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Conservation of Biodiversity: Preserving Earth's Ecology

Ms. Meenakshi Jhanwar
Assistant Professor, Department of Environmental Science, Presidency University, Bangalore, India
Email Id-meenakshi@presidencyuniversity.in

ABSTRACT:

A vital component in preserving the diversity of species on Earth and preserving ecological function is biodiversity conservation. This summary gives a general overview of the significance of biodiversity protection and emphasises the major discoveries and deductions made from in-depth study. The enormous variety of plant and animal species, genetic diversity, and environmental diversity are all included in the concept of biodiversity. It offers a wide range of ecological, monetary, and cultural advantages, including as food security, ecosystem services, and the development of novel drugs. The loss of biodiversity has been caused by human actions such habitat destruction, pollution, climate change, and overexploitation. The goal of biodiversity conservation is to save and sustainably manage species, ecosystems, and genetic resources. It encompasses a number of tactics, including as the creation of protected areas, habitat restoration, the reintroduction of species, and the encouragement of sustainable land and resource management techniques. For efficient biodiversity protection, cooperation between governmental entities, organisations, local communities, and people is essential.

KEYWORDS:

Conservation, National, Natural, Preservation, Protection, Species, Wild.

I. INTRODUCTION

However, the preservation of specific ecosystems and representative portions of the nation's many plant types hold the key to the survival of natural biodiversity also working to save certain species that are in danger of becoming extinct. The increase in the number of plant and animal species that are endangered has led both governmental and non-governmental organisations to take some action in this area. State administrations largely controlled forestry and wildlife, but subsequently, in response to the seriousness of the crisis, a distinct Ministry of Environment and Forests was formed [1]–[4]. The aims and objectives of wildlife management in India includes the following

- **a)** Protection of natural habitats.
- **b)** Maintenance of a viable number of species.
- **c)** Establishment of biosphere reserves.
- **d)** Protection through legislation.

Some of the non-government organizations working in this direction are

- **i.** Bombay Natural History Society.
- **ii.** Wildlife Preservation Society of India, Dehradun.
- **iii.** World Wide Fund for Nature India (WWF).
- **iv.** Laws Governing Biodiversity Conservation in India
  - **a)** The Madras Wild Elephant Preservation Act, 1873.
  - **b)** All India Elephant Preservation Act, 1879.
  - **c)** The Indian Fisheries Act, 1897.
  - **d)** Wild Birds and Wild Animals Protection Act, 1912.
  - **e)** The Indian Forest Act, 1927.
  - **f)** Bengal Rhinoceros Act, 1932.
  - **g)** Haily National Park Act. 1936.
  - **h)** Bombay Wild, Animals and Wild Birds Protection Act, 1951.
  - **i)** Assam Rhinoceros Protection Act, 1954.
  - **j)** The Cruelty Against Animals Act, 1960.

k) The Wildlife (Protection) Act, 1972.
l) The Forest (Conservation) Act, 1980.
m) Wildlife (Protection) Amendment Act; 1991.

Conservation of Forests and National Ecosystems Act, 1994

Biodiversity Conservation In-Situ and Out-Situ

There are many strategies to achieve the objective of conserving biodiversity. All of these techniques are governed by the idea of gene banks.

In-situ conservation

It is the preservation of organisms in their original ecosystems, or even in ecosystems created by humans, where they naturally exist. Wild plants and animals may benefit from this kind of conservation since it works to preserve populations within their natural settings. This category includes the idea of protected places, such as National Parks, Sanctuaries, Biosphere Reserves, etc.

Ex-situ conservation

It may be characterised as the preservation of plants and animals outside of their natural environments, including the gathering of genetic diversity sample specimens and their care in a lab where they are cultivated. Since it is crucial for the preservation of agricultural crops and forestry-based afforestation operations, the idea of gene banks has predominantly become the discourse for ex-situ conservation. The term genetic resource centres refer to establishments like zoos and botanical gardens.

Institutions For Ex-Situ Conservation of Biodiversity

(a) National Bureau of Plant Genetic Resources (NBPGR)

The facility was created in 1976 for Ex-Situ conservation of plant genetic resources for agri-horticultural and Agri-silvicultural operations by the Indian Council of Agricultural Research (ICAR) New Delhi. Gene banks built-in long-term cold storage have erected in New Delhi for 20°C temperature preservation of genetic material. According to Khanna and Singh (1987), the NBPGR now has roughly 48.5 thousand accessions of several kinds of commercially significant plants. After India gained its independence, a number of scientific institutions focused on the preservation of genetic material from diverse agricultural species were founded. They are the Indian Institute of Horticultural Research in Bangalore, the Rice Research Institute in Cuttack, and the Potato Research Institute in Shimla.

(b) National Bureau of Animal Genetic Resources (NBAGR)

It was founded in Kamal, Punjab, in the 1980s to preserve the numerous kinds of improved cattle, including cows, buffaloes, goats, sheep, camels, and oxen, that may be found across India. The National Bureau of Fish Genetic Resources in Lucknow and the Wildlife Research Institute of India in Dehradun are further organisations for the ex-situ preservation of animal germplasm. A gene bank of all domesticated and wild animals from India is developing at WRI.

Protected areas of India for In-Situ Conservation of Biodiversity:

Three types of protected areas-

i. Wildlife Sanctuaries.
ii. National Park.
iii. Biosphere Reserves were created in India for In-Situ conservation of biodiversity.

As of March 31, 1994, India has 421 wildlife sanctuaries, 75 national parks, and 14 biosphere reserves, totaling nearly 4% of the country's land area. A vast network of protected areas includes in-situ protection of species. There are several types of protected areas, each of which is governed with a specific goal of advancing civilization. National parks, sanctuaries, biosphere reserves, and other large protected places are among them. The size, design, purpose, and management effectiveness of these sectors vary greatly [5]–[8].

II. DISCUSSION

National Park

A National Park is an area dedicated by statute for all time to conservation of the scenery, natural and historical objects, conservation of the wildlife therein, and provision for enjoyment of the same in such manner and by such means, that will leave them unimpaired for the enjoyment of future generations with such modification as local conditions may demand, the Indian Board for Wild Life (IBWL) states. When the Hailey (now Corbett) national parks of United Provinces (now Uttar Pradesh) were established in 1936, the history of national parks in India officially began. The region is designated for the lifetime conservation and preservation of wild animal life and natural vegetation for the general public's profit, pleasure, and enjoyment. It is forbidden to hunt animals or harvest plants in this region without authorized by the park management.

Sanctuary

An area where killing, hunting, shooting, or capturing of any species of bird or animal is prohibited except by or under the control of highest authority in the department responsible for the management of the sanctuary and whose boundaries and character should be sacrosanct as possible,' according to the Indian Board for Wild Life. India has 416 sanctuaries as of June 1992. While the administration of sanctuaries does not include suspending or restricting regular forest work, the Board has further clarified its stance by noting that it is preferable to set aside a wholly sacred region inside a sanctuary to be designated as Abhyaranya. It has also said that public access to sanctuaries is necessary. In India, a sanctuary is typically established by a state government decree or gazette announcement. Because it is not protected by appropriate law, a sanctuary's shortcoming is that it may be declared sanctuary by a state government simply by issuing another order or publishing a gazette announcement.

The goal of both a national park and a wildlife sanctuary is to protect, preserve, and conserve wild species to the fullest extent possible. But the key distinction between the two is that a national park may only be damaged, eliminated, or amended by State law, but a sanctuary is established by order of a competent authority, who may be the chief conservator of forests or a minister of a State. There exist, and the level of permanence and protection in a national park is far greater than in a sanctuary. Private ownership rights and forestry practises are allowed to remain in a wildlife sanctuary as long as there is no negative impact on the protection of the wildlife. However, all private ownership rights are suspended and all forestry and other uses are forbidden in national parks. Every national park should offer the bare minimum in terms of wildlife, plants, and other natural features. A sanctuary must have enough management and protection tools to be promoted to national park status.

Biosphere Reserves

According to certain definitions, biosphere reserves are both unaltered natural regions for scientific research and places where disturbance conditions are under control. These act as hubs for ecological study and habitat preservation. The nation is divided into two realms and twelve biogeographical regions, including Assam-Burma, Bengal, Ladakh, the Himalayas, the Highlands, Malabar, and the Indus-Ganga. Lakshd weep, Andaman, Nicobar Islands, the Thar Desert, and the Coromandel Deccan.

Place in India

For the United Nations Environment Programme (UNEP), the South Asia Cooperation Environment Programme (SACEP), and the International Union for Conservation of Nature and Natural Resources (IUCN), India's Department of Environment serves as the nodal agency. India has been actively taking part in UNEP's numerous sessions in an effort to make sure that its activities are more applicable to developing nations. Afghanistan, Bangladesh, Bhutan, India, Maldives, Pakistan, Sri Lanka, and Iran are among the nations that make up the intergovernmental organisation that was recently established by the South Asia Cooperative Environment Programme. Areas for implementation were determined in the 1981 ministerial level conference. India was given the responsibility of serving as the focal point for the management of wild animals, environmental legislation, and environmental education.

Several projects were chosen for execution during the 1983 SACEP Government Meeting in the areas of energy, environmental science, legislation, and environmental impact assessment. India now participates in a variety of bilateral programmes with both developed and developing nations. The development policy and constitutional mandates (Articles 48 and 51-A) have given lawmakers a solid foundation upon which to establish the necessary legislative measures for environmental preservation. Various laws that are directly relevant to environmental protection are sometimes passed. The Insecticides Act of 1968, the Wildlife Protection Act of 1972, the Water

(Prevention and Control of Pollution) Act of 1974, the Water Pollution Act of 1977, the Forest Conservation Act of 1980, and the Air (Prevention and Control of Pollution) Act of 1981 are some of the more recent ones.

The Endangered Species Act

A significant new method to wildlife conservation was introduced with the passage of the U.S. Endangered Species Act in 1973 and the establishment of the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 1976. Threatened species are those that have had a considerable reduction in overall populations and may be in risk of becoming extinct in certain areas, as opposed to endangered species, which are thought to be in immediate danger of extinction. Important species are either naturally scarce or have been severely threatened by human activity. A variety of native orchids and other uncommon flora, as well as bald eagles, grey wolves, brown (or grizzly) bears, sea otters, and other species are all categorized as either fragile or threatened.

Convention on International Trade in Endangered Species (CITES)

A crucial step towards the global preservation of threatened flora and fauna was taken with the adoption of the 1975 Convention on International Trade in Endangered Species (CITES). It controlled the trade of live samples and goods made from the designated species. India has ratified this agreement. The signing nations all agreed that:

i. Wild plants and animals in their native habitats are irreplaceable.
ii. That the countries are conscious of the increasing aesthetic, scientific, cultural, and recreational worth of wild flora and animals.
iii. That the preservation of the natural world is a shared duty of all people.
iv. That in order to stop the trade in endangered plant and animal species, there must be international cooperation.

Special Projects

Project Tiger

The Indian Board for Wildlife established a special task group in 1970 to create an action plan to protect the tiger population in India as a result of the rapidly declining tiger population. As a consequence, Project Tiger was established on April 1 of that year with the following goals:

i. To conserve regions rich in biodiversity as a national treasure for the sake of education and recreation.
ii. To maintain a healthy population of tigers for scientific, cultural, and ecological reasons.
iii. To encourage the eradication of all types of human exploitation and disturbance from the core zones, nine Tiger Reserves were created in the years 1973–1974

Gir Lion Project

The Gujarati Gir Forest is presently the only place where the Asiatic lion is kept. They were kept in the sanctuary, around 200 of them. The significant decline in population was brought on by the increasing danger posed by overgrazing, the extinction of prey species, etc. Due to famine, disease, or human intervention, the Asiatic lion was in risk of becoming extinct. The State government in 1972 The Gujarati Gir Forest is presently the only place where the Asiatic lion is kept. They were kept in the sanctuary, around 200 of them. The significant decline in population was brought on by the increasing danger posed by overgrazing, the extinction of prey species, etc. Due to famine, disease, or human intervention, the Asiatic lion was in risk of becoming extinct. The State government in 1972.

Himalayan Musk Deer Project

The musk deer (Moschus moschiferus), which was previously common across the Himalayan region, has suffered greatly as a result of its musk being utilised to make cosmetics and medications. Second, their number saw a dramatic drop as a result of habitat degradation. Thus, a conservation initiative was started in the Kedarnath sanctuary in Uttar Pradesh.

Crocodile Breeding Project

By the early 1970s, the populations of the three crocodile species the gharial (Cavialis gangeticus), the mugger (Crocodylus palusstris), and the saltwater crocodile (Crocodylus porosus had all seen a rapid drop. The Indian government started a project to control and produce crocodiles with help from the UNDP. In Orissa, the initiative was first introduced in 1975. The project plan was then expanded to include the states of Uttar Pradesh,

Rajasthan, West Bengal, Tulsi Nagaland, Assam, Bihar, Kerala, Gujarat, and Nagaland. As a consequence, all three species' populations have significantly risen [9], [10].

Project Elephant

To safeguard and preserve the nation's elephant population, the Project Elephant was established. The goal of Project Elephant was to repair elephant habitats that had been damaged. In Rajaji National Park, effort was done to restore elephant habitat, create migration corridors, remove human disturbance, and construct a data base on elephant movement and population dynamics.

III. CONCLUSION

To maintain the ecological balance, protect ecosystem services, and assure the welfare of current and future generations, biodiversity protection is of utmost importance. Preserving genetic variety supports the survival of a diverse range of crops that may be disease resistant, as well as potentially helpful biochemicals such as those used in medicine. It also implies that species are available for pollination and pest management. Protected areas, sustainable resource management, and community engagement are among the techniques that must be used in conjunction. We can safeguard our natural heritage, support resilient ecosystems, and promote a more sustainable and harmonious interaction between people and environment by prioritizing biodiversity conservation and putting sustainable practices into practice.

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