grazing grounds results in searching for food elsewhere which lead to them to crop fields and resulting in man animal conflict.

### **Mitigation**

- Fusion of the corridors with nearby protected areas wherever feasible.
- In other cases, declaration as Ecologically Sensitive Areas or conservation reserves to grant protection.
- Securing a corridor and Habitat restoration if needed.
- Sensitizing local communities to the option of voluntarily relocation outside the conflict zones to safer areas.

### **Monitoring of Illegal Killing of Elephants (MIKE) Programme**

- Project Elephant has been formally implementing MIKE (Monitoring of Illegal Killing of Elephants) programme of CITES in 10 Elephant reserves since January 2004.
- It is mandated by COP resolution of CITES.
- It was started in South Asia in 2003 with the following purpose -
  1. To measure levels and trends in illegal hunting of elephants.
  2. To determine changes in these trends overtime.
  3. To determine the factors causing or associated with these changes and to try and assess in particular to what extent observed trends are a result of any decisions taken by the Conference of the Parties to CITES.
  4. Data are collected from all sites on monthly basis in specified MIKE patrol form and submitted to Sub-Regional Support Office for South Asia Programme in Delhi who are assisting Ministry in implementation of the programme.

#### **Mike Sites in India**

- Chirang Ripu ( Assam )
- Dhang Patki ( Assam )
- Eastern Dooars ( WB )
- Deomali ( Arun Pradesh )
- Garo Hills ( Meghalaya )
- Mayurbhanj ( Orissa )
- Mysore ( Karnataka )
- Nilgiri ( T N )
- Shivalik ( Uttarakhand )
- Wayanad ( Kerala )

### **Haathi mere Saathi**





- No-no not the above movie. We are talking about campaign which was launched by the Ministry of Environment and Forests (MoEF) in partnership with the, wildlife trust of India (WTI).
- To improve conservation and welfare prospects of the elephant - **India's National Heritage Animal**.
- Launched at - "**Elephant- 8**" Ministerial meeting, Delhi in 2011.
- E-8 countries are India, Botswana, Republic of Congo, Indonesia, Kenya, Sri Lanka, Tanzania, and Thailand.
- Aim – Increasing awareness among people and developing friendship, companionship between people and elephants.

### **The campaign Mascot “Gaju”**

- Focuses on – target audience groups including locals near elephant habitats, youth, policy makers etc.
- It envisions of setting up of Gajah (Elephant) centre to spread awareness on their plight and invoke people’s participation in addressing the threats to them.
- It also plans to build capacity of [protection and law enforcement agencies at the ground level, and advocate for policies favoring the elephants.
- Elephant task force (ETF) campaign to “Take Gajah (elephant) to the Prajah (people)” aims to spread awareness and encourage people’s participation in elephant conservation and welfare.

### **Elephant - 8 Ministerial Meeting**

- The E-8 ministerial meeting represented regions with all 3 species of elephants –
  - *Elphas maximus* (Asian elephant)
  - *Loxodonta Africana* (African Bush elephant)
  - *Loxodonta Cyclotis* (African forest elephant)
- Participants include – policy makers, conservationist, scientists, historians, art and culture experts among the participating countries.
- Discussions were under 3 basic themes

- Science and conservation
- Management and conservation
- Cultural and ethical perspectives of conservation
- E-8 countries resolved to –
  - Take necessary steps in the direction of elephant conservation.
  - To actively pursue a common agenda to ensure a long term welfare and survival of all species of elephants in all range countries.
- To realize this goal meeting has called all range countries to join hands under umbrella of elephant 50:50 forum.

### **E-50:50 forum**

- It is the share vision of 50 states to promote conservation, management and welfare of elephants in next 50 years.
- 1st international congress – New Delhi (2013) – for adopting a common global vision of conservation, management and welfare of elephants across all range countries.

### **Think!**

- Differentiate between Asian and African Elephants
- Steps to counter Man-animal conflict



### **Vulture**

**India has 9 species of vultures in the wild. They are the –**

### **Oriental White-backed Vulture (*Gyps bengalensis*)**



### **Slender billed Vulture (*Gyps tenuirostris*)**



### **Long billed Vulture (*Gyps indicus*)**



### **Egyptian Vulture (*Neophron percnopterus*)**





**Red Headed Vulture (*Sarcogyps calvus*)**



**Indian Griffon Vulture (*Gyps fulvus*)**



**Griffon Vulture (*Gyps fulvus*)**

Bomort National Reserve, Catalonia, Spain, 10 Oct 2014 160955 © Ian Montgomery birdway.com.au

**Himalayan Griffon**



**Cinereous Vulture (*Aegypius monachus*) and**



**Bearded Vulture or Lammergeier (*Gypaetus barbatus*).**



- Decline of vulture populations first recorded at - Keoladeo Ghana National Park, Rajasthan.
- Gyps genus – 97% decline by 2005.
- Nepal and Pakistan also faced declines.
- In India - White-backed Vulture (endangered), Slender billed Vulture and Long Billed Vulture declined.
- Red-headed vulture or king vulture, Slender billed Vulture and Long billed Vulture - critically endangered.
- Reason for decline was considered as decline in food availability or viral epidemic disease but it was due to drug Diclofenac.

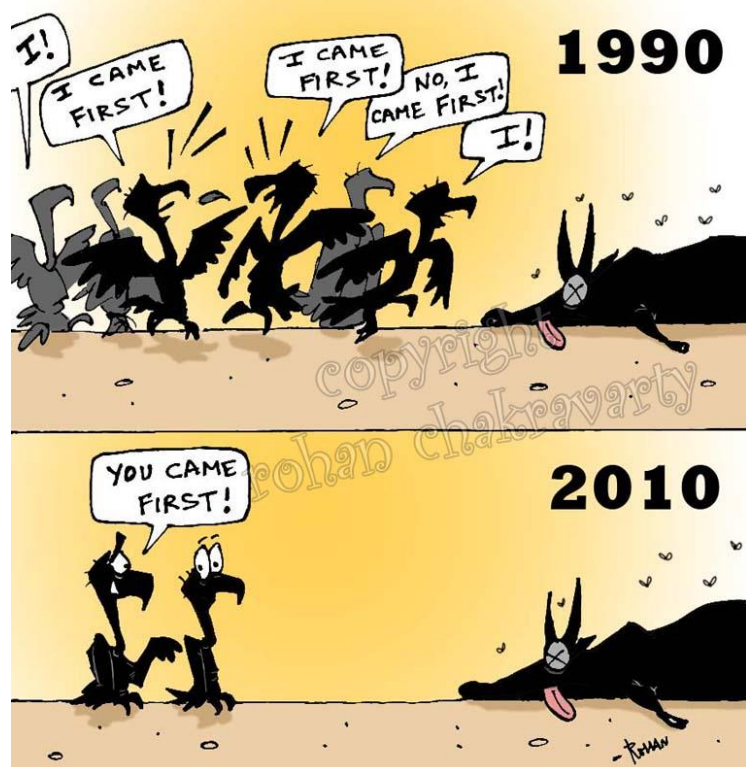
Vultures which used to be very common in Indian countryside some years ago are rarely seen nowadays. This is attributed to

- a) The destruction of their nesting sites by new invasive species.
- b) A drug used by cattle owners for treating their diseased cattle.
- c) Scarcity of food available to them.
- d) A widespread, persistent and fatal disease among them.






## Diclofenac Sodium as the Probable Cause



- A non-steroidal anti-inflammatory drug (NSAID) administered to reduce inflammation and to reduce pain in certain conditions.
- Diclofenac was given to cattles for reducing pain. The carcass of these cattles was eaten by Vultures.
- Vultures were unable to break down the chemical diclofenac and suffer from kidney failure (NSAIDs are associated with adverse kidney (renal) failure which is caused due to the reduction in synthesis of renal prostaglandins)

**DICLOFENAC DEBACLE**

<ul style="list-style-type: none"><li>➤ In 1991 diclofenac was introduced in the country</li><li>➤ Animals were given injected doses of the drug</li><li>➤ Vultures, which scavenged on carcasses of animals treated with diclofenac,</li></ul>	<ul style="list-style-type: none"><li>suffered renal failure and died</li><li>➤ From 4 crore, the number of vultures in the wild dwindled to 1 lakh in 2007</li><li>➤ The Centre banned veterinary use in 2006, but cattle owners procured the drug illegally</li></ul>
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- "Neck drooping" – this behavior of vultures just weeks before collapsing from trees is sign or indication that birds are ill. Neck drooping is also reported in healthy birds under hot conditions.

## Alternative of Diclofenac – Meloxicam

- 2<sup>nd</sup> generation NSAID.
- Better than Diclofenac for the treatment of livestock, with reduced risk of side effects.
- Also approved for human use.

#### **Diclofenac is banned but it is still in use. How's that's possible?**

- Indian govt. had banned it for use on cattles.
- But it is not banned for human use and so same is used for cattles.
- Human form of diclofenac is cheaper than Meloxicam

#### **Current Update**

Despite pleas from two major pharmaceutical companies, on the 25th of October the Madras High Court upheld the ban on large “multi-dose” vials of diclofenac, of a large enough volume to be used on livestock for veterinary purposes. The illegal practice was banned in India in 2006 after years of lobbying from environmental groups like the Bombay Natural History Society (BNHS, BirdLife in India) and the RSPB (BirdLife in the UK). This was after it was revealed that traces of diclofenac in livestock carcasses were triggering large-scale poisonings of vultures across the country, leading to population collapses of up to 99.9% in some species.

The Union Ministry of Health has banned multi-dose vials of human formulations of diclofenac, a painkilling drug that is responsible for the death of vultures in large numbers, reducing them to a critically endangered species in India and other Asian countries

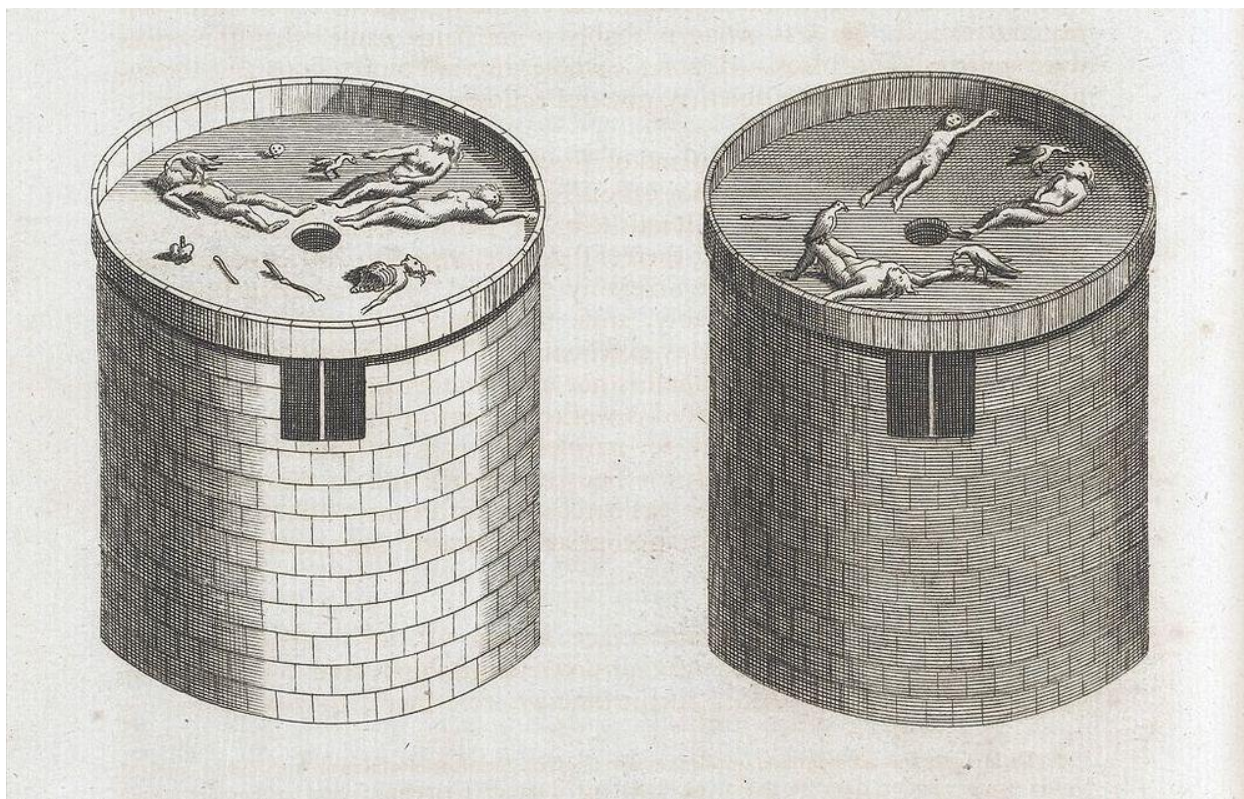
Yet despite the ban, pharmacies continued to sell the drug in suspiciously large 30ml multi-dose packets –allegedly for human use, but frequently diverted to animals as a slightly cheaper option than its legal, and vulture-safe, alternatives (such as meloxicam). In 2015 the Indian Government banned these large packets too, limiting vial sizes to 3ml, and stood their ground despite the protests of big names in the pharmaceutical industry.

#### **Significance of vultures in India**

- Keeps environment clean – by scavenging animal carcass.
- Parsi community's religious practice of disposing dead bodies. (see 4<sup>th</sup> point of next question for details)
- Primary removers of carrion in India and Africa.

#### **Q.) What if Vultures would not be there?**

- Equilibrium between populations of other scavenging species will be affected.
- Result in increase in putrefying carcasses.
- Increasing risk of spread of Rabies and Anthrax - Movement of Feral dogs into carcass dumps
- Traditional custom of the Parsis of placing their dead in the “Towers of Silence” for vultures to feed upon will be affected.



### Towers of Silence

- Life will be much harder for local hide and bone-collectors, who rely, on cleaned carcasses in order to earn living.
- Cattle owners will have to pay to have livestock carcasses buried or burnt.

### Conservation of Vultures

#### Vulture safety zones (VSZ)

Aim – to establish targeted awareness activities surroundings 150 km radius of vultures' colonies so that no diclofenac or the veterinary toxic drugs are found in cattle carcasses, the main food of vultures (to provide safe food).

#### Zones

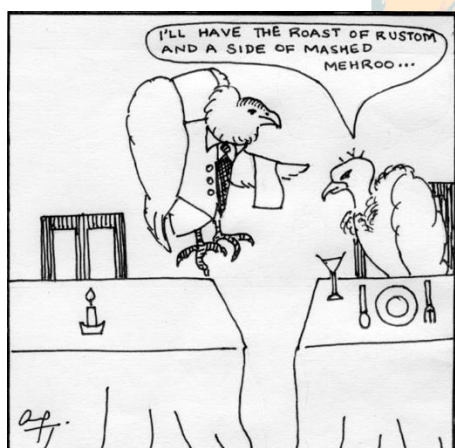
1. Corbett to Katriya Ghat
  - Slender-billed vulture and white-backed vulture.
  - Marshy grassland, Savannas and forests.
2. Dibrugarh (Assam) to North Lakhimpur (Arunachal pradesh)
  - Slender billed and white backed species of vulture
3. Central India covering Chhatisgarh, where white-backed and long-billed vultures are found.



## How VSZ can be helpful?

- Safe source of food that is free of contamination from veterinary drugs, poisons and other agricultural chemicals.
- A place where vultures can feed free from human disturbances.
- Supplement the ever decreasing food base for vultures.
- Increase their breeding success because of food availability.
- An economical and practical way of disposing of old and unproductive cattle.
- Help to reduce the risk of spreading diseases.
- A place for scientists to study the biology and ecology of these threatened species.
- An opportunity to raise public awareness on vulture conservation and to raise funds
- An excellent opportunity for eco-tourists to observe these magnificent birds.

## Vulture Restaurants



Chandola used to attract sizeable number of birds from Himachal

- At this restaurant, tables are reserved only for the unique and rare vultures by Maharashtra and Punjab forest departments.

## Aim

- Conserve the fast dwindling vulture population.
- Diclofenac free carcasses of cattle.
- Involvement of local communities in in-situ conservation.
- People inform the forest department in case of the death of an animal in their village and the department tests the dead animal for presence of diclofenac.
- In their absence the department pays monetary benefits to the owner of the animal and informer, transports it to the vulture restaurant.
- Whenever a vulture nesting is found, conservation measures like providing safe food near nesting trees, constant protection ... from all sorts of disturbances, etc., are put in place without delay.

## Benefits

- Conservation of vulture from extinction
- Community participation in conservation
- Economic incentive to local cattle breeders
- Phasing out the use of diclofenac
- Awareness
- Dining spots
- Punjab - Kathlore, Chandola and Chamraur
- Maharastra - Gadchiroli, Thane, Nagpur, Nashik, Raigad districts

## Breeding Centers in India

- Vulture Breeding and Conservation Centre had already been established at -
  - Pinjore, Haryana
  - Rani, Guwahati (Assam)
  - Buxa, West Bengal
  - Junagadh
  - Bhopal
  - Hyderabad
  - Bhubhaneshwar

## India's Role in Conservation

- India moved a motion in IUCN in,2004 for vulture conservation, which was accepted in the form of the IUCN resolution.
- This resolution called upon Gyps Vulture Range countries to begin action to –
  - Prevent all uses of diclofenac in veterinary applications.
  - Establishment of IUCN South Asian Task Force under the auspices of the IUCN and range countries to develop and implement national vulture recovery plans, including conservation breeding and release.

## Do you know?

- The Haryana government launched Asia's First 'Gyps Vulture Reintroduction Programme' at Jatayu Conservation Breeding Centre, Pinjore.

## One Horn Rhino- Indian Rhino Vision 2020

- Implemented by - Department of environment and forests, Assam with Bodo autonomous council as an active partner.
- Supported by - WWF – India, International Rhino foundation (IRF), save the rhino's campaign of zoological institutions worldwide and number of local NGOs.



### Vision –

- To increase the total rhino foundation in Assam from about 2000 to 3000 by 2020.
- To ensure that these rhinos are distributed over at least 7 protected areas (PA) to provide long term viability of the one-horned rhino population.



### Why they need to be distributed?

- Concentration at one place exposes to risk like –
  - Calamities (flood, massive poaching attempts)
  - Competition for food, habitat
  - Increased human-rhino conflicts.
- Project partners - Assam Forest Department, the Bodoland Territorial Council, WWF, IRF, and the US Fish and Wildlife Service
- Location - Kaziranga, Orang and Manas National Parks and Pobitora Wildlife Sanctuary in Assam, India
- Species - Greater one-horned rhinos

- Habitat - Grasslands and shrub lands on the southern base of the Himalayas
- Activities - Anti-poaching, monitoring, translocations and community conservation
- Translocating rhinos will help to create a viable population this threatened species.

## Project Snow Leopard



- IUCN Status- Vulnerable
- Previously it was put under Endangered
- Surviving in the Himalaya and Central Asian mountains, facing tremendous human pressures.
- India having a substantial proportion of its global population.
- Distribution in India – High altitude areas of Indian Himalayas.
- 5 Himalayan states - Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh.
- Most snow leopard occurring order - China, follow by Mongolia and India.
- Threats posed due to
  - Competition with livestock
  - Degradation
  - Poaching
  - Even facing local extinction

## Project Snow Leopard - Jan 2009

- The Project Snow Leopard is an Indian initiative for strengthening wildlife conservation in the Himalayan high altitudes.

### Aim

- To promote a knowledge-based and adaptive conservation framework.
- It also involves the local communities, who share the snow leopard's range, in conservation efforts.



## Goal

- To safeguard and conserve India's unique natural heritage of high altitude wildlife populations and their habitats by promoting conservation through participatory policies and actions.

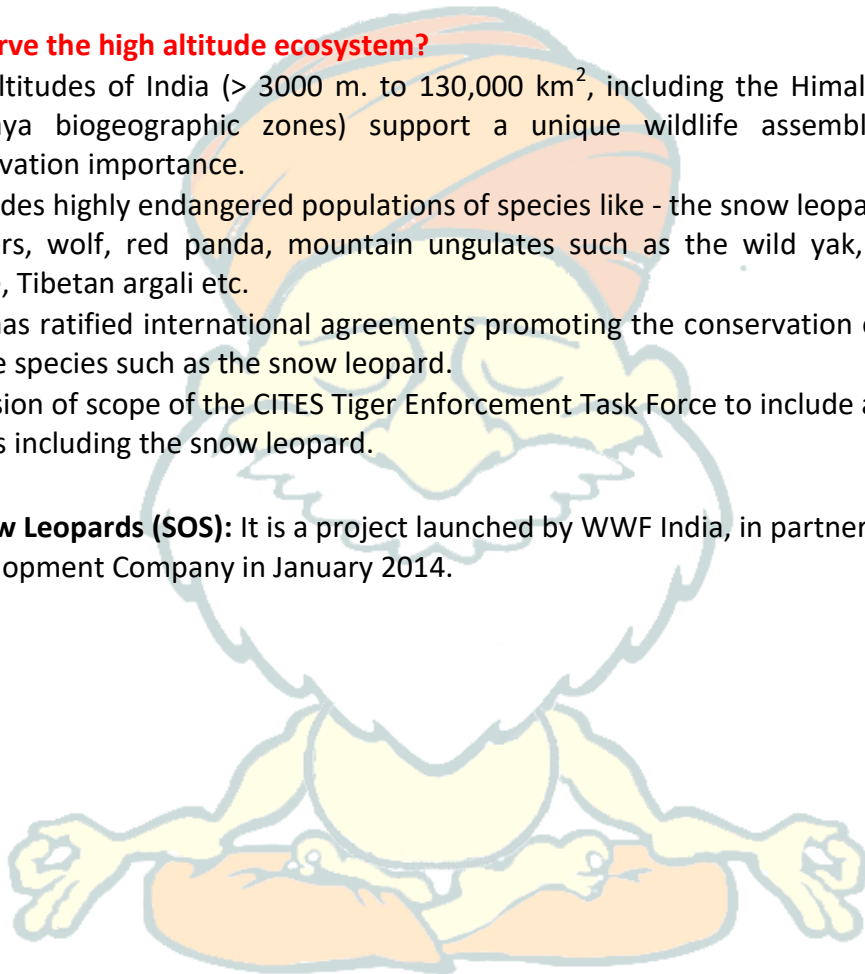
## Location

- All Himalayan high altitudes states Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh.
- It is designed for all biologically important habitats within the snow leopard's range, irrespective of their ownership (e.g. Protected Areas, common land, etc.).

## Why to conserve the high altitude ecosystem?

- High altitudes of India (> 3000 m. to 130,000 km<sup>2</sup>, including the Himalaya and Trans-Himalaya biogeographic zones) support a unique wildlife assemblage of global conservation importance.
- It includes highly endangered populations of species like - the snow leopard, two species of bears, wolf, red panda, mountain ungulates such as the wild yak, chiru, Tibetan gazelle, Tibetan argali etc.
- India has ratified international agreements promoting the conservation of high altitude wildlife species such as the snow leopard.
- Expansion of scope of the CITES Tiger Enforcement Task Force to include all Asian Big cat species including the snow leopard.

**Save Our Snow Leopards (SOS):** It is a project launched by WWF India, in partnership with Tata Housing Development Company in January 2014.





## Sea Turtle Project



### Olive Ridley Turtle

- A significant proportion of world's Olive Ridley Turtle population migrates every winter to Indian coastal waters for nesting mainly at eastern coast.
- **Implementation by** – MoEF&CC + UNDP + WII
  - (Min. of environment, forest and climate change) (Wildlife institute of India)
- **Objective** - conservation of olive ridley turtles and other endangered marine turtles.
- Implemented in 10 coastal states of the country with **special emphasis in State of Orissa**.
- The project has helped in -
  - Preparation of **inventory map of breeding sites** of Sea Turtles
  - Identification of nesting and breeding habitats along the shore line
  - **Migratory routes** taken by Sea Turtles
  - Development of **guidelines to safeguard** and minimize turtle mortality,
  - Development of **national and international cooperative** and collaborative action for Sea Turtle Conservation
  - Developing guideline plans for tourism in sea turtle areas and developing infrastructure and human resources for Sea Turtle Conservation.
- One of the important achievements - demonstration of **use of Satellite Telemetry to locate the migratory route of Olive Ridley** Turtles in the sea and **sensitizing the**

**fishermen** and State Government for the **use of Turtle Exclusion Device (TED)** in fishing trawlers to check turtle mortality in fishing net.

### Indian Crocodile Conservation Project



- **Implemented by** - Gol + state govt. + UNDP/FAO.
- **Launched in** – 1975
- This project had **saved crocodiles from extinction** and placed them on good path of recovery.

### Objectives

- **Protect** the remaining population of crocodilians in their natural habitat.
- To rebuild natural, population quickly through '**grow and release**' or '**rear and release**' technique
- To promote captive breeding,
- To take-up research to improve management.
- To build up a level of trained personnel for better continuity of the project.
- To involve the local people in the project intimately

## Project Hangul



- Kashmir stag is **also known as Hangul**.
- It is a **subspecies of Central Asian Red Deer** native to northern India.
- State animal of Jammu & Kashmir.
- This deer lives in groups of two to 18 individuals in dense riverine forests, high valleys, and mountains of the Kashmir valley and northern Chamba in Himachal Pradesh.
- In Kashmir - found in **Dachigam National Park** (3,035 meters' elevation)
- Threats - habitat destruction, over-grazing by domestic livestock and poaching.
- Once they were 5000 but remained just 150 by 1970.
- However, the **state of Jammu & Kashmir, along with the IUCN and the WWF** prepared a project for the protection of these animals. It was known as Project Hangul. This brought great result.

## Captive Breeding

- Captive breeding means that members of a wild species are captured, then bred and raised in a special facility under the care of wildlife biologists and other expert.
- This may be the last chance to preserve a species in the wild in these situations –
  - When a population drops dangerously
  - When the entire existing habitat is poor quality or other environmental problems occur.
  - When the existing habitat is fragmented.
  - When we need to acquire knowledge about specie.

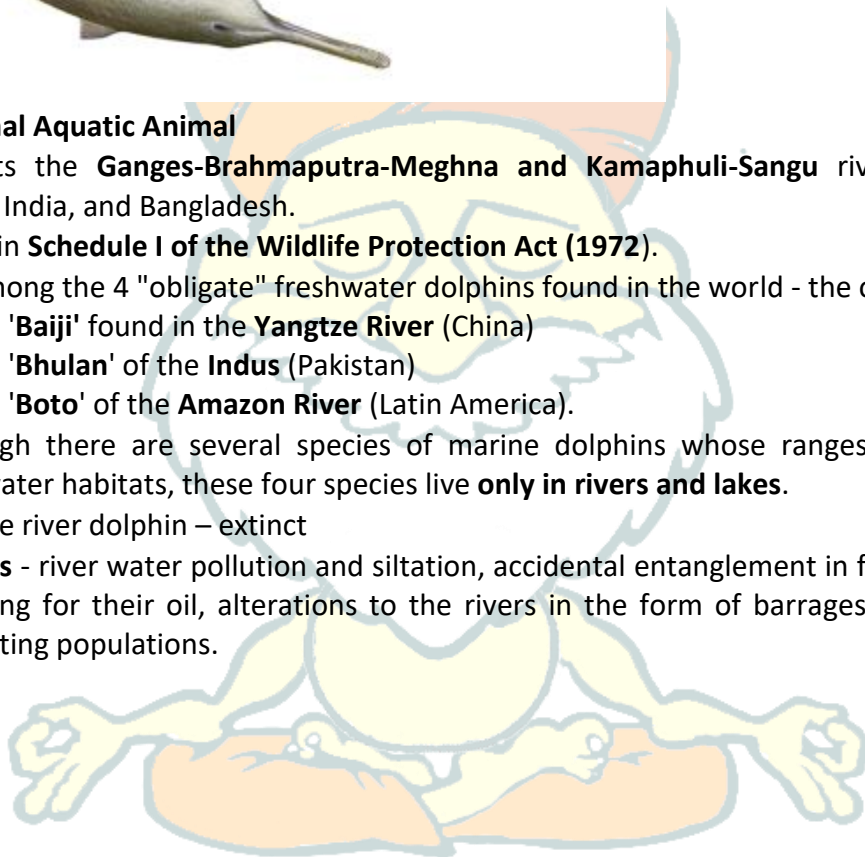


- E.g. captive breeding of lion tailed macaque in Arignar Anna Zoological Park, Chennai and in Mysore zoo.

## Ganges Dolphin



- **National Aquatic Animal**
- Inhabits the **Ganges-Brahmaputra-Meghna and Kamaphuli-Sangu** river systems of Nepal, India, and Bangladesh.
- Listed in **Schedule I of the Wildlife Protection Act (1972)**.
- It is among the 4 "obligate" freshwater dolphins found in the world - the other three are
  - '**Baiji**' found in the **Yangtze River** (China)
  - '**Bhulan**' of the **Indus** (Pakistan)
  - '**Boto**' of the **Amazon River** (Latin America).
- Although there are several species of marine dolphins whose ranges include some freshwater habitats, these four species live **only in rivers and lakes**.
- Chinese river dolphin – extinct
- **Threats** - river water pollution and siltation, accidental entanglement in fishing nets and poaching for their oil, alterations to the rivers in the form of barrages and dams are separating populations.



### Do You Know?

- **Project Leopard:** Rajasthan has become the first state in the country to launch a **project to conserve leopards** by improving their prey base, mitigating conflicts with humans and controlling poaching. Leopard is an endangered animal under schedule one of the Wildlife Protection Act, 1972.
- The Uttar Pradesh State Cabinet has approved **Blackbuck Conservation Reserve** in trans-Yamuna belt near Allahabad. It will be first of its kind conservation reserves in India exclusively dedicated to blackbuck. Hunting of blackbuck is prohibited under Schedule I of the Wildlife Protection Act of 1972. It has been categorised least concerned in IUCN Red Data Book. The Bishnoi community of Rajasthan is known worldwide for their conservation efforts to blackbuck and Chinkara
- Several species of vultures including four from India on their migratory routes were **awarded highest protection by the Convention on Conservation of Migratory Species of Wild Animals (CMS)**. Asian vultures are **red-headed vulture, white-rumped vulture, Indian vulture and slender-billed vulture**.
- **Community Conserved Area (CCA):** In 2004, WWF-India had introduced concept of CCAs in State to empower local communities to become active decision-maker and implement conservation initiatives. Local communities in these CCAs form committees to undertake wildlife monitoring, patrolling and community-based tourism activities
- The Union Government had launched **SECURE Himalaya**, a six-year project to ensure conservation of locally and globally significant biodiversity, land forest resources in high Himalayan ecosystem spread over four states viz. Himachal Pradesh, Jammu and Kashmir, Uttarakhand and Sikkim. It was launched by Union Ministry of Environment, Forests and Climate Change (MoEFCC) in association with the United Nations Development Programme (UNDP). **The key focus areas of the project is protection of snow leopard** and other endangered species and their habitats and also securing livelihoods of people in region and enhancing enforcement to reduce wildlife crime.
- **Global Wildlife Programme (GWP):** The GWP is World-Bank led global partnership of 19 countries in Asia and Africa to promote the conservation and sustainable development by combating trafficking in wildlife. It was initiated in 2015 by the Global Environment Facility (GEF).

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