TOPIC: BIODIVERSITY AND CONSERVATION OF WILDLIFE

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Biodiversity hotspots in India

1. **Himalaya:** Includes the entire Indian Himalayan region.
2. **Indo-Burma:** Includes entire North-eastern India, except Assam and Andaman group of Islands (and Myanmar, Thailand, Vietnam, Laos, Cambodia and southern China)
3. **Sunderland's:** Includes Nicobar group of Islands (and Indonesia, Malaysia, Singapore, Brunei, Philippines)
4. **Western Ghats and Sri Lanka:** Includes entire Western Ghats (and Sri Lanka)

HIMALAYA

The Himalaya Hotspot is the home of the world's highest mountains, including Mt. Everest. The mountains rise abruptly, resulting in a diversity of ecosystems that range from alluvial grasslands and subtropical broadleaf forests to alpine meadows above the tree line. Vascular plants have even been recorded at more than 6,000 m. The hotspot is

home to important populations of numerous large birds and mammals,

including vultures, tigers, elephants, rhinos and wild water buffalo.

INDO-BURMA

Encompassing more than 2 million km^2 of tropical Asia, Indo-Burma is still revealing its biological treasures. Six large mammal species have been discovered in the last 12 years: the large-antlered muntjac, the Annamite muntjac, the grey-shanked douc, the Annamite striped rabbit, the leaf deer, and the saola. This hotspot also holds remarkable endemism in freshwater turtle species, most of which are threatened with extinction, due to over-harvesting and extensive habitat loss. Bird life in Indo- Burma is also incredibly diverse, holding almost 1,300 different bird species, including the threatened white-eared night-heron, the grey-crowned crocias, and the orange-necked partridge.

SUNDERALAND

The spectacular flora and fauna of the Sunderland Hotspot are succumbing to the explosive growth of industrial forestry in these islands and to the international animal trade that claims tigers, monkeys, and turtle species for food and medicine in other countries. Populations of the orang-utan, found only in

this hotspot, are in dramatic decline. Some of the last refuges of two Southeast Asia rhino species are also found on the islands of Java and Sumatra. Like many tropical areas, the forests are

being cleared for commercial uses. Rubber, oil palm, and pulp production are three of the most detrimental forces facing biodiversity in the Sunderland Hotspot

WESTERN GHATS AND SRI LANKA

Faced with tremendous population pressure, the forests of the Western Ghats and Sri Lanka have been dramatically impacted by the demands for timber and agricultural land. Remaining forests of the Western Ghats are heavily fragmented; in Sri Lanka, only 1.5% of the original forest remains. Population levels are also applying increased stress on the fringes of protected areas where many farms, loggers, and poachers use the resources illegally. Due in part to the varying effect of the yearly monsoons and the high mountain regions, this hotspot is home to a rich endemic assemblage of plants, reptiles, and amphibians. Sir Lanka alone may be home to as many as 140 endemic species of amphibians. The region also houses important populations of Asian Elephants, Indian Tigers, and the Endangered Lion-tailed Macaque. Freshwater

fish endemism is extremely high as well, with over 140 native species.

THREATS TO BIODIVERSITY

Losses in biodiversity Today's threats to species and ecosystems are the greatest recorded in recent history and virtually all of them are caused by human mismanagement of biological resources often stimulated by misguided economic policies and faulty institutions. Principal threats to biodiversity A threat by definition refers to any process or event whether natural or human induced that is likely to cause adverse effects upon the status or sustainable use of any component of biological diversity. Habitat alteration / destruction Increased insatiable demand for resources results to land use changes hence loss to genetic diversity, species reduction and increased ecosystem changes such as random population changes, disease outcrops, habitat fragmentation among others resulting in biodiversity losses. Overharvesting/over-exploitation of biological resources. This results when individuals of a particular species are taken at a higher rate than can be sustained by the natural reproductive capacity of the population being harvested.

This can be through hunting, fishing, trade, food gathering etc. Overharvesting will lead to extinction of resources or the biological resources, eventually leading to loss of species. Pollution Chemical or thermal pollution is a threat to biodiversity. Species in habitats are increasingly being harmed by industrial activities and pollution from excessive use of

agro-chemicals such as DDT, oil spills, acid precipitation etc. Introduced species / biological invasions This can be intentional or accidental. Species introduced in an ecosystem will cause changes in the ecosystem. Introduced species are organisms arising in areas/ habitats in which they were previously not native. Such introduced species are usually referred to as biological pollutants. Some of the ecological impacts of the invasion include hybridization, out competition, disruption of original ecosystem, plant pathogenic influences, disease transmission, and disruption of food webs and to some situations extinction. Species may be introduced intentionally for Ornamental concerns; Agriculture; Hunting and spotting activities; Biotechnology for scientific research.

This is of great concern especially when global CO2 increases in the atmosphere resulting to global warming. Most species

originate within a very narrow physiological limit; hence nature has a range of tolerance maintained for ecosystem stability. Changes may be gradual or abrupt such that if the limit is exceeded the upper or lower species suffers extinction.

Population As the human population is increasing; there exists insatiable demand for raw materials which is bound to cause changes in biodiversity. It is therefore vital to control human

population which will result in biodiversity conservation. Institutional / policy failure Some institutions are created to manage biological resources. However, the institutions/policy fail to internalize the values of biodiversity within the decision making process of their Nations and individuals. Such institutions/policies in place should have a holistic approach towards biodiversity conservation rather than part conservation.

CONSERVATION OF BIODIVERSITY

Conservation of biodiversity is must for ensuring the future generation. Each organism in nature has its specific significance in order to their priority in ecosystem.

This incorporates the preservation, maintenance, sustainable use (conservation), recovery and enhancement of the components of biological diversity, where. Conservation - is the sustainable use of resources and encompasses protection as well as exploitation and Preservation is an aspect of conservation meaning to keep something without altering or changing it. A balance between the environment, development and society results to sustainable development which ensures biodiversity conservation. This is only possible in the presence of good enforced and implemented policies/ conventions, environmental institutions (e.g. NEMA for Kenya) and political stability among others (Figure 1).Conservation measures of

biodiversity Ex-situ conservation, Refers to conservation of components of biodiversity outside their natural habitats, e.g. zoos, museums, gene banks, botanic gardens/arboretums; Used for threatened and endangered species to avoid their extinction; also known as captive conservation. In-situ conservation, Refers to conservation of ecosystems and natural habitats including maintenance and recovery of viable populations of species in their natural habitats.

Convention on biological diversity (CBD) Conservation of biological diversity and sustainable use of its components

came into the limelight in 1972 (United Nations Conference on Human Environment; Stockholm). In 1973, UNEP identified conservation of biodiversity as a priority area, hence there was need to get the legal mandate for conservation of world resources. There were negotiations for a legally binding instrument to address biological diversity and its loss to enhance fairness and equity in sharing of the benefits of biodiversity; this led to the opening of the Convention on Biological Diversity in 1992; Rio de Janeiro under the United Nations Conference on Environment and Development (UNCED)/ Earth Summit. The convention was inspired by the growing concern all over the world for sustainable development. The convention objectives were Conservation of

the biological diversity; Sustainable use of its components; A fair and equitable sharing of its benefits. This was the first global comprehensive agreement that addressed all the aspects of biological diversity; genetic resources, species diversity and ecosystem diversity. Figure 1, Concept of sustainable development. Biodiversity conservation other international biodiversity conventions and conservation organizations African Convention on Conservation of nature and natural resources. The Ramsar Convention on Wetlands of international importance. International Union for the

Conservation of nature (World Conservation Union). Convention on International trade for endangered species (CITES). International Convention for the Protection on birds.

International Board for Plant genetic resources. World Resources Institute. World Wide Fund for Nature. Convention on Conservation of migratory species of wild animals. International Convention for the Regulation of whaling. UNESCO programme on Man and biosphere. Existing Measures for Conserving Biodiversity in Kenya Zoological gardens - These are refuge areas for rare animals that could disappear without captive breeding e.g. zoos and aquariums. They are conservation areas for preservation of genetic stocks for re-introduction to the wild when conditions become favourable.

They are also used for educational and scientific research. Botanical gardens/Arboretums - These are areas for research and exhibition of plants, documentation of local flora, preserving samples of rare and endangered species and maintenance of specimen collections for future use. It acts like a museum for plants e.g. the East African Botanical Garden in Nairobi. Seed banks - Ex-Situ approach where storage of conservation materials in form of seeds is monitored with

regard to viability through germination tests and purity analysis. The objective is to ensure that genetic continuity is maintained. National parks and game reserves - These are different from zoological gardens and are established on terrestrial and aquatic ecosystems with the objective to preserve wildlife that cannot co-exist with human beings and human activities. National parks are under the jurisdiction of central government while game reserves are managed by the local county council.

PRINCIPLES WILDLIFE

Protected Area Network in India India is one of the 17 mega diverse countries of the world. With only 2.4% of the world's land area, 16.7% of the world's human population and 18% livestock, it contributes about 8% of the known global

biodiversity, however, putting enormous demands on our natural resources. India is home to world's largest wild tigers population and has got unique assemblage of globally important endangered species like Asiatic lion, Asian Elephant, One-horned Rhinoceros, Gangetic River Dolphin, Snow Leopard, Kashmir Stag, Dugong, Gharial, Great Indian Bustard, Lion Tailed Macaque etc. Protected Area Network in India: A National Board for Wildlife (NBWL), chaired by the Prime Minister of India provides for policy framework for

wildlife conservation in the country. The National Wildlife Action Plan (2002-2016) was adopted in 2002, emphasizing the people's participation and their support for wildlife conservation.

India's conservation planning is based on the philosophy of identifying and protecting representative wild habitats across all the ecosystems. The Indian Constitution entails the subject of forests and wildlife in the Concurrent list. The Federal Ministry acts as a guiding torch dealing with the policies and planning on wildlife conservation, while the provincial Forest Departments are vested with the responsibility of implementation of national policies and plans. A network of 668 Protected Areas (PAs) has been established, extending over 1,61,221.57 sq. kms. (4.90% of total geographic area), comprising 102 National Parks, 515 Wildlife Sanctuaries, 47 Conservation Reserves and 4 Community Reserves. The

State/Union Territory wise details of PAs in the country with year of notification and area is given at Annexure-I. 39 Tiger Reserves (Annexure-II) and 28 Elephant Reserves (Annexure-III) have been designated for species specific management of tiger and elephant habitats. UNESCO has designated 5 Protected Areas as World Heritage Sites.

As the ecosystems and species do not recognise political borders, the concept of Transboundary Protected Areas has been initiated for coordinated conservation of ecological units and corridors with bilateral and/or multilateral cooperation of the neighbouring nations. There are 4 categories of the Protected Areas viz, National Parks, Sanctuaries, Conservation

Reserves and Community Reserves. Sanctuary is an area which is of adequate ecological, faunal, floral, geomorphological, natural or zoological significance.

The Sanctuary is declared for the purpose of protecting, propagating or developing wildlife or its environment. Certain rights of people living inside the Sanctuary could be permitted. Further, during the settlement of claims, before finally notifying the Sanctuary, the Collector may, in consultation with the Chief Wildlife Warden, allow the continuation of any right of any person in or over any land within the limits of the

Sanctuary. National Park is an area having adequate ecological, faunal, floral, geomorphological, natural or zoological significance. The National Park is declared for the purpose of protecting, propagating or developing wildlife or its environment, like that of a Sanctuary.

The difference between a Sanctuary and a National Park mainly lies in the vesting of rights of people living inside. Unlike a Sanctuary, where certain rights can be allowed, in a National

Park, no rights are allowed. No grazing of any livestock shall also be permitted inside a National Park while in a Sanctuary, the Chief Wildlife Warden may regulate, control or prohibit it. In addition, while any removal or exploitation of wildlife or forest produce from a Sanctuary requires the recommendation of the State Board for Wildlife, removal etc., from a National Park requires recommendation of the National Board for Wildlife (However, as per orders of Hon'ble Supreme Court dated 9th May 2002 in Writ Petition (Civil) No. 337 of 1995, such removal/ exploitation from a Sanctuary also requires recommendation of the Standing Committee of National Board for Wildlife).

Conservation Reserves can be declared by the State Governments in any area owned by the Government, particularly the areas adjacent to National Parks and

Sanctuaries and those areas which link one Protected Area with another. Such declaration should be made after having consultations with the local communities. Conservation

Reserves are declared for the purpose of protecting landscapes, seascapes, flora and fauna and their habitat. The rights of people living inside a Conservation Reserve are not affected. Community Reserves can be declared by the State Government in any private or community land, not comprised within a National Park, Sanctuary or a Conservation Reserve, where an individual or a community has volunteered to conserve wildlife and its habitat. Community Reserves are declared for the purpose of protecting fauna, flora and traditional or cultural conservation values and practices. As in the case of a Conservation Reserve, the rights of people living inside a Community Reserve are not affected. Regulations/ laws relating to Protected Areas (PAs): The PAs are constituted and governed under the provisions of the Wild Life 1972, which has been amended from time to time, with the changing ground realities concerning wildlife crime control and PAs management. Implementation of this Act is further complemented by other Acts viz. Indian Forest Act, 1927, Forest (Conservation) Act, 1980, Environment (Protection) Act, 1986 and Biological Diversity Act, 2002 and the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of

Forest Rights) Act, 2006. The Wildlife Crime Control Bureau of the Central Government supplements the efforts of provincial governments in wildlife crime control through enforcement of CITES and control of wildlife crimes having cross-border, interstate and international ramifications. In order to strengthen and synergise global wildlife conservation efforts, India is a party to major international conventions viz. Convention on International Trade in Endangered Species of wild fauna and flora (CITES), International Union for Conservation of Nature (IUCN), International Convention for the Regulation of Whaling, UNESCO-World Heritage Committee and Convention on Migratory Species (CMS). Main issues concerning the management of Protected Areas.

Wildlife conservation and management in India is currently facing a myriad of complex challenges that are both ecological and social in nature. Issues such as habitat loss/fragmentation, overuse of biomass resources in the context of biotic pressures, increasing human-wildlife conflicts, livelihood dependence on forests and wildlife resources, poaching and illegal trade in wildlife parts and products, need for maintaining a broad base of public support for wildlife conservation exemplify and characterize the contemporary wildlife conservation scenario in India. The government and the civil society are taking several measures to address these issues. Improved synergies

and better coordination amongst the wide array of stakeholders are needed to meet the challenges of conserving India's diverse wilderness resources.

6.4.1 PROTECTED AREAS

Protected Areas of India from 2000 to 2017 (as on January, 2017)

Year	No. of National Parks	Area Under National Parks	No. of Wild Life Sanctuaries	Area Under Wild Life Sanctuaries	No. of Community Reserves	Area Under Community Reserves	No. of Conservation Reserves	Area Under Conservation Reserves	No. of Protected Areas	Total Area under Protected Areas
2000	89	37593.94	489	117881.68	-	-	-	-	578	155475.63
2000	96	38183.	506	120244.	-	-	4	42.87	606	158470

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2										
0		382		1205						1588
0		19.		43.						79
7	98	72	51 0	95	4	20.6 9	7	94.82	61 9	.19
2										
0		392		1221						1626
0		32.		38.						51
8	99	58	51 3	33	4	20.6 9	45	1259.8 4	66 1	.45
2										
0		392		1221						1626
0		32.		38.						51
9	99	58	51 3	33	4	20.6 9	45	1259.8 4	66 1	.45
2										
0		400		1225						1640
1		74.		85.						62
0	102	46	51 6	56	4	20.6 9	47	1382.2 8	66 9	.99
2										
0		400		1226						1645
1		74.		15.						12
1	102	46	51 7	94	4	20.6 9	52	1801.2 9	67 5	.37
2										
0		400		1235						1656
1		74.		48.						41
2	102	46	52 4	33	4	20.6 9	56	1998.1 5	68 6	.62
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0		400		1242						1663
1		74.		34.						47
3	102	46	52 6	52	4	20.6 9	57	2017.9 4	68 9	.6
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0		403		1162						1586
1		32.		54.						45
4	103	89	52 5	36	4	20.6 9	60	2037.1 1	69 2	.05
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0		405		1176						1604
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5	103	13	53 1	72	26	46.9 3	66	2344.5 3	72 6	.31
2										
0		405		1180						1609
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6	103	13	53	30	26	46.9	67	2349.3	73	.74

2017	103	7 405 00. 13	53 7	1180 05. 33	26	3 46.93	8 2349.38	3 73 3	1609 01 .77

Source: National Wildlife Database Cell, Wildlife Institute of India