PHYSICAL FEATURES OF INDIA

THEORY OF PLATE TECTONIC

Our Country has practically all major physical features of the earth i.e. mountains, plains, deserts, plateaus and islands. India is a large landmass formed during different geological periods which has influenced her relief. Besides geological formations, a number of processes such as weathering, erosion and deposition have created and modified the relief to its present form.

Earth scientists have attempted to explain the formation of physical featrues with the help of "Theory of Plate Tectonics". According to this theory, the crust (upper part) of the earth has been formed out of seven major and some minor plates.

The movement of the plates results in the building of stresses within the plates and the continental rocks above, leading to folding, faulting and volcanic activity, Broadly, these plate movements are classified into three types,

(i) While some plates come towards each other and form convergent boundary. In the event of two plates coming together they may either collide and crumble, or one may slide under the other.

(ii) Some plates move away from each other and form divergent boundary.

(iii) At times, they may also move horizontally past each other and form transform boundary.

The movement of these plates has changed the position and size of the continents over millions of years. Such movements have also influenced the evolution of the present landform features relief of India.



(a) Formation of Himalayas:

World: Plate Margins

The convectional currents split the crust into a number of pieces, thus leading to the drifting of the Indo-Australian after being separated from the Gondwana land, towards north. The northward drift resulted in the collision of the plate with much larger Eurasian Plate. Due to this collision, the sedimentary rocks which were accumulated in the geosynclines known as the Tethys were folded to form the mountain system of Western Asian and Himalaya.

(b) Formation of Northern plains:

The Himalayan uplift out of the Tethys Sea and subsidence of the northern flank of the peninsular plateau resulted in the formation of a large basin. In due course of time this depression, gradually got filled with deposition of sediments by the rivers flowing from the mountains in the north and the peninsular plateau in the south. A flat land of extensive alluvial deposits led to the formation of the northern plains of India.



(c) "The land of India displays great physical variation.":

- (i) Geologically, the Peninsular Plateau constitutes one of the ancient landmasses on the earth's surface. It was supposed to be one of the most stable land blocks. The peninsular plateau is composed of igneous and metamorphic rocks with gently rising hills and wide valleys.
- (ii) 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 with high preaks, deep valleys and fast flowing rivers.
- (iii) The northern plains are formed of alluvia deposits.

MAJOR PHYSIOGRAPHIC DIVISION

(a) The Himalayan Mountains:

The Himalayas, geologically young and structurally fold montains stretch over the northern borders of India. These mountain ranges run in a west-east direction from the Indus to the Brahmaputra. The Himalayas represent the loftiest and one of the most rugged mountain parriers of the world. 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 altitudinal variations are greater in the eastern half than those in the western half.

The Parallel ranges of Himalayas:

- (i) Himadri: The northern most range is known as the Great or Inner Himalayas or the 'Himadri'. It is the most continuous range consisting of the loftiest peaks with an average height of 6,000 meters. It contains all the prominent Himalayan peaks. The core of this part of Himalayas is composed of granite. It is perennially snow bound, and a number of glaciers descend from this range.
- (ii) Himachal: 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 altitude varies between 3700 and 4500 meters and the average with is 50 km. The prominent ranges over here are Pir Panjal, Dhaula Dhar and Mahabharat ranges. This range consists of the famous valley of Kashmir, the Kangra and Kullu Valley in Himachal Pradesh. This region is well known for its hill stations.
- (iii) Shiwaliks: Shiwaliks -The outer most range of the Himalayas is called the Shiwaliks. They extend over a width of 10-50 km and have an altitude varying between 900 and 1100 meters. These ranges are composed of unconsolidated sediments brought down by rivers from the main Himalayan ranges located farther north. These valleys are covered with thick gravel and alluvium.

The longitudinal valley lying between lesser Himalaya and the Shiwaliks are known as Duns. Dehra Dun, Kolli Dun and Patli Dun are some of the well-known Duns.

Purvancahl or the Eastern hills and mountains:

Beyond the Dihang gorge, the Himalayas bend sharply to the soutfl and spread along the eastern boundary of India. They are known as the Purvanchal or 'the Eastern hills and mountains. These hill!i running through the northeastern states are mostly composed of strong sandstones which are sedimentary rocks. Covered with dense forests, they mostly run as paraller ranges and valieys. The Purvanchal comprises the Patkai hills, the Naga hills, Manipur hills and the Mizo hills.



The Himalayas

Division of Himalayas on the basis of regions from west to east:

These divisions have been demarcated by river valleys.

(i) The part of Himalayas lying between Indus and Satluj has been traditionally known as Punjab Himalaya, also known regionally as Kashmir and Himachal Himalaya from west to east respectively.

(ii) The Kali and Tista rivers demarcate the Nepal Himalayas.

(iii) The part lying between Tista and dihang rivers is known as Assam Himalayas.



(b) The Northern Plains:

the northern plains has been formed by the interplay of the three major river systems, namely - the Indus, the Ganga and the Brahmaputra along with their tributariers. This plain is formed of alluvial soil. 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. With a rich soil cover combined with adequate water supply and favourable climate it is agriculturally a very productive part of India. the rivers coming from northern mountains are involved in depositional work. In the lower course, due to gentle slope, the velocity of the river decreases which results in the formation of riverine islands. the rivers in their lower course split into numerous channels due to the depositon of slit. these channels are known as distributaries.



The Northern Plains

Divisions of Northern Plains:

(i) **Punjab Plains:** The western part of the Northern plains, is formed by the Indus and her tributaries, the larger part of this plain lies in Pakistan. The Indus and its tributaries the Jhelum, the Chenab, the Ravi, the Beas and the Satluj originate in the Himalaya. this section of the plain is dominated by the doabs.

(ii) Ganga Plain: Extends between Ghaggar and Tista rivers. It is spread over the states of north India, Haryana, Delhi, U.P. Bihar, partly Jharkhand and West Bengal.

(iii) Brahmaputra Plain: Lies in the east of Ganga plain, particularly in Assma.

Divisions of Northern Plains on the basis of relief features:

(i)The rivers, after descending from the mountains deposit pebbles in a narrow belt of about 8 to 16 km in width lying parallel to the slopes of the Shiwaliks. It is known as Bhabar. All the streams disappear in this bhabar belt.

(ii) South a bhabar belt, the streams and rivers reemerge and create a wet, swampy and marshy region known as Terai. This was a thickly forested land full of wildlife. The forests have been cleared to create agricultural land and to settle migrants from Pakistan after partition.

(iii) The largest part of the northern plain is formed of older alluvium, they lie above the flood plains of the rivers and present a terrace like feature. This part is known as Bhangar. The soil in this region contains calcareous deposits locally known as kankar.

(iv) The newer, younger deposits of the flood plains are called Khadar. they are renewed almost every year and so a fertile, this, ideal for intensive agriculture.

	Bhangar	Khadar
1	Old alluviam	New alluviam
2	Is always above the level of the flood plains	Is finer, more sandy & free from kanker modules
3	Flood plains	more fertile
4	Found away from the river-bed	found near river channels in deltas & floud
5	clayey & dark	dandy & light in colour

(c) 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 plateau has broad and shallow valleys and rounded hills. One of the distinct features of the peninsular plateau is the black soil area known as Deccan Hap. This is of volcanic origin hence the rocks are igneous. Actually these rocks have denuded over time and are responsible for the formation of black soil. The Aravali Hills lie on the western and northwestern margins of the peninsular plateau. These are highly eroded hills and are found as broken hills. They extend from Gujarat to Delhi in a southwest-northwest direction.



A waterfall in Chotanagpur Plateau

The Central Highlands:

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 Vindhayan range is bounded by the Central Highlands on the south and the Aravalis on the northwest. The further westward extension gradually merges with the sandy and rocky desert of Rajasthan. The flow of the rivers draining this region, namely the Chambal, the Sind, the Betwa and Ken is from southwest to northeast, thus indicating the slope. The Central Highlands are wider in the west but narrower in the east. The eastward extensions of this plateau are locally known as the Bundelkhand and Baghelkhand. The Chotanagpur plateau marks the further eastward extension drained by the Damodar river.

The Deccan Plateau:

The Deccan Plateau is a triangular landmass that lies to the south of the river Narmada. The Satpura range flanks its broad base in the north.while the Mahadev, the Kaitnur hills and the Maikal range form its eastern extension. The Deccan Plateau is higher in the west and slopes gently eastwards. **The Northeastern Plateau:**

The Northeastern plateau is an extension of the Deccan Plateau in the northeast locally known as the Meghalaya and Kabi-Anglong Plateau. It is separated by a fault from the Chotanagpur Plateau. Three Prominent hill ranges from the west to east are the Garo, the Khasi and the Jaintia Hills.

(d) The Indian Desert:

To the northwest of the Aravali hills lies the Great Indian Desert It is a land of undulating topography dotted with longitudinal dunes and barchans. This region receives low rainfall below 150 mm per year; hence, it has arid climate with low vegetation cover it is because of those characteristic features that this is also known as Marusthali. Though the underlying rock structure of the desert is an extension of the peninsular plateau, yet due to extreme arid conditions, its surface features have been carved by physical weathering and wind actions. Some of the well renowned desert land features present here are mushroom rocks, shifting dunes and oasis mostly in its southern part. On the basis of the orientation, the desert can be divided into two parts: the northern part is sloping towards Sing and the southern towards the Rann of Kachchh. Most of the rivers in this region are non-perennial. the Luni River flowing in the southern part of the desert, the only large river in this region, is of some significance. Barchans (crescent shaped dunes) cover larger areas but longitudinal dunes become more prominent near the Indo-Pakistan boundary.

(e) The Coastal Plains:

India has a long coastline. On the basis of the location and active geomorphologic processes, it can be broadly divided into two: (i) the western coastal plains; (ii) the eastern coastal plains.

The western coastal plains are an example of submerged coastal plain. Kandla, Mazagoan, Jawahar Lal Nehru port at Navha Sheva, Marmagao, Mangalore, Coching etc. are some of the important natural ports located along the west coast. Extending from the Gujarat coast in the north to the Kerala coast in the south, the western coast may be divided into following divisions-the Kachchh and Kathiawar coast in Gujarat, Konkan coast in Maharashtra, Goa coast and Malabar coast in Karnataka and Kerala respectively. The western coastal plains are narrow in the middle and get broader towards north and south. The rivers flowing through this coastal plain do not form any delta. The Malabar coast has got certain distinguishing features in the form of 'Kayals' (backwaters), which are used for fishing, inland navigation and also due to its special attraction for tourists. Every year the famous Nehru Trophy Vallamkali (boat race) is held in Punnamada Kayal in Keral.

As compared to the western coastal plain, the eastern coastal plain is broader and is an example of an emergent coast. There are well-developed deltas here, formed by the rivers flowing eastward in to the Bay of Bengal. These include the deltas of the Mahanadi, the Godavari, the Krishna and the Kaveri. 8t1cause of its emergent nature it has less number of ports and harbours. The continental shelf extends up to 500 km into the sea, which makes it difficult for the development of good ports and harbours.

(f) The Islands:

There are two major island groups in India - are in the Bay of Bengal and the other in the Arabian Sea. the Bay of Bengal island groups consist of about 200 islands. These are situated rougly between 6° N, 14° N and 92° E = 94° E. The entire group of island is divided into two broad categories-the Andaman in the north and the Nicobar in the south. They are separated by a water body which is called the Ten degree channel. It is believed that these islands are an elevated portion of submarine mountains. However, some smaller islands are volcanic in origin. Barren island, the only active volcano in India is also situated in the Nicobar Islands.

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The islands of the Arabian Sea include Lakshadweep and Minicoy. These are scattered between 8°N - 12°N and 71°E - 74°E longitude. These islands are located at a distnace of 280km - 480 km off the Kerala coast. The entire island group is built of coral deposits. There are approximately 36 islands of which 11 are inhabited. Minicoy is the largest island with an area of 453 sq. km. the entire group of islands is broadly divided by the Eleneths degree channel, north of which is the Amini island. Kavaratti island is the adminsitrative headquarters of Lakshdweep.



An Island

Physical divisions of India - Each region complements each other

- (i) The northern mountains are the major sources of water and forest wealth.
- (ii) The northern plains are the granaries of the country. They provide the base for early civilisations.
- (iii) The plateau is a storehouse of minerals, which has played a crucial role in the industrialisation of the country.
- (iv) The coastal region and island groups provide sites for fishing and port activities.

SOME INTERESTING KNOWLEDGE

- (i) Mostvolcanoes and earthquakes in the world are located at plate margins, but some do occur within the plates.
- (ii) Gondwanaland is the southern part of the ancient super containent Pangea with Angara Land in the northern part.
- (iii) Majuli, in the Brahmaputra river is the largest rivering island in the world.
- (iv) 'Doab' is made up of two words 'do' meaning two and 'ab' meaning water. Similarly Punjab' is also made up of two words. 'Punj' meaning five and 'ab' meaning water.
- (v) the Chilka Lake is the largest salt water lake in India. It lies in the state of Orissa, to the south of the Mahanadi delta.
- (v) India's only active volcano is found on Barren Island in Andaman and Nicobar group of islands.