

## Chapter-15

### BIODIVERSITY AND CONSERVATION

#### IMPORTANT TERMS:

**Biodiversity:** Totality of genes, species and ecosystems of a given region.

**Genetic Diversity:** Diversity of genes within a species.

**Species Diversity:** Variety of species in a given region.

**Ecological Diversity:** Variation of habitats, community types and abiotic environment of given area.

**In-situ Conservation:** Conservation of organism in its natural home

**Ex-situ Conservation:** Conservation of organisms in botanical garden. Zoological parks, sanctuaries, cryopreservation, tissue culture etc.

**Hot Spot:** Priority area of conservation having extremely rich in species and are under treat of extinction.

**Exotic/Alien Species:** Species that are introduced into ecosystem from the outside.

**Biosphere Reserves:** Protected area of land or coastal environment having unique biodiversity.

**Sacred Forest/ Sacred Grooves:** Forest patches protected by tribal communities due to their religious beliefs.

**Cryopreservation:** Storage of bio material at ultra-low temperature

**Red List Book:** Book contains a record of animals and plants which are known to be in danger and published by IUCN.

**MAB:** Man and Biodiversity Programme

**WWF:** The World Wildlife Fund for nature

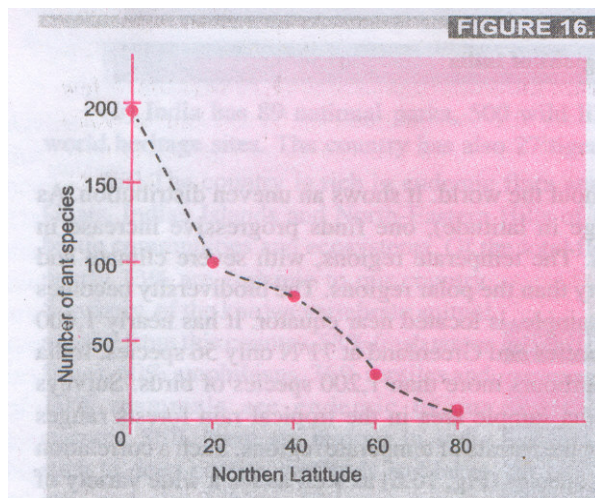
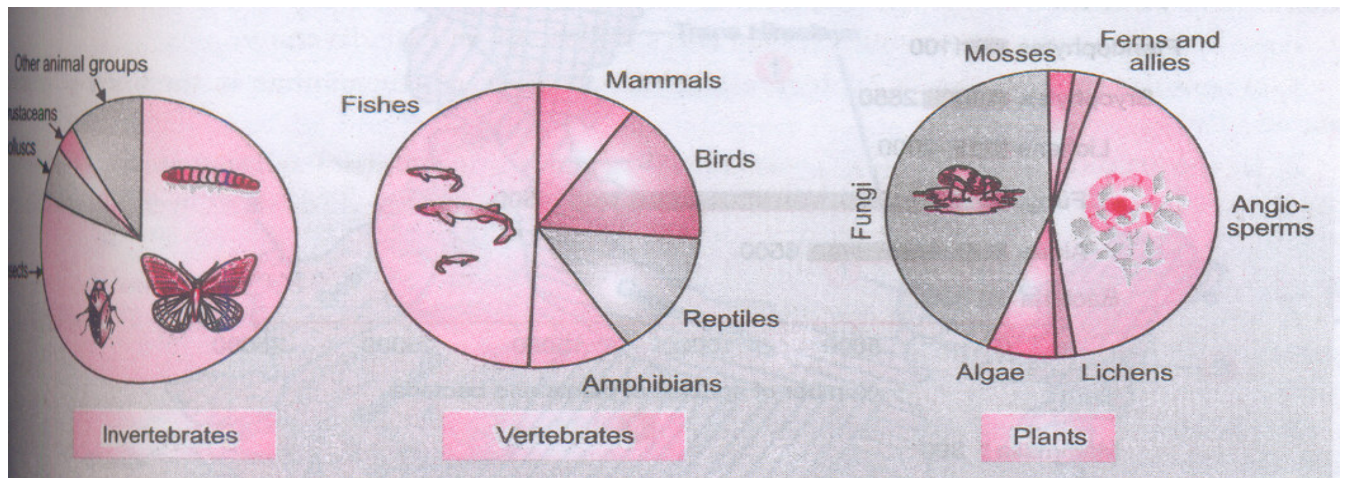
**IBWL:** Indian Board for Wildlife

**IBP:** International Biological Programme

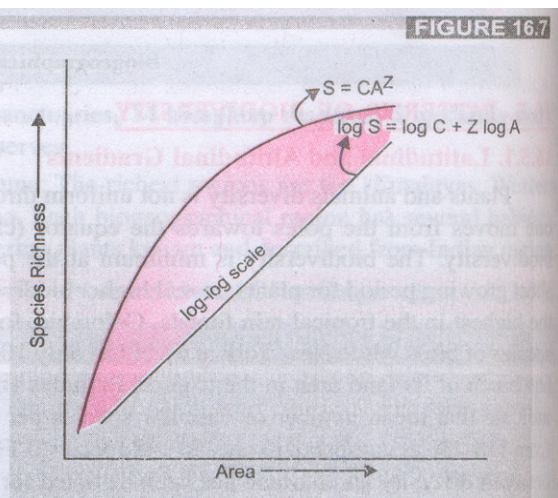
**IUCN:** The International Union for Conservation of Nature and Natural Resources.

**UNDP:** United Nation Development Programme.

#### ***IMPORTANT DIAGRAMS***

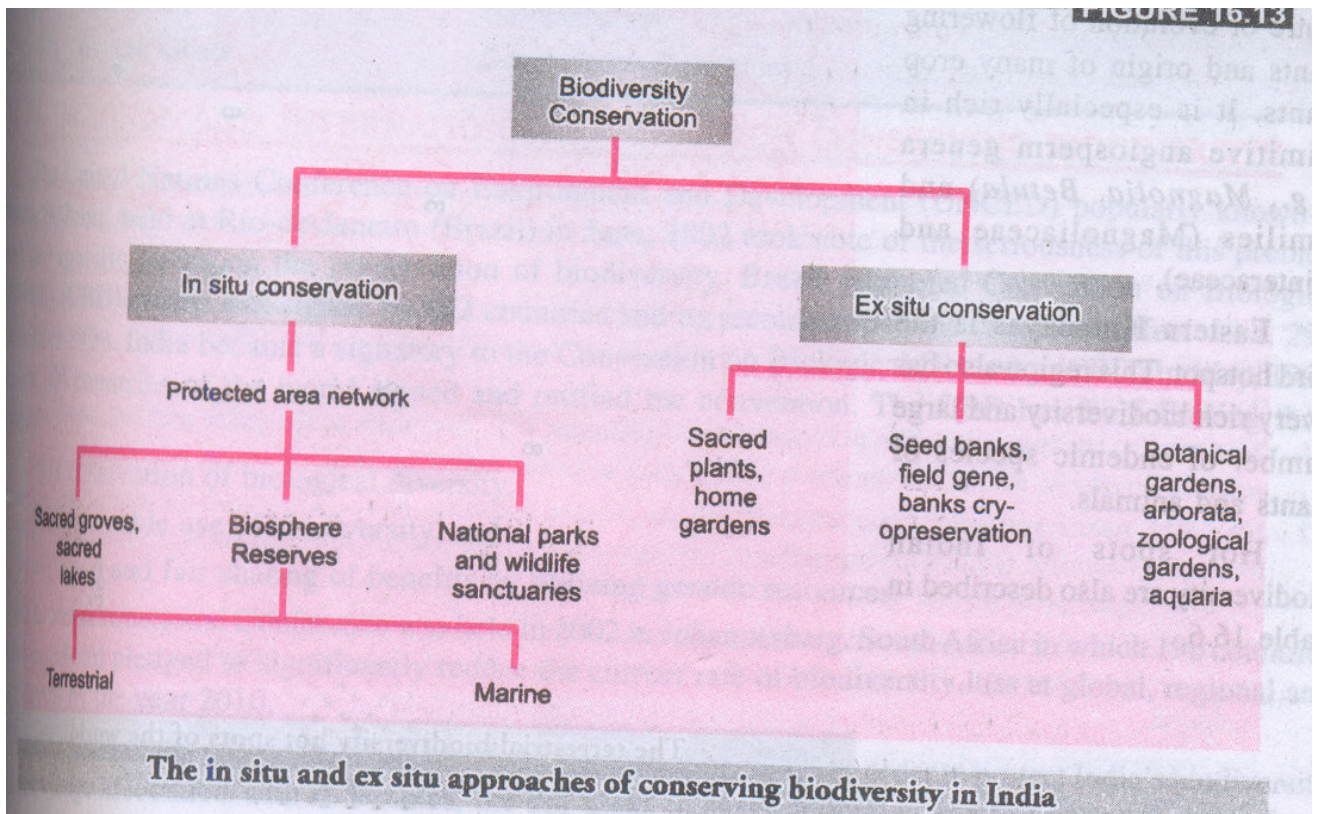
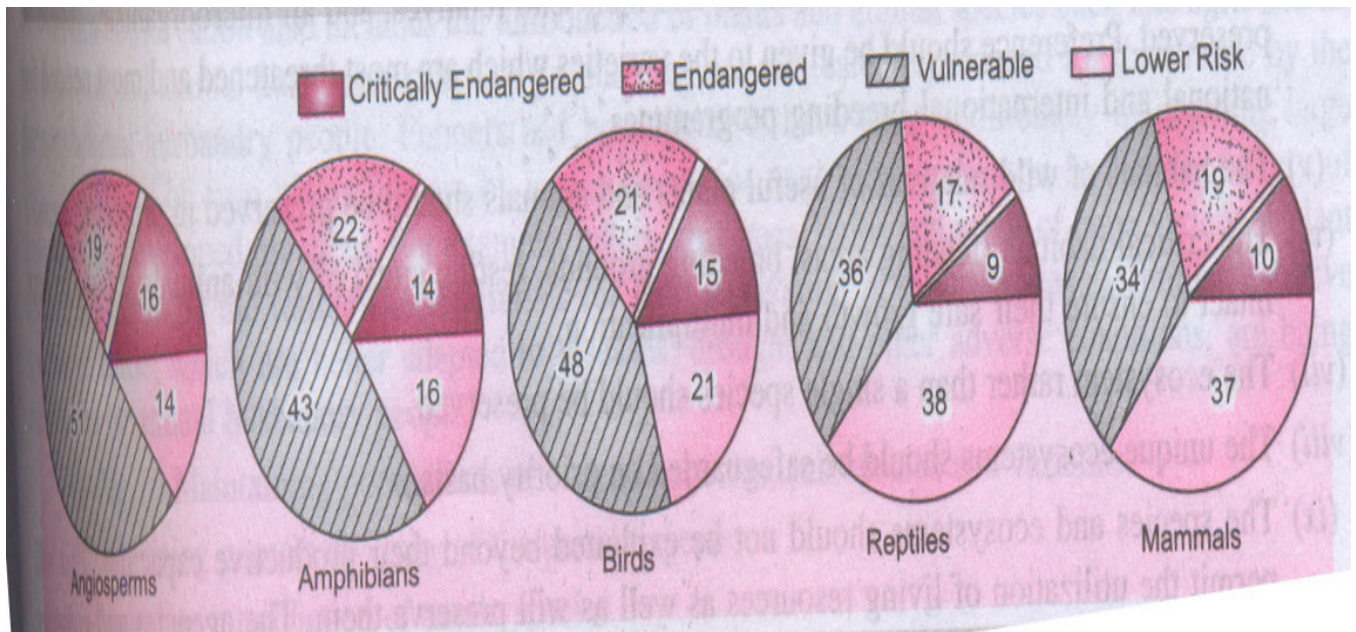


Decrease in number of ant species along the



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## POINTS TO REMEMBER:

The term 'Biodiversity' was coined by Edward Wilson.

It can be studied in following levels:

- Genetic
- Species
- Ecological

*Genetic Diversity:* Genetically uniform populations are highly prone to diseases, harsh environment.

There are more than 50,000 genetically different strains of rice and 1000 varieties of mango in India.

*Species Diversity:* Number of species per unit area.

Species Evenness- the related abundance with which each species is represented in an area.

The Western Ghat has greater diversity of amphibian species than Eastern Ghat.

*Ecological:* Related to species diversity and genetic diversity.

**Global Biodiversity:** According to IUCN (2004) the total number of plant and animal species described is about 1.5 million.

More than 70% of all species recorded are animals; and plants account for about 22%; 70% of the animal are insects

**Biodiversity in India:** About 45000 species of plants and 90000- 100000 species of animals; many more species are yet to be discovered and named.

**Pattern of Biodiversity:** Biodiversity varies with change in latitude and altitude.

- i) Latitudinal Gradients: Species diversity decrease from equator towards poles.

Three hypotheses have been proposed to explain the difference in biodiversity between tropical and temperate regions. They are:

### **Speciation in general**

Constant environment has promoted niche specialization and greater species diversity.

More solar radiation available in tropical region.

### ***Species –Area Relationship:***

Species richness increase with increased explored area but only up to a limit.

The relationship for a number of taxa is found to be a rectangular hyperbola.

The relationship becomes linear and described by the equation:

$$\text{LogS} = \text{LogC} + Z \text{LogA}$$

Where S= species richness, Z is slope of line and A is equal to area, while C is equal to y-intercept.

### **Importance of Species Diversity to Ecosystem:**

More species tend to be more stable than those with less species

A stable community has following attributes

It shall not show too much variation

It must be either resistance to seasonal disturbances and also to invasion by alien species

### ***Loss of biodiversity***

IUCN Red list ( 2004 ) documents the extinctions of 784 species in last 500 years including 359 invertebrates ,338 vertebrates and 87 plants

Extinct animals are:

Steller's sea cow

Dodo

Quagga

Three sub species of tigers

27 species have become extinct in last 20 years alone

Loss of biodiversity in a region can lead to following:

Decrease in plant production

Lowered resistance to environmental perturbation

Increased variability in ecosystem processes like water use ,pest cycle, plant productivity

### **Causes for loss of biodiversity**

Habitat loss and fragmentation

Over –exploitation

Invasion of Alien species and

Co-extinction

## **Conservation of biodiversity**

Reasons:

Narrowly utilitarian

Broadly utilitarian

Ethical

## **Approaches to Biodiversity conservation**

In- situ conservation

eg: biosphere Reserves, national parks, wild life sanctuaries and sacred grooves

Ex –situ conservation

Eg: Botanical garden, zoo, gene bank and tissue culture

## **Conservation of biodiversity**

- i) *The earth Summit*; Held in Reo de Janerio in 1992. For conservation of biodiversity and sustainable utilization of benefits of biodiversity.
- ii) *The world Summit on Sustainable Development*; held in 2002 in Johannesburg, South Africa, to achieve a significant reduction in current rate of biodiversity at global , regional and local level by 2010.

## **ONE MARKS QUESTIONS**

1. Microorganisms are part of wild life. Do you agree?  
Ans: Yes
2. Which pests attack the high yield varieties of rice a few years ago?  
Ans; Brown plant hopper.
3. What is the source of Peniciline?  
Ans : Mould *Penicillium notatum*
4. Name the bird which has recently become extinct.  
Ans: Dodo of Mauritius
5. Cite two examples of Indian endangered species.  
Ans: Great Indian Bustard, Kashmir stag.
6. What for the abbreviation ZSI and IBWL stand?

Ans: Zoological survey of India, Indian Board of Wild Life.

7. Give two soap substitutes provided by forest.

Ans: Ritha, Shikakai.

8. How much area is covered by forests in India?

Ans: 75 million hectare (23% of total land area)

9. Name three products of forest insects.

Ans: Silk, Honey and Lac.

10. How much land should be under forest in a country?

Ans; 1/3

11. Which animals are captured in large numbers for pet trade?

Ans: Parrots, Love birds and Corals.

12. What is the major reason for the decrease and extinction of wild life of our country?

Ans: Laxity on the part of the officials in the enforcement of the wild life protection act.

13. Which species should be paid special attention in conservation?

Ans: Those are the sole representative of their genus.

14. Where is the one-horned Rhinoceros preserved?

Ans : Kaziranga sanctuary in Assam

- 15: How many projects are engaged in Tiger Protection?

Ans: 21

16. Who coined the term Wildlife?

Ans William Hornaday

- 17 What is wild life symbol of WWF?

Ans: Red Panda

18. Give the scientific importance of wildlife.

Ans: wild life acts as gene bank and provide research materials to produce new varieties / species.

19. Which useful material is derived from the bark of Cinchona plant?

Ans: Anti malarial drug-quinine

20. The the most serious threat to the wild life.

Ans Destruction of habitats.

21. Which animal from India become extinct due to excess hunting?

Ans: Cheeta, *Acinomyx jubatus*

22. What %age of the living species of animal is threatened?

Ans: 10%

23. Name three categories of threatened species.

Ans: Endangered, vulnerable and rare species.

24. Give the full form of IUCN.

Ans: International Union for Conservation of Nature and natural resources.

25. When does the wild life week is celebrated in India?

Ans: First week of October.

26. Which sanctuary is called an oasis of water birds?

Ans: Chilka lake bird sanctuary, Orrisa.

27. Name the zoo famous for white tiger.

Ans: Nandankanan zoo, Orrisa

28. Name three zones of biosphere reserves.

Ans: Core, buffer and manipulative

29. Which organisms are mostly affected by cleanliness measures?

Ans: Scavengers.

30. Which day is celebrated as World Environment Day?

Ans: 5<sup>th</sup> June.

### **TWO MARKS QUESTIONS**

1. Sometime introduction of an exotic species upset native species of the ecosystem. Substantiate the statement with two examples.

2. How do zoological parks differ from National park concerned with species conservation?

Ans: Zoological park – ex-situ conservation, National park – in-situ conservation.



3. The accelerated rate of species extinction that the world is facing now is largely due to human activities. Group such activities under four major heads and explain.

Ans: Habitat loss and fragmentation; Overexploitation; Introduction or invasion of alien species; co-extinction.

4. A survey of latitudinal gradients of bio-diversity of birds is as follows:

India –80 North -----1200 Species

Greenland –71o North ----55 Species

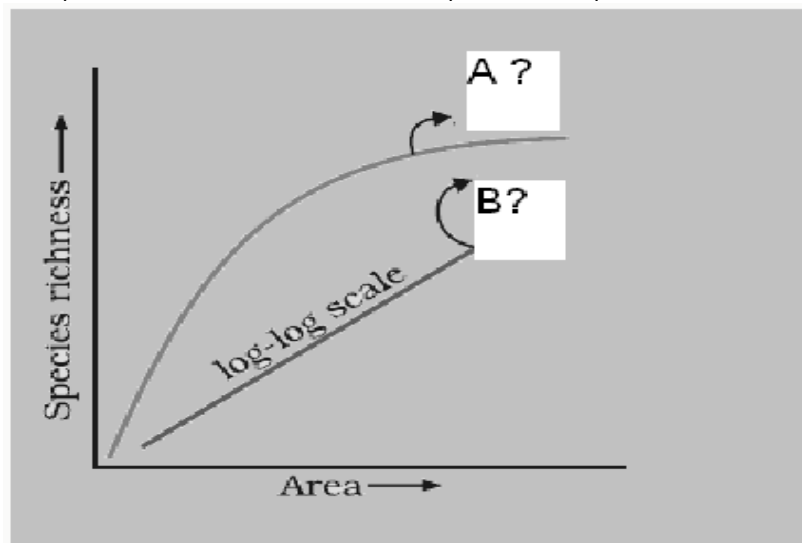
By analyzing the above data what does it indicate about the distribution of birds.

Answer: Species diversity decreases from equator towards the poles.

5. Why Biodiversity do not have political boundaries?

Answer: Conservation is the collective responsibility of all the Nations.

6. . From the graph of species richness and area relationship write the equation for 'a' and 'b'.



### THREE MARKS QUESTIONS:

1. Give one term for the following statements

- Exploring molecular genetics, species level diversity for product of economic importance.
- The Amazon rain forest being so huge.
- Sixth episode of extinction is in progress at hundred to thousand times faster rate

Ans:

- Bio-prospecting
- Lungs of the planet
- Sixth Extinction

2. What do you mean by evil quartet? How can it be prevented?

Hint: Any three causes of biodiversity loss

3. How is biodiversity useful to modern agriculture?

4. (i) Mass extinction of species has been witnessed even before humans appeared on the earth . But how is the sixth extinction presently in progress different from the previous episodes?

(ii) Mention any three consequences of such extinction.

5. Categorize the following into in-situ and ex-situ approaches of biodiversity conservation.

- i) Botanical gardens ii) Wild life sanctuaries iii) Gene bank
- iv) Biosphere reserves v) Sacred forests/lakes vi) Pollen banks
- vii) Tissue culture viii) Cryo-preservation

Ans: (i) Ex-situ (ii) In-situ (iii) Ex-situ (iv) In-situ (v) In-situ  
(vi) Ex-situ (vii) Ex-situ (viii) Ex-situ

6. Categorize the followings statement into narrowly utilitarian, broadly utilitarian and ethical reason:-

- i) Every species in biodiversity has an intrinsic value even if it not of value to us.
  - ii) Human beings derive a number of economic benefits like food, fiber etc from Biodiversity.
  - iii) Biodiversity provides ecosystem services which can not be given price tag.
- Justify your categorization also.

Ans: (i) Ethical  
(ii) Narrowly utilitarian  
(iii) Broadly utilitarian

### FIVE MARKS QUESTIONS

1. Biodiversity has various benefits to mankind- Discuss.
2. Explain the causes of biodiversity loss in detail.

Hints: Manmade & natural.

3. What are sacred groves? Where are they found in India? Name any four. What is their characteristic feature?

### HOTS QUESTIONS:

1. Differentiate between

Genetic Diversity & Species Diversity

Keystone Species & Endangered Species

2. (i) Write three reasons for maximum biodiversity in tropical rain forest.

(ii) What does IUCN stand for?

(iii) What do you mean by sacred groves? Name such groves in Meghalaya, Rajasthan, Madhya Pradesh.

(iv) When , where and in which country Earth Summit was held?

- 3.(a). Explain the terms CBD and CITES

(b). When did India sign CBD, list three goals of CBD.

4. (a). Name the category of protected areas recently evolved by

UNESCO's Man and Biosphere Programme.(MABP).Define it.

(b). Give its zones. Also explain its role.

5.(a) What are Hot spots of biodiversity?

(b) List four main criteria for determining a particular place as a hot spot.

© Among the hot spots of the world, list two which are located in India.