

Course- M.Sc. Botany Part -II Paper- XII
Topic- Biodiversity-
(Global Efforts to Conserve Biodiversity)
(Environmental Biology)

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Biodiversity:

Biodiversity, also called biological diversity, the variety of life found in a place on Earth or, often, the total variety of life on Earth. A common measure of this variety, called species richness, is the count of species in an area. Colombia and Kenya, for example, each have more than 1,000 breeding species of birds, whereas the forests of Great Britain and of eastern North America are home to fewer than 200. A coral reef off northern Australia may have 500 species of fish, while the rocky shoreline of Japan may be home to only 100 species. Such numbers capture some of the differences between places—the tropics, for example, have more biodiversity than temperate regions—but raw species count is not the only measure of diversity. Furthermore, biodiversity encompasses the genetic variety within each species and the variety of ecosystems that species create.

Conservation of Biodiversity:

One of the most pressing environmental issues today is the conservation of biodiversity. Many factors threaten the world's biological heritage. The challenge is for nations, government agencies, organizations and individuals to protect and enhance biological diversity, while continuing to meet people's needs for natural resources.

This challenge exists from local to global scales. If not met, future generations will live in a biologically impoverished world and perhaps one that is less capable of producing desired resources as well.

Conserving biological diversity involves restoring, protecting, conserving or enhancing the variety of life in an area so that the abundance and distribution of species and communities provide for continued existence and normal ecological functioning, including adaptation and extinction. Today our biosphere is in danger of extinction for a variety of reasons like lack of conservation in ecological planning; and destruction of natural habitats as space is given over to either alternative uses or is over-exploited and polluted. It is reported that during the next 20 to 30 years, the world would lose more than a million species of plants and animals—primarily because of environmental changes brought about by human beings. This demands an urgent attention for the conservation of biosphere.

The Global biodiversity assessment warns, “Unless actions are taken to protect biodiversity, we will lose forever the opportunity of reaping its full potential benefit to humankind.” Effective and implementable methods of stopping further genetic erosion and fostering the rehabilitation of degraded ecosystems in mega biodiversity regions are the need of the hour. Efforts have been initiated to save biodiversity both by ex-situ and in-situ conservation.

In-situ Conservation:

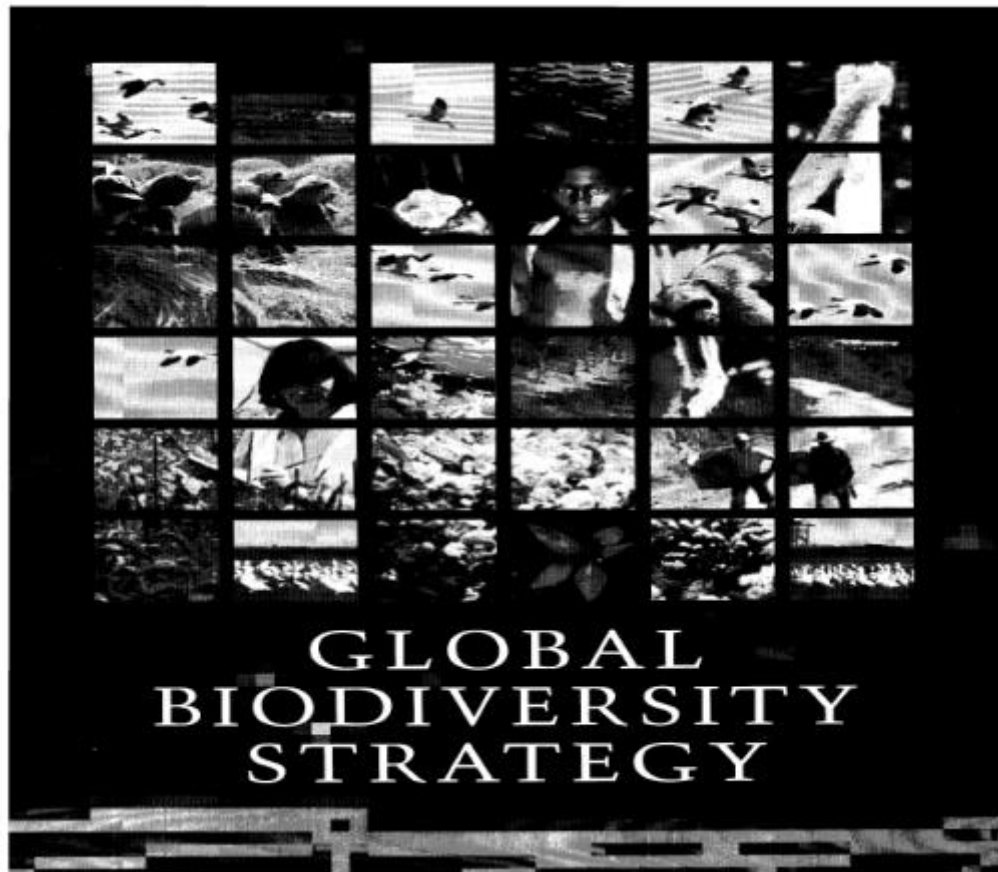
This type of conservation includes conservation of plant and animals in their native ecosystems or in man-made ecosystem where they naturally occur.

This type of conservation applies only to wild fauna and flora and not to the domesticated animals and plants because conservation is possible by protection of population in nature.

In-situ conservation includes a system of protected areas of different categories, e.g., National Park, Sanctuaries, Biosphere Reserves, Cultural Landscapes, and National Monument etc. According to the World Conservation Union, protected area is defined as: “An area of land and/or sea specially dedicated to the protection and maintenance of biological diversity and of natural and associated cultural resources and managed through legal or other effective mean.”

Ex-situ Conservation:

Ex-situ conservation means conservation of species (sample of genetic diversity), particularly of endangered species away from their natural habitat. It is done through establishment of ‘gene banks’, which include genetic resource centres, Botanical gardens, Cultural collection and Zoos etc.



Global Efforts to Conserve Biodiversity:

The importance of biodiversity has been promoted by the International Convention on Biological Diversity, part of Earth Summit held in Rio de Janeiro in 1992. The convention was signed by 152 nations committing that by law to adopt ways and means of conserving biodiversity and to ensure and equity of benefits from biological diversity.

The USA was notable by its refusal to sign, but it was later ratified a new administration. The convention has spawned many international initiatives and projects while continuing meetings to develop it then.

It has laid the foundation for a unified and inclusive approach to global biodiversity including the collaborative efforts of developed nations, which possess the financial means and scientific expertise required for effective conservation and the developing world water most of biodiversity resides.

Another product of Earth Summit Agenda 21, also addresses the conservation of biological diversity but is not legally binding Agenda 21 is a blue print to encourage sustainable development in the 21st century and recommendations for strong living the role of major groups, including women in sustainable development.

The exploitations of indigenous knowledge by foreign interest are recognized by the Convention on Biological Diversity which refers to the sovereign rights of resources. There is an International Alliance to the indigenous trivial developed of the tropical

forest which issued a Forest People Charter setting out conservation policy based on the rights of these peoples to their forests.

To achieve conservation of biological diversity it is usually necessary to establish protected area to reintroduce some species, to restore ecosystems and to manage or eradicate previously introduced plants and animals conservation strategies must exist at a range of different levels of detail and scale to accommodate the markedly different political scales at which conservation objectives are directed such strategies form the basis of conservation legislation.

The IUCN has provided a link between NGOs, government agencies and sovereign states. The conservation in the International and export. Trade in endangered species (CITES) has been successful in preventing the illegal import of many rare species and animal products and has been credited with saving the elephant from extinction. More recently Antarctic sea and marine wildlife have been given specific protection and mining has been banned. The protocol on Environmental protection to the Antarctic Treaty (1992) draws together this whole strategy with one document including how environment damage should be monitored and a requirement to report on the progress of species protection measures.

THE STRATEGY FOR BIODIVERSITY CONSERVATION:

The Strategy in Brief:

Catalyzing action through international cooperation and national planning.

1. Establishing a national policy framework for biodiversity conservation -
 - Reform existing public policies that invite the waste or misuse of biodiversity.
 - Adopt new public policies and accounting methods that promote conservation and the equitable use of biodiversity.
 - Reduce demand for biological resources.

2. Creating an international policy environment that supports national biodiversity
 - Integrate biodiversity conservation into international economic policy.
 - Strengthen the international legal framework for conservation to complement the Convention on Biological Diversity.
 - Make the development assistance process a force for biodiversity conservation.
 - Increase funding for biodiversity conservation, and develop innovative, decentralized, and accountable ways to raise funds and spend them effectively.

3. Creating conditions and incentives for local biodiversity conservation –
 - Correct imbalances in the control of land and resources that cause biodiversity loss, and develop new resource management partnerships between government and local communities.
 - Expand and encourage the sustainable use of products and services from the wild for local benefits.
 - Ensure that those who possess local knowledge of genetic resources benefit appropriately when it is used.
4. Managing biodiversity throughout the human environment -
 - Create the institutional conditions for bioregional conservation and development.
 - Support biodiversity conservation initiatives in the private sector.
 - Incorporate biodiversity conservation into the management of Biological resources.
5. Strengthening protected areas -
 - Identify national and international priorities for strengthening protected areas and enhancing their role in biodiversity conservation.
 - Ensure the sustainability of protected areas and their contribution to biodiversity conservation.
6. Conserving species, populations, and genetic diversity -
 - Strengthen capacity to conserve species, populations, and genetic diversity in Natural habitats.
 - Strengthen the capacity of off-site conservation facilities to conserve biodiversity, Educate the public, and contribute to sustainable development.
7. Expanding human capacity to conserve biodiversity-
 - Increase appreciation and awareness of biodiversity's values and importance.
 - Help institutions disseminate the information needed to conserve biodiversity and mobilize its benefits,
 - Promote basic and applied research on biodiversity conservation.
 - Develop human capacity for biodiversity conservation .

How to Properly Conserve Biodiversity?

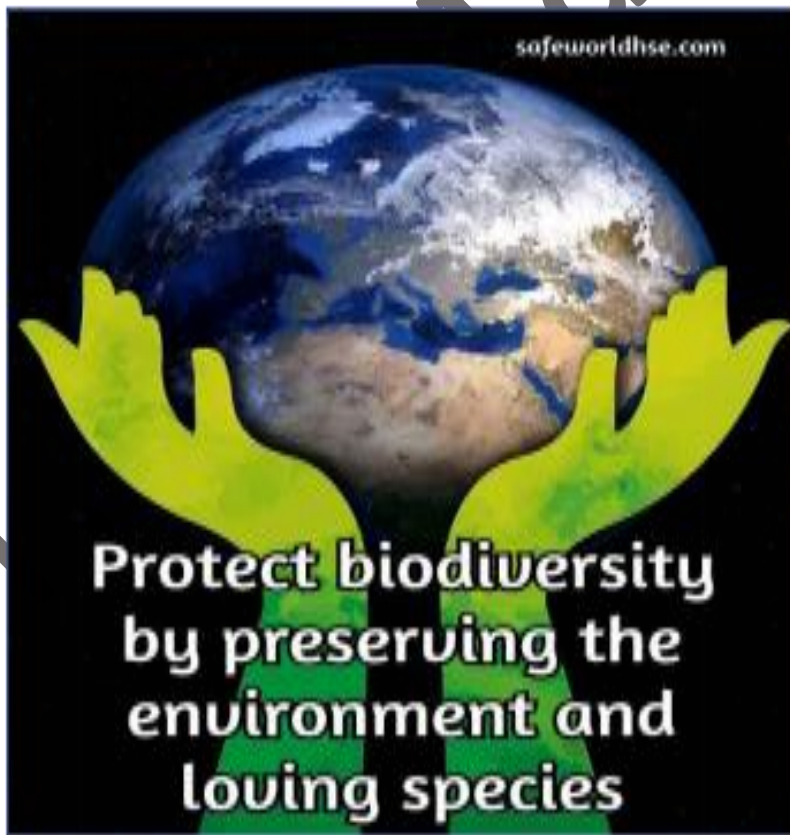
Due to continuous increase in the number of endangered species of flora and fauna, it has become essential to protect plant and animal life conservation of living resources will need:

- a) Maintenance of ecological processes and life supporting systems
- b) Preservation of biodiversity of species and
- c) Sustainable utilization of species and ecosystem.

Conservation of living resources is a complex operation which is specifically concerned with plants, animals and microorganisms with these non-living elements of the environment on which they depend.

The importance of the need for protecting endangered species is mentioned as follows:

- 1) Plants and animals possess undiscovered or undeveloped traits which are very important for survival of a particular species. The genes of all the individual members collected together to create a gene pool will be useful in future. Gene pools are also important to agriculturist.
- 2) Many plants and animals genes are needed to improve domestic crops and livestock. Many plants have medicine value. In our daily life we use many things which are products of wildlife and they have economic value.
- 3) Aesthetic value of a species also promotes its preservation. The taste of wild berries, the refreshing fragrance of wild flower and the softness of a bird mass have nonmonetary value but their aesthetic value provokes us to preserve them.
- 4) The function of a species whether plant or animal is very critical to ecosystem stability. It is well known that ecosystem includes abiotic factors like temperature.



How to Conserve/Protect Biodiversity in India?

Conservation has become a cause for concern all over the world. The governments of various countries, NGOs, communities, research institutions and many others are working to conserve biodiversity.

Some major international organisations involved in this work are the IUCN, the World Wide Fund for Nature (WWF), the United Nations Environment Programme (UNEP) and the United Nations Educational Scientific and Cultural Organisation (UNESCO).

In 1971, the UNESCO began the Man and the Biosphere Programme to establish at least one biosphere reserve in each of the earth's 193 bio-geographical zones. The idea is to protect the plants and animals that characterise each bio-geographical zone in their natural setting. India has three biosphere reserves under this programme—the Nilgiris, the Gulf of Mannar and the Sunderbans.

Wild Life Conservation in India

The shocking death of many tigers and lions due to a mysterious disease in our sanctuaries has brought wildlife conservation policies and their implementation into public focus. India has a wide variety of wildlife, many of them endangered, ranging from the snow leopard in the Himalayas to the giant Malabar squirrel in the rain forests of Kerala. Wildlife conservation has been very much in forefront of government policy and India is a signatory to the Convention on International Trade in Endangered Species (CITES).

Enforcement of wildlife protection is done under the Wildlife Protection Act, 1972. The Indian Board for Wildlife (IBWL) is the apex advisory body in the field of wildlife conservation in the country and is headed by the Prime Minister.

Indian wildlife is protected in 107 Zoos, 49 Deer Parks, 16 Safari Parks, 6 Snake Parks, 24 Breeding centres and 6 Aquariums, besides of course 95 National Parks and 500 Sanctuaries. Forest staff looks after anti-poaching activities, habitat management and improvement. Besides, there are also projects for the flagship species like Project Tiger and Project Elephant where the habitats are maintained according to the requirements of the flagships species like tiger or elephant.

International agreements made by different countries to tackle the problem of conservation globally are listed below.

Some international agreements:

- 1) The Convention on Biological Diversity
- 2) The Convention on International Trade in Endangered Species of Wild Flora and Fauna (flora: plants, fauna: animals)
- 3) The World Heritage Convention, a UNESCO mission to protect cultural and natural heritage. India has five natural world heritage sites—Keoladeo National

Park (Rajasthan), Manas and Kaziranga National Parks (Assam), Nanda Devi National Park (Uttarakhand) and the Sunderbans (West Bengal)

- 4) The Convention on Wetlands—India has 19 wetlands protected under this convention.

Conservation in India:

India has several laws aimed at protecting the environment, including plants and animals. It has also launched several plans and programmes to conserve biodiversity. Let us take a brief look at some programmes and organisations related to conservation in India.

Indian laws on conservation:

- 1) The Forest Act, under which reserved, protected and village forests are managed
- 2) The Forest (Conservation) Act, which regulates non-forest use (e.g., mining) of forest land
- 3) The Wildlife (Protection) Act
- 4) The Environment Protection Act, under which industries cannot be set up near areas protected for conservation. Besides, all development projects have to get an environment clearance from the government.
- 5) The Fisheries Act, which bans the use of explosives and poisons for fishing.

National Biodiversity Strategy and Action Plan:

This has the broad aim of conserving biodiversity with the cooperation of the people and the organisations working for conservation and the rights of the people. It seeks to ensure sustainable utilisation of natural resources. Sustainable utilisation means making use of natural resources to meet the needs of the present generation, while ensuring that future generations are not deprived of the use of natural resources for their needs.

The National Wildlife Action Plan:

This is a comprehensive programme for the conservation of wildlife. The 500 sanctuaries and 89 national parks established under this plan are an effort towards in-situ conservation. The national parks are highly protected areas where traditional activities like firewood collection and grazing are prohibited. The sanctuaries, on the other hand, are areas where traditional activities are allowed to go on in a regulated manner. Some parks aim primarily at protecting a particular species, e.g., the Gir Park aims to save lions.

Other than these there are 13 biosphere reserves, three of which are recognised by UNESCO. Some special projects have also been launched to protect endangered species in their natural habitat. Project Tiger, Project Elephant and Project Crocodile are among these.

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Parks and gardens:

Almost every large city has a zoological park/garden. Many have botanical gardens. Some of these parks and gardens are centres for the ex-situ conservation of wildlife. For example, five parks have been set up across the country for the cultivation of medicinal plants, and several orchid sanctuaries have been set up in the Himalayas and the Western Ghats. The Madras Crocodile Bank is a special park for the breeding of crocodiles.

Wetlands, mangroves and coral reefs:

In all, 24 wetlands are protected under the Wetlands Conservation Programme. The government also maintains a directory on 183 important wetlands. Mangroves are coastal forests of salt-tolerant trees. They offer natural protection against encroachments of the sea into the shore. The Conservation and Management of Mangroves Scheme protects 33 of our mangroves.

Coral reefs are one of the habitats richest in biodiversity. The coral reefs of the Gulf of Mannar, Gulf of Kachchh, Andaman and Nicobar Islands and Lakshadweep Islands are under the special management of state-level committees.

People's participation:

India has had a long tradition of protecting trees and animals. Many plants and animals are considered sacred and pockets of forests are preserved as sacred groves where deities reside. There are ancient tales of people laying down their lives to save trees and modern people's movements to save forests.

The Chipko Andolan:

This movement to save trees is believed to have started in 1973, in the village of Gopeshwar in Chamoli district (Uttarakhand). The villagers rebuffed the attempt of a contractor to cut down trees for a sports goods factory by hugging the trees. Some weeks later, the same contractor was turned away by the people of another village in the same region.

The most dramatic encounter between the contractor and villagers took place in Rani Village in the Garhwal district. The contractor purposely arrived there when the men were away protesting against the auction of a forest. However, the women of the village, led by the 50-year-old Gauri Devi, forced the contractor and his men to leave.

The resistance offered by the villagers to stop deforestation of their land inspired environmentalists all over the world. And the Chipko Andolan spread rapidly across the Himalayan region under the leadership of activists like Sunderlal Bahuguna and Chandi Prasad Bhat.

Long before the modern Chipko Andolan, a similar incident took place in Jodhpur, in 1731. The king of Jodhpur, Abhay Singh, sent his men to cut trees from forests near the Bishnoi villages. The Bishnois are a community with a tradition of caring for animals and trees. When the king's men arrived, Amritadevi, a Bishnoi woman, and her daughters hugged the trees and pleaded with the men not to cut them down.

The king's men, however, killed the women and cut down the trees. Soon, more villagers joined the protest. But the cutting and killing continued until 363 people had died. Then the king heard the news and he was overwhelmed. He prohibited the cutting of trees in the Bishnoi forests forever.

Form groups and find out about the Narmada Bachao Andolan, the protest over Silent Valley and the Save the Nilgiris Campaign. Also collect information for class discussions on 'conservation versus development' and 'conservation versus people'. The protest over silent valley is an example of the first. The protest in 1982 over the rights of the people to carry on their traditional activities at the Keoladeo National Park is an example of the second.

Another example is the help given to poachers (illegal hunters) by tribal hunters at the Ranthambore National Park. The tribals were deprived of their livelihood by the setting up of the park. Do you feel that people's involvement, as in the Joint Forest Management explained next, is the best way to make conservation efforts successful?

Joint Forest Management:

This programme launched by the government aims at involving villagers in developing and protecting degraded forests. Under this programme, the forest department and the people share the responsibility and the benefits of managing forests. At present, more than 14 million hectares of forest land are being managed by such joint managements.



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