MODULE 26 - VALUE OF BIODIVERSITY

OBJECTIVES

By the end of the session the Students shall be able to know:-

1. What is biodiversity and what is its Value?
2. Consumptive use of biodiversity in the form of cereals.
3. Productive use of biodiversity in the form of marketable goods like Honey, gum Catechu & Medicines.
4. Social, ethical, aesthetic and Official Value of biodiversity.

SUMMARY

Biodiversity is connected with our life in the form of different aspects. We cannot think of the existence of man without biodiversity.

It is interesting to note that native persons and tribal's have more contribution in the conservation of biodiversity as compared to urban. Tribal people depend upon biodiversity in their everyday life hence they have linked biodiversity with their social, ethical and aesthetic life.

Government should organize biodiversity boards at national as well as state levels, so that whatever biodiversity is left, remains conserved in future.

TRANSCRIPTION

Introduction

The Word biodiversity was coined by G.Rosen. It is defined as varieties of plants animals and Microbes occuring as on interacting system in a given habitat. Biodiversity provides a variety of environmental services through its species and ecosystems that are essential at the global, regional and Local Level Different types of cycles in nature such as Oxygen cycle, carbon dioxide cycle, Nitrogen cycle, water cycle and cycle of minerals like Sulphur, phosphorus are important uses of biodiversity. The fertility of soil is also maintained by biodiversity of that area. The World now feels that the loss of biodiversity contributes to global climatic changes such as global warming , abnormal snow fall in some parts of the world and natural disasters like tsunami Green plants take carbon dioxide during photosynthesis and give out oxygen. Oxygen is vital air necessary for respiration of plants as well as animals including human beings. Respiration is the most important activity of life. According to the well known environment expert Shri Sunderlal Bahuguna we calculate the value of a tree in terms of wood fruits & fodder but we forget about it's a contribution the production of oxygen. Oxygen is a life saving gas. Every serious patient in hospital is immediately supported by oxygen cylinder. In market an oxygen cylinder of 20 kg capacity may cost about Rs 500/- or so. A single Peepal tree yields tonnes of oxygen. Its cost will run in crores of rupees Scientists of Hyderabad

University have found that ordinary cordia myxa (Gondi) tree is very efficient carbon dioxide absorber. It can purify air very efficiently. The Tree is very commons throughout India and needs no special care for its growth. Such trees are valuable for biodiversity.

The Loss of forest Cover results in the increase in the amount of carbon dioxide leading to green house effect

Changes in biodiversity have resulted in climatic changes like global warming in some countries & global cooling in others, these nautral changes may lead to catastrophe

Food, cloth, shelter, energy and medicines are the basic requirements of human being which depend upon biodiversity. Tribal communities gather resources directly from the forests Urban communities generally use the greatest amount of goods & services which are all indirectly recived from natural ecosystems

For long term survival of man biodiversity conservation is a must. Biodiversity of living organisms which is present in the Wilder ness as well as in our crops and live stocks plays a major role in human development. The preservation of biodiversity is there fore integral to any strategy that aims at improving the quality of human life.

Various organisms in a particular habitat depend upon each other Plants depend upon insects for pollination which is considered now a good example of mutualism-Use of pesticides has reduced the population of honey bees, this in turn has reduced pollination and ultimately the production of fruits & seeds. Man is responsible for disturbing biodiversity.

Man derives many direct and in direct benefits from biodiversity hence he should be continuous while disturbing it.

Biodiversity also provides many eclogical services free of charge that are responsible for maintaining the health of ecosystems.

The uses of biodiversity are as under:-

Consumptive use

The biodiversity of ecosystem provides forest dwellers with all their daily needs such as food. building material fuel wood & fodder Out of several thousand species of edible plants less than 20 species cultivated to produce about 85 percent of world`s food rice wheat and corn are three major staple food crops rich are carbohydrates which yield nearly two third of the food sustaining the human population.

Coconut palm is the source of fat in South India. It is used as cooking medium. Soyabean, groundnut Linseed, mustard and sesamum are oil yielding crops.

Jute, Flax, Sun, coir are fiber crops used for by man as the source of gunny bags, canvas and cordage.

The commercial domesticated species are crossed with their wild relative to improving their genetic characters. Gene for disease resistance is introduced in cultivated variety by crossing it with a wild variety. Wild varieties are disease resistant in nature it self.

Japonica variety of Rice is high yielding while Indica variety from India is disease resistant. When they are crossed the new cultivated variety becomes high yielding as well as disease resistant. In case of wheat also Norin gene of dwarfism but more tillering, from Mexican variety has been introduced in Indian varieties. Kalyan Sona, Sharbati Sonara are such varieties.

According to well known environment expert Norman Myers about 80,000 different species of plants are used as food In Indonesia about 4000 varieties of plants and animals are used as food but only very few are under cultivation.

Due to overgrazing, cutting of forests trees and conversion of forest land in agricultural land several wild verities have disappeared and their germ plasm could not be preserved.

The wilderness is an out come of a long evolutionary process that has created unimaginably Large diversity of living species and the various Eco systems on earth, including all living creatures. This includes man kind also In view of this fact it is binding for us to protect our earth's unique biodiversity.

Production Value

This category includes marketable goods. The biotechnologist uses biologically rich areas to prospect & search for potential genetic properties in plants and animals that can be used to develop better varieties of crops and better live stock. To pharmacist biological diversity is the raw material from which new drugs can be identified from plant or animal products. Plants can also be used for preparation of several synthetic products known as botano chemicals.

The period 1960 on wards is well know for green revolution. Norman Borlaug popularly known as the father of green revolution introduced genetic diversity in different varieties of wheat by cross pollination between Mexican and Indian varieties of wheat, The high yielding varieties solved the problem of food grains in India.

These days improvement is done by genetic engineering. Thus we have shifted from green revolution to gene revolution. The very beginning of current century has started with biotechnology. Bt cotton which is resistant to the boll Worm Helothes Larva is an example of genetically modified crop. Hirudin is a protein that prevents the clotting of blood. The gene encoding Hirudin was chemically synthesised and introduced in Brassica napus (jurnip) In this plant Hirudin is stored in seeds from where it can be extracted purified & used as medicine in patients suffering from blood clotting. Such persons can be saved from cardiac trouble.

Even today, new species of plants & animals are being constantly discovered in the wild. These wild species are The building blocks for the betterment of human life and their loss to is great economic loss it mankind. Among the known species, only a tiny fraction has been investigated for their value in terms of food, or medicinal or industrial potential. The preservation of biodiversity has now become essential for industrial growth and economic developments. A variety of industries like pharmaceuticals are highly dependent on identifying components of great economic value from wide variety of wild species of plants located in undisturbed natural forest. This is called biological prospecting.

Commonly used modern drugs derived from plants sources are

1. Atropine :- Obtained from the leaves of Altropa belladonna used in dilation of pupil during eye testing.
2. Bromeline :- obtained from pineapple fruit It controls swelling in tissue due to infection
3. Caffeine :- From coffee seeds, stimulates Central nervous system and has refreshing effect.

4. Camphor :- From Bark and leaves of camphor tree cinnamomum camphora. It is rubrifacient and increases local blood supply, also cures skin infection.
5. Cocaine :- Obtained from leaves and seed of Coco used as Local anesthesia. Reduces pain during surgery.
6. Codeine :- Obtained from the latex of optium poppy Reduces irritation in throat therefore used in cough syrup as codeine phosphate
7. Morphine :- Obtained from latex of opium poppy. Relieves pain in Cancer patients in last stage.
8. Digitoxin :- Obtain from the leaves of foxglove, Digitalis purpurea it is cardiac stimulant given in Heart trouble.
9. Diosgenin :- Obtained from roots of wild yam, Dioscorea esculenta source of female Contraceptive, prevents pregnancy.
10. Ergot amine :- Smut of Rye or Oat caused by the fungus Claviceps purpurea, given in painless delivery Tablets given in Migraine
11. Gossypol :- Obtained from cotton seeds. Used as male contra captive.
12. Menthol :- Obtained from stem & leaves of mentha piperata, cures stomach ache and used as mouth freshener as well as rubrifacient.
13. Papain :- Obtained from latex of raw Papaya, improves digestion by dissolving excess protein in mucus
14. Penicillin :- It is archetype of antibiotic world, discovered & named by Sir Alexander Fleming of London from the fungus penicillium notatum Isolated by Florey in 1941, now it is manufactured from penicillium chrysogenum It kills gram positive Bacteria specially pus. forming Staphylococcus. it also cures tonsillitis and Pneumonia
15. Quinine :- Obtained from the bark of cinchona officinalis a tree of the family Rubiaceac sold in market under Various names such as Chloroquin, premaquin, Resochin & Nivaquin. It is a wonder ful antimatarial drug.
16. Reserpine :- Obtained from the roots of Rauwolfia serpentina a shrub of the family Apocynaceac. the plant in popularly called serpgandha or snake root. It reduces high blood pressure which is the most common disease these days.
17. Scopolamine :- obtained from the seeds of thorn apple, Datura stramonium it is sedative and also controls tremors in Parkinson's disease.
18. Taxol :- It is resinous secretion of Taxus baccata popularly called pacific yew tree. It is anticanceroses and use ful specially in case of a ovarian Cancer.
19. Vinblasatine and Vincristine :- Obtained from the leaves of Rosy periwinkle catharanthus rose us very common under shrub through out India with Rosy or Pink flowers Both these are anticancer drugs, specially for controlling Cancer in children. The plant flowers throughout the year hence it is called sadabahar or Baramasi or Sadasuhagan in Hindi.

    Actually blue print of several important medicines has been obtained from wild plants By disturbing biodiversity we have lost the germ plasma of several useful plants & animals.

Social Values

Valley of flowers in Himalayas is visited by various societies to observe the beauty of flowers. Several people like to have colored fishes in aquarium and round about them

People visit forest in order to observe wild life. They Visit various Lakes to watch bird life Madhuca Latifolia is used in social life by tribal people.

Village choupal or meetings are organized under shade trees like Banyan where several important decisions pertaining to social life are taken Phoenix and other palms are used for extraction sweet sap known as Neera offered in society at various occasions. Butea monosperma is used for extraction color to celebrate Holi festival.

Ethical Values

Indian civilization has preserved nature through local traditions. Persons of Bishnoi cast do not cut trees. Ginkgo biloba a Conifer Gymnosperm has been saved from extinction because it is cultivated near Buddha temples & Banyan & peepalare also cultivated near Indian temples. Indian civilization has over several generations preserved nature through local traditions.

In our country we have a large number of sacred groves.

As preserved by tribal people in several states sacred groves are traditionally protected forest patches maintained on socio religious grounds. Due to moral and ethical protection by the natives the groves support a rich collection of plants & animals including some rare and endemic taxa In India there are 13720 sacred groves in various states. Kanak Durga sacred grove of west Bengal Supports 388 species of various plants along with six species of reptiles, 13 species of birds & six species of mammals.

Aesthetic Value

Botanical gardens & zoos are the centers of aesthetic value Biodiversity is the beautiful & wonderful aspect of nature. Sitting in a forest and listening to the music of birds is a unique experience, Vehicles of several deities are animals The vehicle of lord Ganesha is a mouse, that of goddess Laxmi is owl while goddess Durga prefers lion, Barahsingha is state animal of M.P. and Banyan tree is the state tree of M.P. Lotus is national flower of India while Tiger is national animal of India Tulsi is worshipped in most of the parts of India Snakes are also worshipped in few parts All these steps lead to conservation of biodiversity.

Optional Values

Optional value depends upon future possibilities. It is difficult to predict which of our species or traditional variety of crops & domestic animals will be of great use in future. But one thing is very clear that we have to preserve wild crop plants and animals. They have original genes for disease resistance and other useful characters According to Darwin natural selection has played very important role in the evolution of wild varieties. Thus we have no option except to preserve biodiversity.

GLOSSARY

1. Biodiversity : Varieties of living plants, animals and microbes in a natural habitat.

2. Ecosystem : Interaction between organisms and environment.
3. Microbes : Microscopic organisms.
4. Global level : World level.
5. Global warming : Increase in temperature at world level.
6. Tsunami : Earthquake inside sea.
7. Conservation : Protection.
8. Wilderness : Uncultivated area.
9. Mutualism : Reciprocal.
10. Consumptive : Usable.
11. Sustaining : Supporting.
12. Larva : Caterpillar.
13. Pharmaceuticals: Use or sale of medical drugs.
14. Irritation : Discomfort in body parts.
15. Contraceptive : Preventing pregnancy.
16. Antibiotic : Substance that can inhibit or destroy Bacteria
17. Pneumonia : Inflammation of lungs.
18. Aesthetic : Sensitive to beauty.

FAQs

Q 1. Who coined the word biodiversity?
Ans. G. Rosen

Q 2. What is biodiversity?
Ans. Varieties of plants, animals & microbes occurring as an interacting system in a given habitat.

Q 3. Name The most prominent change caused due to the disturbance in biodiversity?
Ans. Green house effect

Q 4. Give an example of mutualism?
Ans. Insect pollination

Q 5. How use of pesticides reduces crop production?
Ans. Pesticides kill several useful insects also,which used to carryon pollination.

Q 6. Who is responsible for disturbing the biodiversity?
Ans. Man

Q 7. What is consumptive use of biodiversity?
Ans. Consumptive use of biodiversity is in the form of fuel wood, timber, fodder and cereals like rice, wheat and maize.

Q 8. Why coconut palm is considered as Kalpa Vriksha?
Ans. Because it provides food, fibre and oil. Coconut milk obtained from raw coconut has nourishing as well as medicinal value.

Q 9. List any 3 fibre crops of consumptive value.
Ans. 1. Jute 2. Flax 3. Sun

Q 10. In case of rice why Japonica variety is crossed with Indica variety?
Ans. In order to obtain such variety of rice which is high yielding as well as disease resistant

Q 11. Who is father of Green Revolution?
Ans. Dr. Norman Borlaug of México.

Q 12. List any two high-yielding varieties of wheat?
Ans. 1. Kalyan sona 2. Sharbati sonora

Q 13. What is Bt Cotton ?
Ans. Genetically engineered variety of cotton resistant to boll worm larva

Q 14. What is included in productive value of biodiversity?
Ans. Medicinal plants and plants supplying industrial products

Q 15. Which plant product in given in painless delivery?
Ans. Erogatamine obtained from the fungus Claviceps purpurea

Q 16. Why periwinkle has gained importance these days?
Ans. Its leaves are source of Vincristine & Vinblastine which are anticancer drugs.

Q 17. What is TaxoL?
Ans. Resinous secretion of gymnosperm Taxus baccata applied to cancer tumors.

Q 18. What is social value of biodiversity?
Ans. Watching bird life, using Butea flowers during Holi festival and organizing village choupal under shade trees.

Q 19. What is ethical Value of biodiversity?
Ans. Worshiping trees like Banyan, Peepal & Amla and maintaining sacred groves by natives of various areas.

Q 20. What is aesthetic value of biodiversity?
Ans. Tiger is declared as the national animal of India while lotus is national flower of India.