New Vision IAS Academy
....wings to aspirations

CLASS NOTES
NATURAL VEGETATION & WILDLIFE

- Refers to Plant Community that grows naturally in a geographical region
- Wildlife is component of forest
- Natural Vegetation changes from one region to another due to climatic, edaphic, topographical factors.
- **Relief :** latitude, Altitude, **L**and and Soil (The thickness of the soil), Height and Slope
- **Climate :** Temperature, precipitation and photoperiod (sunlight)
- Vegetation releases oxygen and sequesters carbon. Vegetation provides wildlife habitat and food.
- **Virgin Vegetation:** Part of Natural Vegetation .Completely untouched by human actions; it exists in its original state
- **Indigenous species** : Virgin vegetation which are purely Indian are known as endemic or indigenous species
- **Exotic Plants :** those which have come from outside India are termed as exotic plants

Three broad categories of natural vegetation:

- **Forests:** Grow in regions of high temperature and rain.
- **Grasslands:** Grow in regions of moderate rainfall.
- **Thorny shrubs and scrubs:** Grow in dry regions.

Bushes < Shrubs (Single Plant) < Scrub (vegetation community)
Herbs (non woody Plants) < Shrubs (Wood Plants)

Shrub: A woody perennial plant
Scrub : Forest lands having canopy density less than 10 percent, generally with Shrubs interspersed with trees
Canopy : The cover of branches and foliage formed by crown of trees.

CONSTITUTIONAL PROVISIONS:

- Forests are included in the **Concurrent List** in the (Seventh Schedule) of the Constitution of India.
- Through the **42nd Amendment Act, 1976** Forests and Protection of Wild Animals and Birds were transferred from State to Concurrent List.
- **Article 51 A (g)** of the Constitution states that it shall be the fundamental duty of every citizen to protect and improve the natural environment including forests and Wildlife.
- **Article 48 A** in the Directive Principles of State policy, mandates that the State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country.

FOREST DEFINITION IN INDIA

- Lack of Uniform Definition
- Presently, India lacks an acceptable definition of 'forest'.
- State Jurisdiction:
- States keep the authority to formulate their interpretations of forests.
- Legal Basis:
- The T.N. Godavarman Thirumulkpad vs. Union of India case of 1996 provides states with the prerogative to outline forests, stipulating adherence to the dictionary that means.

Degree of Protection : Reserved Forest > Protected Forest > Village Forest (Indian Forest Act 1927)

RESERVED FOREST An area so constituted under the provisions of the Indian Forest Act or other State Forest Acts, having full degree of protection. In Reserved forests all activities are prohibited unless permitted.

PROTECTED FORESTS An area notified under the provisions of the Indian Forest Act or other State Forest Acts, having limited degree of protection. In protected forest, all activities are permitted unless prohibited.

FOREST COVER: All lands, more than or equal to one hectare in area, with a tree canopy of more than or equal to 10%, irrespective of ownership and legal status; and includes orchards, bamboo, and palm

TREE COVER : Tree cover comprises all tree patches outside the forest area, which are less than one hectare in extent including all the scattered trees found in the rural and urban settings, and not captured under the forest cover assessment

The National Forest Policy 1988 envisages to have a minimum of 33% of the total land area of the country under forest or tree cover

Table: Forest and Tree Cover of India

in km²

Class	Area	Percentage of GA
Forest Cover	7,15,342.61	21.76
Tree Cover	1,12,014.34	3.41
Total Forest and Tree Cover	**8,27,356.95**	**25.17**
Scrub	43,622.64	1.33
Non Forest	24,16,489.29	73.50
Geographical Area of the country	**32,87,468.88**	**100.00**

CLASSIFICATION OF FOREST COVER: (FOREST SURVEY OF INDIA CLASSIFICATION)

Table 2.2 Classification of Forest Cover

Class	Description
Very Dense Forest (VDF)	Canopy density ≥ 70 %
Moderately Dense Forest (MDF)	40 % ≤ Canopy density < 70 %
Open Forest (OF)	10 % ≤ Canopy density < 40 %
Scrub	Canopy density < 10 %, generally with shrubs interspersed with trees
Non Forest	Lands that do not fall into any of the above classes. It includes areas such as cropland, settlements, water bodies, grasslands, snow-clad areas, deserts, etc.

Very Dense Forest

Moderately Dense Forest

Open Forest

Scrub

1. Consider the following pairs:

Forest	Tree Canopy Density
1. Very Dense	70% and above
2. Moderately dense	40 – 70%
3. Open forest	40 – 20%
4. Scrub	less than 20%

How many pairs given above are correctly matched?

a) Only one pair

b) Only two pair

c) Only three pairs

d) All four pairs

Ans B

Types of Forest cover	All lands with tree canopy density of	Percentage
Very Dense Forest	70% and above	3.04%
Moderately Dense Forest	40% - 70%.	9.33%
Open Forest	10% - 40 %.	9.34%

Scrub Forest	less than 10%.	1.42%.
Non-forest:	Lands not included in any of the above classes	76.87%.

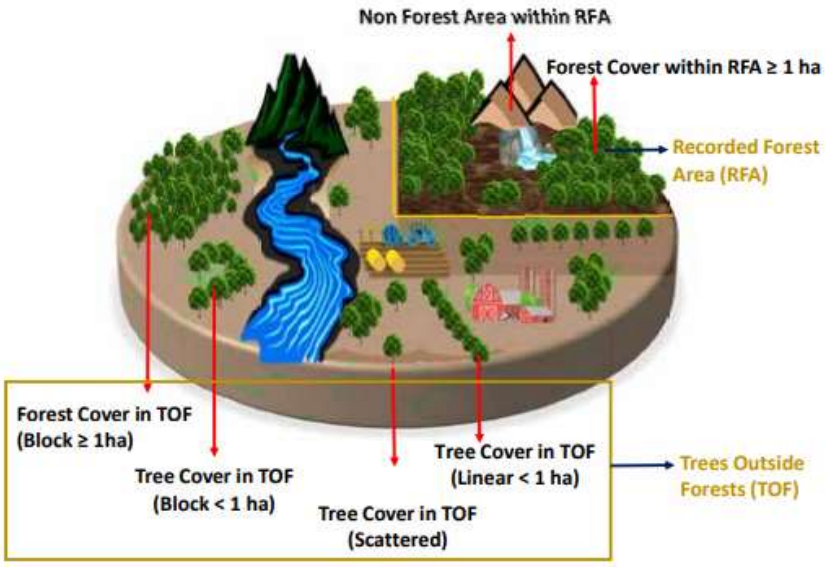


Figure 2.6 Concept of Forest, TOF and Tree Cover

TOF: refers to all trees growing outside the recorded forest areas irrespective of size of patch tree cover is a subset of TOF

NATURAL VEGETATION OF INDIA

In India, the Forests, on the basis of average annual rainfall, can be categorised broadly into five categories

1. **Tropical Evergreen Forests**
   - Moist Evergreen Forest
   - Semi Evergreen Forest
   - Dry Evergreen Forest

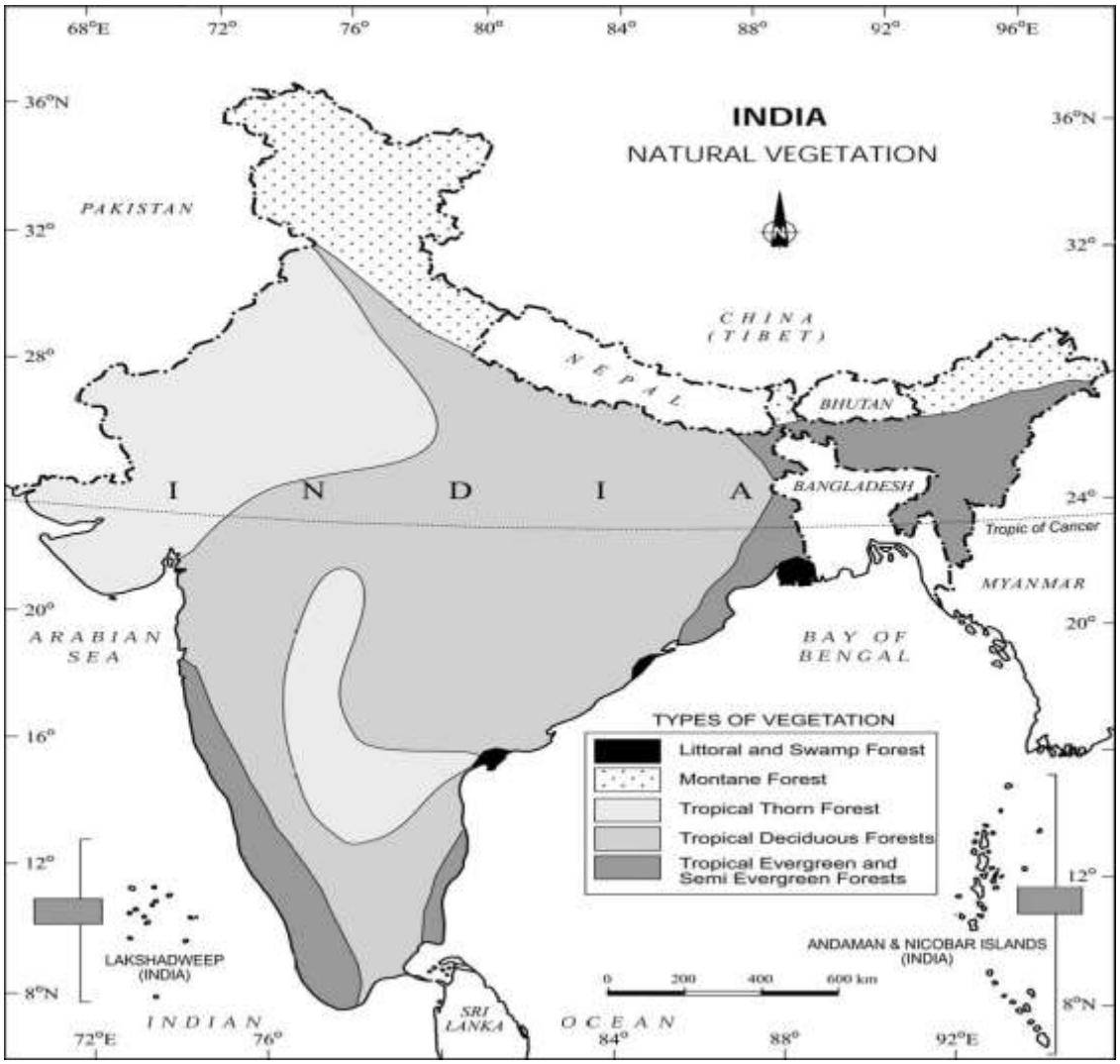
2 Tropical Deciduous Forest (Monsoon Forest)
   - Moist Deciduous Forest
   - Dry Deciduous Forest

3 Tropical Thorn Forest

4 Montane Forest
   - Montane Wet Temperate Forest
   - Montane Subtropical Forest
   - Himalaya Forest

5 Littoral and Swamp forests- Tidal or Mangroves Forest

Annual Rainfall	Type of Vegetation
200 cm or more	Evergreen Rain Forests
100 to 200 cm	Monsoon Deciduous Forests
50 to 100 cm	Drier Deciduous or Tropical Savanna
25 to 50 cm	Dry Thorny Scrub (Semi-arid)
Below 25 cm	Desert (Arid)



CLASSFICATION OF NV IN INDIA

- First given by H.G. Champion (before Independence)- classification system for forests
- S.K.Seth Classification 1968- refine the earlier work
- Subsequently, their system became the standard in forest-type classification in the country
- Champion and Seth's system is based on the premise that a forest type could be treated as a distinct ecosystem
- It has 5 climate-based major groups sub-divided into 16 precipitation and temperature range-based groups

Table 25. 1. The major forest types of India (based on Champion and Seth, 1968)

Major Forest Groups	Forest Groups
I. Moist Tropical forests	Group1: Tropical Wet Evergreen Forests
	Group 2: Tropical Semi-evergreen Forests
	Group 3: Tropical Moist Deciduous Forests
	Group 4: Littoral and Swamp Forests
II. Dry Tropical forests	Group 5: Tropical dry deciduous forest
	Group 6: Tropical thorn forests
	Group 7: Tropical dry evergreen forests
III. Montane Subtropical Forests	Group 8: Subtropical broad-leaved hill forests
	Group 9: Subtropical pine forest
	Group 10: Subtropical dry evergreen forests
IV. Montane Temperate Forests	Group 11: Montane wet temperate forests
	Group 12: Himalayan moist temperate forests
	Group 13: Himalayan dry temperate forests
V. Sub alpine forests	Group 14 Sub alpine forests
VI. Alpine Forests	Group 15: Moist-Alpine Scrub
	Group 16: Dry-Alpine Scrub

Forest (Vegetation) Type (ISFR 2021)		Area in sq km	% of Total	Carbon stock in mt
1	**Tropical Dry Deciduous Forests**	**2,80,547**	**39.30**	**2176.8**
2	**Tropical Moist Deciduous Forests**	**1,31,805**	**18.47**	**1302.7**
3	**Plantation/TOF**	**75,221**	**10.54**	**529.5**
4	**Tropical Semi-Evergreen Forests**	**69,195**	**9.69**	**686.0**
5	Subtropical Broadleaved Hill Forests	31,015	4.35	432.6
6	Himalayan Moist Temperate Forests	28,727	4.02	646.7
7	Montane Wet Temperate Forests	20,185	2.83	342.5
8	**Tropical Wet Evergreen Forests**	19,572	2.74	345.6
9	Subtropical Pine Forests	17,801	2.49	239.4
10	**Tropical Thorn Forests**	13,259	1.86	**49.6**
11	Sub-Alpine Forests	12,672	1.78	232.4
12	Littoral and Swamp Forests	5,478	0.77	72.6
13	Himalayan Dry Temperate Forests	4,255	0.60	103.9
14	Dry Alpine Scrub	2,396	0.34	27.5
15	**Tropical Dry Evergreen Forests**	835	0.12	7.7
16	**Moist Alpine Scrub**	652	0.09	5.6
17	**Subtropical Dry Evergreen Forest**	173	0.02	2.7

TROPICAL EVERGREEN RAINFOREST

- Found in Equatorial Region and Close to Tropical Region
- High Temperature and High Rainfall throughout the year (Humid Region)
- As there is no particular dry season, the trees do not shed their leaves altogether. This is the reason they are called evergreen
- The thick canopies of the closely spaced trees do not allow the sunlight to penetrate inside the forest even in the day time.
- Rainfall : More than 200 Cm
- Mean Temperature: 22°C +
- High Stratification - Tall Trees upto 60m

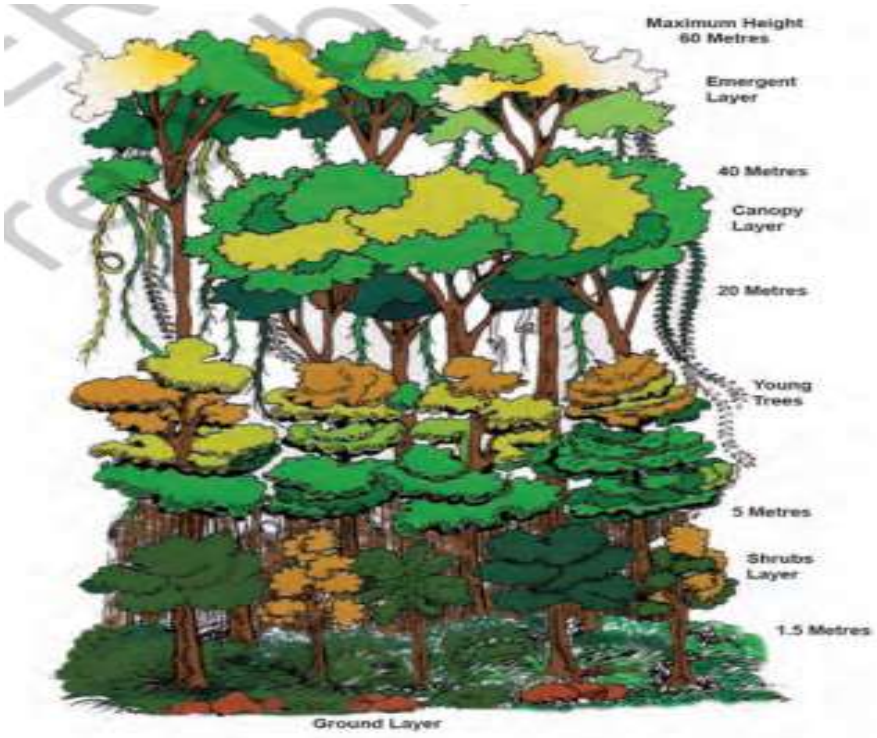


Figure 5.1 : Tropical Evergreen Forest

- Less undergrowth: The sunlight cannot reach the ground due to thick canopy. The undergrowth is formed mainly of bamboo, ferns, climbers, orchids, etc.

Hardwood trees like

- rosewood, ebony, aini, mahogany, mesua, white cedar
- ironwood, Laurelwood, rubber, cinchona,
- **jackfruit, betel nut palm, and mango.**
- climbers, ephiphytes, Lianas, orchids, bamboo are common here.
- Climbers like lianas use trees for support, climbing into the canopy for sunlight.
- Epiphytes grow on tree branches without soil, benefiting from the moist, nutrient-rich canopy environment.

Areas found:

a. Western Slope of Western Ghats
b. hills of the northeastern region, some areas of plains in WestBengal
c. Andaman and Nicobar islands

Note :

- **Mesosphytic**: **Plants adopted to neither too dry nor too wet type climate.**
- **xerophytic plants**, such as cactus, that grow in extremely dry soil
- **hydrophytic plants**, such as water lily or pondweed, that grow in saturated soil or water,

Tropical Wet Evergreen Forests:

- the annual rainfall **exceeds 250 cm**
- the annual temperature is **about 25°-27°C**
- the average annual humidity **exceeds 77 per cent** and
- the dry season is distinctly short.

Area Founded ;

- Western side of the Western Ghats (between 500 to 1370 metres above sea level) south of Mumbai,
- In a strip running from northeast to south-west direction across Arunachal Pradesh, Upper Assam, Nagaland, Manipur, Mizoram and Tripura upto a height of 1070 metres and in the Andaman and Nicobar Islands.

Consider the following States:

1. Arunachal Pradesh
2. Himachal Pradesh
3. Mizoram

In which of the following states do "Tropical Wet Evergreen Forests" occur?

a) 1 only
b) 2 and 3 only
c) 1 and 3 only
d) 1, 2 and 3

Ans C

[UPSC 2021] "Leaf litter decomposes faster than in any other biome and as a result the soil surface is often almost bare. Apart from trees, the vegetation is largely composed of plant forms that reach up into the canopy vicariously, by climbing the trees or growing as epiphytes, rooted on the upper branches of trees." This is the most likely description of

a) coniferous forest
b) dry deciduous forest
c) mangrove forest
d) tropical rain forest

Explanation

- Tropical rainforests feature **rapid decomposition of leaf litter** due to **high temperatures, abundant moisture**, and diverse biodiversity. This leads to a soil surface that is often almost bare, highlighting **efficient nutrient recycling**.

Semi Evergreen Forest: are found in the less rainy part of these regions, it is mixture of evergreen and moist deciduous trees**.**
Examples--- White Cedar, hollock , kail

The important species are:

- Laurel, rosewood, mesua, thorny bamboo – Western Ghats;
- White cedar, Indian chestnut, champa, mango, etc. – Himalayan region

Dry Evergreen Forest

- found in south eastern region of india
- lie in the rain shadow of the western ghats and eastern ghats, which block the rain-bearing summer southwest monsoon.
- Limited average rainfall (100 cm) received during North East Monsoon contributes to dryness of forest
- short-statured trees with adaptations for drought survival,
- includes the coastal region behind the coromandel coast on the bay of bengal, between the eastern ghats and the sea
- covers eastern tamil nadu, part of puducherry and south eastern andhra pradesh.
- ecoregion imp cities : chennaipondicherry, thanjavur, kanchipuram and nellore and godavari-krishna mangroves ecoregion
- the ecoregion is home to two important wetlands, kaliveli lake in viluppuram district of tamil nadu, and pulicat lake north of chennai
- point calimere wildlife and bird sanctuary protects a 17.26 km2 enclave of dry evergreen forest, as well as tidal wetlands and mangroves
- Nelapattu bird sanctuary in pulicat lake

[UPSC 2015] In India, in which one of the following types of forests is teak a dominant tree species?

a) Tropical moist deciduous forest
b) Tropical rain forest
c) Tropical thorn scrub forest
d) Temperate forest with grasslands

Explanation

- **Teak** thrives in **warm and humid climates** with **distinct wet and dry seasons**.
- **Tropical moist deciduous forests** receive heavy rainfall during the monsoon season, followed by a distinct dry season. This seasonal variation aligns perfectly with the growth requirements of teak.

Answer: a) Tropical moist deciduous forest

DECIDUOUS FOREST : TYPES

TROPICAL DECIDUOUS FORESTS or monsoon forests

- These are the most widespread forests in India
- They spread over regions which receive rainfall between 70-200 cm.
- On the basis of the availability of water, these forests are further divided into moist and dry deciduous.

MOIST DECIDUOUS FORESTS	DRY DECIDUOUS FOREST
Rainfall range between 100-200 cm.	Rainfall range between 70 to 100 cm.
Found - found in the northeastern states along the foothills of Himalayas, eastern slopes of the Western Ghats and Odisha	found in rainier areas of the Peninsula and the plains of Uttar Pradesh and Bihar
Key Species : Teak, sal, shisham, hurra, mahua, amla, semul, kusum, and sandalwood, Bamboo, arjun, mulberry	Tendu, palas, Sal ,Peepal ,Neem, amaltas, bel, khair, axlewood, satinwood, rosewood, red Sanders. In the western and southern part of Rajasthan, vegetation cover is very scanty due to low rainfall and overgrazing.

Red Sanders :

- **Tree Dry Deciduous Species of South Eastern Ghats**
- **Known for red wood but this wood not aromatic**
- **Location : Palakonda and Seshachalam hill of Andhra Pradesh**
- The export of Red Sanders from India is prohibited as per the Foreign Trade Policy.
- Under the foreign trade policy of India, the import of Red Sanders is prohibited, while export is restricted
- 'Santalin' is a natural dye obtained from its heartwood and is used in pharmaceutical preparations, food articles, leather, and textile industries
- The species is also fire-hardy and resistant to droughts.

UPSC: With reference to 'Red Sanders', sometimes seen in the news, consider the following statements:

1. It is a tree species found in a part of South India.
2. It is one of the most important trees in the tropical rain forest areas of South India.

Which of the statements given above is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

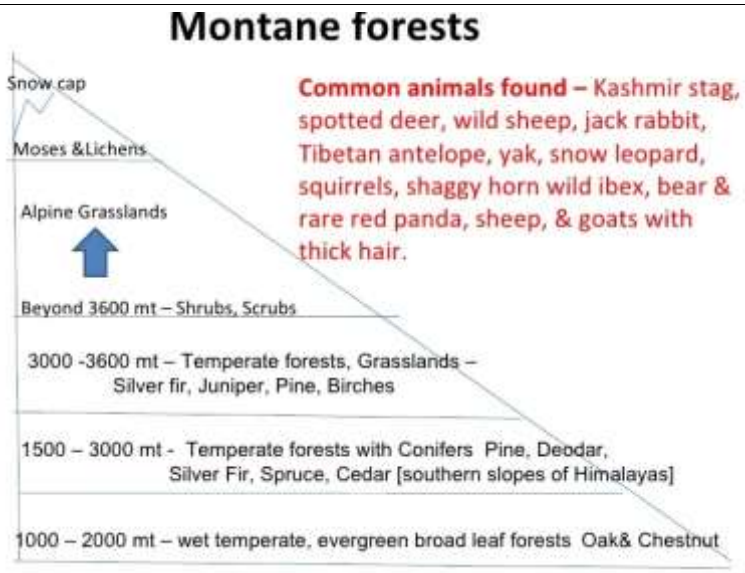
(d) Neither 1 nor 2

TROPICAL THORN FORESTS

- Occur in the areas which receive rainfall less than 50 cm.
- These consist of a variety of grasses and shrubs
- It includes semi-arid areas of south west Punjab, Haryana, Rajasthan, Gujarat, Madhya Pradesh and Uttar Pradesh.
- In these forests, plants remain leafless for most part of the year and give an expression of scrub vegetation.
- Trees are scattered and have long roots penetrating deep into the soil in order to get moisture. The stems are succulent to conserve water. Leaves are mostly thick and small to minimise evaporation.
- infertile soil -Low rainfall, less leaching of nutrients , drought conditions lead to nutrient deficiencies and soil compaction
- Acacias, palms, euphorbias and cacti
- babool, ber, and wild date palm, khair, neem, khejri, palas, etc.
- Tussocky grass grows upto a height of 2 m as the under growth.

MONTANE FOREST

- In mountainous areas, the decrease in temperature with increasing altitude leads to a corresponding change in natural vegetation.
- Mountain forests can be classified into two types, the northern mountain forests and the southern mountain forests.

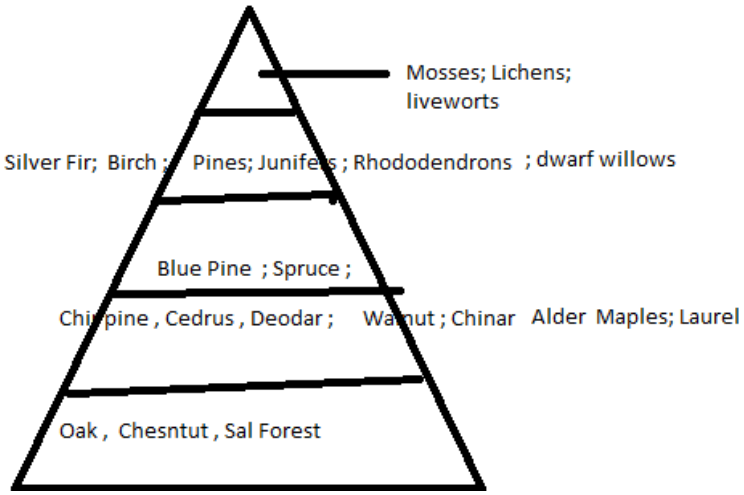


Which one of the following National Parks has a climate that varies from tropical to subtropical, temperate and arctic?
(a) Khangchendzonga National Park
(b) Nandadevi National Park
(c) Neora Valley National Park
(d) Namdapha National Park

Ex Namdapha National park

- **Location : Changlang District, Arunachal Pradesh Near Myanmar International Border**
- **Mountain betwen :** It is located between the *Dapha bum* range of the Mishmi Hills and the Patkai range,
- **Tribes located** : Lisu tribal people within the park.
- **Feline Species:** It is **only park in the World to have the four Feline species** of big cat namely the Tiger, Leopard, Snow Leopard and Clouded Leopard and numbers of Lesser cats.
- **River : on catchment of the Noa-Dihing River (Burhidihang), a tributary of the great Brahmaputra**

a) Northern Mountain Forest:



North mountain Forest :

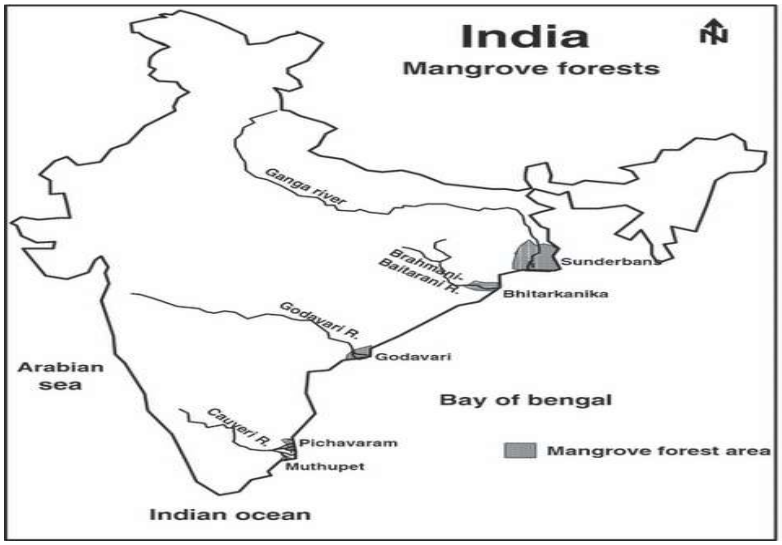
- The Himalayan ranges show a succession of vegetation from the tropical to the tundra, which change in with the altitude.
- Deciduous forests are found in the foothills of the Himalayas
- **Oak , Chestnut ,Laurel, Maple, Chir Pine, Deodar, chinar , walnut , dwarf willows**
- **Blue pine, Spruce, Silver fir, Cedar, Junifers, pine , birch and rhododendrons**
- **Alpine forest and pastures** used extensively for transhumance by tribes like the Gujjars, the Bakarwals, the Bhotiyas and the Gaddis
- The southern slopes of the Himalayas carry a thicker vegetation cover because of relatively higher precipitation than the drier north-facing slopes.
- At higher altitudes, mosses and lichens form part of the tundra vegetation.
- The common animals found in these forests are Kashmir stag, spotted dear, 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.

SOUTHERN MOUNTAIN FORESTS:

- Found in the Western Ghats, the Vindhyas Satpura and the Maikal ranges and the Nilgiris,
- As they are closer to the tropics, and only 1,500 m above the sea level, vegetation is temperate in the higher regions, and subtropical on the lower regions of the Western Ghats, especially in Kerala, Tamil Nadu and Karnataka
- The temperate forests are called Sholas in the Nilgiris, Anaimalai and Palani hills.
- Key species -magnolia, laurel, cinchona and wattle.

LITTORAL AND SWAMP FORESTS

- Mangroves grow along the coasts in the salt marshes, tidal creeks, mud flats and estuaries.
- found along the coastlines and in low-lying areas
- adaptation to saline or waterlogged conditions
- They consist of a number of salt-tolerant species of plants.
- play a crucial role in biodiversity conservation, coastal protection,
- In India, the mangrove forests spread over 6,740 sq. km which is 7 per cent of the world's mangrove forests.
- They are highly developed in the Andaman and Nicobar Islands and the Sunderbans of West Bengal. and Mahanadi, the Godavari and the Krishna deltas.
- Mangrove soils are fertile due to high organic matter content, sedimentation, and anaerobic decomposition.



REGIONS OF MEDICINAL PLANTS OF INDIA

India is currently having 8000 medicinal plants species according to the Botanical Survey of India (BSI)

MEDICINAL PLANTS

India is known for its herbs and spices from ancient times. Some 2,000 plants have been described in Ayurveda and at least 500 are in regular use. The World Conservation Union's Red List has named 352 medicinal plants of which 52 are critically threatened and 49 endangered. The commonly used plants in India are:

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.
Tulsi : Is used to cure cough and cold.
Kachnar : Is used to cure asthma and ulcers. The buds and roots are good for digestive problems.

Identify more medicinal plants in your area. Which plants are used as medicines by local people to cure some diseases?

S.No.	Region	No. of Medicinal plants species
	Western Himalaya	1500
	Eastern Himalaya	3000
	Western Ghats	2000
	Eastern Ghats including Andaman & Nicobar Islands	1500
	TOTAL	8000

- Botanical Survey of India ,: brings out an inventory of endangered plants in the form of a publication titled **Red Data Book**.

FOREST SURVEY OF INDIA

- founded in June 1981
- headquartered at Dehradun
- Under MOEFCC
- Forest Research Institute ,1906 , Dehradun campus hosts the Indira Gandhi National Forest Academy (IGNFA), the staff college that trains officers selected for the Indian Forest Service (IFS).
- FSI assesses forest cover of the country every 2 years by digital interpretation of remote sensing satellite data and publishes the results in a biennial report called 'State of Forest Report' (SFR). Beginning in 1987, 18 SFRs have come so far

ISFR2023 FEATURES :

- Recently, the Ministry for Environment, Forest and Climate Change released the 18th India State of Forest Report 2023 (ISFR 2023).
- **Forest and Tree cover of India = 25.17 percent** of geographical area (Target 33 %)
- 21.76% is forest cover and 3.41% is tree cover
- **Forest Cover** refers to all lands more than one hectare in area, with a tree canopy density of more than 10 percent irrespective of ownership and legal status. Such lands may not necessarily be a recorded forest area. It also includes orchards, bamboo and palm.
- **Tree Cover** : Patches of trees as well as isolated tress outside the RFA on area less than one hectare.
- Increase of forest and tree cover in India compared to ISFR,2021
- maximum increase :Chhattisgarh, UttarPradesh, Odisha and Rajasthan.
- **Area of Maximum Forest and Tree Cover** : Madhya Pradesh, Arunachal Pradesh and Maharashtra
- **Percentage Of Forest Cover** with respect to total geographical area, Lakshadweep (91.33 percent) has the highest forest cover followed by Mizoram and Andaman & Nicobar Island
- **The Present Assessment** also reveals that 19 states/UTs have above 33 percent of the geographical area under forest cover. Out of these, eight states/UTs namely Mizoram, Lakshadweep, A & N Island, Arunachal Pradesh, Nagaland, Meghalaya, Tripura, and Manipur have forest cover above 75 percent.
- The extent of bamboo bearing area for the country has been increased as compared to the last assessment done in 2021.
- There is an increase in the carbon stock of the country as compared to the last assessment.
- **The carbon stock** is the amount of carbon stored in the forests of India.
- Highest Carbon Stock Statewise : Arunachal Pradesh > MP> Chhatisgarh
- More than 70 % of Forest cover in India falls in Tropical semi evergeen , Tropical moist deciduous and Tropical Dry Deciduous Forest type.

WILDLIFE OF INDIAN NATURAL VEGETATION BASED ON FOREST TYPES

Tropical Rainforests

- Royal Bengal Tiger
- Indian Leopard
- Asian Elephant
- Indian Bison (Gaur)
- Nilgiri Tahr
- Malabar Giant Squirrel
- Hoolock Gibbon
- Lion-tailed Macaque

- Slender Loris
- King Cobra, Python
- **Birds:** Hornbill, Malabar Pied Hornbill, Great Indian Hornbill, Various Parrots, Pigeon

Tropical Moist Deciduous Forests

- Bengal Tiger
- Indian Leopard
- Indian Bison (Gaur)
- Chital (Spotted Deer)
- Sambar Deer
- wild Boar
- Sloth Bear
- Peacock
- Reptiles: Indian Python, King Cobra, Monitor Lizard
- Indian Wolf and Blackbuck

Tropical Dry Deciduous Forests

- Lion and Tiger
- Sambar Deer
- elephants, langurs, deer, bears, tortoises, snakes, and monkeys
- Indian Gazelle (Chinkara)
- Desert Fox
- Various reptile species

Tropical Thorn Forests and Scrub

- Mammals: Chinkara (Indian Gazelle), Blackbuck, Nilgai, Wolf, Fox, Wild Ass (Rann of Kutch)
- Reptiles: Desert Monitor, Snakes (various species)
- Birds: Great Indian Bustard, Peafowl
- Mountain Forests
- Himalayan Black Bear
- Snow Leopard
- Red Panda
- Musk Deer
- Birds: Himalayan Monal, Snow Cock, Golden Eagle
- Mangrove Forests/Tidal Forests
- Royal Bengal Tiger
- Indian Leopard,
- Indian Python
- Saltwater Crocodile
- Olive Ridley Sea Turtle
- River Terrapin
- Birds: Kingfishers, Egrets, Herons
- Various species of fish and crustaceans adapted to saline environments

Policy and Legislation

- Indian Forest Act, 1927- primary legislation that provides the framework for the management and conservation of forests in India. It defines various categories of forests (Reserved, Protected, and Village forests)
- The Wildlife (Protection) Act (WPA),1972 provides protection to listed flora and fauna and establishes a network of ecologically important protected areas.
- The Forest Conservation Act , 1980 regulates diversion of forest lands for non forest areas, making sure sustainable use and conservation of Forest resources.
- EPA, 1986
- Biological Diversity Act 2002
- Tribal and Indigenous Forest Rights or Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 guarantees their involvement in forest conservation and management

THE **ENVIRONMENT (PROTECTION) ACT**, 1986

- Act was Passed Under Article 253 (empowers to union government to enact laws to give effect to international agreements signed by the country.)
- Umbrella legislation for Central government
- Central Ground water Authority
- Eco-sensitive Zones shock absorbers for Protected Areas
- Environmental Impact Assessment

Key Legislations under the EPA, 1986 are :

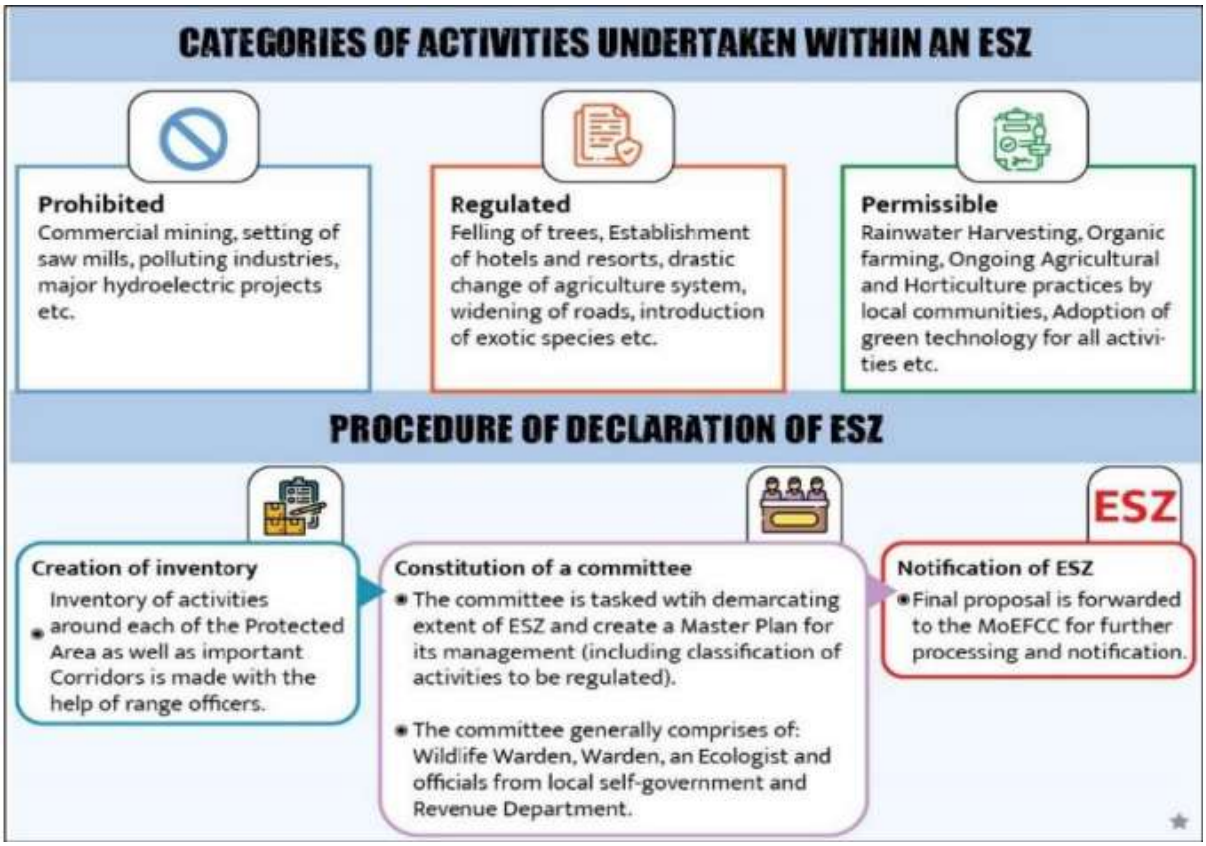
- e waste management rules
- solid waste management rules
- biomedical waste management rules
- Wetland rules
- Ozone Depleting Substances rules
- Plastic waste management rules
- CRZ rules : CRZ I (Ecologically Sensitive Areas), CRZ II(Urban Areas), CRZ III (Rural Areas) CRZ IV (Aquatic Zones Coastal Waters)

Which one of the following has been constituted under the Environment (Protection) Act, 1986? (2022)

a) Central Water Commission
b) Central Ground Water Board
c) Central Ground Water Authority
d) National Water Development Agency

ESZ : Ecological Sensitive Zones

- Surrounding Region Around PAs
- Create a buffer zone to minimize impact of human activities
- Act as " Shock Absorbers" and avoid human animal conflict
- created under EPA 1986
- Act as transition zone from areas of higher protection to areas involving lesser protection
- the authority to declare these zones lies with the central government through the MoEFCC
- state governments have a role in managing and enforcing regulations within Eco-Sensitive Zones,
- Extent of ESZs as per 2011 guidelines: Generally, width of up to 10 kms around a PA.
- Areas beyond 10-km can also be notified by the Union government as ESZs, if they hold larger ecologically important “sensitive corridors”.
- Recently SC directed every protected forest, national park and wildlife sanctuary in the country should mandatorily have a minimum 1 km ESZ,
- Based on Core and buffer model of management
- India has more than 600 Ecologically Sensitive Zones declared across different states.



FOREST RIGHTS ACTS, 2006

- **Scheduled Tribes And Other Traditional Forest Dwellers (Recognition Of Forest Rights) Act, 2006**
- **Ministry of Tribal Affairs Implements it**
- **Gram Sabha deciding forest rights**
- **Recognition of minor forest produce**
- **provide creation of Critical Wildlife Habitat and the creation of 'inviolate areas for wildlife protection'**
- **Habitat Rights to PVGTs - baigas were the first**
- **Community Forest Rights- tribals of Kanerghati National Park(Chhatisgarh) recently got forest rights . CFR gives Gramsabha the right to protect Community Forest Resources.**
- **the Odisha government was the first to recognise Community Forest Resources (CFRs) inside the Simplipal National Park and now Chhattisgarh is the second state to recognize it**

About Minor Forest Produce ?

- The Ministry of Tribal Affairs launched the Minimum Support Price (MSP) for Minor Forest Produce (MFP).
- The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act,2006 defines minor forest produce as all non-timber forest produce of plant origin.
- These include bamboo, brushwood, stumps, canes, cocoon, honey, waxes, Lac, tendu leaves, medicinal plants and herbs, roots among others
- Total 87 items

- Source :https://sansad.in/getFile/loksabhaquestions/annex/177/AS214.pdf?source=pqals

At the national level, which ministry is the nodal agency to ensure effective implementation of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006?

(a) Ministry of Environment, Forest and Climatic Change.

(b) Ministry of Panchayat Raj

(C) Ministry of Rural Development

(d) Ministry of Tribal Affairs

Q.) Under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, who shall be the authority to initiate the process for determining the nature and extent of individual or community forest rights or both?

a) State Forest Department
b) District Collector/Deputy Commissioner
c) Tahsildar/Block Development Officer/Mandal Revenue Officer
d) Gram Sabha

Q.) Consider the following statements:
1. As per recent amendment to the Indian Forest Act, 1927, forest dwellers have the right to fell the bamboos grown on forest areas.
2. As per the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, bamboo is a minor forest produce.
3. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 allows ownership of minor forest produce to forest dwellers.
Which of the statement given above is/are correct?

a) 1 and 2 only
b) 2 and 3 only
c) 3 only
d) 1, 2 and 3

EXP:

- The Indian Forest (Amendment) Bill 2018 permits felling and transit of bamboo grown in non-forest areas. However, bamboo grown on forest lands would continue to be classified as a tree and would be guided by the existing legal restrictions. Hence Statement 1 is Not Correct.
- Statements 2 and 3 Correct

Ans B

Consider the following statements about Particularly Vulnerable Tribal Groups (PVTGs) in India: (2019)

1. PVTGs reside in 18 States and one Union Territory.
2. A stagnant or declining population is one of the criteria for determining PVTG status.
3. There are 95 PVTGs officially notified in the country so far.
4. Irular and Konda Reddi tribes are included in the list of PVTGs.

Which of the statements given above are correct?

(a) 1, 2 and 3
(b) 2, 3 and 4
(c) 1, 2 and 4
(d) 1, 3 and 4

Ans: (c)

Concept of PVGT

- Particularly Vulnerable Tribal Groups (PVTG)
- PVTGs are more vulnerable among the tribal groups
- in **1973,** the **Dhebar Commission created Primitive Tribal Groups (PTGs)** as a separate category, who are less developed among the tribal groups. In **2006,** the Government of India **renamed the PTGs as PVTGs.**
- Ministry of Tribal Affairs administers a scheme namely '**Development of Particularly Vulnerable Tribal Groups (PVTG)'** specifically for the PVTG population**.** The scheme covers the 75 identified PVTGs in 18 States, and Union Territory of Andaman & Nicobar Island
- the 75 listed PVTG's the **highest number are found in Odisha.**

Four Criteria for PVGT:

1. Pre-agricultural level of technology,
2. Low level of literacy,
3. Economic backwardness,

4. A declining or stagnant population.

Name of the States /UT	Name of Primitive Tribal Group	Population as per 2001 Census (Figures in actual)	
Andhra Pradesh	1. Bodo Gadaba	-	
	2. Bondo Porja	-	
	3. Chenchu	49232	
	4. Dongria Khond	-	
	5. Gutob Gadaba	-	
	6. Khond Porja	-	
	7. Kolam	-	
	8. Konda Reddi	-	
	9. Konda Savara	83096	
	10. Kutia Khond	-	
	11. Parengi Porja	-	
	12. Thoti	2074	
	Total	134402	
Bihar & Jharkhand		Bihar	Jharkhand
	13. Asur	181	10347
	14. Birhor	406	7514
	15. Birjia	17	5356
	16. Hill Kharia	-	-
	17. Korwas	703	27177
	18. Mal Paharia	4631	115093
	19. Parhaiya	2429	20786
	20. Sauria Paharia	585	31050
	21. Savar	420	6004
	Total	9372	223327
Gujarat	22. Kathodi	5820	
	23. Kolgha	-	
	24. Kotwalia	-	
	25. Padhar	22421	
	26. Siddi	8662	
	Total	36903	
Karnataka	27. Jenu Kuruba	29828	
	28. Koraga	16071	
	Total	45899	
Kerala	29. Cholanaikayan	-	
	30. Kadar	2145	
	31. Kattunayakan	14715	
	32. Koraga	1152	
	33. Kurumba	2174	
	Total	20186	
Madhya Pradesh & Chhattisgarh		Madhya Pradesh	Chhattisgarh
	34. Abujh Maria	-	-
	35. Baiga	332936	6993
	36. Bharia	152470	88981
	37. Birhor	143	1744
	38. Hill Korwa	-	-
	39. Kamar	2424	23113
	40. Saharia	450217	561
	Total	938190	121392
Maharashtra	41. Kathodi	235022	
	42. Kolam	173646	
	43. Maria Gond	-	
	Total	408668	
Manipur	44. Maram Naga	1225	
Orissa	45. Birhor	702	

	46. Bondo	9378	
	47. Chuktia Bhunjia	-	
	48. Didayi	7371	
	49. Dongria Khond	-	
	50. Juang	41339	
	51. Kharia	188331	
	52. Kutia Khond	-	
	53. Lanjia Saura	-	
	54. Lodha	8905	
	55. Mankidia	1050	
	56. Paudi Bhuyan	-	
	57. Sauura	473233	
	Total	730309	
Rajasthan	58. Saharia	-	
Tamil Nadu	59. Irular	155606	
	60. Kattu Nayakan	45227	
	61. Korumba	-	
	62. Kota	925	
	63. Paniyan	9121	
	64. Toda	1560	
	Total	165103	
Tripura	65. Riang	165103	
Uttar Pradesh & Uttrakhand		Uttar Pradesh	Uttrakhand
	66. Buksa	4367	46771
	67. Raji	998	517
	Total	5365	47288
West Bengal	68. Birhor	1017	
	69. Lodha	84966	
	70. Toto	-	
	Total	85983	
Andaman & Nicobar Islands	71. Great Andamanese	43	
	72. Jarawa	240	
	73. Onge	96	
	74. Sentinelese	39	
	75. Shom Pen	254	
	Total	672	
All India	Grand Total	3262960	

Critically Wildlife Habitat

- CWLHs are meant to be areas of national parks and wildlife sanctuaries that are required to be kept as inviolate for the purpose of wildlife conservation
- CWLH mandatorily requires settlement of forest rights under FRA.
- Critical Wildlife Habitats are to be declared by the Central Government in the Ministry of Environment and Forests after a process of consultation by Expert Committees.
- Government of India (Ministry of Environment & forest) notifies such areas as CWH which meets a scientific criteria decided by an expert committee including experts from locality appointed by the government and from that of the Ministry of Tribal Affairs.

CRITICAL TIGER HABITATS

- Critical 'tiger' habitats (CTHs), also known as **core areas of tiger reserves**—are identified **under the Wild Life Protection Act (WLPA), 1972** based on scientific evidence that "such areas are required to be kept as **inviolate for the purpose of tiger conservation**, without affecting the rights of the Scheduled Tribes or such other forest dwellers".
- The notification of CTH is **done by the state government** in **consultation with the expert committee** constituted for the purpose.

THREATS TO FOREST WORLDWIDE :

Deforestation and Forest Degradation

Define Deforestation :
Deforestation means removal/ clearing of standing forest and using that land for other purposes like Agriculture, Industrialization or mining activities and Urbanization and unsustainablecattle ranching.
ding to the Food and Agriculture Organization (FAO),

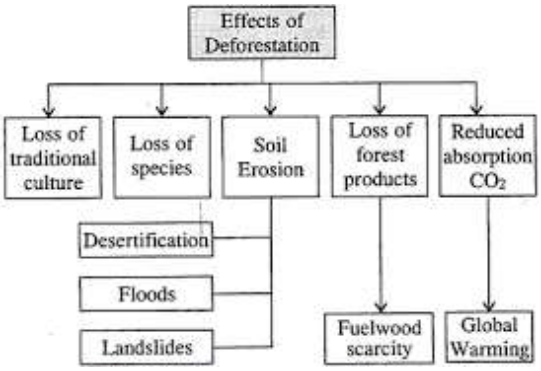
- the expansion of agriculture caused nearly 80% of global deforestation, ex Subsistence agriculture of developing countries and increase of commercial agriculture and livestock rearing .
- **Deforestation Caused By New Constructions (~15%)**
- How Urbanization Is Causing Deforestation (~5%)

Define Forest degradation

- ***Forest degradation*** measures a thinning of the canopy – a reduction in the density of trees in the area – but without a change in land use.
- is used to mean the destruction of specific aspects of forests such asa decrease in tree cover, changes in their structure or a reduction in the number of speciesthat can be found there.
- Forest degradation occurs when forest ecosystems lose their capacity to provide important goods and services to people and nature.

REASON FOR DEPLETION OF FOREST RESOURCES IN INDIA :

- Agricultural Expansion and Shifting Cultivation
- Logging and Timber Extraction
- Grazing and fuel wood collection
- Increase Population Pressure
- Unregulated Industrialization and Unplanned Urbanization,
- Quarrying and Heavy Mining Operations in Forest Patches and
- use of Woods for domestic and other purpose .
- Hunting, poaching, over exploitation , environmental pollution, poisoning and forest fires .
- Overpopulation ; unequal access, inequitable consumption of resources and differential sharing of responsibility for environmental well being .



Consequence of deforestation:

- It Impact Land Ecosystem (land dregradation)
- Increase carbondioxide emissions and increase pollution (air degradation)
- Impact Biogeochemical cycles- Nutrient cycles
- lead to Soil erosion and Impact Soil Biota - Impact tropic level interactions
- deplation of groundwater
- Loss of biodiversity and threat to wildlife
- affects and contribute to climate change
- Loss of carbon sink mechanism,
- It also causes biodiversity loss, flooding and soil degrada- tion
- and increases the likelihood of natural hazards – storms, floods, and extreme fluctua- tions in weather.
- Deforestation threatens the livelihoods and cultural integrity of people that depend on forests and it undermines the availability of timber and non-timber forest products for future generations.

Ex :

- Amazon Rainforest - lung of Planet under threat due to subsistence farming for Soybean, rubber ,Sugarcane and intensve livestock production for meat consumption need of developed countries.
- Bornea, Indonesia forest in News for Palm Oil Cultivation. This makes the palm oil industry one of the biggest contributors to deforestation in Southeast Asia
- Woodcutting of forest reserves and the development of cocoa and palm oil plantations are among the main causes of deforestation in Africa, together with land cleaning for mining activities.

Key reasons of the declining of wildlife are as follows:

(i) Industrial and technological advancement brought about a rapid increase in the exploitation of forest resources.
(ii) More and more lands were cleared for agriculture, human settlement, roads, mining, reservoirs, etc.
(iii) Pressure on forests mounted due to lopping for fodder and fuelwood and removal of small timber by the local people.
(iv) Grazing by domestic cattle caused an adverse effect on wildlife and its habitat.
(v) Hunting was taken up as a sport by the elite and hundreds of wild animals were killed in a single hunt. Now commercial poaching is rampant.
(vi) Incidence of forest fire

Conservation measures:

- About Nature Based Solutions like Forest landscape Restoration (FLR)
- FLR includes multiple activities -Agroforestry, erosion control, natural forest regeneration
- Reafforestation
- Increased Protected Areas like Biospheres reserve Program of UNESCO
- Wildlife sanctuary, National Park, Tiger and Elephant Reserve In India's case
- Strict Implementation of Forest Acts and Environment protection acts.
- Effective land , water and forest policy .

Other Measures ;

- **Consuming Less and More Consciously Helps Stop Deforestation**
- **Reduce the consumption of paper**
- Implement the process of recycling or prefer to buy recycled products, Prefer to buy Eco-friendly products
- focus on Circular Economy

Mitigation Measures :

- **Afforestation** is the planting of trees in a previously barren environment. The main reason for afforestation is to control carbon footprint and to ensure the sustainability of the natural environment
- **Reforestation** is a process of planting trees in a forest land where the trees have been cut for some reasons. Planting of trees can reduce various causes and effects of deforestation, global warming, greenhouse effect, pollution, etc.

Meet Padma Shri Tulasi Gowda, 2020 , the barefoot environmentalist known as 'Encyclopedia of Forest' from Karnataka also received Indira Priyadarshini Vriksha Mitra Awards or **IPVM Awards** are given by Ministry of Environment and Forests 1986

- respect for the rights and knowledge of local communities and indigenous peoples; and enhanced capacity for monitoring of biodiversity outcomes
- **Adoption of cleaner technologies** and the use of improved fuel quality. Like Electric car and bikes

ESSENTIAL TOOLS IN THE FIGHT AGAINST CLIMATE CHANGE.

- The voluntary climate mitigation framework developed by the by the United Nations Framework Convention on Climate Change (UNFCCC).
- REDD and REDD Plus

1 REDD : "Reducing Emissions from Deforestation and Forest Degradation

- **Comprehensive framework Scheme**
- **Launched** in 2008 and HQ Geneva
- **Parent Organization:** UNDP, UNEP and FAO jointly established the UN-REDD Programme
- **Objective :** to address climate change by reducing greenhouse gas emissions caused by deforestation and forest degradation in developing countries
- **Primary Aim**: provide financial incentives to these countries

2 REDD+

- Launched in 2013 at Warsaw
- Holistic Approach beyond two goals
- The "+" refers the framework's forest conservation activities
- expands upon the original REDD framework by including additional activities aimed at enhancing forest carbon stocks and promoting sustainable forest management.
- emphasizes co-benefits beyond just reducing emissions, such as biodiversity conservation, poverty alleviation, and respect for indigenous peoples' rights.

Proper design and effective implementation of UN-REDD+ Programme can significantly contribute to

1. protection of biodiversity
2. resilience of forest ecosystems
3. poverty reduction

Select the correct answer using the code given below.

a) 1 and 2 only
b) 3 only
c) 2 and 3 only
d) 1, 2 and 3

Q. With reference to Reducing Emissions from Deforestation and forest Degradation (REDD+) consider the following statements:

1.It is a framework developed by the United Nations Framework Convention on Climate Change (UNFCCC) Conference of Parties (CoP).

2.It aims at creating financial value for the carbon stored in forests.

Select the correct statement using the codes given below:

a) 1 only
b) 2 only
c) both
d) none

Ans C

FOREST CARBON PARTNERSHIP FACILITY

- global partnership of Governments, businesses, civil society, and indigenous Peoples.
- focused on reducing emissions from deforestation and forest degradation, conserving forest carbon stock, sustainable forest management, and enhancing forest carbon stocks in developing countries (activities commonly referred to as REDD+).
- To assist countries in their REDD+ efforts by providing them with financial and technical assistance
- The World Bank plays an important role in the development of REDD+ activities.

Q. With reference to 'Forest Carbon Partnership Facility', which of the following statements is/are correct?

1. **It is global partnership of governments, businesses, civil society and indigenous peoples.**
2. **It provides financial aid to universities, individual scientists and institutions involved in scientific forestry research to develop eco-friendly and climate adaptation technologies for sustainable forest management.**
3. **It assists the countries in their 'REDD+ (Reducing Emission from Deforestation and Forest Degradation+)' efforts by providing them with financial and technical assistance.**

Select the correct answer using the code given below

a) **1 only**
b) **2 and 3 only**
c) **1 and 3 only**
d) **1, 2 and 3**

It provides financial incentives to countries in their REDD+ efforts. There is no mention of assistance to universities, scientists…

Answer: c) 1 and 3 only

Warsaw International Mechanism (WIM):

- The Warsaw International Mechanism (WIM) for Loss and Damages, set up in 2013, was the first formal acknowledgment of the need to compensate developing countries struck by climate disasters.

BioCarbon Fund Initiative

- The BioCarbon Fund Initiative for Sustainable Forest Landscapes (ISFL) is a multilateral fund, supported by donor governments and managed by the World Bank.
- It seeks to promote reduced greenhouse gas emissions from the land sector, from deforestation and forest degradation in developing countries (REDD+), and from sustainable agriculture, as well as smarter land-use planning, policies and practices.

Q. 'BioCarbon Fund Initiative for Sustain-able Forest Landscapes' is managed by the

a) Asian Development Bank
b) International Monetary Fund
c) United Nations Environment Programme
d) World Bank

Answer: d) World Bank