MODULE 28 - INDIA AS A MEGADIVERSITY NATION

OBJECTIVES

By the end of the session the students will be able to: -

1. Know about the origin of India.
2. Wealth of plants and animals in India.
3. Native crops and indigenous plants of India.
4. Diversity in legumes and grasses.

SUMMARY

Due to origin from three different continents India has very rich biodiversity .It has fauna & flora of Gondwana land as well as Europe & Ethiopia along with its own indigenous plants and animals.

Mango, Plantain, Citrus plants originally belong to India. From here they have migrated to other countries of the world - India has several local breeds of cattle such as buffalos, sheep & goats. Beautiful orchids like Deerdrobium and trees like Elaeocarpus granitrus (Rudraksha) and Rhododendron have India as their native home. India is one of the twelve mega biodiversity nations of the world. We should feel proud of this fact.

TRANSCRIPTION

INTRODUCTION

India is one of 12 mega diversity nations of the world. India is divided into 10 biogeographic regions. The diverse physical features and climatic conditions have formed ecological habitats like forests, grasslands, wetlands, coastal, marine and desert ecosystems, which support immense biodiversity.

India originated 70 million years ago as part of Gondwana Land along with Africa continent, Australia and Antarctica. Hence it has some flora & fauna common with these countries. Due to the continental drift, India shifted northwards across the equator and became part of the Eurasian continent which had plants & animals of the Europe & Asia; because at this time the Himalaya had not been formed. African - Ethiopian species also migrated into India. Ultimately India got separated from other countries due to the formation of the Himalayas as a geographical barrier. Thus India has species from three distinct continents along with its own endemic species. This is the reason why India has such a rich biodiversity.

CENTRE OF ORIGIN

VaviLov a Russian explorer has recognized 12 primary centers of origin of cultivated plants; India being one of them. India is homeland to 167 important plants, species of

cereals, millets, fruits, condiments, vegetables, pulses, fiber, crops and oil seeds. About 114 breeds of domesticated animals are native to India.

SURVEY REPORTS

Approximately 65% of the total geographical area of India has been surveyed so far. Botanical survey of India established in 1890 has described 45000 species of plants. Zoological Survey of India established in 1916 has described 81000 species of animals. This list is upgraded from time to time specially in case of lower plants and invertebrate animals. The forest survey of India established in 1981 assesses the forest cover with a view to develop an accurate data base for planning and monitoring purposes. Conservation and sustainable use of biological resources based on local knowledge, custom and practices is ingrained in the Indian ethos. India has a number of Alternative Medicines like Ayurveda, Unani, Siddha and Homeopathy which are prominently based on ingredients from plants in most of their preparation and formulation. Several plants like Soapnut, Shikakai (Acacia Concina), Henna (Lawsonia inermes) Turmeric are locally used for cosmetic purposes.

CONSERVATION OF BIODIVERSITY

Conservation of biodiversity: - The governments of different countries have realized the importance of the conservation of biodiversity in view of scientific, aesthetic, recreational and economic value. Biodiversity rich area have been declared as National parks and wildlife sanctuaries. Both these are natural ecosystem of a particular country. The oldest national park of the world is “Yellow stone national park” Wyoming in USA.

In India there are 85 National parks and 448 wild life sanctuaries. The oldest national park of India is Jim carbett national park in Nainital, Uttaranchal Pradesh.

In M.P. there are nine national parks and 28 sancturies. The oldest national park of M.P. is Kanha National Park in Mandla district. It is meant for the conservation of swamp deer and (Bharhasingha) Tigers. Madhav national park, Shivpuri is meant for conservation of ‘Neel Gai’(नीलगाय) while Bandhav Garh national park Shahdol is meant for conservation of Tigers. National parks and sanctuaries, are the natural area which not only conserve the biodiversity but are also the areas of entertainment to present as well as future generations. It is interesting to note that the idea of the conservation of biodiversity was initiated not the biologists but by the drawing artists of “Barbigen School” of France. They had conserved Fontainbleau forest in 1853.

Conserving biodiversity in its natural habitat is called in situ conservation. It is observed that in National parks and Sanctuaries animal conservation is given more importance than plant. Plants should also be given equal importance.

For conservation, biodiversity rich areas are declared as national parks, wild life sanctuaries, biosphere reserves and ecologically fragile and sensitive areas.

Degraded areas and waste lands are converted into green areas by afforestation. Gene banks are also established for ex-situ (i.e. conservation outside original habitat) conservation of biodiversity. The Tura range in Garo hills of Meghalaya is a Gene sanctuary for preserving the rich native diversity of wild citrus and Banana species.

About 4.2 percent of the total geographical area of the country has been ear marked for in-situ (i.e. conservation in original habitat) conservation of biodiversity. For this purpose 85 national parks and 448 wild life sanctuaries have been created, resulting in the restoration of viable population of mammals like Tigers, Lions, rhinoceros, crocodiles and elephants.

The Indian council of Forestry Research & Education (ICFRE) has identified 309 areas as reserve forests. Out of these, 187 are natural & 122 are in plantation, covering an area of 8500 hectares.

Programs have also been started for scientific management of wetland, mangroves and coral reef ecosystem. Coral reef ecosystem involving different varieties of algae is the most productive ecosystem. Mangrove conservation is one of the thrust areas of the Ministry of Environment in a view to provide protection from disasters like Tsunami.

Six significant wetlands of India have been declared as "Ramsar Sites" under the Ramsar Convention and five natural sites have been declared as "World Heritage Sites".

Twelve biodiversity rich areas of the country have been designated as Biosphere Reserves as per the UNESCO/MAB criteria. The aim of these reserves is to protect biological diversity and genetic integrity of plants, animals and microbes in their totality as part of the natural ecosystems. In this way natural biodiversity undergoes self perpetuation and evolution.

The Ministry of Environment and Forests framed the National Afforestation and Eco-development Board (NAEB) in August 1992. NAEB has suggested schemes for biomass production, specially the production of fuel wood & fodder in nude areas.

Central government and state governments are managing 33 botanical gardens. Universities have their own botanical gardens. There are 275 zoos, deer parks, safari parks and aquaria where biodiversity of animal is maintained. Botanical garden and Zoos are the proper places for the ex-situ conservation of threatened & endangered species in their respective regions.

VARIOUS ACTS FOR THE CONSERVATION OF BIODIVERSITY

Articles 48a and 51a(g) of the Indian Constitution are related with the protection of the environment.

Major central acts relevant to biodiversity *are*: -

1. Forest Act, 1927.
2. Wildlife Protection Act, 1972.
3. Forest Conservation Act, 1980.
4. Environment Protection Act, 1986.

Various states have their own laws and statutes concerning the forest and natural resources.

The policies directly related to biodiversity include: -

1. National Forest Policy amended in 1988.
2. National Conservation strategy and Policy for Environment and Sustainable Development.
3. National Agricultural Policy.
4. National Land Use Policy.

5. National Fisheries Policy.
6. National Policy and Action Strategy on Biodiversity.
7. National Wildlife Action Plan.
8. Environmental Action Plan.

India is a party to the Convention on Biological Diversity (CBD). The main objectives are: -

1. Conservation of biodiversity
2. Sustainable use of the components of biodiversity
3. Fair and equitable sharing of benefits arising out of the utilisation of genetic resources.

To encourage taxonomic or classification work, Janaki Ammal National Award in taxonomy has been instituted for identifying the critically important areas and filling the gaps in taxonomic work.

India's richness in biological resources and related indigenous knowledge is well recognised. Biodiversity legislation of India aims at regulating access to biological resources. With thorough awareness moulded by legislation we may be able to maintain the richness of biodiversity in this mega diversity nation.

DETAILS OF BIODIVERSITY

India has 115000 known species of plants and animals Paddy, sugarcane, jute, mango, lemon, and plantains originated in India and later on migrated to other countries. Some orchids, cucurbits & medicinal plants are also indigenous to India. India is considered as one amongst twelve mega diversity nations of the world. The place occupied by India on the basis of wild life is as shown:-

S. No.	Group	Number of Species		Percentage of endemic species found in India	Rank of India hold
		World	India		
1	Mammals	4231	372	8	8th
2	Birds	12450	1200	4	8th
3	Reptiles	5300	435	33	5th
4	Amphibians	4184	181	62	15th
5	Fishes	2300	2000	-	-
6	Insects	800000	600000	-	-
7	Molluscs	100000	5000	-	-

India has 13000 types of butterflies & moths. There are 45000 Plants species found in India, out of which most are Angiosperms. India rank 15th as far as the plant biodiversity is concerned.

There are 1022 species of ferns and 1082 species of orchids. Out of 588 genera of monocots 22 are endemic to India.

It is estimated that number of unknown species could be several times higher. High endemism has also been recorded for various groups of insects, marine worms, centipedes, May flies and fresh water sponges. Just like high biodiversity in Indian wild plants there is also great diversity in cultivated crops and breeds of domestic animals.

There are 30000 to 50000 varieties of rice and a number of cereals and vegetables. The highest diversity of crop plants is found in Western Ghats, Eastern Ghats, Northern Himalayas, North Eastern Hills and Andaman & Nicobar Islands. All these are areas of high rain fall. These areas constitute 2 of the 18 hot spots identified in the world.

Gene Banks: - whenever any wild variety is improved the Genes of wild variety become less and less and gradually they may disappear from the population. Genes of wild variety are important to grpw disease resistant varieties in future, therefore germ plasm of wild varieties is preserved in the form of gene banks. The best way to preserve the geren plasm is in the form of seeds. Such seeds form gene banks. VaviLov of Leningrad in Russia started the conservation of germ plasm of 200000 varieties. International rice research institute at Manila in Philippines has collection of 80000 varieties of rice in its gene bank. National seed storage laboratory America has collection of 83000 varieties of seeds of crop plants. Honduras in Central America has gene bank for Banana, Costarika has gene bank for coffee and Panama has**.** Gene bank for palms In India NBPGR (National Beauro of plant genetic resources) has been established at New Delhi in 1976 which looks after the gene bank of plants while national beauro of animal genetic resources Karnal looks after the gene bank of animals specially fishes. Forest research Institute Dehradun has gene bank for forest trees while **germ plasm** of medicinal plants in India is maintained by Botnical survey of India, Kolkata.

Uder National Beauro of plant genetic resources there are 4 satellites research station at shillong Jodhpur. Kanyakumari and Amrawati which have gene bank for plants of different climatic regions.

Conservation of Germ plasm in gene bank is called Ex-situ conservation.

Gene banks in India have collected the samples of 34000 cereals and 22000 pulses.

India has 27 indigenous breeds of cattle, 40 breeds of sheep, 22 breeds of Goats & 8 breeds of buffaloes.

Several local breeds have disappeared, or are on the verge of disappearing because we have been misguided into adopting foreign breeds for e.g., Jersey cows have replaced Indian cattle.

Cash crops like cotton, sugarcane, soyabean have replaced food crops. Eucalyptus and wattle (Acacia) plantation have replaced shola forest. Thus the Indian landscape is losing its individuality by resembling any other scenery in the world.

India has 9500 species of Ethnobotanical importance out of which 7500 are ethnomedicinal. 2000 species have multipurpose uses. They are edible.

WEALTH OF WILD PLANTS IN INDIA

In India wild plants have great bio-diversity because 75% species come under different genera such as Dendrobium, Bulbophyllum, Paphiopedium, Vitis, Citrus, Musa, Rhododendron, Hedychium, Elaeocarpus or Rudraksha, & Eleagnus.

In north eastern cooler parts there are 30 species of legumes, & 45 Species of grasses.

Legumes show great diversity e.g. Astragalus, Medicago, Melilotus, Trifolium, Trigonella & Vicia.

Grasses also show great diversity e.g. Bromus, festuca & lolium. Tribals of India use underground parts of plants as well as leaves and flowers for edible purpose. They cultivate useful plants and preserve them in-situ in natural habitat itself.

GLOSSARY

1.	Gondwana land-		Historic area is including Australia, India, Africa and America Named after Gand tribe of M.P.
2.	Antarctica	-	South pole.
3.	Flora	-	Natural plant wealth.
4.	Fauna	-	Natural animal wealth.
5.	Eurasia	-	Combination of Europe and Asia.
6.	Endemic	-	Indigenizes or local.
7.	Orchids	-	Plants with fantastic beautiful flowers.
8.	Cucurbits	-	Plants like ground with pithy pulp.
9.	Reptile	-	Crawling animal.
10.	Amphibian-		Frog like animals living both on land as well as in water.
11.	Butterfly	-	An insect with beautiful wings and brilliant colours.
12.	Moth	-	Winged natural insects.
13.	Breed	-	Offspring.
14.	Cereals	-	Food Grains
15.	Cash Crop	-	Crops like cotton & sugarcane for which farmer gets cash from the mill owners.
16.	Cattle	-	Four footed animals like cow or goat.
17.	Shola	-	Patch of evergreen vegetation with stream flowing near it.

FAQs

Q1. When did India originate?
Ans. India originated 70 million years ago.

Q2. On what basis gondwana land has been named?
Ans. On the basis of gond tribe of Mandla district in M.P.

Q.3. What is included in Gandevana land?
Ans. Australia, India, Africa & South America of today.

Q.4. Who proposed the theory of continental draft?
Ans. Wagner.

Q.5. What is stated in the theory of continental draft?
Ans. Continents change their position due to change in the direction of oceanic waters.

Q.6. What is Eurasia?
Ans. Combination of Europe & Asia.

Q.7. Was Himalayas associated with India right from the beginning or it originated later on?
Ans. Later on, when Indian shifted north wards across the equator.

Q.8. Why India is consider as a megadiversity nation?
Ans. Because of triple origin, India has flora & fauna form Gondwana land, Europe & Northeast as well as Ethiopian regions.

Q.9. What is the meaning of endemic species?
Ans. Species nature of India or indigenous species.

Q.10. List some important plants where home place is India?
Ans . Mango, Plantain, Sugarcane, Lemon and paddy.

Q.11. What is the nature of India on the basis of number of mammals and birds?
Ans. 8^{th} rank.

Q.12. What is position of India on the basis of reptiles?
Ans. 5^{th} position in the world.

Q13. How many types of butterfly & moths are found in India?
Ans. 13000 types.

Q14. What is the rank of India in view of plant diversity?
Ans. 15^{th} rank.

Q15. How many known species of ferns are found in India?
Ans. 1022 species.

Q16. How many known species of orchids are found in India?

Ans. 1082.

Q17. How many genera of monocots are endemic to India?
Ans. 22.

Q.18. Which areas in India show highest diversity in crop plants?
Ans. Western Ghats, Eastern Ghats, Northern Himalayas & North eastern hills because all these areas of highest rain fall.

Q19. Which American breed of cow has replaced Indian cow?
Ans. Jersey Cow.

Q20. Least 2 common cash crops of India?
Ans. Cotton & Sugarcane.

Q21. What is Ethno botany ?
Ans. Botany of tribal people.

Q22. How many species of plants in India are Ethno medicinal?
Ans. 7500.

Q23. What is scientific name of Rudraksha?
Ans. Elaeocarpus ganitrus.

Q24. What is the meaning of in situ preservation?
Ans. To preserve a plant in its natural habitat.