

Chapter 3

Natural Vegetation, Forests and Wildlife Resources

- **‘Vegetation’** refers to assemblage of plant species living in association with each other in a given environment frame-often termed as ecological frame.
- **Natural vegetation** refers to a plant community which has grown naturally without human aid and has been left undisturbed by humans for a long time. This is termed as virgin vegetation.
- **Flora** - Flora refers to plants of particular region or period, listed by species and considered as a group.
- **Fauna**- Fauna refers to animals of particular region or period listed by species and considered as a group.
- **Land**- Nature of land influences the type of vegetation. The fertile level is generally devoted to agriculture. The undulating and rough terrains are areas where grassland and woodlands develop and give shelter to a variety of wild life.
- **Soil** - Different types of soils provide basis for different types of vegetation. The sandy soils of the desert support cactus and thorny bushes while wet, marshy, deltaic soils support mangroves and deltaic vegetation. The hill slopes with low depth of soil have conical trees.
- **Temperature** - Temperature is a major factor in the ecosystem. It affects the vegetation of different types and its growth.

Temperature Characteristics of the vegetation Zones

Vegetation Zones	Mean Annual Average Temp. (in degree C)	Mean Temp. In Jan. In degree C	Remarks
Tropical	Above 24°C	Above 18°C	No Frost
Sub-tropical	17°C to 24°C	10°C to 18°C	Frost is rare
Temperate	7°C to 17°C	-1°C to (-10)°C	Frost some snow
Alpine	Below 7°C	Below -1°C	Snow

Source : Environment Atlas of India, June 2001, Central Pollution Control Board, Delhi.

- **Photoperiod, (Sunlight)**: The variation in duration of sunlight at different places is due to differences in latitude, altitude, season and duration of the day. Due to longer duration of sunlight, trees grow faster in summer.
- **Precipitation**: In India almost the entire rainfall is brought in by the advancing southwest monsoon (June to September) and retreating northeast monsoons. Areas of heavy rainfall have more dense vegetation as compared to other areas of less rainfall.
- An ecosystem is a living community of plant and animals sharing an environment with non-living elements such as climate and soil.

Types of Vegetation

The following major types of vegetation may be identified in our country

- Tropical RainForests**
 - Annual rainfall - > 200cm.
 - Very dense forest.
 - Trees do not shed their leaves annually.
 - Multi layered appearance composed of tall and medium sized trees.
 - Important trees of this forest are ebony, mahogany, rosewood, rubber and cinchona.
 - The common animals found in these forests are elephants, monkey, lemur and deer.
- Tropical RainForests:**
 - Rainfall between 70 -200cm.
 - Less dense canopy and heavy climber.
 - Bamboos, teak, sal, shisham, sandalwood, Khair, Kusum, Arjun, mulberry are other commercially important species.
 - Dry deciduous forests are found in **areas having rainfall between 100 cm and 70 cm.**
- Tropical Thorn Forests and Scrubs**
 - Kutch and neighbouring part of Saurashtra, Punjab, western Haryana, western and northern Rajasthan.
 - Acacias, palms, euphorbias and cacti are the main plant species.
 - This type of vegetation is found in the north-western part of the country including semi-arid areas of Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, and Uttar Pradesh.
- Montane Forests**
 - The decrease in temperature with increasing altitude leads to the corresponding change in natural vegetation. Wet temperate types of forests are found between heights of 1000 and 2000 metres.
 - Between 1500 and 3000 metres, temperate forests containing coniferous trees like pine, deodar, silver fir, spruce and cedar, are found.
 - Kashmir stag, spotted deer, wild sheep, jack rabbit, Tibetan antelope, yak, snow leopard, squirrels, Shaggy horn wild ibex, bear and rare red panda, sheep and goats with thick hair are the common animals in this area.
- Mangrove Forests**
 - Tidal forests are found in the areas of coasts and influenced by tides.
 - The common varieties with roots of the plants submerged under water.
 - The deltas of the Ganga, the Mahanadi, the Krishna, the Godavari and the Kaveri are covered by such vegetation.

Medicinal plants

- **Sarpagandha** : Used to treat blood pressure; it is found only in India.
 - **Jamun**: The juice from ripe fruit is used to prepare vinegar which is carminative and diuretic, and has digestive properties. The powder of the seed is used for controlling diabetes.
 - **Arjun**: The fresh juice of leaves is a cure for earache. It is also used to regulate blood pressure.
 - **Babool**: Leaves are used as a cure for eye sores. Its gum is used as a tonic.
 - **Neem**: Has high antibiotic and antibacterial properties.
- Biodiversity or Biological Diversity India** is immensely rich in wildlife and cultivated species, diverse in form and function but closely integrated in a system through multiple network of interdependencies.
- Nearly 8% of the total number of species of world are found in India.
 - 10 per cent of India's recorded wild flora and 20 per cent of its mammals are on the threatened list.

Vanishing forest

- The forest cover in the country is estimated at 637,293 sq km, which is 19.39 per cent of the total geographical area. (Dense forest 11.48 per cent; open forest 7.76 per cent; and mangrove 0.15 per cent).
- According to the State of Forest Report (1999), the dense forest cover has increased 10,098 sq km since 1997. Based on the International Union for Conservation of Nature and Natural Resources (IUCN), we can classify species as follows—
- **Normal Species**: Species whose population levels are considered to be normal for their survival, such as cattle, sal, pine etc.
- **Endangered Species**: These are species which are in danger of extinction. The survival of such species is difficult if the negative factors that have led to a decline in their population continue to operate. Example-black buck, Indian wild ass, crocodile.
- **Vulnerable Species**: These are species whose population has declined to levels from where it is likely to move into the endangered category in the near future if the negative factors continue to operate. Example - blue sheep & Asiatic elephant.
- **Rare Species**: Species with small population may move into the endangered or vulnerable category if the negative factors affecting them continue to operate.
Ex ample- Himalayan brown bear, wild Asiatic buffalo, desert fox and hornbill, etc
- **Endemic Species**: These are species which are only found in some particular areas usually isolated by natural or geographical barriers. Example - Andaman teal, Nicobar pigeon, Andaman wild pig, Mithun in Arunchal Pradesh.
- **Extinct Species**: These are species which are not found after searches of known or likely areas where they may occur. Example –Asiatic cheetah & pink head duck.

Causes of Depletion of Flora and Fauna:

- **Agricultural Expansion**: Between 1951 and 1980, according to the Forest Survey of India, over 26,200 sq. km. of forest area was converted into agricultural land all over India. Substantial parts of the tribal belts, especially in the northeastern and central India, have been deforested or degraded by shifting cultivation (jhum), a type of 'slash and burn' agriculture.

- **Enrichment Plantation**: Promotion of a few favoured species, in many parts of India, has been carried through the ironically-termed "enrichment plantation", in which a single commercially valuable species was extensively planted and other species are eliminated.
- **Development Projects**: Large-scale development projects have also contributed significantly to the loss of forests. Since 1951, over 5,000 sq km of forest was cleared for river valley projects. Clearing of forests is still continuing with projects like the Narmada Sagar Project in Madhya Pradesh, which would inundate 40,000 hectares of forest.
- **Mining**: The Buxa Tiger Reserve in West Bengal is seriously threatened by the ongoing dolomite mining. It has disturbed the natural habitat of many species and blocked the migration route of several others, including the great Indian elephant.
- **Unequal Access to Resources**: The richest five per cent of Indian society probably cause more ecological damage because of the amount they consume than the poorest 25 per cent. The former shares minimum responsibilities for environmental well-being.

The Indian Wildlife (Protection) Act 1972: An all-India list of protected species was published. The thrust of the Act was towards protecting the remaining population of certain endangered species by banning hunting, giving legal protection to their habitats, and restricting trade in wildlife. Central and many state governments established national parks and wildlife sanctuaries. The central government also announced several projects for protecting specific animals, which were gravely threatened, including the tiger.

Project Tiger

In 1973, the tiger population had dwindled to 1,827 from an estimated 55,000 at the turn of the century.

Threats for Tiger Population :

Peaching for trade, shrinking habitat, depletion of prey base species, growing human population, etc.

"Project Tiger", one of the well published wildlife campaigns in the world, was launched in 1973.

Success Rate : Tiger Population

1985	4,002
1989	4,334
1993	3,600

Current Status : 27 Tiger Reserves Covering 37,761 sq km.

Important Tiger Reserves :

Corbett National Park in Uttaranchal.
Sunderbans National Park in West Bengal.
Bandhavgarh National Park in Madhya Pradesh.
Sariska Wildlife Sanctuary in Rajasthan.
Manas Tiger Reserve in Assam and
Periyar Tiger Reserve in Kerala.

Government's Categorization of Forests:

- **Reserved Forests**: More than half of the total forest land has been declared reserved forests. Reserved forests are regarded as the most valuable as far as the conservation of forest and wildlife resources are concerned.
- **Protected Forests**: Almost one-third of the total forest area is protected forest, as declared by the Forest Department. These forest lands are protected from any further depletion.
- **Unclassed Forests**: These are other forests and wastelands belonging to both government and private individuals and communities.

Exercise

1

DIRECTIONS : This section contains multiple choice questions. Each question has 4 choices (1), (2), (3) and (4) out of which only one is correct.

1. In which of the following forests, the trees shed their leaves for about two months in dry summer season?
 - (1) Tropical Evergreen forest
 - (2) Tropical deciduous forest
 - (3) Tropical thorny forest
 - (4) Mangrove forest
2. The Gir Forest is the last remaining habitat of
 - (1) Bengal Tiger
 - (2) Asiatic Cheetah
 - (3) Asiatic Lions
 - (4) Leopard
3. Which of the following conservation strategies does not indirectly involve community participation ?
 - (1) Joint Forest Management
 - (2) Beej Bachao Andolan
 - (3) Chipko Movement
 - (4) Demarcation of wildlife sanctuaries
4. Rats, mice, rabbits, fox, wolf, tiger, lion, wild ass, horses and camels are mostly found in
 - (1) Mangrove forests
 - (2) Mountain forests
 - (3) The Thorny forests and Scrubs
 - (4) Tropical deciduous forest
5. Wildlife Protection Act was implemented in
 - (1) 1972
 - (2) 1986
 - (3) 1989
 - (4) 1983
6. Which forests are affected by tides in coastal areas?
 - (1) Alpine
 - (2) Coniferous
 - (3) Deciduous
 - (4) Mangroves
7. The Wildlife sanctuary for elephants is
 - (1) Nilgiris
 - (2) Simlipal
 - (3) Periyar
 - (4) Jim Corbett Park
8. Which type of vegetation is known as purely Indian Vegetation?
 - (1) Exotic plants
 - (2) Indigenous species
 - (3) Virgin vegetation
 - (4) Endemic
9. Dachigam in Jammu and Kashmir is a
 - (1) National park
 - (2) Wildlife sanctuary
 - (3) Bird sanctuary
 - (4) Reserve forest
10. Cinchona trees are found in the area of rainfall more than
 - (1) 100 cm
 - (2) 70 cm
 - (3) 50 cm
 - (4) Less than 50 cm
11. The term flora refers to
 - (1) Interlinking and interdependence of all plants and animals in given areas.
 - (2) All forms of animals found on the earth in natural environment.
 - (3) The original natural vegetation cover consisting of forests, grasslands and shrubs.
 - (4) A plant community that has not been distributed over a long period.
12. Nilgiri's Biosphere Reserve was established in
 - (1) 1986
 - (2) 1985
 - (3) 1989
 - (4) 1988
13. How many plant species are found in India?
 - (1) About 47,350
 - (2) About 47,000
 - (3) 47,700
 - (4) 40,700
14. Plant community which has grown naturally without human aid
 - (1) Virgin Vegetation
 - (2) Exotic plants
 - (3) Tundra
 - (4) Taiga
15. In which of the following places Royal Bengal Tiger is found?
 - (1) Mahanadi delta
 - (2) Godavari delta
 - (3) Kaveri delta
 - (4) Sunderbans delta
16. Which of these statements is not a valid reason for depletion of flora and fauna?
 - (1) Agricultural expansion
 - (2) Large scale developmental projects
 - (3) Grazing and fuel wood collection
 - (4) Rapid industrialization and urbanization
18. The total number of animal species in India is
 - (1) 81000
 - (2) 89000
 - (3) 98000
 - (4) 18000
19. Species which are no longer found on the earth are called
 - (1) Normal Species
 - (2) Vulnerable Species
 - (3) Rare Species
 - (4) Extinct Species
20. Species which are in danger of extinction are called .
 - (1) Endemic Species
 - (2) Extinct Species
 - (3) Vulnerable Species
 - (4) Endangered Species
21. Which one of the river valley projects has significantly contributed to the loss of forests ?
 - (1) Nagarjuna Sagar
 - (2) Narmada Sagar
 - (3) Nizam Sagar
 - (4) Rana Pratap Sagar
22. The state having highest percentage of protected forests is
 - (1) Punjab
 - (2) Tamil Nadu
 - (3) Uttar Pradesh
 - (4) Jammu and Kashmir
23. The present forest cover of India in terms of the total geographical area is
 - (1) 18 per cent
 - (2) 19.39 per cent
 - (3) 22 per cent
 - (4) 15 per cent
24. In which of the following states has the Joint Forest Management started ?
 - (1) Tamil Nadu
 - (2) West Bengal
 - (3) Himachal Pradesh
 - (4) Arunachal Pradesh\

25. Immensely rich in wildlife and cultivated species, diverse in form and function but closely integrated in a system is called
 - (1) Bioreserve (2) Diversity
 - (3) Biodiversity (4) Biome
26. The main objective of Joint Forest Management programme is
 - (1) involving local communities in the management and restoration of degraded forests
 - (2) involving rich people in conservation of forests
 - (3) involving backward communities to conserve wildlife
 - (4) None of the above
27. Which states in India have the highest percentage of unclassified forests ?
 - (1) Northern states
 - (2) North eastern states
 - (3) States of peninsular India
 - (4) None of the above
28. Which one of the following movements was successful in conservation of forests in the Himalayas ?
 - (1) Narmada Bachao (2) Silent Valley Project
 - (3) Chipko Movement (4) Bhodan Movement
29. Which one of the following is a farmers' movement initiated in Tehri ?
 - (1) Tehri Andolan (2) Beej Bachao Andolan
 - (3) Appase Movement (4) Green Revolution
30. Which one of the following is not a reason for environmental destruction ?
 - (1) Global warming
 - (2) Unequal access
 - (3) Over population
 - (4) Inequitable consumption of resources
31. Which Wildlife Protection Act has included for the first time the list of protected species of plants ?
 - (1) Wildlife Protection Act of 1980
 - (2) Wildlife Protection Act of 1986
 - (3) Wildlife Protection Act of 1972
 - (4) Wildlife Protection Act of 1995
32. What is the position of India in the world in terms of biodiversity ?
 - (1) First (2) Fifth
 - (3) Tenth (4) Twelve
35. Mid- latitude forests have

I. Deciduous forest	II. Coniferous forest
III. Evergreen forest	
(1) I & II	(2) II & III
(3) I & III	(4) II only
36. Shallow rooted trees are associated with.
 - (1) Savanna climate (2) Temperate climate
 - (3) Tropical climate (4) Equatorial climate
37. Natural vegetation refers to
 - (1) A plant community that has been left undisturbed over a long time.
 - (2) Plant species which live and grow together.
 - (3) A protected area created by using contour bonding
 - (4) All of the above.
38. What do you mean by reserved forests?
 - (1) Reserve for local use
 - (2) Reserve for animal and plant species
 - (3) Reserve for hunting
 - (4) Reserve for growing medicinal herbs
39. Moist tropical evergreen forests are found in
 - (1) The Shillong plateau (2) The Shiwaliks
 - (3) The Deccan plateau (4) Southern India
40. Which of the following is not a species of tropical moist deciduous forests?
 - (1) Mahagony (2) Sal
 - (3) Shisham (4) Teak
41. Which of the following is the most important factor in soil formation?
 - (1) Relief (2) Climate
 - (3) Natural Vegetation (4) Rock cover
42. Which of the following is a low density area?
 - (1) South Asia forest (2) Tropical desert
 - (3) Eastern Asia (4) North eastern America
43. Which of the following statements is/are false?
 - (1) Tropical evergreen forests have very little undergrowth.
 - (2) Tropical monsoon forests have dense undergrowth.
 - (3) Temperate evergreen forests have rainfall throughout the year.
 - (4) Coniferous forests are mostly deciduous.
44. Which of the following statements is/are false?
 - (1) Asiatic cheetah is a extinct animal species.
 - (2) Asiatic elephant is a rare species.
 - (3) Indian wild ass is an endangered species.
 - (4) Rodent is a normal species.
45. Which of the following statements is/are false?
 - (1) Corbett National park is situated in Uttaranchal.
 - (2) Sundarban National park is situated in West Bengal
 - (3) Manas National park is in Assam.
 - (4) Bandhavgarh National park is situated in Gujarat.

Exercise

2

Matching Based MCQ

DIRECTIONS (Qs. 1 to 3) : Match Column-I with Column-II and select the correct answer using the codes given below the columns.

1.

Column-I Forest	Column-II Trees
A. Tropical Monsoon forests	(p) Fir and Pine
B. Tropical evergreen forest	(q) Bamboos and teak
C. Coniferous forest	(r) Ebony and Mahagony
D. Tundra forest	(s) Mosses and Bilberry

(1) A – (q); B – (r); C – (p); D – (s)
 (2) A – (p); B – (q); C – (r); D – (s)
 (3) A – (s); B – (r); C – (q); D – (p)
 (4) A – (r); B – (q); C – (p); D – (s)
2.

Column-I Sanctuary	Column-II State
A. Bandipur Sanctuary	(p) Kashmir
B. Dachigam Sanctuary	(q) Assam
C. Manas Sanctuary	(r) Karnataka
D. Periyar Sanctuary	(s) Rajasthan (t) Kerala

(1) A – (p); B – (q); C – (r); D – (t)
 (2) A – (r); B – (p); C – (q); D – (t)
 (3) A – (t); B – (s); C – (r); D – (q)
 (4) A – (r); B – (q); C – (p); D – (s)
3.

Column-I	Column-II
A. Corbett National Park	(p) Madhya Pradesh
B. Hazaribagh National Park	(q) Bamboo and Teak
C. Kanha National Park	(r) Ebony and Mahagony
D. Shimpur National Park	(s) Mosses and Bilberry

(1) A – (q); B – (r); C – (p); D – (s)
 (2) A – (p); B – (q); C – (r); D – (s)
 (3) A – (s); B – (r); C – (q); D – (p)
 (4) A – (r); B – (q); C – (p); D – (s)

Passage Based MCQ

DIRECTIONS (Qs. 4 to 6) : Read the passage(s) given below and answer the questions that follow.

PASSAGE - 1

An eco-development scheme in and around national parks and sanctuaries including tiger reserves was launched to provide alternate source of sustenance to the communities living at the fringes of national parks and sanctuaries including tiger reserve to improve the ecological productivity of the buffer zones of

protected areas through the involvement of these communities in protecting these sanctuaries and national parks and their wildlife.

These various activities undertaken under the scheme are habitat improvement, alternate source of energy; infrastructure building/roads etc; and small welfare measures. Indian Eco-Development project is being implemented in seven different states as the externally aided centrally –sponsored plan scheme under Eco-Development around protected areas including tiger reserves.

The main aim of the project is to conserve biodiversity through eco-development, effective and extensive support for eco-development and preparation of future biodiversity projects.

4. Which of the activities has not undertaken through the eco-development schemes?
 - (1) Habitat improvements
 - (2) Hunting
 - (3) Alternate source of energy
 - (4) Infrastructure development
5. This eco-development project is sponsored by which govt?
 - (1) State government
 - (2) Non-government organisation
 - (3) Central government
 - (4) None of these.
6. What is the aim of the eco-developmental programme?
 - (1) To conserve biodiversity
 - (2) To develop industrialisation
 - (3) To conserve water
 - (4) None of these.

Assertion Reason Based MCQ

DIRECTIONS (Qs. 7 to 9) : Following questions consist of two statements, one labelled as the 'Assertion' and the other as 'Reason'. You are to examine these two statements carefully and select the answer to these items using the code given below.

Code :

- (1) Both A and R are individually true and R is the correct explanation of A:
 - (2) Both A and R are individually true but R is not the correct explanation of A.
 - (3) A is true but R is false.
 - (4) If A and R both are false.
7. **Assertion :** The Himalayan Yew is an important plant.
Reason- It has been successfully used to treat cancer.
 8. **Assertion :** Mining is an important factor behind deforestation.
Reason : Due to mining excavation air pollution is caused.
 9. **Assertion :** Indigenous flora is dominant in the Himalayan and Peninsular areas.
Reason : Desert region and western India plain have plants, which are not belonging from North –Africa region.

Correct Definition Based MCQ

10. Choose the correct definition of Exotic plants?
(1) The plants whose origin and development is purely Indian
(2) The plants whose origin and development is from outside India
(3) The plants whose origin and development is in other planet of universe.
(4) None of these
11. Choose the correct definition of biodiversity?
(1) Rich in wildlife and cultivated species, diverse in form and function but closely integrated in a system through multiple network of interdependencies.
(2) Living community of plant and animals sharing an environment with non-living elements such as climate and soil.
(3) Plant community which has grown naturally without human aid and has been left undisturbed by humans for a long time
(4) None of these.

Feature Based MCQ

12. On the basis of features given below, identify the type of forest;
(I) Occurs in sheltered coastline areas such as bays, estuaries, lagoons and creeks.
(II) Most trees in this area contain pores which enable trees to breathe.
(III) Sundari trees are found here.
(1) Evergreen forests (2) Deciduous forests
(3) Montane forest (4) Mangrove forest.
13. From the features given below identify type of species
(I) species are in danger of extinction
(II) For some species survival is difficult
(III) crocodile, black buck and Indian wild ass
(1) Extinct species (2) Endemic species
(3) Endangered species (4) None of these.

Hints & SOLUTIONS

Exercise 1

1. (2) Tropical Deciduous forest trees shed their leaves for about two months in dry summer season.
2. (3) Gir forest in Gujarat is a protected area of Asiatic lions.
3. (4)
4. (3) 5. (1) 6. (4)
7. (3) Periyar is a wild life sanctuary for elephants.
8. (4) 9. (2) 10. (1)
11. (3) 12. (1) 13. (2)
14. (1) Virgin Vegetation where plant community which has grown naturally without human aid
15. (4) Sunderbans delta is a suitable place for Royal Bengal Tigers.
16. (3)
18. (1) Over 81,000 species of animal species are found in India.
19. (4) 20. (4)
21. (2) Narmada Sagar of Gujarat is the river valley project which has significantly contributed to the loss of forests.
22. (4) 23. (3)
24. (2) Joint Forest Management first started in West Bengal.
25. (3)
26. (1) The primary *objective* of JFM is to provide a visible role to the local communities in planning, *management* and protection of *forests*
27. (2) The North-Eastern *states* of India have the *highest percentage* of *unclassified forests* managed by local communities
28. (3) 29. (1) 30. (4) 31. (3)
32. (3) India takes position 10th in world and 4th in Asia in conservation of biodiversity.
35. (1) Mid-latitude forest are Deciduous forest & Coniferous forest type.
36. (1) 37. (1) 38. (2) 39. (1)
40. (1) 41. (2) 42. (2) 43. (4)
44. (2) Asiatic elephant is a vulnerable species.
45. (4)

Exercise 2

1. (1) 2. (2) 3. (1)
4. (2) Hunting is against the other options.
5. (3) 6. (1) 7. (1) 8. (2)
9. (3) Most plants of desert are from North-Africa.
10. (2) 11. (1) 12. (4) 13. (3)