

5

INDIA - PHYSICAL GEOGRAPHY

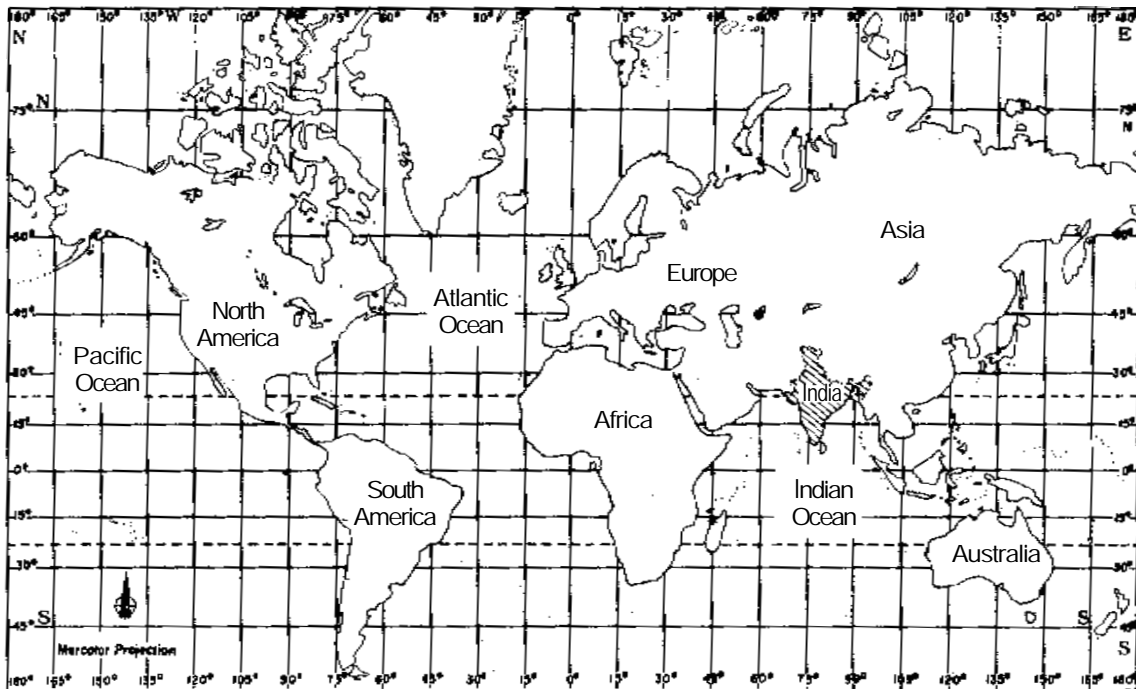
What we have learnt

- Based on altitude the regions of India can be divided into different physiographic divisions.
- Topography, water, soil, climate, vegetation etc are the most important factors that influence habitation in a place.
- The physiographic divisions of India are the great Himalayan ranges, the Northern plains, the Peninsular plateau and the coastal plains.
- Indian rivers can be classified as Himalayan Rivers and Peninsular Rivers.
- Different types of soils are distributed in India.
- India can be divided into different regions based on the amount of rainfall.

There are many factors that influence the culture and development of a place. They are the latitudinal and longitudinal position of that place, topography, climate, soil and vegetation. India is a land of diverse topography, soils,

climate and vegetation. Let us enquire into the cultural diversity of India and the physical features that support it.

Find out the position of India on the world map (Fig. 5.1)



World Map

figure 5.1

India, which lies between $8^{\circ}4' N$ and $37^{\circ}6' N$ latitude and $68^{\circ}7' E$ and $97^{\circ}25' E$ longitude, has a total geographic area of $32,87,782 \text{ km}^2$. This is only 2.42 % of the total geographic area of the world.

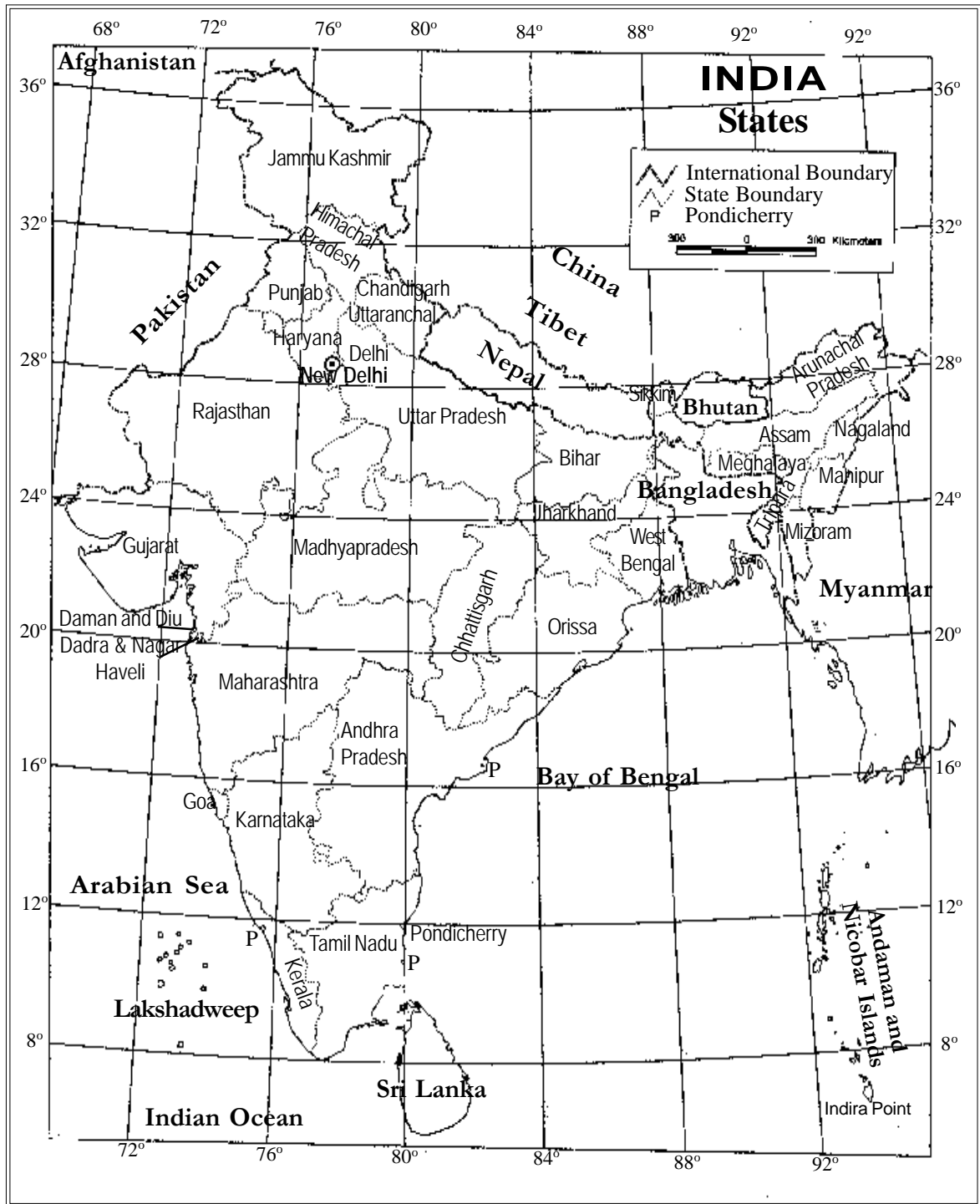


figure 5.2

Based upon Survey of India map with the permission of Surveyor General of India. © Government of India, Copyright 2003

Try to find out the answers to the following questions from the map (figure 5.1 and 5.2).

- In which part of Asia is India located?
- Which part of India is nearest to the Equator?
- In which hemisphere does India situate?
- Which are the other countries in the Indian sub-continent?
- Which are the ocean bodies that surround peninsular India?

Although India is a part of Asia, it keeps an identity of its own. Its size, topography, climate, culture, etc. are entirely different. The huge mountain ranges of the Himalayas in the north protect it from the extreme cold climate of interior Asia. India experiences a unique climate due to the influence of the Himalayas and the ocean bodies that surround the peninsular region.

Indian Peninsula

This is a land unit jutting out into the sea on the southern end of the Indian subcontinent. This land unit is surrounded by the Indian Ocean. The sea which lies in the west is known as the Arabian Sea and that in the east as the Bay of Bengal

- *Area wise, what is the place of India among the countries of the world?*

Find out from a world map, the countries that are larger than India

- Russia
-
-

Find out the group of islands belonging to India from the map (figure 5.2)

- *Which are the neighbouring countries of India in the Indian Ocean?*

Strait

A narrow stretch of water body that connects two large water bodies is a strait. Eg: Palk Strait in the Bay of Bengal.

Isthmus

A narrow stretch of land, which connects two large landmasses, is an isthmus. Eg: Panama Isthmus.

India has a length of 3214 km from north to south and 2933 km from east to west. It has a land frontier of 15200 km and has a coastline of 6083 km.

Draw an outline map of India and show the different states, their capitals, union territories and their head quarters.

Find out from the map (fig 5.2) the region through which the Tropic of Cancer passes. Which are the states crossed by this line?

82°30' E longitude is considered as the Indian Standard Meridian. The local time of this longitude is taken as the Indian Standard Time (IST). This is 5½ hours ahead of the Greenwich Mean Time.

Physiography

India is a land of diversities. Great mountains, rivers, wide plateaus and plains, lengthy coastlines etc., constitute the topography of our country. It has a monsoon climate with local and seasonal climatic diversities. We shall look at the topography, rivers and climate of our country.

Physiographically, India can be classified into four divisions.

- The Northern mountain region
- The Great plains of the north
- The Peninsular plateau
- The Coastal plains and Islands

Find out the different physiographic divisions from the map (figure: 5.3)

The Northern mountain region

This is the great wall like physiographic unit, which stretches from Kashmir in the north west to the Indian border in the east. This region is formed by the Karakoram, Ladakh, Zaskar and the Himalayan range of mountains and the eastern highlands. These mountain ranges are subdivided into three divisions namely, Trans Himalayas, Himalayas and the Eastern Highlands.

The Trans Himalayas comprises the Karakoram, Ladakh and Zaskar ranges that originate from the Pamir Knot. The highest peak in India, 'Mount K₂' (Mt. Godwin Austin, 8611m) is in the Karakoram Range. The Trans Himalayas, in which there are several gorges and mountain passes, has an average height of above 6000m.

The roof of the world

The Pamir plateau with the Pamir Knot in the central Asian country of Tajikistan, is known as the roof of the world. Mountain ranges such as the Hindukush, Sulaiman, Tienshan, Kunlun and Karakoram run to different directions from the Pamir Knot. The Kailas range in Tibet is an extension of the Karakoram Range.

The Himalayas, a part of the Northern mountain region, which trend in NW-SE direction for a length of about 2400km is an arc shaped mountain range. This mountain region with an area of about 5 lakh km² is the highest region in the world. The width of this mountain range, is about 400 km in Kashmir, and it shrinks to 150 km in Arunachal Pradesh. There are three parallel mountain ranges in this physical division, which is composed of many deep valleys and extensive plateaus. Find out these ranges from the map (figure 5.4) and learn their importance from the table given below (Table: 5.1).

The Himalayas, still growing!

Himalaya means the abode of snow. It is the youngest fold mountain system of the world. These mountain ranges are formed due to the intensive folding of the floor of an ancient sea called Tethys. The fossils of different marine organisms, found at various locations on the mountain ranges support the fact that the region was covered by sea in the past.

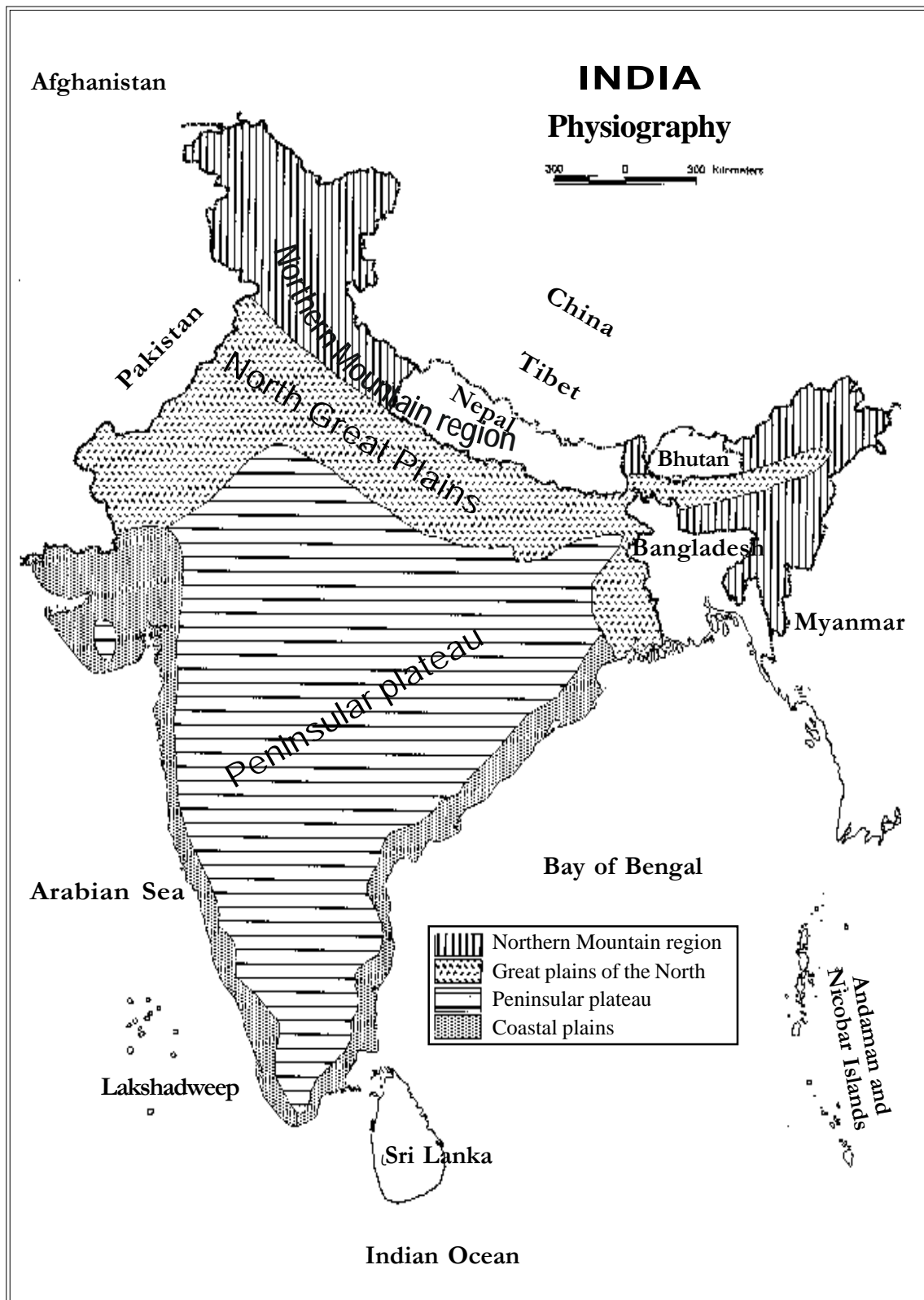


figure 5.3

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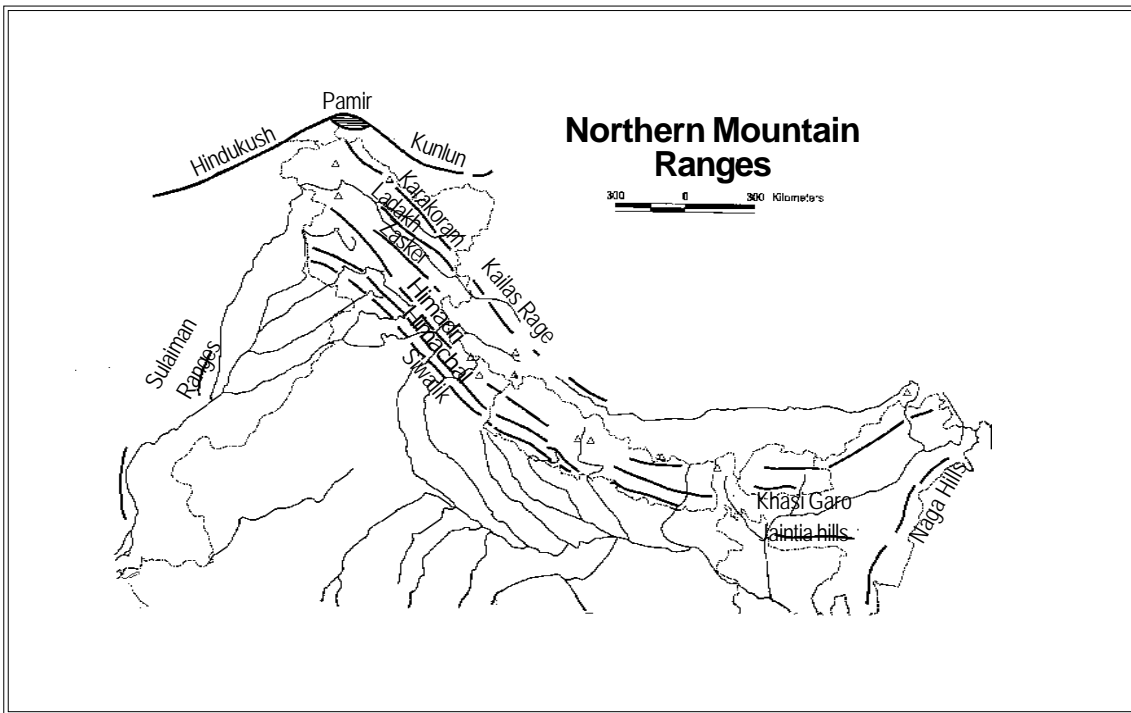


figure 5.4

The height of the mountain ranges gradually decrease as they approach the eastern parts of the Northern mountainous regions. This region with an average height of

500m to 3000m above MSL is known as the Eastern highlands (Purvachal). The thickly forested Khasi-Jaintia hills in this region are the world's rainiest (wettest) spots.

| Greater/Inner Himalayas | Lesser/Middle Himalayas | Outer/Lower Himalayas |
|---|--|--|
| <ul style="list-style-type: none"> • The highest mountain range of the Himalayas. • Under perpetual snow, these ranges have an average height of about 6000m. • Mountain peaks with a height of more than 8000m are situated in this mountain range. (Eg: Kanchenjunga-8595m, Nangaparnbat-8126m) • The source of Ganges and Yamuna | <ul style="list-style-type: none"> • Situated to the south of the Himadri • Average height is above 3000m • Many health resorts are situated on the southern slope of the mountain range, eg: Shimla, Darjeeling. | <ul style="list-style-type: none"> • This is the outer most range, situated on the south of the lesser Himalayas. • These discontinuous ranges join the lesser Himalayas in the extreme east. • Its average height is about 1200m • There are several elongated and flat valleys running parallel to the mountain ranges. They are called "duns". (Eg: Dehradun) |

Table 5.1

- Find out from the map, the states that fall in the Eastern highland region.
- With the help of an atlas, mark the location of the Pamir Knot and the regions of the Northern mountain ranges on the map given at the end of the textbook.

Traveller's Paradise

On 29th May, 1953 Edmund Hillary and Tenzing Norgay conquered the snow clad summit of the world ie, Mt. Everest. Many others repeated this feat, which remains a great achievement till date. The Himalayan valleys attract not only mountaineers but also many tourists of the world. The valleys of Kulu, Manali, Shimla, Darjeeling, Naini Tal and Mussoorie valleys are some of examples.

- Prepare a report, based on the descriptions and maps, about the Northern mountain region. You can enrich your knowledge with more reading materials and references.

Himalayan Rivers

Now you have understood the characteristic features of the Himalayan mountain ranges. The snow clad peaks and glaciers are excellent sources of fresh water. Several great river systems originate from the melt waters of these glaciers. Abundant rainfall in the valleys enriches the flow of these rivers.

Find out the Himalayan rivers from the map given (fig: 5.5). Make a list of the source regions of these rivers, their tributaries, the states through which they flow and the seas which they join, and complete the table given below, (Table: 5.2)

Tributaries and distributaries

Tributaries are those small and big streams that join a river. Upon reaching a plain the rivers branch out and join the sea. These branches are called distributaries.

River Indus

Originating at a height of about 5180m from the Manasarowar in Tibet, River Indus flows northwest through Tibet and enters Jammu and Kashmir. Flowing through the deep valleys of Ladakh, Baltistan and Gilgit, River

| Himalayan rivers | Sources | Tributaries | State through which they flow | Sea which they join |
|------------------|--------------------------------------|-------------|-------------------------------|---------------------|
| • Indus | • | • | • | • |
| • Ganga | • Gangotri, Alakapuri Glaciers | • | • | • |
| • Brahmaputra | • | • | • | • |

Table 5.2

Indus crosses the Indian border and reaches the plains through Attok in Pakistan. Having a length of about 2880 km, it is one of the longest rivers of the world. Only a length of 709 km of the river is in India. Flowing through the plains of Pakistan, Indus branches out into many distributaries and merges with the Arabian sea to the south of Karachi. Jhelum, Chenab, Ravi, Beas and Sutlej are the important tributaries of the Indus.

River Ganga

The river Bhagirathi, which originates from the Gaumukh caves of the Gangotri Glacier and the river Alaknanda, which originates from the Alakpuri glacier meet at Devaprayag and flows further as the Ganga. Flowing through the snow-clad valleys, it enters the plains at Hardwar and becomes sluggish. After flowing through different states the river flows southeast and enters Bangladesh at Farrakka in West Bengal. The Ganga, with a length of more than 2500 km is the river with the largest number of tributaries in India. Important tributaries of the Ganga are

- Yamuna • Son • Ghaghara
- Kosi • Gandak.
- *Do all the tributaries of Ganga receive water from the Himalayan ranges? Find out with the help of an atlas.*

Hooghly is an important distributary of the river Ganga. Kolkata city is situated on the banks of the river Hooghly. The river Damodar is a tributary of the river Hooghly.

The river Damodar is known as "Sorrow of Bengal". This is because of the severe threat it posed to the life and property due to the frequent floods

and change in river course. The construction of dams across the river Damodar has mitigated this havoc to a considerable extent.

The Ganga is known as Padma in Bangladesh. The river Padma joins the Brahmaputra near Chandpur in Bangladesh and is known as Meghna and Jamuna. Later it flows as a number of distributaries and builds an extensive delta. It then merges into the Bay of Bengal.

Farrakka Barrage

It was with the aim of developing water transport in Hooghly river that the Government of India decided to construct a barrage across the river Ganga. The barrage, which was completed in May 1986 has a length of 2240 m. The barrage is bridged with rail and road. The railway that connects the Eastern states with Kolkata passes over this barrage. Travelling by train over the roaring greatness of the river Ganga is an unforgettable experience.

River Brahmaputra

The Chemayungdung glacier (5150m) on the Kailas range about 100 km from the Manasarowar lake in Tibet is the source of the river Brahmaputra. Having a length of 2900 km, the Brahmaputra is one of the longest rivers of the world. This river, which is known by different names in Tibet and Bangladesh, has a length of 725 km in India. The river Tista, river Manas, river Lohit and river Subansiri are the major tributaries. With the maximum discharge among the Himalayan

rivers, Brahmaputra causes severe floods in Assam and Bangladesh.

The red river of India

The Brahmaputra is also known as the red river of India. It's red colour is due to the suspension of red soils of Assam. Brahmaputra is known as Tsangpo in Tibet and Jamuna in Bangladesh.

Water way on mountains !

Ferries and boats of bamboo and leather are in use at a height of 3658 m above MSL. This is a spectacular scene in Brahmaputra River in the Tibetan region. This waterway has a length of 670 km.

In the mountainous zone, deep valleys have been formed due to soil erosion for centuries by rivers that originate from the Himalayas. These valleys break the continuity of the Himalayas. The Himalayas are divided into different divisions. The regions from one river bank to other have different names too.

From River Indus to River Sutlej – Punjab Himalaya

From River Sutlej to River Kali – Kumaon Himalaya

From River Kali to River Tista – Nepal Himalaya

From River Tista to River Brahmaputra- Assam Himalaya

What are the different landforms formed due to the depositional activity of rivers at the foot of the mountains?

- Alluvial fans
-
-

Northern Great Plains

Extensive plains have been formed due to the continuous depositional activity of the Himalayan rivers. With several thousand kilometres of thickness, the Northern Great plains spread out to about 7 lakhs km². This plain is one of the world's most extensive alluvial plains.

Examine the map (figure: 5.5) and find out in what different physiographic divisions the Northern Great Plains are situated? These plains are known in different names based on the depositional activity of different river systems responsible for their formation. Find out these divisions from the table (5.3).

| Name of the plain | The river causes the formation |
|--|---------------------------------------|
| Punjab – Haryana plain | River Indus and its tributaries |
| Marusthali – Bagar plains in Rajasthan | Luni and Saraswathi rivers |
| Gangetic plains | River Ganga and its tributaries |
| Brahmaputra plains in Assam | Brahmaputra and its tributaries |

Table 5.3

- *On the outline map of India given at the end of the textbook demarcate the different parts of the Great Plains in colours.*
- *The south-western part of the Northern Great Plains is a desert. Find out the name of this desert from atlas.*

The disappeared River Saraswathi

Saraswathi was an ancient river, which originated from Himachal Pradesh and flowed to the south and then to the southwest direction. The river which is mentioned in the Rig Veda remains totally disappeared. Studies, with the help of satellite imageries indicate that the river still flows, beneath the ground!

The Northern mountain zone and the Northern Great Plains have a remarkable role in shaping the physiography, climate, culture, human life, agriculture and economy of India. Examine the table (5.4).

After a clear scrutiny of the table 5.4, and from reading materials and mass media, collect more information about the role of these regions in the evolution and spread of the Indian society and conduct a seminar in the class.

Can you find answers to the following questions after examining the maps (Fig: 5.3, 5.5).

- Which are the tributaries of River Ganga not originating from the Himalayas?
- From which zone do these rivers originate?

Peninsular Plateau

You have learnt about continental drift. The peninsular plateau is a landmass believed to

| Northern mountain zone | Northern Great Plains |
|---|---|
| <ul style="list-style-type: none"> • Stands as a natural barrier in the northern part of India • Prevents foreign invasion to a certain extent • Supports an indigenous culture • Protects India from the cold winds blowing from the northern parts of Asia • Obstruct south western monsoon winds and provides rain throughout India • Forms the source of several rivers • This region has a remarkable role in the formation of the Northern Great Plains, which is the food bowl of India • It is the abode of diverse animal and plant species. • This region with cool climate and serene nature is a heaven for tourists | <ul style="list-style-type: none"> • This is the birth place of Indian culture • It forms the backbone of Indian agriculture • One of the world's most densely populated regions • Many metropolitan cities and industrial centres are situated in this zone. • There is an extensive network of rail and road system in this zone • • |

Table 5.4

have got separated from the ancient Gondwanaland. This zone is built of stable rocks and is the most extensive physiographic division of India. Note the characteristic features of the peninsular plateau given below.

- This physiographic division has an area of about 15 lakh km²
- It has a diverse topography of mountains, plateaus and valleys
- The plateaus of this physiographic division has an average altitude of above 400m from mean sea level.
- Anamudi with a height of 2695m is the highest peak in this zone
- Most of the rivers that originate from this zone flow towards the east
- There are large deposits of different minerals occur in this zone
-

Based on the uniqueness of the different regions, the peninsular plateau has been divided into nine subdivisions. The Aravalli hills, Malwa plateau, Vindhya ranges, Satpura ranges, the Chotta Nagpur plateau, the Deccan plateau, the Western Ghats, the Eastern Ghats, the Kachchh and Kathiawar of Gujarat are these subdivisions. Many small and large hills and plateaus are also included in these subdivisions. Find out these from the map. (figure 5.6)

Deccan Trap Region

The northwestern part of the Deccan plateau was formed due to the cooling down of lava from volcanic eruption that occurred millions of years ago. Formed out of igneous rocks, this

region is known as the Deccan Trap. Black soils have developed as a result of weathering of rocks in the lava plateau, one of the largest in the world. This black soil, also known as regur (black cotton soil) is most suitable for cotton cultivation.

- *Based on the lesson and the map (figure 5.6) collect more information about the peninsular plateau and prepare a detailed note on it.*

Rann of Kachchh

The brackish swampy region in the northwestern part of Gujarat is called the Rann of Kachchh. High tides from the Arabian Sea and the rivers Luni and Banas, inundate this region. There are two different divisions in the Rann of Kachchh, namely the Great Rann and the Little Rann. The Great Rann which is situated to the north of the Kachchh peninsula, is a region filled by black sedimentary deposits and salts.

- *On the outline map of India provided at the end of the textbook, mark the sub divisions of the peninsular plateau using different colours.*

Peninsular Rivers

Examine the maps (figure 5.5 and 5.6) and find the rivers that originate from the peninsular plateau and classify them in the following table according to the rivers that merge into the Arabian Sea and those that merge into the Bay of Bengal.

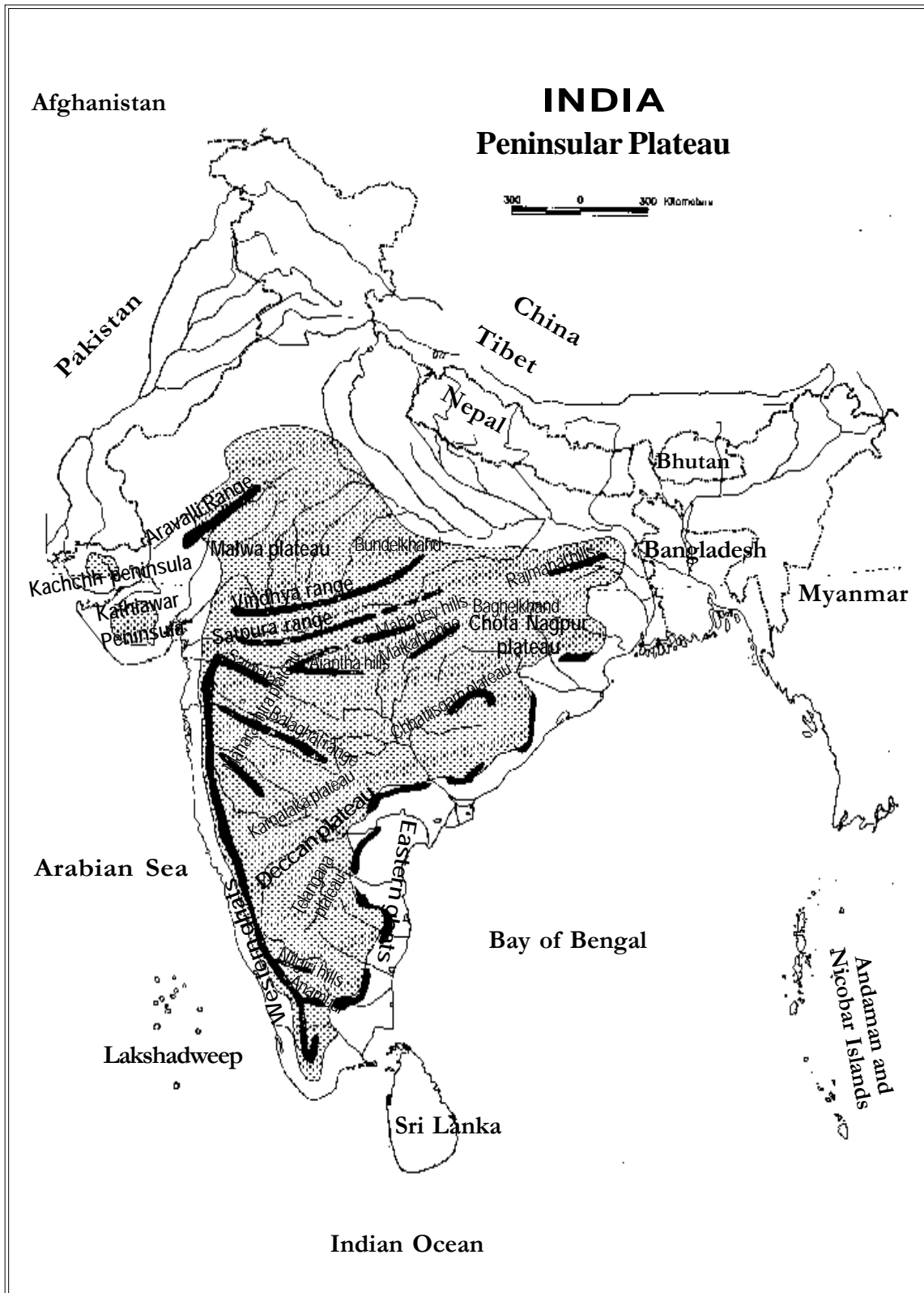


Figure 5.6

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| Name of river | Debouching Place |
|---------------|------------------|
| • Mahanadi | • Bay of Bengal |
| • Narmada | • Arabian Sea |
| • | • |
| • | • |

The peninsular rivers can be divided into two, namely, east flowing rivers and west flowing rivers. For additional information, refer table, (5.5)

Classify the peninsular rivers as east flowing rivers and west flowing rivers. Find out the states through which these rivers flow and make a report on it. For this, you can make use of the drainage map of India, political map of India as well as table (5.5)

Originating from the Peninsular Plateau, rivers Chambal, Betwa, Ken and Sind flow towards the north and

joins the Yamuna and the river Son joins the River Ganga. When compared to other peninsular rivers, these rivers are comparatively smaller in length.

Let us now have a comparative study of the Himalayan rivers and the Peninsular rivers based on their characteristic features. Examine table (5.6).

With the help of an atlas find out the location of the urban centres shown below and the river banks on which they situate.

- Thanjavur
- Baruch
- Agra
- Vijayawada
- Surat
- Thiruchirapalli
- Guwahati
- Cuttack
- Kolkata
- Ladakh
- Devaprayag

| River | Source | Length | Major tributaries | The sea to which it merges |
|----------|---|---------|--------------------|----------------------------|
| Mahanadi | Maikala ranges (Madhya Pradesh) | 857 km | Ib, Tel | Bay of Bengal |
| Godavari | Western Ghats (Nasik district of Maharashtra) | 1465 km | Indravati, Sabari | Bay of Bengal |
| Krishna | Western Ghats (a spring to the north of Mahabaleshwar in Maharashtra) | 1400 km | Bhima, Tungabhadra | Bay of Bengal |
| Cauveri | Western Ghats (Brahmagiri hills in Coorg district of Karnataka) | 800 km | Kabani, Amaravati | Bay of Bengal |
| Narmada | Maikala ranges (Chhattisgarh) | 1312 km | Hiran, Bajan | Arabian Sea |
| Tapti | Multai plateau (Betul district of Madhya Pradesh) | 724 km | Aanar, Girna | Arabian Sea |

Table 5.5

| Himalayan Rivers | Peninsular Rivers |
|--|--|
| <ul style="list-style-type: none"> ● Extensive catchment area ● Rain fed and snowfed ● High erosive capability ● Develop gorges in the mountains and meanders in the plains ● Inland navigation is possible in the plains. ● | <ul style="list-style-type: none"> ● Comparatively small catchment area ● Rainfed ● Low erosive capability ● Deep valleys are not produced as they flow through hard crystalline rocks ● Less chances for inland navigation. ● |

Table 5.6

Mark the course of the major rivers of India on the outline map (river systems) of India given at the end of the textbook and name them.

Coasts and Islands

Examine the map of India (fig: 5.2) and find out the states with coastline.

Extending from the Rann of Kachchh in Gujarat to the Ganga-Brahmaputra delta, it has a length of about 6083 km and lies divided into the west and the east coasts. You can learn their characteristic features from table 5.7.

Islands

There are many islands situated in the Indian Ocean, which form part of our country. These are distributed in the Bay of Bengal, Arabian Sea and in the Gulf of Mannar, between India and Sri Lanka.

Lakshadweep means a hundred thousand islands. But, there are only 36 coral islands present in this group of islands. Only ten islands in the group have been inhabited. This group of islands is situated about 300 km away from the Kerala coast. Kavarati is the capital of

| West Coast | East Coast |
|--|--|
| <ul style="list-style-type: none"> ● Between Arabian Sea and Western Ghats ● Stretches from Rann of Kachchh to Kanyakumari. ● Comparatively narrow ● Divided into Gujarat coastal plain, Konkan coast and Malabar coast ● Lagoons and estuaries are formed in the west coast ● Highly influenced by the south west monsoon | <ul style="list-style-type: none"> ● Between Eastern Ghats and Bay of Bengal ● Stretches from Sundarbans to Kanyakumari. ● Comparatively wider ● Divided into Coromandel coast and North Sircar coastal plains ● Deltas are formed in this coastal stretch ● Influenced by north east monsoons |

Table 5.7

Lakshadweep. With the help of additional references gather information and find out the inhabited islands in the Lakshadweep group.

Known as Bay Islands, the Andaman and Nicobar islands are located in the Bay of Bengal. There are about 200 islands, in this group the majority of which are uninhabited. The Barren volcano is situated in the Barren Island of this island group.

Climate

Note the news reports given below.

Severe hot wave continues in Delhi
May: 28

Cold Wave continues in Delhi
Jan: 17

Snow fall in Shimla: Traffic suspended
Jan: 17

Flood in Assam: Death toll crossed 40
July: 17

Idukki Oct 27:
Heavy rain continues in the district for the past two days. Land slides have been reported from many places.

From the reports, it can be presumed that in all places of India, the climate is not the same in all the months. Find out the factors that are responsible for climatic changes.

- Latitude of a place
- Nearness to sea
-

Although the Tropic of Cancer divides India into tropical and sub tropical regions, India is considered to be a tropical country. The Himalayan Mountains and the sea around the peninsula have a major role in maintaining

the climate of the whole country as a tropical one. The great Himalayas obstruct the monsoon winds and provide rain throughout the country as well as protect from the cold winds which blow from the North.

Though there is much local diversity in climate, India in general, has a monsoon climate.

With the seasons

The Arabs who traded with India used the seasonal winds for sailing their ships. They called these winds “Mousim” which means season. The term monsoon has evolved from Mousim. It was the Greek philosopher Hippallus who for the first time observed and recognised the seasonal winds that blow between Africa and India.

Have you learnt about monsoon winds? Which are the seasons in which they blow? Which are the two rainy seasons we have?

Based on temperature and rainfall the seasons of India are divided into four.

- Cold weather season
- Hot weather season
- South West monsoon season
- North East monsoon season (season of retreating monsoons)

Cold Weather Season

Have you heard of the extreme cold in north India? Extreme cold and dense fog is experienced in certain months, throughout north India. Some places experience heavy snowfall. Even airports remain closed down

and vehicular transport gets affected in this season.

- Which are the months in which we have cold season in India?

The average daily temperature recorded at different places from south to north for two different months is given in the table 5.8. Examine the temperature for January and find out the direction in which the temperature change occurs.

| Place | Temperature (in °C) | |
|--------------------|---------------------|------|
| | January | May |
| Thiruvananthapuram | 26.5 | 28.5 |
| Chennai | 24.3 | 29 |
| Bangalore | 21.0 | 29.4 |
| Pune | 20.6 | 29.7 |
| Kolkata | 18.5 | 30.6 |
| Delhi | 13.8 | 33.2 |

Table 5.8

The distribution of temperature in India from December to February is almost like this. This period is the cold season in India. In this period, north India experiences moderate temperature in the day time and cold condition at night. You might have read in the newspapers about the snowfall in the cold seasons in the hill stations away from the coast, such as Shimla, Darjeeling, Manali and Mussorie. In this season, the north east winds that blow from the land to the seas produce a dry climate throughout the country.

But, these winds cause high rainfall in the east coast of India during this period, especially on the Tamil Nadu coast.

Condensing moisture

Condensation is the process of cooling down of moisture that has evaporated. Based on the rate of condensation, it has been classified into dew, mist, fog, snow, rain, hailstone, etc.

The phenomenon of “western disturbance” is another feature of the cold season. When these winds reach the Himalaya Mountains, they lead to severe snow fall. The intensity of rainfall due to this wind gradually weakens as it moves towards north and east. With the arrival of the western disturbance winter rains occur in the northern plain especially in Punjab. This is ideal for the cultivation of rabi crops.

During the winter season, extreme low pressure is formed over the Mediterranean Sea. It moves gradually towards the east and through the passes in the Sulaiman ranges of Pakistan. This phenomenon which causes heavy rainfall to Punjab, Haryana, Delhi and Uttar Pradesh is known as Western Disturbance. Jet streams have a major role in bringing the western disturbance to India. A strong flow of air through the tropopause is called the Jet Streams.

- Extreme cold season is not felt in the northern states. What could be the reason for this?

Holi – the festival of colours

Spring season comes after winter. Blooming grasses, shrubs and trees, all heralding the advent of spring season is a period of joy and festival to our motherland. The people of north India celebrate it as 'Holi'. Today all Indians celebrate the occasion alike strewing colours and warmth in each and every minds.

Hot weather Season

Burning sun above, parched fields and dried up streams below..... Cattle grazing on the arid grounds, village women carrying pots and walking for miles in search of potable water, the hot dusty wind that blows all around...

What you read is a sketch of an Indian village during hot-weather season. This season in India is from March to June. Examine the table 5.8 and find out how the temperature is distributed in the month of May.

Didn't you understand that some places experience different temperatures in different months. The apparent movement of the sun is the reason for this. In India, summer occurs when the sun shines above the northern hemisphere. Likewise when it is winter the sun's position is in the southern hemisphere. The maximum temperature recorded ever in India is at Barmer (55°C) in the western border of Rajasthan.

To manage drought

Western Rajasthan, Kachchh, Telengana regions, Karnataka, Tamil

Nadu and some places in Orissa are regions that experience extreme drought conditions. Today, Kerala has also started experiencing drought conditions. How can we tackle droughts?

- Give more importance to water shed development programmes.
- Establish local development programmes on a par with water-shed regions.
- Cultivate crops which can resist drought.
- Popularise rain pits and rainwater harvesting.
- Plant trees
- Participate in awareness programmes for the conservation of water and motivate others to participate in such programmes.

Due to intense hot condition that continues from March to May over the northern plains, a low-pressure region is formed. During this season a dry dusty wind called 'Loo' blows over the north western Uttar pradesh and Rajasthan resulting in the rise of atmospheric temperature further. Other local winds that blow in this season are the Kalbaisakhi, Mango showers, etc.

Local winds of India

Kalbaisakhi is a dry local wind of West Bengal during summer season. Originating from the Chota Nagpur plateau and influenced by the westerlies, this warm wind moves

eastwards and is responsible for heavy rain and hailstones in West Bengal, Assam and Orissa. These winds many a time cause destruction to life and property. Cherry Blossom is a local wind blows over the interior Karnataka during the same season is good for coffee cultivation. Mango shower is another local wind that blows during the summer season along the Karnataka coast and in Kerala.

South West Monsoon Season

- Which are the months in which the south west monsoon is experienced in India?
- Why does India receive extensive rainfall during the south west monsoon?

Examine the map (fig: 5.7)

The south west monsoon appears to enter the Indian subcontinent in two branches; the Arabian Sea branch and the Bay of Bengal branch. The Arabian Sea branch causes extensive rainfall in the western and central states and the Bay of Bengal branch gives rainfall to the northeastern states and eastern coastal plains.

- What is the reason for heavy rainfall in the western slopes of the Western Ghats while the Eastern Ghats receive scanty rainfall?

The Arabian Sea branch, which gives moderate rainfall in the Deccan plateau and Madhya Pradesh, joins the Bay of Bengal branch over the Gangetic plains. A branch of

the Arabian Sea branch monsoon blows over Saurashtra and Kachchh in Gujarat and it gives scanty rainfall in broken spells as it reaches western Rajasthan. But when it reaches Punjab and Haryana it joins with the Bay of Bengal branch and blows northwards and gives good rainfall in the northern Himalayan regions.

Aravalli Mountains

One of the oldest mountains of the world, Aravalli extends from Delhi to the northern part of Gujarat covering a distance of about 800km. The mountain range has played a major role in the formation of Rajasthan desert (Thar desert). Lying parallel to the monsoon winds from the Arabian sea, it cannot obstruct the moisture-laden monsoon winds. Rajasthan receives only scanty rainfall due to this reason. The highest peak Guru Sikhar, (1722m) in the Aravalli range is located in Mount Abu.

The Bay of Bengal branch monsoon which enters Bangladesh and West Bengal from the south and southeast directions, bifurcates into two as it crosses West Bengal. One branch enters the Brahmaputra valley and gives heavy rainfall in the north and north-eastern regions. The Khasi-Jaintia hills of Meghalaya obstruct these winds and cause heavy rainfall in these regions. Cherrapunji and Mousinram are in this region.

The other branch moves towards the northwest and through the Ganga plains it reaches Punjab - Haryana plains and joins the Arabian Sea branch.

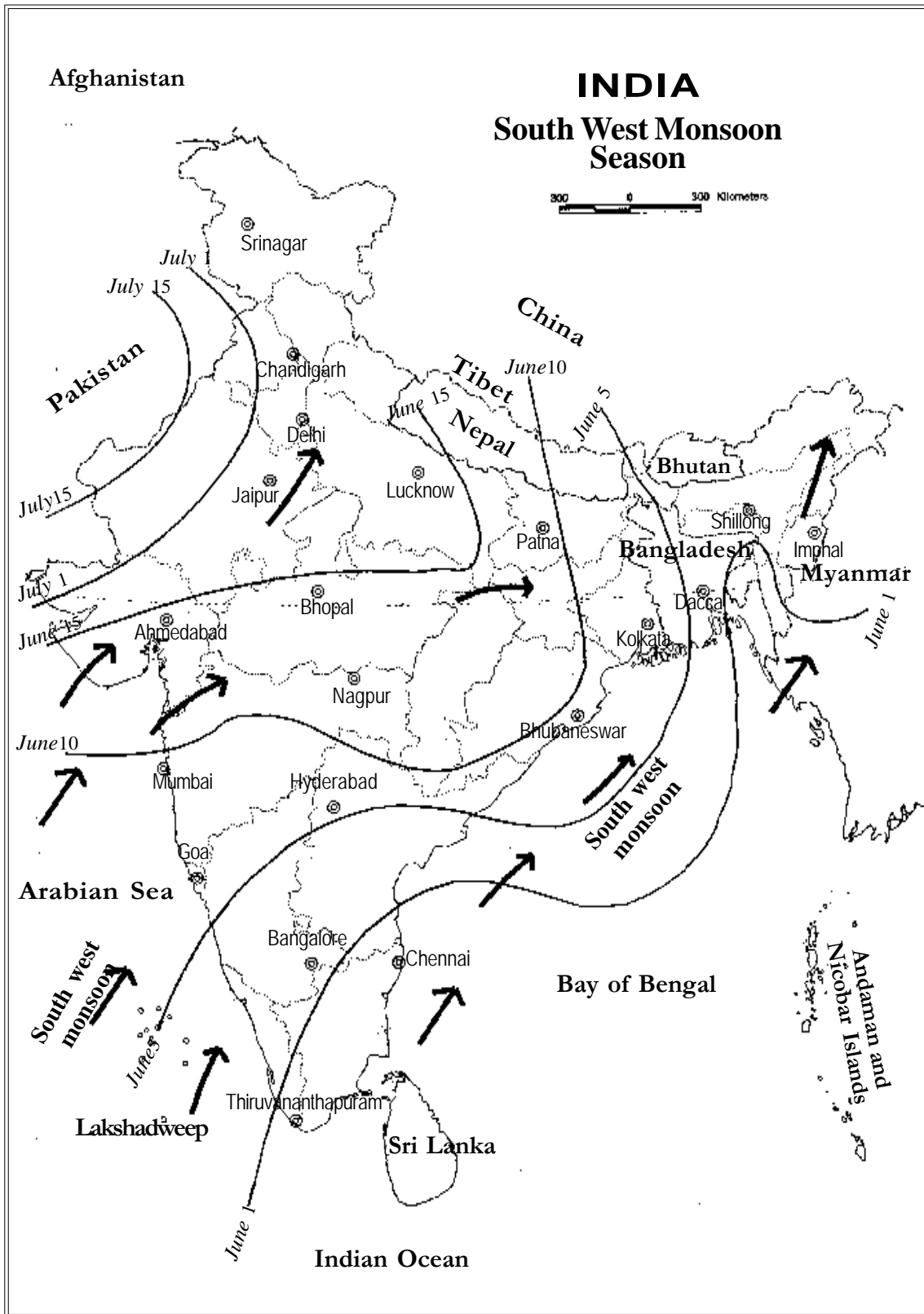


Figure 5.7

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India receives about 60% of its total rainfall during the south west monsoon season.

Land of Rain

No doubt it is Cherrapunji – the village, which receives rain throughout the year is the rainiest place on earth for many centuries, is situated about 56kms from Shillong, the capital of Meghalaya in a height of about 4500ft above MSL in between Khasi, Garo and Jaintia hills. The Britishers pronounced the word Sohra as Chira. 'Sohra' means not suitable for cultivation. 'punji' means soil. 'Cherrapunji' means the soil not suitable for cultivation. This region has very poor topsoil has large reserves of coal and limestone beneath. Therefore water is not available in the wells in this region although the topsoil is wet due to rainfall year round. The coveted place of Cherrapunji with an average rainfall greater than 1080cms was taken over by another place in India some years back. Mousinram, 6 km away from Cherrapunji was the place that captured the position. The Hawaiian Islands have also claimed the honour of being the rainiest spot on earth. But recently Cherrapunji has come back to regain the first place. Our neighbouring country Bangladesh prays not to have heavy rains in Cherrapunji – for the reason that when heavy rainfall occurs in Cherrapunji many places in Bangladesh will get inundated.

Measures to be taken at the time of floods

You might have heard about the floods in the north Indian rivers from newspapers, television etc. Do floods occur in rivers of your place during rainy seasons? What are the precautionary measures to be taken during a flood?

- Do not ignore the governments warnings issued by the authorities regarding the opening of dams during a flood.
- Avoid entering rivers during flood.
- Move to secure places from areas which could be affected.
- Be cautious about contagious diseases during flood seasons.
- Be cautious about broken power lines during thunderstorms.

North East Monsoon Season

Study the map (fig: 5.8)

- *What difference can you notice in the wind direction from that of South West monsoon?*
- *Name the months during which the monsoon winds blow in the direction as shown in the map (fig 5.8).*

During the northward march of the sun the monsoon blows towards the north and during the southward march of the sun it blows to the south. This southward progression is called the retreating monsoon. You have learnt that during the southward movement of the sun the northern hemisphere is gripped by cold weather conditions. During this season the low pressure formed over the Bay of Bengal attracts air from the north. These winds pick

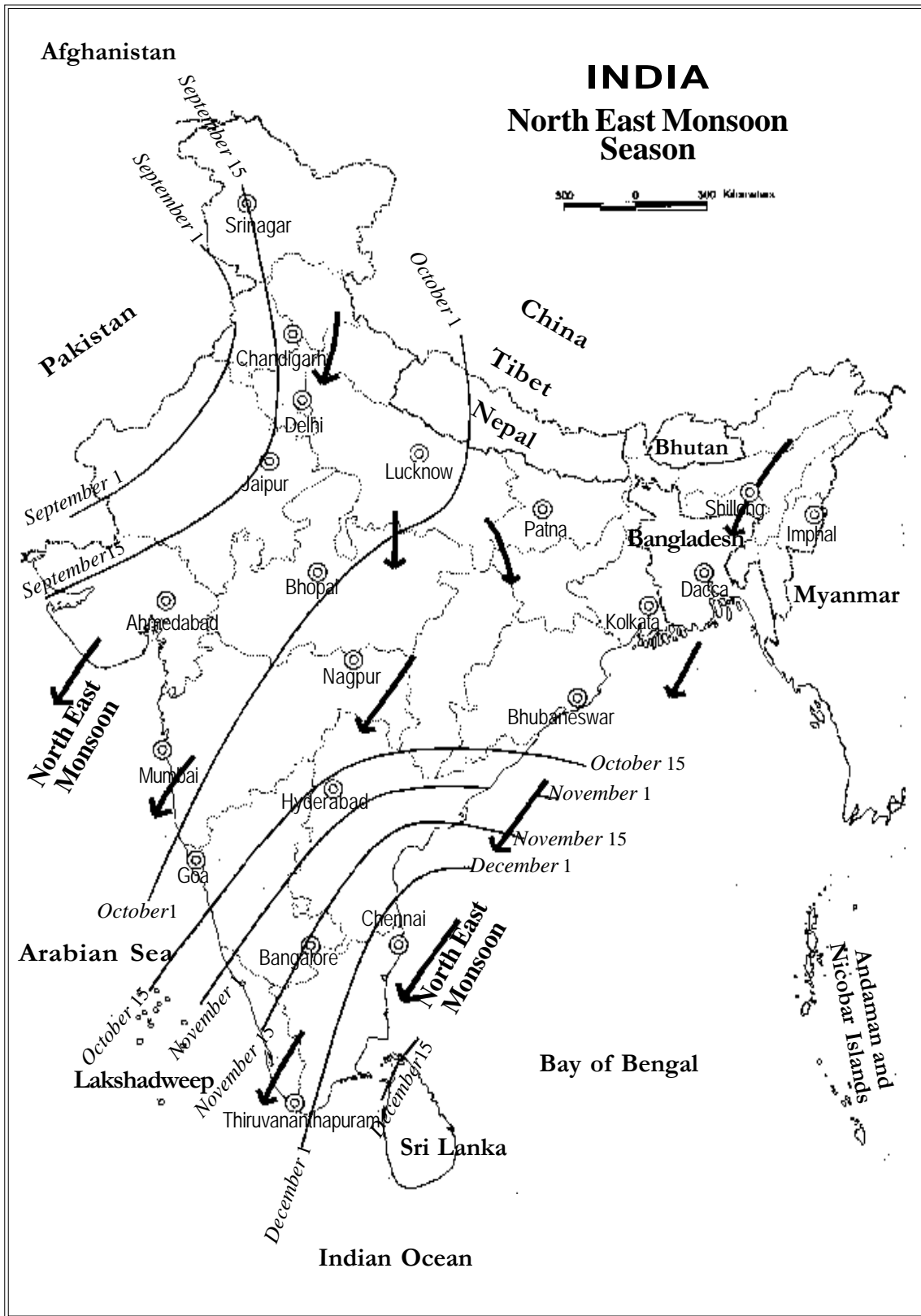


Figure 5.8

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up moisture as they pass over the Bay and blow against the east coast.

Soon after the monsoon season, places all over India experience clear skies and high temperatures. During this time there will be a high diurnal temperature and a very low night temperature. Although the land is wet and moist during these days, the temperature and high humidity make day time very uncomfortable. This phenomenon is called "October heat". By the middle of October atmospheric temperature decreases fast and winter season begins in north India.

October - November months are a gap between rainy season and winter. During this period the low pressure region that occur in the Bay of Bengal causes the formation of cyclones. These cyclones give extensive rainfall in the eastern coastal states of India and cause destruction to the highly populated deltaic regions of Godavari, Krishna and Cauvery. The influence of this rainfall is experienced in the state of Karnataka, Tamil Nadu and Kerala also.

Traditional Indian seasons

Ancient Indians had recognised and demarcated different seasons much before the development of meteorological studies. They had divided the year into six different seasons.

| | |
|------------------|----------------------------|
| Vasantham | March - April |
| Grishmam | May - June |
| Varsham | July - August |
| Sharath | September - October |
| Hemantham | November -December |
| Shishiram | January - February |

Distribution of rainfall

- Is the amount of rainfall the same everywhere in India?
- What could be the reasons for the disparity in the distribution of rainfall?

Examine the map showing the distribution of rainfall (figure 5.9)

In India there are places like Cherrapunji with more than 1080cm of annual rainfall and places like Jaisalmer with less than 12 cm of rainfall. While the western coastal plain and the north-eastern region receive an annual rainfall greater than 400cm. western Rajasthan, Gujarat, Haryana and Punjab have annual rainfall less than 60cm. Based on the distribution of rainfall India has been divided into different rainfall regions.

Draw the rainfall map of India with the help of a tracing table. Superimpose this map on the physiographic map of India and analyse the relation between distribution of rainfall and physiography. What conclusions can we have.

- High rainfall regions and their reasons
- Reasons for the local difference in the distribution of rainfall

●

We can have a discussion in the class based on the information gathered. Prepare a report incorporating the information gathered from the discussion.

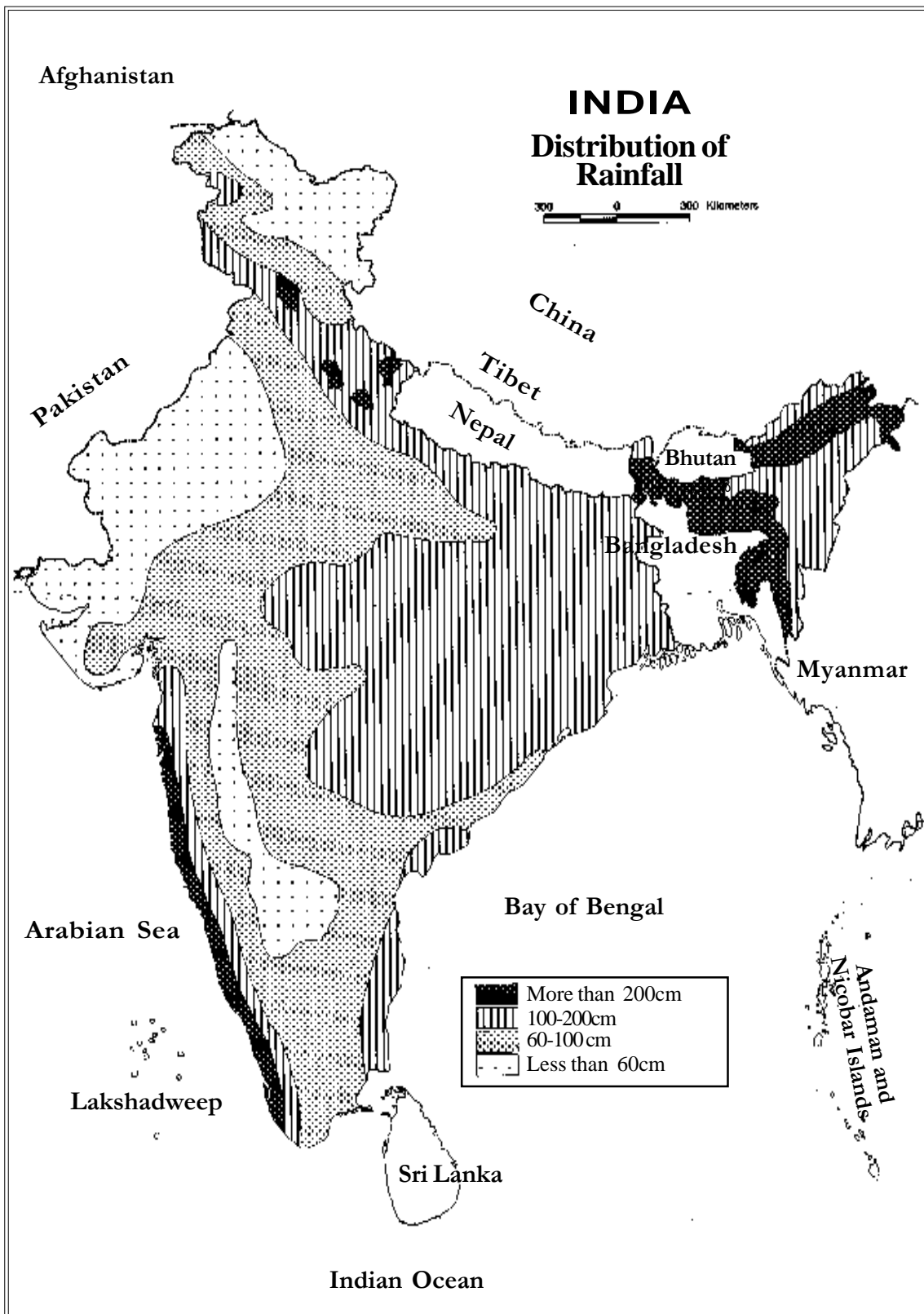


Figure 5.9

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**SUMMARY**

- India is a unique land with diverse physiography, climate and many rivers
- India with an area of 3287782 km² and an extent of 3214 km from north to south and 2933km from east to west is situated between 8°4'N and 37°6'N and from 68°7'E to 97°25' E.
- Physiographically, the regions of India has been divided into the Northern Mountain region, the Great Plains of the North, Peninsular plateau, the Coastal plains and Islands.
- Although there is climatic diversity, the climate of India is termed as monsoon climate
- Based on temperature and rainfall the seasons of India have been divided into four viz., cold, weather season, hot-weather season southwest monsoon season and northeast monsoon season.

QUESTIONS

1. Describe the importance of Northern mountain regions and Northern Great Plains.
2. Explain the role of Northern mountain regions in the formation of Northern Great plains
3. Explain the differences between Peninsular Rivers and Himalayan Rivers.
4. Classify the Indian seasons based on temperature, and rainfall and prepare a report.
5. What are the differences between the western coastal plains and eastern coastal plains?
