

## ***Unit -4***

### ***Biodiversity and its conservation***

#### **Introduction:-**

Bio means “life” and diversity means “variety”. Hence biodiversity refers wide variety of life on the earth.

Diversification in the species is influenced by various physical and chemical, climatic factors, resulting in the production of new species, the new species which are unable to adjust with the new environment gradually become extinct.

Definition:- Biodiversity is defined as the variety and variability among all groups of living organisms and the ecosystem in which they live.

#### **SIGNIFICANCE OF BIODIVERSITY:-**

- Biodiversity protects the fresh air, clean water and productive land.
- It is also important for forestry, fisheries and agriculture which depend on rich water variety of various biological resources available in nature.
- Loss of biodiversity has series economic and social costs for any country.
- It is very important for human life, we depend on plants, microorganisms, earth's animals for our food, medicine and industrial products.

Biodiversity is usually considered as 3 different levels.

- 1) Genetic diversity
- 2) Species diversity
- 3) Ecosystem diversity

- 1) Genetic diversity:- Within individual species there are number of varieties which are slightly different from one another. These differences are due to difference in the combination of genes.

Genes are the basic unit of hereditary information, transmitted from one generation to the other.

Example:-all rice varieties belong to the species “oryzasativa” but there are thousands of wild and cultivated varieties of rice which shows variations at the genetic level and different in their colour, size, shape, nutrient content of the grain.

- 2) Species diversity:-A discrete group of organisms of the same kinds is known as species. Species diversity is the diversity between different species. The sum of varieties of all the living organisms at the species level is known as species of diversity.

There are two popular indices of measuring species diversity known as “Shannon-wiener index” and “Simpson index”.

The Simpson index shows concentration (or) dominance thus give more weight age to dominant species.

Greater the value greater the dominance by one (or) more species. The Shannon index gives greater weight to rare species.

Example:- total number of living species in the earth are about more than 20 million organisms are found and given names. Plant species, apple, mango, grapes, wheat, rice etc.,

- 3) Ecosystem diversity:-It is set of biotic components [plants, animals and micro organisms inter acting with one another and with one a biotic components like soil, air, water etc.,]

The diversity at the ecological (or) habitual level is known as “eco system diversity”. A large region with different ecosystems can be considered as ecosystem diversity.

The ecosystem also shows variation with respect to physical parameters like moisture, temperature, altitude, precipitation etc.,

Example:-

Forest ecosystem:- in forests which is supposed to have mainly a dominance of trees. But, while considering a tropical rain forest a tropical deciduous forest, a temperature forest, variations observed are just many and they are too many due to variations in the physical factors.

## **BIO GEOGRAPHICAL CLASSIFICATION OF INDIA**

India is a mega diversity country having different types of climate and topography in different parts of the country. These variations have induced much variability in flora and fauna. India occupies 10<sup>th</sup> position among the plant rich countries of the world.

It is a very important to know and study the distribution, elevation and environmental relationship of plants and animals in time and space.

Biogeography comprising of photo geography and zoo geography deals with aspects of plants and animals. In order to know about the distribution and environmental interaction of flora and fauna of our country. It has been classified into 10 bio geographical zones. Each of these zones has its own climate, soil, topography and biodiversity.

<b>BIOGEOGRAPHICAL ZONE</b>	<b>BIOTIC PROVINCE</b>	<b>TOTAL AREA</b>
Trans Himalayas	Upper region	186200
Himalayas	North west Himalayas	6900
	West Himalayas	720000
	Central Himalayas	123000
	East Himalayas	83000
Desert	Kutch	45000
	Thar	180000
	Ladakh	NA
Semi arid	Central India	107600
	Gujarat-Rajwara	400400
Western Ghats	Malabar coast	59700
	Western Ghats mountain	99300
Deccan Peninsula	South Deccan plateau	378000
	Central plateau	341000
	Eastern plateau	198000
	Choate Nagpur	217000
	Central highlands	287000
Gang tic plan	Upper Gang tic plain	206400
	Lower Gang tic plain	153000
North east India	Brahmaputra valley	65200
	North eastern hills	1062000
Islands	Andaman islands	6397
	Nicobar islands	1930
	Lakshadweep islands	180
Coasts	West coast	6500
	East coast	6500

## **VALUE OF BIODIVERSITY**

The value of biodiversity provides a variety of environmental services from its species and ecosystem that are essential at the global, regional and locally maintaining the water cycle and protecting soil are some of important services.

Biodiversity is also essential for preserving ecological processes, such as fixing and recycling of nutrients, soil formation, maintaining the water balance within ecosystem.

Food, clothes, housing, energy, medicines are all resources that are directly (or) indirectly linked to the biological variety present in the biosphere. An agricultural community, biodiversity is used to grow their crops to suit the environment.

The environmental multiple uses of biodiversity values has been classified by MC Nectyetal in 1990 as follows.

### **CONSUMPTIVE USE VALUE**

These are directly used values where the biodiversity products are harvested and consumed directly.

Example:-food, drug, fuel etc.,

Food:- A large number of wild plants are consumed by human beings as food. 100% of the protein from domesticated animals consumes by people.

Even how ever our agricultural scientists make use of existing wild species of plants that are closely related to our crop plants for developing new hard strains.

Drugs:-Around 70% of modern medicines are derived for plant and plant extracts.

Example:-

- The wonderful drug penicillin used as an antibiotic. It is derived from a fungus called “pencillinium”.
- life saving drugs like ‘quinine’ that cures for malaria is obtained
- “Vin blast in” and “Vin Christine” two anticancer drugs have obtained from “periwinkle” plant, which possesses anti cancer alkaloids.
- Morphine (pain killer) is all of plant origin.

- The purple tree leaves, trunk and roots are used as effective medicines for curing diseases like fever, cough, stomach ache and skin diseases.
- “Caffeine” is obtained from fox glove which is an effective cure for heart stimulation.

Fuel:-our forest has been used since ago for fuel wood. The forest fossil fuel like coal, petroleum and natural gas are also the products of the fossilized biodiversity.

### **PRODUCTIVE USE VALUES**

Biodiversity products have obtained a commercial value. These products are marketed and sold. These products are marketed and sold. These products may be derived from the animals and plants.

<b>ANIMALS</b>	<b>ANIMAL PRODUCER</b>
Silk worm	Silk
Sheep	Wool
Musk deer	Musk
Elephant	Tusk
Lac insects	Lac

Many industries are dependent upon the productive use values of biodiversity.

Example:- paper and pulp industry, plywood, silk industry, textile industry, leather industry, pearl industry.

Developing countries in Asia, Africa and Latin America are the richest biodiversity centres and wild life products are smuggled and marketed in large quantities to some rich western countries and also to china and honking where export of cat skin and snake skin fetches a booming business.

Social values:-

These are the values associated with the social life customs, religion and spiritual aspects of the people. Many of the plants are considered holy and sacred in our country.

Example:-

Holy plants:- Tulsa, penal, lotus etc.,

The tribal people are very closely linked with the wild life in the forest.

Examples:- cow, snake, bull, peacock, rat etc.,

### ETHICAL VALUES (OR) EXISTANCE VALUES:-

It involves ethical issues like “life must be preserved “. In India and in other countries biodiversity is considered to have great values (or) religious and cultural basis.

Our rich heritage teaches us to worship plant, animals, river and mountains. The ethical values mean that a speck may or may not be used, but its existence in nature gives us pleasure.

Example:-

- The river Gangs is considered as Holy River.
- Tulsa, veggie some of the trees worshipped by the people.

Thus there is an ethical value (or) existence value attached to each species.

Aesthetic values:-

The beautiful nature of plants and animals insist us to protect the biodiversity. The most important aesthetic value of biodiversity is ecotourism.

Example:-

- 1) Eco tourism: - people from far place spend a lot of time and money to visit the beautiful areas, where they can enjoy the aesthetic value of biodiversity. This type of tourism is known as eco tourism.
- 2) The pleasant music of wild birds, colour of butterflies, flowers, peacocks are very important for their aesthetic value.

Option values:-

The option values are the potentials of biodiversity that are presently unknown and need to be known. The optional value of biodiversity suggests that any species may be proved to be a valuable species after someday.

Example:-

- 1) The growing surrounding a species for causing the diseases of cancer and AIDS.
- 2) Medical plants and herbs play a very important role in our India economic growth.

## **NATURAL RESOURCES**

The world resources mean a source of supply. Natural means an ecosystem not influenced by man and resources means that reserve stock of supply.

Definition:-Natural resources can be defined as that natural reserve stock of supply which man utilised for his substance of welfare.

Renewable resources:- these resources are capable of being regenerated by ecological processes within a reasonable time period.

Soil, water, air, wild life, natural vegetation, water evaporates due to sun energy, forms water vapour and is reformed in clouds which fuels to earth as rain.

Non renewable resources:-these resources are not capable of being regenerated by ecological processes.

Examples:-minerals, coal, oil, natural gas, ground water fossil fuels.

## **FOREST RESOURCES**

Forest are one of the most important renewable resources on this earth about  $\frac{1}{3}^{\text{rd}}$  of the world land surface is covered with forest.

Use of forest:-

- The direct economical product of forest is timber which is primarily used as building material such as timber, plywood, hard board etc.,
- Half of the timber cut each year is used as fuel for heating and cooking.

Many forest lands are used for mining agriculture, grazing and recreation and for development of dams provide new material for a variety of industrialism.

Example: - pulp for paper industry provides ingredients for the other pharmaceutical industries.

Production of oxygen:-The trees provide oxygen by photosynthesis which is essential for life on earth.

Reducing global warming:-the main green house gas CO<sub>2</sub> is obtained by the trees(forests) are as a raw materials for photosynthesis, these forests can act as a sink for CO<sub>2</sub> there by reducing the problem of global warming caused by green house gas CO<sub>2</sub>.

Wild life habitat: - Forests are the home of 5 millions of wild animals and plants. 7 million species are found in the tropical forests.

Soil conservation: - Forests bind the soil particles tightly in their roots and prevent soil erosion. They also act as wind breaks.

Pollution moderators: - Forest can absorb many toxic gases and can help in the air pure. They have also been reported to absorb noise and thus help in preventing air and noise pollution.

#### USES OF FORESTS:-

##### 1) Raw materials:-

Forests provide substances consisting of both timber and other commodity products along with wood forest products that some as raw materials in various small scale as well as large scale industries.

##### 2) Edible products:-

Forests provide a large number of products which find an important place in the diet of human beings.

Example: fruits, nuts, seeds, species etc.,

##### 3) Natural habitat:-

Forests provide a natural habitual to tribal people who depend on the plants and trees present in their vicinity for obtaining food, medicines and for other needs.

##### 4) Contribution to nation as income:-

Forests contribute in raising income and thus strengthen a nation economy by activities such as recreation, hunting and fishing.



#### 5) Medicinal plants:-

The leaves, bark and wood of trees contain hundreds of compounds that are valuable to the field of medicine.

#### 6) Tourism:-

Forest increases the beauty of landscape, also opening new avenues for tourism called eco tourism. There by attracting tourists all over the world.

#### 7) Employment opportunities:-

Forests are helpful in generating employment opportunities.

#### 8) They help in reducing desertification and land degradation:-

Forests add humus to the soil and aid in enriching fertility. The presence of trees helps to combine land degradation and also for reducing the desertification.

### **GLOBAL BIODIVERSITY**

Following the 1992 “earth summit” at RIODE JANEIR , it became evident that there is a growing need to know and scientifically became the huge number of species which are still unknown on this earth.

Roughly 1.5 million species are known till today which is perhaps 15% or may be just 2% of the actual number mapping the biodiversity has therefore been rightly recognized as an emergency task in order to plan its conservation and practical utilisation in audacious.

Terrestrial biodiversity of the earth is best described as “biomass” which are the largest ecological unit present in different geographic areas and are named after the dominant vegetarian.

Example:- Tropical rain forest savages, desert tundra etc.,

The tropical rain forests are inhabited by teeming millions of species of plants, birds, amphibians, insects as well as mammals. They are the earth’s largest store house of biodiversity. About 50-80% of global biodiversity lies in these rainforests. 3000 plants identified by national cancer research institute [NCRI] are sources of cancer fighting chemicals.

Very recently extract from one of the creeping vines in the rain forests at Cameroon has proved effective in the inhibition of replication of 'AIDS' virus.

Tropical forests have much less biodiversity but there is much better documentation of the species globally, roughly 170000 flowering plants, 30000 vertebrates and about 250000 other group of species.

## **BIOLOGICAL DIVERSITY TO NATIONAL LEVEL**

Every country is characterised by its own biodiversity depending mainly on its climate.

- India has a rich biological diversity of flora and fauna overall 6% of the global are found in India.
- India ranks 10<sup>th</sup> among the plant rich countries of the world, 11<sup>th</sup> in term of number of endemic species of high vertebrates and 6<sup>th</sup> among the centres of diversity and origin of agricultural crops.

## **LOCAL BIODIVERSITY**

Biodiversity at regional level is better understood by categorizing species richness into four types.

### **1) Point richness:-**

It refers to the number of species that can be found at a single point in a given space.

### **2) Alpha ( $\alpha$ ) richness:-**

It refers the number of species found in a small homogeneous area.

### **3) Beta ( $\beta$ ) richness:-**

It refers to the change of rate of species in composition across different habitats.

### **4) Gamma ( $\gamma$ ) richness:-**

It refers to the rate of change across large land scrape gradients.

$\alpha$  richness is strongly correlated with physical environmental variables.

β richness means that the cumulative number of species increases as more heterogeneous habitats are taken into consideration.

For example:-the ant species found in local species region of north pole is merely 10. As we kept on moving towards the equator and add more and more habituates. The number of species of ants reaches as high as 2000 on the equatorial region.

### **INDIA AS A MEGADIVERSITY NATION:-**

India has a rich and varied heritage of biodiversity, encompassing a wide spectrum of habitats from tropical rain forests to alpine vegetation and from temperature to coastal wetlands.

India is one of the 12 mega diversity countries in the world. Government of India 2000 records 47000 species of plants and 81000 species of animals which is about 7% and 6.5% respectively of global flora and fauna.

**ENDEMISM:** - Species which are restricted only to a particular area are known as endemic. India shows a good number of endemic species about 62% of amphibians and 50% of lizards are endemic to India.

**Centre of origin:-**

A large number of species are known to have originated in India. India has been the centre of origin of 166 species of crop plants and 320 species of wild species of wild relative of cultivated crops.

Nearly 5000 species of flowering plants had their origin in India.

### **MARINE BIODIVERSITY:-**

Along 7500km long coastline of our country in mangroves, estuaries, coral reefs, back water etc., there exist a rich biodiversity.

The marine diversity is rich in moleskin, crustaceans [crabs], polychquetus and corals several species of mangroves plants and sea grasses[marine algae] are also found in our country.

India's forest cover of 64.01 million hectares having a rich biodiversity of plants in the trans-Himalayan, north-west, central and eastern Himalayan forest, coasts, deserts, Gang tic plain, Nicobar and Lakshadweep island.

## ***HOT SPOTS OF BIODIVERSITY***

Areas which exhibit high species richness as well as high species endemism are termed as “hot spots of bio diversity”. The term was introduced by MYERS.

Characteristic features of hot spots:-

- a. They are of global importance and are the hosts of priceless gift of nature.
- b. Very rich in biodiversity, genetic diversity, species diversity (or) combination of all.
- c. Being the habitats of endemic and endangered species. They are having a high level of endemic and are under threat of habitual destruction that again leads to extinction of species.

There are 25 such hot spots of biodiversity on a global level out of which two are present in India, namely the eastern Himalayas and Western Ghats.

HOT SPOTS:-

- 1) Tropical Andes
- 2) Mesoamerican forest
- 3) Caribbean
- 4) Brazil's Antarctic forests
- 5) ENSCO Darien of Panama
- 6) Western Ecuador
- 7) Brazil's Corrode
- 8) Central Chile
- 9) California floristic province
- 10) Madagascar
- 11) Eastern arc and coastal
- 12) Western African forest
- 13) Cape floristic province
- 14) Succulent kaloc
- 15) Mediterranean basin
- 16) Caucasus

- 17) Sunderland
- 18) Wallace
- 19) Philippians
- 20) Indo Burma eastern Himalayas
- 21) South central china
- 22) South Western Australia
- 23) Western Ghats Sri Lanka
- 24) New Zealand
- 25) New Caledonia

Carrier 12 hot spots were identified on a global level Myers teal (2000) recognised 25 hot spots two of these hotspots lie in India extending into neighbouring countries namely Indo-Burma region(covering eastern Himalayas) and western Ghats and Sri Lanka region.

The India hotspots are not only rich in floral wealth and endemic species of plants but also reptiles, amphibians, swallow tailed butterflies and some mammals.

#### SALIENT FEATURES OF SOME OF THE HOTSPOTS ARE:-

##### 1) Eastern Himalayas:-

They display on ultra-varied topography that forests species diversity and endemic.

- a. They are numerous deep and semi isolated valleys in Sikkim which are extremely rich in endemic plant species.
- b. The forest cover in eastern Himalayas has dominated to about 1/3<sup>rd</sup> of its original cover.
- c. Certain species like sepia Himalayas a parasitize organism was sighted only twice in this region in the last 70 years.

##### 2) Western Ghats:-

It extends along a 17000 km strip of forests in Maharashtra, Karnataka, Tamil Nadu and Kerala has 40% of the total endemic plant species 62% amphibians and 50% lizards are endemic to western Ghats.

The hot spots are characterized by endemism interestingly a few species are common to both the hot spots in India.

Some common plants include *Lernstroemia japonica*, *Rhode drum* and *hyponym*.

Threats to diversity:-

Extinction (or) eliminations of a species in a natural species is a natural process of evolution.

During evolution, different species have died out and has loss of species in logic past has been a slow processes. The processes of extinction have been particularly fast in the recent years of human civilization.

If the present trend continues we would lose  $1/3^{\text{rd}}$  to  $2/3^{\text{rd}}$  our current biodiversity by the middle of 21<sup>st</sup> century.

Some of the major causes and issues related to threats to biodiversity.

Loss of habitats:-

- ❖ Habitat degradation is an important cause of known extinction. As deforestation precedes in tropical forests this becomes the cause of mass extinctions caused by human activity.
- ❖ Billions of hectares of forests and grassland have cleared for conservations into agricultural lands, postures settlement area or development projects.
- ❖ The unique rich biodiversity of the wetlands, estuaries and mangroves are under the most serious threat today.
- ❖ Sometimes the loss of habitual is in instatements so that the habitat is divided into small and scattered patches, a phenomenon known as habitual fragmentation.
- ❖ There are many wild life species such as bears and large cats that required large territories to subsist. They get badly threaten so they breed by in the interiors of the forests. Due to habitual fragmentation many song birds and vanishing.

- ❖ The wet lands destroyed due to draining filling and pollution there by causing huge biodiversity loss.
- ❖ Marine biodiversity is also under serious threat due to large scale destruction of the fragile breeding and feeding grounds of our oceanic fish and other species.

Poaching:-

Hunting is a passion for some people and for others is necessary for getting food. Poaching is another threat to wild life. Catching of animals without their knowledge is called “poaching” so human beings at places act as hunter and poachers. These two activities also will help in the destruction of habitat and animals may disappear from their own areas.

Smuggling of wild life items like furs, hides, horns tusks like specimen and herbal products worth millions of dollars per year. The developing nations in Asia, Latin America and Africa are the richest sources of biodiversity and have enormous wealth of wildlife.

The trading of such wild life products is highly profit making for the poachers who hunt there profit wild life and smuggling it to other countries to protect animals from each such dangers of hunters and poachers, the concept of protecting animals in an area called “sanctuary”.

### **MAN WILD CONFLICTS**

The need to protect and preserve our wildlife sometimes we come across conflicting situations when wild life starts causing immense damage and dangerous to man and under such conditions it becomes very difficult for the forest department to specify the affected villages and gain local support for wild life conservation.

### **ENDANGERED AND ENDEMIC SPECIES OF INDIA**

The growing human population and other influences combine to eliminate some wild animals and plants; hence there is a rising concern for preserving wild species all over the world. Natural causes of wild species destruction include evolutionary replacement and mass extinction. The direct threats are over harvesting of animals and plants for food or various industrial and commercial products.

The examples of direct threats to biological resources are habitual destruction to the introduction of exotic species and diseases, pollution of the environment and genetic assimilation. The international union for conservation of nature and natural resources publishes the “RED DATA BOOK” which includes the list of endangering species of plants and animals.

REPTILES: - gharial, green sea turtle, python

BIRDS: - great Indian bustard peacock, great Indian hornbills

CARNIVOROUS: - leopard, striped hyena, Indian lion mammals, gold cat, desert cat, red panda

PLANTS: - orchids, medicine plants like ravivoli serpentina sandal wood tree sanctum.

The zoological survey of India reported that cheetah, pink headed duck and mountain quail have already become extinct from India.

EXTINCT: - A species is said to be extinct when it is not seen in the world for 50 years at least.

Example: - dodo, passenger pigeon

A species is said to be endangered when its number has been reduced to a critical level. A species is said to be vulnerable if its population is facing continuous decline due to over exploitation (or) habitat destruction.

A species which are not endangered (or) vulnerable at present but are at a risk are categorized as rare species.

### **ENDEMIC SPECIES OF INDIA:-**

India has two biodiversity hot spots and thus possesses a large number of endemic species out of about 47000 species of plants in our country, 7000 are endemic. Some of the important endemic floras include orchids and species like “sepia Himalayan ovarian lardier, nepenthes khasi land”.

A large number out of total 81000 species of animals in our country is endemic the Western Ghats are particularly rich in amphibians and



reptiles. Different species of monitor lizards' relict pythons and Indian gharial are some important endemic species of our country.

### **CONSERVATION OF BIODIVERSITY:-**

Conservation refers to management of human activities in the environment. So, that it does not lead to habitual destruction and loss of biodiversity.

- To preserve and protect the species of their habitat.
- To maintain essential ecological process. So that there is no ecological imbalance created.
- To use the species and ecosystem sustainably without exploiting them.
- The creation of natural parks, sanctuaries biosphere reserves etc., to preserve flora and fauna.
- Conservation of genetic biodiversity by establishing zoo's botanical gardens, nurseries etc.,
- Proper planning of land use and other natural resources affecting the biodiversity.
- By prohibiting of hunting, poaching of animals, fishing etc., beyond the productive capacity of ecosystem.
- By regulation through acts, laws, legislative controls such as India forests act, endangered species act etc.,
- By creation of public awareness about sustainable use of the species without affecting the biodiversity.
- By delineating areas as reserves so that no activity is permitted in that zone. Example:-reserve forest
- A number of measures are now being taken the world over to conserve biodiversity including plants and animals.

### **THERE ARE TWO APPROACHES OF BIODIVERSITY CONSERVATION:-**

#### **a) In situ conservation[Within habitat]:-**

This is achieved by protection of wild flora and fauna in nature itself.

Example:- biosphere reserves, national parks, sanctuaries reserve forest.

#### **b) Ex situ conservation[outside habitats]:-**

This is done by establishing of gene banks, seed banks, zoo, botanical gardens, culture collection etc.,

## **INSIST CONSERVATION**

We have 7 major biosphere reserves, 80 national parks, 420 wild life sanctuaries and 120 botanical gardens in our country. The biosphere reserves some representative ecosystems. In India we have Nandi Devi[U.P], Manes[Assam], Nilgiri's[Karnataka, Kerala, Tamil Nadu] Within the biosphere reserve we have one (or) more national parks.

Example:-nilagiri biosphere reserve has two national parks Sandspur and nagarhole parks.

### ***NATIONAL PARKS:-***

- 1) It is an area abdicated for the conservation of wild life along with its environment.
- 2) It is also meant for enjoyment through tourism but without impairing the environment.
- 3) Each national park usually aims at conservation specifically of some particular species of wildlife along with others.
- 4) Overgrazing of domestic animals all private rights and forestry activities are prohibited with in national parks.

<b>NATIONAL PARK</b>	<b>STATE</b>	<b>IMPORTANT WILD LIFE</b>
Kaziranga	Assam	One horned rhino
Sandspur	Karnataka	Elephant
Gar national park	Gujarat	Indian lion
Primer	Kerala	Elephant, tigers
Saransk	Kagastharn	Tigers
Dudwa	Uttar Pradesh	Tigers

### **Wild life sanctuaries:-**

This also protected areas where killing, hunting, and sharing (or) capturing of wild life is prohibited except under the control of highest authority. Some important wild life sanctuaries of India

<b>NAME OF SANCTUARY</b>	<b>STATE</b>	<b>MAJOR WILD LIFE</b>
Wild ass sanctuary	Gujarat	Wild ass, wolf nilgai
Ghana bird sanctuary	Rajasthan	Chickaree
Hazerbagh sanctuary	Bihar	Tiger, leopard
Sultanpur bird sanctuary	Haryana	Migratory birds

## **EXCITE CONSERVATION:-**

This type of conservation is mainly done for conservation of crops varieties, the wild relatives of crops and all local varieties.

### **1) National bureau of plant genetic resources[NBPGR]:-**

It is located in New Delhi. Here agricultural and horticultural crops and their wild relative are preserved by cryo-preservation of seeds, pollen etc., by using liquid nitrogen at a temperature of  $-196^{\circ}\text{C}$ .

Varieties of rice, pearl millet, radish, turnip onion, tomato, carrot chilli, tobacco poppy etc., have been preserved successfully in liquid nitrogen for several years without losing seed viability.

### **2) National bureau of animal genetic resources[NBAGR]:-**

It is located at Karnataka, Haryana. It preserves the semen of domesticated bovine animals.

### **3) National facility for plant tissue culture repository[NFPTCR]:-**

For the development of a facility of conservation of variety of crop plants/trees by tissue culture. This facility has been created within "NFPTCR". The G-15 countries have also resourced to step up network of gene banks to facilitate the conservation of various varieties of aromatic and medicine plants for which India is the networking coordinator country.

## **MAN-WILD LIFE CONFLICTS**

Man wild life conflicts arise, when wild life starts causing immense damage and danger to the man under such conditions it is very difficult to gain the affected villages support for wildlife conservation.

Example:-

- 1) In Jabalpur, Orissa 195 humans were killed in the last years by elephant in realisation, the villagers have killed 98 elephants and badly injured 30 elephants
- 2) In the border of kotachamarajnagar, Mysore several elephants were killed because of the massive damage done by the elephants to the farmer's cotton and sugarcane crops.

- 3) The organised villagers sometimes hide explosives in the sugarcane fields, which explode when the elephants enter into their fields.

### **CAUSES OF MAN ANIMAL CONFLICTS:-**

- 1) Dwindling habitats of tigers, elephants, rhinos and bears due to shrinking forest cover compels them to move outside the forest and attack the field.
- 2) Human encroachment into the forest area includes a conflict between man and the wildlife.
- 3) Injured animals have a tendency to attack man usually the female wildlife attacks the human if she feels that her newborn cubs are in danger.
- 4) Earlier, forest departments used to cultivate sugarcane, paddy, and coconut trees in the sanctuaries. When the favourite food of elephants, were not available, they feed them to the elephants. But, now due to lack of such practices the wild animals move out of the forest for searching foods.
- 5) Often the villagers put electric wiring around their crop fields. The elephant get injured, suffering pain and star violence.
- 6) The cost compensation paid by the government for the damage caused by the wild animals is not enough. Therefore the organised farmers get revengefully and kill the wild animals.  
Example: - a farmer in Mysore gets compensation of RS 400/- per quintal but the marketed price is RS 2400/- per quintal.
- 7) Garbage near human settlement (or) food crops near forest areas attracts wild animals.

### **REMEDICAL MEASURES:-**

- ✚ Adequate crop and cattle compensation schemes must be started, along with sustainable cash compensation for loss of human life.
- ✚ Solar powered fencing should be provided along with electric current proof trenches to prevent the animals from staying into fields.
- ✚ Cropping pattern should be changed near the forest borders and adequate fodder, fruit and water should be made available for the elephants within forest zones.

- ✚ Wild life corridors should be provided for mass migration of big animals during unfavourable periods.
- ✚ The development and constructional work in and around forest region must be stopped.

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