

**Conservation:** Conservation is the wise use of natural resources, without wasting them.

**Conservation biology** is the management of nature and of Earth's biodiversity with the aim of protecting species, their habitats, and ecosystems from excessive rates of extinction and the erosion of biotic interactions.

#### **Conservation Principles:**

- Wildlife/Plants manager's job is to maintain number of animals in a habitat at or below habitat's carrying capacity, so no damage is done to the animals or to their habitat.
- In addition to looking at the total number of a species in a habitat, wildlife managers also monitor breeding stock correct mix of adult and young animals/plants needed to sustain a population.
- To manage a habitat, wildlife /plants managers must consider historical trends, current habitat conditions, breeding population levels, long-term projections and breeding success.

**IUCN:** International Union for Conservation of Nature (IUCN), in full International Union for Conservation of Nature and Natural Resources, formerly called World Conservation Union, network of environmental organizations founded as the International Union for the Protection of Nature in October 1948 in Fontainebleau, France, to promote nature conservation and the ecologically sustainable use of natural resources. It changed its name to the International Union for Conservation of Nature and Natural Resources (IUCN) in 1956 and was also known as the World Conservation Union (IUCN) from 1990 to 2008. The IUCN is the world's oldest global environmental organization. Its headquarters are in Gland, Switz.

The IUCN's activities are organized into several theme-based programs ranging from business and biodiversity to forest preservation to water and wetlands conservation. In addition, a smaller number of special initiatives draw upon the work of different programs to address specific issues, such as climate change, conservation, and poverty reduction. The volunteer work of more than 10,000 scientists and other experts is coordinated through special commissions on education and communication; environmental, economic, and social policy; environmental law; ecosystem management; species survival; and protected areas. All of the IUCN's work is guided by a global program, which is adopted by member organizations every four years at the IUCN World Conservation Congress.

The IUCN maintains the IUCN Red List of Threatened Species, a comprehensive assessment of the current risk of extinction of thousands of plant and animal species. The organization also publishes or coauthors hundreds of books, reports, and other documents each year.

**Extinction:** In biology and ecology, extinction is the cessation of existence of a species or group of taxa. A species becomes extinct when the last existing member of that species dies. Extinction therefore becomes a certainty when there are no surviving individuals that are able to reproduce and create a new generation.

**Pseudoextinction:** Descendants may or may not exist for extinct species. Daughter species that evolve from a parent species carry on most of the parent species' genetic information, and even though the parent species may become extinct, the daughter species lives on.

In other cases, species have produced no new variants, or none that are able to survive the parent species' extinction. Extinction of a parent species where daughter species or subspecies are still alive is also called pseudoextinction.

Pseudoextinction is difficult to demonstrate unless one has a strong chain of evidence linking a living species to members of a pre-existing species. For example, it is sometimes claimed that the extinct Hyracotherium, which was an ancient animal similar to the horse, is pseudoextinct, rather than extinct, because there are several extant species of equus, including zebra and donkeys. Pseudoextinction is much easier to demonstrate for larger taxonomic groups. It is said that dinosaurs are pseudoextinct, because some of their descendants, the birds, survive today.

**Coextinctions:** Coextinction refers to the loss of a species due to the extinction of another; for example, the extinction of parasitic insects following the loss of their hosts. Coextinction can also occur when a species loses its pollinator, or to predators in a food chain who lose their prey. • "Species coextinction is a manifestation of the interconnectedness of organisms in complex ecosystems ... While coextinction may not be the most important cause of species extinctions, it is certainly an insidious one".

#### **Strategies for Conservation of Biodiversity:**

**The following strategies should be undertaken in order to conserve biodiversity:**

- (1) All the possible varieties (old or new) of food, forage and timber plants, live stock, agriculture animals and microbes should be conserved.

- (2) All the economically important organisms in protected areas should be identified and conserved.
- (3) Critical habitats for each species should be identified and safeguarded.
- (4) Priority should be given to preserve unique ecosystems.
- (5) There should be sustainable utilisation of resources.
- (6) International trade in wild life should be highly regulated.
- (7) The poaching and hunting of wildlife should be prevented as far as practicable.
- (8) Care should be taken for the development of reserves and protected areas.
- (9) Efforts should be made to reduce the level of pollutants in the environment.
- (10) Public awareness should be created regarding biodiversity and its importance for the living organisms.
- (11) Priority should be given in wildlife conservation programme to endangered species over vulnerable species and to vulnerable species over rare species.
- (12) The habitats of migratory birds should be protected by bilateral and multilateral agreement.
- (13) The over exploitation of useful products of wild life should be prevented.
- (14) The useful animals, plants and their wild relatives should be protected both in their natural habitat (in-situ) and in zoological botanical gardens (ex-situ)
- (15) Efforts should be made for setting up of National parks and wild life sanctuaries to safeguard the genetic diversity and their continuing evolution.
- (16) Environmental laws should be strictly followed.

**IN SITU CONSERVATION:** *In situ* means in the natural, original place or position; as in the location of the explant on the mother plant prior to excision. *In situ* conservation which include conservation of plant and animals in their native ecosystem or even in man made ecosystem, where they naturally occur. Thus *in-situ* conservation refers to protection zones and areas of high biological diversity. This type of conservation applies only to wild fauna and flora and not to the domesticated animals and plants, because conservation is achieved by protection of populations in nature. The *in-situ* conservation of habitats has received high priority in the world conservation strategy programmes launched since 1980. *In-situ* conservation includes a system of protected areas of different categories e.g. National parks, Sanctuaries, National Monument, Cultural landscapes, Biosphere Reserves, etc. One of the best methods to save wildlife species, which is on the road to extinction, is to put it in a special enclosure to reproduce. Sanctuaries and National parks, whose legal definition varies from country to country, best illustrate this.

**International Efforts:** Biodiversity is the variety and variations occurring in nature, which has sustained the harmonious existence of life on earth. The components of this diversity are so interdependent that any change in the system leads to major imbalance and threatens the normal ecological cycle. Acknowledging the need for conservation, the concern for conservation of biodiversity at global level figured for the first time.

In the discussion at the UN Conference on the Human Environment held in Stockholm in 1972. The United Nations Environment Programme (UNEP) identified conservation as priority area in 1972. It was only towards 1980's that systemic and concentrated efforts to look at biodiversity conservation profile at international level started with constitution of an Ad hoc working group of experts on biological diversity by UNEP in 1987. Eventually an experts group was constituted by UNEP, which started its work in 1989.

Convention on Biological Diversity (CBD)" was one of the foremost issues discussed at the Earth Summit held at Rio de Janeiro (Brazil) between June 3 and 14, 1992. A ceremony to mark the opening of the convention on biological diversity took place in the afternoon on June 5. This convention entered into force on December 29, 1993. Fernando Collor, the President of the Federal Republic of Brazil was the first to sign the convention, followed by India, and 155 other nations. At present, 166 countries are parties to the convention.

**Indian Initiative:** India is fortunately placed in a position of advantage. Ours is tropical country with a tremendous heterogeneity of environments ranging from tropical rain forests of Andaman and Arunachal Pradesh to the deserts of Rajasthan and Ladakh. • It lies at the junction of the three biogeographical provinces of Africa, temperate Eurasia and Oriente. As a result, it has rich biological heritage that qualifies it as one of the 17-megadiversity nations of the world.

Dr M S Swaminathan (1983) reviewed the scientific aspects of conservation. He suggested that the first step in conservation should be defining the categories of materials (plants/ genes) for preservation and the major methods preserving them. In India, institutionalised management of biodiversity in situ started with the

establishment of the first National Park, the Hailey National Park (now Jim Corbett National Park) in 1935. Following this, more than 500 protected areas (PAs) were set up representing a wide range of ecosystems.

Institutional efforts at *in-situ* conservation of endangered animals were initiated in the country about 30 years ago with the launching of Project Tiger. An all-India tiger census conducted in 1972 revealed that there were only 1,827 tigers in the country as against an estimated 40,000 at the turn of the century. India holds the largest number of Asian elephants with 20,000 – 24,000 in the wild and nearly 3000 in captivity. Other special conservation programmes have also been initiated and these include the Indian Rhino, Lion, certain primates (Indo-USA Primate Project in Northeast India), and aquatic mammals especially river dolphins.

The Indian Council of Forestry Research and Education (ICFRE) has identified 309 forest preservation plots of representative forest types for conservation of variable and representative areas of biodiversity. 187 of these plots are natural forests and 117 in plantations, covering a total area of 8500 hectares. There are a number of Non Government Organisation (NGO) initiatives for *in-situ* conservation in the country. One of these is the WWF-India's Community Biodiversity Conservation Programme.

**BIOSPHERE RESERVE:** The idea of 'biosphere reserves' was initiated by UNESCO in 1973-74 under its Man and Biosphere (MAB) programme. The MAB, launched in 1970 by UNESCO, is a broad based ecological programme aimed to develop within the natural and social sciences a basis for the rational use and conservation of the resources of the biosphere and for the improvement of the relationship between man and the environment; to predict the consequences of today's actions on tomorrow's world and thereby to increase man's ability to manage efficiently the natural resources of the biosphere reserve. The Indian National Man and Biosphere (MAB) committee identifies and recommends potential sites for designation as Biosphere Reserves, following the UNESCO's guidelines and criteria. By 20 September 2010, 18 biosphere reserves have been established in India and some additional sites are under consideration.

#### 1. 22. Biosphere Reserve Zone

**Biosphere Reserve in India** (First Eleven 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)

SN	Year	Name	State	Type	Area (Km <sup>2</sup> )	Key fauna
1	1986	Nilgiri Biosphere Reserve	Tamil Nadu, Kerala and Karnataka	Western Ghats	5520	Nilgiri tahr, tiger, lion-tailed macaque
2	1988	Nanda Devi Biosphere Reserve	Uttarakhand	Western Himalayas	5860	Snow leopard, Himalayan black bear
3	1988	Nokrek	Meghalaya	Eastern hills	820	Red panda
4	1989	Gulf of Mannar	Tamil Nadu	Coasts	10500	Dugong
5	1989	Sundarbans	West Bengal	Gangetic Delta	9630	Royal Bengal tiger
6	1994	Simlipal	Odisha	Deccan Peninsula	4374	Gaur, royal Bengal tiger, Asian elephant
7	1999	Pachmarhi Biosphere Reserve	Madhya Pradesh	Semi-Arid	4981.72	Giant squirrel, flying squirrel
8	2005	Achanakmar-Amarkantak Biosphere Reserve	Madhya Pradesh, Chhattisgarh	Maikala Hills	3835	Four-horned antelope, Indian wild dog, sarus crane, white-rumped vulture, sacred grove bush frog
9	2000	Khangchendzonga	Sikkim	East Himalayas	2620	Snow leopard, red panda
10	2001	Agasthyamalai Biosphere Reserve	Kerala, Tamil Nadu	Western Ghats	3500.08	Nilgiri tahr, Asian elephant
11	1989	Great Nicobar	Andaman and Nicobar Islands	Islands	885	Saltwater crocodile

12	1989	<b>Manas</b>	Assam	Eastern Hills	2837	Asiatic elephant, tiger, Assam roofed turtle, hispid hare, golden langur, pygmy hog
13	1997	Dibru-Saikhowa	Assam	Eastern Hills	765	White-winged wood duck, water buffalo, black-breasted parrotbill, tiger, capped langur
14	1998	<b>Dihang-Dibang</b>	Arunachal Pradesh	Eastern Himalaya	5112	Mishmi takin, musk deer
15	2008	<b>Great Rann of Kutch</b>	Gujarat	Desert	12454	Indian wild ass
16	2009	<b>Cold Desert</b>	Himachal Pradesh	Western Himalayas	7770	Snow leopard
17	2010	Seshachalam Hills	Andhra Pradesh	Eastern Ghats	4755	Slender loris
18	2011	Panna	Madhya Pradesh	Catchment Area of the Ken River	2998.98	Tiger, chital, chinkara, sambhar and sloth bear

**NATIONAL PARK:** A national park is an area dedicated to conserve the scenery (or environment) and natural objects and the wildlife therein. In national parks, all private rights are non-existent and all forestry operations and other usages such as grazing of domestic animals are prohibited. However, the general public may enter it for the purpose of observation and study. As per National Wildlife Database, June 2008, there are 97 existing national parks in India covering an area of 38,199.47 km<sup>2</sup>, which is 1.16% of the geographical area of the country (Table 4.1). In addition to the above 74 national parks covering an area of 16,630.08 km<sup>2</sup> are proposed in the Protected Area Network Report (Rodgers et al. 2002). The network of parks will go up 171 after full implementation of the above report.

SN	Name	State	Year	Area (km <sup>2</sup> )	Notability
1	Anshi National Park	Karnataka	1987	417.34	Great hornbill, tiger, leopard, black panther, bear, elephant, deer
2	Balphakram National Park	Meghalaya	1986	220	Wild water buffalo, red panda, elephant and eight cat species, including the tiger and marbled cat
3	Bandhavgarh National Park	Madhya Pradesh	1982	446	1336 species of endemic plants
4	Bandipur National Park	Karnataka	1974	874.20	Chital, Bengal tiger, gray langurs, Indian giant squirrel, gaur, leopard, sambar deer, Indian elephants, honey buzzard, red-headed vulture
5	Bannerghatta National Park	Karnataka	1986	104.3	Tiger, sloth bear, peacock, elephant, sambar deer, mouse deer
6	Betla National Park	Jharkhand	1986	1135	Tiger, Indian bison, elephant, hyenas, monkey, leopard
7	Bhitarkanika National Park	Odisha	1988	145	Mangroves, saltwater crocodile, white crocodile, Indian python, black ibis, wild pigs, rhesus monkeys, olive ridley sea turtle, chital
8	Bison (Rajbari) National Park	Tripura	2007	31.63	
9	Blackbuck National Park, Velavadar	Gujarat	1976	34.08	Hunting cheetahs, Blackbuck Lodge, the endangered Indian grey wolf, the nocturnal striped hyena, Indian fox, golden jackal, jungle cat and many small mammals like hare, gerbil, field mice, mongoose and hedgehog.
10	Buxa Tiger Reserve	West Bengal	1992	760	
11	Campbell Bay National Park	Andaman and Nicobar Islands	1992	426.23	
12	Chandoli National Park	Maharashtra	2004	317.67	
13	Clouded Leopard National Park	Tripura	2003	5.08	
14	Dachigam National Park	Jammu and Kashmir	1981	141	Only area where Kashmir stag is found <sup>[2]</sup>
15	Desert National Park	Rajasthan	1980	3162	Great Indian bustard
16	Dibru-Saikhowa National Park	Assam	1999	340	Feral horse
17	Dudhwa National Park	Uttar Pradesh	1977	490.29	Tiger, Sambar deer, hog deer

18	Eravikulam National Park	Kerala	1978	97	Nilgiri tahr, Strobilanthes kunthiana
19	Galathea National Park	Andaman and Nicobar Islands	1992	110	
20	Gangotri National Park	Uttarakhand	1989	2390	Gaumukh Glacier
21	Gir Forest National Park	Gujarat	1975	1412	Asiatic lion
22	Gorumara National Park	West Bengal	1994	79.45	The park is rich in large herbivores including Indian rhinoceros, gaur, Asian elephant, sloth bear, chital, and sambar deer
23	Govind Pashu Vihar National Park	Uttarakhand	1990	472.08	
24	Great Himalayan National Park	Himachal Pradesh	1984	754.40	UNESCO World Heritage Site
25	Gugamal National Park	Maharashtra	1987	361.28	
26	Guindy National Park	Tamil Nadu	1976	2.82	
27	Gulf of Mannar Marine National Park	Tamil Nadu	1980	6.23	
28	Guru Ghasidas (Sanjay) National Park	Chhattisgarh	1981	1440.71	
29	Hemis National Park	Ladakh	1981	4400	Largest National park in India
30	Inderkilla National Park	Himachal Pradesh	2010	104	
31	Indra Gandhi Wildlife Sanctuary and National Park	Tamil Nadu	1989	117.10	
32	Indravati National Park	Chhattisgarh	1981	1258.37	Wild Asian buffalo, tiger reserve, hill mynas
33	Jaldapara National Park	West Bengal	2012	216	Indian rhinoceros
34	Jim Corbett National Park	Uttarakhand	1936	1318.5	First national park in India (established in 1936 as Hailey National Park)
35	Kalesar National Park	Haryana	2003	100.88	On the bank of Yamuna river
36	Kanha National Park	Madhya Pradesh	1955	940	
37	Kanger Ghati National Park	Chhattisgarh	1982	200	
38	Kasu Brahmananda Reddy National Park	Telangana	1994	1.42	
39	Kaziranga National Park	Assam	1974	858.98	Highest known tiger density in the world, Indian rhinoceros, UNESCO World Heritage Site
40	Keibul Lamjao National Park	Manipur	1977	40	Only floating park in the world
41	Keoladeo National Park	Rajasthan	1981	28.73	UNESCO World Heritage Site
42	Khangchendzonga National Park	Sikkim	1977	1784	UNESCO World Heritage Site
43	Khirganga National Park	Himachal Pradesh	2010	710	
44	Kishtwar National Park	Jammu and Kashmir	1981	400	
45	Kudremukh National Park	Karnataka	1987	600.32	
46	Kuno National Park	Madhya Pradesh	2018	748.76	Asiatic Lion Reintroduction Project
47	Madhav National Park	Madhya Pradesh	1959	375.22	
48	Mahatma Gandhi Marine National Park	Andaman and Nicobar Islands	1983	281.50	
49	Mahavir Harina Vanasthali National Park	Telangana	1994	14.59	
50	Manas National Park	Assam	1990	950	UNESCO World Heritage Site
51	Mandla Plant Fossils National Park	Madhya Pradesh	1983	0.27	
52	Marine National Park, Gulf of Kutch	Gujarat	1980	162.89	
53	Mathikettan Shola	Kerala	2003	12.82	elephants

	National Park				
54	Middle Button Island National Park	Andaman and Nicobar Islands	1987	0.44	
55	Mollem National Park	Goa	1978	107	
56	Mouling National Park	Arunachal Pradesh	1986	483	
57	Mount Harriet National Park	Andaman and Nicobar Islands	1987	46.62	Important bird area as attributed by BirdLife International
58	Mrugavani National Park	Telangana	1994	3.60	
59	Mudumalai National Park	Tamil Nadu	1940	321.55	
60	Mukundra Hills National Park	Rajasthan	2006	200.54	
61	Mukurthi National Park	Tamil Nadu	2001	78.46	Nilgiri tahr
62	Murlen National Park	Mizoram	1991	100	
63	Nagarhole National Park	Karnataka	1988	643.39	
64	Namdapha National Park	Arunachal Pradesh	1974	1985.24	Tiger
65	Nameri National Park	Assam	1978	137.07	
66	Nanda Devi National Park	Uttarakhand	1982	630.33	UNESCO World Heritage Site, UNESCO World Biosphere Reserve
67	Navegaon National Park	Maharashtra	1975	133.88	
68	Neora Valley National Park	West Bengal	1986	88	
69	Nokrek National Park	Meghalaya	1986	47.48	UNESCO World Biosphere Reserve
70	North Button Island National Park	Andaman and Nicobar Islands	1979	0.44	
71	Ntangki National Park	Nagaland	1993	202.02	
72	Orang National Park	Assam	1999	78.81	
73	Pambadum Shola National Park	Kerala	2003	1.32	Nilgiri marten, Nilgiri wood pigeon, Nilgiri langur, Nilgiri flycatcher, Blue rock-thrush
74	Panna National Park	Madhya Pradesh	1981	542.67	
75	Papikonda National Park	Andhra Pradesh	2008	1012.85	Royal Bengal Tiger, Leopards, rusty-spotted cat, King Cobra
76	Pench National Park <sup>[3]</sup>	Madhya Pradesh	1977	758	Rudyard Kipling's 'Jungle Book' was set in this NP.
77	Periyar National Park	Kerala	1982	305	Malabar parakeet, Malabar grey hornbill, Nilgiri laughing thrush, Nilgiri blue robin, great hornbill, Malabar pied hornbill, lion-tailed macaque, hairy-winged bat
78	Phawngpui Blue Mountain National Park	Mizoram	1992	50	
79	Pin Valley National Park	Himachal Pradesh	1987	807.36	
80	Rajaji National Park	Uttarakhand	1983	820	Mainly known for elephants, tigers, leopards and several species of birds, reptiles and mammals.
81	Rajiv Gandhi (Rameswaram) Park	Andhra Pradesh	2005	2.4	
82	Rani Jhansi Marine National Park	Andaman and Nicobar Islands	1996	256.14	
83	Ranthambore National Park	Rajasthan	1981	392	Tiger Reserve.
84	Saddle Peak National Park	Andaman and Nicobar Islands	1979	32.54	
85	Salim Ali National Park	Jammu and Kashmir	1992	9.07	
86	Sanjay National Park <sup>[4]</sup>	Madhya Pradesh	1981	466.7	
87	Sanjay Gandhi National Park	Maharashtra	1969	104	Asiatic Lion, Indian Leopard, Rhesus Macaque, Bonnet Macaque, Spotted Deer, Hanuman Langur, Indian Flying Fox, Indian Hare, Barking Deer, Porcupine, Palm Civet, Mouse Deer
88	Sariska Tiger Reserve	Rajasthan	1955	866	

89	Satpura National Park	Madhya Pradesh	1981	524	
90	Silent Valley National Park	Kerala	1980	237	Indian bison, Travancore flying squirrel, Salim Ali's fruit bat, Stripe-necked mongoose, Blue-winged parakeet, Crimson-backed sunbird
91	Simbalbara National Park	Himachal Pradesh	2010	27.88	
92	Sirohi National Park	Manipur	1982	41.30	
93	Simlipal National Park	Odisha	1980	2750	Tiger, leopard, Asian elephant, sambar, barking deer, gaur, jungle cat, wild boar
94	Singalila National Park	West Bengal	1986	78.60	
95	South Button Island National Park	Andaman and Nicobar Islands	1987	0.03	Dugong, dolphin, water monitor lizard, blue whale and smallest National park in India
96	Sri Venkateswara National Park	Andhra Pradesh	1989	353	
97	Sultanpur National Park	Haryana	1989	1.43	
98	Sundarbans National Park	West Bengal	1984	1330.12	UNESCO World Heritage Site
99	Tadoba National Park	Maharashtra	1955	625	Tiger
100	Valley of Flowers National Park	Uttarakhand	1982	87.50	UNESCO World Heritage Site
101	Valmiki National Park	Bihar	1976	898.45	
102	Vansda National Park	Gujarat	1979	23.99	
103	Van Vihar National Park	Madhya Pradesh	1983	4.48	

**SANCTUARIES:** A wildlife sanctuary, similar to national park, is dedicated to protect the wildlife, but it considers the conservation of species only and also the boundary of it is not limited by state legislation. Further, in the sanctuary, killing hunting or capturing of any species of birds and mammals is prohibited except by or under the control of highest authority in the department responsible for management of the sanctuary. Private ownership may be allowed to continue in a sanctuary, and forestry and other usages permitted to the extent that they do not adversely affect wildlife. As per Ministry of Environment, Forests & Climate Change, Government of India (2017), 543 wildlife sanctuaries were established in the country that cover 118,918 km<sup>2</sup> (45,914 sq mi) as of 2017. Among these, the 50 tiger reserves are governed by Project Tiger, and are of special significance for the conservation of the Bengal tiger. Another 217 sanctuaries are proposed in the Protected Area Network Report covering an area of 16,669.44 km<sup>2</sup>.

Wildlife sanctuaries of West Bengal

1. Chapramari Wildlife Sanctuary, Jalpaiguri, 1976
2. Haliday Island Wildlife Sanctuary, S 24 Parganas, 1976
3. Lothian Island Wildlife Sanctuary, S 24 Parganas, 1976
4. Mahananda Wildlife Sanctuary, Darjeeling, 1976
5. Sajnakhali Wildlife Sanctuary, S 24 Parganas, 1976
6. Senchal Wildlife Sanctuary, Darjeeling, 1976
7. Ballabhpur Wildlife Sanctuary, Birbhum, 1977
8. Bethuadahari Wildlife Sanctuary, Nadia, 1980
9. Bibhutibhushan Wildlife Sanctuary, N 24 Parganas, 1980
10. Ramnabagan Wildlife Sanctuary, Bardhaman, 1981
11. Chintamani Kar Bird Sanctuary, S 24 Parganas, 1982
12. Jore Pokhri Wildlife Sanctuary, Darjeeling, 1985
13. Raiganj Wildlife Sanctuary, Uttar Dinajpur, 1985
14. Buxa Tiger Reserve, Alipurduar, 1986

**WETLAND:** A wetland is an area of land consisting of soil that is saturated with moisture, such as a swamp, marsh, or bog. As defined in terms of physical geography, a wetland is an environment "at the interface between truly terrestrial ecosystems and aquatic systems making them inherently different from each other yet

highly dependent on both". In essence, wetlands are ecotones. Wetlands often host considerable biodiversity and endemism.

**Categories of Wetland in India:** 8 series of wetland in India. 1. Deccan Plateau - South-East Area; 2. The Gulf of Kutch - Rajasthan-Gujrat; 3. Fresh water region - Rajasthan-Gujrat; 4. Iceland - Andman Nicobar; 5. Kashmir – Laddhakh; 6. Ganga ghat and Brahmaputra Field; 7. India's Eastern Pier (Chilka Lake); 8. North India Himalayas high heels.

**Some Important Wetland in India:** Renuka – Himachal Pradesh; Bhoj - Madhya Pradesh; Chilka – Odisha; Sundarban Wetland - West Bengal; Rudra Lake – Tripura; East Kolkata Wetlands - West Bengal; Rasikbil - West Bengal.

**MANGROVE:** Mangrove ecosystem is a peculiar habitat found at the interface between land and sea. The term "mangrove" is being applied to the specific ecosystem of the intertidal world in the tropics and subtropics and the plant community of this ecosystem is termed as "mangrove vegetation".

**Example of Mangroves in India:** Sundarbans in West Bengal, Bhitarkanika – Odisha; Godavari-Krishna – Andhra Pradesh; Pichavaram – Tamil Nadu; Mumbai – Mumbai; Baratang Islands – Andaman & Nicobar Islands; Kannur - Kerala

**CORAL REEFS:** Coral reefs are aragonite structures produced by living organisms, found in shallow, tropical marine waters with little to no nutrients in the water. High nutrient levels such as those found in runoff from agricultural areas can harm the reef by encouraging the growth of algae. In most reefs, the predominant organisms are stony corals, colonial cnidarians that secrete an exoskeleton of calcium carbonate.

**Types of Coral reefs:** 1. Fringing coral reefs (Gulf of Katch, Gulf of Mannar, Andman and Nicobar Islands); 2. Barrier coral reefs (The **Great Barrier Reef** of Australia; the world's largest coral reef system); 3. Atoll coral reefs (Lakshadweep).

*Web page References: Google, Wikipedia*