

Biodiversity & Its conservation

It is nothing but species diversity also known as biological diversity. Man from ancient days man has started domesticating various animal species as well as plant species. But still so many species are unknown to us. Due to our developmental activities we are reducing our forest cover. Species which are unknown to us are getting vanished without knowing their importance as food & medicines.

def - "Biodiversity" or "Biological diversity" is referred to the vast range of life forms, from simple, microscopic, unicellular to the evolved, complex & multicellular forms on earth.

These includes all the living organisms i.e. millions of plant, animals & microorganisms.

Bio means - life. Diversity - means variety of life. Biodiversity can be studied at 3 diff levels.

Levels of Biodiversity - 3 levels

1. Genetic diversity
2. Species diversity
3. Ecosystem diversity

1. Genetic diversity - It is the basic source of diversity. The genes found in organism can form enormous number of combinations. which shows variations.

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

When genes within the same species shows different variety due to new combinations it is called as Genetic variability.

Eg: Rice variety belonging to species Oryza sativa, but there are 1000s of wild & cultivated varieties of rice, which shows variations at genetic level & differs in their colour, size, shape, aroma & nutrient content of the grain. This is genetic diversity of rice.

Genetic diversity is important in breeding crops & livestock.

2. Species diversity - Species is genetically isolated units of organisms which is used to classify millions of different plant & animal forms on earth.

Eg - cow & goat are diff species.

Species diversity is measured in species richness & their abundance in a community. Species diversity is most common to describe biodiversity in any given area. Based on this level of diversity India is included in "Mega Diversity" countries.

3. Ecosystem diversity:

Ecosystem includes living organism like plant, animal & microorganism & non-living things like air, water, soil minerals etc. & interaction between them for energy & nutrients.

Ecosystem diversity is the diversity of ecological complexity showing variations in trophic structure, food webs, nutrient cycle etc. The ecosystem also shows variation in physical parameters like moisture, temperature, rainfall etc. Thus there occurs tremendous diversity within the ecosystems.

Biogeographical classification of India.

India has different types of climate, topography in different parts.

From highest mountain range like Himalayas to islands like Andaman & Nicobar, from evergreen forest of Arunachal to dry desert of Rajasthan, coastal areas on the east & west of the country surrounded with numerous estuaries, backwaters & deltas like Sunderban, large wetlands like lakes, rivers, marshes & man-made reservoirs. also with different ecosystems which consist of variety of flora & fauna.

Indian biogeography can be broadly divided into 7 prominent regions namely:

~~source of~~ medicine, fibres & fodder requirement which ultimately determines the quality of life.

- a) food - A large number of wild plants are consumed by humans as food. About 30,000 edible plant species are found to be wild. Even agricultural scientists are making use of existing wild species or plant that are closely related to one

c) FUEL - The fossil fuel like coal, petroleum & natural gas are also product of fossilized biodiversity. The tribal people & local villagers directly use the forest products for fuel purpose, hence the fuel falls under the consumptive value.

2) PRODUCTIVE USE : These are commercially valuable products which are sold in the market. These may include the animal products like tusks of elephant, musk from musk deer, silk from silkworm, wool from sheep, fur of many animals etc. Many industries are dependent upon the productive use value of biodiversity like the paper & pulp industry, plywood industry, railway sleeper industry, silk industry, textile industry, leather industry etc. As there is ~~now~~ international ban on endangered species. But still some smuggling of fur, tusks, live specimen, sandal wood is there.

3) Social values - This is the most significant value of biodiversity. Because large population depends on local biodiversity for their daily needs & survival. Many of the plants like Tulsi, neem, mango, lotus, Bael, etc. The leaves, fruits or flowers of these plants are used in worship as the plant itself is worshipped. The tribal people are closely linked with the wildlife in forest. Their social life, songs, dances are closely woven around the wildlife. Many animals like cow, bull, snake have significant place in our festivals. Thus biodiversity has distinct

wildlife sanctuary, gardening
pet keeping
social value.

affection (moral duty)

- 4) Ethical value - It is believed that each species is a unique creation of nature or god & has every right to exist & is to be respected. It involves ethical issue like "Live & Let Live". For our survival we have to take care of Biodiversity connected with beauty & appreciation of beauty.

5) Aesthetic values -

The beauty of nature attracts man's attention & has created special place in life. It gives great pleasure to visit beautiful places in biodiversity. We like to visit wild areas where bio-aesthetic values are great, such tourism is known as ecotourism.

e.g. - Ecotourism, bird watching, visiting wildlife sanctuaries, pet keeping, gardening etc.

- 6) Option values:- These values include the potential of biodiversity that are presently unknown & needs to be explored. To fulfill one day to day demand for domestic use as well as industrial use, varieties of new species can be used.

So research is to be done to invent new & useful species from biodiversity.

Endemic - native.

Endangered -

Exotic - foreign species.

Rare -

pain & becomes violent.

Eng- Endangered & endemic species of India

In nature some species are always less in number, rare or uncommon, because of their requirement, structures, behaviour etc. whereas others are more common or even abundant.

The distribution of those organisms can also be universal, regional & be very much localised. The species which are naturally found in a specific area & nowhere else in the world are termed as endemic.

e.g:- Mammals endemic to India are like Asiatic Lion, one-horned Indian rhino, etc.

are restricted to a limited range & are found nowhere else in the world.

The term threatened & endangered indicates the degree of intensity of threat to the organisms in their natural surroundings. The factors that are responsible for their threat are competition for food & space, habitat loss, diseases, etc. which may even result in extinction of local species.

The International Union for Conservation of Nature & Natural Resources (IUCN).

published the Red Data Book, which includes the list of endangered species of plant & animals.

The red data symbolizes the warning signal for those species which are endangered & if not protected, are likely to become extinct in near future.

Extinct - When it is not seen in the wild for 50 yrs.

e.g. - Dodo (type of duck), passenger pigeon.

Endangered : When the no. of species gets reduced to a critical level & if such species are not protected & conserved, they are called endangered species.

Vulnerable : If the population is facing continuous decline due to overexploitation or habitat destruction.

(over different products)

Rare species — Species which are not endangered
or vulnerable at present, but are at
a risk, are known as rare species. In
future, they may become extinct.

In India nearly 450 plant species have
been identified to be endangered, threatened or rare.
A few species of endangered reptiles, birds,
mammals & plants are given below.

- a) Reptiles — Gharial, Green sea turtle, tortoise,
python.
- b) Birds — Great Indian Bustard, peacock, Great
Indian hornbill, Siberian white crane.
- c) Carnivorous mammals — Indian wolf, red fox,
sloth bear, tiger, leopard, Indian lion, golden
rat, desert cat etc.
- d) Plants : species of orchids, medicinal plants,
sandal wood tree etc.

ZSI has reported that cheetah, pink
headed duck & mountain quail have already
become extinct in India.

Biodiversity Region

Indian biodiversity is rich in flora & fauna. Many rare species are found in India. Overall 6% of world species are found in India. In world 13 hot spots of diversity are there. Out of that in India 2 are there. Many plant, vertebrate, agricultural species are found in India. The total no. of living species identified so far in India are 150,000.

Western Ghats & North eastern Himalayas.

Importance of Western Ghats as Biodiversity Region.

The western ghats are locally known as Sahyadri, in the northern portion, mountain range runs its full length of 1600 km. more or less parallel to the west coast, it starts from the mouth of the river Tapi in Dhule district of Maharashtra & ends in Kanyakumari. The entire entire region covers an area of around 16,000 sq. km & supports a population of over 45 millions.

Plenty of rivers - Krishna, Bhima, Tungabhadra, Kaveri, Kali, Saraswati etc. covers about 20% of utilisable water of India.

Ghat receives 2000 - 7000 mm / yr. rainfall.
80% during monsoon.

Tropical, semievergreen, moist & dry deciduous, subtropical hill forest are included in W.G. These forest are rich in medicinal plants, orchids, grasses, trees & many other species, altogether nearly 4500 species of flowering plants are observed in W.G. W.G is home of many rare & important species of animals such as tiger, elephant, leopard, bear, gaur, Nilgiri langur, Malabar gray hornbill, are some of species. Malabar Giant squirrel, whistling Thrush,

Many protected areas are observed in W.G. such as wildlife sanctuaries, & national parks like project tiger reserves in Tamilnadu, Kerala, Karnataka, Goa & Maharashtra.

Ranthambore wildlife sanctuary
Chandoli National park

Koyana wildlife sanctuary & many protected areas in Sahyadri region.

Ecological & environmental problems of W.G. includes, increasing pressure of population on land & vegetation, submergence of forest due to developmental projects like river valley project, encroachment (प्रदूषण) on forest land, clear felling of forest for plants of tea, coffee, rubber etc., mining activities, soil erosion, shifting cultivation, etc. depletion of wildlife population. etc.

* Zoological Survey of India (ZSI) has made the survey & established that the present rate of deforestation in the area varies from 60-110 sq. km. every year. ZSI warned that if immediate conservation measures are not taken then the W.G. ecology will be wiped out in the next 5 decades.

* Sathyadri Ecological Forum (SEF) established more than 25 NGOs from Maharashtra, Goa & Karnataka in 2002. They have proposed.

Sathyadri Ecological Sensitive Area (SESA).
to the central Govt.

The SESA proposal aims at protecting, preventing & promoting what is left of the W.G.

1. in w.g.
2. parks
in, Kerala

The Biodiversity has 2 ~~imp~~ concepts
Hot spots & Megadiversity region.

Hot spots of Biodiversity:-

Area which exhibit high species richness as well as high endemic (native species) species are termed as hot spots of biodiversity. (limited to habitat loss).

Megadiversity -

- concept covers the broad frame of biodiversity concept. which stresses more on species richness, threatened species & endemic species.

Threats to Biodiversity - (5 marks)

Extinction or elimination of a species is a natural process of evolution. During evolution, species have died out & replaced by others. However, the rate of loss of species in geological past is a slow process but the process of extinction has become fast in the recent years due to human civilization, resulting in extinction of thousands of species & varieties annually.

These are major causes & issues related to threats to biodiversity.

- 1) Loss of habitat.
- 2) Poaching
- 3) Man - wildlife conflict.

1) Loss of Habitat -

Destruction & loss of natural habitat is the single largest cause of Biodiversity loss. Billion hectares of forest land & grassland have been cleared over the past 10,000 yrs. for conversion into agricultural land, settlement areas or for developmental projects. These natural forests & grassland were the natural

Subj ect
Name of thousands of species which perished
due to loss of their natural habitat.

- Severe damage is caused to wetlands.
 - due to the misuse ^{at water bodies} of drinking, filling & pollution - This causes loss of biodiversity.
- Habitat fragmentation - Habitat area is divided in small & scattered patches i.e. habitat fragmentation.
This affect many ^{wild} animals like bears, wild cat, which breeds in only in the interiors of the forest.

Many song birds are lost due to such fragmentation.

2) Poaching :- (Rajnik)

It is illegal trade of wildlife products by killing animals. So poaching is another threat to wildlife.

The illegal hunting of wild animals is done to obtain commercially valuable animal parts as - skin, ~~gut~~, horns, bones, organs ~~&~~ medicinal purpose.

e.g. - Virappan - poaching of tusker elephant for ivory.

Even there is poaching at protected areas, as National park, wildlife sanctuaries, project tiger area.

Poaching has links in the international markets also.

3) Man-Wildlife conflicts -

The relation b/w man & wildlife is always Prey-predator types. In previous days we had domesticated various wild

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animals for our agricultural purpose.

In development we have converted forest land into agri. land.

So the man-wildlife conflicts have changed its dimension.

- As we are reducing forest areas wild animals are losing their natural habitat so these animals are moving towards human settlement areas ~~for~~ in the search of food. Even they attacks human being.

eg. Tiger, boars, elephant, leopards etc

Biosphere Reserve is the concept of insitu conservation. Without interference of In India the local community.

In India 7 Biosphere Reserves are there

(b)	Biosphere Reserve	State
	Manda & Dovi	U.P.
	Nokrek	Meghalaya
	Manas	Assam
	Sundarbans	West Bengal
	Gulf of Mannar	Tamil Nadu
	Nilgiri	Karnataka, Kerala & T.N.
	Great Nicobar & Similipat	Odisha

National park is an area dedicated for the conservation of wildlife along with its environment. It is also used for tourism without disturbing the wildlife.

some imp - N. P. in India :

1.	Kaziranga	Assam	one-horned Rhino
2.	Gir national park	Gujrat	Indian Lion
3.	Dachigam	J&K	Hangul (deer)
4.	Periyar	Kerala	Elephant, Tiger
5.	Bandipur	Karnataka	Elephant
6.	Kanha	M.P.	Tiger
7.	Corbett	Uttarakhand	Tiger
8.	Dudwa	U.P.	Tiger
9.	Ranthambore	Rajasthan	Tiger
10.	Sariska	Rajasthan	Tiger

Wildlife sanctuaries are also protected areas where killing, poaching, hunting, shooting is prohibited under the

control of highest authority.

Some major WLS are:

Name of sanctuary state Major wild life

1. Ghana Bird sanctuary	Rajasthan	300 species of birds (including migratory)
2. Hazaribagh sanctuary	Bihar	Tiger, leopard.
3. Sultanpur Bird	Haryana	Migratory birds.
4. Nalsarovar Bird	Gujarat	Water birds -
5. Abohar WLS	Punjab	Black duck
6. Madumalai WLS	Tamilnadu	Tiger, elephant, leopard.
7. Vedanthangal Birdsanc.	--	Water birds.
8. Jaldapara WLS	West Bengal	Rhinoceros, elephant, tiger
9. Wild Ass Sanctuary	Gujarat	Wild Ass, wolf, chinkara

For the protection & conservation of certain animals, there have been specific projects in our country like - Project Tiger; Gizlion project, Crocodile Breeding project, Project Elephant, Snow leopard project.

For plants, there is one gene sanctuary for citrus (lemon family) & one tree pitcher plant (an insect eating plant) in Northeast India.

Ex - SITV Conservation:

The ex-situ conservation of plant & animals is being carried out as a last alternative to in situ conservation, however this can never be the substitute to it.

or afforestation programmes. It is done through gene pool.

The collection & preservation of genetic information material of wild variety of crops, domestic animals, medicinal sp. etc. is done in several national institutes & laboratories by preparing different cultural media for preparing seeds.

In India we have important gene bank or seed bank facilities in New Delhi, Haryana where agricultural & horticultural crops & their wild relatives or varieties are preserved.