Paper Name: Environmental Studies

Unit IV: Biodiversity (Part II)

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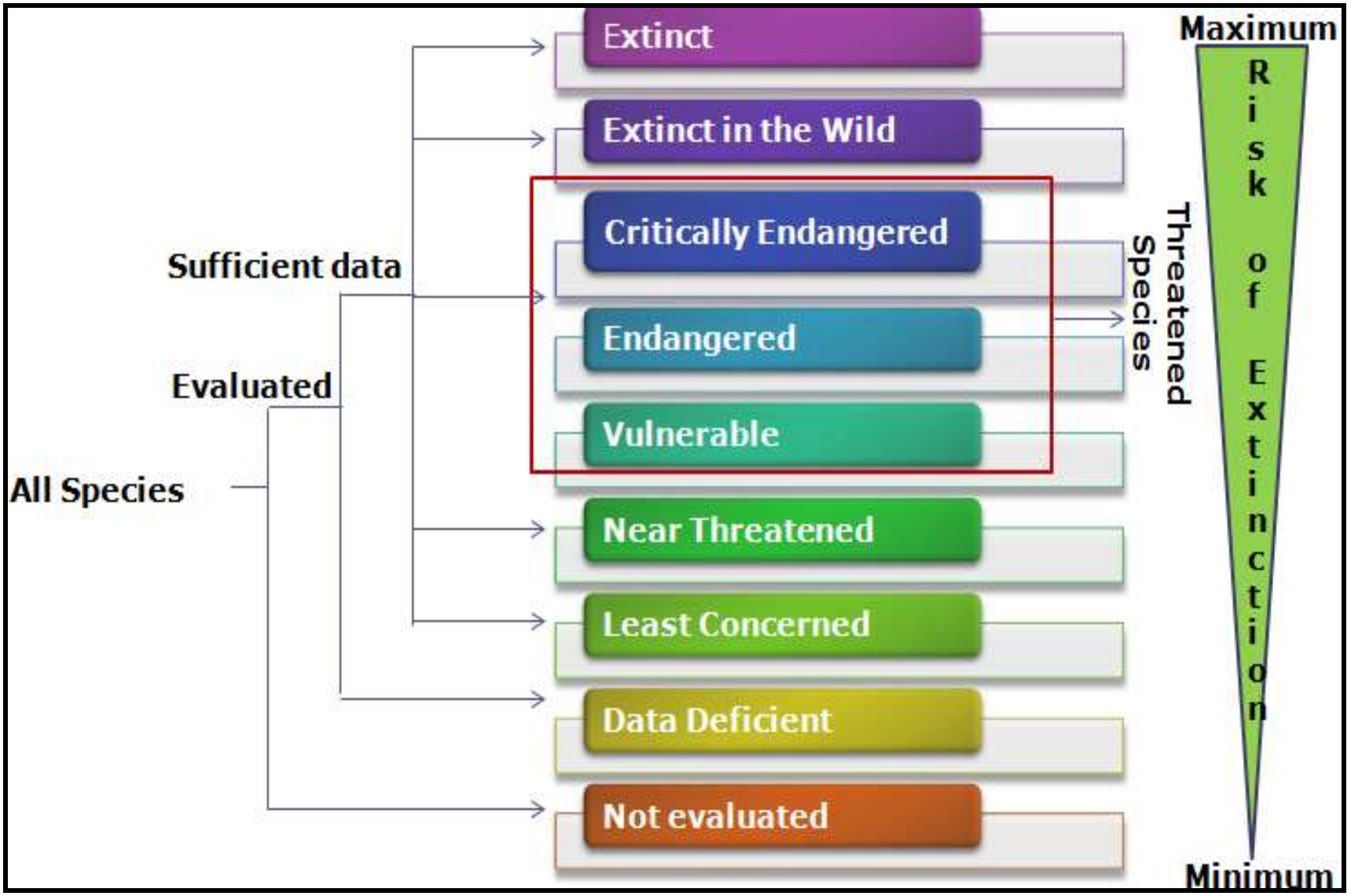
INTERNATIONAL UNION FOR CONSERVATION OF NATURE'S RED LIST

- Established in 1964, it has evolved to become the world's most comprehensive information source on the global conservation status of animal, fungi and plant species.
- A critical indicator of the health of the world's biodiversity.
- A powerful tool to inform and catalyze action for biodiversity conservation and policy change, critical to protecting the natural resources.
- It provides information about range, population size, habitat and ecology, use and/or trade, threats, and conservation actions that will help inform necessary conservation decision.
- Union's headquarters is at Gland, near Geneva.
- Some key features of this organization are enlisted below:
  - **i.** **Vision**: adjust world that values and conserves nature.
  - **ii.** **Mission**: to influence, encourage and assist societies throughout the world to conserve nature and to ensure that any use of natural resources is equitable and ecologically sustainable.
  - **iii.** **Strategy and policy**: to explore and promote mutually beneficial conservation arrangements that suits those promoting development as well as assisting people and nations to better preserve their flora and fauna.
  - **iv.** **Key operating principle**: strong need to cater and address the needs of local nations, communities and people so that they take up the ownership of future.
  - **v.** **Major working principle**: protected areas and threatened species could most effectively be safeguarded if local people considered it in their own interest to do so. ***Working with rather than against local people.***
- The IUCN Red List divides species into nine categories.

Source: https://www.iucnredlist.org/

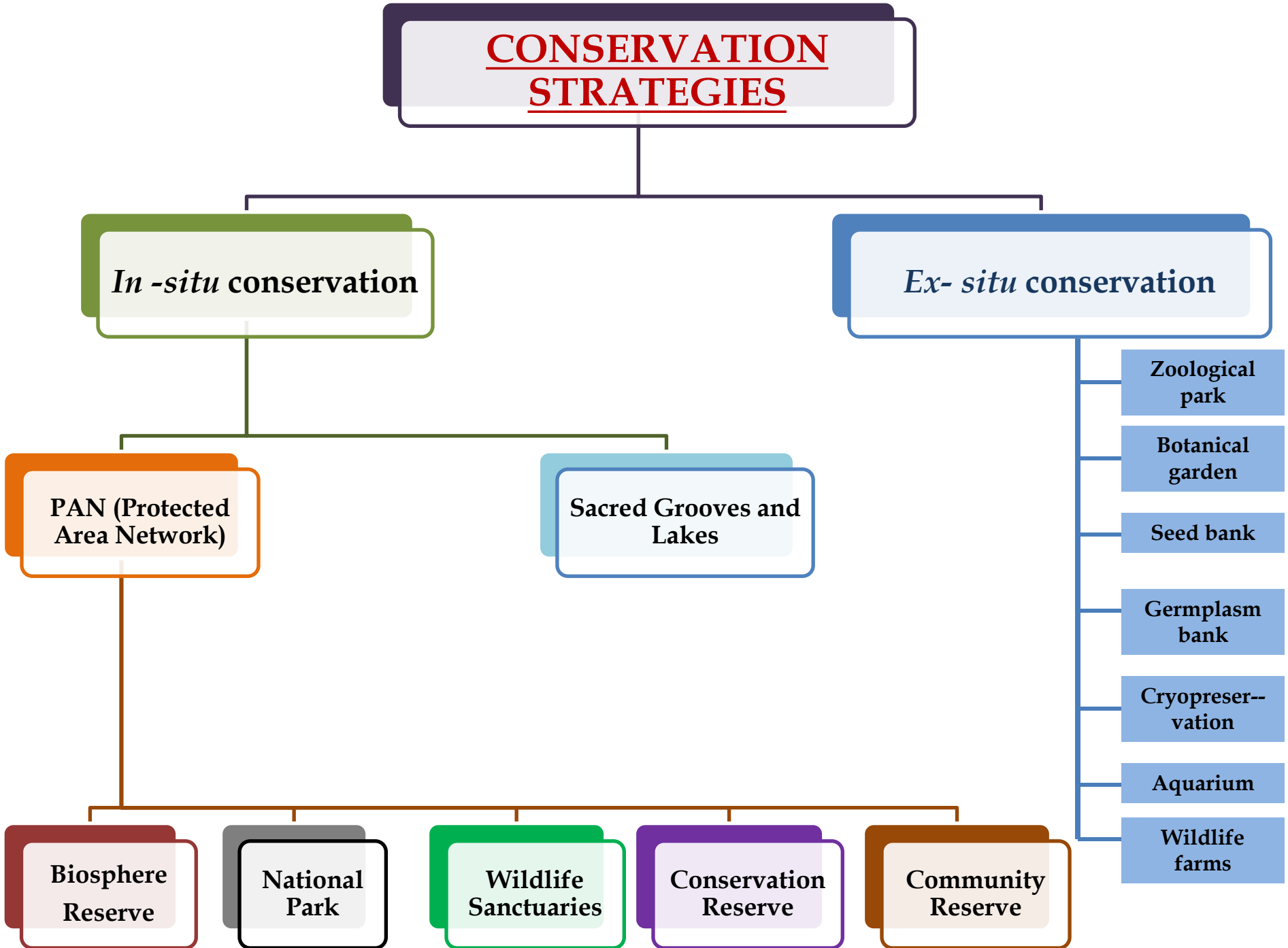
IUCN RED LIST CATEGORIES OF SPECIES



RED LIST CATEGORIES OF SPECIES

S.NO.	CATEGORY	DEFINITION	EXAMPLE
1.	**Extinct**	A taxon is said to be **extinct** when there is no reasonable doubt that the last individual of the species has died	Dodo
2.	**Extinct in wild**	A taxon is said to be **extinct in wild** when the species ceases to exist in their natural habitat but a few member of species still exist in captivity somewhere in the world.	Hawaiian crow
3.	**Critically endangered**	A taxon is said to be **critically endangered** when the species is facing High risk of extinction in the immediate future.	Great Indian bustard
4.	**Endangered**	A taxon is said to be **endangered** when the species is facing High risk of extinction in the near future.	Lion-tailed Macaque
5.	**Vulnerable**	A taxon is said to be **vulnerable** when the species is facing risk of becoming endangered in the medium term future.	Gangetic Dolphin
6.	**Near Threatened**	At present found in sufficient numbers but its population dwindling fast throughout its range so that it can become a threatened species soon.	Red fruit bat
7.	**Least Concerned**	A large population of the species is found so it is of not much concern as there is no risk of it extinction	Sand lizard
8.	**Data Deficient**	Limited data is available for the species to be put in any of the above mentioned category.	Common Stingray
9.	**Not Evaluated**	Status of the species not yet evaluated.	

Source: https://www.iucnredlist.org/


CONSERVATION STRATEGIES
In -situ conservation
Ex- situ conservation
PAN (Protected Area Network)
Sacred Grooves and Lakes
Zoological park
Botanical garden
Seed bank
Germplasm bank
Cryopreser--vation
Aquarium
Wildlife farms
Biosphere Reserve
National Park
Wildlife Sanctuaries
Conservation Reserve
Community Reserve

Difference between *In-situ* Conservation and *Ex-situ* Conservation

In-situ Conservation	Ex-situ Conservation
It means onsite conservation.	It means offsite conservation.
It is the conservation of wild species in their natural habitats in order to maintain and recover endangered species.	It is conservation of species in the man-made habitats that imitate the natural habitats of species.
It is more dynamic as it involves natural habitats of organisms.	It its less dynamic as it involves man-made habitats.
It provides protection to endangered species against predators.	It provides protection against all hostile factors.
It is suitable for animals that are found in abundance.	It is suitable for animals that are not found in abundance.
It is not suitable in the event of a rapid decline in the number of a species due to environmental, genetic or any other factor.	It is an ideal option in case of rapid decline in the number of a species due to environmental or any other reason.
Wildlife and livestock conservation involve in-situ conservation.	It can be used to conserve crops and their wild relatives.
Examples include: 589 PANs (Protected Area Networks) have been created across the country to preserve their very special ecosystems. The Indian Govt. has declared 18 Biosphere reserves across India. National Parks were notified to preserve major wildlife species such as tigers, lions, elephants, and deer. Wildlife Sanctuaries have been created in order to protect highly endangered species of wild plants and animals found nowhere else in the world. Conservation Reserves and Community Reserves should be managed by local people to bring about the conservation of biodiversity while using the area's resources in an equitable and sustainable way. Several lakes and plants are declared sacred to save them in their habitat, such as neem or peepal trees.	Examples include: Zoological Parks are constructed not only for animal viewing, but also for animal breeding. Botanical Parks are sites wherein plant breeds are stored. Seed Banks are facilities for securing seed varieties and later cross-breeding them. There is also another form of preserving a plant by preserving its Germplasm in a Gene Bank that it can be used if needed in future. Cryopreservation is the use of very low temperatures to preserve structurally intact living cells and tissues. Lyophilisation or freeze drying is a process in which water is removed from a product after which it is frozen in vacuum.
It involves designation, management and monitoring of the target species in their natural habitat.	It involves sampling, storage and transfer of target species from their natural habitats to man-made habitats.
It helps maintain the ongoing process of evolution and adaptation within the natural environment of the species.	It separates the animals form the ongoing process of evolution and adaptations within their natural environment.

BIOSPHERE RESERVES

- Biosphere reserves are sites established by countries and recognized under UNESCO's **Man and the Biosphere (MAB)** Programme to promote sustainable development based on local community efforts and sound science.
- The programme of Biosphere Reserve was initiated by **UNESCO in 1971.** The purpose of the formation of the biosphere reserve is to

  a.Conserve in situ all forms of life, along with its support system, in its totality,

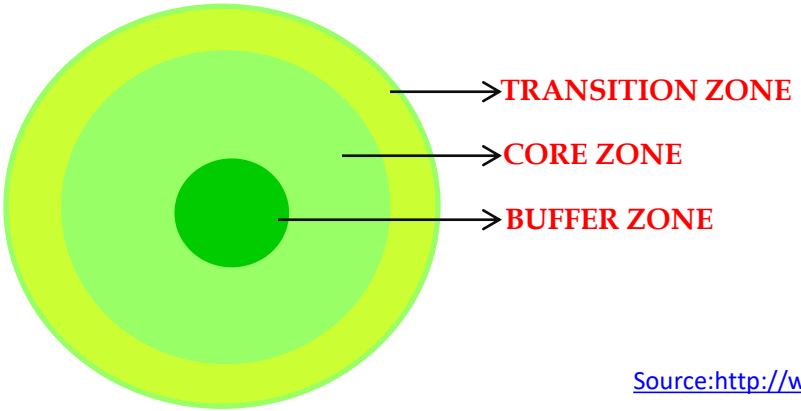
  b.Serve as a referral system for monitoring

  c.Evaluate changes in natural ecosystems.
- The first biosphere reserve of the world was established in 1979, since then the network of biosphere reserves has increased to 701 biosphere reserves in 124 countries, including 21 transboundary sites. Presently, there are 18 notified biosphere reserves in India.
- Biosphere reserves have three interrelated zones that aim to fulfil three complementary and mutually reinforcing functions:

  a.The core area(s) comprises a strictly protected ecosystem that contributes to the conservation of landscapes, ecosystems, species and genetic variation.

  b.The buffer zone surrounds or adjoins the core areas, and is used for activities compatible with sound ecological practices that can reinforce scientific research, monitoring, training and education.

  c.The transition area is the part of the reserve where the greatest activity is allowed, fostering economic and human development that is socio-culturally and ecologically sustainable.



Source:http://www.wiienvis.nic.in/Database/cri_8229.aspx

Difference between In-Situ and Ex-situ Conservation Strategy

S.NO.	ATTRIBUTES	NATIONAL PARK	WILDLIFE SANCTUARY
1.	Definition	National parks (IUCN Category II) is the protected area, which are established by the government, to conserve wildlife and also develop them. Flora, fauna, landscape, historic objects, etc.	Wildlife Sanctuary(IUCN Category IV) , is a natural habitat, owned by the government that safeguards particular species of birds and animals.
2.	Establishment	A National park is an area that is established under the three provisions of the Wild Life Protection Act: ie section 26A, 38 (2) and 66 (3) by state and Central Government respectively.	A sanctuary is an area that is established under the three provisions of the Wild Life Protection Act: ie section 35A, 38 (1) and 66 (3) by state and Central Government respectively.
3.	Objective	To protect the natural and historic objects and wildlife of an area.	To make sure that viable population of the wildlife and their habitats are maintained.
4.	Boundaries and area	Clearly marked boundaries. Area: 0.04-3162 Km^2	Boundaries of wildlife sanctuaries are not sacrosanct. Area: 0.61-7818 Km^2
5.	Permissible Human activities	Highly restricted areas, which are not open to all the people. To visit national parks, official permission is to be taken from the requisite authorities.	have lesser restrictions than national parks.no official permission is to be taken to visit a wildlife sanctuary.
6.	Example	Jim Corbett National park	Okhla Bird Sanctuary

Difference between Community reserve and Conservation reserve

Conservation and community reserves are the 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.

S.NO.	ATTRIBUTES	COMMUNITY RESERVE	CONSERVATION RESERVE
1.	Definition	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 part of the lands are privately owned.	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 part of the lands are privately owned.
2.	Establishment	First introduced in the Wildlife (Protection) Amendment Act of 2002 – the amendment to the Wildlife Protection Act of 1972.	These protected area categories were first introduced in the Wildlife (Protection) Amendment Act of 2002 – the amendment to the Wildlife Protection Act of 1972.
3.	Objective	These categories were added because of reduced protection in and around existing or proposed protected areas due to private ownership of land, and land use.	These categories were added because of reduced protection in and around existing or proposed protected areas due to private ownership of land, and land use.
4.	Example	There are 127 community reserve at present with highest number in Meghalaya (65). Example Kokkare bellur in Karnataka	There are 84 community reserve at present with highest number in Jammu & Kashmir (34). Example Shri naina Devi in Himachal Pradesh

Source:http://www.wiienvis.nic.in/Database/cri_8229.aspx

CONSERVATION PROJECTS: CASE STUDY

Several national wildlife conservation projects are designed and implemented to conserve endangered animals. A few important projects are enlisted below.

1. Project Tiger: Project Tiger was launched in 1973 with the objective to increase the declining tiger population in the country. Several tiger reserves were created throughout the country where limited human interference is allowed only in the buffer zone and no activity is allowed in the core zone. The project is ecosystem oriented with the restoration of the entire ecosystem and hence other wildlife found in the area would be benefitted by it. Starting from nine (9) reserves in 1973-2016 the number is grown up to fifty (50). A total area of 71027.10 km2 is covered by these project tiger areas.

2. **Project Elephant**:PROJECT ELEPHANT was launched by the Government of India in the year 1992 as a Centrally Sponsored Scheme with following objectives:

1. To protect elephants, their habitat & corridors
2. To address issues of man-animal conflict
3. Welfare of captive elephants

The Project is being mainly implemented in 16 States / UTs , viz. Andhra Pradesh, Arunachal Pradesh, Assam, Chhattisgarh, Jharkhand, Karnataka, Kerala, Maharashtra, Meghalaya, Nagaland, Orissa, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh, West Bengal. At present, there are 25 elephant reserves in India.

3**. Indian Crocodile Conservation Project**: This project aims at conservation of threatened crocodile. This is achieved by protecting the remaining population of crocodile by formation of sanctuaries. Also, 'grow and release' or 'rear and release' techniques are used to improve the natural populations.

4**. Project Hangu**l: Hangul or Kashmir stag (Cervus affinis hanglu) lives in dense riverine forests, high valleys, and mountains of the Kashmir valley and northern Chamba in Himachal Pradesh. Their numbers have declined drastically due to habitat loss, overgrazing by domestic animals and poaching. This persuaded the state of Jammu & Kashmir, along with the IUCN and the WWF to initiate project Hangul for the protection of these animals. As a result of this project their population has increased, and they are conserved at Dachigam National Park in Kashmir.

http://www.wiienvis.nic.in/Database/

CONSERVATION PROJECTS: CASE STUDY CONTD…

Jatayu Conservation Breeding Centre, Pinjore

The Vulture Conservation Breeding Centre (VCBC) is a joint project of the Haryana Forest Department and the Bombay Natural History Society (BNHS).
It is a collaborative initiative to save the three species of vultures, the White-backed, Long-billed and Slender-billed, from looming extinction.
The VCBC, earlier known as Vulture Care Centre (VCC), was established in September 2001 with the UK Government's 'Darwin Initiative for the Survival of Species' fund, to investigate the dramatic declines in India's Gyps species of vultures.
The centre played an important role in confirming that diclofenac, a non-steroidal anti-inflammatory drug, given to cattle to treat pain and inflammation, was the main cause of vulture mortality and population crash in vultures due to "Visceral Gout". This happens when there is kidney failure and the uric acid crystals get deposited on the visceral organs. Vultures are exposed to diclofenac when they feed from carcasses of livestock that have died within a few days of treatment and contain residues of the drug. The concentration of diclofenac, as low as 0.22 mg/gm of body weight, was found to be lethal to vultures. JCBC is world's largest facility in terms of numbers of vultures, hosting ever increasing 250 vultures in 2017,[growing annually at the rate of more than 17% per year.

Beej Bachao Andolan

In the late 1980s, the movement was initiated by the group of activists of Hemwal Valley of Tehri and led by a farmer and social activist Vijay Jardhari. 'Beej Bachao Andolan' (Save the Seeds Movement) was started from Jardhargaon of Tehri district, Uttarakhand. Because of the adverse effects of Green revolution, many indigenous practises and seeds have been lost. 'Beej Bachao Andolan' as an awareness campaign in 1989 for farmers to discontinue growing cash crops like peas, potatoes and soybean, and promote indigenous practices like the 'Baranaja'. It is a traditional method of mixed farming and intercropping of twelve species in agriculture.This movement also promotes the traditional practises of the villagers like controlling the pests by using the leaves of walnut and neem

http://haryanaforest.gov.in/en-us/Wild-Life/Protected-Area/Vulture-Conservation-and-Breeding-Centre-Pinjore

http://www.wiienvis.nic.in/Database/

CONSERVATION PROJECTS: CASE STUDY CONTD…

Conservation of Olive Ridley turtle

The Olive ridley turtles are the smallest and most abundant of all sea turtles found in the world, inhabiting warm waters of the Pacific, Atlantic and Indian oceans and are best known for their unique mass nesting called Arribada, where thousands of females come together on the same beach to lay eggs. The species is recognized as Vulnerable by the IUCN Red list. These turtles spend their entire lives in the ocean, and migrate thousands of kilometers between feeding and mating grounds in the course of a year. During this phenomenal nesting, up to 600,000 and more females emerge from the waters, over a period of 5-7 days, to lay eggs in conical nests about one and a half feet deep. The coast of Orissa in India is the largest mass nesting site for the Olive-ridley, followed by the coasts of Mexico and Costa Rica. After about 45-65 days, the eggs begin to hatch, and these beaches are swamped with crawling Olive-ridley turtle babies, making their first trek towards the vast ocean.

Olive-ridleys face serious threats across their migratory route, habitat and nesting beaches, due to human activities such as turtle unfriendly fishing practices, development and exploitation of nesting beaches for ports, and tourist centres. However, the most severe threat they face is the accidental killing of adult turtles through entanglement in trawl nets and gill nets due to uncontrolled fishing during their mating season around nesting beaches.

The olive ridley sea turtle has been listed on Schedule – I of the Indian Wildlife (Protection) Act, 1972 (amended 1991). The species is listed as vulnerable under IUCN. The sea turtles are protected under the 'Migratory Species Convention' and Convention of International Trade on Wildlife Flora and Fauna (CITES). they are still extensively poached for their meat, shell and leather, and their eggs, though illegal to harvest, have a significantly large market around the coastal regions.

Wildlife Protection Society of india (WPSI) launched Operation Kachhapa in September 1998 in collaboration with the Orissa State Forest Department and the Wildlife Society of Orissa and other local NGOs to reduce turtle mortality and try to safeguard the future of the species by concentrating on three main activities:

- To improve patrolling of non-fishing zones and the protection of nesting sites.
- To support legal action on turtle conservation and fishing law violations.
- To build public support and awareness of sea turtle conservation issues.

https://www.wwfindia.org/about_wwf/priority_species/lesser_known_species/olive_ridley_turtle/

INTERNATIONAL TREATIES, CONVENTIONS AND ORGANIZATIONS

i) Convention on International Trade in Endangered species of wild flora and fauna (CITES) 1973

CITES is an international agreement between governments to ensure that international trade in specimens of wild animals and plants does not threaten their survival. Representatives of 80 countries met and agreed the text of the convention at a meeting held in Washington, D.C., the United States of America, on 3 March 1973. CITES entered in force on 1 July 1975. This treaty is now signed by 178 countries and gives protection to 5,000 species of animals and 29,000 species of plants against over-exploitation through international trade. These species are listed in the three CITES Appendices. India became a party to this treaty in 1976. CITES has helped reduced international trade in many threatened animals including elephants, crocodiles and chimpanzees. However, the effects of treaty are limited because of the following reasons:

- Enforcement is difficult and spotty
- Convicted violators often pay only small fines
- Member countries can exempt themselves from protecting any listed species
- Much of the highly profitable illegal trade in wild life and wildlife products goes on in countries that have not signed the treaty.

ii) Convention on Biological diversity (CBD) 1993

The Convention on Biological Diversity (CBD) entered into force on 29 December 1993. It has 3 main objectives:

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

This convention is signed by 172 countries and it legally binds the signatory governments to check the global decline of biodiversity. However, implementation of the treaty is very slow as some key countries like US have not signed the treaty and it has no severe penalties or other enforcement mechanisms.

NATIONAL LAWS (IN INDIA)

These laws are made to give protection to animals by legislation. Some of the important Government Organizations/ Acts working for the conservation of wildlife in India are as follows:

- Wildlife Protection Act 1972 amended 1991.
- Indian Board of wildlife (IBWL)–established in 1952
- National wildlife action plan, 1982 endorsed by IBWL
- Forest Act XVI in 1927
- Forest Conservation Act, 1981
- Prevention of Cruelty to Animals Act, 1960

Wildlife Protection Act 1972 amended 1991

Of the above-mentioned acts, the most important is Wildlife Protection Act 1972. It is a comprehensive central legislation that was enacted in 1972 for providing special legal protection to our wild life in general and to endangered species in particular. For infringement of provisions of this act, very stringent punishments have been provided. According to this act, the following activities are strictly prohibited:

- Possession, trapping, shooting of wild animals alive or dead
- Serving their meat in eating houses
- Their transport and export are all controlled and watched by special staff
- Hunting of female and young ones strictly prohibited
- Threatened species are absolutely protected.

Salient Features of Wildlife Protection Act

This Act provides for the protection of a listed species of animals, birds and plants, and also for the establishment of a network of ecologically-important protected areas in the country.

- The Act provides for the formation of wildlife advisory boards, wildlife wardens, specifies their powers and duties, etc.
- It helped India become a party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
- The Act prohibited the hunting of endangered species.
- Scheduled animals are prohibited from being traded as per the Act's provisions.
- The Act provides for licenses for the sale, transfer and possession of some wildlife species.
- It provides for the establishment of wildlife sanctuaries, national parks, etc.
- Its provisions paved the way for the formation of the Central Zoo Authority. This is the central body responsible for the oversight of zoos in India. It was established in 1992.
- The Act created six schedules which gave varying degrees of protection to classes of flora and fauna.
- Schedule I and Schedule II (Part II) get absolute protection and offences under these schedules attract the maximum penalties.
- The schedules also include species which may be hunted.
- The National Board for Wildlife was constituted as a statutory organisation under the provisions of this Act (an advisory board that offers advice to the central government on issues of wildlife conservation in India chaired by the Prime Minister)
- The Act also provided for the establishment of the National Tiger Conservation Authority with an overall supervisory and coordination part, performing capacities as given in the Act. It gives statutory authority to Project Tiger which was launched in 1973 and has put the endangered tiger on a guaranteed path of revival by protecting it from extinction.

HUMAN -ANIMAL CONFLICT

Conflict between people and animals is one of the main threats to the continued survival of many species in different parts of the world, and is also a significant threat to local human populations.

Why is this conflict increasing?

Reasons

- Human population explosion,
- Shrinking forest cover,
- Poaching,
- Rapid and unplanned urbanisation, which entails electrification penetrating into forest areas,
- Increasing road density,
- Destruction of natural animal corridors,
- Agricultural expansion and cultivation up to forest boundaries.
- As city land continues to become inadequate for growing human needs, boundaries are pushed into the forest land, making wetlands and forest patches dry up. Wildlife, thus, is disturbed, homeless and starved.

Impacts

- People lose their crops, livestock, property, and sometimes their lives.
- The animals, many of which are already threatened or endangered, are often killed in retaliation or to 'prevent' future conflicts.

Examples:

- According to the State of the Forest Report 2017, Delhi has lost about 0.2 sq km of very dense forest and 0.9 sq km of moderately dense forest since 2015. Moreover, according to the NCR Planning Board, over 32,000 hectares of green areas were lost from 1999-2012.. The consequences are obvious. Complaints of conflicts with monkeys, leopards, snakes, monitor lizards, civet cats and birds have seen a huge jump in the NCR region.
- Human-elephant conflict in North Bengal, Assam and Southern India.
- Human-rhesus macaque interactions in Himachal Pradesh, northern India
- human- tiger conflict around Sundarban Tiger Reserve, Ranthambore.

Preventive measures

- To control poaching
- Wildlife corridors to provide a safe pathway to animals in the human-inhabited and developed areas.
- Awareness Programmes
- Solar or stone Fencing around agriculture fields.
- Paying Compensation to the to the victims of wildlife attack so that the people will not become enemy of the wild animals.
- Eco-development activities
- Eco-Tourism.
- Use of ICT some Information technology tools like GPS, high-frequency radio collars etc. can help track the movement of animals and warn the local population.
- Land-use planning -. Protecting key areas for wildlife, creating buffer zones and investing in alternative land uses