

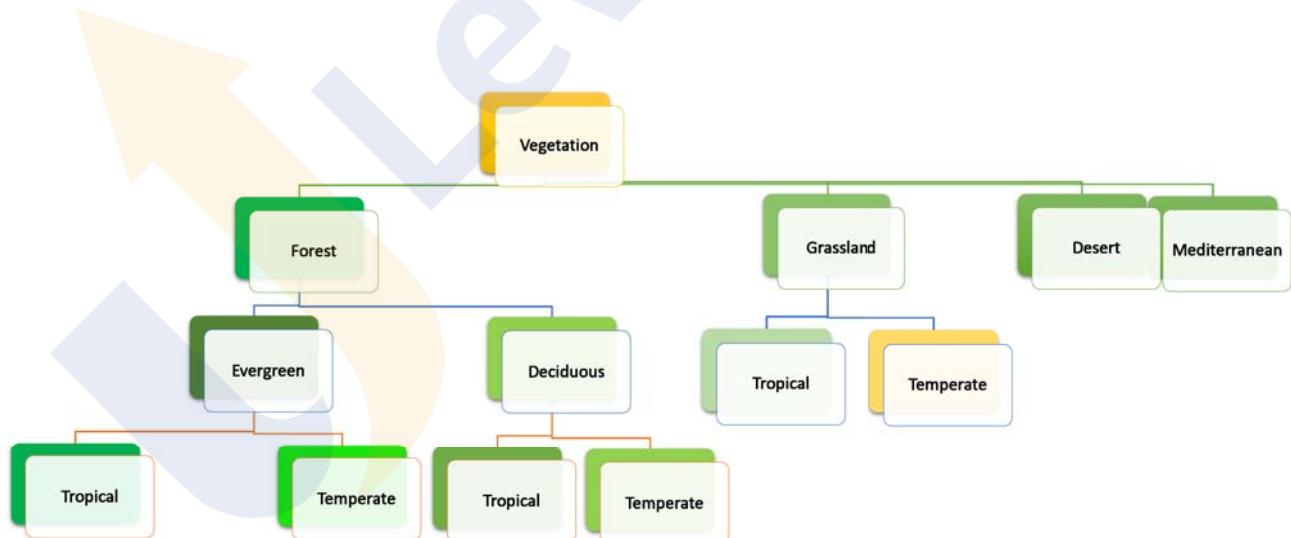


GS FOUNDATION BATCH FOR CSE 2024

**Geography - 07
(Vegetation and Soil)**

Topic – Vegetation of India and Soil of India

Dimple Nankani



Types of Vegetations



Tropical evergreen forest



Temperate evergreen forest



Tropical deciduous forest



Temperate deciduous forest



Temperate grassland



Tropical grassland



Mediterranean vegetation



Desert vegetation



Conifer forest

Tropical evergreen forest

It occurs in the regions near the equator

Climate is hot and receive heavy rainfall throughout the year but maximum rainfall around the Equinox. Average maximum temperature is around 30 degree Celsius and 20 degree

Because of absence of dry season trees do not shed their leaves at the same time.



Tropical evergreen forest

Because of absence of dry season trees do not shed their leaves at the same time.

Each day is more or less the same, the morning is clear and bright with a sea breeze; as the Sun climbs high in the sky, heat mounts up, dark clouds form, then rain comes with thunder and lightning. But rain is soon over

e.g. - Rosewood, Ebony, Mahogany

In India it is seen in AnN, Lak, Western side of Western Ghat



Temperate evergreen forest

It is located in the mid-latitudinal coastal region.

They are commonly found along the eastern margin of the continents.

Common in - south east USA, South China and in South East Brazil

Comprise both hard and soft wood trees

e.g. - oak, pine, eucalyptus. In India it is found in Himalayas



Tropical deciduous forest

Are the monsoon forests

It is found in the large part of India, northern Australia and in central America

Trees shed their leaves in the dry season to conserve water

The hardwood trees found in these forests

These are useful for making furniture. Seen across the India



Temperate deciduous forest

Found in higher latitudes.

Shed their leaves in dry season

North eastern part of USA, China, New Zealand, Chile and Western Europe.

Trees - oak, ash, beech. In India it is found in Himalayas



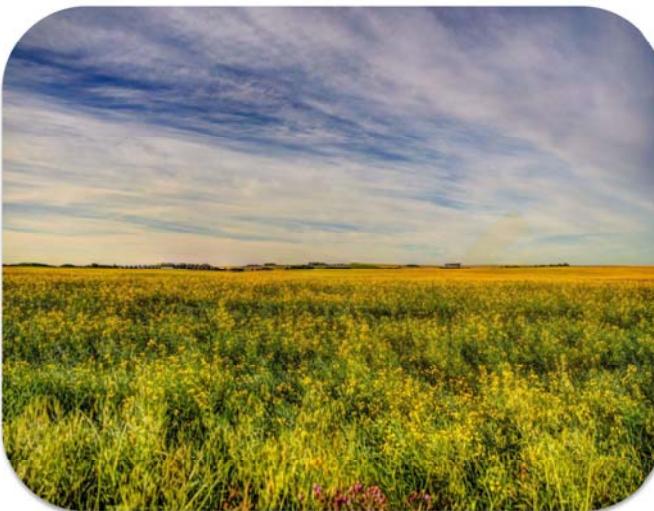
Temperate Grassland

These are found in the mid-latitudinal zones and in the interior part of the continents.

Usually, grass here is short and nutritious.

In steppe, Climate is extreme, rainfall is scanty and the people used to be nomadic herders

In India it is seen in Himalayas



Tropical grassland



Found on the either side of the equator and extend till the tropics

Grasses here are very tall, about 3 to 4 metres in height

Savannah grasslands of Africa are of this type. In India is it seen in Peninsular Plateau

Tropical grassland

Low latitude

Grasses are not nutritious.

Trees are present

Savana, Llanos, Campos.

Temperate grassland

Mid-latitude

Grasses are nutritious

Pure grassland (no trees)

Prairies, Pampas, Pustaz, Veldts, Steppes, Downs

Mediterranean vegetation



Found in west and south west margins of the continents

Areas around the Mediterranean, California in the USA, south west Africa, south western, South America and South west Australia.

It has warm and dry climate, mild and wet winter

Citrus fruits such as oranges, figs, olives and grapes are commonly cultivated. Evergreen oak trees are also present. It is not seen in India

Desert vegetation

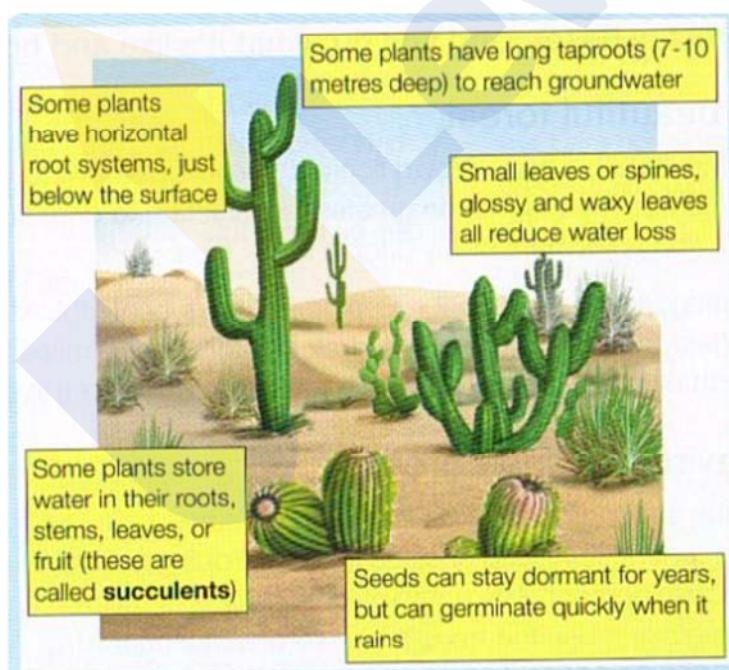


It found in the desert

Vegetation is adapted to scanty rain and scorching heat

The vegetation cover is scarce

In India it is seen in Ladakh, Rajasthan, Gujarat



Conifer forest



In the higher latitudes ($50^{\circ} - 70^{\circ}$) on upper altitude.

It has tall, softwood evergreen trees.

Woods of these trees are very useful for making pulp, paper newsprint, and match boxes.

e.g. - Chir, pine, cedar. In India it is seen along Himalayas

Tundra Vegetation



Coldest biome and very fragile biome on Earth

Temperature is below freezing for most of the year. Its frozen layer of ground is called permafrost.

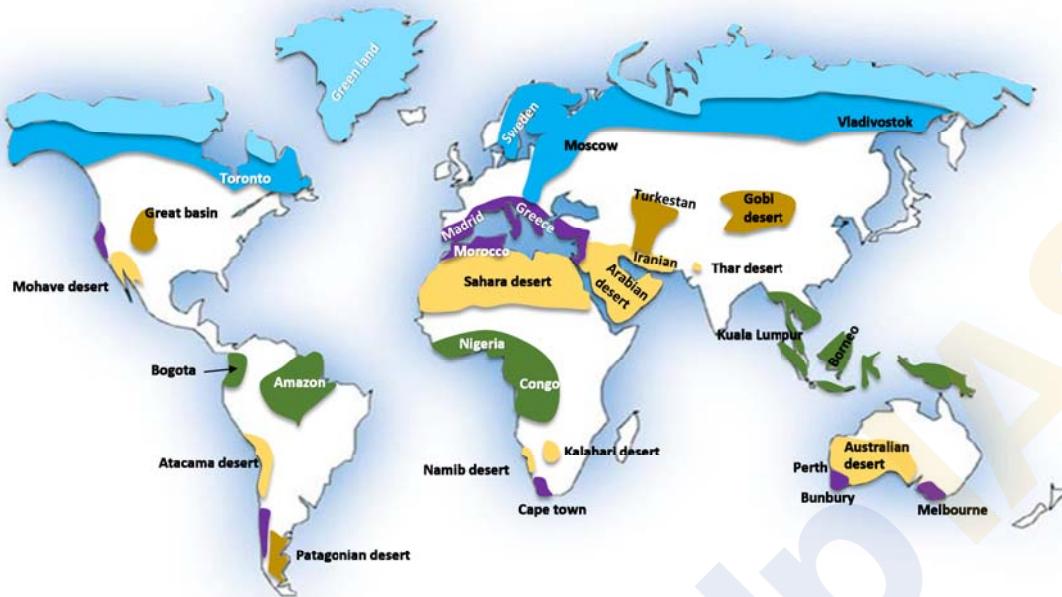
Unique due to its harsh climate and limited vegetation and animal life.

Plants which grow in the tundra include grasses, shrubs, herbs, and lichens

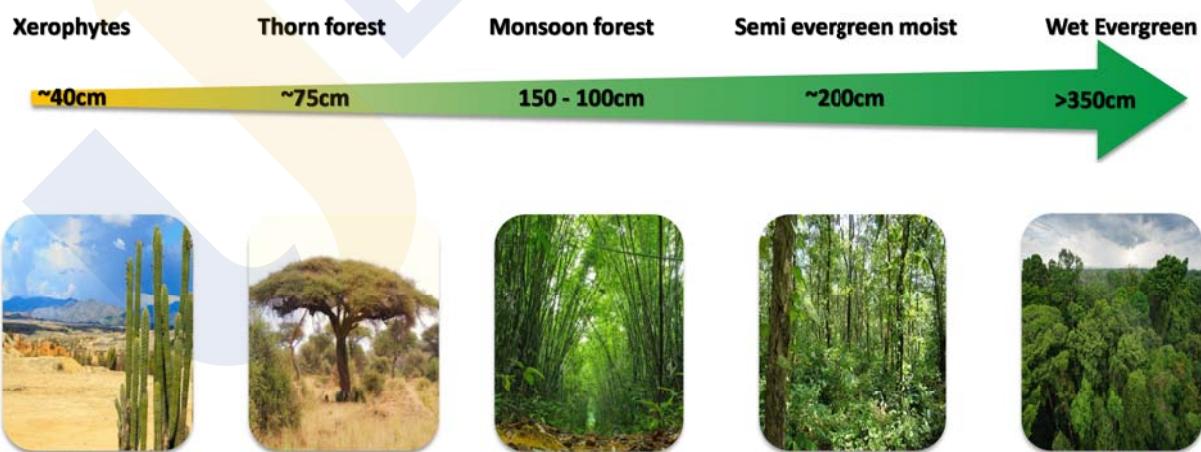
Animals in the tundra have small tails as well as ears.

Areas: South of Arctic Region: Canada and Siberia. In India it is seen along Himalayas

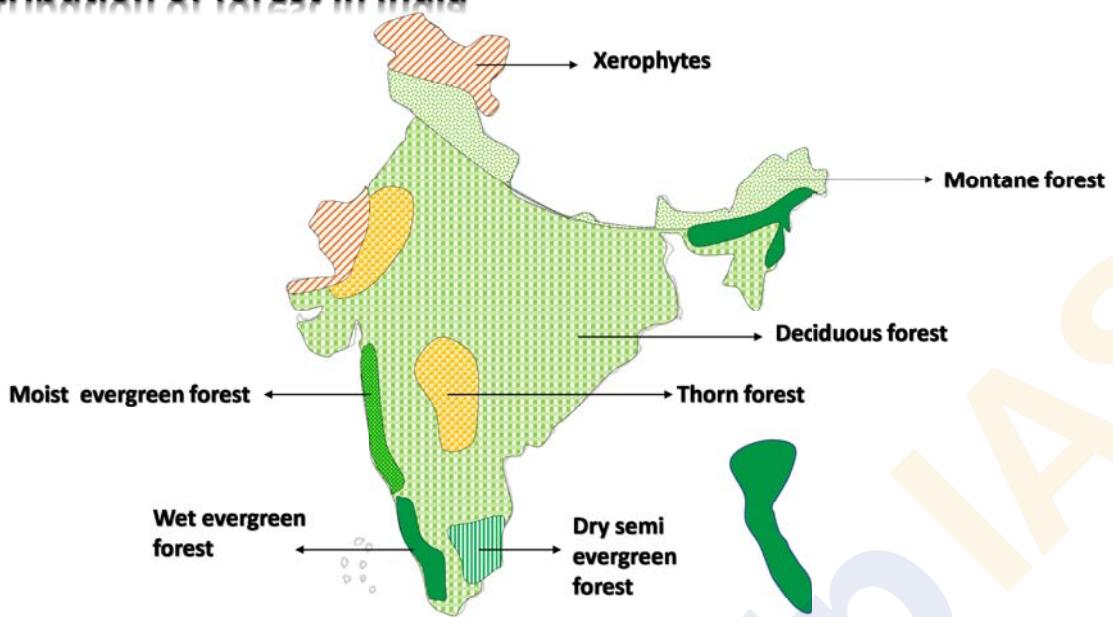




Types of forest based on rainfall

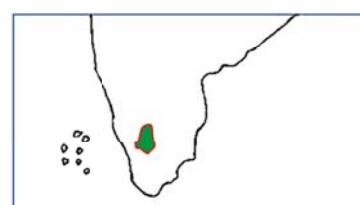


Distribution of forest in India



Southern Mountain Forest

1. Southern mountain forests include the forests found in three distinct areas of Peninsular India viz; the Western Ghats, the Vindhyas and the Nilgiris.
2. 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.
3. The temperate forests are called Sholas in the Nilgiris, Anaimalai and Palani hills.
4. Some of the other trees of this forest of economic significance include, magnolia, laurel, cinchona and wattle.
5. Such forests are also found in the Satpura and the Maikal ranges



Littoral and Swamp forest

1. Wetland habitats in India:

- About 70 per cent is under paddy cultivation.
- Total area of wetland is 4 million ha.
- Two sites: Chilika Lake (Odisha) and Keoladeo National Park (Bharatpur) are protected as water-fowl habitats under the Convention of Wetlands of International Importance (Ramsar Convention)

2. Mangroves:

- Mangroves grow along coasts in the salt marshes, tidal creeks, mud flats and estuaries.
- They have number of salt-tolerant species of plants.
- These forests give shelter to a wide variety of birds.
- Mangroves are found along entire coast with vase stretches along Andaman and Nicobar Islands, Sunderbans of West Bengal, Mahanadi, the Godavari and the Krishna deltas.



THE MANGROVE ECOSYSTEM
Extreme Conditions and Extremely High Biodiversity

Mangrove forests are found on coastlines in tropical and subtropical areas. The mangrove tree looks a bit strange because its roots are partially above water, making the tree look like it's standing on many gnarly stilts. The roots are exposed to help the tree take in oxygen in a waterlogged environment. Fish, shrimp, crabs, and mollusks are among the organisms that take shelter within mangrove roots. This ecosystem is home to considerable biodiversity, but is unfortunately threatened by shrimp farming and rising sea levels. In some countries, shrimp farming clears large sections of mangroves to build holding tanks and processing facilities. The maps below show the changes to the mangrove ecosystem in Honduras from 1987 to 1999, where much of it has been removed to store shrimp brought in from the Gulf of Fonseca.

Coastal Protection
Mangrove forests are able to bear the brunt of storms that hit the coast. They reduce the impact of strong waves on anything that lives further inland, including humans. Mangrove trees also protect the coast from erosion by collecting sediments from rivers and ocean tides around their roots. These sediments build up and strengthen the shoreline.

The Ocean's Nursery
Mangrove ecosystems host a lot of biodiversity, in part due to the mangrove tree's strange root system. The roots serve as a nursery for the larvae of many fish species, such as barracuda, tarpon, and snook. This is where fish can develop into adults before moving out to the big, unforgiving ocean. In fact, around one-third of all marine fish species are sheltered from predators in mangrove forests as juveniles.

Detritus
Leaves and branches that have fallen into the water are called detritus, and are broken down by bacteria to return nutrients to the water.

1987

1999

American Crocodile
Crocodylus acutus

Great Blue Heron
Ardea herodias

Little Red Bat
Lasiurus minus

Red Mangrove Tree
Rhizophora mangle

Larvae

Gray snapper
Lutjanus griseus

Pink Shrimp
Farfantepeanust duorarum

Bocourt Swimming Crab
Callinectes bocourtii

Hardclam
Meretrix mercenaria

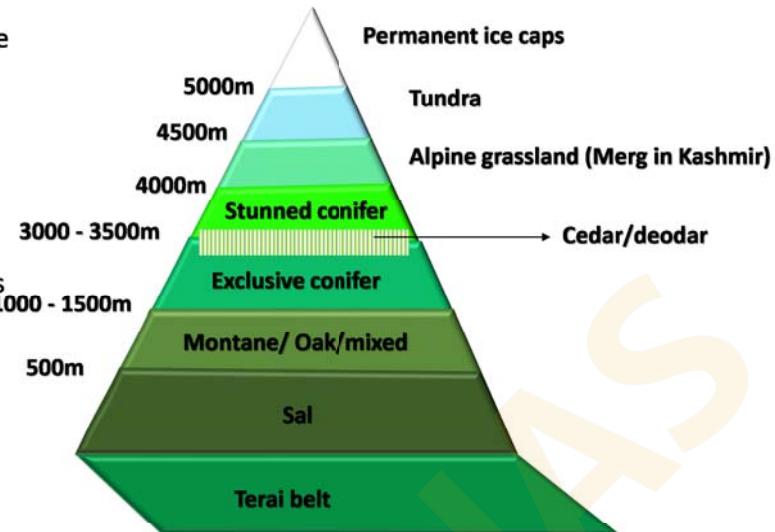
Great Egret
Ardea alba

Brown Pelican
Pelecanus occidentalis

NATIONAL GEOGRAPHIC

Montane forest

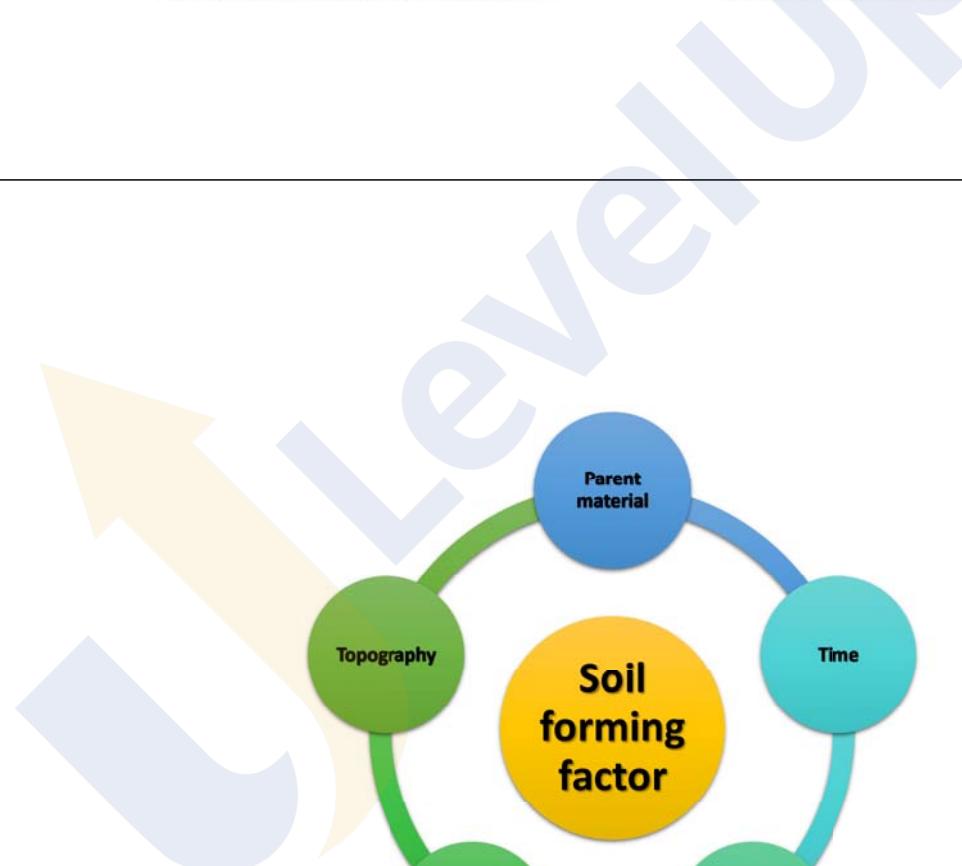
1. Decrease in temp with increasing altitude leads to change in natural vegetation from tropical to the tundra
2. Some name of species that can be memorised: oak, chestnut, pine forests such as Chir Pine, Deodar, Chinar , Walnut, Blue pine , Spruce, Silver firs, junipers, pines, birch and rhododendrons
3. Pastures are used extensively for transhumance by tribes like the Gujjars, the Bakarwals, the Bhotiyas and the Gaddis.
4. Southern slopes of the Himalayas carry a thicker vegetation cover because of relatively higher precipitation than the drier north-facing slopes
5. At higher altitudes, mosses and lichens form part of the tundra vegetation.



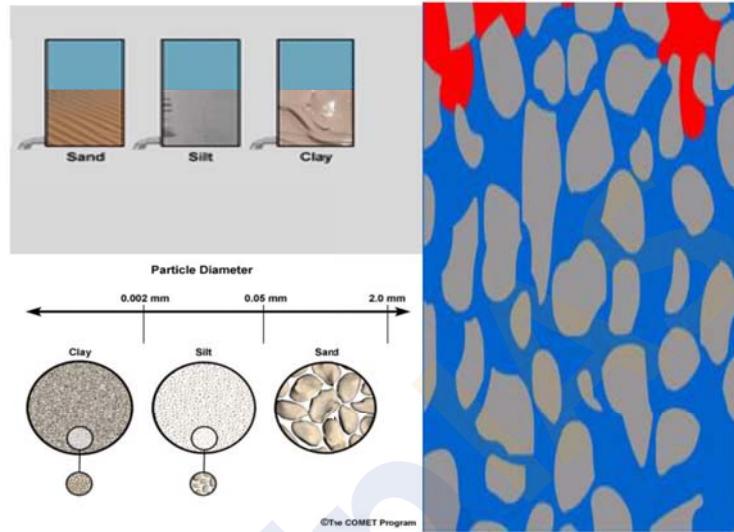
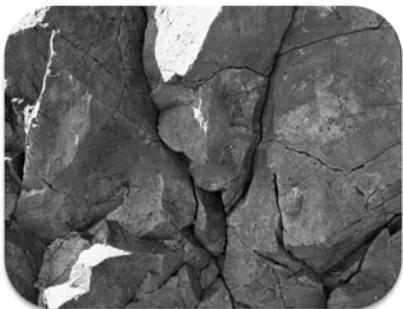
Soil

- **Weathered Parent Rock:** Weathering
- **Factors:** 5 major factors
- **Process:** Weathering, Leaching, Capillary Action.

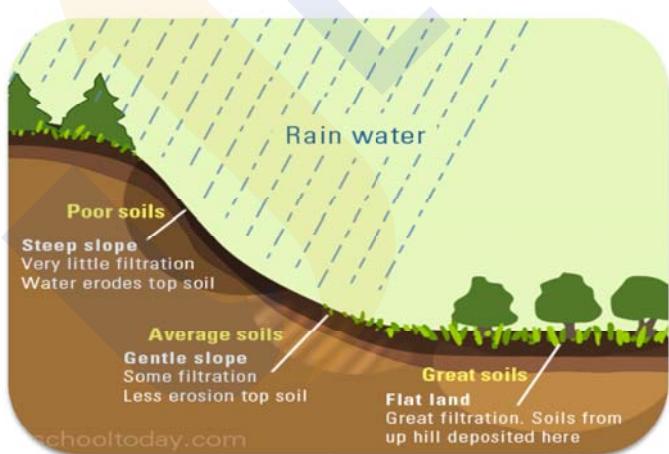
Soil as a Ecosystem

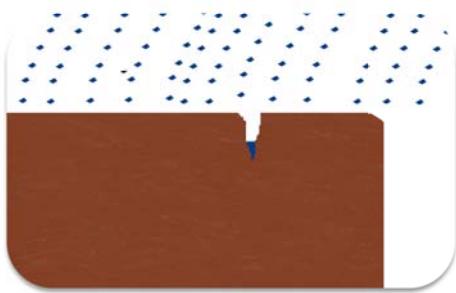


Parent material

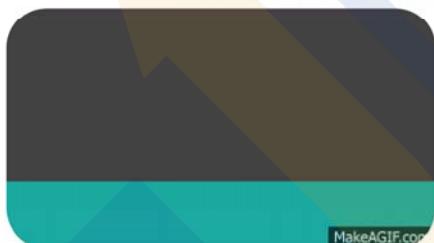


Topography



Climate

Freeze Thaw action

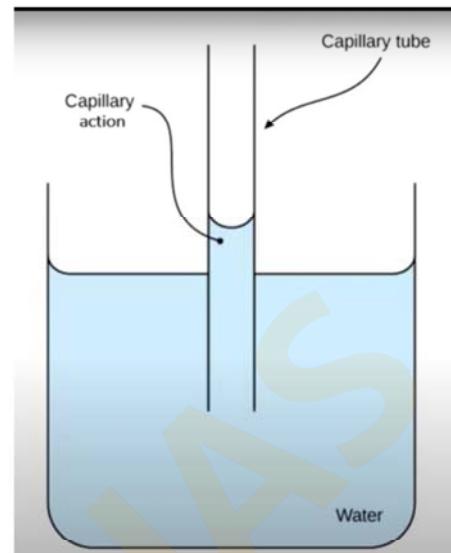
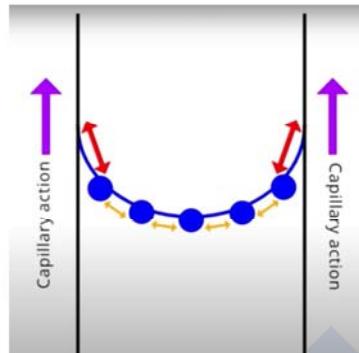
Climate<https://youtube.com/shorts/e9axSq3xzNw?feature=share><https://www.youtube.com/watch?v=b-9H1GWR4Qo>

Capillary action

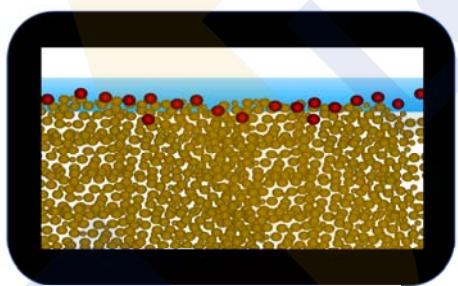
DESERT SOIL

Capillary Action

- It is the ability of a liquid to flow through narrow spaces of a solid material without the help of external force. The flow can be against the gravity to a certain extent
- Drawing up of liquid occurs a result of intermolecular attraction between the liquid and surrounding solid surface



Climate



**Laterite
Leaching**





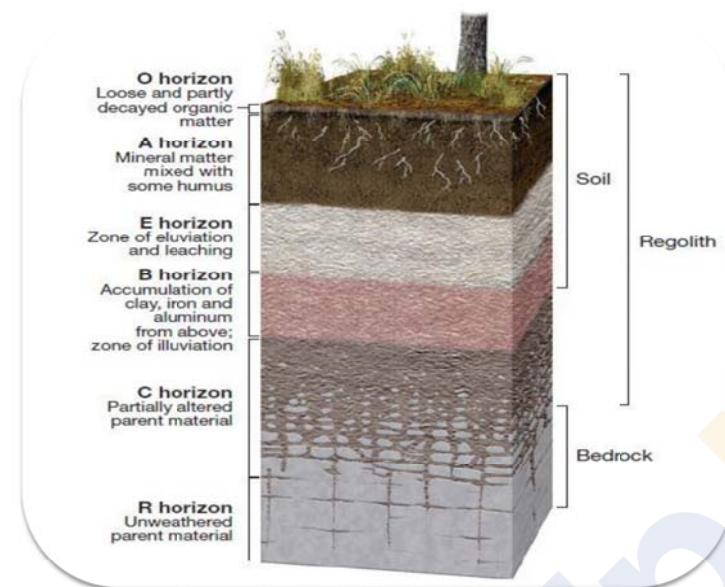
Biota



Time



Soil Profile



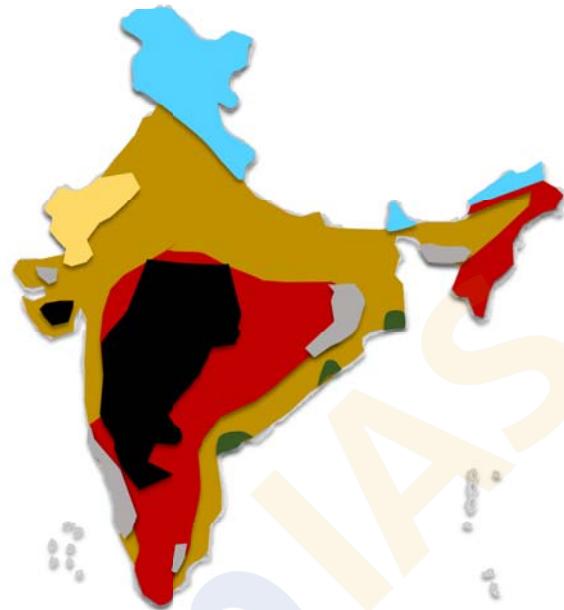
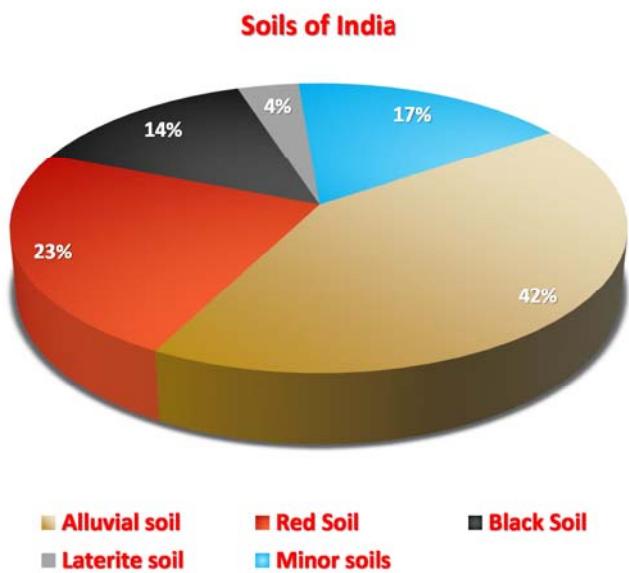
Indian Soils

Major Soils

Alluvial	Red
Black	Laterite

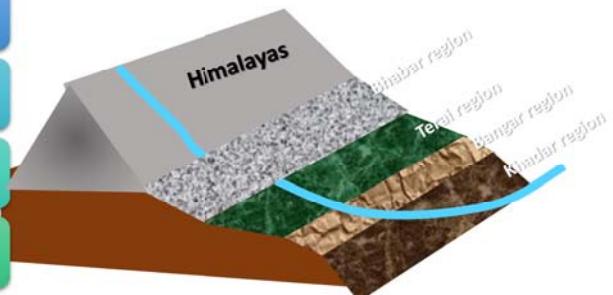
Minor soils

Desert	Mountain
Mangrove	Alkaline



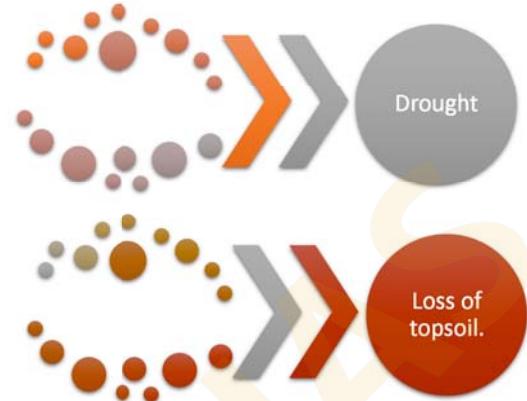
Alluvial Soil

- Transported soil
- Deposited by the river
- Rich in Potash
- Poor in Phosphorus
- Found in River basin, Valleys and deltas
- Supports all types of crops.
- Over cultivation, sand mining



Red Soil

- Most common in Peninsular region
- From weathering of Gneissic rock
- Poor in nitrogen, phosphorus and humus
- Dry soil with coarse texture (Fit for agriculture with fertilizers)
- Supports dry crops – Oilseeds, Pulses Millets, Tobacco, etc.
- Found in Telangana, Karnataka, Bundelkhand, T.N Plain/Plateau



Black Soil

- Soil of Deccan region
- From weathering of basalt rock
- Found in Maharashtra, Kathiawar, South MP, Telangana, Karnataka pt.
- Rich in Lime, Iron, Magnesia, Alumina



Laterite Soil

In Highland with Hot and humid climate

Through the process of laterization → leaching

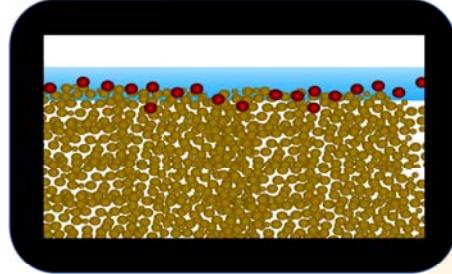
Red in colour

Fit for forestry and plantation crops.

Poor soil for agriculture.

Used mostly for brick making, Aluminum industries

Formation of IRON PAN



Minor Soil

Forest soil

Mountain Region

Parts of the Podsol

Best for forestry

Arid Soil

Rajasthan

Poor in humus

Kankar Formation: Problem

With irrigation these are fit for the agriculture

Peaty soil

Along the coast

Black and sticky

Water logged

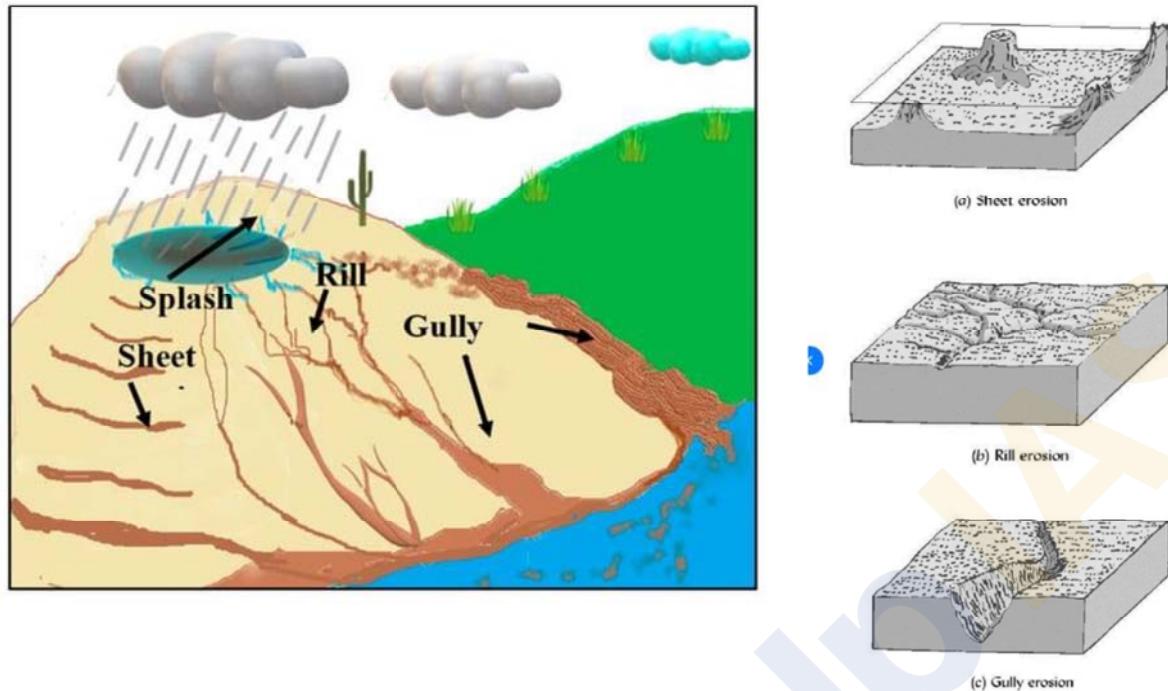
High peat content. Not for cultivation

Saline soil

Degraded soils (Over irrigation)

Found in poor drained and Dry region, also in water logged regions

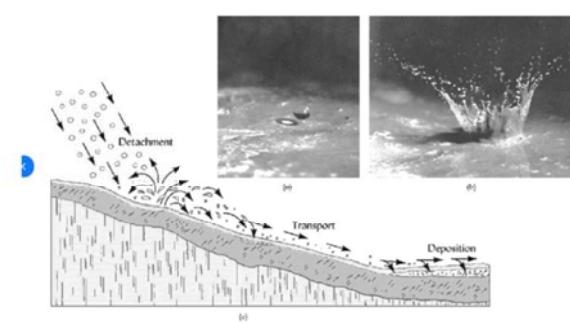
Sundarban, Gujarat



SOIL PROBLEMS

1. Soil Erosion:

- Removal of fertile top layer. It is associated with mining, wrong agricultural practices like fallow land (bare land without any crop cover), deforestation, over grazing.
- Fallowing of land exposes soil to hitting of raindrop leading to splash erosion. Continuous erosion by raindrop leads to erosion of entire surface in form of sheet known as sheet erosion.
- Surface water flows that cause sheet erosion rarely travel more than a few metres before turning into rills and causing Rill Erosion
- Rill eventually widen to become gully erosion



1 (a) Raindrop falling on the surface (b) Splash impact of raindrop (c) Process of water erosion (modified from Stittcher 2010) 12.2.1.3. Rill erosion (channel erosion)

SOIL PROBLEMS

2. Soil Degradation: It refers to decline in productivity and quality of soil. It can be due to:

- **Soil Pollution:** Excessive use of chemical fertilizers, pesticides etc
Waste Dumping, Mining, Disposal of industrial effluents
- **Wrong Agricultural Practices** like monoculture, unscientific rotation of crops, salinisation due to cultivation of water intensive crops in dry regions, Shifting Cultivation.
- Capillary action leads to accumulation of calcium carbonate beneath (kankar), the soil will act as impermeable to water and water gets logged as happened in Indira Gandhi canal regions of Rajasthan.

SOIL PROBLEMS

3. Soil Desertification: Extreme form of soil degradation where soil is no longer fit for cultivation

• **Reasons:**

- Spread of desert like conditions along the productive soil.
- Extreme form of Land degradation: Same points as degradation but with more intensity

Solutions

- **Soil organic matter** should be maintained as it provides fertility, better water retention and holds the soil together
- **Plant trees, shrubs** to provide wind protection and also binds soil to roots.
- **Mulching:** Covering on ground of hay, straw and crops residue which prevents soil from erosion and preserves moisture in soil. It also prevents growth of weeds
- **No-Till/Minimum Tillage Methods** to conserve the soil of moisture, reduce erosion and does not disturb the soil
- **Erosion-reducing grazing practises:** Rotational grazing is a method of moving livestock from one pasture paddock to the next. Each paddock is given a rest period and is allowed to regrow naturally, reducing soil compaction and erosion.
- **Terracing esp in hilly areas** to prevent ploughing against the slope.
- **Windbreaks (also known as shelterbelts)** are rows of trees and shrubs planted along the edges of agricultural fields to provide wind protection
- **Organic farming, Precision farming** to reduce the excessive use of fertilizers, pesticide
- **Growing climate suitable crops** to prevent soil degradation

2011

23. If a tropical rain forest is removed, it does not regenerate quickly as compared to a tropical deciduous forest. This is because
- (a) the soil of rain forest is deficient in nutrients
 - (b) propagules of the trees in a rain forest have poor viability
 - (c) the rain forest species are slow-growing
 - (d) exotic species invade the fertile soil of rain forest

2012

Which one of the following is the characteristic climate of the Tropical Savannah Region?

- (a) Rainfall throughout the year
- (b) Rainfall in winter only
- (c) An extremely short dry season
- (d) A definite dry and wet season

2012

Consider the following statements : If there were no phenomenon of capillarity

- 1. It would be difficult to use a kerosene lamp
- 2. One would not be able to use a straw to consume a soft drink
- 3. The blotting paper would fail to function
- 4. The big trees that we see around would not have grown on the Earth

Which of the statements given above are correct?

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

2012

Consider the following agricultural practices :

1. Contour bunding
2. Relay cropping
3. Zero tillage

In the context of global climate change, which of the above helps/help in carbon sequestration/storage in the soil?

- (a) 1 and 2 only
- (b) 3 only
- (c) 1, 2 and 3
- (d) None of them

2013

Which of the following is/are unique characteristic/characteristics of equatorial forests?

1. Presence of tall, closely set trees with crowns forming a continuous canopy
2. Coexistence of a large number of species
3. Presence of numerous varieties of epiphytes

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

2013

"Climate is extreme, rainfall is scanty and the people used to be nomadic herders." The above statement best describes which of the following regions?

- (a) African Savannah
- (b) Central Asian Steppe
- (c) North American Prairie
- (d) Siberian Tundra

2013

Which of the following statements regarding laterite soils of India are correct?

- 1. They are generally red in colour.
- 2. They are rich in nitrogen and potash.
- 3. They are well-developed in Rajasthan and UP.
- 4. Tapioca and cashew nuts grow well on these soils.

Select the correct answer using the codes given below.

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

2014

If you travel through the Himalayas, you are likely to see which of the following plants naturally grow there?

1. Oak
2. Rhododendron
3. Sandalwood

Select the correct answer using the code given below

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

2015

"Each day is more or less the same, the morning is clear and bright with a sea breeze; as the Sun climbs high in the sky, heat mounts up, dark clouds form, then rain comes with thunder and lightning. But rain is soon over.

"Which of the following regions is described in the above passage?

- (a) Savannah
- (b) Equatorial
- (c) Monsoon
- (d) Mediterraneana

2015

In a particular region in India, the local people train the roots of living trees into robust bridges across the streams. As the time passes, these bridges become stronger. These unique 'living root bridges' are found in

- (a) Meghalaya
- (b) Himachal Pradesh
- (c) Jharkhand
- (d) Tamil



2015

Consider the following States:

1. Arunachal Pradesh
2. Himachal Pradesh
3. Mizoram

In which of the above 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

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 rainforest
- (c) Tropical thorn scrub forest
- (d) Temperate forest with grasslands

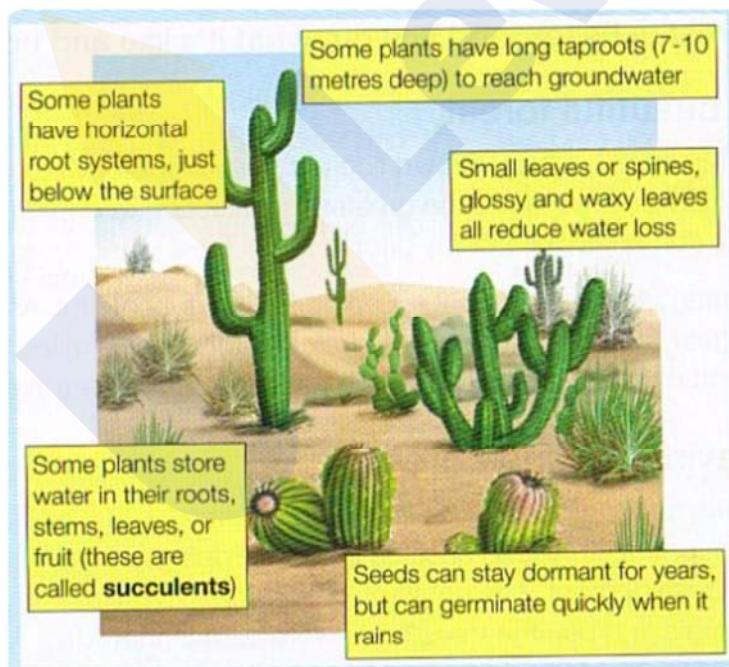
2018

Which of the following leaf modifications occur (s) in the desert areas to inhibit water loss?

1. Hard and waxy leaves
2. Tiny leaves
3. Thorns instead of leaves

Select the correct answer using the code given below:

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



2018

With reference to agricultural soils, consider the following statements :

1. High content of organic matter in soil drastically reduces its water holding capacity.
2. Soil does not play any role in the sulphur cycle.
3. Irrigation over a period of time can contribute to the salinization of some agricultural lands.

Which of the statements given above is/are correct?

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

2021

The vegetation of savannah consists of grassland with scattered small trees. The forest development in such areas is generally kept in check by one or more or a combination of some conditions. Which of the following are such conditions?

1. Burrowing animals and termites.
2. Fire
3. Grazing herbivores
4. Seasonal rainfall
5. Soil properties

Select the correct answer using the code given below.

- (a) 1 and 2
- (b) 4 and 5
- (c) 2, 3 and 4
- (d) 1, 3 and 5

2021

The black cotton soil of India has been formed due to the weathering of

- (a) Brown forest soil
- (b) Fissure volcanic rock
- (c) Granite and schist
- (d) Shale and limestone

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

2023

Consider the following statements:

Statement-I: The soil in tropical rain forests is rich in nutrients.

Statement-II: The high temperature and moisture of tropical rainforests cause dead organic matter in the soil to decompose quickly.

Which one of the following is correct in respect of the above statements?

- a) Both Statement-I and Statement-II are correct and Statement-II is Correct the explanation for Statement-I
- b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I
- c) Statement-I is correct but Statement-II is incorrect
- d) Statement-I is incorrect, Statement-II is correct

Questions

2020: The process of desertification does not have climatic boundaries. Justify with examples.

2020: Examine the status of forest resources of India and its resultant impact on climate change.

2019: Discuss the causes of the depletion of mangroves and explain their importance in maintaining coastal ecology.