Conservations of Biodiversity: In-Situ Conservation and Ex-Situ Conservation

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Conservation is the protection, preservation, management, or restoration of wildlife and natural resources such as forests and water. Through the conservation of biodiversity and the survival of many species and habitats which are threatened due to human activities can be ensured. There is an urgent need, not only to manage and conserve the biotic wealth, but also restore the degraded ecosystems.

Humans have been directly or indirectly dependent on biodiversity for sustenance to a considerable extent. However, increasing population pressure and developmental activities have led to large scale depletion of the natural resources.

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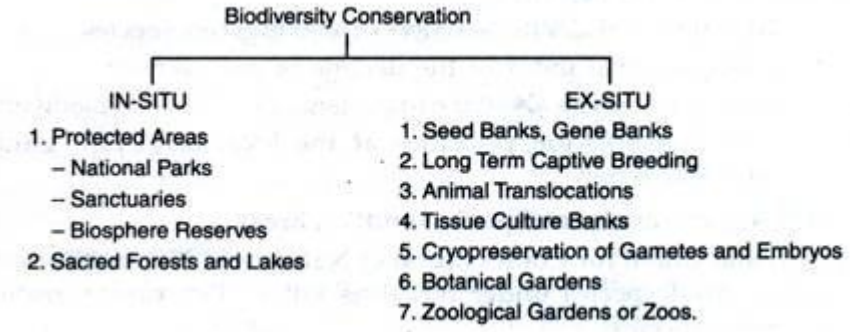
Types of Conservation:

Conservation can broadly be divided into two types:

1. In-situ conservation

2. Ex-situ conservation



In-situ Conservation:

In-situ conservation is on site conservation or the conservation of genetic resources in natural populations of plant or animal species, such as forest genetic resources in natural populations of tree species.

It is the process of protecting an endangered plant or animal species in its natural habitat, either by protecting or cleaning up the habitat itself, or by defending the species from predators.

It is applied to conservation of agricultural biodiversity in agro forestry by farmers, especially those using unconventional farming practices. In-situ conservation is being done by declaring area as protected area.

In India following types of natural habitats are being maintained:

1. National parks

2. Wildlife sanctuaries

3. Biosphere reserves

INDIA has over 600 protected areas, which includes over 90 national parks, over 500 animal sanctuaries and 15 biosphere reserves.

1. National Parks:

A national park is an area which is strictly reserved for the betterment of the wildlife and where activities like forestry, grazing on cultivation are not permitted. In these parks, even private ownership rights are not allowed.

Their boundaries are well marked and circumscribed. They are usually small reserves spreading in an area of 100 Sq. km. to 500 sq. km. In national parks, the emphasis is on the preservation of a single plant or animal species.

Table. List of some major National Parks of India:

S.No.	Name	State	Established	Area (in km^2)
1.	Corbett National Park	Uttarakhand	1921	1318.5
2.	Dudhwa National Park	Uttar Pradesh	1977	490.29
3.	Gir National Park	Gujarat	1965	258.71
4.	Kanha National Park	Madhya Pradesh	1955	940

5.	Kanger Ghati National Park (Kanger Valley)	Chhattisgarh	1982	200
6.	Kaziranga National Park	Assam	1974	471.71
7.	Nanda Devi National Park	Uttarakhand	1982	630.33
8.	Sariska National Park	Rajasthan	1955	866
9.	Silent Valley National Park	Kerala	1980	237
10.	Sundarbans National Park	West Bengal	1984	1330.12

2. Wildlife Sanctuaries:

A sanctuary is a protected area which is reserved for the conservation of only animals and human activities like harvesting of timber, collecting minor forest products and private ownership rights are allowed as long as they do not interfere with well-being of animals. Boundaries of sanctuaries are not well defined and controlled biotic interference is permitted, e.g., tourist activity.

Table. List of some major Wildlife Sanctuaries of India:

S.No.	Name	State	Established	Area (in km^2)
1.	Ghana Bird Sanctuary	Rajasthan	1982	28.73
2.	Hazaribag Wildlife Sanctuary	Jharkhand	1954	183.89
3.	Mudumalai Wildlife Sanctuary	Tamil Nadu	1940	321.55
4.	Jaldapara Wildlife Sanctuary	West Bengal	2012	216
5.	Mount Abu Wildlife Sanctuary	Rajasthan	1960	288.84
6.	Anamalai Wildlife Sanctuary (Indira Gandhi Wildlife	Tamil Nadu	1989	117.10

Sanctuary and
National Park)

3. Biosphere Reserves:

It is a special category of protected areas where human population also forms a part of the system. They are large protected area of usually more than 5000 sq.km. A biosphere reserves has 3 parts- core, buffer and transition zone.

1. Core zone is the inner zone; this is undisturbed and legally protected area.

2. Buffer zone lies between the core and transition zone. Some research and educational activities are permitted here.

3. Transition zone is the outermost part of biosphere reserves. Here cropping, forestry, recreation, fishery and other activities are allowed.

The main functions of biodiversity reserves are:

1. Conservation:

To ensure the conservation of ecosystem, species and genetic resources.

2. Development:

To promote economic development, while maintaining cultural, social and ecological identity.

3. Scientific Research:

To provide support for research related to monitoring and education, local, national and global issues.

Biosphere reserves serve in some ways as 'living laboratories' for testing out and demonstrating integrated management of land, water and biodiversity.

Table. List of some major Biosphere Reserves of India:

S.No.	Name	State	Established	Area (in km^2)
1.	Nanda Devi	Uttarakhand	1982	5,860.69
2.	Manas	Assam	1990	2837
3.	Gulf of Mannar	Tamil Nadu	1980	10,500
4.	Great Nicobar	Andaman and Nicobar Islands	1989	885

5.	Panchmarhi	Madhya Pradesh	1999	4,926.28

Advantages of in-situ conservation:

1. The flora and fauna live in natural habitats without human interference.

2. The life cycles of the organisms and their evolution progresses in a natural way.

3. In-situ conservation provides the required green cover and its associated benefits to our environment.

4. It is less expensive and easy to manage.

5. The interests of the indigenous people are also protected.

Ex-Situ Conservation:

Ex-situ conservation is the preservation of components of biological diversity outside their natural habitats. This involves conservation of genetic resources, as well as wild and cultivated or species, and draws on a diverse body of techniques and facilities. Such strategies include establishment of botanical gardens, zoos, conservation strands and gene, pollen seed, seedling, tissue culture and DNA banks.

i. Seed gene bank:

These are cold storages where seeds are kept under controlled temperature and humidity for storage and this is easiest way to store the germ plasma of plants at low temperature. Seeds preserved under controlled conditions (minus temperature) remain viable for long durations of time.

ii. Gene bank:

Genetic variability also is preserved by gene bank under normal growing conditions. These are cold storages where germ plam are kept under controlled temperature and humidity for storage; this is an important way of preserving the genetic resources.

iii. Cryopreservation:

This is the newest application of technology for preservation of biotic parts. This type of conservation is done at very low temperature (196°C) in liquid nitrogen. The metabolic activities of the organisms are suspended under low temperature, which are later used for research purposes.

iv. Tissue culture bank:

Cryopreservation of disease free meristems is very helpful. Long term culture of excised roots and shoots are maintained. Meristem culture is very popular in plant propagation as it's a virus and disease free method of multiplication.

v. Long term captive breeding:

The method involves capture, maintenance and captive breeding on long term basis of individuals of the endangered species which have lost their habitat permanently or certain highly unfavorable conditions are present in their habitat.

vi. Botanical gardens:

A botanical garden is a place where flowers, fruits and vegetables are grown. The botanical gardens provide beauty and calm environment. Most of them have started keeping exotic plants for educational and research purposes.

vii. Animal Translocation:

Release of animals in a new locality which come from anywhere else.

Translocation is carried in following cases:

1. When a species on which an animal is dependent becomes rare.

2. When a species is endemic or restricted to a particular area.

3. Due to habit destruction and unfavorable environment conditions.

4. Increase in population in an area.

viii. Zoological Gardens:

In zoos wild animals are maintained in captivity and conservation of wild animals (rare, endangered species). The oldest zoo, the Schonbrumm zoo which exists today also, was established in VIENNA in 1759.

In India, the 1st zoo came into existence at BARRACKPORE in 1800. In world there are about 800 zoos. Such zoos have about 3000 species of vertebrates. Some zoos have undertaken captive breeding programmes.

Advantages of ex-situ preservation:

1. It is useful for declining population of species.

2. Endangered animals on the verge of extinction are successfully breeded.

3. Threatened species are breeded in captivity and then released in the natural habitats.

4. Ex-situ centres offer the possibilities of observing wild animals, which is otherwise not possible.

5. It is extremely useful for conducting research and scientific work on different species.

Difference between “In-situ Conservation” and “Ex-situ Conservation”

Some of the major Differences between In-situ and ex-situ Conservation are as follows:

In situ Conservation:

1. It is conservation of endangered species in their natural habitats.

2. The endangered species are protected from predators.

3. The depleting resources are augmented.

4. The population recovers in natural environment.

Ex situ Conservation:

1. It is conservation of endangered species outside their natural habitats.

2. The endangered species are protected from all adverse factors.

3. They are kept under human supervision and provided all the essentials.

4. Offspring produced in captive breeding are released in natural habitat for acclimatization.
