

---

## UNIT 4 BIODIVERSITY CONSERVATION

---

### Structure

- 4.0 Introduction
- 4.1 Objectives
- 4.2 Need to Conserve Biodiversity
- 4.3 Different Approaches to Biodiversity Conservation
- 4.4 *In Situ* Conservation Strategies
- 4.5 *Ex Situ* Conservation Strategies
- 4.6 International Efforts to Conserve Biodiversity
  - 4.6.1 Emergence of Global Concern for Biodiversity Conservation
  - 4.6.2 Convention on Biological Diversity (CBD)
  - 4.6.3 Other Global Conventions Related to Biodiversity Conservation
  - 4.6.4 Identification of Biodiversity Hot-spots and Mega-biodiversity Countries
- 4.7 Biodiversity conservation in India
  - 4.7.1 Biodiversity Conservation Programmes in India
  - 4.7.2 Important National Parks, Sanctuaries and Gene Banks of India
  - 4.7.3 Policy and Institutional Framework for Biodiversity Conservation
  - 4.7.4 India as a Signatory to the Convention on Biological Diversity (CBD)
  - 4.7.5 Protection of Traditional Knowledge about Biodiversity
- 4.8 Major Challenges in Meeting Goals of Biodiversity Conservation
- 4.9 Let Us Sum Up
- 4.10 Key Words
- 4.11 References and Suggested Further Readings
- 4.12 Key to Check Your Progress

---

### 4.0 INTRODUCTION

---

There is growing recognition that biodiversity is a global asset of tremendous values to the present and future generations. Biodiversity is critically important for proper functioning of ecosystems and the services provided by healthy and bio-diverse ecosystems are the foundation for human well-being and survival of all the creatures of the earth. Ironically, overexploitation and imprudent use by man are leading to depletion of biodiversity on an alarming rate. This calls for global and national attention to save biodiversity from further decline and to adopt various conservation practices. Conservation of biodiversity means using biodiversity in sustainable manner so that it may benefit the present generation while maintaining its potential to meet the needs and aspirations of the future generations.

While Unit-2 of the present Block introduced you to the concept of biodiversity, and Unit-3 gave detailed account of biodiversity depletion, the present unit aims at providing you adequate information about biodiversity conservation. The Unit first discusses the concept and approaches of biodiversity conservation. It then explores various programmes and policy framework for biodiversity conservation

at international level. It then describes these programmes and policy framework in the context of India.

---

## 4.1 OBJECTIVES

---

After reading this unit, you will be able to:

- explain the concept of biodiversity conservation;
- describe different approaches of biodiversity conservation; and
- discuss different National and International programmes for conserving biodiversity.

---

## 4.2 NEED TO CONSERVE BIODIVERSITY

---

We know from previous units that biodiversity is the variety of living organisms on the earth. It includes diversity within species, between species and of ecosystems. Unfortunately, as a result of overexploitation and imprudent use by man, biodiversity of the earth is depleting on an alarming rate. We have learned that the loss of biodiversity due to human activities occurred more rapidly in the past 50 years than at any time in human history. As a result of biodiversity loss, productivity of most of the ecosystems is declining and the supply of various goods and services provided by nature is getting hampered. This calls for global and National attention to save biodiversity from further decline and to adopt various conservation practices.

Conservation of biodiversity aims at conserving diversity at all the levels including genetic, species and ecosystems. It also includes promoting sustainable use of all its components, including plants, animals and microorganisms. Protecting natural habitats from degradation and fragmentation is an important part of biodiversity conservation programmes. It also provides for fair and equitable sharing of benefits arising from the use of bioresources and associated traditional knowledge.

Worldwide a number of International, regional and National level programmes are being carried out to ensure conservation of biodiversity and to check its further depletion. 'Convention on Biological Diversity' (CBD), one of the key agreements adopted at Earth Summit 1992, chiefly aims at conserving rich biodiversity of the planet. As of now, 193 countries are party to the CBD. India, which is known for its rich heritage of biodiversity, has been a signatory to the Convention since 1994, and is one of the countries that have enacted comprehensive legislation to achieve the objectives of the convention. In India, biodiversity conservation is observed as a part of cultural practices for long and it is also linked to livelihood generation for millions of people especially for those living in rural areas.

---

## 4.3 DIFFERENT APPROACHES TO BIODIVERSITY CONSERVATION

---

Conservation of biodiversity means 'the management of human use of biosphere so that it may give maximum benefit to the present generation, while maintaining its potential to meet the needs and aspirations of the future generations'. Since biodiversity includes living communities and their attributes, understanding of

basic principles of biology and ecology is crucial for the management or conservation of biodiversity. Conservation biology as a discipline evolved for the purpose. Conservation biology matured in the mid 20<sup>th</sup> century as ecologists, naturalists, and other scientists began to collectively research and address issues pertaining to global declines in biodiversity. Conservation biology includes principles, guidelines, and tools for the purpose of protecting biodiversity.

Conservation biology is crisis oriented and multidisciplinary subject, that includes biology, ecology, social organization, education and many other disciplines. The conservation ethic advocates management of natural resources for the purpose of sustaining biodiversity in species, ecosystems, the evolutionary process, and human culture and society. In response to the extinction crisis, the research of conservation biologists is being organized into strategic plans that include principles, guidelines, and tools for the purpose of protecting biodiversity.

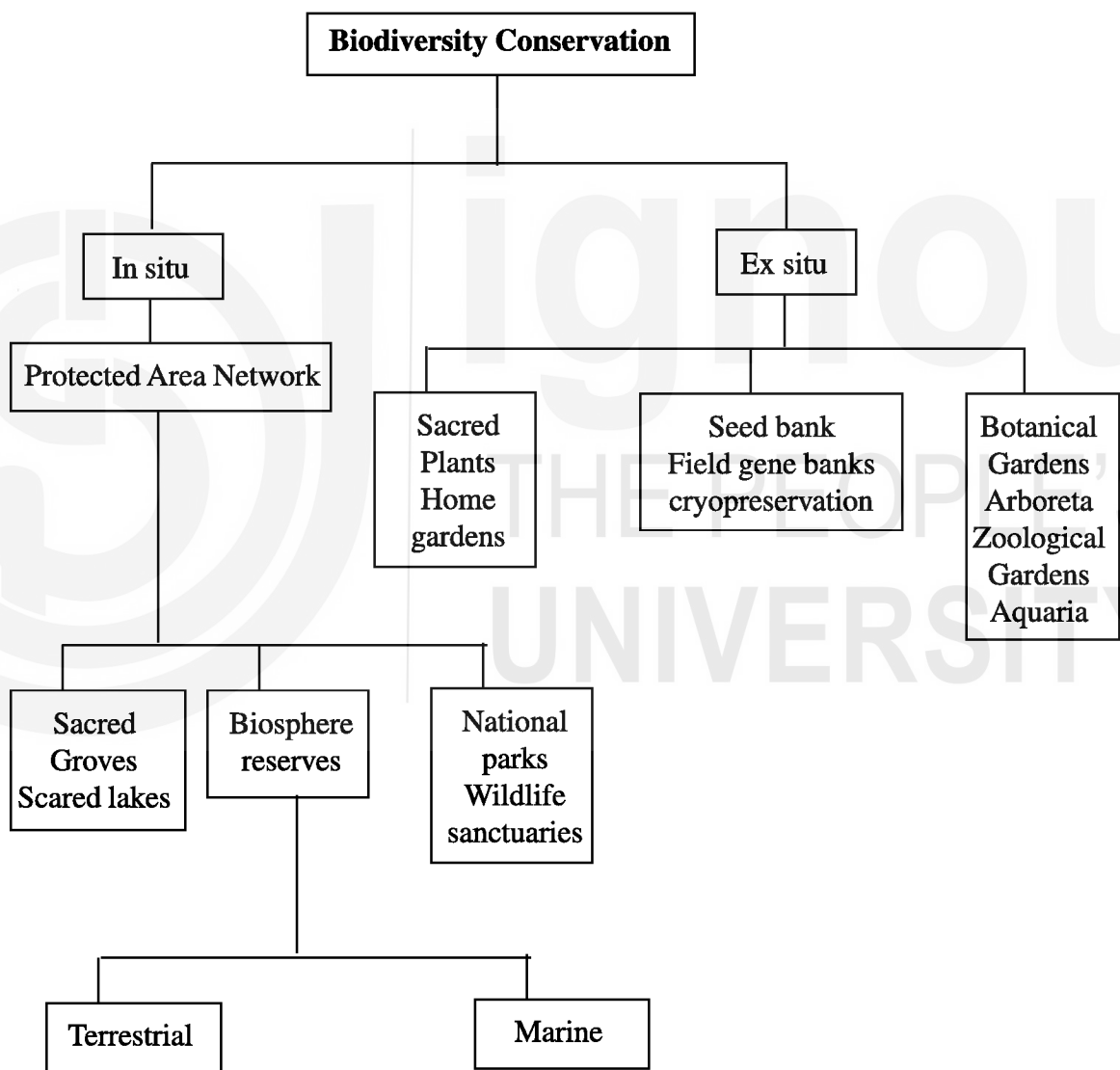


Fig.4.1: Biodiversity Conservation strategies

There are two basic strategies of biodiversity conservation: *in situ* (on site) and *ex situ* (off site). *In situ conservation* refers to the conservation of biological diversity in their natural habitats through protection of total ecosystem. *Ex situ conservation* refers to the conservation of biodiversity at place away from their natural habitat. It has been realized, that preserving habitat (*in situ* conservation)

and reintroducing eliminated indigenous species is more effective to conserve biodiversity in general. Once the preservation of the remaining native species in an area is assured, reintroduction can be attempted. Missing species can be identified from databases such as the Encyclopedia of life and the Global Biodiversity Information Facility.

Preventing entry of invasive alien species and managing them, in situations of their unintentional or accidental introduction, help in preserving native biodiversity and their natural habitats. Exotic species that have become a pest can be identified taxonomically (e.g. with Digital Automated Identification System (DAISY), the barcode of life. Eradication is practical only against large groups of individuals due to the economic cost. Other measures contributing to the preservation of biodiversity include: the reduction of pesticide use and/or a switching to organic pesticides. Biodiversity banking is another approach which involves placing a monetary value on biodiversity so that its values are realized in economic terms. One example is the Australian Native Vegetation Management Framework.

---

#### 4.4 *IN SITU* CONSERVATION STRATEGIES

---

It refers to the conservation of biological diversity in their natural habitats through protection of total ecosystem. The areas which provide protection to the biological diversity include: Protected areas, Biosphere reserves, Sacred forests and Sacred lakes.

- 1) **Protected areas.** These are areas of land and /or sea especially dedicated to the protection and maintenance of biodiversity and managed through legal or other effective means. National Parks and Wildlife Sanctuaries are the examples of protected areas.

The protected areas provide following benefits.

- i) Maintains viable populations of all native species and sub species
- ii) Maintain the number and distribution of communities and habitats and conserve the genetic diversity of all the present species.
- iii) Prevent man made introduction of exotic species

**a) National Parks:** A National Parks is an area which is strictly reserved for the welfare of wildlife and where activities such as forestry, grazing or cultivation are not allowed. The earliest National parks, the Yellowstone in USA and Royal near Sydney, Australia, were chosen of their scenic beauty and recreational values. The Jim Corbett National Park near Nainital, was first National Park established in India.

**b) Sanctuaries:** A sanctuary is an area, which is reserved for the conservation of animals only. Operations such as harvesting of timber, collection of minor forest products and private ownership rights are allowed provided they do not affect the animals adversely.

- 2) **Biosphere reserves:** The man and biosphere (MAB) programme of UNESCO formulated the concept of biosphere reserves in 1975, which deals with the conservation of ecosystems and genetic resources contained therein. The

Biosphere reserves are the special category of protected areas of land / or coastal environments, wherein people are an integral component of the system.

A Biosphere Reserve consists of three zone- Core, buffer and transition zones.

- i) **Core or natural zone.** It comprises an undisturbed and legally protected ecosystem.
- ii) **Buffer zone:** It surrounds the core area, and is managed to accommodate a greater variety of resource use strategies, and research and educational activities.
- iii) **Transition zone:** It is the outermost part of Biosphere Reserve. It serves as an area of active cooperation between reserve management and the local people, wherein activities like settlements, cropping, forestry and recreation and other economic uses continue in the harmony with conservation goals.

The Biosphere performs following three main roles.

- i) **Conservation:** It ensure the conservation of landscapes, Ecosystems, species and genetic resources.
  - ii) **Development:** It promotes culturally, socially and ecologically sustainable development.
  - iii) **Scientific research, monitoring and education:** It provide support for research monitoring, education and information exchange related to local, national and global issues of conservation and development.
- 3) Sacred forest and sacred lakes:** There has been a traditional practice in India and other Asian countries to maintain scared forests and lakes to protect biodiversity. The sacred forest is protected by the tribal communities due to religious sanctity accorded to these forests. Many of states of our country such as Karnataka, Maharastra, Kerala, Meghalaya etc. possess scared forests. These are serving as protective centres for a number of rare, endangered and endemic taxa. Similarly aquatic flora and fauna is also protected in scared water bodies. For instance Khecheopalri lake in Sikkim has been declared scared by the people to save aquatic life for degradation.
- 4) On-farm conservation of agricultural biodiversity:** Agrobiodiversity refers to the variety and variability of living organisms that contribute to food production systems and associated activities. In the past five decades, intensification and the homogenization of agroecosystems have led to significant losses in agrobiodiversity, including the loss of crop and livestock species, genetic diversity, as well as crop-associated biodiversity. Need of conserving agrobiodiversity is being perceived as urgent priority at national and international levels. *In situ* on farm conservation of agrobiodiversity is the major approach towards this end. It encourages sustenance of rich biodiversity in the agricultural farms. Although agrobiodiversity has severely declined in most of the modern agricultural farms, there are communities that still practice traditional agriculture in which they grow great variety of

crops. Such communities are largely confined to hilly regions, tribal areas and remote areas in India. In the last two decades, farmers in certain states have also adopted methods of organic farming in which they have paid attention to conserve agrobiodiversity. *In situ* on farm conservation of agrobiodiversity also contributes in improving the livelihoods of farmers particularly in resource poor areas.

---

## 4.5 EX SITU CONSERVATION STRATEGIES

---

*Ex situ* refers to the conservation of biodiversity at place away from their natural habitat. For *ex situ* conservation of biodiversity, germplasm banks or gene banks are established. These include botanical garden, zoos, genetic resources centres, seed, tissue culture and DNA banks. Seed gene banks are the easiest way to store germplasm at ultra low temperature (i.e., at a temperature of -196°C in liquid nitrogen) is called cryopreservation. By cryopreservation the germplasm can be stored for a long period of time. Gene banks are collections of specimens and genetic material. Some banks intend to reintroduce banked species to the ecosystem (e.g. via tree nurseries).

As compared to *in situ* conservation, *ex situ* conservation requires lesser geographical area to establish but more sophisticated management. Botanical gardens and zoos are the most common places for the conservation of biodiversity. All over the world, there are more than 1500 botanical garden which contains more than 80,000 species of plants. Many of these botanical gardens have seed banks, tissue culture facilities and other *ex situ* technologies.

*Ex situ* conservation of biodiversity is significant due to the following two major reasons:

- i) The conservation of wild varieties of plant or crops and culture of microorganism provides a source of genetic materials.
- ii) Plants and animals conserved in botanical garden, zoos and aquaria can be used to restore degraded land, reintroduce into species into the wildlife and restock depleted populations.

### Check Your Progress 1

**Note:** a) Use the space given below for your answer.

b) Compare your answers with those given at the end of the unit.

1) What is the need to conserve biodiversity?

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

2) How do protected areas help in conserving biodiversity?

.....

.....

.....

.....

.....

.....

.....

---

## **4.6 INTERNATIONAL EFFORTS TO CONSERVE BIODIVERSITY**

---

For the last 2-3 decades, biodiversity depletion is perceived as a potential challenge to human wellbeing all over the world. As a response to this, efforts to conserve biodiversity have been observed at varying scale. International conferences particularly Stockholm Conference and Earth Summit played key role to evolve institutional or policy measures to conserve biodiversity. In the following sections, these efforts have been mentioned in details.

### **4.6.1 Emergence of Global Concern for Biodiversity Conservation**

Global concern about environmental destruction and loss of species and ecosystems were first time expressed in the early seventies. In 1972, the United Nations Conference on the Human Environment in Stockholm resolved to establish the United Nations Environment Programme (UNEP). Governments signed a number of regional and international agreements to tackle specific issues, such as protecting wetlands and regulating the international trade in endangered species. These agreements, along with controls on toxic chemicals and pollution, helped to slow the rate of destruction. For instance, an international ban and restrictions on the taking and selling of certain animals and plants have helped to reduce over-harvesting and poaching. In addition, many endangered species were protected in zoos and botanical gardens, and key ecosystems were preserved.

Later, it was realized that the long-term viability of species and ecosystems depends on their being free to evolve in natural conditions. This means, that humans have to learn how to use biological resources in a way that minimizes their depletion and allow them to lead their live in their natural habitat. By the early eighties, scientists and policymakers across the world started working on the challenge to find economic policies that motivate conservation and sustainable use by creating financial incentives for those who would otherwise over-use or damage the resource. This required a comprehensive vision for world development supported by adequate policy framework.

In 1987, the World Commission on Environment and Development (the Brundtland Commission) in its landmark report, 'Our Common Future', gave a mandate that humanity has the ability to make development sustainable by

ensuring, that it meets needs of the present without compromising the ability of future generations to meet their own needs. It called for a new era of environmentally sound economic development.

#### 4.6.2 Convention on Biological Diversity (CBD)

In 1992, the largest ever meeting of world leaders took place at the United Nations Conference on Environment and Development in Rio de Janeiro, Brazil which is popularly known as “Earth Summit”. Two historic agreements were signed at the, conference: the Convention on Climate Change, and the Convention on Biological Diversity. Convention on Biological Diversity (CBD) is the first global agreement on the conservation and sustainable use of biological diversity. CBD gained rapid and widespread acceptance. Over 150 governments signed the document at the Rio conference, and since then more than 193 countries have ratified the agreement.

The Convention on Biological Diversity has three main objectives or goals:

- Conservation of biodiversity,
- Sustainable use of the components of biodiversity, and
- Sharing the benefits arising from the commercial and other utilization of genetic resources in a fair and equitable way.

The Convention addresses all aspects relating to biodiversity. The institutional framework for CBD’s implementation is provided by the Conference of the Parties (COP). The COP is the governing body of CBD which keeps under review implementation of the Convention, and steers its development. COP is the supreme decision making body which has the authority to adopt protocols under the Convention. It also has the authority to amend the Convention itself.

The Convention is comprehensive in its goals, and deals with an issue so vital to humanity’s future, that it stands as a landmark in International law. It recognizes for the first time, that the conservation of biological diversity is “a common concern of humankind” and is an integral part of the development process. The agreement covers all ecosystems, species, and genetic resources. It links traditional conservation efforts to the economic goal of using biological resources sustainably. It sets principles for the fair and equitable sharing of the benefits arising from the use of genetic resources, notably those destined for commercial use. It also covers the rapidly expanding field of biotechnology, addressing technology development and transfer, benefit-sharing and biosafety. Importantly, the Convention is legally binding; countries that join it are obliged to implement its provisions.

The Convention reminds decision makers that natural resources are not infinite and sets out a new philosophy for the 21<sup>st</sup> century, that of sustainable use. While past conservation efforts were aimed at protecting particular species and habitats, the Convention recognizes that ecosystems, species and genes must be used for the benefit of humans. However, this should be done in a way and at a rate that does not lead to the long-term decline of biological diversity.

The Convention also offers decision makers guidance based on the precautionary principle that where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for

postponing measures to avoid or minimize such a threat. The Convention acknowledges, that substantial investments are required to conserve biological diversity. It argues, however, that conservation will bring us significant environmental, economic and social benefits in return.

### **4.6.3 Other Global Conventions Related to Biodiversity Conservation**

Apart from CBD there are few other International conventions that directly or indirectly contribute towards conservation of biodiversity and ecosystems at the global or regional scale. Four major conventions have been introduced in the following paragraphs.

**Convention on Migratory Species (CMS):** It aims to protect those species of wild animals, that migrate across or outside national boundaries. This includes conservation of terrestrial, marine and avian species over the whole of their migratory range. The convention was concluded in 1979 and came into force on 1 November 1983. As of December 1999, 68 states have ratified the convention.

**The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES):** It is an international treaty drawn up in 1973 to protect wildlife against overexploitation and to prevent International trade from threatening species with extinction. The treaty entered into force on 1 July, 1975 and now has a membership of 146 countries.

**Ramsar Convention on Wetlands of International Importance:** The Convention, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. There are presently 117 Contracting Parties to the Convention.

**The World Heritage Convention Concerning the Protection of the World Cultural and Natural Heritage (the World Heritage Convention):** It was adopted by the General Conference of UNESCO in 1972. As of October 1999, more than 158 countries have signed the convention. This is one of the most universal international legal instruments for the protection of the cultural diversity and natural heritage.

### **4.6.4 Identification of Biodiversity Hotspots and Mega-Biodiversity Countries**

Biodiversity is not distributed evenly on the Earth. There are certain regions in the world which harbor rich biodiversity. Biodiversity hotspot and mega-biodiversity countries have been identified on the basis of such criteria. Identification of these pockets of rich biodiversity helps in focusing conservation efforts to protect maximum biodiversity of the world.

As discussed earlier biodiversity hotspot are bio-geographic region characterized both by exceptional levels of plant endemism and by serious levels of habitat loss. These biodiversity hotspots were first identified in 1988 by Dr. Norman Myers. We have learned from the previous units that according to Conservation International (CI), to qualify as a hotspot a region must meet two strict criteria: it must contain at least 1,500 species of vascular plants (> 0.5 percent of the world's

total) as endemics, and it has to have lost at least 70 percent of its original habitat. In 2005, CI described 34 regions in the revised hotspot list. Most of these hotspots fall in tropical region. India has four out of thirty four global biodiversity hotspots, which is an indicator of high degree of endemism (of species) in India. They are – Eastern Himalayas, Western Ghats, North East India and the Andaman and Nicobar Islands.

The mega-diverse countries are a group of countries that harbor the majority of the Earth's species and are therefore considered extremely biodiverse. The World Conservation Monitoring Centre, an agency of the United Nations Environment Programme, has identified 17 megadiverse countries, most located in the tropics. In 2002, a separate organization, Like-Minded Megadiverse Countries, was formed in Mexico, consisting of countries rich in biological diversity and associated traditional knowledge. In alphabetical order, these 17 countries are: Australia, Brazil, China, Colombia, Congo, Ecuador, India, Indonesia, Madagascar, Malaysia, Mexico, Papua New Guinea, Peru, Philippines, South Africa, United States and Venezuela.

---

## 4.7 BIODIVERSITY CONSERVATION IN INDIA

---

India is known for its rich heritage of biodiversity. India is one of the 17 megadiverse countries in the world. With only 2.4% of the world's area, India accounts for 7-8% of the world's recorded plant (about 45,000, of which approximately 15,000 are of known medicinal value) and animal species (about 91,000). India's ten biogeographic zones possess an exemplary diversity of ecological habitats like alpine forests, grasslands, wetlands, coastal and marine ecosystems, and desert ecosystems.

India has four out of thirty four global biodiversity hotspots, which is an indicator of high degree of endemism (of species) in India. They are – Eastern Himalayas, Western Ghats, North East India and the Andaman and Nicobar Islands. About 5,150 plant species and 1,837 animal species are endemic to India. India's biodiversity includes wild relatives of agricultural crops and domesticated animals. India has 16 major types and 251 subtypes of forests. The large mosaic of distinct agro-ecosystems has contributed to diverse cropping pattern and systems across the country.

Biodiversity conservation is practiced in India since times immemorial. In the last 4-5 decades, however a number of institutional measures have been taken for the purpose. Creation of protected areas, biosphere reserves, gene banks etc. are some of the examples of such efforts. Various conservation programs and policies of India are discussed in fair details in the following sections.

### 4.7.1 Biodiversity Conservation Programmes in India

India proudly upholds the tradition of nature conservation. In 252 BC, the Emperor Asoka established Protected Areas (PAs) for mammals, birds, fish and forests through a proclamation. Jim Corbett National Park covering an area of 325 sq. Km. came into being as the India's first and world's third National Park in 1936. India has currently 4.79% of total geographic area under an elaborate network of PAs, which includes 99 National Parks, 513 wildlife sanctuaries, 43 conservation reserves, 4 community reserves and 3 Biodiversity Heritage sites.

India has a National Wildlife Action Plan, which envisages 10% of the geographical area of the country under PA coverage. This is significant, keeping in view that India holds 18% of world's human population and also 18% of the world's livestock population in an area, which is only 2.4% of the world's geographical area. Under the Man and Biosphere (MAB) Programme out of 16 biospheres in India (70,000 sq. km.), seven are already in UNESCO World Network of Biosphere Reserves (World total 503).

India has a National Wetland Conservation Programme covering 125 wetlands including 25 Ramsar sites under the Ramsar Convention. India accounts for about 5% of the world's mangroves (including Sunderbans delta the largest mangrove forest in the world) and partners with IUCN's Mangroves for future programme and has established a National Institute of the Mangrove Research at Kolkata. Coral reefs in India occupy an extent of 2375 sq. km. (including the Andaman Islands, which have rich coral diversity and a National Coral Reef Research Centre at Port Blair).

India has a National Lake Conservation Plan covering 42 lakes, which aims at rejuvenation in terms of improvement on water quality and biodiversity. India has a National River Conservation Plan under implementation in 160 cities covering 34 rivers. NGRBA (National Ganga River Basin Authority) is responsible for conserving and sustainable use of the biodiversity of the river Ganges.

Conservation and sustainable use of biodiversity have been an integral part of Indian ethos. Sacred groves are thick patches of natural Forests conserved by the local communities as part of sociocultural practices. The Sacred Grove Information System holds information on 3000 such groves in the country out of an estimated 100,000 to 150,000.

Several species specific projects are being implemented for flagship animal species such as Tiger (National Animal), Elephant (National Heritage Animal), Rhinoceros, Gharial, Hangul and snow leopard, birds such as Vulture, Great Indian Bustard, and plants such as Orchids, Rhododendron and citrus.

#### **4.7.2 Important National Parks, Sanctuaries and Gene Banks of India**

Some important National Parks of India with a mention of major species being conserved:

- Kaziranga National Park, Assam for Rhinoceros, Elephant, Python etc.
- Sundarbans (Tiger Reserve), West Bengal for Tiger, Crocodile, Deer etc.
- Hazaribagh National Park, Hazaribagh, Jharkhand for Tiger, Sambhar, Nilgai etc
- Corbett National Park, Nainital, Uttranchal for Tiger, Panther, Chital, Cobra etc.
- Gir National Park, Gujrat for Lion, Chinkara, Langur, Panther etc.
- Kanha National Park, Madhya Pradesh for Tiger, Panther, Chital, Blue bull etc.
- Tandoba National Park, Maharastra for Tiger, Bear, deer, Crocodile etc.

- Bandipur National Park, Karnataka for Elephant, Tiger, Leopard, Green Pigeon etc.
- Desert National Park, Rajasthan for Great Indian bustard, Black buck, Chinkara etc.

Some important Sanctuaries of India with a mention of major species being conserved:

- Annamalai Sanctuary, Tamilnadu – Elephant, Tiger, Panther, Spotted deer etc.
- Sultanpur Lake Bird Sanctuary, Gurgaon, Haryana – Sarus, Duck, Green pigeon etc.
- Nagarjuna Sagar Sanctuary, Guntur, A.P. – Tiger, Panther, Chital, Nilgai etc.
- Periyar Sanctuary, Kerala – Elephants, Leopard, Black Langur etc.
- Chilka Lake Bird Sanctuary, Orissa – Water fowls, Duck, Cranes etc.
- Manas Wildlife Sanctuary Assam – Rhino, Sambhar etc.

Major gene banks in India are:

- NBPGR (National Bureau of Plant Genetic Resources) at New Delhi
- NBFGR (National Bureau of Fishery Genetic Resources) at Lucknow
- NDRI (National Dairy Research Institute), Karnal, Haryana
- IMTECH (Institute of Microbial Technology), Chandigarh
- NBAIM (National Bureau of Agriculturally Important Microorganisms), Mau, Uttar Pradesh

#### **4.7.3 Policy and Institutional Framework for Biodiversity Conservation**

Environment protection is enshrined in the Constitution of India [Article 48A and Article 51A (g)]. Wide ranging policies, programmes and projects are in place, which directly or indirectly serve to protect, conserve and sustainably use the country's biological resources. These include the Forest (Conservation) Act, Wildlife (Protection) Act, Biological Diversity Act, National Green Tribunal Act, National Biodiversity Action Plan, National Forest Policy, National Wildlife Action Plan, National Forestry Action Programme, National Environment Policy and National Action Plan on Climate Change.

India is committed to conservation of biodiversity. This is not only because of India's international obligations as a signatory to the Convention on Biological Diversity, but because India believes that protecting our biodiversity is a critical national priority as it is linked to local livelihoods of millions of people in the country. Sustainable use of our biodiversity, therefore, has both ecological and economic value. It is with this objective that India has enacted Biological Diversity Act, 2002 and set up a National Biodiversity Authority (NBA) in 2003, with an explicit mandate of promoting conservation of biological resources and associated knowledge as well as facilitating access to them in a sustainable manner.

Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, enacted in 2006, is a tool to provide occupational and habitational

rights to the people, thus, incentivising conservation and sustainable use of biological resources by providing access to livelihood enhancing resources to people. National Biotechnology Development Strategy, 2007, calls for promotion of mass use of technologies for sustainable utilisation of bioresources. National Biodiversity Action Plan of 2008 developed in consultation with various stakeholders and by taking cognizance of legislative and policy framework is a dynamic matrix for mainstreaming biodiversity concerns in the country.

India has large number of scientific personnel and important network of scientific institutions in public, private and NGOs sectors. The important institutions/organisations include Botanical Survey of India, Zoological Survey of India, Wildlife Institutes, Fishery Survey of India, Forest Survey of India, ICFRE, ICAR, CSIR, DBT, DST, DRDO etc. National Bureaus on plants, animals, fish, insects, microbes and forest genetic resources are specifically mandated for management of genetic resources. All India Coordinated Project on Taxonomy and network projects on honeybee and pollinators and ornithology are also in place for capacity building and research.

India has put in place a number of initiatives for promoting conservation of biodiversity, such as, provision of national gene fund, national biodiversity fund, awards etc. Pressure from habitat loss and degradation has been reduced by the system of environment clearances based on Environmental Impact Assessment (EIA), Coastal Regulation Zone (CRZ), National Afforestation and Eco-development Board (NAEB), National Action Programme to Combat Desertification and Green India Mission.

#### **4.7.4 India as a Signatory to the Convention on Biological Diversity (CBD)**

India has been a signatory to the Convention since 18<sup>th</sup> February, 1994, and is one of the first countries to have enacted an appropriate comprehensive legislation to achieve the objectives of the convention. As of now, 193 countries are party to the CBD. India has hosted COP-11 in 2012. The COP-11 was very significant as it the 10<sup>th</sup> anniversary of Johannesburg World Summit on Sustainable Development, 20<sup>th</sup> anniversary of the Rio Earth Summit and 40<sup>th</sup> anniversary of Stockholm Conference. During 2010, several activities have been organized in India to mark the celebration of International Year of Biodiversity.

As a signatory to the CBD, the Biological Diversity Act, 2002, passed on December 11, 2002 came into force on February 5, 2003, followed by the formation of it Rules in 2004. The Biological Diversity Act of, 2002, provides necessary statutory and administrative mechanism at the National, State and Local body levels to realize the objectives of the Act and CBD. A three tiered system of regulation is envisaged under the Biological Diversity Act, which consists of the National Biodiversity Authority (NBA) at the apex level, Biodiversity Boards (SBBs) at State level and Biodiversity Management Committees (BMCs) at local level.

The headquarter of NBA is at Chennai and the main functions include regulating activities, advising the Government of India on biodiversity matters, grant for access to biodiversity and associated knowledge and to take necessary measures to protect the biological diversity of the country. The main functions of the State Biodiversity Boards are to regulate requests for utilization of biological resources

by Indian nationals and to assist the State Government in notification of areas of biodiversity importance as Biodiversity Heritage Sites and framing rules for their management and conservation. At the local level, Biodiversity Management Committees perform the function of documenting People's Biodiversity Registers and implement biodiversity conservation programmes.

To ensure the fair and equitable sharing of benefits arising out of the use of genetic resources, India has taken significant legislative measures and also integrated these principles in various policies and programmes. The Protection of Plant Varieties and Farmer's Rights Act, 2001 and Rules, 2003 deal primarily with the protection of plant breeders rights over the new varieties developed. The second and third amendments to the Patent Act, 1970 provide for mandatory disclosure in the patent application, of the source and geographical origin of the biological material used in the invention. National Innovation Foundation (NIF), an autonomous society established in 2000 for recognizing, respecting and rewarding innovations and outstanding traditional knowledge at grass root level.

#### **4.7.5 Protection of Traditional Knowledge about Biodiversity**

India has rich traditional knowledge about medicinal values of plants and natural products which have been used by people here since times immemorial. This knowledge has generally been passed down by word of mouth from generation to generation. A part of this knowledge has been described in ancient classical and other literature which is often rarely accessible to the common person.

Documentation of this existing knowledge, available in public domain, on various traditional systems of medicine has become imperative to safeguard the sovereignty of this traditional knowledge and to protect it from being misappropriated in the form of patents on non-original innovations, and which has been a matter of national concern. India fought successfully for the revocation of turmeric and basmati patents granted by United States Patent and Trademark Office (USPTO) and neem patent granted by European Patent Office (EPO).

In 1999, the Department of Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homoeopathy (AYUSH) and Council of Scientific and Industrial Research (CSIR) constituted an interdisciplinary Task Force, for creating an approach paper on establishing a Traditional Knowledge Digital Library (TKDL). TKDL is an effective deterrent to bio piracy. TKDL is a maiden Indian effort and is a proprietary and original database. TKDL is available in English, Japanese, French, German and Spanish. Today, India through TKDL is capable of protecting about 0.224 million medical formulations. TKDL is proving to be an effective deterrent against biopiracy.

India has also set up a global bio piracy watch system under TKDL in respect of patent applications related to Indian System of Medicines misappropriation and biopiracy are the issues of great concern for the developing countries and this agenda is being pursued at multilateral fora such as CBD, TRIPS Council and WIPO, and a global Traditional Knowledge protection system is expected to be established soon. The Biological Diversity Act, 2007 provides for documentation of coded and oral traditional knowledge associated with bioresources in the form of People's Biodiversity Register, to ensure effective management, promotion and sustainable uses.

---

## 4.8 MAJOR CHALLENGES IN MEETING GOALS OF BIODIVERSITY CONSERVATION

---

Major challenges in meeting goals of biodiversity conservation are briefly summarized as below:

- Regulating the large scale deforestation and land use changes while meeting the growing demands of expansion of agriculture, roads, railway tracks, mining, factories, powerhouses, river dams and urban residential schemes among many others.
- Meeting the increasing demand for biological resources caused by population growth and increased consumption.
- Controlling the increasing pollution levels and global warming.
- Increasing our capacity to document and understand biodiversity, its value, and threats to it.
- Building adequate expertise and experience in biodiversity planning.
- Improving policies, legislation, guidelines, and fiscal measures for regulating the use of biodiversity.
- Adopting incentives to promote more sustainable forms of biodiversity use.
- Promoting trade rules and practices that foster sustainable use of biodiversity.
- Strengthening coordination within governments, and between governments and stakeholders.
- Securing adequate financial resources for conservation and sustainable use, from both national and international sources.
- Making better use of technology.
- Building political support for the changes necessary to ensure biodiversity conservation and sustainable use.
- Improving education and public awareness about the value of biodiversity.

### Check Your Progress 2

**Note:** a) Use the space given below for your answer.

b) Compare your answers with those given at the end of the unit.

1) What are the major goals of CBD?

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

2) Has India taken some initiative to protect biodiversity?

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

---

## 4.9 LET US SUM UP

---

- Biodiversity of the earth is depleting on an alarming rate and this calls for conservation efforts from the world community.
- Conservation of biodiversity means using biodiversity in sustainable manner so that present and future generations can fulfill their needs.
- *In situ* conservation approach includes Protected areas (like National parks and sanctuaries), biosphere reserves, Nature reserves, sacred grooves, on-farm conservation of agricultural biodiversity etc.
- *Ex situ* conservation approach includes botanical garden, zoological parks, seed-banks, tissue culture etc.
- At international level, Conference on Biological Diversity (CBD) provides the most comprehensive policy framework for the sustainable use of biodiversity.
- A number of policy and programmes for biodiversity conservation are running in India which is one of the signatory to CBD.

---

## 4.10 KEY WORDS

---

- Ecosystem Services** : Various direct and indirect services provided by nature, e.g., producing food.
- Conservation** : Conservation of biodiversity means using biodiversity in sustainable manner so that present and future generations can fulfill their needs.
- In situ* conservation** : Conservation of biological diversity in their natural habitats.
- Ex situ* conservation** : Conservation of biodiversity at place away from their natural habitat.
- Endemism** : The extent to which species of any area are confined to that area in their distribution.

**Extinction** : It is a phenomenon when all the members of a particular species disappear from the world due to natural or human induced reasons. Once a species is extinct, the unique information contained in its DNA is lost forever.

---

## **4.11 REFERENCES AND SUGGESTED FURTHER READINGS**

---

- Cogălniceanu, Dan 2007. Biodiversity. Kessel Publishing House, Germany.
- Millennium Ecosystem Assessment 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington DC.
- O’Riordan, Tim and Stoll-Kleemann, Susanne 2002. Biodiversity, Sustainability and Human Communities: Protecting beyond the Protected. Cambridge University Press.
- Secretariat of the Convention on Biological Diversity 2006. Global Biodiversity Outlook 2. Montreal.
- Wilson, E.O. 1988. Biodiversity. National Academy Press. Washington, DC.

Relevant Websites:

- <http://www.biodiversityhotspots.org> (Biodiversity Hotspots of the world)
- <http://www.cbd.int/abs/>(Conservation of Biodiversity)
- <http://wikipedia.org/wiki/biodiversity> [What is Biodiversity?]

---

## **4.12 KEY TO CHECK YOUR PROGRESS**

---

### **Check Your Progress 1**

- 1) Your answer must include the following points:
  - To save species from extinction and threats to their survival
  - To maintain ecosystem services provided by biodiversity
- 2) Your answer must include the following points:
  - Maintaining viable population of native species and sub-species
  - Protecting natural habitats of all species to promote their conservation
  - Managing threats imposed by invasive alien species

### **Check Your Progress 2**

- 1) Your answer must include the following points:
  - Conservation and management of biodiversity
  - Sustainable use of the components of biodiversity
  - Sharing the benefits arising from the use of bioresources (and associated traditional knowledge) in a fair and equitable manner as provided under the national legislation

2) Your answer must include the following points:

- India's national obligations as a signatory to CBD
- Legal protection to biodiversity in India
- Establishment of protected areas and biosphere reserves
- Conservation practices in India since historical times

