



GEOGRAPHY OF INDIA

UNIT - I

❖ GEOGRAPHICAL SETTING

❖ PHYSICAL FEATURES - MAJOR PHYSIOGRAPHIC DIVISIONS

❖ DRAINAGE

❖ CLIMATE

❖ SOIL AND

❖ NATURAL VEGETATION.

GEOGRAPHICAL SETTING

- Indian subcontinent is a large peninsula. In the north, the Himalayan mountains separate India from the rest of Asia.
- India is surrounded by the Bay of Bengal in the east, Arabian Sea in the west, Indian Ocean in the south and the Lakshadweep Sea to the southwest.
- India is situated north of the equator between $8^{\circ}4'$ north to $37^{\circ}6'$ north latitude and $68^{\circ}7'$ east to $97^{\circ}25'$ east longitude.
- The seventh-largest country in the world with a geographical total area of 3.2 million sq.kms.
- India measures 3,214 kms (1,997 mls) from north to south and 2,933 kms (1,822 mls) from east to west.

- It has a land frontier of 15,200 kms (9,445 mls) and a coastline of 7,516.6 kms (4,671 mls).
- India has 7 union territories and 29 states.
- India borders shares with several countries, it shares land borders with Pakistan, Nepal, Afghanistan and China in the north or north-west, and with Bangladesh and Myanmar in the east.
- India also shares water borders with Sri Lanka, Maldives and Indonesia.

India Neighboring Countries

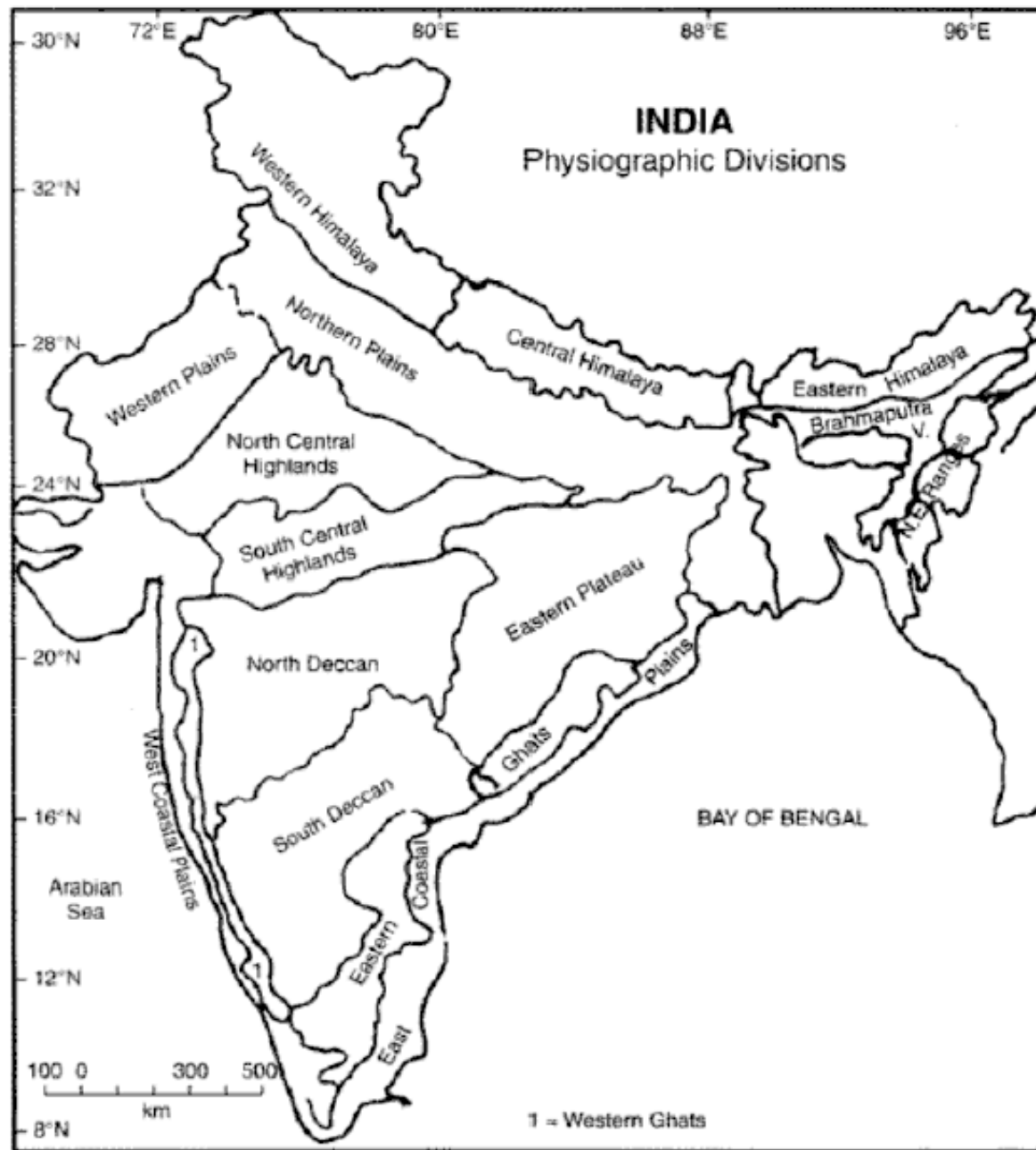


PHYSICAL FEATURES

- The Himalayas and the Northern Plains are the most recent landforms.
- From the view point of geology, Himalayan mountains form an unstable zone. The whole mountain system of Himalaya represents a very youthful topography
 - High Peaks,
 - Deep Valleys and
 - Fast flowing Rivers.
- The northern plains are formed of alluvial deposits.
- The peninsular plateau is composed of igneous and metamorphic rocks with gently rising hills and wide valleys.

MAJOR PHYSIOGRAPHIC DIVISIONS

- **The Himalayan Mountains**
- **The Northern Plains**
- **The Peninsular Plateau**
- **The Indian Desert**
- **The Coastal Plains and**
- **The Islands**



THE HIMALAYAS

- Himalayas northern borders of India. These mountain ranges run in a west-east direction from the Indus to the Brahmaputra.
- They form an arc, which covers a distance of about 2,400 Km.
- Their width varies from 400 Km in Kashmir to 150 Km in Arunachal Pradesh.
- The Himalaya consists of three parallel ranges in its longitudinal extent.

- The range lying to the south of the Himadri forms the most rugged mountain system and is known as Himachal or lesser Himalaya.
- The ranges are mainly composed of highly compressed and altered rocks.
- The outer most range of the Himalayas is called the Shiwaliks.
- The Brahmaputra marks the eastern most boundary of the Himalayas.

THE NORTHERN PLAINS

- The northern plain has been formed by the interplay of the three major river systems, namely the Indus, the Ganga and the Brahmaputra along with their tributaries.
- This plain is formed of alluvial soil. The deposition of alluvium in a vast basin lying at the foothills of the Himalaya over millions of years, formed this fertile plain.
- It spreads over an area of 7 lakh sq. km. The plain being about 2400 Km long and 240 to 320 Km broad, is a densely populated physiographic division.

THE PENINSULAR PLATEAU

- The Peninsular Plateau The Peninsular plateau is a tableland composed of the old crystalline, igneous and metamorphic rocks.
- It was formed due to the breaking and drifting of the Gondwana land and thus, making it a part of the oldest landmass.
- The part of the Peninsular plateau lying to the north of the Narmada river covering a major area of the Malwa plateau is known as the Central Highlands.
- The Vindhyan range is bounded by the Central Highlands on the south and the Aravalis on the northwest.
- The Western Ghats and the Eastern Ghats mark the western and the eastern edges of the Deccan Plateau respectively.

THE INDIAN DESERT

- The Indian desest lies towards the western margins of the Aravali Hills.
- This region receives very low rainfall below 150 mm per year.
- It has arid climate with low vegetation cover.
- Soon after they disappear into the sand as they do not have enough water to reach the sea.
- Luni is the only large river in this region.

THE COASTAL PLAINS

- The Peninsular plateau is flanked by stretch of narrow coastal strips, running along the Arabian Sea on the west and the Bay of Bengal on the east.
- The western coast, sandwiched between the Western Ghats and the Arabian Sea, is a narrow plain.
- The plains along the Bay of Bengal are wide and level.
- Large rivers such as the Mahanadi, the Godavari, the Krishna and the Kaveri have formed extensive delta on this coast.
- Lake Chilika is an important feature along the eastern coast.

THE ISLANDS

- Locate the Lakshadweep Islands group lying close to the Malabar coast of Kerala.
- This group of islands is composed of small coral islands.
- Earlier they were known as Laccadive, Minicoy and Amindive.
- The Lakshadweep covers a small area of 32 sq km.
- Kavaratti island is the administrative headquarters of Lakshadweep.
- This island group has great diversity of flora and fauna.
- The Pitti island, which is uninhabited, has a bird sanctuary.
 - ***The mountains are the major sources of water and forest wealth.***
 - ***The northern plains are the granaries of the country.***
 - ***They provide the base for early civilisations.***

DRAINAGE

- Indian drainage system consists of a large number of small and big rivers.
- It is the outcome of the evolutionary process of the three major physiographic units and the nature and characteristics of precipitation.
- The Himalayan drainage system includes the Ganga, the Indus and the Brahmaputra river basins.
- The peninsular plateau is drained by Narmada, Tapi, the Mahanadi, the Godavari, the Krishna and the Kaveri.

- The drainage pattern of an area is the result of the geological time period, nature, and structure of rocks, topography and slope, etc.
- *About 77% of the drainage area consisting of the Ganga, the Brahmaputra, the Mahanadi, the Krishna, etc. It is oriented towards the Bay of Bengal. On the other hand, 23% comprising the Indus, the Narmada, the Tapi, the Mahi, and the Periyar systems discharge their waters in the Arabian Sea.*
- A river drain is a specific area, which is known as the catchment area of that river.
- An area drained by a river and its tributaries is known as a drainage basin.
- The boundary line separating one drainage basin from the other is called as the watershed area.

India Major Rivers



DRAINAGE PATTERN

Following are the major drainage patterns are

- **Dendritic**
- **Radial**
- **Centripetal and**
- **Trellis**

CLASSIFICATION OF DRAINAGE

Indian drainage is classified as

- ❖ The Himalayan drainage and
- ❖ The Peninsular drainage.

THE HIMALAYAN DRAINAGE

Major Himalayan drainage systems are

The Indus,

The Ganga, and

The Brahmaputra rivers.

THE INDUS

- The total length of the Indus River system is 2,880 km (in India 1,114 km).
- The Indus, which is also known as the Sindhu, is the westernmost of the Himalayan Rivers in India.
- **The Indus originates from a glacier near Bokhar Chu in the Tibetan region at an altitude of 4,164 m in the Kailash Mountain range.**
- Major tributaries of Indus are the Shyok, the Gilgit, the Zaskar, the Hunza, the Nubra, the Shigar, the Gasting, and the Dras in the upper part.
- In the lower part, the Satluj, the Beas, the Ravi, the Chenab, and the Jhelum are the major tributaries of the Indus.
- ***Originating from the Beas Kund near the Rohtang Pass at an elevation of 4,000 m above the mean sea level, Beas is also an important tributaries of the Indus.***
- Beas enters into the Punjab plains and meets with the Satluj near Harike.

- *Also popular as Langchen Khambab (in Tibet), the Satluj originates from the Rakas lake near Mansarovar at an altitude of 4,555 m in Tibet.*
- The Satluj passes through the Shipki La on the Himalayan ranges and enters into the Punjab plains.
- The Satluj is the river that feeds the canal system of the Bhakra Nangal project.

The Ganga

- *The Ganga originates from the Gangotri glacier near Gaumukh (3,900 m) in the Uttarkashi district of Uttarakhand.*
- The major tributaries of the Alaknanda are the Dhaulī and the Vishnu Ganga; these two rivers meet at Joshimath/Vishnu Prayag.
- Some other tributaries of the *Alaknanda* are the *Pindar* (joins at Karna Prayag), the *Mandakini* or *Kali Ganga* (joins at Rudra Prayag).
- *The total length of the Ganga in India is 2,525 km, which is shared by Uttarakhand (110 km); Uttar Pradesh (1,450 km); Bihar (445 km); and West Bengal (520 km).*

- The Ganga river system is the largest river system in India.
- The *Son* is a major right bank tributary of the Ganga, however, major left bank tributaries are the *Ramganga*, the *Gomati*, the *Ghaghara*, the *Gandak*, the *Kosi*, and the *Mahananda*.
- The Yamuna joins the Ganga at Allahabad (Prayag), Uttar Pradesh. The *Chambal* rises near Mhow in the Malwa plateau of Madhya Pradesh.
- The *Gandak* joins the Ganga at *Sonpur* near Patna, Bihar.
- The *Ghaghara* originates from the *Mapchachungo* glaciers and joins the Ganga at Chhapra, Bihar.

- The *Barakar* is the main tributary of the *Damodar*.
- *The Sarda or Saryu River rises from the Milam glacier in the Nepal Himalayas where it is known as the Goriganga.*
- However, along the Indo-Nepal border, it is called as *Kali* or *Chauk*, where it joins the *Ghaghara*.
- Originating from the *Amarkantak* plateau, the *Son* is a large south bank tributary of the Ganga, it joins the Ganga at Arrah, Bihar.

THE BRAHMAPUTRA

- The *Brahmaputra* originates from the *Chemayungdung* glacier of the Kailash range near the *Mansarovar* Lake.
- In Tibet, the *Brahmaputra* is known as the *Tsangpo*.
- The *Rango Tsangpo* is the major right bank tributary of the Brahmaputra in Tibet.
- The Brahmaputra enters into India near the west of Sadiya town in Arunachal Pradesh.
- Major left bank tributaries of the Brahmaputra are Lohit, Dibang or Sikang, Burhi Dihing, and Dhansari.
- Major right bank tributaries of the Brahmaputra are the Subansiri, Kameng, Manas, and Sankosh.
- The Tista joins the Brahmaputra on its right bank in Bangladesh and from here, the river is known as the Yamuna.

THE PENINSULAR DRAINAGE

- The Peninsular drainage system is older than the Himalayan Rivers.
- The Mahanadi originates from Sihawa in Raipur district of Chhattisgarh and runs through Madhya Pradesh and Odisha and finally discharges its water into the Bay of Bengal.
- The total length of Mahanadi is 851 km. Popularly known as the Dakshin Ganga, the Godavari is the largest peninsular river system.

- With total 1,465 km length, Godavari covers the areas of Maharashtra, Madhya Pradesh, Chhattisgarh, Odisha, and Andhra Pradesh.
- The Penganga, the Indravati, the Pranhita, and the Manjra are the major tributaries of Godavari.
- The Koyna, the Tungabhadra, and the Bhima are the major tributaries of the Krishna.
- The total catchment area of the Krishna, 27% lies in Maharashtra, 44% in Karnataka, and 29% in Andhra Pradesh.

- The Kaveri originates from the Brahmagiri hills (1,341m) located in Kogadu district of Karnataka.
- The river Kaveri's total course of 770 km commands a basin area of 8.8 million hectare mha, of which, 3% lies in Kerala, 41% lies in Karnataka, and 56% lies in Tamil Nadu.
- *Major tributaries of the Kaveri are the Kabini, the Bhavani, and the Amravati.*
- The Narmada originates from the western flank of the Amarkantak plateau (1,057 m).
- *Dhuandhar Waterfall The total length of Narmada is 1,312 km.*

- About 79% of the Tapi basin lies in Maharashtra, 15% in Madhya Pradesh, and the remaining 6% in Gujarat. Luni is the longest river system of Rajasthan.
- Primarily, Luni originates in the Pushkar valley of the Aravalli range, Rajasthan in two branches, i.e. the Saraswati and the Sabarmati; which join each other at Govindgarh.
- Some small rivers flowing towards the West are the Shetruniji, the Bhadra, Dhadhar, Sabarmati, Mahi, Vaitarna, Kalinadi, Dediti, Sharavati, Mandovi, Juari, Bharathapuzha, Periyar, etc.
- Some small rivers flowing towards the East are Subarnarekha, Baitarni, Brahmani, Penner, and Palar.

CLIMATE

- Weather is the temporary state of the atmosphere, while climate refers to the average of the weather conditions over a longer period of time.
- Weather changes quickly, may be within a day or week, but climate changes in imperceptibility and may be noted **after 50, 100 years, or even more.**
- The climate of India has distinct regional variations discernible by the pattern of winds, temperature, and rainfall. Further, also in the form of rhythm of seasons and the degree of wetness or dryness.
- The during winters, the northern half of India is warmer by **3°C to 8°C than other areas located on same latitudes.**
- So Indian climate, to be precise, is tropical monsoon type **rather than just a tropical or half temperate climate.**
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FACTORS THAT AFFECT INDIAN CLIMATE

Major factors the climate of India are

- Latitudinal location,
- Distance from the Sea,
- Himalayas and Indian Climate,
- Physiography and Indian Climate,
- Monsoon Winds and Indian Climate,
- Upper Air Circulation,
- Tropical Cyclones and Western Disturbances and
- El-Nino, La Nina, ENSO and Indian Climate.

SEASONS IN INDIA

The subcontinent of India has great latitudinal dimensions. There are different seasons from kanyakumari to jammu and kashmir. The Meteorological Development of India, however, divides the seasons of India into the following four seasons

A . Season of North-East Monsoon

1. Winter season, mid-December to mid-march and
2. How weather season, mid-March to May.

B. Seasons of South-West Monsoon

3. Rainy season, June to September and
4. Seasons of retreating monsoon, October to mid-December.

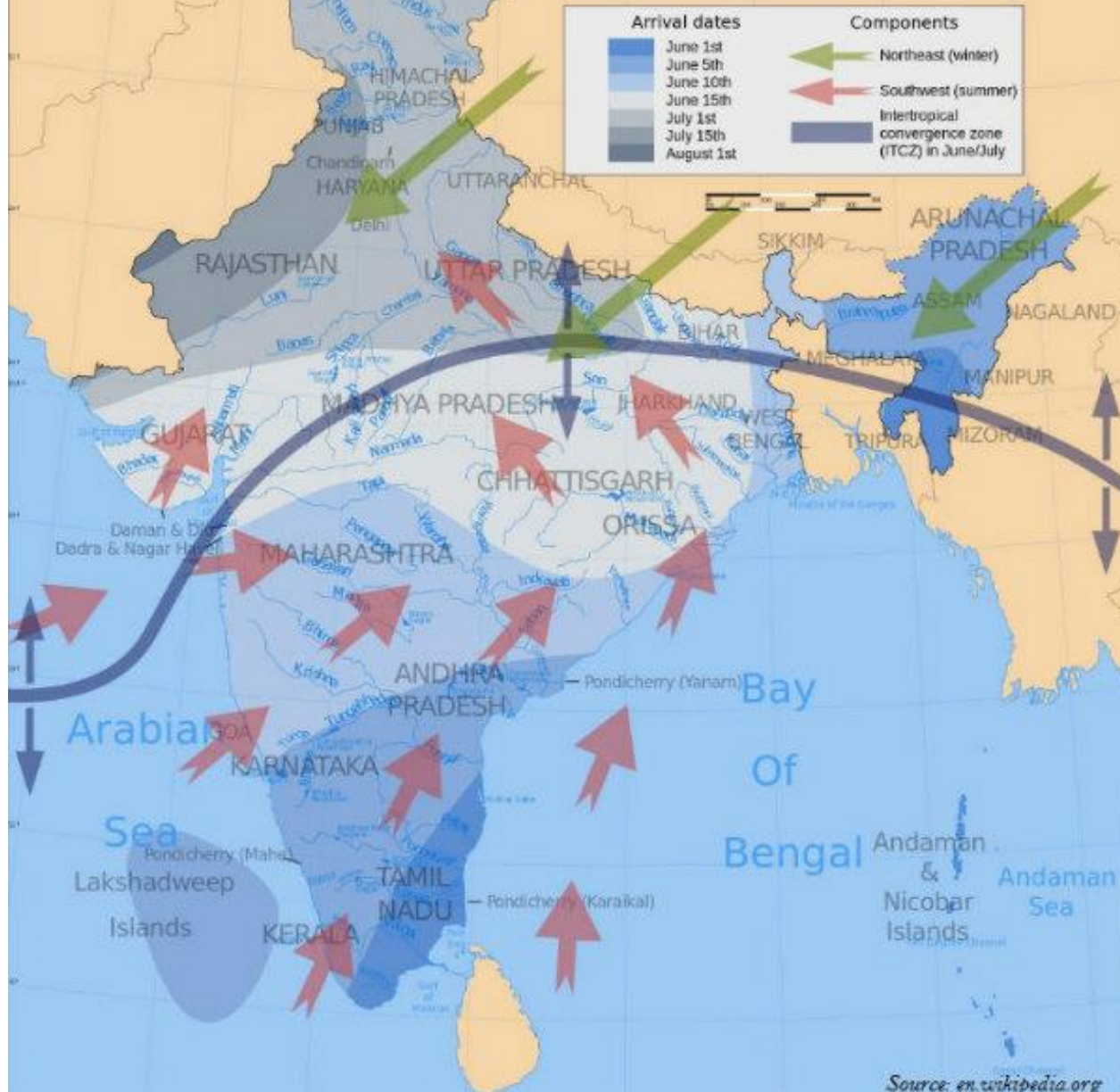
1. The Cold Weather Season

- The cold weather season in the greater parts of India begins in the later part of November in the north, and by the beginning of December in the rest of the country.
- The middle latitude westerlies reach down to the surface north of about 25°N , South of this latitude the general movements of air is from the north east.

2. The Hot Weather Season

- The north Indian region a well defined hot weather season from mid-March to mid-June.
- The lid of subsiding warming dry air prevents the surface thermal low from having sufficient effect as lifting agent to carry air aloft and so to being about precipitation.

India Monsoon Onset Map



3. The Season of General Rain

- By the end of June a low pressure area develops over Punjab and Rajasthan.
- The southern branch of the jet stream weakens and is finally withdrawn from the southern slopes of the Himalayas by mid-June, leading to the formation of a dynamic depression over the surface thermal low.
- In the northern plains of India, the temperature reaches its maximum in June to break the monsoon. In places, the day temperature touches 46°C and more.

4. Season of Retreating Monsoon

- The south-west monsoon begins to retreat from northern India by the third week of September with the southward migration of the sun.
- The temperature during the season of retreating monsoon is uniformly high about 25°C in the beginning of October in Northern India.
- The day temperature is generally high but nights become pleasant with the mean going down to 20°C or even lower.

SOIL

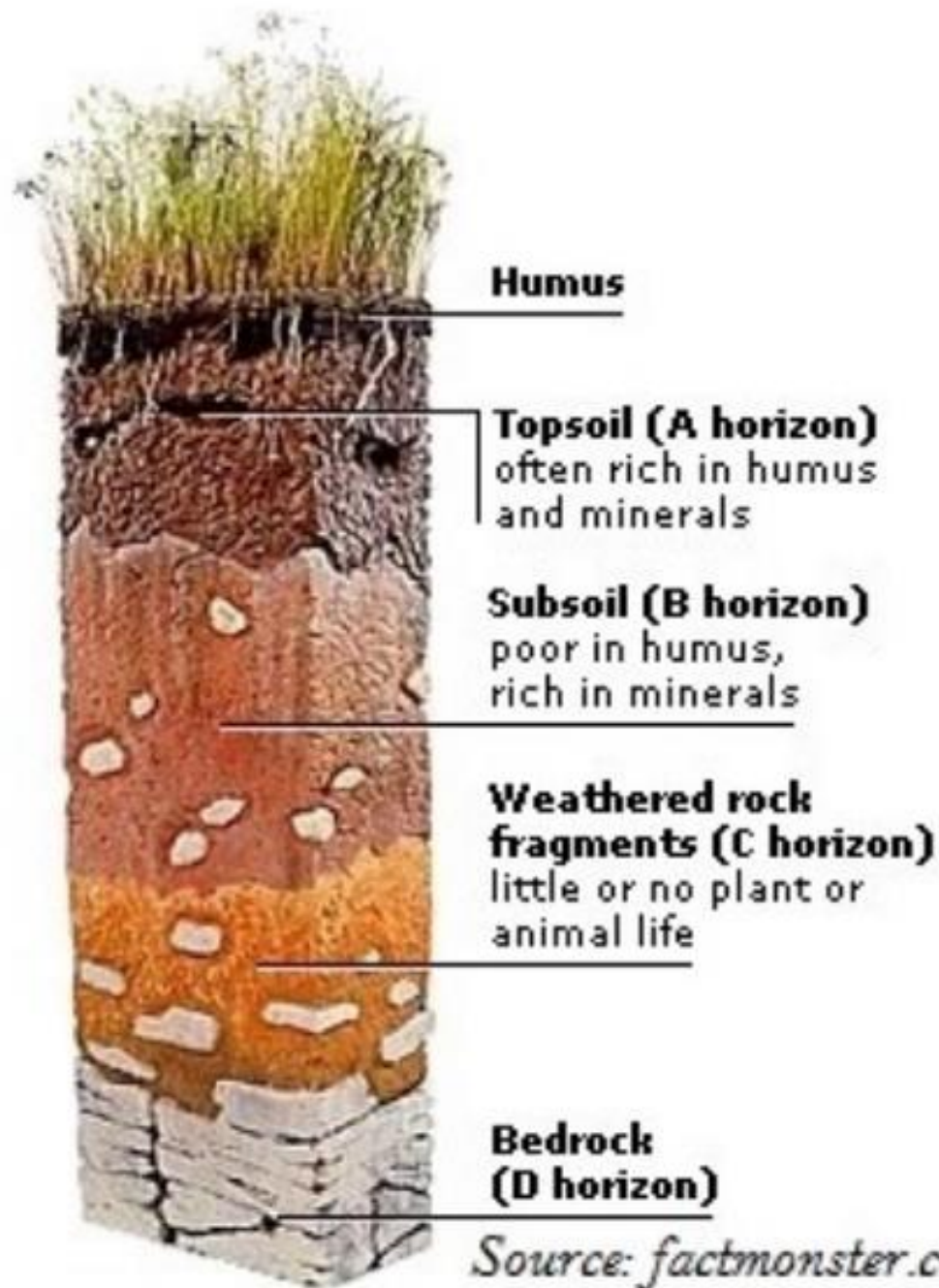
- Soil is very important and a valuable resource for every human being.
- Soil is the **mixture of rock** debris and organic materials, which develop on the earth's surface.
- The major factors that determine soils' characteristics are parent **material, climate, relief, vegetation, time, and some other life-forms.**
- Major constituents of the soil are **mineral particles, humus, water, and air.**
- A soil horizon is a layer generally parallel to the **soil crust**, whose physical characteristics differ from the layers above and beneath.

Soil Profile:

- Soil Horizon is classified into three categories – **Horizon A, Horizon B, and Horizon C**; collectively known as Soil Profile (i.e. the arrangement of soil layers).
- Horizon A' is the topmost zone, where organic materials stored with the **minerals, nutrients, and water, necessary for the growth of the plants.**
- 'Horizon B' is the transition zone between the **'horizon A' and 'horizon C'**, and hence, it contains matter derived from 'horizon A' as well as from 'horizon C'.
- 'Horizon C' is composed of loose parent material and hence, it is the layer of first stage of the soil formation process and eventually forms the above discussed two layers.

Classification of Soil

- Soils were classified on the basis of their inherent characteristics and external features including **texture, color, slope of land, and moisture content in the soil.**
- Soil Survey of India, **established in 1956**, made comprehensive study of soils.



Source: factmonster.com

Indian soil

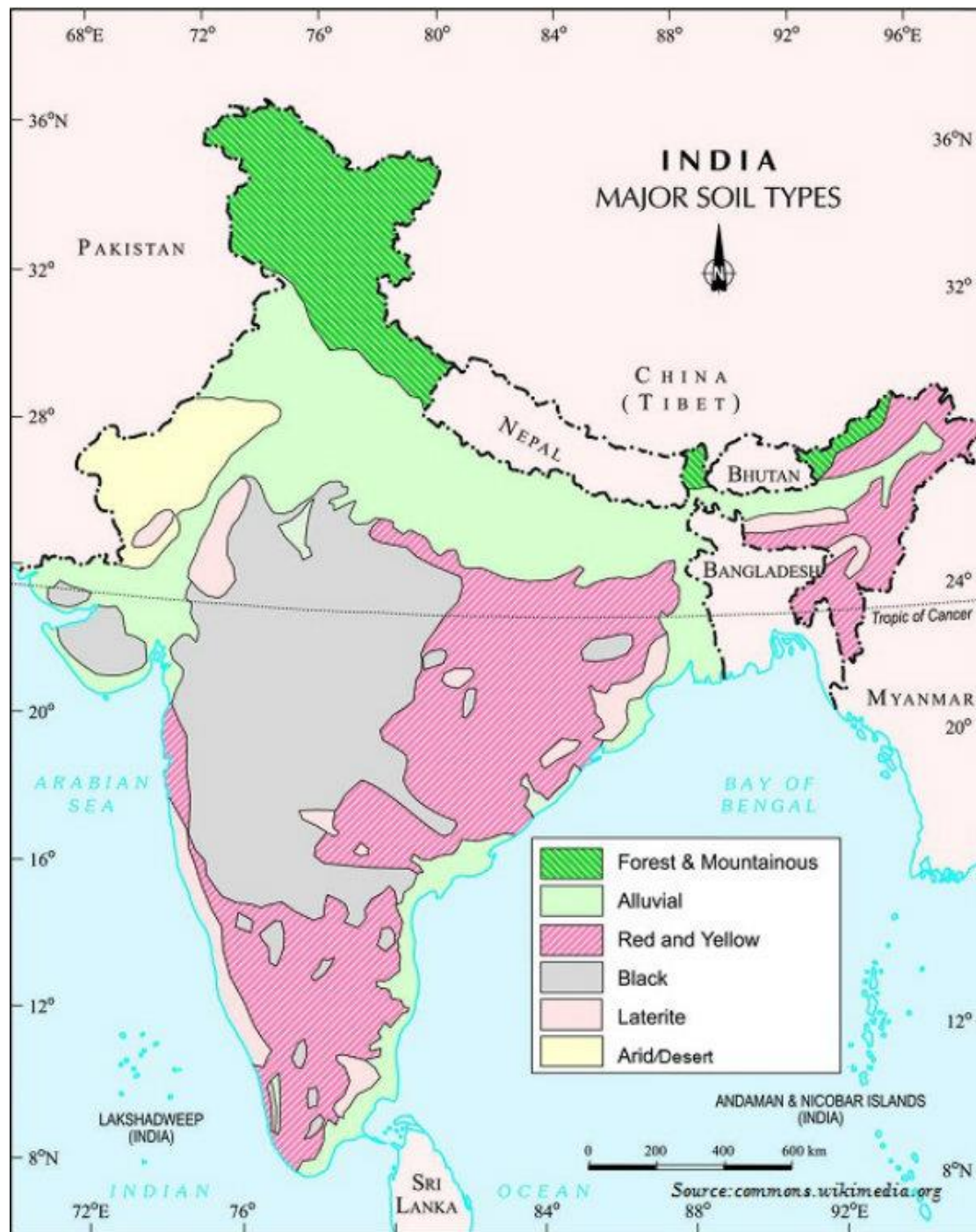
- On the basis of genesis, color, composition, and location, the soils of India have been classified as –
 - Alluvial soils,
 - Black soils,
 - Red and Yellow soils,
 - Laterite soils,
 - Arid soils,
 - Forest soils,
 - Saline soils and
 - Peaty soils.

Alluvial Soils:

- Alluvial soils are widespread in the northern plains and the river valleys and cover about **40% of total area of India**.
- Alluvial soils are depositional soils, as transported and deposited by the rivers streams.
- Alluvial soils are normally rich in potash, but poor in phosphorous.
- In the Upper and **Middle Ganga plain**, two different types of alluvial soils are found i.e. Khadar (it is the new alluvium and is deposited by floods annually) and Bhangar (it is a system of older alluvium, deposited away from the flood plains).
- The alluvial soils normally vary in nature from **sandy, loamy, to clayey** and its color varies from light grey to ash grey.

Black Soils:

- Also popular as Regur Soil or the Black Cotton Soil, Black soil covers most of the Deccan Plateau; for example, black soil is found in parts of **Maharashtra, Madhya Pradesh, Gujarat, Andhra Pradesh, and Tamil Nadu.**
- Black soil is usually **clayey, deep,** and impermeable; therefore, it can retain the moisture for a very long time (very useful for the crops especially cotton).
- Black soil is **rich in lime, iron, magnesia, alumina, and also potash.**
- The color of the **black soil** varies from **deep black to grey.**



Red & Yellow Soils:

- Red soil develops on crystalline igneous rocks in the areas of low rainfall, especially, in the **eastern and southern parts of the Deccan Plateau**.
- Red soil develops a reddish color because of a **wide diffusion of iron in crystalline and metamorphic rocks**. On the other hand, it develops yellow color when it occurs in a **hydrated form**.
- The fine-grained red and yellow soils are usually **fertile, whereas coarse-grained soils** found in dry upland areas have **poor fertility**.
- The **red and yellow soils** normally have poor content of **nitrogen, phosphorous and humus**.

Laterite Soils:

- The laterite soils develop in areas of **high temperature and high rainfall.**
- The laterite soils are commonly found in **Karnataka, Kerala, Tamil Nadu, Madhya Pradesh, and the hilly areas of Odisha and Assam.**
- Laterite soils are the result of intense leaching due to tropical rains; because of rain, lime and silica are leached away, and soils become rich in iron oxide and aluminum.
- Laterite soils however are poor in **organic matter, nitrogen, phosphate, and calcium, but rich in iron oxide and potash.**
- Laterite soils are normally infertile; however, it is widely used to make bricks (used in building construction).
- Normally sandy in structure and saline in **nature, arid soils vary from red to brown in color.**

Arid Soils:

- Lower horizons of the arid soils are occupied by 'kankar' layers because of the increasing calcium content downwards.
- Arid soils have poor content of humus and organic matter.
- Arid soils are typically developed in western Rajasthan.

Saline Soils:

- Saline soils contain a larger proportion of sodium, potassium, and magnesium, and thus, they are infertile, and do not support vegetation.
- Because of the dry climate and poor drainage system, saline soil contains more salt.
- Saline soils are normally found in arid and semi-arid regions, as well as in waterlogged and swampy areas.
- Deficient in nitrogen and calcium, saline soils are found in western Gujarat, deltas of the eastern coast, and in Sunderban areas of West Bengal.
-

Forests Soils:

- Forest soils are usually formed in the forest areas where sufficient rainfall is available.
- Like other organism, soils are living systems, as they too develop and decay, get degraded, and respond to proper treatment if administered in time.

Peaty Soils:

- In the areas of heavy rainfall and high humidity, large quantity of dead organic matter accumulates and enrich humus and organic content that forms the peaty soils.
- Peaty soils are normally heavy and black in color and widely found in the northern part of **Bihar, southern part of Uttaranchal, and the coastal areas of West Bengal, Odisha, and Tamil Nadu.**
- Decline in soil fertility because of any reason (either natural or human induced) is known as soil degradation (example shown in the image given below).

NATURAL VEGETATION

- Classification of Vegetation
- Based on climatic conditions, forests are divided into categories. They are –
 - Tropical Evergreen and Semi Evergreen forests
 - Tropical Deciduous forests,
 - Tropical Thorn forests,
 - Montane forests and
 - Littoral and Swamp forests

Tropical Evergreen Forests

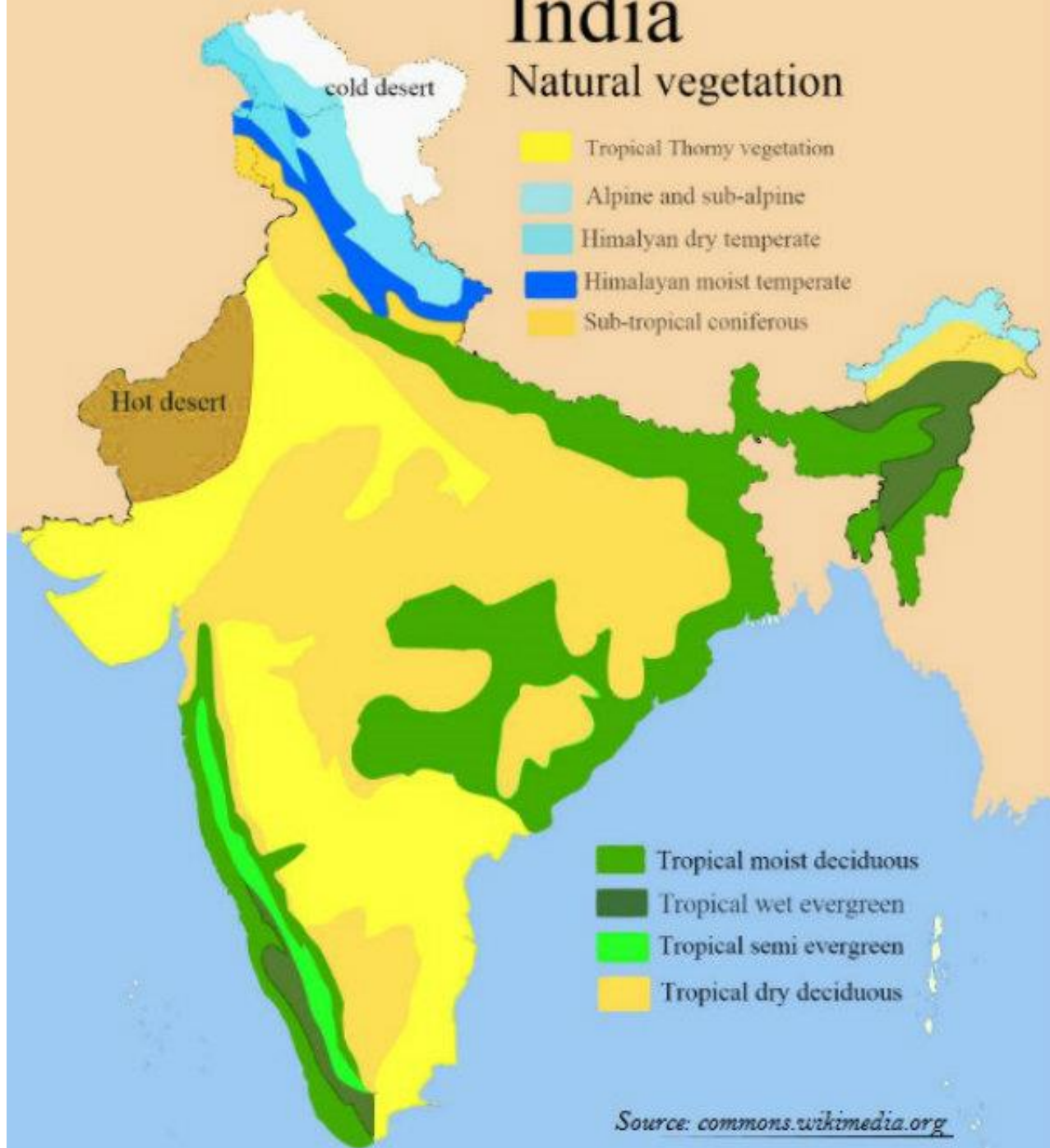
- Tropical evergreen forests are found in the regions that receive annual precipitation of over 200 cm.
- Tropical evergreen forests are found in the **western slope of the Western Ghats, hills of the northeastern region, and the Andaman and Nicobar Islands.**
- In tropical evergreen forests, trees reach great heights, i.e., up to 60 m or even above. and, largely these trees do not have fixed time to shed their leaves.
- Major examples of evergreen forests are rosewood, mahogany, aini, ebony, etc.

Semi-evergreen Forests

- Semi-evergreen forests are a mixture of evergreen and moist deciduous trees, found in the regions that receive less precipitation than the evergreen forests.
- Main species of semi-evergreen forests are white cedar, hillock, and kail.

India

Natural vegetation



Source: commons.wikimedia.org

Tropical Deciduous Forests:

- Tropical Deciduous Forests are the most widespread forests of India and are popularly as Monsoon Forests.
- Tropical deciduous forests are found in the regions, which receive rainfall between 70 and 200 cm.
- Tropical deciduous forests are further categorized as the Moist deciduous forests and Dry deciduous forest.
- The moist deciduous forests are found in the regions, which record rainfall between 100 and 200 cm.
- The moist deciduous forests are found along the foothills of the Himalayas, eastern slopes of the Western Ghats, and Odisha.
- **Teak, sal, shisham, hurra, mahua, amla, semul, kusum, and sandalwood etc.** are the main species of the moist deciduous forests.
- Dry deciduous forests are found in the regions that receive precipitation between 70 and 100 cm.
- As the dry season begins, the trees of deciduous forests shed their leaves completely.

Tropical Thorn Forests:

- Tropical thorn forests are found in the areas, which receive rainfall less than 50 cm.
- Tropical thorn forests are found in the areas of **South west Punjab, Haryana, Rajasthan, Gujarat, Madhya Pradesh, and Uttar Pradesh.**
- Babool, ber, and wild date palm, khair, neem, khejri, palas, etc. are the important species of tropical thorn forests.

Mountain Forests:

- Mountain forests in India are normally classified into two types, i.e. the northern mountain forests and the southern mountain forests.
- Deciduous forests are found in the foothills of the Himalayas.
- Temperate forests found between an altitude of 1,000 & 2,000 m.
- In the higher hill ranges of northeastern India; for example, hilly areas of West Bengal and Uttaranchal, evergreen broad leaf trees such as oak and chestnut are predominant.

- Chir, deodar, pine, etc. are the important species of temperate forests.
- Between 3,000 and 4,000 m, **Silver firs, junipers, pines, birch, and rhododendrons, etc.** are found.
- However, at higher altitude, the tundra vegetation is found and major species are mosses and lichens.
- At a higher altitude, the southern mountain forests largely belong to the temperate type, which are locally known as 'Sholas' in the **Nilgiris, Anaimalai, and Palani hills**. Some of the trees of economic significance include magnolia, laurel, cinchona and wattle.

Littoral and Swamp Forests:

- India is rich in Littoral and Swamp Forests.
- **Chilika Lake** (in Odisha) and **Keoladeo National Park** (in Bharatpur, Rajasthan) are protected as water-fowl habitats under the Convention of Wetlands of International Importance (i.e. Ramsar Convention).

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