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PHYSICAL SETTINGS

India or Bharat, our nation, is an ancient country. It is surrounded on three sides by the sea, with a high mountain range separating it from the rest of Asia. As a result, the Indian subcontinent has emerged as a separate entity. India is the world's seventh-largest country by area. It is a vast country with a wide range of physical characteristics. As a result, it is essential to have some understanding of its basic physical settings. You may become familiar with its significant features such as the location of India in terms of neighbouring countries, major physiographic divisions and their salient features, the drainage system, and unity in diversity in India.



OUTCOMES

After studying this lesson, learner:

- locates India in terms of neighbouring countries;
- describes major physiographic divisions of India and their salient features;
- describes the drainage system and
- explains unity in diversity in India.

11.1 LOCATION OF INDIA AND ITS NEIGHBOURING COUNTRIES

A vast landmass of South Asia is flanked by new fold towering mountains on the northwest, north, and northeast. The Arabian Sea lies to its south west, the Bay of Bengal to its south east, and the Indian Ocean to its south. This well-defined South Asian landmass is called the Indian subcontinent. This sub-continent consists of the countries of India, Pakistan, Bangladesh, Nepal, and Bhutan, including Sri Lanka, an island narrowly separated by the Palk Strait. India alone covers about three-fourths of the area of this sub-continent and has a common frontier with each one of them. Our country and five neighbours form an identifiable geographical

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unit with certain common cultural parameters. Since old times, the country has been known by various names such as Jambudvipa, Aryavarta, Hindustan, and Bharat, and presently it is called India. The Indian Ocean, or Hind Mahasagar, has also been named after India - the only country is to be named. According to the Constitution of India, the country is known as Bharat or India.

India lies wholly in the northeastern hemisphere. The Indian mainland extends between $8^{\circ}4'N$ to $37^{\circ}6' N$ latitudes and from $68^{\circ}7' E$ to $97^{\circ}25' E$ longitudes. Thus, the latitudinal and longitudinal extent of India is about 29 degrees. It measures about 3,214 km from north to south and 2,933 km from east to west. The southern most point of mainland India is Kanyakumari in Tamilnadu. However, the country's southernmost point lies further south in Andaman and Nicobar Islands. It is now called Indira Point. It is situated at $6^{\circ}45'N$ latitude. The western most point of India is Ghuar Moti, which lies in the Kutch district, Gujarat, and the easternmost point is Kibithu, which lies in Arunachal Pradesh.

Let us see the impact of such a large latitudinal extent on the lives of the people of India. The northern parts of the country are quite far off from the equator. Therefore, the rays of the sun strike those parts more obliquely. Consequently, this part of the country receives less insolation and has a cold climate, unlike the southern regions. Secondly, the difference between the length of day and night in the southernmost part of India is much less, only about 45 minutes, as they are situated near the equator. This difference between day and night in the northern parts of India steadily goes on increasing till it becomes as much as 5 hours.

The Tropic of Cancer passes almost halfway through the country from eight states i.e. Gujarat, Rajasthan, Madhya Pradesh, Chattisgarh, Jharkhand, West Bengal, Tripura, and Mizoram. Thus half of the country to the south of the Tropic of Cancer is situated in the Tropical or Torrid zone, and the other half lying north of the Tropic of Cancer falls in the Sub-tropical zone.

The earth takes 24 hours to complete one rotation on its axis. The Sun rises first in the east and then in the west because the earth rotates from west to east. The earth's longitudinal expanse of 360° is thus covered in 24 hours at the pace of 15° per hour. As the longitudinal extent of India is nearly 29° , the real-time difference in India between its eastern and western extremities is roughly two hours. While at the eastern extremity of India, the day may have just broken out, the extremity of the west would take nearly another two full hours to do so.

To iron out this big chunk of the time difference, India, like all other countries of the world, follows the local time of its relatively central meridian as the standard time for the whole country. Each country chooses its standard meridian in a multiple of $7^{\circ}30'$ for convenience. Accordingly, the standard meridian of India has been selected to be $82^{\circ}30' E$.

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Fig. 11.1: India: Longitude and Latitude Extents

The north-central part of India is broad, while the southern part tapers down towards the Indian Ocean in the south. Thus, the northern part of the Indian Ocean has been divided into two by the sheer presence of the Indian Peninsula. The western part of the north Indian Ocean is called the Arabian Sea, while the eastern part is called the Bay of Bengal. The total length of the coastline of India, including the island groups, is about 7,516.6 km. The Palk Strait separates the Indian mainland from Sri Lanka.

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India accounts for 2.42 percent of the world's total land area, whereas it sustains about 17 percent of the world's population. The land frontiers of India measure 15,200 km. Pakistan, Afghanistan, China, Nepal, Bhutan, Myanmar, and Bangladesh share common boundaries with India. The kingdom of Bhutan is situated in the Eastern Himalayas. Most of our boundary with Pakistan and Bangladesh is almost manufactured. There is no mountain range or river to form a natural boundary. The international border of India passes through various landforms - barren desert lands, lush green agricultural fields, gushing rivers, snow-clad mountains, and densely forested mountain ranges.

**INTEXT QUESTIONS 11.1**

1. Fill in the blanks:
 - i. The Indian mainland extends between to north latitude.
 - ii. The southern most point of India is called
 - iii. $82^{\circ}30'$ E longitude is called meridian of India.
 - iv. The land frontiers of India measure kms.
2. Answer the following questions in one word or a sentence.
 - i. By which parallel of latitude is India divided into tropical and temperate belts?
 - ii. How much is the real time difference between its eastern and western extremities?
 - iii. Name the southernmost point of India republic.

11.2 PHYSIOGRAPHIC DIVISIONS OF INDIA AND THEIR SALIENT FEATURES

India is a land of physical diversities. Almost all types of dramatic and breathtaking landforms are found here. According to one estimate, 29.3 percent of the area of India is occupied by mountains and hills, 27.7 percent by plateaus, and 43 per cent by plains.

From a physiographic point of view, India can be divided into the following six regions:

- A. The Northern Mountains
- B. The Northern Plains
- C. The Peninsular Plateau
- D. The Indian Desert
- E. The Coastal Plains

F. The Islands

Let us know more about these physiographic divisions.

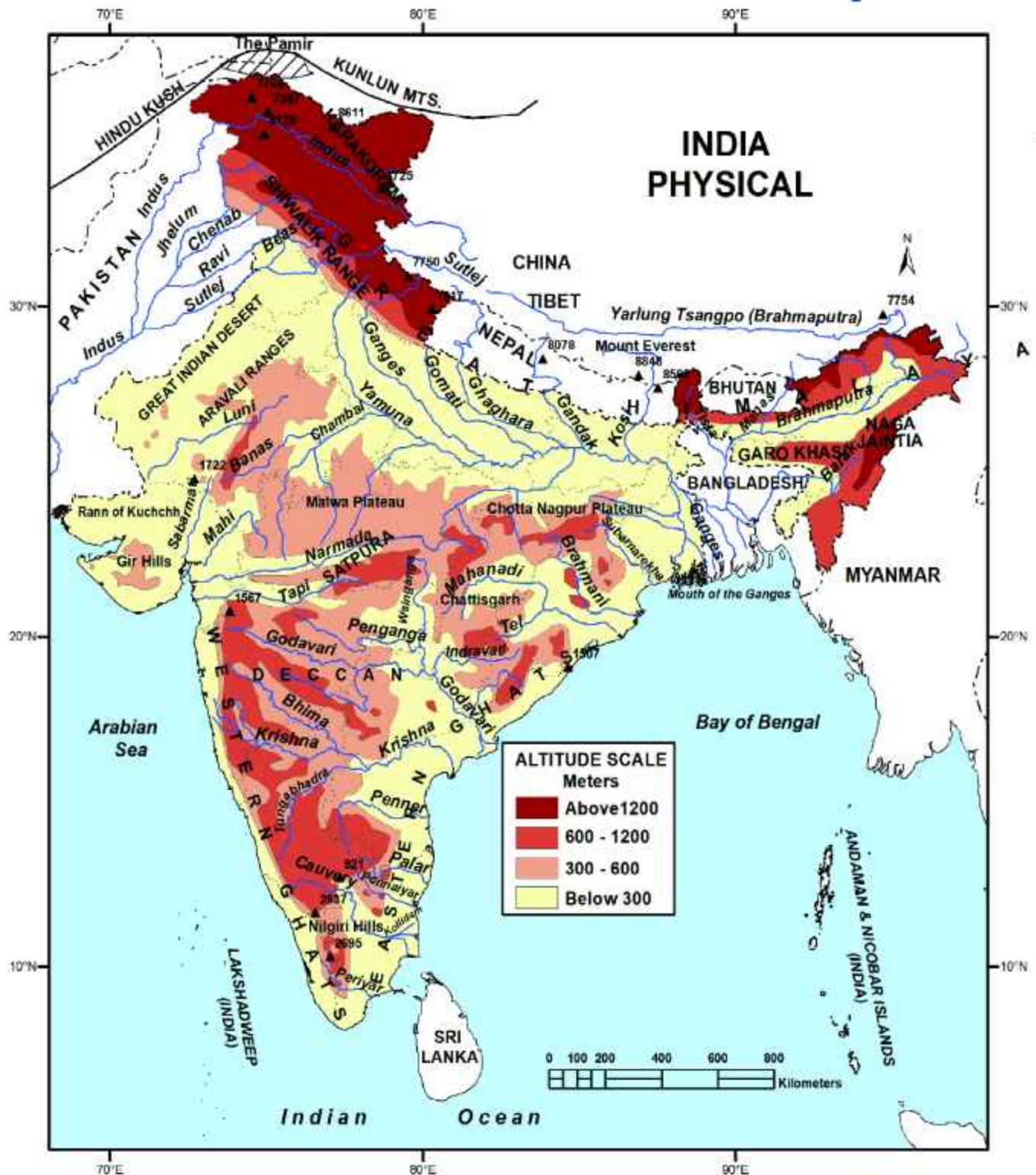


Fig. 11.2: Physiographic Divisions of India

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A. The Northern Mountains

They include the mountains and plateaus of northern Kashmir, the Himalayas and the hills of Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, and Meghalaya. They are divided into three groups. They are:

- a. The Himalayas
- b. The Trans-Himalayas
- c. Purvanchal or the hills of the north-east

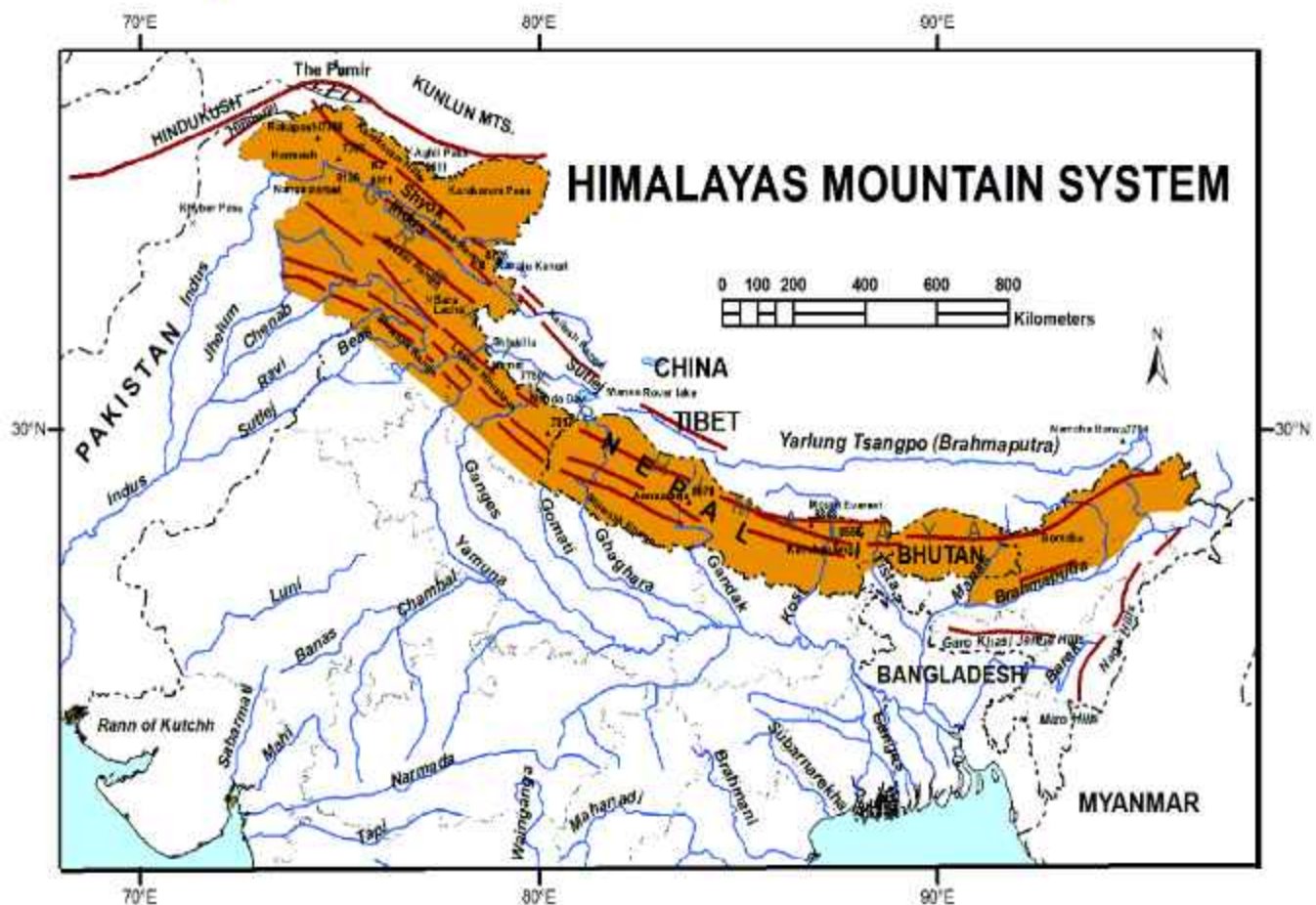


Fig. 11.3 Himalayas Mountain System

a. The Himalayas

It is the highest mountain range in the world. It extends in the shape of an arc for a distance of about 2500 km from west to east along the northern boundary of India. It is spread between the Indus gorge in Ladakh in the west and Brahmaputra gorge in Arunachal Pradesh in the east. The breadth of the Himalayas ranges between 400 km



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in the west to 150 km in the east. The area covered by this mountain system is about 5 lakh square km. It has three major ranges. Deep valleys and plateaus separate these ranges. The southern slopes of the Himalayas facing India are steeper, and those facing the Tibetan side are generally gentler. In the east, the Himalayas rise almost abruptly from the plains of West Bengal and Assam. That is why two of the highest peaks of the Himalayas, Mt. Everest (in Nepal) and Kanchenjunga are not very far from the plains.

On the other hand, the western part of the Himalayas rises rather gradually from the plains. Hence, the higher peaks in this part are farther from the plains, and several ranges lie between the plains and the high mountain. The high peaks of this part, such as Nanga Parbat, Nanda Devi, and Badrinath, are very far from the plains.

Three parallel ranges can be identified in the Himalayas. These are:

- i Himadri
 - ii Himachal and
 - iii Siwalik
- i. **Himadri (Greater Himalaya):** Himadri is the northern most and highest range of the Himalayas. It is the only Himalaya range that maintains its continuity from west to east. This range's core comprises granite rocks flanked by metamorphic and sedimentary rocks. The extent of this range is between the Nanga Parbat peak (8126 m.) in the west and the Namcha Barwa peak (7756 m.) in the east. The average height of this range from sea level is about 6100 metres. Over 100 peaks have a height of more than the average height of the range. The highest peak in the world, Mount Everest (8848 m), is situated in this range. Kanchenjunga, Makalu, Dhaulagiri, and Annapurna are some other peaks with a height of more than 8000 metres. Kanchenjunga is the highest peak of the Himalayas in India. The Himadri range is snow-clad throughout the year. There are many large and small glaciers. After the melting of snow and ice, their water falls in the rivers of northern India and make them perennial. Gangotri and Yamunotri are good examples of such glaciers. The Himadri range can be crossed through some passes like Zojila, Shipki La, Niti, Nathula, etc.
 - ii. **Himachal (Lesser or Middle Himalaya):** It is located southwards of Himadri. The breadth of the Himachal range is 60 to 80 km, and the height varies from 1000 metres to 4500 metres. Some of the peaks of this range have a height of more than 5000 metres. This range is highly dissected and uneven. Rocks in this zone have been metamorphosed due to violent thrusts and compression. Therefore, this range mainly consists of metamorphosed rocks. The gentle slopes of the eastern part of this range are covered with dense forests. The south-facing slopes of other parts of this range are steep and generally devoid of vegetation. The north-facing gentle slopes of this range

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are covered by dense vegetation. Pir Panjal in Jammu and Kashmir and Dhauladhar in Himachal Pradesh are the local names of this range. The beautiful valley of Kashmir extends between the Pir Panjal and Himadri ranges. The famous valleys of Kullu and Kangra are also a part of the Himachal ranges. Most hill towns or resort towns are located in the Himachal range. Shimla, Nainital, Mussouri, Almora, and Darjeeling are some famous hill towns. There are many beautiful lakes around Nainital.

- iii. **Siwalik (Outer Himalaya):** The southern most range of the Himalayas is known as Siwalik. The Himadri and Himachal ranges were formed much before the Siwalik range. The rivers rising in the Himadri and Himachal ranges brought gravel, sand, and mud, deposited in the rapidly shrinking Tethys Sea. With time, the earth's movements caused the folding of these relatively fresh deposits of sediments, giving rise to the least close Siwalik range. The average height of the Siwalik range is very low, about 600 metres only. There are some broad valleys between the Himachal and the Siwalik ranges. These valleys are known as 'duns.' Dehradun valley is one of the best examples.

b. **The Trans-Himalayan Ranges**

There are some mountain ranges north of Himadri in Jammu and Kashmir. The range extending to the north of the Himadri and running parallel to it is called the Zaskar range. North of the Zaskar range is the Ladakh range. The river Indus flows north west between Zaskar and Ladakh ranges. Many scholars treat Zaskar and Ladakh ranges as parts of the Great Himalayas and include them in Kashmir Himalayas. North of the Ladakh range lies the Karakoram. The name of the Karakoram in Sanskrit literature is Krishnagiri. K2 (8611m) is the highest peak of the Karakoram Mountains. It is the second-highest peak in the world, next only to Mt. Everest.

Ladakh plateau is situated in the UT of Ladakh. This plateau is very high and arid. It forms one of the remote areas of our country.

c. **Purvanchal**

Purvanchal is the name given to all the hills of north east India beyond Brahmaputra gorge. The average height of these hills from sea level is 500 to 3000 metres. These hills are located in Southern Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, and Meghalaya. Mishmi, Patkai Bum, Naga, Manipur, Mizo (Lushai), and Tirupur are the major hilly ranges of this region. Meghalaya Plateau is also part of these hills of the north eastern region. This plateau includes the hills of Garo, Khasi, and Jaintia. However structurally, it is a part of Peninsular India.



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**INTEXT QUESTIONS 11.2**

1. Name the three parallel ranges of Himalayas.
2. Name the highest mountain peak of the world.
3. Fill in the blanks:
 - i. The beautiful valley of Kashmir extends between and
 - ii. Famous hill stations such as Shimla, Nainital, Mussoori etc. are located in Range.
 - iii. The river Indus flows between and range.

B. The Northern Plains

This plain extends from west to east, between the Himalayas in the north and Great Indian Plateau in the south. The plain extends from the arid and semi-arid areas of Rajasthan in the west to the Brahmaputra valley in the east. The area of this plain is more than 7 lakh square km. This plain is very fertile, and a very sizable part of the Indian population lives in numerous villages and big cities.

The northern plain comprises the soils brought down and deposited by the rivers flowing from the Himalayas in the North and the Great Indian plateau in the South. The rivers have deposited sediments in this plain for millions of years. Therefore, the alluvium in this plain is quite a few hundred metres deep. In some parts, the sediments' depth is as much as 2000 to 3000 metres.

This plain is almost dead flat. Its average height is 200 metres above the mean sea level; due to a very gentle slope towards the sea, the rivers in this plain flow leisurely and, sometimes, sluggishly. The slope from Varanasi upto the mouth of Ganga is only 10 cm. per km. The land around Ambala is a bit more elevated. However, it acts as a water divide between the two major river basins - the Satluj in the west and the Ganga in the east. Rivers lying eastwards of this water divide flow into the Bay of Bengal, while that west of it flows into the Arabian Sea.

The relatively higher part of the plain is called Bangar. This area is never covered with flood water from the rivers. Contrary to this, the comparatively lower area is called the khaddar. This area is flooded by streams almost every year. Khadar area is known as bet in Punjab.

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There is a strip of plain about 10-15 km broad along the outer slopes of the Siwaliks in Punjab, Haryana, and Uttar Pradesh. This region is known as 'bhabar.' This strip of bhabar is made of gravel and coarse sand. The smaller streams disappear underground in the 'bhabar' region during summer, and their water surfaces again after crossing the bhabar. This water accumulates in the strip of plain about 15 to 30 km wide and extends to the south of bhabar. Accumulation of this water makes the land marshy. This marshy land is called the terai. Many parts of the terai have been reclaimed for agricultural purposes.

The great Northern Plain can be divided into four parts:

- (i) Western plain,
- (ii) North Central plain,
- (iii) Eastern plain, and
- (iv) Brahmaputra plain.

- i. **Western Plain:** This region includes the Rajasthan desert and Bangar region lying to the west of the Aravalli ranges. The desert is partly rocky and partly sandy. Some geographers believed that in the ancient period, the perennial streams - Saraswati and Drishadvati - flowed through this region. This region includes the fertile area of Bikaner. River Luni flows through this Bangar region and falls into the Rann of Kutch. The famous saltwater lake of Sambhar is situated in this part of the plain.
- ii. **North Central Plain:** This plain extends over Punjab, Haryana, and Uttar Pradesh. The part of this plain extending into Punjab and Haryana has been formed by the alluvium brought by rivers Satluj, Beas, and Ravi. It is a very fertile area. The part of this plain lying in Uttar Pradesh is made up of the deposits laid down by the rivers like Ganga, Yamuna, Ramganga, Gomati, Ghagra, and Gandak. This plain part is highly fertile and has been the cradle of Indian civilization and culture.
- iii. **Eastern Plain:** This part of the great plains covers the middle and the lower Ganga valley lying in the states of Bihar and West Bengal. Ganga flows through the middle of this plain in Bihar. Ghagra, Kosi, and Gandak join Ganga from the north, while Son joins from the south. On entering West Bengal, the plain widens further, extending from the foothills of the Himalayas upto the Bay of Bengal. The southern part of the plain is the delta region. Ganga is divided into several distributaries in the delta region. Hooghly is the best example of a distributary of Ganga. This part of the plain is indeed very fertile and rainier.



- iv. **Brahmaputra Plain:** The northeastern part of the Great Indian Plain extends into Assam. This plain was formed by the alluvium deposition brought down by river Brahmaputra and its tributaries. Brahmaputra is highly prone to devastating floods at regular intervals. After the floods, the river generally changes its course. This process has led to the formation of various islands in the river. Majuli (1250 square kilometres) in the Brahmaputra river is the world's largest river island. This part is also very fertile. It is surrounded by hills from three sides. Bangladesh is situated on this plain, and the delta is jointly formed by Ganga and Brahmaputra and their distributaries.

**INTEXT QUESTIONS 11.3**

- Distinguish between Khadar and Bangar.
- Name the four parts of the great Indian plain.
- Fill in the blanks:
 - Marshy land is called
 - Saltwater lake is situated in the western plain.
 - Hoogly is the best example of distributaries of
 - World's longest river islands situated in Brahmaputra river.

C. The Peninsular Plateau

The Peninsular plateau is a triangular-shaped landmass. It is part of an ancient land mass called the Gondwana land. It covers an area of nearly 5 lakh sq km. It is spread over the states of Gujarat, Maharashtra, Bihar, Karnataka, Telangana and Andhra Pradesh. River Narmada divides the peninsular plateau into two parts: The central highlands and Deccan Plateau

- a. **The Central Highlands:** It extends between the Narmada river and the northern plains. Aravallis is a mountain that rises from Gujrat through Rajasthan to Delhi. The highest peak of the Aravalli hills is Gurushikhar (1722m) near Mt. Abu. The Malwa Plateau and Chhota Nagpur plateau are parts of the central highlands. The pair of the central highlands which extends to the east of Malwa plateau is known as Bundelkhand and is further followed by Baghelkhand and ultimately to Chhota Nagpur plateau. Vindhyaachal ranges form the southern range of Malwa plates. River Betwa, Chambal, and Ken are the important rivers of the Malwa plateau, while Mahadeo, Kaimur, and Maikal are the important hills of the Chhota Nagpur plateau. The valley of Narmada lies between the Vindhyas and the Satpura, which flows east in a rift valley to west and joins the Arabian sea.

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- b. **The Deccan Plateau:** The Deccan plateau is separated by a fault (A fracture in the rock along which rocks have been relatively replaced) from the Chhota Nagpur plateau. The black soil area in the Deccan plateau is known as the Deccan trap. It is formed due to volcanic eruptions. This soil is suitable for cotton & sugarcane cultivation. The Deccan plateau is broadly divided into (i) The Western Ghats and (ii) The Eastern Ghats.

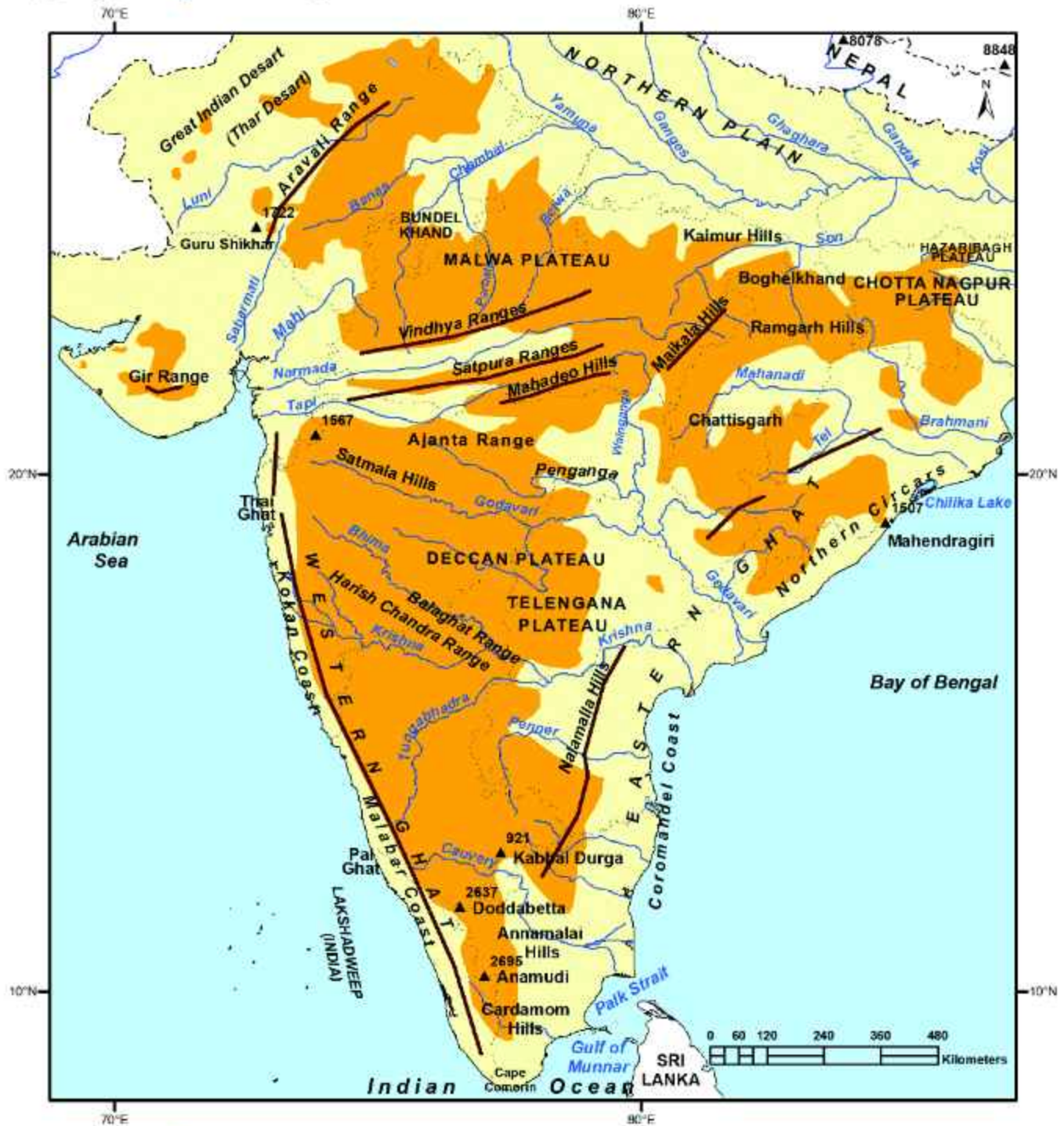


Fig. 11.4: The Peninsular Plateau



- (i) **The Western Ghats:** If we look at the map, we will see the Western Ghats or Sahyadris lie on the Western edge of the Deccan plateau. It runs parallel to the western coast for about 1600 km. The average elevation of the Western Ghats is 1000 metres. The famous peaks in this area are Doda Betta, Anamudi, and Makurti. The highest peak in this region is Anaimudi (2695m). Western ghats are continuous and can be crossed through passes like Pal Ghat, Thal Ghat, and Bhor Ghat. The rivers like the Godavari, Bhima, and Krishna flow eastward, while the river Tapti flows westward. The streams form many rapids and water falls in Western Ghats. The famous waterfalls are Jog Falls on Sharavathi, Shiva Samudram falls on Kaveri, etc.
- (ii) **The Eastern Ghats:** The Eastern Ghats are discontinuous low belts. Their average elevation is 600 m. They run parallel to the east coast from the south of Mahanadi valley to the Nilgiri hills. The highest peak in this region is Mahendragiri (1501 m). The famous hills are Mahendragiri hills, Niyamgiri hills in Orissa, Nallamala hills in Southern Andhra Pradesh, Kollimalai, and Pachaimalai in Tamilnadu. The Mahanadi, Godawari, Krishna, and Kaveri river systems drain the area and fall into the Bay of Bengal. The Nilgiri hills join the Western and Eastern Ghats in the south.

**INTEXT QUESTIONS 11.4**

- Select the correct alternatives:
 - Which river flows through a rift valley?
 - Chambal
 - Yamuna
 - Godavari
 - Narmada
 - Which is the highest peak of Aravallis?
 - Gurushikhar
 - Anamudi
 - Mahendragiri
 - Doda Betta
- Name any three important rivers of Malwa plateau.
- Which is the highest peak of Southern India?

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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 an arid climate with low vegetation cover. It is because of these characteristic features this is also known as Marusthali. It is believed that this region was under the sea during the Mesozoic era. It can be corroborated by the evidence available at the wood fossils park at Aakal and marine deposits around Brahmsar, near Jaisalmer (The approximate age of the wood fossils is estimated to be 180 million years). Though the underlying rock structure of the desert is an extension of the Peninsular plateau, due to extremely arid conditions, its surface features have been carved by physical weathering and wind actions. Some well-pronounced desert land features are mushroom rocks, shifting dunes, and an oasis (mostly in its southern part). Based on the orientation, the desert can be divided into two parts: the northern slopes towards Sindh and the south towards the Rann of Kutch.

Most of the rivers in this region are ephemeral. The Luni river flowing in the southern part of the desert is of some significance. Low precipitation and high evaporation make it a water-deficit area. Some streams disappear after flowing for some distance and present a typical case of inland drainage by joining a lake or playa. The lakes and the playas have salty water, the primary source of salt.

E. The Coastal Plains

The Great Plateau of India is surrounded by plains on all sides. In the north lies the Great Northern Plain, and in the south, along the east and west, lie the Coastal Plains.

- a. **The East Coastal Plain:** It extends along the coast of the Bay of Bengal from Ganga Delta in the north to Kanyakumari in the south. This plain is broader than the western coastal Plains. This plain includes the deltas of the rivers Mahanadi, Godavari, Krishna and Kaveri. Chilka, Pulicat, and Kollur lakes are the famous lagoons of this plain. These lakes have been formed by enclosing small parts of the Bay of Bengal behind sand bars. Lake Chilka is situated south of the delta of Mahanadi. The lake measures 75 km in length. Lake Pulicat is situated north of Chennai city. Koluru lake is situated between the deltas of the Godavari and Krishna rivers. The east coastal plain is fertile, where rice grows in abundance.
- b. **The West Coastal Plain:** It extends along the Arabian Sea from the Rann of Kutch in the north and to Kanyakumari in the south. Except for the Gujarat plain, the western coastal plains are narrower than the eastern coastal plain. From southern Gujarat upto Mumbai, this plain is comparatively broader, but it narrows southwards of Mumbai. Occasionally rocky domes and hills are visible in the plains of Gujarat,



the Rann of Kutch, and the plains of Kathiawar. The plains of Gujarat are made up of black soil. The coastal strip extending for about 500 km between Daman in the north and Goa in the south is called Konkan. This region is highly dissected, and the coastline is indented or irregular with several natural harbours. Several small and seasonal rivers flow through this region. The coast from Goa to Mangalore is called the Karnataka coast. The coast from Mangalore upto Kanyakumari is called the Malabar coast. Here the coastal plain is wider. There are a number of long and narrow lagoons. Eighty kilometres long, Vembanad is an example of its kind. Kochi port is situated on one of the lagoons.

F. Indian Islands

There are two small groups of islands. One of these, situated in the Bay of Bengal off the coast of Myanmar, is known as the Andaman and Nicobar Islands. The other is known as Lakshadweep and is situated in the Arabian Sea, off the coast of Kerala. The Andaman Islands consist of (i) North, (ii) Middle, (iii) South, and (iv) Little Andaman Islands. Port Blair is the capital city of the entire Union Territory and is located on South Andaman Island. The Ten Degree Channel separates this island group. To its south are situated the Nicobar Islands. They include Car Nicobar, Little Nicobar, and Great Nicobar Islands from north to south. The southernmost point of the Indian Union lies on Great Nicobar Island and has been named after Indira Gandhi. These islands represent a submerged chain of mountains. The Barren Island in the Andamans is India's only active volcano. These islands act as naval and air outposts of our country because of their strategic location. This island group faces seven countries - Bangladesh, Myanmar, Thailand, Malaysia, Singapore, Indonesia, and Sri Lanka.

Lakshadweep Islands are situated in the Arabian Sea, off the coast of Kerala. All these islands are of coral origin. They have been built up by corals, the microscopic polyps. All these islands are very small in size. The largest island among these, the Minicoy, only has an area of 4.5 square km. Kavaratti is the capital city of this island group.



INTEXT QUESTIONS 11.5

1. Fill in the blanks:
 - i. Koluru lake is situated between the deltas of the and rivers.
 - ii. The plains of Gujarat are made up of soil.
 - iii. The significant river of the Indian desert is



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2. Name any three famous lagoons of east coastal plain.
3. Which is the largest island of Lakshadweep Islands?

11.3 DRAINAGE SYSTEM OF INDIA

The drainage pattern or system of an area refers to the system of flow of surface water, mainly through the rivers and basin forms. The drainage system studies streams and the directions in which they carry the surface water of an area. The drainage system is related to a number of factors, for example, the slope of the land, geological structure, amount of water volume, and water velocity. Several small and large rivers carry India's surface runoff. The country's drainage system can be studied with reference to two parts: Northern India and Southern India.

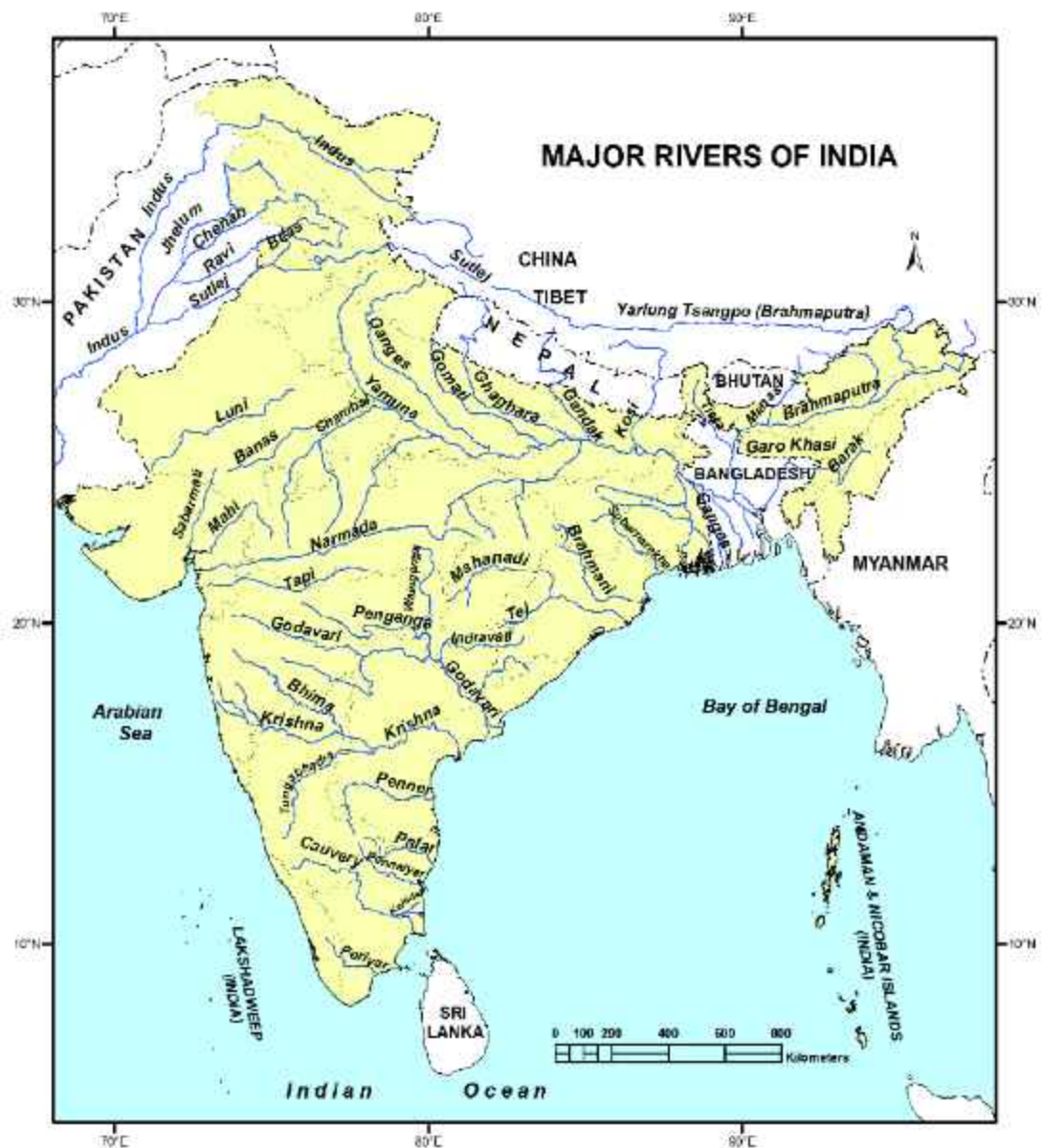


Fig. 11.5: Major Rivers of India

*Notes***A. Drainage System of North India**

The Himalayas play an essential role in the drainage system of North India. It is because the rivers of North India have their sources in these mountains and beyond. These rivers differ from South India's as they still rapidly deepen their valleys. The debris eroded by these rivers is carried to the plains and seas and deposited there. This deposition is caused by the reduced velocity of river waters in the plains and deltas for want of necessary slope.

The Great North Indian plain has been formed by the silt brought down by these rivers. Some of the Himalayan rivers are older than the Himalayas themselves. As the ranges of the Himalayas had been rising upwards, these rivers were equally busy in downward cutting, forming deep gorges and valleys. Consequently, parts of the valleys of these rivers are very deep, and gorges have been formed. The depth of the Indus gorge near Bunji (Ladakh) is 5200 metres. Sutlej and Brahmaputra have also formed such gorges.

The drainage system of Northern India can be further subdivided into three subsystems: Indus System, Ganga System, and Brahmaputra System.

The major rivers of the Indus basin are the Indus, Jhelum, Chenab, Ravi, Beas, and Sutlej. The Ganga basin includes Ramganga, Ghagra, Gomti, Gandak, Kosi, and Yamuna and its southern tributaries, Son and Damodar rivers. The major rivers of the Brahmaputra basin are Dibang and Lohit in Arunachal Pradesh and Assam, Tista in Sikkim, West Bengal and Bangladesh, and Meghna, draining the north-eastern part of Bangladesh.

B. Drainage System of Southern India

Peninsular India is an ancient landmass. Therefore, the streams flowing through this region are in their old stage. They have almost attained their base level of erosion. Their capacity to erode valleys vertically has nearly come to a negligible stage. Now, these streams are eroding their sides at a slow pace. This results in the broadening of their valleys.

Consequently, during floods, their waters spread over a large area. It is believed that the Peninsular block had a slight tilt towards the east due to the time of Himalayan orogeny due to the movements associated with the mountain-building processes. This is why, barring Narmada and Tapi, all the major rivers of south India flow towards the east. Narmada and Tapi both flow through fault or rift valleys. The major rivers of the drainage system of southern India are Mahanadi, Godavari, Krishna, Pennar, Kaveri, and Vaigai.

The slope of the northern part of the southern peninsula is towards the north. Consequently, some of the streams originating in the Vindhyas flow north and join Yamuna and Ganga. Chambal, Ken, Betwa, Sind, and Son are more important among these.

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The difference between the Himalayan rivers and Peninsular rivers:

The rivers which have their origin in the Himalayas are perennial. These rivers are fed by the melting of ice and snow lying near the tongue of glaciers of the Great Himalayan Range (Himadri).

In the rivers of South India, the flow of water is highly fluctuating. While the rivers are in spate during the monsoons, they are almost dry during the long rainless months. Some of these rivers, in many places, become dry.

11.4 UNITY IN DIVERSITY IN INDIA

India possesses a wide variety of landforms and relief features. Its young fold mountains of the north have very bold and sharp features. They include long and tall mountain ranges, towering mountain peaks, high mountain passes, and precipitous river valleys. If in one direction lie very steep slopes, in the other, there are gentle slopes. If some parts are without thick forests, the others are clad with varied natural vegetation - from tropical rainforests to Alpine grasslands. They rightly boast of large snowfields, glaciers, picturesque waterfalls along the hanging valleys, and glacial lakes like the Dal in Srinagar. The youthful Himalayan rivers prefer to jump, leap and hop, forming waterfalls, rapids, and cascades on their way. Equally awe-inspiring are its deep gorges establishing a balance between steadily rising mountain ranges on the one hand and the silent down-cutting action of weighty trans-Himalayan rivers like the Indus, Sutlej, and Brahmaputra on the other. Not even a handful of countries can boast of such a majestic and maddening beauty of youthful fold mountains. These world's highest and largest mountain chains have enabled the Indian subcontinent to develop its unique culture by acting as a physical barrier between the subcontinent and the rest of Asia. Perhaps even more compelling is its role as a climatic divide. This physiographic division acts as a storehouse of snow and water, giving rise to hundreds of perennial rivers to drain and irrigate one of the world's largest and most fertile plains. In fact, the plains themselves are a gift of these mountains and rivers flowing from them. It is also a storehouse of hydel power, fuel wood, timber, various forest products, and medicinal herbs, not excluding some strange wildlife species. No wonder this region can attract tourists from far and near, both in summer and winter.

The Northern Plains are matchless in the expanse. These flat or dead-level plains are mostly well-drained and fairly well-irrigated through surface and groundwater. The meandering rivers, oxbow lakes, braided river channels, and a maze of distributaries help to break the monotony of these extremely level plains. Once a forest land, it has been brought almost entirely under the plough. The lower parts of the deltas are ribboned with mangrove or tidal forests. These well-watered plains, supported by highly fertile soils, produce varied crops yearly, sustaining a large chunk of the world's population. They have also been keeping an equally large bovine population. They are one of the world's largest food baskets producing cereals, pulses, oil



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seeds, vegetables, and fruits, besides industrial or cash crops like cotton, jute, sugarcane, and the like.

In sharp contrast with the Northern Mountains and Plains stand the hills of moderate altitude and a highly denuded rocky landscape, representing one of the oldest landmasses of the world - the peninsular block of India. Its rounded hills and flat-topped ridges have a beauty of their own. The varied metamorphic and old granite rocks have given rise to hills, plateaus, and foliated rocks. Furthermore, the basalt or Deccan Trap of Western India has its typical flat-topped hills and that of hairlike structures. Its steep wall-like escarpments run miles without interruption overlooking the Arabian Sea. Their beauty needs to be seen and to be believed. This physiographic division is known for millets and various industrial crops such as cotton, sugarcane, coffee, and groundnut. More importantly, it is a storehouse of minerals - mainly the ferrous ones and mineral fuels like coal and atomic or radio-active minerals. They also have sizable hydel power resources. They, thus, provide a sound base to develop both agro-based and mineral-based industries.

The coastal strips are ribboned with a partly regular and indented coastline. The latter has provided spacious natural harbours like Mumbai and Marmagao. The coastal strips and island groups have ideal conditions to tap deep and shallow water fisheries. The coastal plains in the east have very fertile deltas providing rice bowls. If it is a coast of emergence on the eastern coast, then the major part of the western coast is that of submergence. The plains are rocky and highly eroded. Rice, coconuts, rubber, tobacco, and spices are some of the agricultural produce. Off-shore oil and natural gas fields have also been located. If the Lakshadweep are of coral origin, the Andaman and Nicobar Islands are the peaks of the emerging mountain chain. These islands are of great strategic significance to the defence of the mainland. They face seven countries across the seas washing their shores - Bangladesh, Myanmar, Thailand, Malaysia, Singapore, Indonesia, and Sri Lanka. The islands are known for fishing, forestry, and tourism.

In this way, the enormous variety of macro- and micro-relief features and landforms has enriched our culture, improved agricultural potential to grow almost every crop, laid strong foundations for the modern industry, making all of its physiographic divisions interdependent on one another, and contributed to the unity in diversity in our Bharat.

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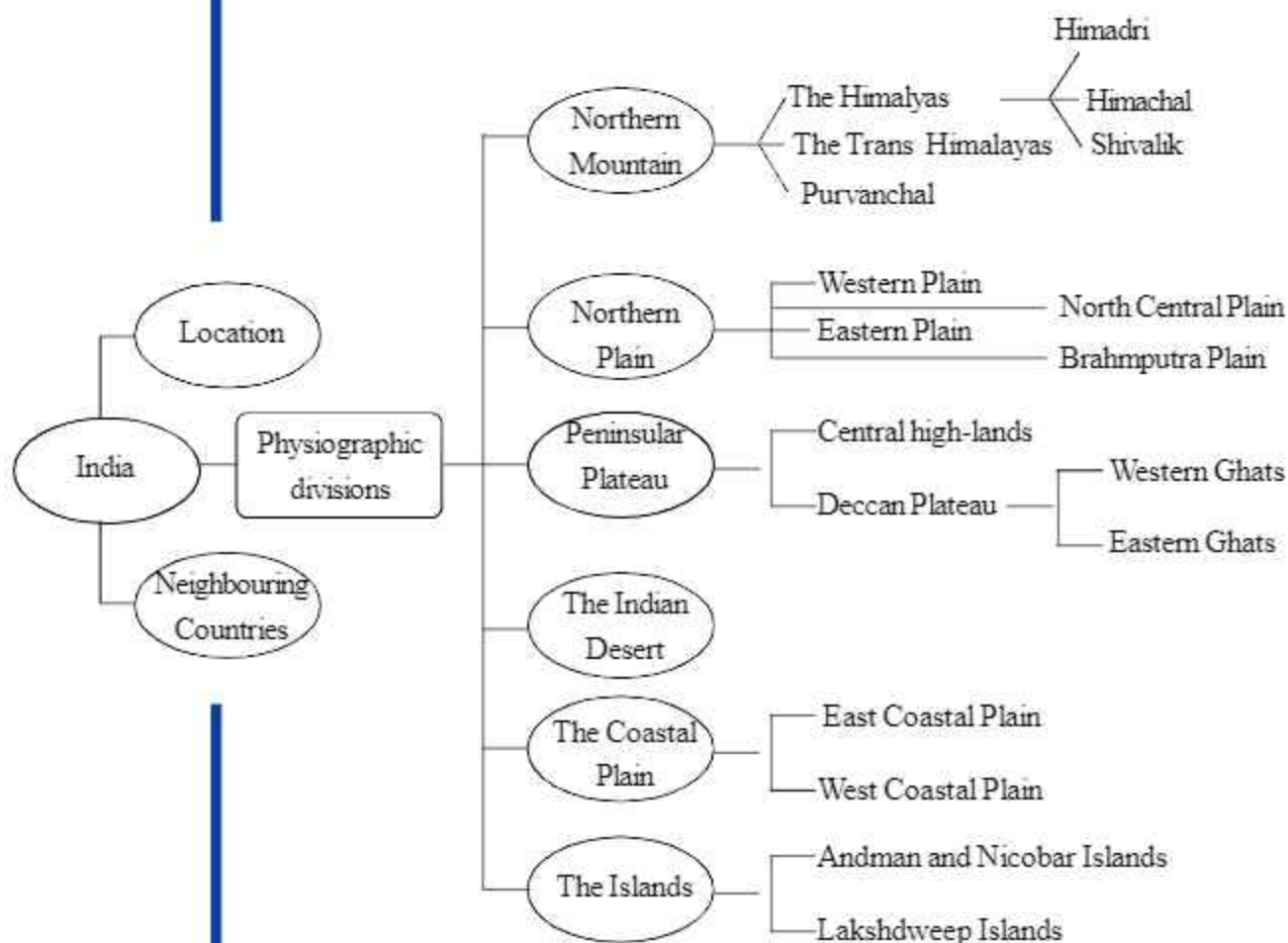


INTEXT QUESTIONS 11.6

1. Fill in the blanks:
 - i. The depth of the Indus gorge near Bunji (Ladakh) is metres.
 - ii. Son is the southern tributary of
2. Name the drainage system of Northern India.
3. Name any three rivers of the southern drainage system.



WHAT YOU HAVE LEARNT



**TERMINAL QUESTIONS**

1. Give a brief account of the Himachal Range under the following headings.
 - a. Location
 - b. Their average height and length
 - c. A few major peaks
 - d. Few prominent glaciers and
 - e. Major hill towns
2. Differentiate between:
 - a. Western ghat and Eastern ghat.
 - b. The Himalayan rivers and peninsular rivers.
3. Divide the Northern Plain into four physiographic divisions and describe briefly the eastern plain.
4. Describe briefly the key features of the eastern coastal plain.
5. Write a brief description of the Indian Islands.
6. Define the following -
 - a. Standard Meridian of India
 - b. Drainage System
7. Locate the following in the outline maps of India.
 - a. Himadri
 - b. Karakoram
 - c. Pir Panjal Range
 - d. Ladakh Range
 - e. Satpura and Vindhya Range
 - f. Satluj river

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- g. Ganga river
- h. Mahanadi river
- i. Godavari river
- j. Kaveri river and
- k. Narmada river

**ANSWERS TO INTEXT QUESTIONS****11.1**

1.
 - i. $8^{\circ}4'N, 37^{\circ}6'$
 - ii. Indira Point
 - iii. Standard
 - iv. 15,200
2. Answer the following questions in one word or a sentence.
 - i. Tropic of Cancer
 - ii. Approx 2 hours
 - iii. Indira Point

11.2

1. Himadri, Himachal and Shivalik
2. Mt. Everest
3. Fill in the blanks:
 - i. Pir Panjal, Himadri ranges
 - ii. Himachal
 - iii. Zaskar, Ladakh

**11.3**

1. The relatively higher part of the plain is called Bangar while the comparatively lower area is called the khaddar.
2. (i) Western plain,
(ii) North Central plain,
(iii) Eastern plain, and
(iv) Brahmaputra plain.
3. Fill in the blanks:
 - i. Terai
 - ii. Sambhar
 - iii. River Ganga
 - iv. Majuli

11.4

1. Select the correct alternatives:
 - i. d. Narmada
 - ii. a. Gurushikhar
2. Betwa, Chambal, and Ken
3. Anamudi

11.5

1. Fill in the blanks:
 - i. Godavari and Krishna
 - ii. Black
 - iii. Luni
2. Chilka, Pulicat, and Koluru
3. Minicoy

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11.6

1. Fill in the blanks:
 - i. 5200
 - ii. Ganga
2. Perennial
3. Narmada, Tapi, Godavari, Krishna, Kaveri etc (Any three)