Chapter-1

LOCATION & EXTENT

Our country India is one of the oldest cultures in the world. India's rich natural variation has embellished it with various cultural diversities. Ancient Indus Valley civilization flourished only here. *Vaishali* in Bihar is the world's first republic. Therefore, India has significant contributions in the development of world history. India is the only country in the world, on the name of which an ocean is named as 'Indian Ocean'. This reflects the important position of India in South Asia. In the past few decades, India has made remarkable progress in social and economic sector. But, growing population is creating hindrance in the holistic development of India.

LOCATION

India is a vast country. Mainland of India is located between $8^0$4' North and $37^0$6' North latitudes and $68^0$7' East and $97^0$25' East longitudes. If we include the Indian island groups then India expands up to $6^0$45' north latitude. Indira Point is the southernmost point of India which is located in Andaman and Nicobar Island. $23^0$30' north latitude (Tropic of Cancer) passes through the middle of India and divides it into two parts. India's position, the latitudinal and longitudinal extent, boundary line, etc. is evident in Figure 1.1.

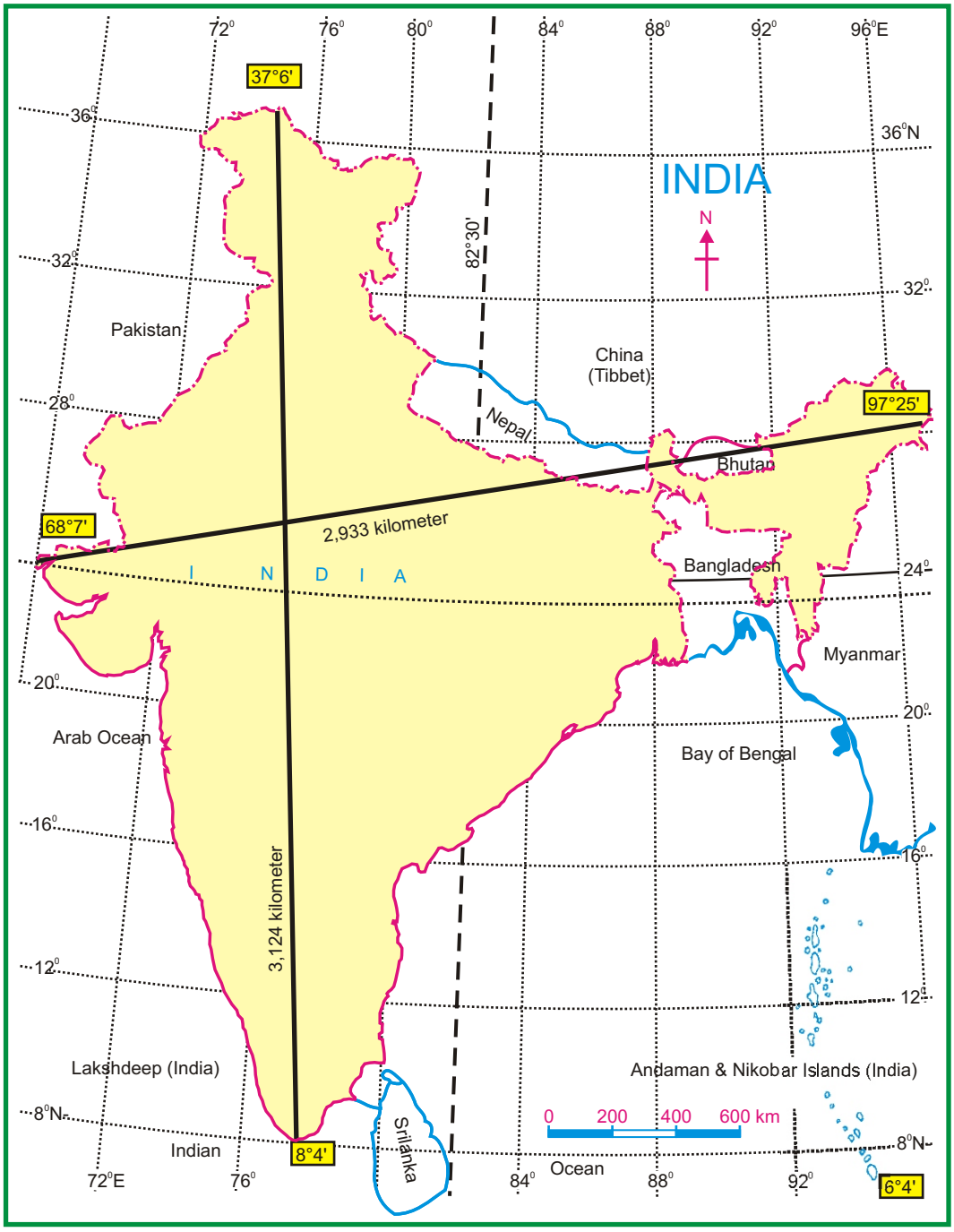
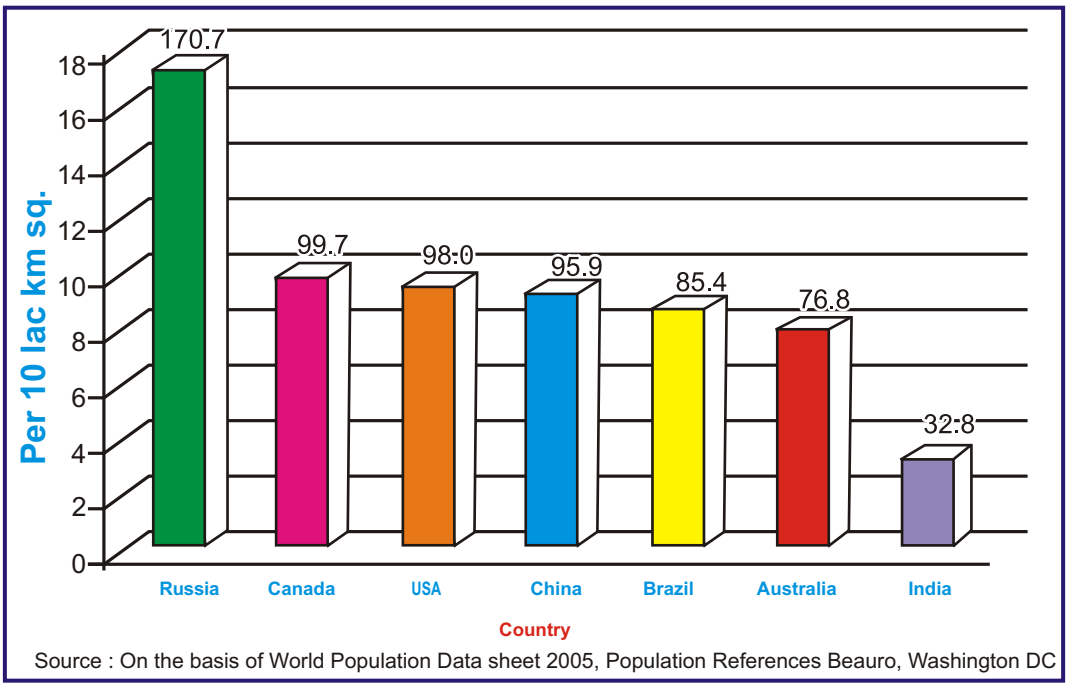


Figure 1.1 India- Expansion and Standard lines

SHAPE

The area of India is 32.8 lac square km which constitutes 2.4% of the world's geographic area. Figure 1.2 shows the relative position of India with other countries of the world.



Source : On the basis of World Population Data sheet 2005, Population References Beauro, Washington DC

Figure 1.2: Seven largest countries in the word in terms of expansion

The Territorial boundary of India - India's territorial boundary is very lengthy. Its territorial boundary line is almost double of its coastal boundary line. The total length of territorial boundary line is 15,200 km. Coastal boundary line of mainland is 6100 km long. After adding the coastal boundary line of Indian Islands, the total length of boundary line becomes 7,516.6 km.

Seven largest countries in the world

(1) Russia (2) Canada (3) China
(4) U.S.A. (5) Brazil
(6) Australia (7) India

The shape of India can be roughly seen as triangular. Its northern part is wider whereas its southern

part gradually becomes thinner from 22^0 north latitude. The Southern end of mainland has taken a shape of cape which is called *'Kumari Antarip'* or *'Kanyakumari'*.

Do you know?
The narrow portion of mainland, surrounded by sea from three sides is called cape.

Because of its peninsular shape, India is surrounded by ocean from three sides. These are (1) Bay of Bengal in the east, (2) In west the Arabian Sea and (3) the Indian Ocean to the south. The peninsular India which is centrally located in Indian Ocean also has very long coastlines. Young fold mountains are located in the north-west, north and north-east region of India.

Impact of latitudinal and longitudinal expansion

India's longitudinal and latitudinal expansion is almost same that is (30^0), however the actual terrestrial distance is not quite similar. This happens because the distance between two latitudes are always equal while the distance between two longitudes gradually decreases when we go towards poles.

In 24 hours, Earth covers 360^0 longitudinal distance through one complete revolution on its axis. Hence, Earth takes 4 minute to cover 1^0 longitude. The difference between Saurashtra and Arunachal Pradesh is 30^0 longitudinally apart. Therefore, 30^0 ×4 minute=120 minute it means 2 hours.In India, the difference of local time between Arunachal Pradesh and Kutch is 2 hours.

When the sun rises in Arunachal Pradesh, there is still dark in Kutch region where sunrise happens after 2 hours. It is due to 30^0 longitudinal expansion between these two regions.

The 82^{0}30'East longitude passes through Allahabad (*Naini*) in Uttar Pradesh. This is the Standard Meridian of the country.

While choosing Standard Meridian, this is taken into consideration that it passes almost through the middle of the country and should be a multiple of $7^{0}30'$. The longitudinal difference of $7^{0}30'$ is convenient since it is equal to 30 minutes time difference.

Tropic of cancer (23.5^{0} north latitude) passes from the middle of the country and divides it into two equal parts. This tropic of cancer passes from our neighbouring states Jharkhand's capital Ranchi and our neighbouring country Bangladesh.

Indian standard time is 5.30 hours ahead of Greenwich time. Because of having Indian standard time, all places in India follow the same time. However, there is difference in the time of sunrise between different places. For example, in the eastern States, sun rises 2 hours earlier as compare to Kachchh in Gujarat.

Now we will understand how latitudinal expansion or distance affects Indian lifestyle? Northern most end of India lies in the state of Jammu and Kashmir and latitudinal line passes through 37^{0} 6' North. Therefore, it is very far from the equator and the region receives slant sun's rays. Consequently, it receives lesser solar heat and winters are very cold here.

On the other side, in the southern part of India, such as Kerala and Tamil Nadu is very close to the equator. Therefore, sun rays fall comparatively straight on these regions and they receive comparatively more solar heat. In this way the people of Jammu and Kashmir wear warm clothes in the winter season while farmers in Kerala wear light clothes. More latitudinal expansion also affects the duration of day and night. In Kerala, the difference between the longest and the smallest day is of 45 minutes, whereas in Leh which is the capital of Ladakh, this difference is of five hours.

Locate the name and position of various passes on map.

INDIA AND THE WORLD

The peninsular India lies in the Indian Ocean. It is convenient for India to develop relations with European countries, south-west Asian

region and Africa through its western coast and with Australia and Asian countries through its eastern coast. India has a unique and important position in Indian Ocean in comparison to other countries. Therefore, the ocean is named after it. (Figure no. 1.3)

Find out : What is the international importance of Bodh Gaya? In which state is it situated?

India had connectivity with other countries of the world not only through sea- routes but also through the various passes of Himalayan ranges. India always had amazing relations with western, central-east and south-east Asian countries. Because of these relations, many Asian and *Panchtantra*'s stories, thoughts of *Upanishadas*, Buddhism, Indian number and decimal systems have reached different parts of the world. Spices, *malmal* clothes and many other goods used to be exported from India to different countries. On the other side, India used to receive various things from other countries. You may find the influence of Greek and west-Asian architecture on the domes and minarets in different parts of our country.

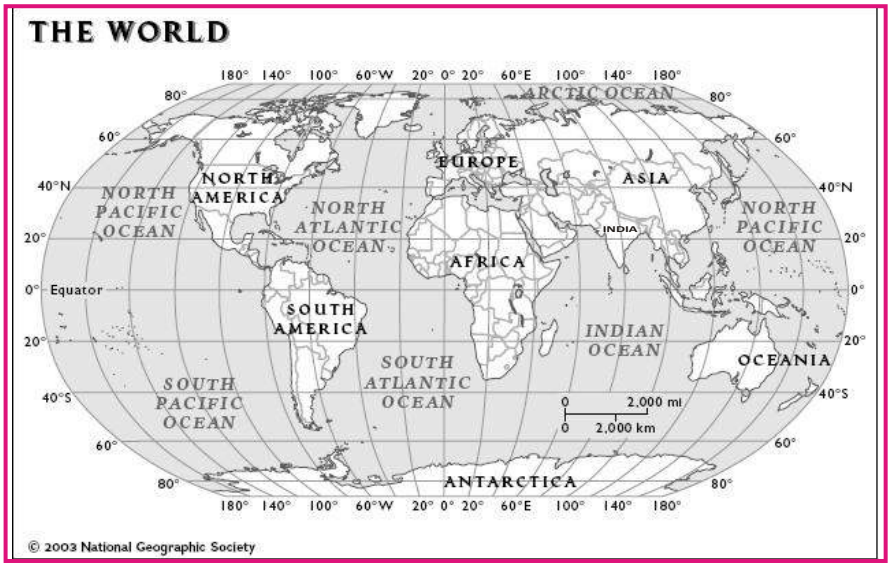


Figure 1.3: India and the World

INDIA'S NEIGHBOURING COUNTRIES

India holds a very important place in south Asia and it is also a member of SAARC which means 'South Asian Association for Regional Cooperation'.

Member countries of SAARC are:
India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan, Maldives, Afghanistan.

India's territorial boundary touches seven countries. These countries are Pakistan, Afghanistan, China, Nepal, Bhutan, Bangladesh and Myanmar. Sri Lanka and Maldives are island countries situated in Indian Ocean. Palk Straight and Gulf of Mannar separate Sri Lanka from India. Dhanushkoti situated on the main land of India is only at a distance of 24 kilometers from the coast of Sri Lanka. This linear chain of Islands is called Adam's bridge. The territorial boundaries in north and north-east are determined by mountain ranges. There is a region in Jammu and Kashmir where the boarders of India, Afghanistan and china meet each other. At some distance from this region, there are the borders of Pakistan and Tajikistan. Therefore, this region is very sensitive from the strategic point of view due to its closeness with the borders of five countries. Tibetan plateau is situated in the north-east of Jammu and Kashmir, which is under china now. Kailash mountains and Mansarovar lake is situated here. Hereafter, when we move towards north-east, we find one more neighbouring country of India in the lap of Himalayas i.e. Nepal. Culturally, Nepal is quite similar to India. From ancient, times India is having very strong relations with Nepal. Himalayan rivers originated from Nepal meet Ganges after passing through the plains of Bihar. The river of Kosi which is also known as 'Sorrow of Bihar' originates from Nepal. Both nations have developed a combined project on Kosi river, which also strengthens mutual cooperation and friendly relation between these two countries. The breakdown of Kosi river embankments on 18th August 2008, led to heavy flood in Bihar. Therefore, Nepal is more important to India from the political, economic and cultural point of view.

Bhutan is situated on the east of Nepal, which also has special ties with India.

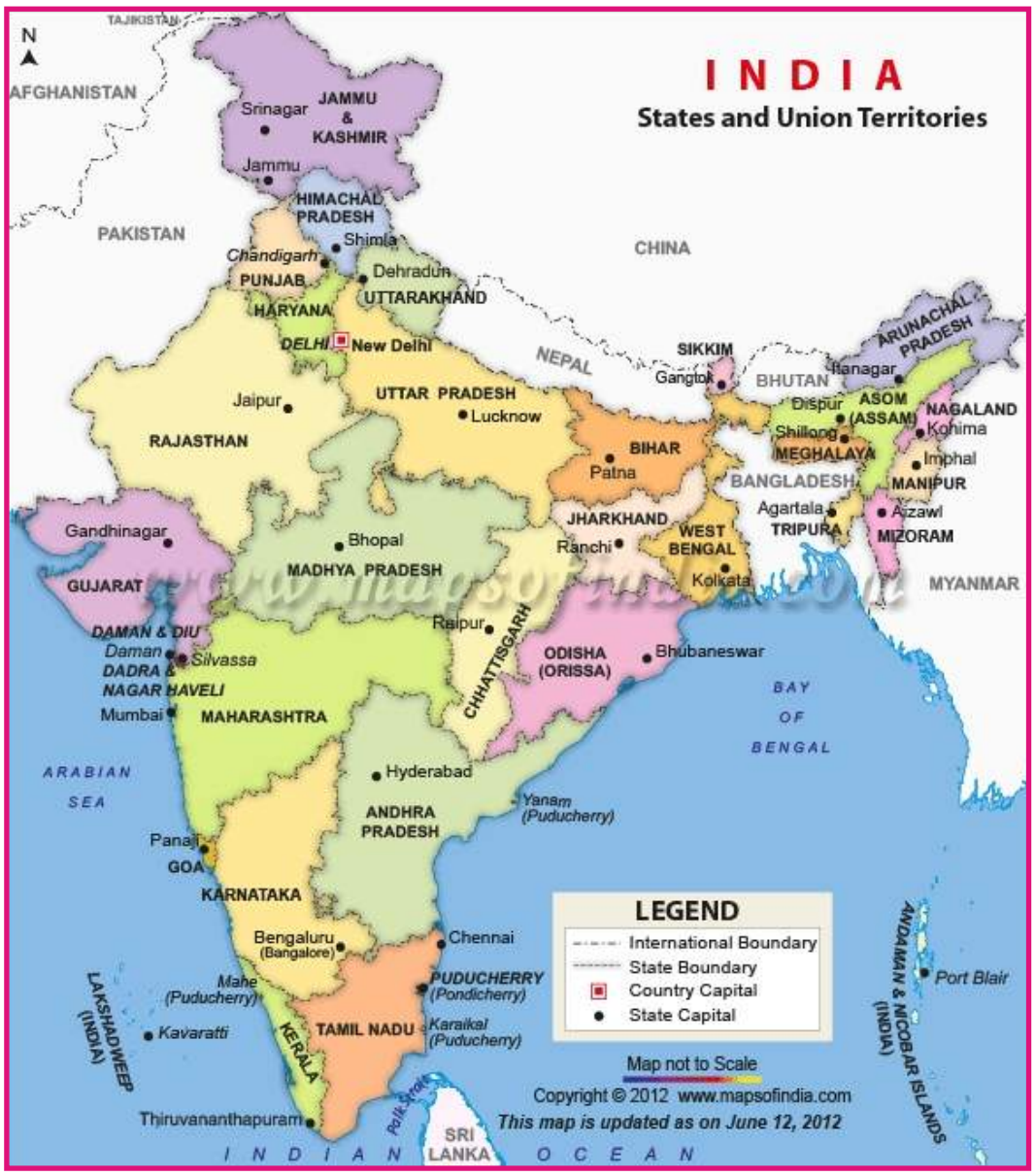


Figure 1.4: India and the Neighbouring Countries

Actually, the responsibility of security and development of Bhutan is highly depended on India. In the east of Bhutan, the border line between India and china passes through Himalayan ranges. The name of this border line is **McMahan line**. In the north-east of Arunachal Pradesh the boundary of India, china and Myanmar meet at a point.

Afterwards, there are Purvanchal hills. They separate India from Myanmar. Moving towards south, these hills get merged with Aarakan mountain range of Myanmar. Then, they get submerged in the Bay of Bengal and remerge in the form of Andaman and Nicobar islands. These mountain ranges situated in north and east region are very complex and rugged. As a result, transposition and communication in these regions have not developed much. Therefore, It is difficult for India to connect with its neighbouring countries via these areas. However, the modern technologies have brought changes in these regions. It has been possible to develop Indo-Tibetan Highway due to modern means of transportation. This highway passes through *Shipki la* pass. Another mountain way is Kashmir-Leh highway, which passes through very high mountain ranges. Third prominent highway passes through a pass in Sikkim. Due to the development of Airways, these high mountains are not unreachable now.

Find out : Boundaries of how many states of India, touches Pakistan and Bangladesh?

In the east of West Bengal, there is another neighbouring country Bangladesh. Similarly, Pakistan is situated in the west of India. The line which separates India and Pakistan is known as **Redcliff line**.

EXCERCISE QUESTIONS

OBJECTIVE QUESTIONS:

(1) Does which place in the world India have on the basis of area?

(a) 7^{th} (b) 9^{th} (c) 5^{th} (d) 8^{th}

(2) What is the difference in degree between the latitudinal and longitudinal expansion of India?
(a) 45^0 (b) 40^0 (c) 30^0 (d) 35^0

(3) What is the value of Standard meridian line of India?
(a) $83^0 30'$ (b) $81^0 35'$ (c) $82^0 30'$ (d) $80^0 30'$

(4) How long of coastal border line is India's territorial boarder line?
(a) Half (b) double (c) thrice (d) four times

(5) What is the name of the border line between India and China?
(a) Redcliff line (b) McMahan line (c) Greenwich line (d) None of these

FILL IN THE BLANKS:

(1) Total area of India is ……square km. which is ……% of the world's total geographical area.
(2) The mainland of India is expanded from ……..north to ……..north latitude and from ……..east to ……..east longitude.
(3) There are total …….. States and …….. Union territories in India.
(4) Sri Lanka gets separated from India through …… and……
(5) Kosi river is called as …… of Bihar which originates from …….. mountain of Himalaya.

GIVE REASON:

1. The latitudinal and longitudinal expansion of India is almost equal but their actual terrestrial distances are different. Why?
2. The residents of Arunachal Pradesh wake up 2 hours earlier as compared to the residents of Saurashtra in India? Why?
3. In India, the residents of Jammu and Kashmir wear woolen clothes in winters whereas at the same time the resident of the Kerala wear light clothes. Why?
4. The coastal border line of India is too long. Why?

SHORT ANSWER TYPE QUESTIONS:

1. Write the names of the countries in sequence, which have more geographical area than India?

2. Write the names of Island of India situated in the Bay of Bengal and the Arab Sea?
3. Write the names of all neighbouring countries, which touch the territorial boundary line of India?
4. Which states of India do not touch the international border line and sea coast?
5. What is known as Strait?

LONG ANSWER TYPE QUESTIONS:

1. What is the impact of longitudinal and latitudinal expansion of India on its time? Explain?

Map work

1. Identify the following with the help of map:
2. Capitals of all states of India
3. Capital of Union Territories of India
4. State having longest coastline
5. Southernmost point of India
6. Southernmost point of the main land of India
7. Strait which separates India and Sri Lanka
8. How many countries together form Indian sub-continent?
9. Identify the members of SAARC

PROJECT WORK

1. Find out the latitudinal and longitudinal expansion of your State. Find out names and positional directions of your neighbouring States.

2. Collect information related to the *Setu-Samudram* project.
   Collect information about Silk route. Also explore about different organizations which are involve in making roads on high altitudes and mountain regions.

Chapter-2

PHYSICAL FORM : STRUCTURE & RELIEF

Our country has a vast region, because of which we find variations in its physical forms. In some regions, we find high mountain ranges whereas at other regions, there are plateaus and large plains. In this way, various land forms have developed here, which are not similar at all places. The high mountain ranges at some reguins are covered with snow and at some regions with dense forests. Similarly, rivers also form rugged surfaces by cutting various plateau regions. They also affect plain regions which we can roughly see in figure 2.1.

The present physical form of India has taken millions of years to develop. In this long process, the geological activities below Earth crust as well as external forces such as weathering, erosion and deposition have played important role.

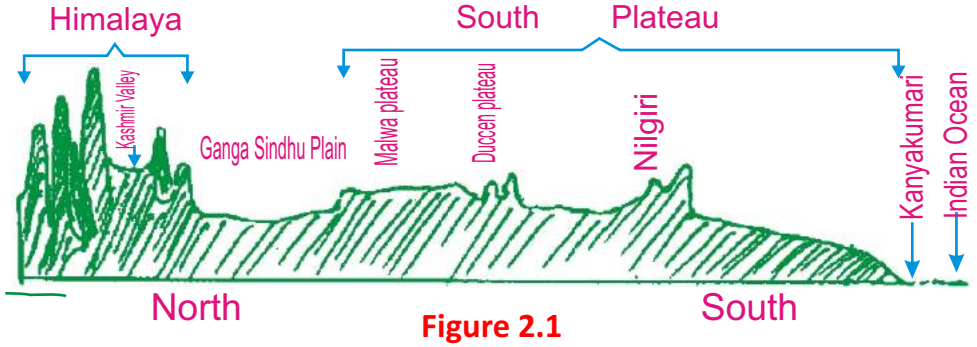


Figure 2.1

Geologists have tried to explain the formation of physical structure of India. There are various theories in this context, but at present majority of geographers have accepted the 'Plate Tectonic Theory'. According to this theory, Earth crust is divided into various plates. Peninsular Plateau of India for example is a part of one plate.

In 1965, Tuzo Wilson used the word 'Plate Tectonic', however W.J. Wilson firstly proposed the theory of Plate tectonic. According to this theory, the earth's outer crust is made up of six large plates and nine small plates.
Large Plates: 1. Indo-Australian Plate, 2. African Plate, 3. American Plate, 4. Eurasian Plate, 5. Pacific Plate, 6. Antarctic Plate
Small Plates: 1. Arabian, 2. Philippine, 3. Juan de Fuca, 4. Cocos, 5. Nazca, 6. Scotia, 7.Caribbean, 8.Somalia, 9. Bismarck
Plates form solid earth crust and between two plates the formation of plate boundary or tectonic takes place.

Peninsular plateaus are one of the oldest parts of earth crust. This part represents the oldest land form which never submerged in ocean. It means it is the most primitive, tough and fundamental part of India.
High pressure and tension get created in the inner and outer surface of earth crust due to the movement of plates which leads to folds, faults and volcanic activities.

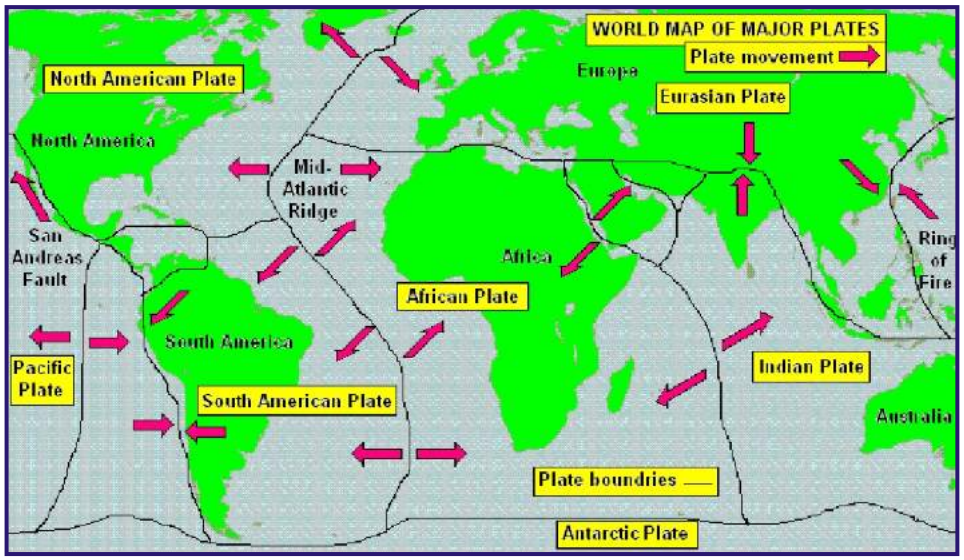


Figure 2.2: Major plates of Earth Crust

Broadly, the movement of the plates creates three types of tectonic boundaries: **convergent**, where plates move into one another; **divergent**, where plates move apart; and **transform**, where plates move sideways in relation to each other.Due to the movements, happening in these plates during millions of years, there has been a change in the position and shape of continents. The fundamental development of present land forms of India is a result of these movements.

Earth came into existence around five billion years ago. The age of Earth can be divided into four Eras: 1. **Azoic Era** 2. **Paleozoic Era** 3. **Mesozoic Era** 4. **Cenozoic Era**. These Eras have been further divided into periods. Pre Cambrian has the longest time period, from Earth's evolution to till fifty five crore years ago from now.

Twenty crore years ago, India was extreme far in southern hemisphere which was a part of Gondwana land. India, Australia, Africa and South America formed the major parts of Gondwana land. Converging currents have divided earth crust into several parts. Indian plate got separated from Australian plate and moved towards north direction which then collided with the larger 'Eurasian plate'. In this way about 7 crore years ago, there was a collision between the two plates which led to the folding of sedimentary rocks at 'Tethys' sea which was situated between them. Because of this collision, Asian mountain ranges have developed and whose development still continues.

The movement of plates near Arctic tectonic boundary is 2.5 centimeters and in Pacific.

Initially, there was only one supercontinent called as Pangaea. Its northern part is termed as 'Angara Land' whereas the southern part is termed as 'Gondwana Land' and there was 'Tethys sea' between these two land parts. Peninsular plateau of India is the part of Gondwana land and is the actual basis of Indian land.

Due to uplift of the Himalaya and down fold of the remaining parts of Tethys sea and deposition of sediments, a large basin was formed. Along with this, sedimentary deposition was also led by rivers of Southern plateaus. In this way, flat surfaced land areas were developed which is called the Great Plain of India.

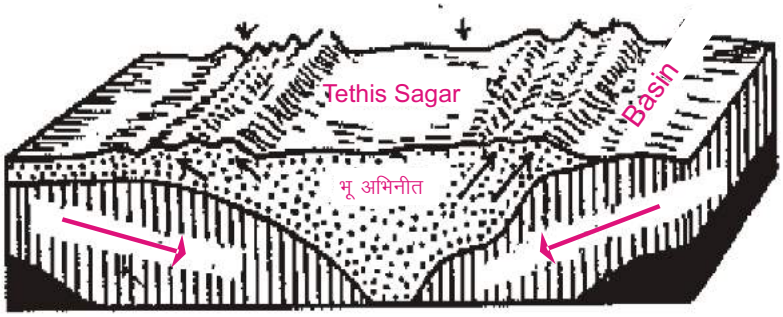


Figure 2.3: Formation of Young fold mountains

Coastal plains were developed due to sedimentary depositing brought by the rivers through plateaus and sea-tides. Andaman Nicobar islands are the residual of submerged mountains whereas Lakshadweep is formed by coral deposition.

Out of the total land area of India, 11% is mountain part, 28% is plateau, 18% is hilly region and 43% is plain regions. The average height of mountain and plateau region is between 300-900 meters. Contrary to this, plains and coastal regions have an average height of less than 160 meters. The average height of the northern mountain ranges is 1200 meters to 6000 meters. There are some mountains in this region having height more than 8000 meters and most of them are covered with snow throughout the year. Folds and faults are formed here due to pressure. Various valleys of Himalayas have been formed due to the lake deposition. *Wular* and *Dal* lake in Kashmir are the evidence of this in the form of remains. In the middle of Himalayan highlands, also called Himachal, there are deep gorges of more than 1000 meters through which several rivers flow. On the south of the middle Himalaya, there is Sivalik which also has several important valleys.

The Himalaya evolves from Pamir and move towards east. Then it takes a turn towards south by making an angle. After passing Brahmaputra

river it turns towards south where it is expanded as Patkai hills (Arunachal Pradesh), Naga hills (Nagaland), Manipur hills and Lushai hills (Mizoram). These are also known as Purvanchal range of hills. There are several small and large glaciers in the Himalayan region. The major glaciers are Gangotri, Yamunotri, Siachen, Baltoro, Biako and Batura. There are also several passes here, such as *Zoji la* and *Burzil* in Jammu and Kashmir, *Bara-Lach la* and *Shipki la* in Himachal Pradesh, *Thag la* in Uttarakhand, *Nathu la* and *Jalep la* in Sikkim.

In the south of northern mountain region, there is Great Plain which is formed by the sediment deposition of Ganges, Indus and Brahmaputra and their tributaries. Due to the emergence of Aravalli mountain ranges in the middle of this plain, Indus and its tributaries such as Jhelum, Chenab, Ravi, Beas and Sutlej flow towards west, whereas Ganges and its tributaries such as Yamuna, Gandak, Ghaghara, Saryu, Kosi , Mahananda, Son, etc. flow towards east. In this way, Aravalli mountain ranges acts as a water divider. The southern part of India is plateau region where many mountains exist in the north east and the west region. The average height of this region is 500 to 750 meters. Narmada river divides the plateau region into two parts. In the south of Satpura range, there is valley of Tapi river. Narmada and Tapi form narrow alluvial plain. Both these rivers flows through fault valley. On the northern end of this plateau region, there is Vindhyachal mountain range. There are also many mountains in the east and west of peninsular plateau. There is Western Ghat in the west which is also known as Sahyadri. Three major passes are here which are known as Thalghat, Bhorghat and Palghat. The Eastern Ghat mountains are discontinuous. Mahanadi, Godavari, Krishna and Kaveri flow through Easter Ghat and form fertile plain. The major hills of Eastern Ghat are Mahendragiri in Odisha, Nallamala in Andhra Pradesh, Annamalai, Pachamalai, Palani, Yelagiri hills in Tamil Nadu.

Coastal Plains have developed on the eastern and western side of Deccan plateau. In the west, this plain is narrow and discontinuous whereas broader and flat in the east. The Rann of Kutch is formed due to upliftment in sediment deposition by sea.

There are dry lands on the north of the Great Plains which is also called the desert of Rajasthan. This is a part of Thar desert. You may find many sand dunes here. A dune is a mound of sand formed by the wind, usually along the beach or in a desert. Dunes are formed when wind blows sand into a sheltered area behind an obstacle. Dunes grow as grains of sand accumulate. Every dune has a windward side and a slip face. A dunes windward side is the side where the wind is blowing and pushing material up. A dunes slip face is simply the side without wind. A slip face is usually smoother than a dunes windward side. The height of these dunes ranges from 120 to 150 meters.

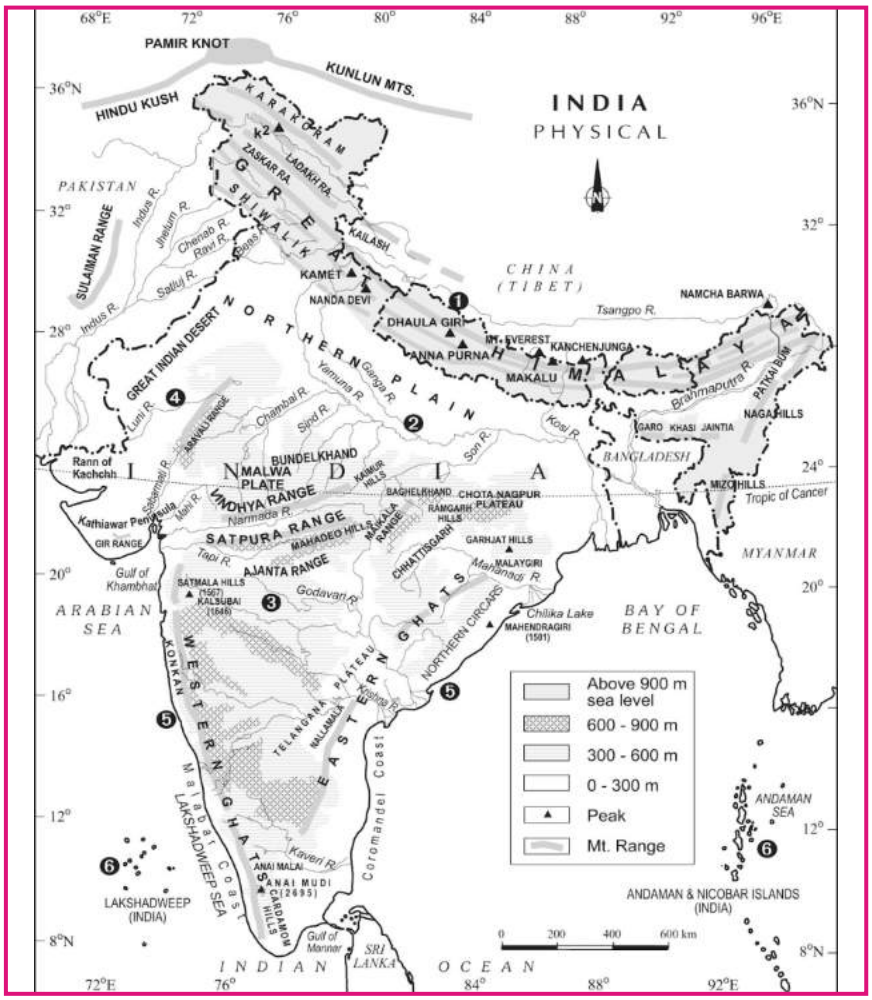


Figure 2.4: India- Major Geographical division

Physical Division- On the basis of physical features, India can be divided into following six divisions:

i. The Himalayan mountain ranges
ii. The Great Plains of Northern India
iii. The Peninsular Plateau
iv. The Coastal Plains
v. The Indian Desert
vi. The Islands.

i. The Himalayan mountain ranges

The Himalayas are the young fold mountains located along the northern boundaries of India. The Himalayas are the climatic barriers between India and the central Asia. They spread from west-east direction from Indus to Brahmaputra for 2500 km in arc shape. The Himalayan ranges cover around 5 lac square kilometres of area. Their width varies from 160 km in Arunachal Pradesh to 500 km in Kashmir. The eastern part has more height variations in comparison to the western part. Longitudinally, the Himalayas may be divided into the parallel ranges: Greater Himalayas or *Himadri*, Lesser Himalayas or *Himachal*, and Outer Himalayas or *Siwaliks*.

Some mountain peaks of Himalayas

Peak	Country	Height (Meters)
Mount Everest	Nepal	8,848
Mount Godwin Austin (K2)	India	8,611
Kanchenjunga	India	8,598
Makalu	Nepal	8,481
Dhaulagiri	Nepal	8,172

Nanga Parvat	India	8,124
Annapurna	India	7,817
Kamet	India	7,756
Namcha Barawa	India	7,756
Gurla Mandhata	Nepal	7,728

The Greater Himalayas or Himadri- The Greater Himalayas comprises the northern most ranges and peaks. It has an average height of 6100 metres and its width lies between 120 and 190 Kms. It is the most continuous range. It is snow bound and many glaciers are descend from this range. It has high peaks such as Mt. Everest, Kanchenjunga, Makalu, Dhaulagiri, Nanga Parbat etc. High Mountain passes also exist in this range, namely, Bara Lacha La, Shipkila, Nathu La, Zelepla etc. Zanskar range is also part of the Greater Himalayas. Ladakh mountain range lies on the north of Zanskar range. Karakoram mountain range is situation on the north of Himalaya and is called Trans-Himalaya. K2 (8611 km) is located here which is the second highest peak of the world. It is also known as mount Godwin Austin or *Gaurinanda Parvat*.



Figure 2.5: Himalayas

The Lesser Himalayas or Himachal- Another horizontal Himalayan range called lesser Himalayas or Himachal is situated in the south of the Greater Himalayas. It is the most discontinuous range of Himalayas which is made up due to high compression. The altitude of this range lies between 1800 and 4500 metres and the average width is 50KM. A few peaks of this range have height above 5000 meters. Rivers form George up to 1000 meters depth. There is snow fall during winters for 3-4 months in these regions whereas the summers are peasant and good for health. The Prominent ranges in this region are Pir Panjal, Dhaula Dhar and Mahabharata ranges. It comprises many famous hill stations such as Shimla, Mussoorie, Nanital, Darjeeling, etc. It also comprises famous valleys such as Kashmir, Kullu, Kangara etc. All mountain ranges are covered with dense Evergreen forests and also have grasslands which are called as '*marg*' in Kashmir (for example: Gulmarg, Khilanmarg and Sonmarg).

Punjab: It is a Persian word. '*Punj*' means Five and '*ab*' means Water. It means a '*region with five rivers*'.

The Outer Himalayas or the Siwaliks- The southernmost range of Himalayas is called outer Himalayas or Siwaliks. It is the outer most range of the Himalayas which starts from Potwar Plateau region in the west and continues till Tista river in the east. It is the youngest part of the Himalayas. The altitude varies between 900-1500 meters with average height of 1200 meters. The width lies between 10-50 km. They have low hills such as Jammu hills, Miri hills, Mishmi hills etc. The valleys lying between Siwalik & Lesser Himalayas (Himachal) are called Duns like *Dehera Dun*, *Kotli Dun* and *Patli Dun*. The north-west hilly region of West Champaran District in Bihar is the part of Himalayan Siwaliks range. Its covers about 856 square kilometres of area in Bihar and is known as Someshwar Hills.

The Himalayas can also be divided on the basis of regions from East to West. The river Brahmaputra marks the eastern most boundaries of Himalayas and Indus river as the western most boundary.

The regional classification of Himalayas is:

- **Kashmir Himalayas**-They lie between river Indus and Sutlej
- **Kumaon Himalayas**-They lie between Sutlej river and Kali river. This region comprises is from lakes such as Nanital, Bhimtal and Nankuchiatal, etc.
- **The Nepal Himalayas**-This stretch is from Kali to Tista. They consist of highest peaks of the world such as Mt. Everest, Dhaulagiri, Annapurna, Makaln, etc.
- **The Assam Himalayas**-This region extends from Tista to Dihang (Brahmaputra). It consists of several hills such as Mizo, Naga, Garo, Khasi, Miri etc. They are also known as Purvanchal hills.

As you know that Brahmaputra river forms the eastern most boundary of the Himalaya. After Dihang George, it takes a sharp turn towards south and spread along eastern border line of India. It is also known as Purvanchal hills or Eastern Hills. These hills are in the north east States of India. Patkai hills (Arunachal Pradesh), Naga hills (Nagaland), Manipur hills and Lushai hills (Mizoram) are situated here. The southern slope of the Himalaya is very sharp in comparison to its western slope. Therefore, glaciers have been created more on northern slope than the southern slope.

ii. The Great Plains of Northern India

The Northern Plains are located between the Himalayas in the north and the peninsular plateau in the south. It is formed by the deposition of the sediments brought by three main river systems namely the Indus, the Ganga and Brahmaputra and their tributaries. The Northern plain spreads over an area of seven lakh sq. Km and is highly populated. It stretches about 2400 Km from east to west. Its width varies between 150-500 Kms. The northern plain spreads mainly in the states of Punjab, Haryana, Uttar Pradesh, Bihar and West Bengal. The alluvial soil here is rich in nutrients and hence good for cultivation. The great plain is maximum 240 meters above the sea level. The Western part of the Great plain has slope towards south-west from north-east and Easter part has slope towards south-east from north-west.

The Great Plain can be broadly divided into four subparts:

Plains of the Punjab (Western Part): It is made up by Indus river and its

tributaries. Its maximum region is in Pakistan. Western part of Haryana and Punjab of India, is also included in this part. Jhelum, Chenab, Ravi, Beas and Sutlej are the major tributaries of this region which originate from Himalaya. The region between Ravi and Beas rivers is called as '*Upper Bari doab'*, whereas '*Bist doab'* is formed by Beas and Sutlej rivers.

Plains of Rajasthan (South western Part): The average **its** height of this plain is form 150-300 meters and its normal slope is towards south-west from north-east. Its expansion is in the west of Aravalli ranges. It is basically semi-arid or dry region. Sand dunes are major landforms here. In the eastern part, there are many hills which are called '*Tor*'. Luni is the major river of this part which extends up to Rann of Kutch in rainy seasons. There are several famous salt water lakes in this part such as Sanvar, Degna, Didwana and Kuchapan.

Plains of Ganga (Central Part): It expands from Yamuna river to the western border of Bangladesh. It is about 1,400 km long from Ghaggar to Tista river. The slope of this region is generally towards north-west from south-east. This plain spreads mainly in the states of Uttar Pradesh, Bihar, West Bengal and some parts of Jharkhand. This can be further divided into three subparts: **Plain of Upper Ganga** (the region between Delhi and Allahabad), **Plain of Central Ganga** (the region between Allahabad and Farakka) and **Plain of lower Ganga** (delta region and West Bengal).

Except the north-west part of Siwalik range and a few hills in southern part, the major part of Bihar is formed by the alluvial soil brought by Ganga and its tributaries. Here, the plain of Ganga is divided into two parts: the Northern plain of Ganga and the Southern plain of Ganga. Gandak, Budhi Gandak, Bagmati, Kamala, Kosi and Mahananda are the major rivers in the northern plain. Kosi is called as 'Sorrow of Bihar' due to its flood consequences. The flood also forms residual lakes, marshy lands *(daldal)*, etc. In the southern plain of Ganga, the major rivers are Son, Punpun, Falgu and Chanan. These rivers generally become dry in summer seasons. The low land is called as '*Jalla*' and '*Taal'* here. These are also the regions of new Alluvial soil.

Plains of Brahmaputra (Eastern Part): Its expansion is about 650 kilometres from the north-east of Sadia in Assam to Dhuwari land. It is surrounded by hills from all sides except western part. The gradual slope of this region is from north-east to south-east. Brahmaputra river flows between this region and *Majoli* island situated in the middle of this river is world's largest river island.

On the basis of physical features, the Great plain has been divided into four parts. A 8-16 km width region belt is formed with the deposition of small pebbles and stones at the mountain bed when we come down from Siwalik slope. This deposition is called '*Bhabar*'. Small rivers get extinct here. On the south of this region belt, rivers again get emerged which lead to the formation of wet and marshy lands, called as lowlands or '*Taraai*'. There are tall grasses a*n*d dense forests in this region with rich wildlife.

The high lands formed due to the deposition of rivers in Gangetic plain*s*, are out of the reach of flood water. These are called '*Bangar*'. Limestone deposition is also found in the soil of this region. The low plain, where flood water reaches every year and causes sediment deposition is called as '*Khadar*'. Each year, the soil in *Khadar* region is renewed; therefore it is very fertile and ideal of extensive cultivation.

iii. The Peninsular Plateau

It is a triangular shaped land and part of primitive Gondwana land. It is wider in the north and narrow in the south. The average height of this land is about 600-900 meters. Aravalli, Vindhyachal and Satpura ranges are situated in the west of peninsular plateau. The western slopes of the plateau are higher than the eastern part. The Western Ghat (It is a continuous ridge or hills) and the eastern Ghat are on the edges of the peninsular plateau. The Peninsular plateau is broadly divided into:

(a) The Central Highland
(b) The Deccan Plateau

(a) The Central Highland- The major part of central highland is called as Plateau of Malwa. This region is surrounded by Mahadev range in the east,

Aravalli range in the north-west and Vindhyachal range in the centre. The desert of Rajasthan is situated in its west. Chambal, Sindh, Betwa and Ken are the major rivers of this region. The slope of this region is from the south-west to the north-east. The region is wider in the west and narrow in the east. Its eastern expansion is locally known as Bundelkhand and Baghelkhand. Its eastern most expansion is Chota Nagpur plateau where Damodar and Swarnrekha rivers flow.



Figure 2.6: Peninsular Plateau

There is Satpura range parallel to Vindhyachal range, and also Amarkantak and Chota Nagpur plateau in the east. Dhoopgarh peak (1350 meters) of Satpura range is situated on Panchamardi hills. In Bihar, the expansion of Chota Nagpur plateau is upto the southern end of Gaya district. Damodar, Sone and Swarnrekha flow through the plateau. Its western central part is 1100 meters high, which is called as 'Paat' region and the highest region of Chota Nagpur plateau. Plateau of Ranchi is in its east with average height of 600 meters. Third is the plateau of Hazaribagh whose average height is 300 meters. Here, Parasnath hill is situated which is 1365 meters high.

On the south of Satpura range, there is Tapi river valley. Narmada and Tapi, both rivers flow through faults. Aravalli hills spread from south-west in Gujrat to north-east in Delhi. Near Delhi, they are called Hills of Delhi. The average height of Aravalli hills is 300.920 meters. In south-west, mount Abu is one of its peaks, which is 1722 meter high.

(b) The Deccan Plateau- The Deccan plateau is also known as Deccan trap. It is formed by lava because of volcanic eruptions. It covers an area of nearly 5 lakh sq.km. It is mainly spread over the states of Madhya Pradesh, parts of Maharashtra, Western Andhra Pradesh, Karnataka and Tamil Nadu. The estimated depth of lava here is about 2134 meters, however the depth is comparatively less in the east and west side.

The Western Ghats or Sahyadris lies 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 1000mt. The famous peaks in this area are Doda betta, Anainnudi, Makurti etc. Doda betta (2670 meters) is one of the highest hills of this region. The highest peak in South India is Anaimudi (2695 Meters) which is situated on Annamalai hills. Western Ghats are continuous and have famous passes such as Palghat, Thalghat, Bhorghat and Shinkota. The streams form rapid water falls before entering the Arabian Sea. The famous waterfalls are Jogfalls on Sharavathi, Shivanasamudra falls on Kaveri, etc. form fertile plains and deltas.

The Eastern Ghats are discontinuous low belt. Their average elevation is 600 meters. They run parallel to the east coast from south of Mahanadi valley to the Nilgiri hills to the length of 1800 km. The famous hills are Mahendragiri hills in Odisha, Nallamallai hills in Southern Andhra Pradesh, Annamalai, Pachamalai, Palani, Yelagiri hills in Tamil Nadu. These hills are separated by rivers such as Mahanadi, Godavari, Krishna and Kaveri which

iv. The Coastal Plains

The coastal plains in India run parallel to the Arabian Sea and Bay of Bengal along the peninsular plateau. These plains are formed by sediment deposition caused by the action of rivers and sea. There are two majorparts in these plains, the Western Ghat and the Easter Ghat. The western coastal plain is a narrow belt along the Arabian Sea with average width of 10.60 km. It stretches from Rann of Kutch to KanyaKumari. The rivers of this region have very fast stream that leads to the formation of estuaries on the mouth of the rivers since there is no sediment deposition. In the south of this region, lagoons are formed which include the coastal region of Saurashtra and Kutch. The northern and southern part of Western Ghat is respectively called as Konkan and Malabar.

The eastern coast runs along Bay of Bengal. It is wider than the western coastal plain. Its average width is from 160 to 350 Kms. It spreads from the delta formed by Ganga river to Kanyakumari. Eastern coastal plain is marked by deltas made by the rivers Mahanadi, Godavari, Krishna and Kaveri. There are also lagoons along this coast. The lake Chilka (largest salt water lake in India) in Orissa is found to the south of Mahanadi delta. The northern part of the coast is called Golkunda coast and the southern part is called coromandel coast.

v. The Indian Desert

The Great Indian Desert is situated in the western Rajasthan. It lies towards the western margin of Aravalli Hills and is also called Thar Desert. Its length is 644 km and width is 160 km. The total area under this region is about

1,04,000 square kilometres. This region has semi-arid and arid weather conditions. It receives less than 15 mm of rainfall per year. Luni is the major inland river of this region. All other streams appear only at the time of rainfall otherwise they disappear into the sand. Sand dunes and Barkhans are the major landform in this reason.

vi. Islands

There are in total 1256 islands under the water boundary of India. These islands are basically in two groups. There are 572 islands in the Bay of Bengal out of which 36 have human habitation. 43 islands are in Arabian Sea. Along with this, there are several islands in the delta of Gangasagar and Mahanadi. There are also small islands between India and Sri Lanka. In the same way, Gujarat, Kerala, Maharashtra and Karnataka also have some coastal islands. The Andaman & Nicobar Island extend from north to south in Bay of Bengal. They are bigger in size. Channel 10^0 divides this islands group into two parts. These islands are the upper part of submerged mountains. 'Indira point' ($6^0$30' north latitude) is the southernmost point of India which got submerged into the sea after 2004 Tsunami. Now it has emerged again. These islands are endowed with variety of flora and fauna. An active volcano can be located on the Barren Island in Andaman & Nicobar group Islands.

Lakshadweep and Minicoy islands are located in the Arabian sea. These islands are formed by coral deposition. Channel 11^0 divides this group of islands in two parts.

In this way, through the study of this chapter, we got aware about the natural division of India. Along with multiple variations in these landforms, they are also supplementary to each other and enrich out natural resources. The Northern mountain region is a vast source of water and forests. Similarly the plains are the source of grains and foods. Recently, through a geological survey mineral oil reserves are found under Ganga basin. Along with this, the Great plains were also the basis of ancient civilizations. The southern plateau region is full of mineral resources which is very important for our industrial development. Coastal regions are well fertile for the cultivation of rice and also for fishing industry. Several harbours have also developed here.

Therefore, these physical variations are the basis of natural resources of India.

EXERCISE QUESTIONS

OBJECTIVE QUESTIONS

(1) Which of the following peak is not situated in India?
(a) K2 (b) Kamet (c) Mount Everest (d) Nanda Devi

(2) Which range of Himalaya is situated on the North-west end of Bihar?
(a) Greater Himalaya (b) Sivalik (C) Middle Himalaya
(d) Eastern Himalaya

(3) Which theory about the formation of Himalaya is widely accepted?
(a) Continental displacement theory (b) Territorial movement theory
(c) Plate Tectonic theory (d) None of these

(4) Find out the height of Saddle peak.
(a) 515m (b) 460m (c) 642m (d) 738m

(5) The most primitive land part of India is...
(a) Peninsular plateau (b) Great plains
(c) Parts of Northern mountain (d) Coastal part

SHORT ANSWER TYPE QUESTIONS

1. Write the name of three parallel ranges of the Himalaya?
2. Name the highest mountain peak of the Karakoram range?
3. Which coastal plain is comparatively broader?
4. Name the three lakes situated in the coastal plain?
5. What is another name of the Western Ghat Mountain?
6. Mention four main characteristics of Central Plain of Ganga.
7. Write two important differences between Himalayan mountains and Peninsular mountains.
8. What is *Khadar* and *Bangar* ?

9. Mention the difference between the Eastern Ghat and the Western Ghat?

LONG ANSWERS QUESTIONS

1. Write the characteristics of the Northern Great Plains?
2. Name the parts of peninsular plateau and elaborately discuss one of its parts?
3. Mention the characteristics of Himalayan Mountain ranges.

FIND OUT

1. Mention the important Glaciers and Passes in Himalaya.
2. Name the states of India where the high peaks of Himalaya are situated.
3. Locate Mussoorie,, Nainital and Ranikhet and name their respective State.
4. In which river and state the world's largest river Island situated is?
5. Where is the only active volcano of India situated?

MAP WORK

Show the following on the political map of India:

1. **Mountain Ranges**- K2, Kanchenjunga, Nanga Parvat, Nanda Devi
2. **Plateaus**- Chota Nagpur, Bundelkhand, Malva
3. Thar Desert, Aravalli Hills, Ganga-Yamuna
4. Plains of Punjab, Plains of Brahmaputra

ACTIVITY

1. Explain the water divider with the help of figure.
2. Prepare the Physical form of India with clay.
3. With the help of thermocol, prepare the structure of India and show the mountains and plateaus.

CHAPTER – 3

DRAINAGE PATTERN

The word 'Drainage' means flow of water. If you look at the physical map of India, you will find that small streams that flows in different areas combine together to form a major river. In the end, these rivers discharge themselves in large water bodies like Lake or Sea or Bay. The water of a region that flows through a river system is called drainage basin. When a highland, e.g., Mountain, separates two neighbouring drainage basin then this type of highland is called 'Water Divide'.

The development of any drainage pattern is determined by the topography of that particular region. The rivers of India can be divided into two parts on the basis of land forms:

1. Rivers of Himalayas
2. Peninsular Rivers

As these rivers originate in different geographical regions, they are different from each other. Their difference is evident from the following description:

DO YOU KNOW?

Amazon river basin is the largest drainage basin of the World.

FIND OUT

Which river has largest drainage basin in India?

RIVERS OF HIMALAYAS

Most of the Himalayan rivers are perennial. Apart from rainfall, these rivers continuously receive supply of water, all the year round, by the melting snow on the peaks of the Mountains. Rivers like Indus and Brahmaputra

originate from Himalayas. These rivers have cut down the Mountains to form gorges during the course of their flow (Fig. 3.1).

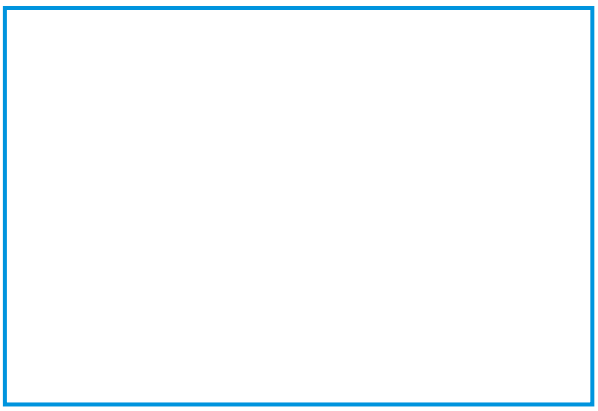


Fig.3.1 Gorge

The rivers originating from Himalayas, right from their origin point to their journey up to the Sea, they perform several functions. On the upper parts of their course they cause massive erosion and carry with them loads of eroded materials like silt, sand, soil, etc. As the rivers move forward the mass of sediments increases. In the middle and lower courses where the slope of the land becomes less, it becomes difficult for the rivers to carry the sediments brought by them. As a result of which, the rivers begin to meander and land types like Oxbow lakes, flood plains and deltas are formed by them

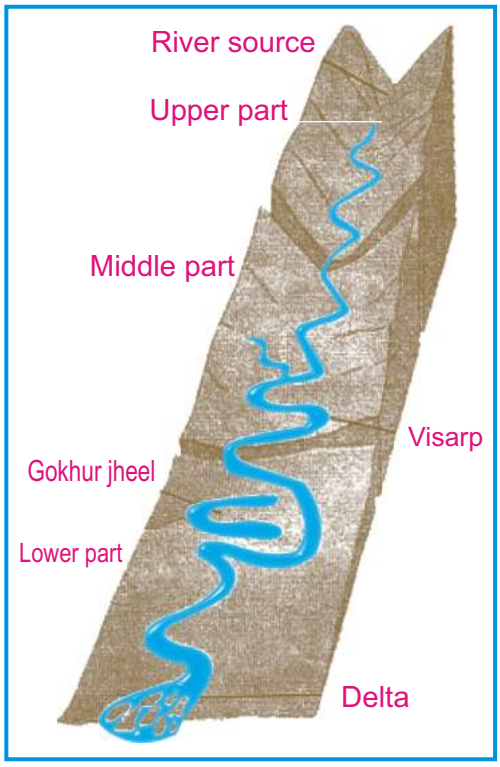


Fig.3.2 Different stages of the rivers

PENINSULAR RIVERS

Most of the peninsular rivers are seasonal whose main source is rain water. In summer season and dry weather when there is no rainfall the water level of large rivers decreases to a very low level and these rivers turn in to small streams or *nalas*. Few rivers from these emerge out of the plateau and the western Ghat Mountains and move westwards and discharge themselves in to Arabian Sea. But, most of the Peninsular rivers emerges out of western Ghats and discharge their water in

the Bay of Bengal. These rivers are shallow and short in length. These rivers also form waterfalls at a number of places. Deltas are formed by the rivers which discharge in the Bay of Bengal and Estuaries are formed by the rivers which discharge in to the Arabian Sea.

IMPORTANT RIVERS OF INDIA

A study of the drainage map of India makes it clear that Indus, Ganga and Brahmaputra are the important rivers of the Himalaya. These rivers are long and deep. Apart from major rivers they have several tributaries also. In peninsular India also there are number of rivers that drain the region and finally discharge their water either in Bay of Bengal or Arabian Sea. The description of these rivers are given below:

ACTIVITY

Make a list of the Peninsular rivers through which it could be identified as to which river discharges in Bay of Bengal and which discharges in Arabian Sea.

DO YOU KNOW?

Rivers form natural embankments (Levee) through the deposition of sediments that they carry with them. These embankments are considered to be most ideal place for human habitat in flood plains.

FIND OUT

On which river's natural embankment (Levee) is Patna, the capital of Bihar situated?

RIVER INDUS

River Indus is one of the largest rivers of India. It originates from the Mansarovar Lake near Tibet and moves in south – west direction and enters India in Ladakh district of Jammu and Kashmir. The drainage area of this river is spread over in about 250 square kilometers which is joined by important rivers such as Zaskar, Nubra, Shyok, and Hunza. In Ladakh Indus river forms a gorge known as Gilgit gorge. It is the main center of attraction for tourism. It passes through Baluchistan and Gilgit and finally emerges out of the hills in

Attock. Here, the Satluj, the Beas, the Ravi, the Chenab and the Jhelum joins Indus at Mithankot (Pakistan).Then, this river flows towards south – west and forms a plain just before Karachi and finally discharges into the Arabian Sea. The length of this river that originates in Himalaya is about 2900 km. One third drainage area of this river is in India (Jammu – Kashmir, Himachal Pradesh and Punjab) and the rest is in Pakistan.

RIVER GANGA

The main channel of this river 'Bhagirathi' rises from 'Gaumukh' of Gangotri glacier situated in the Himalayas. At Devprayag situated in Uttrakhand, the Alaknanda meets Bhagirathi and from here it flows by the name of Ganga. The river Ganga enters the plains near Haridwar. The river has a length of 2525 km. which flows through Uttrakhand, Uttar Pradesh, Bihar and West Bengal, it passes through Farakka and enters Bangladesh where it is called Padma. River Hoogly is the main branch of Ganga in India. Look at the Fig. 3.3 and study the Ganga drainage area. Many Himalayan rivers – Yamuna, Ghaghra, Gandak, Kosi, etc. are its tributaries. Apart from these, rivers rising from central highlands e.g. Sone, also joins ganga. The Ganga river is divided into two parts near Farakka – first, Hoogly in the form of a distributary of Ganga, crosses the delta region and finally discharges into Bay of Bengal. The second part in the form of main channel enters Bangladesh where it is joined by river Brahmaputra and this confluence is called 'Meghna'.

Rivers Ganga and Brahmaputra, before discharging themselves in to Bay of Bengal, form a large delta which is known as 'Sunder van delta'.

The mountain or plateau which separates flow of the rivers in two directions is known as 'Water divide'. Aravali highland between Indus and Ganga is an example of water divide. Aravali town is situated on the water divide of Ganga and Indus. The length of the plain from Aravali to Sunder Van is 1800 km. and its slope reduces at the rate of 1meter/6km. towards Sunder van.



Fig. 3.3 Drainage pattern of Indian rivers and important water divides

RIVER BRAHMAPUTRA

This river rises from the Mansarovar Lake situated in Tibet. Its length is more than 2900 km. but most of its drainage area, like Indus, is situated outside India. This river in the north flows parallel to Himalayas and near Namcha Barwa peak it makes a U shape bend and enters Arunachal Pradesh through gorge. It is also known as 'Dihang' in local language here. Near Assam Budhi Dihang, Disang, Kapoli Lohit, Kenula and other tributaries joins Brahamputra river. Its Himalayan tributaries are Sunavshree, Kameng, Dhanshree, Manash and Tista.

The river Brahmaputra rises in Tibet which is a cool and dry region where amount of silt is almost nil in river waters but when this river passes through high mountainous region and is joined by a number of channels in Assam then amount of water and silt increases in it. Here, it turns into braided channels and forms many islands (Diara).

DO YOU KNOW?

Brahmaputra river is known as 'Tsangpo' in Tibet and 'Jamuna' in Bangladesh. It is a type of Antecedent river.

ACTIVITY

Make a list of important Antecedent rivers that drains Bihar.

Every year in rainy season, due to increase in sedimentation in river valley, the water flow crosses the embankments and spreads in nearby areas and takes the form of floods. It causes immense loss to life and property in Assam and Bangladesh. In comparison to other Himalayan rivers, due to large amount of silt deposition in Brahmaputra river, the course of the river keeps on changing time and again.

RIVER YAMUNA

River Yamuna rises from the 'Yamunotri glacier' of Himalaya and covers a distance of 1375 km. and joins river Ganga near Prayag (Allahabad). Its important tributaries are Chambal, Betwa, Ken, etc. which join it at its right bank.

RIVER GHAGHARA

This river rises from Mapchachungo glacier situated in Karnali in Trans– Himalayan region. This river flows in south – east direction and crosses the Himalayas. It is called Karnali in mountainous region and Ghaghara in plain region. This river drains Nepal and near Chapra it captures water of Sharda river and then finally joins Ganga. It is also called Saryu in Uttar Pradesh.

RIVER GANDAK

This river rises from great Himalayas and crosses Nepal and enters Champaran of Bihar. There is a continuous change in its course and due to excess deposition of sediments floods occurs frequently here. There are many ancient legend associated with this river.

RIVER KOSI

This river also rises from 'Gosaithan' of the Great Himalayas and crosses Nepal and enters Supaul district of Bihar. The main channel of Kosi is called 'Arun' near its source. Its other important tributaries are Milachi, Bhotia, Sapt kosi, Tamba, likhu, Dugdh and Tambur. In addition to these, it joins other channels also and finally meets Ganga near Kursela (Saharsa). The length of

DO YOU KNOW?

The flood plain formed by the new alluvium brought by river Ganga is also called 'Tal'.

- FIND OUT –

Where the Tal does extends in Bihar?

this river is about 230 km.

This river is also famous for sudden change of its course and erosion. Kosi, on the one hand, forms fertile plain by its alluvium whereas on the other it brings curse through its disastrous floods. Embankments have been built on its both banks for the protection from flood.

DO YOU KNOW?

Large scale destruction is caused by river Kosi through its floods in Bihar. That is why this river is also called the 'Sorrow of Bihar'.

RIVER NARMADA

River Narmada originates from the Maikal hills near Amarkantak in Madhya Pradesh and moves towards west in a fault valley. Before discharging in to Gulf of Cambay near Bharoch, it forms several admirable structures and places. Near Jabalpur in Bheraghat, this river flows in a deep gorge in marble rocks and forms 'Dhuandhar Prapaat' (Kapildhara). Most of the tributaries of Narmada are small and meets the main stream at right angle. The length of this river is 1, 312 km. which drains the states of Madhya Pradesh and Gujarat. It is the second longest river of the Peninsular India.

RIVER TAPI

River Tapi originates from the Satpura hills situated in Baitul district of Madhya Pradesh. Like river Narmada, it emerges from the fault valley and runs parallel to river Narmada and drains the states of Madhya Pradesh, Gujarat and Maharashtra and finally discharge itself in the Gulf of Cambay. Purna is its only tributary near Surat.

Other than this, river Sabarmati and Mahi of Gujarat are important amongst west flowing rivers. Other than these, there as many rivers that emerges from western Ghat and discharges in Arabian Sea. They include Mandawi and Juari of Goa, Kalindi, Gangaveli, Sharvati and Netravati of Karnatka and Periyar, Pamba and Manimala of Kerala. They are small but

Rapid flowing rivers. River Luni is very important amongst the rivers of Rajasthan that drains the desert parts.

DO YOU KNOW?

The hot water and Cold water springs of Rajgir and Kakolat respectively are examples of waterfalls situated in Bihar.

RIVER MAHANADI

This is the third longest river in Peninsular India that discharges itself in the Bay of Bengal. It is 890 km. long; this river emerges near Raipur situated in Chhattisgarh and drains Odisha and finally discharges in to Bay of Bengal. Its drainage system extends in Chhattisgarh, Jharkhand and Odisha. Its important tributaries are Shivnath, Hansdev, Mand, Jonk and Tel.

DO YOU KNOW?

Which are the states that are drained by river Sabarmati and Mahi?

RIVER GODAVRI

This river rises from western Ghat near Nasik in Maharashtra. Its basin is spread over in Maharashtra, Madhya Pradesh, Odisha, Andhra Pradesh and Karnatka. It is the longest amongst the Peninsular rivers with a length of 1450 km. 50% of the drainage basin of this river has developed in Maharashtra. Its important tributaries are Pranhit wardha, Manjira, wanganga and Penganga. Due to its large size and extension, is called by the names like 'Dakshin ki Ganga' or 'Bridh Ganga'.

RIVER KRISHNA

It emerges from a source near Mahabaleshwar (Maharashtra), situated in the western ghat and drains a total distance of 1290 km. and finally discharges itself into the Bay of Bengal. Its drainage basin extends in the states of Maharashtra, Karnataka, Andhra Pradesh. Its important tributaries are Dudhganga, Panchganga, Tungbhadra, Koyana, Ghatprabha, Malprabha, Musi and Bhima.

RIVER KAVERI

Kaveri rises from the Brahamagiri hills situated inthe western ghat. Its length is about 760 km. The drainage basin of this river is spread over in the states of Tamil Nadu, Kerala and Karnataka. Its important tributaries are Amaravati, Bhavani, Hemavati, Logpawani, Akavli, Lakshman Tirth and Kabini. Finally, this river discharges its water in the Bay of Bengal south of Kudlur situated in Tamil Nadu.

Apart from above mentioned rivers, there are number of small rivers which flow in the east direction. Among these Damodar, Brahmani, Baitarani and Subarnarekha are important.

DO YOU KNOW?

Shiva – Samudram waterfall, on Kaveri river, is the second largest waterfall of India. The power station of this water fall transmits electricity to Mysore and Kolar gold mine region.

FIND OUT

Which is the largest waterfall of India? Where is it situated?

LAKES

You are acquainted with Dal and Wular Lakes situated in Kashmir, Nainital, Sambhar Lake of Rajasthan, Kanwar Bird sanctuary of Begusarai, Saraiyamaan of Bettiah, Lakshmisagar of Darbhanga . They are a source of human use and a centre of attraction for the tourists as well.

Have you ever tried to know the importance of Lakes? Think, if there had been no Lakes on these places then could these places have attracted so many tourists as they are doing today? Generally, a large depression filled with water is known as Lake but there is difference in the size and type as well as the nature of Lakes. Lakes are formed by the accumulation of rain water and melting of the glaciers and ice sheets. Mainly Lakes are formed because of the Natural causes.

Following are the types of Lakes from the formation perspective -

1. **Rift Valley Lakes:** When water is accumulated in the Rift valley then this type of lake is formed. The number of such Lakes is more in Africa. Victoria, Rudolf, Nyasa are examples of such Lakes. In India an artificial Lake has been created in the rift valley by Tilaiya Dam.
2. **Oxbow Lake:** When amount of sediments increases in rivers or slope of the land becomes less, then meanders are created in its course. Finally, the meander part is separated from the main channel which looks like hoof of a cow and this is called oxbow Lake. A number of such Lakes are found in the north Bihar. Saraiyamaan of Bettiah or Kanwar Lake of Begusarai are its examples.
3. **Crater Lake:** When emission of ash and lava stops from the crater of the Volcano, then rain water begins to accumulate in the crater and this turns crater into a Lake. Lake Titicaca of Bolivia and Lake Von of Turkey are its examples. Lonar Lake of India has been formed in a similar way.
4. **Lagoon Lake:** Through spit and Barriers (Bars), in coastal areas, when sea water is separated from Sea then this type of Lakes are called Lagoon. Chilka Lake and Pulikat Lake situated in India are examples of Lagoon.
5. **Barrier Lake:** At times in mountainous region, due to land slide, the rocks fall in the river and stop the flow of the river water resulting in to formation of Lake. This is called Barrier Lake.
6. **Glacial Lake:** Nainital, Bhimtal, Sat Tal etc. are beautiful examples of the glacial created Lakes in the Himalayan region.
7. **Lakes created by Geological activities:** Wular Lake in Jammu and Kashmir is the largest fresh water Lake of India. Lakes are also created when Dams are constructed on rivers for the production of hydro electricity e.g. Govind Sagar Lake was created when Bhakhra Nangal Project was developed. Fresh water lakes like Loktak and Badyani along with Saline water Sambhar Lake of Rajasthan are examples of this type of Lakes.

Generally, it is seen that in deserts and semi dry regions saline water lakes are found where as in cold and mountainous regions fresh water lakes are found.

Lakes are very useful to mankind. During excess of rainfall or floods, lakes stabilises the flow of rivers in both the situation. During dry periods the utility of stored water increases. Lakes are also useful in the production of hydro electricity. It also normalises the climatic conditions of nearby areas. Lakes help in the strengthening of water cycle along with making the natural setting beautiful, attractive and enjoyable.

RIVERS AS LIFE LINE OF HUMAN CIVILISATION

River valleys are known as 'mother of civilization' since ancient times. Harappa - Mohanjodaro civilization in Indus valley, Chinese civilization in Hawang ho valley and Greek civilization in river Nile valley developed due to rivers.

Man has continuously developed since the separation of human beings from the development pyramid of life cycle . The suitable condition for Human development might not have been equally conducive at all the places. Different scholars and researchers have also accepted this view. The first credit for discovery of pre historic human culture goes to 'Baucher de Parthes' of France. He after the study of different proofs accepted Sien river of Paris as the center of evolution of civilization. Similarly, Dr. Mitra has declared river valley south of Siwalik formed by the melting of the glaciers as the center of human evolution. All the research papers seems to be unanimous on the opinion that during the course of human development river valleys have been the center of evolution of human civilisation.

Today at Prayag near Allahabad, the confluence of Ganga, Yamuna, Saraswati is the center of religious belief for the devotees. Large towns and cities also developed in the river valleys. Today rivers play an important role in the development of Industries, agriculture and means of transportation. Though, the over exploitation of river water and dumping of waste into these water bodies is badly polluting the rivers. It is a matter of great concern at the global level.

DO YOU KNOW?

Gandhi Setu, situated at Patna, is the longest road pool (7 km) of India which was built in 1984.

FIND OUT

On which river is Gandhi setu situated?

POLLUTION – With the increase in population, the misuse of water increased at a rapid rate. Right from the domestic work to industrial work water is a very useful resource. Today water resource is being utilised for the crops of humid agriculture.

During floods the rivers become ominous, as they neutralise all the waste (Domestic waste, Industrial waste and other solid wastes) which badly affects the quality of water. Fertilizers used in agriculture, insecticides, pesticides, washing soap, soda, detergents dissolves in water and pollute it. Human activities such as draining of excreta, cleaning of animals increase the pollution of water. In fig. 3.4 disaster, induced by human activity is shown.

The unmindful cutting of forest has resulted into rapid increase in soil erosion, which has caused rapid siltation in the course of the rivers. Due to increase in the amount of solid silt, mud and chemical waste, the aquatic life is threatened and also threat of flood has also increased.

DO YOU KNOW?

Lakes of large size is also called Sea e.g. Caspian Sea, Dead Sea, Aral Sea etc.

DO YOU KNOW?

In 1987, 2004, 2007, 2008, the Kosi floods inflicted large scale loss of life and property in Bihar.

CONSERVATION – The pollution of rivers has adverse effect on the environment. Presently, several nations of the world are facing this problem. To overcome this difficult situation, it is essential to concentrate on conservation works. The implementation of conservation is unavoidable for persons, society and in national interest.

INCREASE IN VEGETATION COVER - Vegetation helps us to survive in pollutionless environment. It provides us fresh air alongwith fruits, Medicine, precious woods. Their roots hold the soil together which makes the erosion process of rivers and wind ineffective. This not only controls the denudation of soil by rivers but also reduces the silt content in the rivers. Vegetation absorbs carbon dioxide present in the atmosphere and gives us life saving oxygen and balances the environment. Thus, from the environment perspective, 33 percent of the total area of any nation should have forest cover. Presently, only 19.25 percent of the total area of India is under forest cover which is not suitable for environment. The reduction in the area of the forest affects the wild life also; so, their habitat is getting smaller day by day.

NATIONAL RIVER CONSERVATION PLAN – 90 percent of the river water is received from the Monsoon rainfall and melting of ice in the Himalayan region. But their uncertainty and uneven distribution creates devastating situations, like floods and drought. To overcome such situations or disasters, awakening among the people and planned efforts by the government machinery are essential.

The government of India did start 'Ganga Karya Pariyojna' in 1985 but it got stopped on 31st March, 2000. In this backdrop, executive committee of National River Conservation Authority, after the observation of first stage, made a few suggestions. These suggestions and plans have been implemented under the National River Conservation Plan for the important polluted rivers. Under this plan 152 cities situated on the banks of 27 rivers of 16 states have been included. In 57 districts, efforts are being made, under this plan, to check pollution. To check pollution were approved of,



Fig. 3.4 River water being polluted by the human activity.

215 programmes, out of which 69 programmes have been completed. The target set under this project is to purify lakhs of liters of polluted water.

Lake Conservation work has also been included under this plan. Initially, two Lakes – Pawai (Maharashtra) and Ooty (TamilNadu) have been included. Presently, such conservation programmes are in progress on Ganga, Yamuna, Gomti and many other rivers.

The use of chemicals (insecticides, pesticides, fungicide) in agricultural activities is increasing very rapidly. These chemicals get dissolved in flood water along with rain water and pollute the river water. This can be prevented by making bunds in plains or agricultural regions; it can also help in stopping solid waste.

FORMATION OF WATER COLLECTION CENTER

As we know that source of river water is rain, snowfall or glacier. The distribution of water is not even in whole country and so the need of all

states can't be fulfilled. In reference to some rivers, one state establishes monopoly over the water sources and its neighbouring state is denied of the essential water supply. In such situations dispute erupts between the states for the distribution of water.

Therefore, the central government should establish National Water Collection Center and supply water to the states as per their requirement. It will not only solve the dispute of the states but also control flood and drought. Planning of interstate linking of the rivers could be an effective policy in this direction but uncertainty prevails about its implementation.

EFFECT OF DRAINAGE PATTERN ON HUMAN LIFE

As said earlier, drainage region of rivers is the mother of civilisation and culture. The position of rivers has been very significant in the economic development of India. Since ancient times, rivers have been the source and control of human activities. Rivers have been the birth place of different civilizations and cultures. It is here that human development has flourished. The river waterfalls are center for hydro electricity and point of attraction for tourism. During ancient times, in absences of roads and airways, rivers were the most suitable means of transportation. Today, National water ways are also being developed. Rivers have become useful today from the strategic point of view as well.

DO YOU KNOW?

Chemical waste materials dissolved in water, give birth to acid rainfall.

Due to the effect of the rivers 40 percent of the agricultural land is covered with alluvial soil which is spread in river valleys, delta and coastal regions. There is sufficient amount of alluvium in the deltas of Ganga, Indus, Ganga – Brahmaputra and plain regions. In North Bihar, sediments are being deposited every year by the rivers such as Kosi, Bagmati, Gandak etc. This maintains the fertility of the soil.

Multipurpose projects have been designed and developed for rivers.Some of them have been completed and others are still being

constructed. For achieving these objectives, many Dams have been built on the rivers which have led to the development of manmade canals and Lakes. These canals and Lakes are ideal for aquatic life. These are centre of sports and place of tourist interest as well. By the completion of these Dams ambitious plans like flood control, development of water ways, breeding of aquatic animals, protection of soil erosion, Production of hydro electricity, development of forest have received impetus. Bhakhra Nangal, which is a project of river Sutluj, produces 1200 Megawatt of electricity and irrigates about 20 lakh hectares of land. Tehri project has been developed on river Bhagirathi which produces 2400 Megawatt of electricity.

In Bihar many projects have been proposed. Excepting Son project, all river valley projects are under construction. Pandit Nehru (First Prime Minister) had remarked about river valley projects as 'Temples of modern India'.

DO YOU KNOW?

The Tehri project situated on river Bhagirathi is the fifth largest of the world and largest river valley project of Asia.

Rivers deposit sediments, brought by them, in plains and valleys. These sediments have fossils along with fertile soil.

These fossils are source of mineral and mineral oil. Damodar valley is famous all over the world for its coal deposits. Other than this, important minerals like iron ore, gold, quartz etc. Exists in the river valley regions. Apart from this the climate around rivers get rectified which attracts human settlements. All the facts given above shows positive impact of rivers on human life. With the support of these facilities man has reached at the peak of development but

DO YOU KNOW?

Which are the states that are drained by river Sabarmati and Mahi?

they have jeopardized the existence of these rivers. The danger inflicted at the existence of the rivers shows its negative aspect. The pollution of river and lake water finally, creates an atmosphere of destruction of human civilisation.

EXERCISE QUESTIONS

OBJECTIVE TYPE QUESTIONS

1. In which state is Laxmi Sagar Lake situated?
   (a) Madhya Pradesh (b) Uttar Pradesh
   (c) Bihar (d) Jharkhand
2. Which of the following is a saline lake?
   (a) Wular (b Dal
   (c) Sambhar (d) Govind Sagar
3. Near which city is Gandhi Setu on river Ganga situated ?
   (a) Bhagalpur (b) Katihar
   (c) Patna (d) Gaya
4. Which river flows through faulted valley?
   (a) Mahanadi (b) Krishna
   (c) Tapi (d) Tungbhadra
5. Which river is the longest river of Peninsular India?
   (a) Narmada (b) Godavri
   (c) Krishna (d) Mahanadi
6. When was the Indus water treaty made?
   (a) 1950 (b) 1955
   (c) 1960 (d) 1965
7. Which river is nicknamed Tsang Po?
   (a) Ganga (b Brahmaputra
   (c) Satluj (d) Godavari
8. Which among the following is a hot water fall?
   (a) Kakolat (b) Garsoppa
   (c) Brahmkund (d) Shiv Samudram

9. Origin place of Kosi river –
   (a) Gangotri (b) Mansarovar
   (c) Gosai Dham (d) Satpura Range

SHORT ANSWER TYPE QUESTION

1. What is the function of water divide? Give one example.
2. Which is the largest river basin in India?
3. From where does Indus and Ganga rivers originate?
4. Write the names of two primary currents of river Ganga? Where do they meet each other to form river Ganga?
5. Why has Brahmaputra less silt in Tibetan region in spite of having long current ?
6. Which two peninsular rivers flow through rift valley? Which type of land forms are formed by them before discharging into the Sea?

LONG ANSWER TYPE QUESTION

1. Describe important specialties of Himalayan and Peninsular rivers?
2. Compare the east and west flowing rivers of Peninsular India?
3. Describe the importance of rivers in Indian economy?
4. Describe the types of Lakes in India with examples?

MAP WORK

(A) Locate the following rivers on the map of India and write their names - Ganga, Sutluj, Damodar, Narmada, Tapi, Mahanadi, Dihang

(B) On the outline map of India locate the following Lakes:
Chilka, Sambhar, Wular, Pulikat and Koleru.

CHAPTER- 4

CLIMATE

It is very essential to understand Indian climate to understand the physical environment and the Geographical components that affect the Indian life style. Almost half of the land mass of the country lies south of the Tropic of Cancer which is a tropical region and half of its area is in North which, from the point of view of extension, is in sub - tropical region. The presence of the great Himalayas on the Northern boundary and location of Indian Ocean, Arabian Sea and Bay of Bengal on South- Eastern and South- Western boundaries respectively has affected the climate of India a great deal. The vast size and location of the country has created climate related diversities. Thus: it is said, that all the climate of the world is found in India.

In layman's terms we consider weather and climate as one but students of geography must understand the difference between the two. Climate is almost permanent but weather is temporary. The average sum total of weather or atmospheric specialties of a very large region for more than 30 years is called climate. The Atmospheric condition of a place or area for a particular time is called weather. Weather can change a number of times in a day but climate of a place remains the same for years together. The main components of weather and climate are – Temperature, Air pressure, Wind, Humidity and Precipitation. They keep on changing by the Insolation of the Sun. The atmospheric condition remains the same for a few months in a year like – Hot or Cold, Windy or Calm, Sky full of clouds or clean and Dry or humid, etc. On the basis of the average atmospheric conditions in these months, the year is divided into Summer, Winter and Rainy seasons and studied accordingly.

Monsoon type of climate is found in our country. The word Monsoon is derived from Arabic word "Mausim" which means weather or season. Slowly the word Monsoon began to be used for that wind which blows from sea

towards land during summer and from land towards sea in winters. The Asian regions affected by these winds are named as Monsoon Asia in which our country India has an important position. In Monsoon climate of India there is distinct unity along with regional diversity.

In Barmer area of Rajasthan on some days of June the temperature soars to 48 – 50°c on the same day the temperature of Pahalgam or Gulmarg of Kashmir is less than 20°c where as the temperature of Khilanmarg north of Gulmarg is less than 0°c. At this time (June) whole north India remains under the effect of hot and dry wind whereas Assam receives so heavy rainfall that the Brahamputra river experiences heavy floods. In India the temperature found in the coastal areas are moderate but in the land part it is extreme. All these differences are durinal. These differences can be seen annually as well. During December nights the minimum temperature goes down upto – 40°c at places like Kargil. In Thiruvananthapuram or Chenai the temperature ranges between 25° – 30°c during June . At this time in western Rajasthan it rises up to 50° C. From the point of view rainfall the average annual rainfall of Mawsynram is 1180 Centimeter whereas in Jaisalmer it is not more than 12 Centimeters. In October – November the eastern part of South India receives good rainfall due to retreating Monsoon whereas in North India Temperate Cyclones cause rainfall. When the farmers of Kashmir shiver in cold in December January, at the same time the Moplas (Local Tribe) of Kerala Coast only wear Lungi and cultivate Paddy crop with upper portion of their body without any cloth. The amount of rainfall decreases from East to West in North India and so the diversity in food, clothing and habitat of the people is found.

One word LANDFORMS is used for the factors controlling the climate, which affect the climate.

L – Latitude
A – Altitude
N – Nearness from Sea
D – Direction of wind
F – Forest
O – Ocean Current
R – Rainfall
M – Mountain
S – Soil

If the sun rays are vertical or inclined then there is difference in the amount of solar energy. The Sun rays fall vertically on lower latitudes and fall inclined on higher latitudes. This is the reason why the temperature falls when we move from Equator towards Pole. As altitude of the surface rises from sea level the atmosphere becomes rarer and there is fall in temperature. This is the reason why in Utakmund or Ooty (Tamil Nadu), which lies in lower latitude, temperature is low and during summer tourists in large number visit this place. In any place if the temperature rises, the air pressure becomes low and when the temperature decreases the air pressure rises. The wind begins to blow from high pressure towards low pressure and if the wind is coming from water body then it carries sufficient moisture which causes rainfall but wind coming from land part is dry. Climate is certainly affected by Sea. Water takes time to get hot and cold. Therefore, the Coastal areas do not become much cooler during winter and also it does not become much warmer during summers but the land part quickly becomes warm and cold. Therefore, the central part of the continent becomes extremely cold during winter and extremely warm during summers. The climate nearer to sea is found to be moderate and the climate away from the sea is found to be extreme. Cold or warm Oceanic currents affect those coastal areas through which they pass. High mountains stop the moisture laden wind that creates rainfall which causes heavy rainfall in windward parts of the mountains but leeward side of the mountain remains devoid of rainfall which is called Rain Shadow region. The forest attracts clouds and prevents from hot sun rays. The type of soil also affects temperature. Sandy soil or coarse soil becomes warm quickly and increases the temperature but alluvial soil does not become warm quickly.

The Factors Affecting the Indian Climate

Latitude – The Tropic of Cancer (23.5° N) crosses from the centre of India. In India North of Tropic of Cancer Sub tropical and South of it Tropical climate is found. Therefore, South India remains Hot and the North India remains comparatively cool.

Altitude – There is decrease in temperature as the height increases. In the North of India lies the Himalayan Range which has an average height (Great Himalaya) of about 6000 Meters. The height of Indian Plains and Coastal areas is 30 to 150 Meters. As a result the mountainous areas remain cooler and Plains or Coastal areas remains comparatively warmer. The icy

winds coming from central Asia during winter fail to cross the Himalayas as a result of which there is not much fall in temperature but in Summers the Himalayas stops the Monsoon winds and brings good rainfall in India.

Air Pressure and Wind – Air Pressure and direction of wind has given distinctness to Indian Climate. In India the North – Eastern monsoon winds blow from the Tropic of Cancer region towards the equatorial region. They blow from sub tropical high pressure belt towards tropical low pressure belt**. I**n other words**,** they blow from land towards Sea as a result they do not cause any rainfall. In summers this situation gets reversed because the presence of Sun in the Northern Hemisphere a low pressure belt is created in Rajasthan Desert area and high pressure belt is created in Tropic of Capricorn region. Therefore, in summer, winds from the Tropic of Capricorn region of Southern hemisphere quickly cross the Indian Ocean and begin to reach India. After crossing the Equator, according to the Ferrel's law, it turns right and begins to blow in South - West direction and this is called South - West Monsoon. Through this wind there is wide spread rainfall in whole India.

The upper air circulation is dominated by westerly flow in India. Jet stream is the important component of this flow. Jet streams flow in the upper portion of atmosphere between 27° and 30^{0} north Latitudes. Therefore, they are known as Sub Tropical Westerly Jet Stream. They shift to southern fringe of Himalayas from September to March and at times bring heavy rainfall in the North and North – Western part of the country in the form of Western Cyclonic disturbances. During summer, the Sun shines over Tropic of Cancer. Therefore, the Westerly jet stream shifts towards the northern fringe of the Himalayas. At this time another Easterly Jet stream which is called Tropical Easterly Jet Stream blows over Southern India on approximately 14° North Latitude during summer (April to August) and brings rainfall with stormy winds in the coastal areas of Bengal, Odisha, Andhra Pradesh etc. To bring about this type of condition, the difference in air pressure and direction of wind is a major factor.

Distribution of Water and Land Mass – The Climate of India has been affected by the distribution of Water and land mass. In the coastal areas there is not much difference of temperature in winter and summer because the water bodies take time to get warm and cold. The climate remains moderate there because of less range of temperature. The coastal areas of south India

remains in its effect but as the North India is far distant from the sea, so there is no sea effect here. As a result there is extreme cold in winter and extreme warm in summers. The range of temperature is very high here and so the climate becomes extreme and this is the reason why, in Delhi, warm clothes in winter and Ice during summers, both are sold in large amount.

EL NINO

El Nino is a Spanish word which means "Child". In fact El, Nino is a warm Ocean current that evolves after an interval of three to seven years on the coasts of Peru and Ecuador. Due to this warm current, there is sudden rise of water temperature upto 5° to 10° C. When this current reaches the Eastern Archipelago region a low pressure belt is created there and because of this some part of South – West monsoon is attracted towards this low pressure belt as a result of which in North India the rainfall is less than the average and drought like condition is created. As the meteorologists say the drought of 1987 was due to El Nino effect. On the other hand, when this warm ocean current does not appear in any year, the Monsoon remains normal in India and there is goon rainfall creating flood like situation at times. The forecast of Monsoon can be made by studying El nino.

LA NINA

It is also evolved, at times, on the Peru coast. This cold current increases the air pressure as it reaches the Eastern Archipelago region. From this high pressure humid air blows in all directions. Some amount of this reaches India and increases water content in Monsoon winds that causes more than average rainfall which creates flood problem in many parts of the country. Because of this, Australia, South East Asia and China also receive heavy rainfall.

THE INDIAN MONSOON

The word Monsoon has been derived from the Arabic word Mausim (Season). This word was, at first, used for those winds which used to blow in Arabian Sea by the Arabian sailors which used to change their direction with the change of the season. In India in common language the meaning of

Monsoon is rainfall. Meaning of good monsoon is good rainfall. In India the direction of these winds remains in South – West direction for 6 months and for another 6 months it remains in North – East direction. Therefore, they are called south – west and north – east monsoon respectively.

During summer when the Sun shines vertically near the Tropic of Cancer, the north – western part of India becomes very warm. As a result of which there develops a large and intense low pressure belt but due to inclined sun rays near Tropic of Capricorn, the Thermal effect is less which from comparison point of view becomes a high pressure belt. When the air mass from here is attracted towards Indian low pressure belt and crosses the Equator then due to coriolis force (Ferrell's law) it turns towards right and blows in North – East direction and reaches Kerala coast. This wind is known as South – West Monsoon which, in fact, is an extension of south – eastern circulating winds. They travel thousands of Kilometers over sea and carry moisture in large quantity. South – West monsoon reaches Kerala coast by 1st June and by mid July through Mumbai and Kolkata covers the whole India (Fig. – 4.1). If any mountain comes on the way of Monsoon wind they rise and get condensed there to give very heavy rainfall. This is the main reason for very heavy rainfall on western slope of the Western Ghats (Sahyadri) and southern slope of the Himalayas. Normally, the windward slope of the mountains receives heavy rainfall but leeward slope of the mountain falls in rain shadow area and receives very less rainfall. The eastern portion of Western Ghats falls in rain shadow area and therefore receives less rainfall.

In November – December, the Sun shines vertically over Tropic of Capricorn. As a result of which a low pressure belt develops here. At this time our country experiences extreme cold conditions which begin to develop high pressure belt.

The areas which the South – West Monsoon vacates, there the North – East monsoon takes its effect. As such the duration of North – East monsoon remains effective from mid November upto mid March. It brings rainfall at some places of Southern Coastal parts of India. At this time, there is a shift in westerly wind belt towards south which creates westerly wind depression

and it brings rainfall in the Northern Plains of India which benefits the Rabbi crop.

As a result, the progress of the South – West Monsoon slowly becomes less. By 1st September it fails to reach Rajasthan Desert and by 15th September it stops near Delhi, Chandigarh and Srinagar. By 1st October it vacates Mumbai, Bhopal and Lucknow. By 10th October it vacates North India and by 15th November it vacates whole India. This is called 'Retreating monsoon'.

NATURE OF MONSOON

Uncertainty is found in the nature of the Monsoon, still following are his

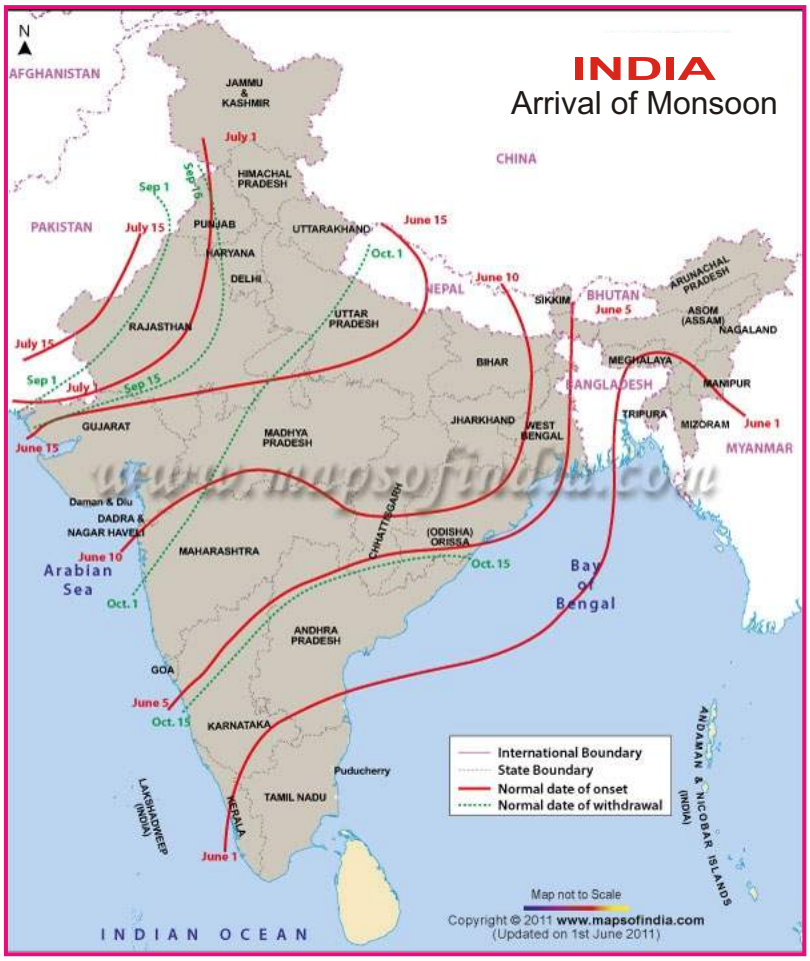


Fig. 4.1 - Expected dates of Arrival of Monsoon



Fig. 4.1 - Average date of retreating Monsoon

normal behavior:

1. The rainfall of the South – West monsoon is seasonal which occurs from June to September.
2. The amount of rainfall decreases as the distance from the Sea increases. In Kolkata 162.5 cm, in Patna 135 cm, in Allahabad 100 cm and in Delhi only 67 cm rainfall occurs.
3. The Monsoon rains are controlled by the Geomorphology.
4. During summer the rainfall is very heavy which increases the water flow and the rate of soil erosion increases. Many areas are affected by the floods.
5. Monsoon has a significant contribution in the agriculture dominated economy of India.
6. The distribution of Monsoon rainfall, in India, is also uneven which on the average ranges from 12 cm to 1180 cm.
7. The arrival of Monsoon at times is earlier and at times it is very late; at times it brings very heavy and at times scanty rainfall. As a result the crops are effected causing disasters like drought and floods.

RAINFALL AND ITS TYPES

India receives both summer and winter rainfall.

THE SUMMER RAINFALL: - In India the summer rainfall occurs through south – west Monsoon winds. Because of the triangular shape of the south India the south – west monsoon progresses ahead after getting divided into two branches. One branch is Arabian Sea branch which brings heavy rainfall on the western coastal parts and western slope of the Western Ghats. The second branch is Bay of Bengal branch. Andaman and Nicobar Islands receive very heavy rainfall through this branch. Moving further the monsoon reaches between Poorvanchal and Meghalaya and turns towards west and

Brings rainfall to the Eastern India and Ganga – Brahmaputra Plains. As it moves towards west, due to continuous rainfall, the amount of moisture keeps on decreasing. As a result the amount of rainfall keeps on decreasing from east to west. In Eastern India it is more than 250 cm (in Mawsynram 1187 cm) whereas in western part of Rajasthan the total rainfall is less than 25cm.

THE WINTER RAINFALL

India has limited area of winter rainfall. The Eastern Coastal parts of India, Tamil Nadu and Kerala receive rainfall through retreating Monsoon and North – East Monsoon. The land breeze while passing through Bay of Bengal gathers moisture and causes this rainfall.

In winter season when the wind belts shift towards south then the western part of India comes under the effect of the westerly wind. This wind entering India from south – west direction brings rainfall in Rajasthan, Punjab, Haryana, Uttar Pradesh and Bihar. This is due to the western Disturbance. This Rainfall keeps on decreasing from west to east.

Whereas the summer rainfall is useful to Kharif crops similarly the winter rainfall is useful to Rabbi Crops.

SEASONS

In India total six seasons are found which is a remote possibility in any other country of the world – they are Basant, Grishm, Versha, Sharad, Hemant and Shishir but from the Geographical point of view and according to Metrological department , In India there are mainly four seasons:

1. Winter Season – From mid November to mid March.
2. Summer Season – From mid March to mid June.
3. Rainy Season – From mid June to mid September and
4. Retreating monsoon season – From mid September to mid November

THE WINTER SEASON

During winter season, the Sun remains in Southern hemisphere, therefore the Northern Hemisphere remains cold. In January the average

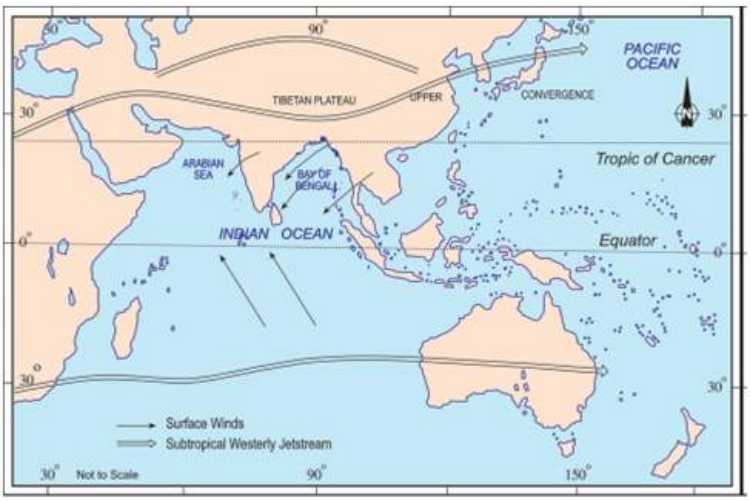


Fig. 4.3 – Atmospheric Condition over Indian Sub – Continent in the month of January.

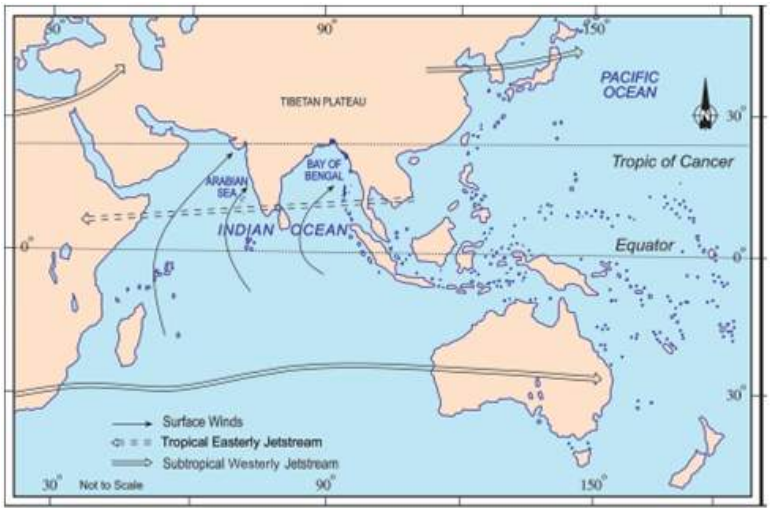


Fig. 4.4 – Atmospheric Condition over Indian Sub – Continent in the month of June.

temperature of South and Central India ranges from 210c to 270c and in the Ganga plains it ranges beetween 12^0 & 18^0 c (Fig. 4.3). At this time the average temperature found at Chennai is 25^0c, Kolkata 20^0c, Patna 17^0c and Delhi 14^0c. The maximum cold remains in North-Western parts and so a high pressure area develops there. At this time the breeze blows from land

towards sea which is dry and does not cause rainfall.

The sky remains clean and due to cloudless sky the thermal radiation is very quick during night and because of this there is fall in temperature. Jammu and Kashmir, Himachal Pradesh and Uttrakhand of Himalayan region experiences snowfall at this time. In this season two areas of India experience rainfall. They are North – Western portion and South – Eastern Coastal parts. North – Western India experiences cyclonic rainfall which reaches India from Eastern Mediterranean Sea through Iraq, Iran and Pakistan from December to March. The total rainfall is only up to 3 to 6 cm but it is highly useful for Rabbi Crops. The North – Eastern dry winds, in January February, pass through the Bay of Bengal and absorb moisture and bring rainfall in the South – Eastern parts (Tamil Nadu) of India. This rainfall is useful for Paddy cultivation in winter season.

THE SUMMER SEASON

As the sun rays begin to become vertical towards north, heat begins to rise in India. By June the Sun becomes vertical over Tropic of Cancer as a result of which extreme hot condition grips India. In South India due to the height of the plateau and nearness from the Sea the temperature remains low but in North India average temperature in the month of May remains more than 38°c. The Day temperature rises up to 40°c (Fig. 4.4).The wind becomes very dry. The sky becomes totally cloudless. The vegetation, Ponds, Wells, etc. all becomes dry. The rivers of South India remains only like a line of water. Generally, the North India remains cooler in winters and hotter in summers in comparison to South India. Thiruvanthapuram has only 2.8°c as annual range of temperature where as Delhi's annual range of temperature rises up to 30°c.

The wind comes from Arabian Sea in the South – Western coast of India which brings rainfall but weather in other parts of the country remains dry. At this time the westerly winds that blow in Northern India are very hot and dry. They are called 'Loo'. During this time dusty storm blows in Bihar and west Bengal. In west Bengal it is called 'Norwester' or 'Kaal Baisakhi'.Generally this wind strikes round about 3 in the afternoon and brings some rains with them. This rainfall is highly useful for the Tea crop of

Assam but it causes huge damage to the Mango crop. As such, this storm is called 'Mango showers' in Karnataka.

THE RAINY SEASON

By the beginning of June the summer heat rises. Most of the animals take shelter under tree to escape from the scorching heat but by mid June there is sudden change in the weather conditions. Stiff wind begins to blow from the South – West direction. The clouds fill the sky and heavy rainfall begins to occur with thunderstorm. This is also known as 'Monsoon Burst'. By first week of July, Monsoon covers the whole country and brings heavy rainfall at number of places. In fact, the South – East trade winds cross the Equator and in accordance with the Ferrel's law they turn towards right and they change into South – West monsoon and strike Kerala coast by 1st June

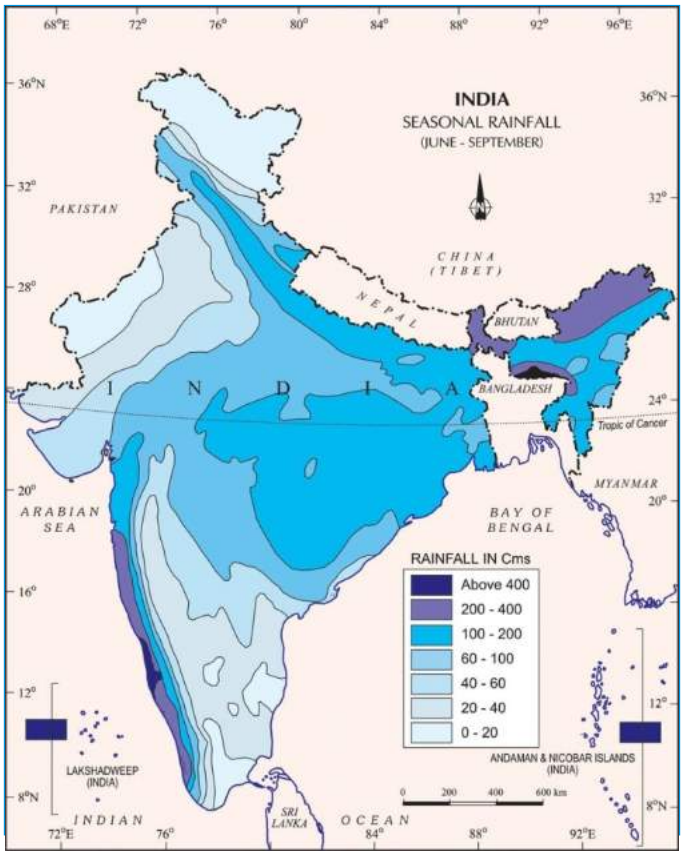


Fig. 4.5 - Seasonal Rainfall (June - September)

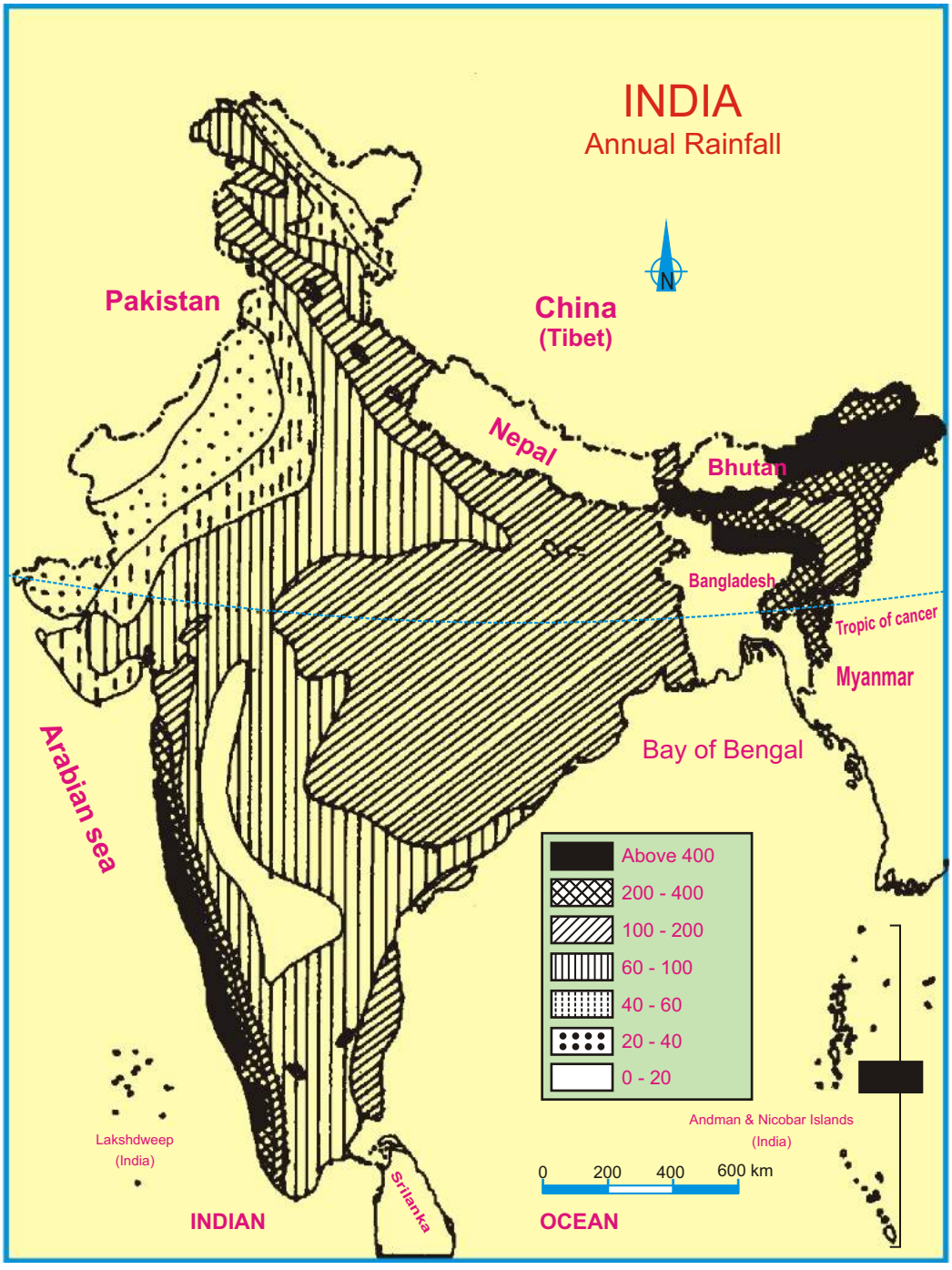


Fig.4.6 – Annual Rainfall

bring rainfall in this area.

Because of the triangular shape of southern peninsula of India the monsoon winds are divided into two branches. One branch is Arabian Sea branch and the other one is Bay of Bengal branch. Rainfall occurs in North India through Bay of Bengal branch and South – West part receives rainfall from Arabian Sea branch. The amount and distribution of rainfall is affected by the Geomorphology and relief of a place. The Arabian Sea branch rises along the slopes of Western Ghats (Sahyadris) and brings very heavy rainfall in the western parts but as they cross over the Mountain, on the leeward side, the rainfall is less because winds, while climbing down, becomes warm and their moisture retaining capacity increases.

The Bay of Bengal Monsoon branch, while advancing towards North, strikes with the Poovanchal and Garo, Khasi and Jaiantia Mountains after reaching Assam – Meghalaya and brings very heavy rainfall in Meghalaya and Assam Valley.

These winds start advancing towards low pressure belt of North-West India and as they advance towards west the amount of rainfall begins to become less. From June to September in Kolkata 118 cm, in Patna 100 cm, in Allahabad 90cm and in Delhi 55cm of rainfall is recorded. As we move away from Himalayas towards south the amount of rainfall begins to become less. In Nainital 202 CM, Bareilly 90 CM and Agra 58 CM of rainfall is received. The maximum rainfall occurs in Assam and Meghalaya Hills. Here in Cherrapunji and Mawsynram, from June to September 823cm (Fig. 4.5) rainfall is received whereas the annual rainfall is 1187cm (Fig. 4.6). The winds of Bay of Bengal branch completely dry out before reaching low pressure belt of North – West. The Arabian Sea branch after reaching there, begins to advance further moving parallel to the Aravallis and so in both the cases this area remains dry. This is the reason why the western part of Rajasthan has become a desert. In India 85 percent of the rainfall occurs through South – West monsoon (Fig.4.5). The farmers sow seeds in their fields expecting good rainfall but at times due to uncertainty of the Monsoons their crops get damaged and at times very good crop is received. Therefore, it is said that “Indian Agriculture is gambling with Monsoon’.

During rainy season the temperature remains little lower than the dry summer season. After first rainfall the temperature becomes low. In Patna, the average temperature in May is 35°c, in June 32°c and in July temperature comes down to 30°c. The dry vegetation becomes green during rainy season. Widespread greenery can be seen everywhere. Rivers, Ponds get filled up with water and farmers began their agriculture work.

RETREATING MONSOON SEASON

In the end of September with the apparent movement of the Sun towards south, the low pressure trough over the North West parts ends and it shifts towards south. As a result the South West monsoon weakens. In September Monsoon withdraws from Rajasthan, Gujrat, west Gangetic plains and central India. In October it is located at North of Bay of Bengal. By November it advances only up to Tamil Nadu and Karnataka and by mid November the monsoon totally withdraws from whole India. This is called the retreat of the Monsoon. At this time there is fall in temperature in India. Because the wind blows from the land the weather becomes dry, but at this time on the coastal areas of peninsular India good amount of rainfall is received through North East monsoon.

EFFECT ON HUMAN LIFE

Monsoon is synonym to Indian climate. Form North to South and from East to West, the Indian farmers await eagerly for the arrival of the Monsoon. It affects the economy system of the country. The regional diversity of Monsoon Climate helps in the cultivation of different crops. The arrival of Monsoon on time or its late arrival or its early departure or its absence for longer period of time etc. affects the life of the people of whole India. The distribution of Monsoon rainfall has been affecting the food habits, clothing and habitat of the people of India. The devastating floods and drought brought by Monsoon affect lakhs of people every year. The fast current caused by rains of Monsoon has given birth to the problem of soil erosion. The Mountainous regions are affected by landslides due to heavy rain. Thus, it can be said that Indian Monsoon Climate is gift on one hand and curse on the other.

EXERCISE QUESTIONS

1. Objective Questions

(i) What is the reason of rainfall in winter in the coastal areas of Tamil Nadu?

(a) South – West Monsoon
(b) North – East Monsoon
(c) Temperate Cyclones
(d) Local wind flow

(ii) Which fact is wrong in reference to South India?

(a) Daily range of temperature is less.
(b) Annual range of temperature is less.
(c) Range of temperature remains high for whole year.
(d) Extreme climate is found.

(iii) When the Sun shines vertically over the Tropic of Cancer, then what is its effect?

(a) High pressure exists in North – West India.
(b) Low pressure exists in North – West India.
(c) No change occurs in temperature and air pressure in North – West India.
(d) Monsoon begins to retreat from North – West India.

(iv) In which place of the World maximum rainfall occurs?

(a) Silchar
(b) Cherrapunjee
(c) Mawsynram
(d) Guwahati

(v) What name is given to dusty storm blowing in west Bengal in the month of May?

(a) Loo
(b) Trade wind
(c) Kaal Baisakhi
(d) None of these

(vi) When does the South – West Monsoon arrive in India?

(a) 1st May
(b) 1st June
(c) 1st July
(d) 1st August

(vii) Which is the coolest place in winter?
(a) Gulmarg
(b) Pahalgam
(c) Khilanmarg
(d) Jammu

(viii) What is the reason of winter rainfall in north – West India?
(a) North – East Monsoon
(b) South – West Monsoon
(c) Western Disturbance
(d) Tropical cyclone

(ix) Which local storm of summer season is useful for Coffee cultivation?
(a) Mango shower
(b) Shower of Flowers
(c) Kaal Baisakhi
(d) Loo

2. Fill in the blanks selecting right word from the bracket?

(A) The temperature of Chennai is …….. from Kolkata. (Less/More)

(B) The rainfall in North India is……. towards west in comparison to East. (More/Less)

(C) The word Monsoon was at first used by…… sailors. (Arab/Indian)

(D) Western part of Western Ghats receives……. rainfall.(Less/More)

(E) ……. side of Mountain is called rain shadow area.(Windward/Leeward)

3. Give Geographical reasons of the following –

(A) Western Rajasthan is a desert.

(B) In Tamil Nadu rainfall occurs in winter.

(C) Indian agriculture is a gamble with Monsoon.

(D) Mawsynram receives highest rainfall in the world.

(E) The temperature in Ooty remains low throughout the year.

SHORT ANSWER QUESTIONS

4. Answer Following questions.

(a) In what places of India does winter rainfall occur?

(b) What is Ferrel's law?

(c) What is Jet stream?

(d) Mention three important specialties of Indian monsoon.

(e) What do you understand by 'Loo'?

(f) What is Monsoon burst?

(g) Name the hottest and coldest areas of India?

5. LONG ANSWER QUESTIONS

(a) Explain regional diversity of Monsoon climate of India with examples?

(b) How many seasons are found in India? Give Geographical description of any one of them?

(c) Explain the important factors of Indian Climate?

(d) What is jet Stream and what is its effect on Indian climate?

(e) Explain the Monsoon rainfall and its specialties in India?

(f) Differentiate between El Nino and La Nina?

6. MAP WORK

(a) Area of more than 400 cm rainfall.

(b) Area of less than 20 cm rainfall.

(c) Direction of South – West monsoon in India.

(d) Areas of winter rainfall.

(e) Cherrapunjee, Mawsynram, Jodhpur, Mangalore, Ooty, Nainital.

7. PROJECT WORK

Construct a Table and make an index of song and dance, important items and ingredients of food according to the climate and season.

CHAPTER- 5

NATURAL VEGETATION & WILD ANIMALS

Natural vegetation refers to those trees and plants which grow totally in keeping with their surrounding natural environment. Human beings have no role in their growth and development. As such different crops, orchards, etc. will be called vegetation but they cannot be termed as natural vegetation because agricultural crops, orchards etc. are planted and nourished by human beings.

The vegetation is divided in to two categories on the basis of their origin – endemic or indigenous species and exotic species. Local vegetation are called indigenous and vegetation which comes from outside is called exotic.

In our country about 47,000 of different plant species are found. As such, India occupies tenth place in the World and fourth in Asia as far as plant bio-diversity is concerned. India has 15,000 varieties of flowering plants which account for six percent of the world's total flowering plants. In this country there are many non flowering plants such as Fern, Algae and Fungi, etc. In India about 89,000 species of animals and different types of fresh and marine water fishes are found.

Large areas covered with big trees and bushes are termed as Forest. Forests have occupied very significant place in India since ancient times. Dandkaranaya, Virindavan, Nandanvan, Kananvan, etc. Have remained famous forests since ancient times. They have also been meditation place for Rishis – Munis and here many important religious incidents of Indian history took place. In Indian culture, tradition of worshiping trees has remained in practice. The forests are considered to be the source of all comforts in Vedas. In many religious epics trees are considered to be at par with son.

In the beginning years of the century the rapid growth of the population, the increasing demand of cultivable land for agriculture, increase in demand for fuel, necessity of excess of land for urbanization and industrialization, floods, forest fire etc. caused excess damage to the forest. Very little forest is now left in the plain areas because of very dense population there.

This huge diversity in flora and fauna is found in India due to following factors –

(1) Land Features: Land features greatly affect the types of vegetation. Same type of vegetation is not found in Mountains, Plateau and Plain areas. The surfaces of the Mountains are uneven, high and inaccessible. That is why the vegetation that grows here is different.

The Plateaus are comparatively less high but its surface is not completely even like plains and so the types of vegetation found here are different.

As the surfaces of plains are even, therefore, it is highly conducive for human settlement. Here the human settlement is maximum. People have cut trees and cleaned areas for agriculture and for their settlements, and so there is dearth of natural vegetation in plain areas.

(2) Soil: The different types of soils also affect the natural vegetation. In the sandy soil of Rajasthan we find unique type of thorny bushes whereas in the Ganga delta region where the land is marshy unique types of tree Sundari, in the higher Mountainous region tree forests are found. In the areas where the soil is full stones conical forest are found. That is why they are called Sunderban.

(4) CLIMATE

(I) Temperature: Climate is a very important factor that affects the diversity of the vegetation. Himalayan Mountain is a very good example of this. With the increase in height in the Himalayan Mountains the temperature decreases and with that the type of vegetation also changes. Where the temperature is very low

Vegetation Zone	Mean annual average Temp (in degree C)	Mean Temperature in January (in degree C)	Remarks
Tropical	Above 24°C	Above 18° C	No Frost
Sub - Tropical	17°C to 24° C	10°C to 18° C	Frost is rare
Temperate	7°C to 17° C	-1°C to (-10°) C	Some frost some snow
Alpine	Below 7°C	-	-

- -

(ii) **Sunlight:** The sunlight is an important factor affecting the diversity of vegetation. The factors like, duration of sunlight, its inclination and altitude from the sea level directly affect vegetation. Due to longer duration of sunlight, trees grow faster in summer.

(iii) **Precipitation:** The amount of rainfall provides moisture to the vegetation. We know it very well, how important moisture is for the growth of the vegetation. There is change in vegetation as the amount of rainfall decreases or increases. For example in Eastern most states where the rainfall is very high, the vegetation is dense and evergreen trees are found. On the other hand on the eastern slope of western Ghat mountains which lie in rain shadow area, the density of vegetation, its types and its height, all are affected. Similarly, in the Ganga plains as we move from East to West, the amount of rainfall and its duration lessens. Its effect can be seen on the denseness of the vegetation, height of the trees and its types.

Children, have you ever thought why the forests are so important to us? They have number of uses for human beings. They determine the quality of environment, for example - they stabilize the amount of carbon dioxide, attract the rainfall, control soil erosion, increase the fertility of the soil through the manure of the leaves etc. Apart from these they make us available number of forest produce like – precious wood, fire wood, animal fodder, honey, Katha, medicinal herbs, etc. Also the forest provides shelter for the different wild life.

PROJECT WORK

Celebrate Van Mahotsav in your locality and village in rainy season and plant trees useful to mankind like Arjun, Kachnaar, Neem, Kadamb etc. and teach people living there how to protect them from animals.

ECOSYSTEM

The distribution of plant and animals, to some extent, is affected by physical condition and climate. Forests provide shelter to particular vegetation and particular animal life. When the vegetation of a particular place is altered, it also affects the animals living there, their number and type also change. The plants and animals of any place are interrelated to their physical environment and are also related to each other. Thus, these three combine each other to form an ecosystem. Human beings are also an integral part of this ecosystem. When human beings cut forests for their benefit, they bring change in the ecosystem and degrade the quality of physical environment. Because of the many varieties of plants, medicinal herbs and animals have reached the verge of extinction.

Find out, how the Human life is threatened by the extinction of different plant and animals?

A very large ecosystem on the Earth having distinct types of vegetation and animal life is called **Biome** like Monsoon biome, Desert biome, Equatorial biome etc. In all these biomes a particular type of vegetation and a particular type of animal kingdom are interrelated to each other. They are found in an extended area of the earth.

TYPES OF VEGETATION

In our country diversity in temperature, rainfall and land surface is found, therefore, here diversity in vegetation is also found –

(1) Tropical Evergreen Forests

(2) Tropical Deciduous Forests

(3) Tropical Thorn Forest and scrubs

(4) Montane Forests

(5) Mangrove or Deltaic Forests

Tropical Evergreen Forest:

These Forests are found in heavy rainfall areas of Western Ghats, Andaman Nicobar Islands and upper areas of Assam. Here, rainfall is roughly above 200 cm and dry season is for very short period. In this area there is very rich growth of trees due to very heavy rainfall and high temperature. The height of the trees is generally 60 meters or more and they grow in the form of dense Forest. Because of these trees the sun rays fail to reach the surface. In the quest to gain sun light the trees become denser and higher. Here different types of creepers are found embracing the trees and surface is covered with shrubs. In this type of forests, it is very difficult to travel from one place to another. The trees don't shed their leaves together at a time rather they shed their leaves in small amounts all the time and so the trees look full of leaves all the time. Thus, these forests are called Ever Green Forests.

In these forests trees of very precious wood are found such as – Rosewood, Cinchona, Ebony, Bamboo etc.

As the trees are dense and high in this forest, we find here animals jumping from one tree to another – Langoor, Monkeys and their other species.

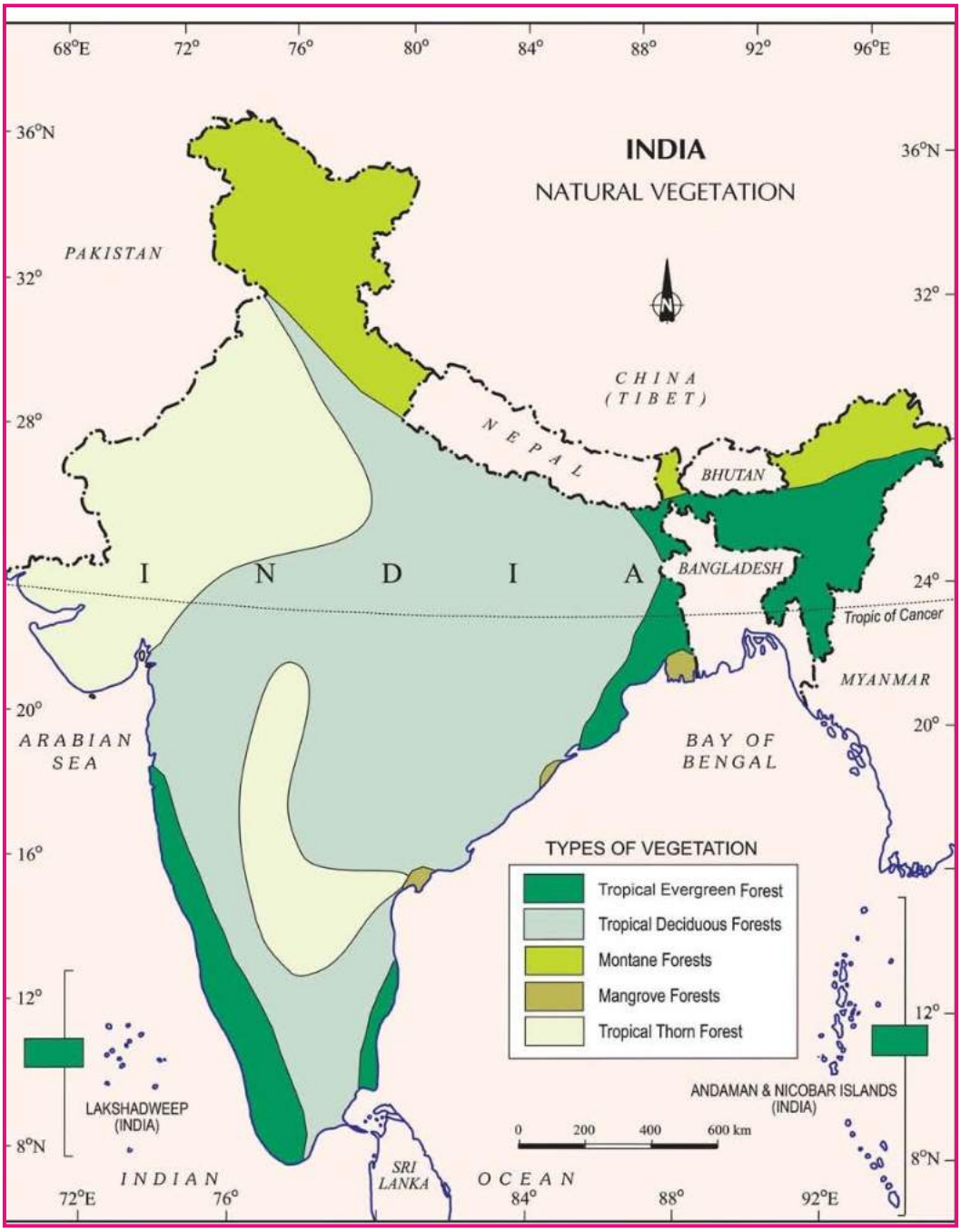


Fig. 5.1 : Natural Vegetation

The Elephants and one horned Rhinoceros that are found in the marshy areas of Assam are the animals of these forests. Apart from these, here different types of birds, reptiles and insects are found.

Tropical Deciduous Forests:

These forests are most widespread and cover maximum forested area of India. Here the rainfall is between 50 - 200 cm. Trees of this type of forest shed their leaves for $1^{1}/2$ – 2 months. Thus, the trees remain without leaves for longer time and therefore they are called deciduous forests.

PROJECT WORK

Make an Index of all those trees of your locality which shed their leaves together and look stark naked. Also identify those trees which shed their leaves slowly and so look green all the year round.

On the basis of availability of moisture, these forests are divided into moist and dry deciduous forest. The moist deciduous forest is found where the rainfall is between 100 – 200 cm . These forests are distributed in Eastern part of the country, North – Eastern states, Himalayan foot hills, Jharkhand, Odisha, Chhattisgarh, Eastern slope of Western Ghats, etc. Teak and Sandalwood are the most dominant species of this forest. Other species like Bamboo, Sal, Shisam, Khair, Kusum, Arjun and Mulberry trees are also found here.

The dry deciduous forests are found in those areas where the rainfall is between 50 - 100 cm. These forests are found in inner parts of peninsular Plateau and Uttar Pradesh. Here the density of trees is very less. In this region large scale cutting of trees and clearing of grass lands have taken place for agriculture and other purposes. Neem, Peepal, Teak and Sal trees are usually found here. In deciduous forests unique animals are found among which important ones are Lion, Tiger, Boars, Deer and Elephants. A varied variety of

Birds, Lizards, Snakes, Tortoises, etc. are found. In this region Peacock is found in large number.

Tropical Thorn Forest and scrubs:

Thorny forest and bushes are found where the rainfall is less than 50cm. This type of vegetation is found in the north – western part of the country which includes Gujarat, Rajasthan, semi - arid region of Haryana, south – western region of Uttar Pradesh, north – western region of Madhya Pradesh, etc. Palm, Euphorbia, Acacias and Cactus are the main plant species. The demand of water is most important for such vegetation types. Thus, the trees have long roots and penetrate deep into the soil to get moisture. For the maximum conservation of water, the trees have thick stems or their leaves are thick, hairy or succulent to conserve water. This is a unique example of adjustment of vegetation with physical environment. In these forests, generally, animals like - Rats, Rabbits, Fox, Wolf, wild Ass and Camels - are found.

Montane Forests:

In the plains there is difference in temperature due to latitude. Similarly, in mountainous regions increasing altitude affect the temperature. So, the type of vegetation changes with the change of latitude in plain areas, similarly, in the Mountainous region type of vegetation changes with increasing altitude.

In the lower parts of Himalayas Tropical evergreen forests and Tropical deciduous forests are found. The wet temperate type of forest is found between a height of 1000 – 2000 meters, in which broad – leaf trees like Oak, Larel and Chestnut dominate. Between a height of 1500 – 3000 meters coniferous trees like – Pine, Deodar, Silver fir, Spruce etc. are found. At more high altitudes (around 3600 meters) Alpine vegetation is found among which Silver fir, junior pines are important between Snow line and Forest line lie the grass and flower lands. Valley of flowers in the Garhwal Himalayas is an

example of this type of vegetation.

As Snow - line is approached the height of the trees lessens and due to swift wind the shape of the trees becomes wavy, and eventually their number becomes nil. After this, Alpine Grassland is found. These are used for grazing by Gujjars and the Bakarwals tribes. When the temperature becomes very low in winters then they climb down to lower valleys. In these forests, generally, Kashmir stag, spotted deer, Rabbits, wild Sheep, Tibetan Antelope, Yak, Snow Leopard, Squirrels, Bear, Goats and Sheep etc. are found.

Children! Do you know that the activity of migration for grazing of their animals with the change of temperature, during summer season towards more higher reaches and in winter climbing down to valley is called 'Transhumance'.

MANGROVE FORESTS

This is a unique type of vegetation which is found in the Deltaic and marshy regions of coastal areas. Here, Marsh which is formed by the Mud and silt brought by saline water of sea and fresh water of rivers give birth to a unique type of ecosystem in which Sundari trees are found in abundance. The roots of these trees rise above water. It seems as if the claws of the birds are submerged in the water. This vegetation is found in the Deltaic regions of Ganga, Brahamaputra, Mahanadi, Godavari, krishana, Kaveri etc. and in the internal coastal areas of Andaman and Nicobar Islands.

Royal Bengal Tiger is the most famous animal found in Sunderbans. Other than this Crocodiles, Ghariyals, Turtles, Snakes etc. are also found in large numbers.

MEDICINAL PLANTS

India, since ancient times, is known for its spices and herbs. In the ancient Medical system of India, In Ayurveda, different medicinal Herbs are included. Through domestic prescription also these Medicinal herbs are used to cure common diseases in Indian culture. In Ayurveda, some 2000 plants have been

described and at least 500 are in regular use. The World Conservation Union's Red list has named 352 medicinal plants of which 52 plants are threatened and 49 endangered.

Identify medicinal plants of your area. Make a list of them and write their uses. To do this work, take the help of elderly persons also.

WILD LIFE

Like vegetation, India is also rich in its wild life. Here 89,000 of animal species are found. The country has more than 1200 species of Birds. This is 13 percent of the total wild life species. Here 2500 species of fish is also found which is, about 12 percent of the world's total. In India World's 5 – 8 percent of mammals, amphibians and reptiles are found.

The Elephant is most significant amongst mammals. They are found in hot wet forests of India. One – horned Rhinoceroses is another important animal, which lives in the marshy areas of Assam. In the Rann of Kutch and Thar desert, wild Asses and Camels are found respectively. Indian Bison, Nilgai (Blue Bull), Gazel and Deer of different species etc. are some other animals found in Indian forests. Here several species of monkeys are also found.

Do you know that Wildlife Protection Act, was implemented in 1972 in India.

India is the only country in the World where Lion and Tiger both are found. Gir forest of Gujarat is the natural habitat of the Indian lion. The habitat of Indian Tiger is in the forest region of Sunderbans of West Bengal, Madhya Pradesh, Jharkhand and the Himalayan region. In the freezing region of Ladakh Yak is found which is shaggy horned, weight carrying Ox like animal. In the rivers, lakes and coastal areas Turtles, Crocodiles and Gharials are

found. On the Digha coast in Kharagpur of West Bengal world famous large Crocodiles are found. India has several species of birds. Peacocks, Parrots, Maina, Cranes, Ducks, Pigeons, etc. inhabit the forest and wetlands of the country.

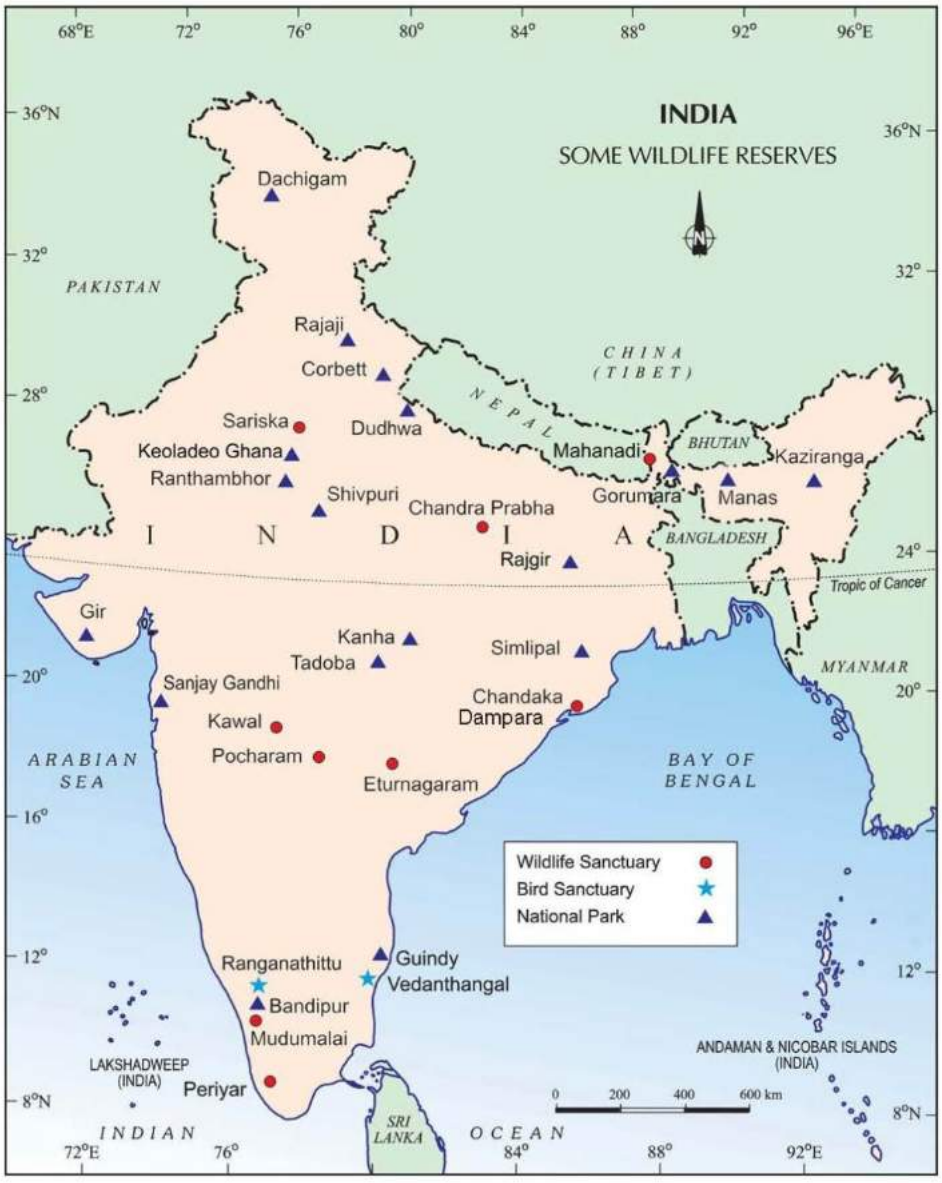


Fig. 5.1 : Wild Life Reserves

MIGRATORY BIRDS

Few wetlands of India are famous for migratory birds. Siberian Cranes come to India in large numbers during winter season. Rann of Kutch in Gujarat, Bird sanctuary of Bharatpur situated in Rajasthan and areas on the banks of river Ganga near Kanwar lake in Begusarai are some of their favorite places.

Mokama Tal area in Patna is also the home and play ground for several species of birds.

We have selected our crops in reference to bio – diverse environment. Similarly, we have selected Medicinal plants from the naturally available store of medicinal herbs. The animals were selected from large stock provided by nature as milch animals. We get support from the animals in the form of food, transport, agriculture, etc. Many insects support us in the pollination of crops and flowers and kill harmful insects and so they exert biological control on them. Every species contributes in the successful working of the ecosystem. Hence, their conservation is very essential. We all know that due to excessive exploitation of the nature several plants and animals are endangered and imbalance in the ecosystem has been created. About 1300 species of plants are endangered and 20 species are extinct. Several wild animal species are endangered and some are on the verge of extinction.

PROJECT WORK

Collect information about endangered species of wild animals and plants from Newspaper, Magazines and other sources.

The main cause of imbalance in the ecosystem is the pressure of growing population, reckless cutting of forest for agriculture and habitat, Pollution due to chemical and industrial waste and acid deposits, excess of hunting by greedy businessmen for their business etc.

To protect the flora and fauna of the country, the government has taken several steps:-

(i) Fourteen Biosphere reserves (Sancturies) have been established. Four out of them are included in the world network of Biosphere reseves. They are – (i) Sunderbans (West Bengal) (ii) Nanda Devi (Uttarakhand) (iii) Gulf of Mannar (Tamil Nadu) (iv) Nilgiris (Kerala, Karnataka and Tamil Nadu).

FOURTEEN BIO – RESERVES (SANCTURIES)

(1)	Sunderbans	(8)	Simlipal
(2)	Gulf of Mannar	(9)	Dihang - Dibang
(3)	The Nilgiris	(10)	Dibru Saikhoba
(4)	Nanda Devi	(11)	Agasthyamalai
(5)	Nokrek	(12)	Kanchenjunga
(6)	Great Nicobar	(13)	Pachmari
(7)	Manas	(14)	Achanakmar – Amarkantak

(ii) From 1992 planning was made by the government to provide financial and technical support to Botanical gardens.

(iii) Many plans such as - Lion Sanctuary, Rhino Sanctuary, Bison Sanctuary, Crocodile Sanctuary etc. were made and are being implemented.

(iv) 89 National Parks, 149 Wild life sanctuaries and many Zoological gardens were established to protect and conserve the flora and fauna of the country.

EXERCISE QUESTIONS

Objective questions

(1) When was the Wildlife Protection Act implemented in India?

(a) 1982 (b) 1972

(c) 1992 (d) 1985

(2) Where is the Bharatpur Bird sanctuary situated?

(a) Assam (b) Gujarat

(c) Rajasthan (d) Patna

(3) How many types of Plant species are found in India?

(a) 9000 (b) 90000

(c) 95000 (d) 85000

Fill In The blanks –

(1) In India, because the temperature is sufficient everywhere, therefore amount of ..... determines the type of vegetation here.

(2) An ecosystem of unique type of species of plant or animal on the surface is called.....

(3) Human beings are an.....part of ecosystem.

(4) Ghariyal is a species of Crocodile found in only ..... Country of the World.

(5) The total number of biosphere reserve (Sanctuary) in the country is.....out of which ..... are included in the Biosphere reserves of the world.

Give Reasons-

(1) On the Southern slopes of Himalayas the vegetation is denser In comparison to Northern slopes.

(2) In the Tropical rain forest the surface is covered with creepers.

(3) India is rich in Bio – diversity.

(4) In the Scrub and thorny forests the leaves of the plants are shaggy, waxy, fleshy and small.

Short Answer Questions-

(1) Where is Simlipal Biosphere reserve situated?

(2) In what type of vegetation region is Bihar situated?

(3) In which vegetation region is Elephant found?

(4) Name some endangered flora and fauna fund in India.

(5) Name the animal to protect which in Bihar a project is being run in Valmiki Nagar?

Long Answer Questions-

(1) What is ecosystem?

(2) What are the factors that affect the distribution of flora and fauna in India?

(3) Why are Plant life and animal life important for our existence?

Map Skills

On the outline map of India label the following –

(1) Vegetation regions of India

(2) Fourteen Biosphere reserves

PROJECT WORK-

(1) Search the name of any ten professions which receive raw material from forest and wild animals.

(2) Make sure that you plant at least one tree on the occasion of birthday of your family members.

(3) Plant in your school campus, plants with medicinal value fruit (Jamun), Vegetable (Sahjan, Bora) Flower (Desi Gulab, Sadabahar) etc. and nourish them.

(4) Plant trees in your Mohalla and village in suitable season along with

CHAPTER – 6

POPULATION

The economic development of any country relies mainly on two things–Natural resources and human resources. In fact, it is seen that the human resources or population contributes most significantly in the economic development; because population is not only the means of economic development but it is also the main resource. Human beings make and use resources and are themselves resources with different qualities. In absence of population or human efforts it is not possible to produce economic materials and services. Thus, it can be said that real feature of any country is not in the land or reservoir or mines, animals or wealth but in the healthy and happy male, children and females.

The size and growth of population in India is very alarming. It is termed as 'population explosion'. This population explosion has affected all the developmental programmes. Human being creates and consumes the resources of the earth; therefore, it is essential to know how many people live in a country and what their qualities are? The information related to the population of our country. The information related is based on census of India, 2001.

Children, you are the part of this growing population. Today we will discuss on following three points related to population –

1. Population size and distribution.
2. Population growth and process of population change.
3. Characteristics or Qualities of the Population.

Population size and distribution.

On 1st March, 2001, the population of India was 102 Crore 8 lakh which is

16.7 percent of the world's population. These 103 crore people are unevenly distributed in the India's vast area of 32.8 lakh square km. (2.4 percent land area of the world) (Fig. 6.1).

CENSUS

Official counting of Population after a certain interval of time is called Census. In India the first Census was conducted in 1872. The first complete Census was conducted in 1881. Since then Census is being held after an interval of ten years.

The Census of India is the most comprehensive source of demographic, current facts and economic data.

According to the 2001 census, Uttar Pradesh is the most populous state in the country, where the total population is 16.60 crores. In Uttar Pradesh reside the 16 percent of the total population of India. On the second position is Maharashtra where the total population is 9.68 crores (9.42

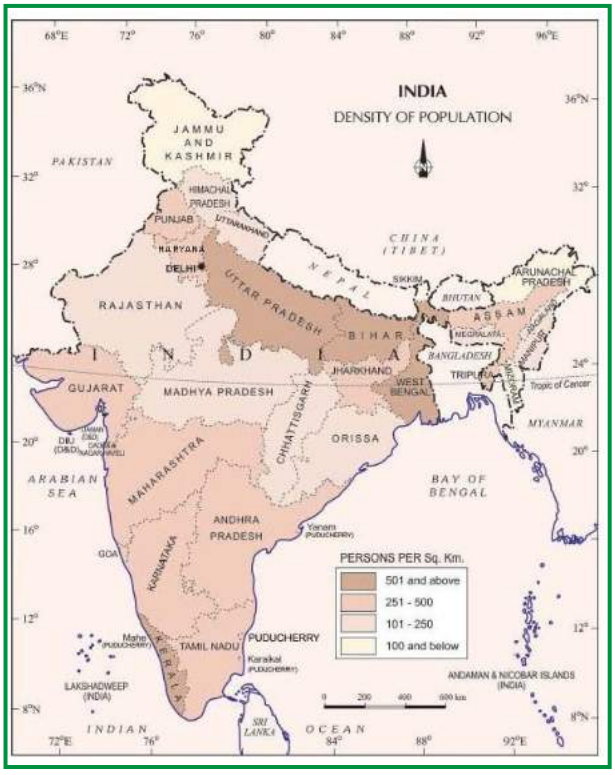


Fig. 6.1 Population density of India (2001)

percent of the total population). On the third position is Bihar with a population of 8.29 crores (8.06 percent of the total population of the country).On the contrary to these large states, the Himalayan state Sikkim has a population of only 5 lakh and only 60 thousand people live in Lakshadweep.

About half of the Indian population lives in only five states of India. These states are – Uttar Pradesh, Maharashtra, Bihar, West Bengal and Andhra Pradesh. Rajasthan is the largest state in terms of area, which has 5.5 percent of the total population of India.

FIND OUT

What is the cause of uneven distribution of population in India?

Distribution of population in India on the basis of Density

Population density means population living on per unit area of land. Per square Kilometer has been accepted as a unit for standard measurement by the Census Department of India. From this point of view, the average population density of India, according to the 2001 census of India, is 325 persons per square Km. but it has huge diversity in it. The states in plain areas have maximum population density, Coastal states too have sufficient density but in Mountainous states density is less due to inadequate facility of habitat and economic structure. In Plateau states the situation of density is normal.

Amongst Indian states the maximum density is in West Bengal. On an average 904 persons per square Km. live here. After this, are Bihar (881), and Kerala (819). The least density is that of Arunachal Pradesh, hilly state, where the average density is only 13 persons per square km. If we look at Union Territories collectively then we find that the density in Delhi is maximum. Here, the density is 9340 persons per square km. but least density is in Arunachal Pradesh. Among Union Territories the density of Andaman and Nicobar Islands is only 34 persons per square km.

Because of the fast rate of population growth, there has been quick rise in average population density of India as well. It was only 17 persons per square km. in 1901 which grew to 325 persons per square km. in 2001

FIND OUT

Make a table in which write the name of all the states of India, their total population and density. With its help compare the states with low density and high density.

POPULATION GROWTH

The meaning of population growth is the change in the number of inhabitants of a country or state in any given interval within 10 years. This type of change can be expressed in two ways. First, relative growth and second, grown through percentage change that occurs every year.

The growth of population every year or in a decade is the magnitude of growth in total number. It can be obtained by subtracting earlier population (e.g. population of 1991) from the later population (e.g. population of 2001). It is known as 'Absolute Growth'.

The second aspect of population growth can be expressed in percent per year, for example the meaning of rate of percentage increase per year is the increase of 2 persons on every 100 person in the base population of a given year. It is also called as **annual growth rate**. The Indian population has increased from 3,610 lakhs in 1951 to 10,280 lakhs in 2001. Only in 1921, there has been negative population growth.

Year	Total Population (in lakh)	Relative increase In a decade (in lakh)	Annual growth rate (%)
1951	361.0	42.43	1.25
1961	439.2	78.15	1.96
1971	548.2	108.92	2.20
1981	683.3	135.17	2.22
1991	846.4	163.09	2.14
2001	1028.7	182.32	1.93

Table 6.1 and Fig. 6.2 show that from 1951 to 1981 there has been regular increase in annual population growth rate. This explains the rapid increase in population which reached from 361 lakh in 1951 to 1028.7 lakh in 2001.

FIND OUT

From Table 6.1 it is revealed that in spite of decline in growth rate there has been increase in number of persons in every decade regularly. Why is it happening?

Since 1981, the growth rate is steadily declining. During this period, there has been rapid decline in birth rate, still in 2001 there was a increase of 182 lakh people in total population. Decadal increase of this proportion never happened before.

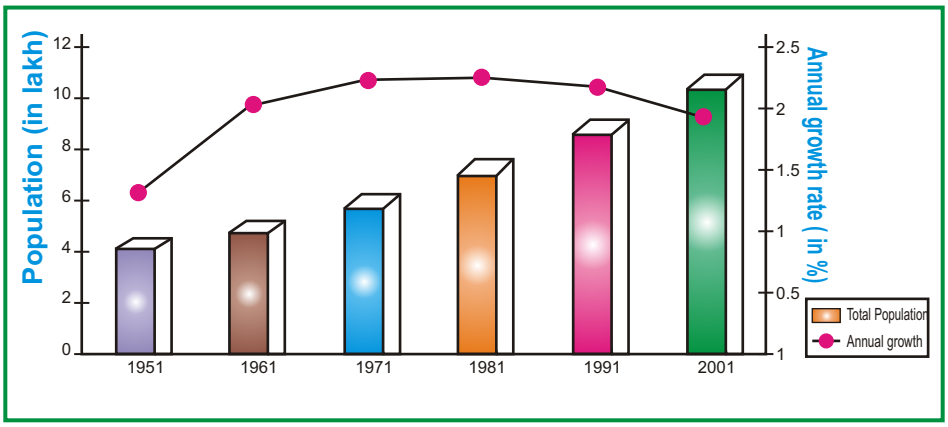


Fig. 6.2 – Total population and population growth 1951 – 2001

It is important to consider that the population of India is very large. The low annual growth rate in large population, yields very high relative growth. Even when in a population of 10 crores the increase is at a very low rate even then the total number of persons added becomes very large. The annual growth rate of present Indian population is 155 lakh which is sufficient to neutralise resources and environment protection.

Decline in growth rate is an indicator of success of the efforts being taken to control birth rate. Despite these, the growth in population continues and by 2045 India may leave China behind to become the most populous country of the world.

There are three main causes of change in population – Birth rate, Death rate and Migration. The difference between death rate and birth rate is the real natural growth of population.

The number of live births of children on every thousand persons in one year is called **Birth rate**. It is a major component of growth because, in India, the birth rate has always remained higher than the death rate.

The number of deaths per thousand persons in a year is called **Death rate.** The rapid decline in death rate has been the main cause of growth rate of the Indian population.

Because of the high birth rate and death rate, by 1980, there was a huge difference between birth rate and death rate and because of this the population growth became explosive. From 1981, there was a gradual decline in birth rate, as a result of which there was also a decline in population growth rate. The main reasons for this change have been the awakening at family, political, administrative and religious levels towards planned family.

Migration is the third component of population growth. The movement of people from one area to another area is called Migration. Migration could be internal (from one place to another place e.g. in flood displaced regions in North Bihar) or interstate (from one state to another state) or international (from one country to another country).

THINGS TO REMEMBER

1. In the present World, in every 6 persons there is an Indian.
2. In the last ten years (1991 – 2001), there has been an increase of 1.82 crores every year in the population of India.
3. Presently the population of Mumbai metropolis is more than the total population of Australia.
   Every minute there is an increase of 29 persons in the total population of India.

Internal migration does not bring any change in the size of the population but it influences the distribution of population within the country. Migration plays an important role in changing the distribution of population and its components.

ACTIVITY

Prepare a table and trace the migration in your family, of your grandparents and parents since their birth. Trace the reasons for each migration.

Most of the internal migration, in India, occurs from rural to urban areas because of the effect of 'push' factor in rural areas. These are adverse conditions, in rural areas, of poverty and unemployment and the 'pull' effect of the urban centers presents increase in employment opportunities and better living standards.

Migration is an important component of population change. It not only affects the size of the population but from the age and gender point of view, it changes the composition of urban and rural population. Due to rural – urban migration in India, the population of towns and cities has been increasing regularly. In 1951, out of the total population, the percentage of urban population was 17.29 percent which increased to 27.78 percent in 2001. Inside one decade (from 1991 to 2001) the number of cities having population above ten lakhs increased from 23 to 35.

SPECIALTIES OF POPULATION

(A) AGE COMPOSITION

From the point of view of age composition, the Indian population has been divided into three categories. They are –

1. Children Group - Age below 15 years
2. Adult Group - Age between 15 – 59 years
3. Aged Group - 60 years or more

We call the adult population group as labourer or working age group and the first and last groups are called dependent population.

India has 36.5 percent population under children group. Under adult group 56.7 percent and the aged group has 6.8 percent population. Due to rapid improvement in the health facilities, rapid growth in the aged

population group is expected. On the contrary the increasing awakening for population control and due to favourable measures of management the children group of population is expected to decline. In labourer or working group due to expected increase in population ratio, new areas of employment will have to be searched otherwise unemployment problem may acquire explosive form.

ACTIVITY

How many children of your locality work as domestic helpers or labourers?

Make a list of educated unemployed in your village or nearby areas.

(B) SEX RATIO

Number of females on every 1000 males is called Sex ratio. This information is an important social indicator to measure the limit of equality between male and female in the society at a given time. The sex ratio, in the country, is not in favour of females. The sex ratio from 1951 to 2001is shown in Table 6.2.

CENSUS YEAR	SEX RATIO
1951	946
1961	941
1971	930
1981	934
1991	929
2001	933

Table 6.2: Sex ratio in India 1951 - 2001

DO YOU KNOW

In Kerala there are 1058 females on per 1000 males. In Pondicherry 1001 on every1000 where as in Delhi 821 on every 1000 and in Haryana 861 females on every 1000 males.

(C) LITERACY RATES

Literacy is a very significant resourceful quality of population. It is very obvious that only an educated and informed citizen can take intelligent decisions and can accomplish research and developmental works. Decline in literacy standards is a serious obstacle to economic development.

According to the 2001 census, a person whose age is 7 years and above, and who can write or read with comprehension in any language is bracketed in literate category.

The literacy standard of India is improving steadily. According to 2001 census the literacy rate of India is 64.84 percent. It is 73 percent for males and 53.67 percent for females. Due to traditional beliefs the literacy rate of females is low, but it is improving very quickly.

(D) OCCUPATIONAL STRUCTURE

The percentage progress of economically active population is an important indicator. The distribution of population according to the different occupations is called occupational structure. The occupations are generally classified as primary, secondary and tertiary.

The primary occupation embraces agriculture, animal husbandry, tree plantation, fishing and mining. In secondary activities manufacturing, building and other construction works are included. In tertiary activities transport, communications, commerce, administration and different types of services are included.

Find out

The names of five states with maximum literacy and five with the lowest literacy.

In developed and developing nations the proportion of people working in different activities varies. In developed countries the proportion of people is high in secondary and tertiary activities. In developing nations the proportion of people working in primary activities is more. In India 64 percent of the total population is engaged in agriculture only. The proportion of people engaged in secondary and tertiary activities is 13 and 20 respectively.

(E) HEALTH –

Health accounts for the process of population development being, healthy and effective. In the present condition there has been constant improvement in health indicators. Death rate which was 25 (per thousand) in 1951, reduced to 8.1 (per thousand) in 2001. The life expectancy which was 36.7 years in 1951, increased to 64.6 years in 2001.

Most of the infectious diseases have, almost, been brought under control. Despite important achievements in the field of health, the health level in India is low in comparison to developed countries. The per capita calorie consumption is much below the recommended level and a large portion of our population is affected by malnutrition. Safe drinking water and basic health saving facilities is available to only one - third of the rural population.

Thus, it is essential for India that management of population should be given priorities in national policies. Any nation can change population into resources by bringing improvement in education and health. The proper management of huge youth power, engaged in daily occurring riots, battery and violence, can make them emerge as crown of the future India.

ILL EFFECTS OF POPULATION GROWTH

The explosive growth of population has multi faceted ill effects. There was a huge increase in food grain – production, employment opportunities and industrial structure of India. But despite all these, due to growing population, India could not translate heights of these developments into developed nation. Even today more than half of the children are victim of malnutrition in India. Still the per day food availability is less than 450 grams.

The maximum number of illiterate and unemployed persons in the world is in India. This bunch of illiterates and unemployed is the outcome of explosive population growth of Independent India.

Today also the pressure of population is constantly increasing on agricultural land because maximum population lives in villages. The land is limited but the size of its exploiters has become huge. As a result the pressure of agriculture, pasture and houses can be felt on those lands also which, according to the laws of the nature, were a part of ecological balance. There has been constant reduction in the forest areas, desert regions and wet lands of India. There was a time when Himalayan Mountainous region was a store house of bio – diversity. Today less than 40 percent land has forest cover due to fast growing population, development of tourism, increase in religious travels and increasing development of industries and towns, in the states like Jammu and Kashmir, Himachal Pradesh and Sikkim less than 40 percent land has forest cover. However 60 percent of land should have forest cover.

When the green revolution arrived in the 1960s then modern agriculture developed in Punjab, Haryana and semi arid regions of North Rajasthan. It has made us almost self reliant in the matters of food materials but it has also left behind the challenge of soil pollution and ecological imbalance.

Similarly, due to huge increase in rural population the process of rural – urban migration has become fast. Again due to increasing crowd of rural poor in cities, the development of unofficial system, slums and encroached settlements have spoiled the urban ecosystem. Presently, Mumbai has become the second largest city of the world. Here, on an average 3 – 4 lakh people immigrate from outside and settle here. The basic region for this is Population explosion.

Poverty, unemployment, illiteracy and malnutrition are four such pillars which is the biggest challenge for developing India and its root is based upon the basic structure of population explosion.

NATIONAL POPULATION POLICY

Keeping in mind the problems arising from the population explosion, the policy of population control has been adopted since the first five year plan. India is the first country of the world which, during the first five year plan, declared family planning as the government programme. Even today maximum family welfare center are in India but because of the policy of self

desire of family planning, there has not been much success in the direction of population control.

In 1976 population policy was declared at national level according to which, the minimum marriageable age for boys and girls was fixed at 21 and 18 years respectively. In states like Kerala, indirect effort was made to control population growth by giving priority to literacy, and this achieved a huge success. Keeping this achievement as base, greater importance is being given to indirect programmes from eight five year plan. Under this effort women empowerment, creation of employment opportunity, poverty eradication, policy of encouragement for the people engaged in secondary and tertiary activities and decision of not increasing the seats of Loksabha, Rajyasabha and Vidhansabha on the basis of population till 2026 are proving very effective. It has been made clear in the population policy of 2002 that by 2045 the population of India will become stagnant. The population policy of India, however, is based on the policy of 'Small Family, Happy Family'

EXERCISE QUESTIONS

OBJECTIVE TYPE QUESTIONS

1. Which state has maximum literacy rate in India?
   (a) West Bengal (b) Maharashtra
   (c) Bihar (d) Kerala

2. What is the average age structure of India?
   (a) 64.6 years (b) 64.9 years
   (c) 81.6 years (d) 70.2 years

3. What is the situation of proportion of women on per 1000 male in 2001 Census?
   (a) 927 women (b) 990 women
   (c) 933 women (d) 1010 women

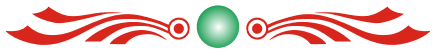
4. What is the average per square Km. population density of India?
   (a) 318 persons (b) 325 persons

SHORT ANSWER QUESTIONS

1. What was the population of India in 1951?
2. What was the percentage of urban population of India in 2001?
3. What is the proportion of women per 1000 male in Kerala?
4. Describe the literacy rate of India?
5. Explain the specialties of gender ratio of India?
6. What do you understand by Census?

LONG ANSWER QUESTIONS

1. Explain the specialties of population growth of India?
2. Describe the uneven density of population of India?



CHAPTER – 7

NEIGHBOURING COUNTRIES OF INDIA

(A) NEPAL

INTRODUCTION

Nepal is a neighbouring country of India. We don't need a visa (International order for communication) to visit Nepal. This neighbouring nation of ours is situatedto north of India. Nepal can be seen from 26^0 20' to 30^0 10' North latitudes and 80^0 15' to 88^0 10' East longitudes on the globe. It is a land locked country and therefore, it is called a buffer nation. To the north of Nepal, Tibet (China) is situated and between them Himalayas stand like a wall. From other three sides, it is surrounded by Indian states. In the East of Nepal Sikkim and West Bengal, in the West Uttrakhand and in the South states of Bihar and Uttar Pradesh are situated. The important center of Buddhist culture, Lumbini, during Mauryan rule is situated in Nepal. Birth place of Gautam Buddha also lies here. Great center of Hindu pilgrimage, Pashupatinath temple, is situated in the Nepal's capital Kathmandu. A large fair is organised here on every Shivratri. The total area of Nepal is 140797 squares Km. and total population is 2.76 crores (2005).

STRUCTURE AND LANDFORMS

The structure of Nepal is associated with the origin of Himalayas. The land form created by the folding of the sedimentary rocks due to geo - compressive force is the specialty of the Nepalese land forms. Softer rocks near the surface and harder rocks at greater depth from the surface are found here. Most of the Mountain peaks are made up of Igneous and metamorphic rocks.

On the basis of land forms, Nepal has been divided into three parts.



Fig. 7.1 Nepal – Political and Physical

First, fertile Tarai region of the south which is adjacent to Indian border with an average height of 300 meters. Dense forest and long grass is the specialty of this region. Second, central hilly region in which Mahabharat Lekh and hills of Chure are included. The height of this region is up to 500 to 1500 meters. It has a number of small hills which are full of coniferous trees. To the North of this region Siwalik Hills are situated. There are many valleys here among which Kathmandu valley is famous for its beauty. The third is Himalayan range region. This region extends in the Northern part of Nepal. This region has many high Mountain peaks which attract the mountaineers. The highest peak of the world, Mt. Everest whose height is 8848 meters is situated on the Nepal Tibet border. Local people call this peak by the name of 'Sagar Matha'. All the Mountain peaks, situated in this region, remain covered with snow throughout the year and are the origin place of a number of perennial rivers. The other important peaks such as Makau (8463 meters), Mejune (7139 meters) and Gaurishankar (7134 meters) are amongst the highest peaks of the world. Mt. Everest along with other Himalayan ranges has remained center for adventure and is world famous for Mountaineering. Nepal's other peaks such as, Annapurna, Dhaulagiri, Nepeu are important.

CLIMATE

The climate of Nepal is dominated by cold conditions. The land forms affect the climate of Nepal. Except for the Tarai region of the south, the temperature of the rest of the areas remains low because 75% of the total area is much higher from the Sea level. The temperature of Kathmandu goes below 2^0 C in winters whereas it rises up to 30^0 C in summers. The average annual temperature, here, is 10^0 C. Nepal experiences summer season from March to August and winter season from September to February. In summer, Monsoon winds bring 200 cm. rainfall in the eastern part of Nepal and 100 cm. in the western part annually. During winters the northern part of Nepal experiences snowfall and cyclonic rainfall is also experienced.

DRAINAGE

From east to west there are successively three river system Kosi, Gandak and Ghaghra. The longest river, here, is Karnali which is a tributary of Ghaghra and it flows in the western Nepal and enters India. River Gandak flows in the central Nepal which is also called Narayani river here and river Kosi is called Saptkosi in the east Nepal. All rivers flow in the north to south direction and enter into Indian Territory. Because the terrain has slope, therefore, the rivers move very swiftly which creates the problem of soil erosion but presents the great possibilities of Hydro electric production.

SOIL AND VEGETATION

In the Tarai region and valleys of Nepal alluvial soil is found. On the lower Mountain slopes Lateritic and in central Mountainous region unfertile brown Podzol soil is found. The soils of Mountainous region are plagued by soil erosion.

Forests and Pastures are spread over 25.4 percent and 13 percent of land respectively in Nepal. In the Tarai region, Tropical evergreen and Monsoon forests are found. Evergreen broad leaved forests are found in 1200 to 2400 meters. Above this evergreen coniferous forests are found in 2400 to 4000 meters. Above this Mountainous pastures are found where due to rise

in population, cutting of forests has created environmental problems. Wild animals like Elephants, Tiger, Bear, Monkey, Deer, Rabbits etc. are found in the forests here. Thus, Nepal is a store house of bio diversity.

AGRICULTURE

Subsistence agriculture along with animal husbandry is the main profession in Nepal. On 18 percent land area agriculture is practiced here. Important food grains are rice, maize, wheat, Millets etc. In commercial crops Jute, sugarcane, fruits, tobacco, tea and cotton are important. 70 percent of the total agricultural produce comes from eastern Tarai region of the country alone. Intensive agriculture is done in the Kathmandu valley in which cultivation of rice, fruits and vegetables are important.

EFFECT OF MINING AND INDUSTRIES ON ECONOMY

There is scarcity of minerals in Nepal. Mica is the important minerals here. Lignite, Copper, Cobalt etc. in small quantity, are also found. In the form of power resources Devi Ghat Hydro Electric Project has been started with the collaboration of India. There are immense possibilities for the development of Hydro Electric projects but there has been almost no development at all.

Industrially also Nepal is a Backward country. There is scarcity of factors required for the establishment of the large industries here. Industries based on Agriculture and forest are being developed here. Cotton textiles, sugar, leather, vegetable oil, tobacco, match box, paper and pulp etc. are manufactured here. Cement and Agricultural equipments are also being manufactured here. The natural beauty, religious places and mountaineering attract tourists here. The tourism industries are developing very rapidly here.

TRADE

The trade of Nepal is also improving due to increase in mining and industries, the foreign trade and economic condition. Nepal has trade relations mainly with India, Bangladesh, China and Bhutan. Cotton and woolen textiles, food materials and herbs are exported from here. Heavy

machinery, Electrical goods and Vehicles are imported. Being a land locked nation, it has to rely on Kolkata port for the trade with other nations.

Kathmandu is the capital of Nepal and is connected with India and China through roadways. A road has been constructed with the help of China which runs across Himalayas and goes up to Tibet border. Kathmandu is connected through airways with all continents and all goods of modern comfort are available here. Pokhara is the second largest city. The lake, situated here, attracts tourists. Birganj and Janakpur are other important trade centers. All the cities, here, are connected with one another by the means of transport and communications.

There are ample possibilities of development here. The development of Hydro Electricity, Mineral and Agriculture is being done by adopting modern techniques and with the support of neighbouring countries. If expected developmental standards are achieved in Nepal then it can become Switzerland of the east. For the last 240 years there was the rule of Monarchy system of administration. The citizen of this country voted for the end of Monarchy and laid the foundation of democracy in 2008. Today's Nepal has risen in the form of a new republic. The people of Nepal now expect the possibilities of all round development of Nepal.

EXERCISE QUESTIONS

OBJECTIVE TYPE QUESTIONS

1. The border of Nepal touches which state of India?
   (a) Arunachal Pradesh (b) Manipur
   (c) Sikkim (d) Punjab

2. What is Mahabharat Lekha?
   (a) Mountain Range (b Accounts office
   (c) Plain (d) Palace

3. By which name river Gandak is known in Nepal?

(a) River Kali Gandak (b) River Narayani

(c) River Trishul (d) River Krishna

SHORT ANSWER TYPE QUESTION

1. Mention the name and height of the highest peak of Nepal.
2. Write the name of three important rivers of Nepal.
3. Write the names of neighbouring countries and bordering Indian states of Nepal.

LONG ANSWER TYPE QUESTION

1. Describe the economy of Nepal.
2. Describe the Climate, Soil and Drainage of Nepal.
3. Describe the effect of Industries on the economy of Nepal.

MAP WORK (PROJECT WORK)

With the help of Atlas make a map of Nepal and locate important Mountain peaks and Industrial centers.

(B) BHUTAN

INTRODUCTION

Bhutan is an important neighbouring country of India. It is a Mountainous country which is situated in the central part of the Eastern Himalayas. Bhutan extends between 26^0 45' and 28^0 20' North latitudes and 89^0 45' and 92^0 05' East longitudes. The total area of Bhutan is 46,500 square Km. In the north of Bhutan is China (Country), in the east is Arunachal Pradesh, in the south Assam, and in the west Sikkim is situated. These are all states of India. Bhutan is a land locked country. The capital of Bhutan is Thimphu.



Fig. 7.2 Bhutan

STRUCTURE

On the southern fringe of Bhutan there is a 16 Km. wide strip of plain area known as 'Duars'. Duar region, which is up to 600 meters in height is a narrow strip of land. In the north of plains are the lower Himalayan Mountains whose height is 1500 to 3000 meters. North of these mountains are the greater Himalayas, whose maximum height in Bhutan is 7,574 meters.

CLIMATE AND VEGETATION

The climate of Bhutan is Mountainous Monsoon type. The effect of altitude can be seen on temperature here. Severe cold condition prevails all

DO YOU KNOW

Which type of climate is found in Bhutan? If somebody from your family and neighbour has visited Bhutan then apart from your book collect information from them.

the year round. The average temperature of the January month is 4^0 C and of July it is 17^0 C. More than 185 cm of rainfall is received in May to September. The average annual rainfall is 250 cm.

Tropical climate is found in Duar plain areas. Here, the month of January remains cold. In the mountainous regions where height ranges from 1050 to 2250 meters temperate type of climate is found. Most of the country's population is found in this area only. The areas having greater altitude than this have very cold climate and generally, they remain covered with snow. Very few people inhabit in these high plateau areas and natural vegetation is almost nil.

The southern slopes of the Mountains receive more rainfall and records 500 to 750 cm of rainfall. The vegetation zones are found in accordance with the climatic conditions. Duars have broad leaved tropical forest, Chir forest in 1200 – 2200 meters altitudes, in 1500 – 3000 meters altitude Chir, Oak, Maple, Popular, Walnut etc. and at further higher altitude Fir, Birch etc. type of vegetation is found. About 68 percent of the total area of Bhutan is covered with forests.

DO YOU KNOW

What is shifting cultivation? Collect information in this regard.

AGRICULTURE

The agriculture is practiced on less than 10% of the total area here. Agriculture is done, in the inner valleys of the rivers and on gentle slopes. The agriculture is more developed in south – western parts. Shifting cultivation is done in the eastern parts. The production of crops is based on the slopes and altitude. Rice, Wheat, Barley, Potato, Maize, vegetables are mainly grown here.

POPULATION

The total population of Bhutan is 23.28 lakhs (2007) and the average population density is 42 persons per square Km. In 2005 the annual growth rate of population was 1.9%. The percentage of urban population was 11%

and rate of literacy was 42%. Because of the economic backwardness people are poor here. Thimphu and Punakha are Bhutan's impotant towns. In the Human Development Index of 2008, Bhutan is placed on 133rd position.

INDUSTRY

Industrially, Bhutan is very backward. The development of the resources have been very difficult here due to difficult terrain, harsh climatic conditions and lack of transportation facilities. Some small and cottage industries have developed here. Plywood, packing, distillery, resin and turpentine oil industry have been established. Tourism industry is developing very rapidly here.

EFFECT OF INDUSTRY ON THE ECONOMY

The Geographical location and physical structure of Bhutan is such that all means of transportation could not be developed here. Apart from this there is scarcity of minerals here. Though some minerals are found here but other mixed resources are not available. That is the reason why there is complete absence of large industries here. Industries in the form of Cottage and small scale have been developed, to some extent, which are based on animal husbandry and agriculture. Tourism industry is also contributing significantly to the economy here. Basically, it depends upon India for economic development. Many centers of hydro electricity have been set up with support from India in recent years. Electricity is supplied to India also from these centers.

EXERCISE QUESTIONS

OBJECTIVE TYPE QUESTIONS

1. Where is the capital of Bhutan?
   (A) Kathmandu (b) Dhaka
   (c) Thimphu (d) Yangon

2. The maximum height of Bhutanese Himalaya is...

(a) 8848 meters (b 7554 meters

(c) 7115 meters (d) 8850 meters

3. Is the average rainfall of Bhutan?

(a) 350 cm (b) 300 cm

(c) 250 cm (d) 380 cm

4. In how many percent area of Bhutan is there extension of forest?

(a) 20% (b) 50%

(c) 70% (d) 21%

5. What is the percent of literacy rate of Bhutan?

(a) 30% (b) 40%

(c) 42% (d) 50%

SHORT ANSWER TYPE QUESTIONS

1. Describe the surface area of Bhutan.
2. Briefly describe the economic resources of Bhutan.

LONG ANSWER TYPE QUESTIONS

1. Write brief introduction of Bhutan.
2. Describe the Climatic specialties of Bhutan.
3. Describe the Agriculture specialties and Industrial development of Bhutan.

PROJECT WORK

1. Find out the latitudinal and longitudinal extension of Bhutan.
2. Show the situation of Bhutan on the world map.
3. Illustrate the situation of Bhutan on the Globe.

(C) BANGLADESH

INTRODUCTION

In 1947, as a result of the partition of the country Bangladesh was declared a part of Pakistan in the form of 'East Pakistan' but on 17th December, 1971 it was declared a sovereign independent nation by the name of Bangladesh. Its boundary touches the Indian border from west, north and east direction, which is 4,096 km. in length. To its east lies Myanmar (Burma) and the bay of Bengal is situated on its south. To the north of it India's Assam and Meghalaya, and in the east Tripura, Mizoram and west Bengal states are situated. The total area of Bangladesh is 148, 393 square km. This country extends from 20^0 north to 27^0 north latitudes and 88^0 East to 93^0 East longitudes.

Population wise Bangladesh is Asia's fifth largest country. The population of Bangladesh is about 15 crores (2006). The population density is 880 persons per square km. Country's 98 percent population belong to the Bengali community. The rest of the population is tribal. 83percent of its population are Muslims.



Fig.7.3 Bangladesh

STRUCTURE AND LANDFORMS

Bangladesh is a Deltaic region which is situated in the middle of the world's largest Delta that is Ganga - Brahamputra delta. The height, in most of the places of this plain area dominated country, is even less than 25 meters from the Sea level.

In delta region the slope of these rivers is very less and so, their water inundates the whole area. The plains are formed of layers of sediments brought by the rivers, as a result of which the soil is very fertile. The coastal areas are marshy regions. In the delta areas due to

DO YOU KNOW?

Which is the largest Delta of the world and where it is situated?

continuous sedimentation by the rivers small islands have been formed near the coast. Cox's Bazar situated on the eastern coast of Bangladesh is the sandiest beach of the world.

Bangladesh can be divided in to nine physical divisions – (i) Hills of Chittagong and Silhat (ii) Ancient alluvial terraces (iii) Tipra surface (iv) Sandy alluvial fan region (v) Moriband Delta (vi) Isthir (stable) Delta (vii) Marshy depression (viii) Braided stream " Tidal land" (ix) Tidal Delta.

The eastern and south - eastern parts only, have hilly regions. In Chittagong and Silhat regions there is extension of hilly ranges of less altitude. These hills are 200 to 300 meters in height from the sea level. In the middle of these hills Mountainous passes are also situated.

DRAINAGE

There is a network of rivers in Bangladesh. These rivers, on the one hand help in transportation but on the other hand bring disaster through floods. The rivers have a deep impact on the life of people here. Therefore, these rivers are like life line for Bangladesh.

Almost all the rivers flowing in Bangladesh finally drain into the Bay of Bengal. The important rivers are – Ganga, Padma, Meghna, Surma, Brahamputra, etc. Ganga, Meghna and Brahampura frequently experience floods. Brahamputra is called 'Jamuna' in Bangladesh. The combined current of Ganga and Brahamputra is called Padma. Due to too much of sedimentation and less slope the rivers frequently change their direction.

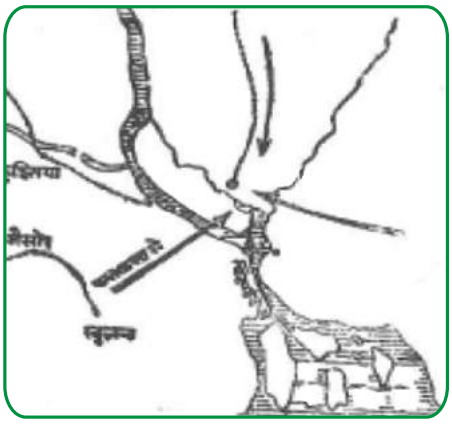


Fig. 7.4 : Rivers of Bangladesh

CLIMATE SPECIALTIES

Bangladesh has Monsoon type of climate. Normal cold is experienced during the winter season and the average temperature remains at 18.5^0 C. Summers are very hot. The average summer temperature remains at 38^0 C Because of the situation of Himalayan in the north the

climate remains moderate here.

DO YOU KNOW

By which name Brahamputra is known in Bangladesh?

Bangladesh receives enough amount of rainfall. The average annual rainfall is 200 to 500 cm. Rainfall occurs from the south – west Monsoon winds coming from the Bay of Bengal. Weather uncertainty prevails in the southern part as it remains under the effect of cyclones from October to December. In this period the tidal currents enter the inner parts after crossing the coastal areas and cause immense damage to life and property. These storms are also known as 'Kal – Baishakhi'. The average of rainfall is not even everywhere. The maximum rainfall occurs in the eastern parts.

SOIL AND VEGETATION

Bangladesh is mainly dominated by plains where a fresh layer of soil is re-laid after the floods. That is why fertile Loamy soil is found on a very large area which is its most important resource. Forests are found on 6.7% of the total area of Bangladesh. Due to the excess of rainfall the trees grow very rapidly. Evergreen forests are found in the Mountainous parts of Chittagong and Silhat. Bamboos dominate in these evergreen forests. In the southern deltaic regions marshy forests are found. These forests are also known as 'Sunder vans'. World famous Bengal tiger is found in these forests. Grass is found, at places, in the plain areas.

AGRICULTURE

Agriculture is the mainstay of the Bangladesh economy. 80% of the total population is engaged in Agricultural works. Agriculture contributes one third in the Gross Domestic Product (G.D.P). 63% land of the country is given to agriculture. Here crop production, animal husbandry, fishing and forestry are main economic activity. 81% of the total business, 80% of the total income from foreign trade and more than 50% of the National product comes from agriculture. Rice is cultivated on 62% of the total agricultural area of the country, on 6% Jute, on 4% wheat and on rest 10% vegetables, fruits and cash crops are sown. Here, the three varieties of rice – Aman on (67%), Aus on (25%) and Boro on (3.5%) land is grown. Here more than 6% of the world's raw Jute is grown. Country's 7% Jute is grown in Maimansingh district. Tea is grown on the slopes of the Chittagong and Silhat hills. Sugarcane, Tobacco and wheat are other crops. Animal husbandry is

FIND OUT

(a) Where is Sundari tree found?

(b) What do you understand by Mangrove forest?

Popular as a supplementary to agriculture. Generally, every family domesticates hen or duck for meat and animals for milk and fuel. Sheep and goats are also domesticated.

Because of the greater number of internal ponds, fresh water fishing is well developed. The Sea fishing resource is also there in abundance. Enough Mangrove forests are found here. The wood of Sundari tree is useful for manufacture of railway sleepers, fuel, pulp and items of industrial works. Bamboo is also a useful tree.

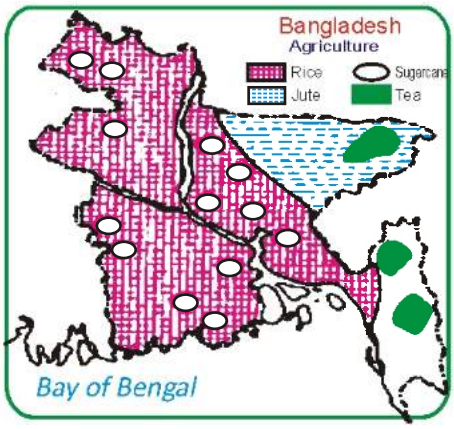


Fig. 7.5 Bangladesh - Agriculture

EFFECT OF MINING AND INDUSTRY ON THE ECONOMY

Bangladesh is quite deficient in the mineral wealth. There is scarcity of mineral reservoirs here. The important minerals found in this country are coal, lime stone, salt, sand of glass, iron and natural gas. Low quality coal is found in Jamalpur and Faridpur regions.

Natural gas is found in Silhat, Tipra and Rashidpur regions. Natural gas is produced in Titas which is transported to Dhaka through pipe line. An important oil refinery is situated in Chittagong.

The development of modern industries has been almost nil in Bangladesh and that is why, majority of its population is dependent on agriculture. Only 10% of the national product comes from industries and less than 10% of the total population is engaged in industrial works. The major Industries of Bangladesh is agro based. Mainly Jute, Cotton textiles, Paper, Sugar and Fishing industries have developed. World's 50 percent Jute and goods made from Jute are exported from Bangladesh. Apart from these, a few factories of Cement, glass, fertilizer, steel, Oil refinery and Ship manufacturing are also there. Small engineering, metal, chemical, electrical goods, industries related to transportation are based on raw materials

imported from foreign countries.

The major imports of Bangladesh are food materials, oil, cloth, coal, goods of iron and steel and motor cars. Similarly the major exports are Jute and goods made from jute, fish, leather, herbs, electric equipments and engineering goods. Dhaka, Chandpur, Barilal and Khulna are internal river ports.

EXERCISE QUESTIONS

OBJECTIVE TYPE QUESTIONS

1. What is the previous name of Bangladesh?
   (a) East Pakistan (b) East Bengal
   (c) Pakistan (d) Mujib Nagar

2. What is the length of land boundary of India with Bangladesh?
   (a) 4018 km (b 4096 km
   (c) 4180 km (d) 4009 km

3. When did Bangladesh got Independence?
   (a) 17th December, 1970 (b) 18th October, 1971
   (c) 17th December, 1971 (d) 18th March, 1981

4. In which part of Asia is Bangladesh situated?
   (a) Western Part (b) Southern Part
   (c) Northern Part (d) Eastern Part

5. By which name is Brahamputra river known in Bangladesh?
   (a) Meghna (b) Jamuna
   (c) Surma (d) Karnfuli

SHORT ANSWER TYPE QUESTION

1. Describe the location and importance of Dhaka City.

LONG ANSWER TYPE QUESTION

1. Present a detailed Geographical account of Bangladesh
2. Explain the economic importance of agriculture of Bangladesh alognwith the important commercial crops .

MAP WORK

Locate the important rivers and cities on the map of Bangladesh.



(D) SRI LANKA

INTRODUCTION

Sri Lanka, situated south of India in Asia, is a large Island of Indian Ocean. Because of the dominance of the of 'Sinhalese Caste' this island is also named as 'Sinhal Island'. The English popularised the Sinhal Island by the name of Ceylon. The island has been decorated by the name of 'Island of Pearls' because of the abundant storage of diamonds – pearls, ornaments and other rubies. The English has made this island a colony of British Empire in 1802. On 4th January, 1948 after the Indian independence, Sri Lanka got rid of the colonial rule and became an independent nation. In 1956, Democratic rule was established in this country.

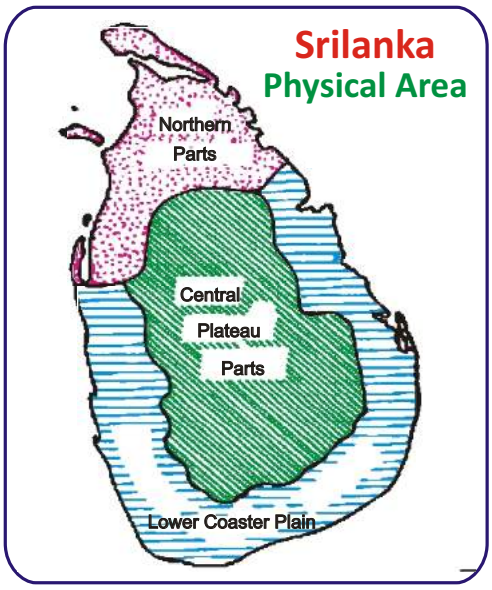


Fig.7.6 Sri Lanka Physical

This country is situated at a distance of about 52 km. from India. It looks like Oval or closed fist in shape. This country is spread over in a area of 66 thousand square km. and is separated by Palk Strait from India. There are many coral islands found here which is called ' Adam's Bridge'.

Situated at the top of Indian Ocean, Sri Lanka is such a country which has been supplying fuel to all ships passing through Indian route since colonial era. This country is also important from the Geo – Strategic point of view.

STRUCTURE AND LAND FORMS

Like peninsular India, this island is also made of Gondwana (per Cambrian) rocks. The extension of plains of Sri Lanka is in coastal areas. Below

these strata of hard rocks are found. In the Northern parts plains of Jaffna is situated, where lime stone dominates. It is not more than 100 meters high. The central part is plateau in nature, around which extends the coastal plains. The highest peak here is Pidurta Laganala whose height is 2527 meters. The land forms can be seen in fig.7.6. Other Peaks are Rampad, Budhpad, Aadam are important.

CLIMATE SPECIALTIES

The climate of Sri Lanka is Monsoon type. Because of its nearness to the equator, it remains hot here all over the year and it keeps raining also. There is no winter season here. In coastal areas up to 200 cm and in Mountainous regions more than 500 cm of rainfall occurs. There is almost no annual range of temperature (5^0 C 7^0 C) in winter and summer seasons. During winter season the average temperature remains at 22^0 C. In the Mountainous parts the temperature remains at 20^0 C.

DO YOU KNOW?

The equatorial vegetation is very tall. In their struggle to get sun light they keep growing taller from each other.

FIND OUT

With the help of Atlas show those Asian countries who are near to the equator.

DRAINAGE

Amongst the major rivers Mahabali Ganga, Paan and Aarubi flow out from the central highlands and run through the coastal areas and drain out into the Sea. In the Mountainous regions like Rampad and Budhpad beautiful waterfalls Dyaluma, Luxpana and Perawala are situated.

SOIL AND VEGETATION

Here, in the northern plains lime stone dominated soil is found. Generally, in the alluvial plains, formed by the rivers, Lateritic soil is found.

Here, in the forests, Rubber, Cinchona, Gataparcha and Cheru woods are found. Forests are found on 30 percent of land area. Dense forests are found in central highlands. Here, mainly equatorial vegetation is found.

AGRICULTURE

The agriculture of Sri Lanka is more famous for commercial crops than food crops. Important commercial crops like - Tea, Black Pepper, Cinnamon, Coffee, Tobacco, Banana, Pine apple, Beatle leaves, Beatle nuts, Sugarcane, Coco and Cashew nut etc. are grown. In the plains rice and in the coastal regions Coconut is mainly grown. In the internal parts of the country fishing is popularly done in rivers and ponds. Because, Sri Lanka is surrounded by water from all sides fishing has taken the shape of industry and has become an important part of economy here.

EFFECT OF MINING AND INDUSTRY ON THE ECONOMY

Here, on the name of minerals Graphite, Monazite, Mica and Iron ore are found. Rubbles like Nilam, Raktamani, Pukhraj are found in abundance. Here extraction of pearls from sea is also popular. That is why this island is also called 'Pearl of the East'.

Agriculture and minerals both forms the base for the establishment of the industries. Here, all convenient sources are not available for the establishment of the mineral based industries. Still, few mineral based industries have been set up. Looking at the availability of the lime stone in the Jaffna plains cement industries have been set up, but very few scale industries have been established due to scarcity of the power resources.

Agriculture based industry is the main stay of the economy here. Here Tea, food processing industries like Sugar industry, Rubber industry, Fishing

industry and spices industries have been developed. These industries have been developed mainly, in the form of small and cottage industries.

The majority of the population, here, is engaged in either agriculture or Agro based industries. Here, Coconut oil, ropes, mats and carpets are being manufactured from the Coconut. Sri Lanka is the largest exporter of tea in the world. Some important materials like mineral oil, machinery goods, Sugar, Salt, Cement etc. are imported here.

Trincomalee and Colombo are important ports here. There is also a naval base in Trincomalee. Jaffna, in the North, is one of the large towns. Apart from this Ratanpur, Anuradhapur and Galle are also important towns.

To a large extent, the economy of Sri Lanka is based on mining, Agro based industries, Tourism and fishing. There are immense possibilities for the development of small scale industries. In recent years violent movement run by Tamils has affected adversely on its development. Still, it is developing very rapidly amongst Asian countries.

EXERCISE QUESTIONS

OBJECTIVE TYPE QUESTIONS

1. What is the shape of Sri Lanka?
   (a) Square (b) Oval
   (c) Triangular (d) Circular

2. Pidurtalgaala is an important land form of Sri Lanka -
   (a) River (b) Lake
   (c) Peak (d) Depression

3. Is the capital of Sri Lanka-
   (a) Kandy (b) Colombo
   (c) Jaffna (d) Anuradha Nagar

4. Separates India from Sri Lanka -

(a) Palk Strait (b) Sri Lanka Strait

(c) Harbhuj Strait (d) None of these

5. When was democracy established in Sri Lanka ?

(a) 1948 (b) 1949

(c) 1955 (d) 1956

SHORT ANSWER TYPE QUESTION

1. What type of climate is found in Sri Lanka?
2. Why is Sri Lanka called as the 'Pearl of the East'?
3. What type of vegetation is found in Sri Lanka?

LONG ANSWER TYPE QUESTION

1. Describe the climate of Sri Lanka.
2. Write an essay on the economy of Sri Lanka.

MAP WORK

1. With the help of Atlas, show important Cities on the map of Sri Lanka.

(E) PAKISTAN

Introduction

Pakistan is a neighbouring country of India. It has largest area and population amongst our nearest neighbouring countries. Few decades age it was a part of India. On 14th August, 1947 it separated from India and became a separate independent nation. It had two parts which was called west and East Pakistan but in 1971 its eastern part separated from it and became an independent country. Now only West Pakistan is called Pakistan. It is situated in the north – west of India. Afghanistan is situated in the north – west of Pakistan, in west is Iran and in the south Arabian Sea is situated.



Fig 7.7 Location of Pakistan

Geographically, Pakistan extends from 23^0 30' North to 36^0 45' North latitudes and 61^0 East to 76^0 East longitudes. Its total area is 8, 03, 943 square km. Its national language is Urdu. Apart from this Punjabi, Sindhi, Pashto and Baluchi languages are also spoken. Apart from Sindh, Baluchistan, Punjab, North – West frontier province, Pakistan is a union of ten other small administrative units.

POPULATION AND CITIES

The total population of Pakistan is more than 15.5 crore (2005 Human Development UNO – 2008) and 150 persons per square km inhabit here. Majority of population, here, follow the Islam religion. The important cities of Pakistan are Islamabad, Rawalpindi, Karachi, Lahore and Hyderabad. Islamabad is the capital of Pakistan. Some distance from here famous city of Rawalpindi is also situated. Karachi is the largest city and Lahore is the second famous city of Pakistan.

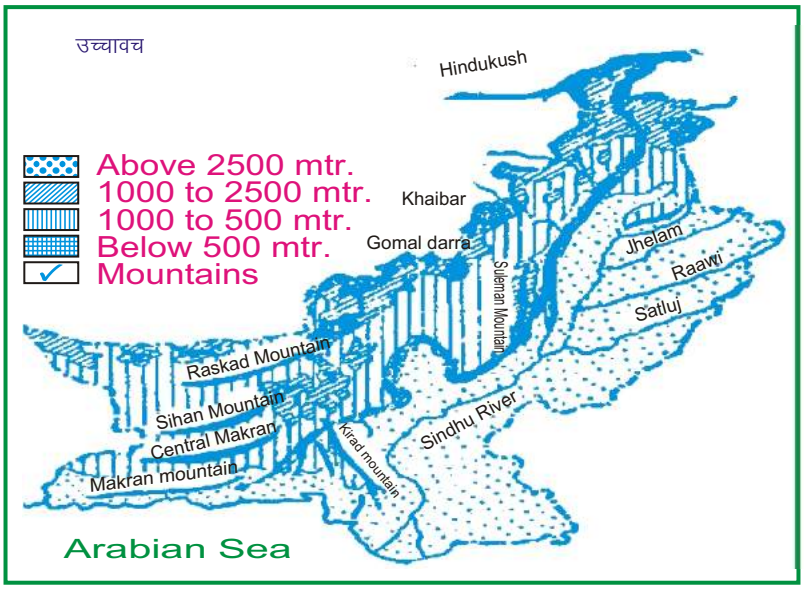


Fig. 7.8 Relief of Pakistan

LAND FORMS

The natural structure of Pakistan is uneven. Here, there is an extension of high Mountains, Plateau areas; fertile plain surface on one hand then on the other sandy desert areas can also be seen. In the south, there is an extension of coastal plains. Its North – Western part is the highest region here, where height is more than 3000 meters. From here a series of Mountain range extend up to south in a curve form which, in fact, is western and southern extension of Himalayas. These ranges from North to South are famous by the name of – Hindukush, Suleiman and Kirthar respectively. Takht Suleiman is the most famous peak here whose height is 3,770 meters and is situated in western province region. There are many passes in these Mountain ranges in which, Khyber, Bolan and Gomal are important. The south – western part which is popularly known as Baluchistan is Plateau in nature. The average height, here, is 300 to 1000 meters. It is a dry region in which dissected valleys and lakes of saline water are found. In its North – Eastern part is Potavar plateau.

South – Eastern border of Pakistan is a desert region. There are number of sand dunes situated here. Its structure is similar to that of Thar Desert. The Indus plain is situated in the south – western part of this desert.

This plain has been formed by the deposition of sediments brought by Indus and its tributary rivers in the Indus basin. Every year fresh alluvial soil is deposited here and so the region is very fertile. The average height of this region is 150 meters from the Sea level. In the southern region here, extension of deltaic plain and coastal plain is found.

CLIMATE

The climate found here is Monsoon and hot desert type. Here, very hot summer and very cold winter is experienced. The average temperature falls below 7^0 C in winter season and snowfall occurs in the northern Mountainous region. The temperature rises up to 45^0 C in summer season. At this time, the temperature of Jacobabad rises up to 55^0 C. This is the hottest place not only of Pakistan but also of Asia. The eastern desert region experiences sandy storms and sand dunes can also be seen all around the region.

There is scarcity of rainfall here. The average annual rainfall is only 35 cm. Cyclonic rainfall occurs during winter season and in summers Monsoon winds coming from Bay of Bengal bring rain here. The distribution of rainfall is not even here. 75 to 80 cm in the northern foothill region , 35 to 50 cm in eastern plains whereas only 20 to 25 cm rainfall in western region.

Indus is the most important river here and among its tributaries – Jhelum, Chenab, Ravi, Sutlej and Beas are there. They are called 'Panchnad' and Indus is called 'Nad' here. The Indus originates from across Himalayas and travels a long distance before draining out into the Arabian Sea. All tributaries join it in the central part of the plains from north – east direction (North – West of India). River Kabul is also amongst the tributaries of Indus, which runs through Afghanistan and joins Indus from North – West direction. Pakistan is called as the 'Gift of Indus'. This is a fact that, in absence of Indus, whole Pakistan will be like a heap of stones and desert. The other rivers here are Joba, Pashmel, Tochi and Chitrala. These are all small and rain fed rivers, though their currents are very swift but they dry out in summer season. Here, Dams have been constructed on large scale on Indus and other rivers. The development of Dams at this magnitude is rarely found in the other parts of

the world. Through the development of Dams, a network of Canals has been developed. Among the important Dams – Mangla, Sakhar, Islam, Barasak are there. Amongst the large Canals, here, Upper Chenab, Lower Chenab, upper Jhelum, Lower Jhelum and upper Bari Doab canals are there. Many Doabs have been formed by Indus and its tributary rivers. Famous amongst them are Lower Bari, Rachna, Jech, Sindhu Sagar Doab etc. River Indus forms Delta on its mouth.

The land between two rivers is called 'Doab'

Natural features and climate affects the soil and vegetation of any region. Here, in North – East new and old alluvial soil is spread all over which is very fertile. In north – west and central – west coarse soil is found. Because the south – east region is plateau, desert and dry in nature, so sandy and coarse soil is found here. Indus Delta is situated in the south – east, here very fertile new alluvial soil is found. Due to scarcity of rainfall the extension of forests here is very less. Only 3% of the total area has forest cover here. In the upper reaches of the northern Mountains, Deodar, Chir, Fir and spruce dominated forests are found. On the plateau areas of Baluchistan pine and oak tree dominated forests are found. In the central parts and Basins of the rivers Babul, Shisham, Neem and Mango trees are found. Similarly, in the eastern desert region thorny bushes are found. In the central and lower parts of the Indus grass lands are found.

In spite of being a rain scarce region, Pakistan is agriculture preponderant country. Agriculture is practiced here on 19% of land and 72% population is dependent upon agriculture here. The plains of Indus and its tributaries are very fertile. Apart from this, a large network of irrigation canals has been developed through Indus and its tributaries, through which 63% of the total arable land is irrigated. Wheat is the most important crop here. Wheat is cultivated on 55% of the arable land. Other crops such as Gram, Maize, Millets, Cotton, Oil seeds, Sugarcane, and Tobacco are also grown. Rice is grown here in a very limited area of south – east region. Wheat is mainly grown in the western part of Punjab. Occupies the second position in this regard Gram. Maize and Millets are grown, in a limited amount, in those

areas where there is no proper development of irrigational facilities. In cash crops cotton and sugarcane are important. They are grown on 15% and 5% of the agricultural land respectively.



Fig.7.9 Mineral resource of Pakistan

To mitigate the uncertainty and lack of rainfall,a number of Dams and a network of canals have been constructed which have made agriculture possible here.

EFFECT OF MINING AND INDUSTRY ON THE ECONOMY

There is scarcity of mineral wealth in Pakistan. The important minerals found here are – Coal, mineral oil, natural gas, chromites, gypsum, iron, rock salt, lime stone, bauxite and sulphur etc. Mineral oil is produced in Balakasar, Khairpur, Atak, and Chakwal. Coal is found in Rawalpindi, Majrabal, and in many areas of Hyderabad. Iron ore is extracted from Atak, Sargodha, Jitral and Miyanwala regions. Chromium is found in the Joba valley of Baluchistan. Manganese is found in Lasbela and Kohat regions. The important area of natural gas is Sui, Khairpur and Lailpur.

INDUSTRY

Industries based on agriculture and chemical have been more

developed here. Important amongst them are cotton textiles, woolen, sugar, sports goods, paper, chemical and match box industries. Important mineral based industries are cement, oil refinery and natural gas based industries. In forest based industries Sialkot is world famous for the manufacture of sports goods.

The important cotton textiles centers are Multan, Karachi, Lyallpur, Lahore, Ukara etc. Harnayee, Bannu and Kadiabad are woolen textile centers. Bamboo based Paper mills are located at Naushera and rahwali. Sugar mills are established at Charsadda, Mardan, Auharabad. Asia's largest sugar mill is situated at Mardan (Peshawar).

Cement industries have been developed at Karachi, Hyderabad, Daudkhel, Bah and Rohari. The largest chemical industry is located at Daudkhel. Apart from these in Naushera, Lyallpur, Haripur caustic soda, sulphur, Acid, chemicals, DDT, Rasin, Pencilin and color manufacturing industries are there. Oil refinery at Morgah of Karachi and at Sui gas based industry is situated. Nuclear power station is situated at Kahura.

Here, import is more in comparison to export. Foreign trade is mainly done with USA, Great Britain, Germany, Japan, Iran, India, Canada, China and Russia. The goods that are imported are Machines, Railway engines, Railway compartments, Ships, Aircraft, Tractor, Iron ore, Coal, Tea, Paper, Beatle leaves, Rice etc. exports mainly include Cotton, Hide, leather, Fruit, Tobacco, Paper, Leather shoes etc. The goods are mainly exported to Great Britain, USA, and China.

EXERCISE QUESTIONS

OBJECTIVE TYPE QUESTIONS

1. Where is the largest Airport of Pakistan located?
   (a) Islamabad (b) Karachi
   (c) Sialkot (d) Multan

2. Is world famous for sports goods manufacturing -
   (a) Karachi (b) Rawalpindi
   (c) Sialkot (d) Lahore

3. What is the height of Pakistan's famous peak Takht Suleiman?
   (a) 3750 Meters (b) 3770 Meters
   (c) 3700 Meters (d) 4400 Meters

4. River Indus Flows -
   (a) From south to North (b) From East to West
   (c) From North to South (d) None of these

SHORT ANSWER TYPE QUESTION

1. Why is Pakistan called the 'Gift of Indus'?

LONG ANSWER TYPE QUESTION

1. Describe the climatic specialties of Pakistan.
2. Describe the mining and industrial development of Pakistan.

MAP WORK

1. Construct an outline map of Pakistan and show important industries and Mineral centers.

CHAPTER- 8

MAP READING

Our Earth is a large heavenly body which is spherical in shape. It is impossible to make a map equal to its size; therefore scale was developed to draw maps. Scale is that method through which whole earth or part of it, as per the requirement, can be exhibited by drawing map. With the help of that map the actual distance between the two points on the surface is calculated. In other words, scale is the process of measurement of proportion of distance between two points shown on the map and the corresponding points on the actual surface.

UTILITY OF SCALE

Geography is also called as the science of Map. The use of scale is essential for drawing map. Without this no map can be drawn, where as map is an essential tool for the student of Geography.

FOLLOWING ARE THE USES OF SCALE IN MAP

1. Scale is the method to exhibit part of the surface correctly on the map.
2. Through scale we can exhibit very large earth surface in small form on the map.
3. Through scale, area of any region can be found.
4. With the help of scale any surface can be exhibited in large or small size.
5. Scale is essential for drawing map of building, factories, railway line etc.
6. Scale is also essential for survey.

METHODS OF EXPRESSING THE SCALE

The scale can be expressed through the following three methods on the map:

1. Statement Method
2. Representative Method
3. Graphical Method

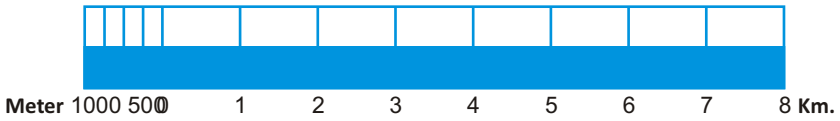
1. **Statement Method** – In this method scale is expressed through a statement e.g. 1 cm = 5 Kilometer or 1 Inch = 18 miles etc.
   1 cm = 5 km. means that a distance of 1 cm on the map expresses a distance of 5 km. on the surface. Similarly, 1 Inch = 18 miles means a distance of 1 inch on the map expresses a distance of 18 Miles on the surface. The first part of this statement expresses the distance between any two places on the map and the second part expresses the distance of those two places on the surface.
2. **Representative Fraction:** There is no similarity in the use of scale system in every country of the world. The statement method is used only in the concerned countries. To solve such problems Representative Fraction is used. Through this method scale can be made in any country even though, any other system of scale expression is being used in that country. In this method the distance on the map and distance on surface is expressed through a fraction. The numerator of this fraction is always 1 which expresses the distance of the map and the denominator is in same unit and expresses the distance of the surface. Representative Fraction is also called uplakchak and nirupak fraction.

$$\text{Representative Fraction} = \frac{\text{Map Distance}}{\text{Ground Distance}}$$

Through this method citizens of any country can study map very easily. For example – $\frac{1}{250,000,000}$

It means 1 inch on the map expresses 250,000,000 inch of the surface. Similarly 1 cm of the map expresses 250,000,000 cm of the surface. Representative fraction can be understood by changing it according to the scale system of any country. Therefore, it is also called **'International Scale'**.

3. **GRAPHICAL SCALE:** This method is called plain scale method. The length of the graphical scale is determined on the mathematical base with the help of statement or representative fraction. After this, the line is divided in primary and secondary sections through arithmetic method. On main or primary section, large units like Mile or Kilometer and on secondary or sub – sections smaller units like Furlong or Meter is expressed.

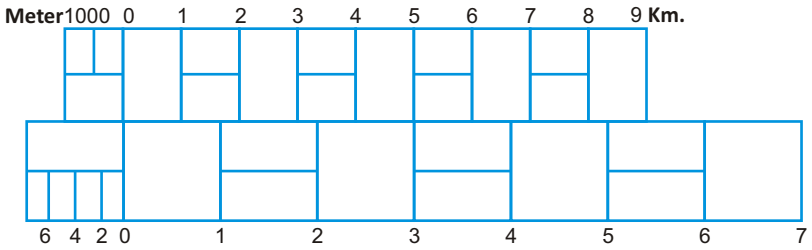


GRAPHICAL SCALE

The evaluation of the divided line is done after leaving first primary part. In other words 0 is fixed after leaving first part from left and 1, 2, 3, km etc. is fixed towards right from 0. Now, a main section of left side is again divided in sub – sections and 500, 1000 meter etc. is fixed from 0 towards left.

COMPARATIVE SCALE: In comparative scale distances are expressed in one or more than one scale system, e.g. Mile, Furlong, Meter and Gaj etc. are used in only one scale. At times two different facts are expressed in it e.g. distance and time is shown. The greatest quality of this scale is commencement of its secondary and primary scale is from one reference line or from zero value.

DIAGONAL SCALE: In plain scale tenth part of any unit or second section of unit is expressed. If hundredth part of any unit or third section of this unit is to be expressed then we take the help of Diagonal



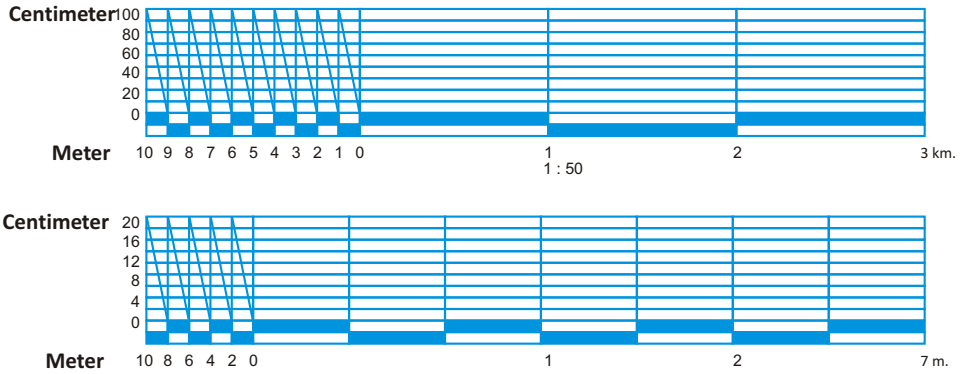
DIAGONAL SCALE

scale. Thus, hundredth part of any unit or the scale that expresses micro distances is called Diagonal Scale.

In this type of scale a scale similar to plain scale is made and on the sub – sections of the scale parallel lines are drawn at a fixed distance and then diagonals placed. This enables the reading of distances on the parts of diagonal. On this scale Kilometer, Hectometer, Decameter or Meter, Decimeter, Centimeter etc. are expressed.

TYPES OF SCALE: Scale is of following two types –

(1) SMALL SCALES: Small scale is also called micro scale. In this the expression of one centimeter is equal to several kilometers e.g. 1 cm = 5 km. or $\frac{1}{50,000,00}$



Large Scale

It means that 1 km distance of the map expresses 500, 000 cm or 5 km on the surface. On small scale long distances are expressed. Most of the wall maps are based on small scale.

(2) LARGE SCALES: Large scales are also called big scales. In this scale, 1 km is expressed in several cm e.g. 5 cm = 1 km or $\frac{1}{20,000}$

It means that 5 cm distance of map expresses 1 km on the earth or 1 cm = 20, 000 cm. On large scale small distances are expressed. The maps of Indian villages and cities are made on large scale. The roadways and railways can easily be expressed on large scale. It is convenient to express small distances with full details on large scale. Town planning and land use maps are made on large scale.

EXERCISE QUESTIONS

OBJECTIVE TYPE QUESTIONS

1. Which scale method is most accepted?
   (a) Statement (b) Representative
   (c) Graphical (d) None of these

2. How does the scale find out the distance of the map?
   (a) Numerator (b) Denominator
   (c) Statement of scale (d) None of these

3. Denominator in scale expresses -
   (a) Distance of the surface (b) Distance on the map
   (c) Both distances (d) none of these

4. Which of the following scale is of Representative fraction?
   (a) Meter (b) Centimeter
   (c) Inch (d) None of these

5. Through which of the following scales distances of both the Kilometer and Mile can be expressed?
   (a) Line scale (b) Graphical scale
   (c) Representative fraction (d) Comparative scale

SHORT ANSWER TYPE QUESTION

1. What is scale? What is the importance of scale? Illustrate.
2. Describe the methods to express scale?
3. What is Representative fraction?
4. How many types of scale are there?
5. What are the two different systems of scale?
6. Why is representative fraction method called universal method?
7. What are the important uses of Graphical method?
8. What are the specialties of comparative scale?

LONG ANSWER TYPE QUESTION

1. What is scale? What is its importance for map? Describe in detail the different methods used to express scale.
2. Write short notes on the following –

   (i) Representative fraction (ii) Graphical scale

   (iii) Statement scale

PROJECT WORK

1. Find out the distance from your home to school and convert them in Centimeter and Meter.



CHAPTER – 9

REGIONAL STUDY

Regional study is a significant component of Geography. Basically, it is an basic point of learning through which we learn about human beings and its surroundings of a particular region. This knowledge greatly helps in understanding the man – environment relationship. Difference in social, cultural and economic conditionsis found in different regions . There is obvious effect on the lives of people, living in a particular region of land form, climate, drainage, agricultural productivity, industrial development, urbanisation etc. The living style of the people is connected to all these factors. The human activities also affect their surroundings. Regional study is essential to understand these things. We collect direct information through this method of study and analyse it from different methods.

WORKING PROCESS OF REGIONAL STUDY:

For regional study, at first, observation of the region is made by visiting it. Keeping in mind the objective of this study, the focus of studyis given to all the aspects and then related questionnaire is prepared. Whatever, written information is received from questionnaire; it is collected then studied and analysed. They are the sources of primary data.

In regional studies primary and secondary, both types of data are used. To choose a region, it has to be kept in mind that burning aspects of that region should be

Primary Data – This data is collected by visiting the chosen region.
Secondary Data – This is made available through some sources.
e.g. Municipality, Village panchayat, Agriculture department, census department etc.

included in it e.g. falling water level in a region, land use, different types of pollution such as air pollution, water pollution, noise pollution etc.

ACTIVITY

(A) What are the causes of increasing pollution in the cities?

(B) The number of motor vehicles has increased or not?

QUESTIONNAIRE:

In this method questions are asked to the people. Questions are prepared with the support of the teachers according to the necessity. For survey, several types of questions may be asked. The nature of the questions depends upon the nature of the required data and background of the people living there. The answer to some of the questions can be in yes or no e.g. are you in service?

The answer to this question will be in yes or no. In the answer of the multiple choice questions, some options are given and out of these options only one option is correct.

The surveyors, at first, try to know the existing burning problem by visiting that area. After that, information is collected from the people living in that area through questionnaire. The collected data is studied and a report is prepared which gives sufficient information regarding the problems of that region e.g. Study of flood affected regions of Bihar. What changes has been experienced in the land use of a village or city? How much rise in pollution level has been experienced due to increase in number of vehicles in the city? As an example details of the causes of falling underground water level and solution for its conservation are being given –

DO YOU KNOW

What is underground water table?

CAUSES AND REMEDY OF FALLING UNDERGROUND WATER TABLE:

Rapid growth in population, agriculture and industrial development have led to large scale utilisation of underground water, as a result of which the level of underground water table is falling. In some regions the underground water table has fallen below the dangerous level. There has been remarkable fall in the underground water table in both urban and rural areas. The demand for water has increased in the cities, due to population explosion and modern amenities like sewer

System. Irrigation is done through tube wells in the rural areas which causes the fall in the level of underground water table. Due to tube well irrigation in the districts of Gaya, Nawada, Nalanda, Jehanabad, Aurangabad etc. a clear fall in the underground water table has been experienced and this has created a water crisis in this area. The daily solid wastes of the cities are disposed of on the outskirts of the cities. These wastes mix with the rainwater that seeps in to the underground water and contaminates it. The measurement of the depth of the subsoil water is determined by measuring the water level of the wells with the help of the measuring tape. While setting up the tube well, at the time of digging, the depth of the underground water table is measured with the help of the pipes. Change is experienced in the underground water level during rainy and dry seasons. The data should be recorded according to the date and weather. The measurement of the depth of water of the wells should be recorded according to the seasons. By measuring the depth a contour line map of the underground water can be prepared.

MEASURES TO PREVENT FALLING UNDERGROUND WATER TABLE:

The urban population should construct planned colony or multi storied buildings with facilities of rain water harvesting system on the roof of the buildings which will help in recharging the underground water through this harvested water. The rain water can be stored by digging pits called 'charging pit' through which level of underground water table can be improved. In Bihar, for the improvement of the underground water table, it has been planned to connect water tanks on the ground through pipes with the rain water being collected on the roofs of the government offices. This process is called 'water harvesting'. By adopting this method in every home, the level of underground water can be improved.

To survey the falling level of underground water, select few wells and tube wells of any village or city and compare it with the water level of previous 4-5 years. To measure the water level of the well put a rope in to the well and measure it with the help of measuring tape and note down its depth. Compare it with the previous 4-5 year data which can gauge the changes that has come about in water level. The underground water level can be measured before and after the rainy season. Through this the effect of rainfall on the water level can be gauged. For this, following table can be prepared –

No.	Serial Number of tube wells	Present water level	Previous water level	Change in water level	Rate of water
1.					
2.					
3.					
4					

.

DO YOU KNOW?

In which form the land is being used around you? Collect information on the issue.

CHANGE IN THE FORM OF THE LAND USE:

The main aim to study the land use is to find out the present use of the land. In the regional study of the land use, whole village or any of its locality can be considered. This selection will depend upon the size of the region. If the region is large then any of its part and if it is small then whole region can be studied.

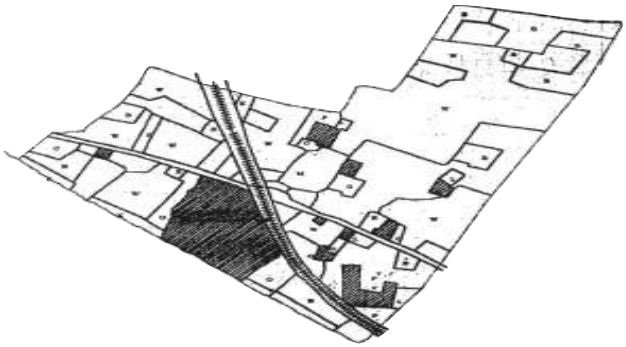
While surveying the land use of any village, on the Cadastral map of the village, it is important to show all types of land use. On the Cadastral map of the village, size of the agriculture fields and its number is exhibited. Before the beginning of the survey work any permanent structure of the region is selected as the reference point. The land use can be shown on the map through symbolic indications e.g. Wheat fields can be indicated by 'C' and Rice fields can be indicated by 'F'.

On a separate map, types of soil can be shown according to their colour and structure. On the map some questionnaire can be prepared on the topic - such as slope of the fields, drainage, irrigated and unirrigated crops, etc. for the conversation with the farmers and gathering information from them. By making separate groups of the students table can be prepared after collection of the data. Crops, sources of irrigation etc. are to be exhibited in different colors. Maps of land use, soil, land forms etc. can be superimposed on each other and a composite map can be prepared.

Prepare your report by analysing these data and maps. Attach maps and tables at suitable places in the report.

TABLE OF LAND USE DATA COLLECTED FROM FARMERS THROUGH INTERVIEW

Sl. No.	No. of fields	Name of the farmer	Area of the field (in hectares)	Type of soil Red, black, loam y etc.	Name of the crops produced				Irrigation	
					Kharif Paddy, Jowar, Millets	Rabi Wheat	All seasons	Kharif	Rabi	In all seasons



M Maize W Wheat B Barley G Gram P Potato K Khesari O Oil seeds Settlements

Field - Boundaries and Agriculture Forms (Rabi Crops)

POLLUTIONS: TYPES, CAUSES AND PREVENTION –

Pollution is a serious problem. Amongst pollutions - soil pollution, air pollution, water pollution and noise pollution are important.

On local level, students can select any factory or crossroads to study pollution. Agricultural region or pond adjacent to the agricultural region can be selected to study pollution caused by the use of chemical materials.

Through discussion with the people living in the region, information

can be gathered about causes of pollution and polluting solid waste materials. Information regarding factors responsible for the spread of the pollution, effect of pollution on surrounding areas, problems faced by the people and lack of fertility of the soil can also be gathered.

In regional studies air and water pollution are chiefly studied. Effect on the health of the local people can also be determined. In pollution studies, polluted region is fixed and with the help of the teachers by forming the groups of the students, necessary data should be collected.

This type of report on regional studies will provide solution to the problems on the one hand where as on the other hand it will help in studying that region on micro level. Local problems can also be controlled through such studies.

EXERCISE QUESTIONS

OBJECTIVE TYPE QUESTIONS

1. What do we call the data collected by visiting the region?

(a) Secondary data (b) Primary data

(c) Tertiary data (d) quaternary data

2. Regional studies in Geography is -

(a) A Origin Point (Ek Upagam) (b) A Law mechanism (Ek Vidhitantra)

(c) A Theory (d) A Model

SHORT ANSWER TYPE QUESTION

1. Through light on the importance of Regional studies in Geography.
2. In which region is land more used for agriculture?
3. What type of damage is caused by air pollution?
4. Discuss the ill effects of water pollution?
5. How is the rain water harvested?
6. Show rain water harvesting with the help of graph.

7. What do you understand by regional studies?
8. What are the benefits of regional studies?
9. On which points should attention be given while selecting regions?

LONG ANSWER TYPE QUESTION

1. Answer the following questions by studying the table given below:

Major Land use	YEAR					
	1801	1850	1920	1950	1980	2000
Forest	6215	5960	5675	5382	5052	3454
Cropped Areas	6862	6832	6745	6780	6788	3426
Grass lands	265	538	915	1170	1500	1513

(A) Name that land use category whose area is declining constantly.

(B) What is the main cause of constant increase in cropped area? Explain.

(C) In which category of the land use has the least land area been used?

2. Discuss the different methods of questionnaire for regional studies?
3. Describe the four sources of air pollution?

REGIONAL STUDIES: QUESTIONNAIRE MODEL

1. Name of the region –
2. Name and address of the person interviewed –
3. Has the agriculture region increased?
4. Does your village have tube well?
5. Has the water level of well increased or decreased in previous five years?
6. What are the irrigational facilities available in this region?

7. Which are the major diseases that spread in large scale in that region in last one year?
8. Which type of pollution exists in study region?
9. What are the causes of reduction in water level?
10. Do you collect rain water?
11. What are the crops you grow in a year?

Name of the interviewer
and Signature

PROJECT WORK

1. Survey the land use of any Mohalla or village situated nearby you and prepare a project report?
2. Find out the ill effects of water and soil pollution in the region around your School?
3. Make a group of Teacher and students, and visit a local region. Give clear knowledge to the students about the Geographical specialties of that region. After that get a Geographical report prepared from the students.



Chapter – 10

DISASTER MANAGEMENT: AN INTRODUCTION

Disaster is a manmade or natural phenomenon whose effect brings disaster for human life. It creates situations like death, disability and injury for human beings. Also, it damages the constructed area. Destruction of crops and animals can also be seen during its occurrence.

Previously, mainly the natural problems used to take the form of disaster but presently human induced problems also, not only take the form of disaster but its implications are also more disastrous. In the most disastrous components of human induced disasters, the disasters created by Chemical, Biological and Nuclear factors can create havoc. The human induced general disasters are created by accidents in factories, leakage of poisonous products, pollution, breach in Dams, fire due to human error, religious and caste based riots etc.

The management of disaster, whether human induced or natural, is essential. It is almost impossible to completely wipe out the disasters but its impact can be minimised. If its impact is minimised then its repercussions are less destructive and number of deaths are also reduced. Following are the four important factors of disaster management:-

(1) Preparedness before the occurrence of disasters.

(2) Responsive action and relief work.

(3) Rehabilitation.

(4) Prevention and planning of minimisation of ill effects.

Following important things are to be kept in mind before the disaster strikes in any region:-

(i) To prepare disaster management plan by School/community/individual.

(ii) Community awareness and education.

(iii) Training of warning system through mock drill.

(iv) Comprehensive knowledge of total warning system.

(v) Material and human ability resource – List of both the resources.

(vi) Identification of unsafe community and buildings.

(vii) Development of traditional support system.

(viii) Announcement of forecast from the public places such as – religious places, after main worship and prayer.

(ix) Identification of School, Dharamshala, panchayat bhavan and religious places to run the relief operations.

Community arrangement of response action and relief work is essential as the disaster strikes. Following are the few important works:-

(i) To establish community kitchen with the help of local groups.

(ii) To start emergency Control Room.

(iii) To execute the disaster management planning.

(iv) To establish medical camp and make sufficient arrangement of medicines and Doctors.

(v) To gather resources.

(vi) To give warning of the disaster as per the latest situation.

(vii) To make temporary arrangements of the houses.

(viii) To make arrangements of the shelter and toilets.

(ix) To send teams for searching the affected people and for their protection.

(x) To keep the search and protection groups in readiness.

Following works are essential at this stage:-

(i) To start programme of consoling those who have separated from their families and to make efforts of re - uniting the families.

(ii) Restoration of essential services like road and communication facilities.

(iii) To provide shelter/temporary housing facilities.

(iv) To collect re - usable materials from the debris for the re - construction work.

(v) To re – establish normal life standard and rehabilitation process.

(vi) To find employment opportunities.

(vii) To construct new houses.

(viii) To provide first hand knowledge to the community about how to remain healthy and safe.

It is impossible to totally stop disaster. Its impact can be minimized through following works:

(i) Stopping habitation in the vulnerable areas.

(ii) Preparing land use plan.

(iii) Constructing disaster protective buildings.

(iv) Finding out means to reduce risks before the effect of disaster becomes less.

(v) Building community awareness and education.

As a disaster Manager

Students, you can yourself become a disaster manager. Whenever you hear an announcement about a coming disaster then instead of panicking you can inform your family and your neighbours about this. So that everybody can work together to stop it and save others from it. You can run relief work with the help of your friends and teachers, to provide shelter to the victims in your school and with the help of the villagers provide the victims with food and medical facility. This arrangement made by you will share the pain of disaster affected people.

Students, I will narrate you a story of bravery of a child of a village of Banka district. There was a pond just beside the school. Two boys aged seven years while returning back from the school started bathing in the pond. One of the boys got drowned. The other boy started shouting and running towards the village. His shouting collected many people and they pulled out the drowned boy whose life could be saved by administering first aid. This effort of seven year old Guddu exceeded the knowledge of educated disaster managers. This story of bravery remained a matter of discussion for long time in nearby villages also. Such acts of children connects communities together and set an example of managerial skills which cannot be achieved by large units associated with this.

DISASTER MANAGENENT AT NATIONAL LEVEL

In India, all the year round in almost every region, natural and human induced disasters can be experienced. Disasters like Earthquake of Bhuj in Gujarat (2001) and Tsunami of Indian Ocean (2004) have shaken the disaster managers. Every day incidents like bomb blast and other terrorist acts have become troublesome for the people associated with disaster management. The good thing is this that several plans have been made at the national level. Its long lasting effect will be highly useful. Like –

1) Provision of emergency fund is there in the annual budget for the disaster management. This provision solves the problem of funds at the time of crisis.
2) Prime Minister's relief fund has been created for disaster management.
3) Maps of the disaster prone areas are being prepared on the basis of frequency of the disaster, so that knowledge of that area could be gathered.

4) The training of the personnel engaged in the disaster management is also essential. That is why many training centers are being established for them. Disaster management is also being taught in Universities as a subject now.
5) At the Panchayat and village level not only training for disaster management is given but also complete knowledge is being given to tackle the disaster. To minimize the terrorism and communal riots, Anti Terrorist Squad is also being constituted.
6) The contribution of self help organisations is also very significant. It works significantly in the form of guide.

DO YOU KNOW?

Presently, information about disaster is also being received from the satellites. It increases the chances of forecasting many natural and human induced disasters.

7) The work of disaster management is incomplete without the participation of 'Gram Sabha' because in every disaster the activity of 'Gram Sabha' increases the activity of common people. In this situation people themselves determine the priority of works and take the effect of the disaster to lowest level.

It is essential for the disaster management that the community should come forward for the management of disaster because the first benefit of management is being experienced by people and the second benefit comes in the form of community satisfaction. Thus, the role of community is of great importance.

EXERCISE QUESTIONS

OBJECTIVE TYPE QUESTIONS

1. Are the main components of disaster management are -
   (i) Preparedness at the personal level before the disaster.
   (ii) Preparedness at the community level before the disaster.
   (iii) To depend on others for prevention.
   (iv) To have no knowledge of disaster management.

2. Which are the measures to minimise the effects of human induced Disasters?
   (i) To have no knowledge of land use.
   (ii) To construct disaster protective buildings.
   (iii) To concentrate on community awareness.
   (iv) To increase settlements in the vulnerable areas.

SHORT ANSWER QUESTIONS

1. What is disaster management?
2. What are the measures to be adopted to minimise the disaster?
3. How will you help people in the disaster affected areas?
4. How the disaster affected people can be helped by the school?

LONG ANSWER QUESTIONS

1. Describe the role of 'village Panchayat' in disaster management?
2. Asses the work done at the national level for disaster management?

PROJECT WORK

1. Students, collect information from your grandparents and elderly persons regarding fire and epidemic in your village/Mohalla in the last one year.

CHAPTER – 11

DISASTERS DUE TO HUMAN ERRORS: NUCLEAR, BIOLOGICAL AND CHEMICAL

Disaster is that phenomenon which creates such a situation of crisis, suddenly and without warning, for not only human beings but also for other livings beings when it causes heavy loss to life and property. Disasters are of many types but normally disasters can be put into two categories – (A) Natural disasters and (B) Disasters caused by human errors.

Natural disaster includes those mis-happenings whose origin is associated with natural factors. Regions affected by incidents like earthquake, Tsunami, volcanic eruption, hail storm, sudden snowfall, landslide etc. experiences sudden crisis for human beings and animals. The causes, results and management of these disasters will be studied in next class (Class X).

In the present class causes, results and management of disasters caused by human errors will be studied. Man has achieved new heights of success in industrial development. Reaching Moon and preparing to put his step on Mars, India's ambitious Chandrayan project, missile and development of nuclear weapons has brought mankind to such a place where the pace of development, time and again, give birth to disasters. This crisis is the outcome of human error.

Among the disasters caused by human error - nuclear, chemical and biological disasters are most important. Due to these three disasters large scale destruction not only of mankind but also wild life around it, is destroyed or they become disabled which causes permanent crisis in their life. Since

time immemorial it is called God's curse but we cannot defend our mistakes by calling incidents like atomic bomb explosion on Hiroshima and gas leakage at Bhopal as curses of God. The objective of the technical development was public welfare, eradication of the poverty and to provide opportunity to everybody to live happily and peacefully but in the name of these objectives the scientific knowledge has been misused and this has continuously increased the disasters caused by human error. If these disasters are not controlled in time then human induced disasters will cause more deaths than the deaths caused by natural disasters.

11.1 NUCLEAR DISASTER

The development of nuclear energy is one of the unique achievements of science. Minerals like Uranium and Plutonium are processed through reactor because of which there is nuclear disintegration through which releases energy. This energy can provide impetus to socio-economic development but when it is utilised to make nuclear weapons then this



Fig. - 11.1 Nuclear reactor: Nuclear energy producing center

energy becomes a cause for disaster. Presently, a number of nations have manufactured nuclear weapons. India is also one of them. India has exhibited its extraordinary strategic capability through nuclear weapon explosions, in

the Rajasthan desert. The neighbouring countries of India, China and Pakistan, have also manufactured nuclear weapons and exploded it to exhibit their war capabilities (Fig. 11.1).

Nuclear bomb was at first exploded in 1945 by America in the last phase of Second World War by dropping bombs on the two cities of Japan. The first bomb was dropped on 6th August, 1945, through air attack, on Hiroshima and again on 9th August, 1945 on Nagasaki. It killed lakhs of people. The cities of towering buildings and industrial units turned into graveyard. Over one lakh people were injured (Disabled) who suffered from diseases like cancer, skin disease. The people who survived were separated from their family and this led to the problem of mental disease. The nuclear bomb attack shook Japan and they surrendered before this inhuman act. The American victory along with nuclear bomb explosion was a tragedy of the human civilisation.



Fig. 11.2 Nuclear explosion: one of the main causes for human destruction.

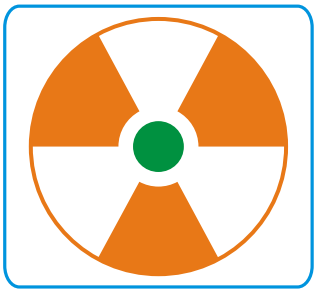
Though after this tragedy, up till now, nuclear weapon has not been used in any war but there has been massive increase in the production of nuclear weapons. Human error has been the testimony of accidents on the nuclear energy producing centers. In 1986, in erstwhile Soviet Union, due to human error in Chernobyl City, radio activity from one reactor killed hundreds of people and its adverse effect remained for years on the nearby

accident was narrowly averted.

On every nuclear energy producing center, automatic process of radiation remains active. So, scientists and other workers working there use anti radiation jackets. In a country like India neither the optional labourer are trained to protect themselves from radiation and nor the special type of jackets have been made available to them. This type of negligence has been reported several times in India, at Tarapur (Maharashtra) nuclear power station. Almost similar type of situation prevails at Kalpakam nuclear power station (Chennai).

The improper disposal of nuclear waste after the use of the nuclear energy, begins radiation process again after some interval of time . Therefore, for the disposal of nuclear waste, it is essential to construct specially designed store houses for its storage or it should be dumped at a greater depth. It can be dumped at a greater depth far away from the human habitats but it has been reported several times that nuclear power capable nations dump their nuclear waste either on waste lands of poor nations or they are dumping it in the ocean waters. There is information that countries like Russia and America which are having nuclear submarines dump nuclear rods in to the Sea after its use.

NECESSITY OF MANAGEMENT AND WORK



Logo of International Radiation

The use of nuclear power is not always destructive and this is the reason why India has made an agreement on nuclear power with America this year. About twenty nuclear technique rich nations of the world have agreed to supply enriched uranium to India for the production of nuclear power. In this context India has made it clear that production of this energy by India is not for making nuclear bombs but for the production of electrical energy for development. Therefore, on international level it is essential that all the countries agree on nuclear non - proliferation policy. In other words, decision of not making

bomb can make this technique more useful and messenger of development. Finally, after the nuclear explosion on Japan, to escape from the tragedy, sensible people started showing togetherness. It was the result of this unity that after one year in 1946, an international journal was developed by California University for prevention from radio - radiation disaster, symbolising of togetherness on the issue.

The agreement of not making the nuclear bomb is not sufficient. It is also essential for the nuclear power producing centers to stop ill effects of radiation. Lakhs of people can be killed by bomb explosion only, without the malfunctioning of the reactor and human error. Therefore, these centers can be established far away from the human settlements. The kaiga nuclear plant, in India, is an example of this. Similarly in Russia, United States of America and Canada nuclear centers are situated in extreme remote areas. Health checkups of the personnel serving in these centers ate regular intervals are also essential. The use of radiation protective jackets should be mandatory for the persons working in nuclear stations. Not only this, the people living nearby and in cities adjacent to the nuclear establishment should have sufficient knowledge of protecting themselves in case of any accident. In case of any tragedy the population expected to be affected should be informed through modern electronic information system. The information regarding



Fig. 11.3 Radiation protective jackets and Masks: A way of safety

safety should also be given regularly. In case of accidents, DOs and DON'Ts must be intimated at the community level. It must be adequately informed that as soon as people get information about accident they must wear radiation protective jackets and masks (Fig. – 11.3). They must not eat in open, or ignite fire, etc. The people must be supplied with relief materials immediately. Food packets not affected by radiation should be distributed. The students of the schools should be trained regularly by self help institutions about preventive and safety measures. Awareness among people living nearby is essential. In these areas adequate number of cellars should be built and people should have prior direction to enter inside it as soon as warning of the accident is given. After a certain depth the effect of the radiation becomes less.

DO YOU KNOW?

1. Where did the first nuclear explosion take place in the world?
2. At which place was the first nuclear explosion by India done?
3. Where was first nuclear power center established in India was? If you don't know then take the help of your teacher to know it.

EXERCISE QUESTIONS

OBJECTIVE TYPE QUESTIONS

1. Which among the following is nuclear power center?
   (a) Kaiga (b) Varanasi
   (c) Delhi (d) Meerut
2. In which country is Hiroshima located?
   (a) India (b Japan
   (c) China (d) Taiwan
3. Who at first developed the logo to escape from the nuclear explosion?
   (a) Tokyo University (b) Cambridge University
   (c) California University (d) None of these

SHORT ANSWER TYPE QUESTION

1. What is nuclear energy?
2. On which country, was the nuclear bomb dropped first in the world?
3. In which state of India was nuclear test done?

LONG ANSWER TYPE QUESTION

1. What are the hazards of Radiation? Give information about its ill-effects on human beings?
2. What are the uses of nuclear energy? Describe.

PROJECT WORK

What is disaster? Has any disaster occurred around you? If yes, then collect data associated with it?

11.2 CHEMICAL DISASTER

With the achievement of Industrial development several problems have also started. In the problems associated with the industrial produce, the problems associated with the production of chemical materials have taken the form of disaster. This disaster can be divided in to three important parts –

(A) Hidden hazards caused by Toxic Chemical Products.

(B) Chemical Warfare Hazards.

(C) Seepage in Chemical industrial units and hazards caused by waste materials.

(A) Hidden hazards caused by Toxic Chemical Products:

This disaster is not felt immediately. Its maximum effect is seen on agriculture. The use of chemical fertilizer and insecticide not only destroys the soil micro organisms but the produce also becomes poisonous. Its continuous consumption gives rise to different diseases which, at times, becomes fatal. Sometimes, by the use of the insecticides, the water of agricultural fields and ponds becomes poisonous and domestic animals and

even human beings a victim to it. The green revolution associated this disaster, is a big challenge for the Indian rural society.



Logo of poisonous chemical disaster

The indirect disaster of the metro cities is mainly associated with adverse effect of the Carbon dioxide and Methane produced by the use of fossil fuel in the transport sector. It fatally affects wind pipe (Trachea), skin, eye and other sensitive human organs. The scarcity of oxygen creates problem of fatal suffocation. International logo has been developed for this disaster as well.

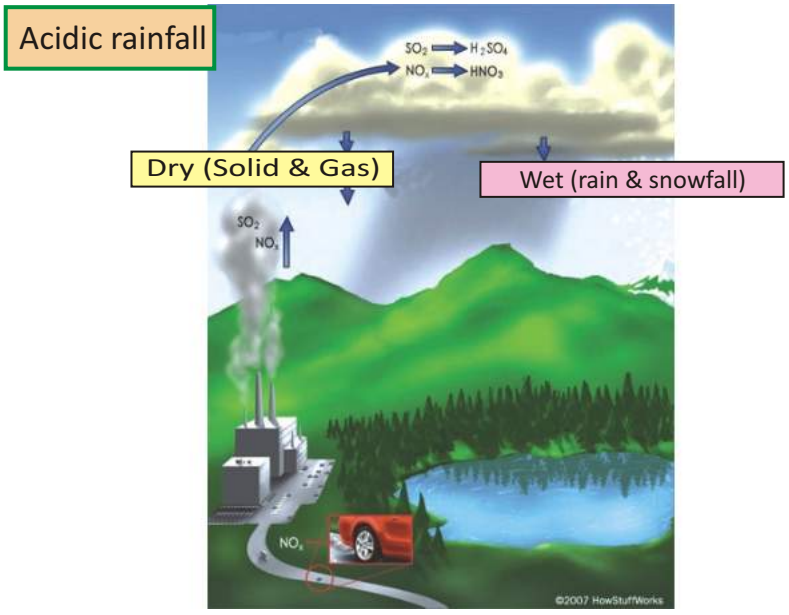


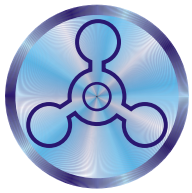
Fig – 11.4: Causes of acidic rainfall, process and result

Acidic rainfall is also an indirect disaster. It is a serious problem in Damodar valley. It increases the amount of acid in vegetation, soil and water to a large extent. The main cause of acidic rainfall is due to the effect of Sulphur dioxide (So_2) and nitrogen oxide in the atmosphere by the industrial emission. It can be understood by fig. 11.4. It adversely affects human body, crops, vegetation, fruits and fishes. The use of all these things causes fatal



Fig 11-5 – The situation of the trees in the forest due to the effect of acidic rainfall

diseases. Due to acidic rainfall the leaves of the trees become almost dead and there is hardly any growth of fresh leaves (Fig. 11.5).



Logo of chemical war disaster

(B) Chemical Warfare Hazards:

The chemical weapons have been in use since Second World War. Lakhs of Jews were killed by the Germans in the gas chambers only. The main cause cited for the attack on Iraq by the United States of America was, that Iraq has amassed large scale chemical weapons. In chemical weapons along with the use of different gases, similar gases are also induced in explosives because of which burning and melting of skin occurs. Suffocation through internal effects by breathing, faintness and situation of death is also created.

(C) Seepage in Chemical industrial units and hazards caused by waste materials:



Fig. 11.6 Chemical gas seepage disaster: Relief effort

The seepage in the chemical industrial units also takes the form of big disaster. The Bhopal gas tragedy is its biggest example. The Bhopal chemical gas leak disaster occurred on 2-3 December, 1984 which is the largest disaster of industrial world.

Along with hydrogen cyanide and other reactive products, 45 tons of highly poisonous Methyl isocyanides gas leaked from the insecticide factory of Union Carbide and it got mixed with the air and spread all around the nearby areas. It instantly killed 2000 people and rendered over 10,000 persons disabled. Due to its affect the death toll kept on increasing up to 1989. Presently the total number of death has grown to about 16, 000 and number of injured has gone up to 50, 000. The disabled people are still suffering from diseases like breathing trouble, frequent fever, continuous cough, mental disability, depression etc.

Similarly, 90 girls were affected in the copper melting factory due to gas leak in Tuticorin in Tamil Nadu on 5th July, 1997. They suffered from vomiting, burning sensation in chest and Pneumonia. Similarly, there is continuous adverse effect on the health of workers serving in most of the cracker and explosive factories.

MANAGEMENT

To escape from the chemical disaster, immediate and long term management is required. In the immediate management, in the campus of all the chemical factories sufficient amount of water and fire extinguisher is required. Again, the installation of wind measuring instrument is also essential. In case of gas leak, the present people should be given correct direction to move in the opposite direction of the wind. So many people lost their life in Bhopal, since there was no such information available. It should be mandatory for the people serving in chemical factories to be supplied with mask and gloves, specially designed trousers and shoes etc. The health check up of the workers after a certain period of time is also essential. The chemical industries should be established far away from the densely populated areas. For this, there should be sustainable use of these techniques so that the incidents of such accidents of seepage



may be reduced.

Its not enough that the production of chemical weapons should be prohibited. There should also be a joint policy agreement among the nations that keep these weapons and those that manufacture it to minimise the possibilities of its use. The chemical weapon expert, G. Harizel has called chemical weapons as "weapons of terror and mass destruction". Therefore, worldwide prohibition on its production and use can only save human beings from this disaster.

Long term sustainable agricultural development policy is required to be made to protect ourselves from the hidden disaster created by chemical fertiliser and Insecticides. The use of organic fertiliser is required in place of chemical fertiliser. The world health organisation (WHO) has declared 80% of insecticides used in India as highly poisonous and said to have adverse effect on human health. The increase in the use of insecticides is related to the increased use of new hybrid seeds. There has been huge increase in the use of these seeds but these produced materials are becoming a challenge for human health. Therefore, there is also need for preservation and popularisation of the traditional seeds. According to Prof. Swaminathan, this process can convert green revolution in to ever green revolution.

The continuous increase in the amount of carbon dioxide, Methane and acid can have destructive effects not only on lower layer of the atmosphere but also on whole living world. To reduce the emission of these destructive gases is a serious challenge for available technology. Therefore, it is essential for those industrial units that emit these gases to utilise such technologies that ensure the least emission of poisonous gases. The best example for this is the new technology based generator.

Presently, the first essential component of any disaster management is to make available safe place, clean water and emergency medical facilities to the people living around the affected area. After this, injured and unconscious persons should be taken to nearby hospital. The people engaged in relief work should themselves also wear masks and other necessary clothes .

For this type of quick response action, self help organisations in the nearby areas, should train people and arrange counseling facilities.

Through the above mentioned methods the process of chemical disaster management can be brought to optimum level.

DO YOU KNOW?

1. Which gas was leaked out in Bhopal gas tragedy?
2. What are the harmful effects of insecticide materials?
3. Who is affected by acid rainfall? Collect more information about it with the help of your class teacher.

EXERCISE QUESTIONS

OBJECTIVE TYPE QUESTIONS

1. When did chemical seepage take place in Bhopal?
   (a) 1984 (b) 1990
   (c) 1930 (d) 2004
2. Which disease ocurred from the seepage of gas in Tuticorin in 1997?
   (a) Vomiting (b cold and cough
   (c) Vomiting and burning in chest (d) Brain fever
3. Where does the maximum effect of acid rainfall occurs?
   (a) Patna (b) Damodar Valley
   (c) North Bihar (d) Assam Valley

SHORT ANSWER TYPE QUESTION

1. Which did country use gas to kill Jews?
2. Which chemical material is used in insecticide?

LONG ANSWER TYPE QUESTION

1. Which type of precautions should be taken in the event of gas leak?
2. Describe the problems that occur at the time of chemical disaster.

11.3 BIOLOGICAL DISATER

The root causes of Biological disaster are those organisms and material derived from the organisms whose utilisation and contact can take the form of disaster for human life. In this category those living organisms are also included which also adversely affect the heath of the animals. For this, United Nations Organisation has developed an international biological disaster logo also. The centre for disease control and prevention of United States of America has divided biological disaster into four categories –

Logo of Biological Disaster

(A) In the first category those diseases are included which are caused by such Bacteria and Virus. Bacteria and virus create diseases like chicken pox, Kenin hepatitis etc. These are diseases are not very destructive. For immediate protection from these diseases, it is essential to follow normal rules like – compulsory use of equipments like gloves, masks, etc. Utilisation of contaminated materials also creates disasters.

(B) Under this biological disaster those diseases are kept whose main cause is Bacterias and Viruses. The possible diseases caused under this category are hepatitis A, B, and C, Influenza, Lime disease meseales, chicken pox and AIDS etc. To protect ourselves from these diseases health check up is essential from time to time. Clean eatable materials and boiled water recommended by United Nation Organisation's to protect ourselves from the effect of virus.

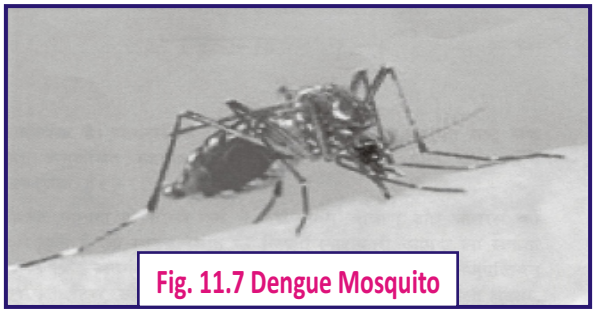
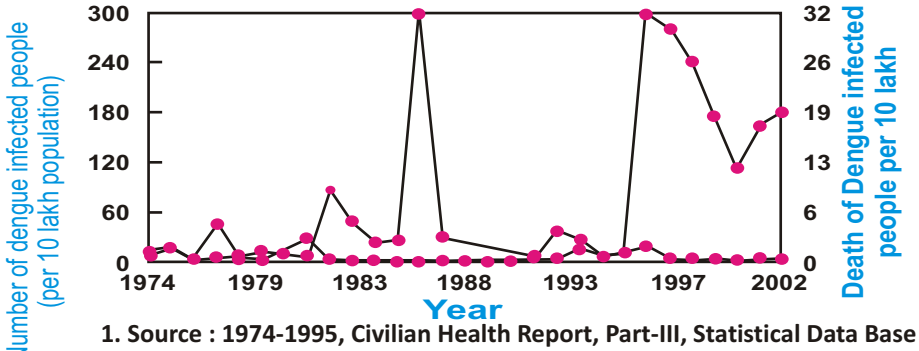


Fig. 11.7 Dengue Mosquito

© In the third category of biological disaster those Bacterias and viruses are kept which can bring destructive disaster for human beings. Important among them are anthrax, western nil virus, Venezuelan encephalitis, small pox, tuberculosis virus, rift valley fever, yellow fever and malaria, diarrhoea, etc. The disaster of Kala-azar disease is mainly found in Bihar, West Bengal, and Uttar Pradesh. The main source of this disease is the infection spread by Sand Fly. Irregular fever, jaundice and enlargement of lever occur in this disease. Due to its infection, 77000 and about 256000 people died in 1992 and 1995 respectively in India. In this category, Bacteria and viruses that develop these diseases are very dangerous. In most of the poor countries these diseases acquire the status of biological disaster.

(D) In the fourth category of biological disaster very destructive virus has been kept. The main diseases spread by these viruses are Bolivian, Argentine fever and Bird flu, AIDS, Dengue fever, Mar berg fever, Ebola fever etc. In the Delhi Metro region, 423 people died in 1996 from Dengue. This is the most risky disaster. Figure 11.8 shows through a graph that the number of people infected and number of people died due to Dengue from 1974 to 2002. AIDS is caused by HIV (Human Immunodeficiency Virus). In India it was detected in 1986. Though it does not cause any sudden tragedy but it is a fatal disaster at family level. The AIDS virus spread through heredity, by infected blood transfusion and the mother transmit this disease to her children.



1. Source : 1974-1995, Civilian Health Report, Part-III, Statistical Data Base (1999), 1996-2002 CD Alert

Fig.11.8

According to World Health Organisation (WHO), in India, about 25 lakh people are suffering from this disease. No effective medical facility has been developed as yet to counter this fatal disease.

Bacteria and virus, basically develop different types of infectious diseases which take the dangerous form of epidemic. The infectious diseases spread very quickly in their respective areas. There is urgent need for management of these disasters. Therefore, following important points are to be followed seriously –

1. To consume boiled water as well as clean and fresh food as much possible as one can.
2. Do not allow dirty water to accumulate at a place so that the dengue larva may not germinate.
3. To continuously clean and sprinkle the nearby areas.
4. To get blood tested from time to time.
5. Training and counseling of the people by self help organisations.
6. To sprinkle DDT etc.
7. To keep the public toilets clean.
8. To give essential information to school students in this context.
9. To arrange fresh drinking water.

DISASTER CAUSED BY BIOLOGICAL WEAPONS

In the modern warfare biological weapons are also included. These are called weapons of mass destruction. The technology for biological weapons was developed by the Japanese but the real use of biological weapon started after the terrorist attack on world trade center of United States of America in 2001. Terrorists started sending Anthrax bacteria to important strategic areas of America through postal service and by unknown persons. The main cause of attack on Iraq by American administration was due to this apprehension that Iraq has amassed biological weapons. These are those bacteria which

enter our body through breathing system and create poison inside our body. They are also called “Dirty Bomb”. Apart from Anthrax there are many more bacterias which are used in biological weapons. Other bacterias are called “Disease Organism”. For the protection from the fear of its war and to create awareness amongst people regarding biological weapons an international logo has been developed. This logo has been created by four rings which symbolise that if we work together against this disaster then biological disaster can be mitigated.

PROTECTION FROM BIOLOGICAL DISASTER

For the protection from the biological disaster, disaster risk management is needed. For this drinking of boiled water, intake of fresh food, sprinkling and commitment of administration is required. There is no need to lay hand or touch packets given by unknown persons because there could be possibility of Anthrax in it. Gloves should be used as safety measure. The place of biological weapons can be traced with the help of dog squad. Also there is need of strict laws that prohibits the use of biological weapons. For this international effort is also needed.

EXERCISE QUESTIONS

OBJECTIVE TYPE QUESTIONS

1. What is the cause of dengue disease?

(a) Fire (b) Water kept in a utensil for longer time

(c) Due to flood (d) Dirty food

2. What is Anthrax?

(a) Micro organism (b Battle ship

(c) Wild animal (d) A weapon of war

3. How many people are affected by AIDS in India?

(a) 25 Lakhs (b) 30 Lakhs

(c) One crore (d) 50 Lakhs

SHORT ANSWER TYPE QUESTION

1. What are the causes of Plague and diarrhoea?
2. Mention the causes of AIDS disease?
3. Mention the causes of hepatitis disease?

LONG ANSWER TYPE QUESTION

1. How many types of biological disaster are there? Give a brief account of them?
2. What is biological weapon? Describe problems created by them?
3. Describe the safety measures to be taken to save ourselves from biological disaster.

PROJECT WORK

1. Make a list of those people who has suffered from Pox, Malaria and diarrhea in your village.



CHAPTER – 12

COMMON DISASTER : ERADICATION AND CONTROL

In the last chapter, you were apprised of those disasters which were caused due to human error in the course of modern technologies. In this chapter we will acquaint you with those disasters which are also caused because of the human error or due to insufficient knowledge. The sources of these disasters are not ominous situation arising due to technological development but are those facts which are associated with daily activities, food habits, transportation and social settings. These disasters create that type of mental torture, the management of which require greater human understanding and foresightedness than material and money.

Common disasters can be categorised in to two following categories:

(A) Small scale disasters

(B) Large scale disasters

(A) Small Scale disasters:

Small scale disasters are caused because of the unhealthy food habits and life style. It evolves at individual and family level but sometimes due to lack of social awareness and that of proper management of health services it becomes an epidemic. These disasters bring death warrant for the poor families. In this disaster, infectious and epidemic causing diseases like malnutrition, vomiting, Cholera, plague, kalajar, malaria and high fever can be caused. Diseases like malnutrition and diarrhea are very common in poor families. Firstly, they don't get easily digestible meals and secondly, whatever food is available to them, they don't take it properly due to lack of knowledge and time. For example, hot meal and cooled boiled water minimises the risks of such type of diseases to almost nil level.

Even, if the disease occurs then there should be arrangement of its initial management at family level like administration of mixture of salt and

sugar, lime, putting clove between the teeth etc. This type of family management can help in quickly controlling it. Community management is needed in the remote villages, in the case of not getting quick relief from family management. There is hardly any health center in the villages. Therefore, there is need for persons having vehicular facility in the village to come forward and help families suffering from indigestion and diarrhea. There is also need for persons having mobile phones to inform the nearby health centers. Every home in the village should have Electral powder; if it is not available then mixture of salt and sugar should be administered to the patient.

It is essential for the Village Panchayats to arrange, from time to time, with the help of the self help institutions (NGO), exhibitions and "Nukkad Natak" to inform the people how to protect themselves from the disasters.

ACTIVITY

Students should prepare a list of persons from their family or neighbours who were affected by these disasters and try to know what immediate treatment was arranged.

Cholera and Plague is an epidemic of large scale, which, in true sense, is a community disaster. This type of disaster occurs when number of cases of a particular disease exceeds the expected limit. The main cause of these disasters is the disease wearing bacteria/virus. Infection of these spreads disaster. These disasters spread more in the slums of the cities and toli of the villages. The management of these disasters has already been discussed in detail in the last chapter.

Kala-azar and high fever are almost similar types of disasters. In case of Kala-azar and high fever, the patient experiences too much of shivering. In the environment of unhealthy food and contaminated water these two diseases spread quite rapidly. In case of Kala-azar the effect of high fever remains for long time. It develops through poisonous bacteria. Its basic cause is also the intake of unhealthy food. In this fever the brain of the patient is also affected. In high fever also almost same condition prevails. Normal high fever is the result of such infection which can be controlled after initial treatment

but in case of Kala-azar, the treatment is only possible in big hospitals because its treatment takes longer period of time and hospitalisation of the patient is essential. The mental management of the patient and family members is more essential than the management of transport facility for the transportation of the patient from home to health center and arrangement of money. In this situation, the arrangement of treatment is more important than the nervousness. The disaster can become tragedy if a little human error occurs in its treatment.

(B) Large Scale disasters:

Under large scale disaster transport related accidents, fire, communal riots and terrorist attacks can be included.

Transport related accidents are a big problem for the country like India. Road and rail accidents frequently occur. If you read news paper then you will find that news related to these accidents appear daily. These days air transport related accidents have also become frequent.

(a) Road accidents and Management:

In the disasters associated with road ways, if any Bus accident occurs then people die and get injured in large number. These accidents, at times, take the form of destructive disaster in mountainous regions. In most of the cities and to some extent in villages also we find that normally people, while trying to cross the roads in a hurry, fell victim to accidents. At times, this hurry becomes the cause of their death. The place where the Bus accident has occurred, it is not essential that administrative management is there. In this situation villagers from nearby villages work together to overcome the challenge. They not only administer first aid to the injured but also arrange for them clean water and food. If needed, they collect money through donation from each other and provide financial help to disaster affected people. Accidents that occurs while crossing the road is the outcome of personal mistake.



Fig. 12.1 Road accident: Result of human error

Students, do you know that you never cross road from everywhere. In the cities roads must be crossed at only those places where there is Zebra crossing.

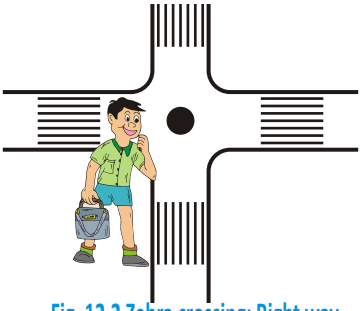


Fig. 12.2 Zebra crossing: Right way of crossing the roads

In the crowded cities, at number of places, surface foot paths or subsurface foot paths are built. If you have gone to Delhi then you might have seen number of routes. At crowded places foot over bridges have been built, you must walk on these bridges. In Villages and rural areas, these facilities are not available for crossing the roads. There, you should only cross the road when you are sure that there is no vehicle coming either from left or from right.

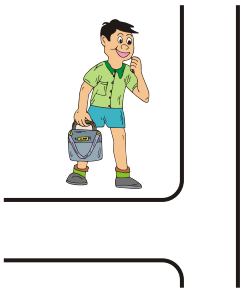


Fig. 12.3 To walk to the left of the road: Right method

Students do you know that – whenever you walk on the side of the road, always keep to your left. This will save you from disaster and you will escape from accident.



Fig. 12.4 A massive train accident due to human error.

(a) Rail accidents and Management:

There are different types of accidents associated with railways. Never carry combustible materials like – Gas, petrol, oil, diesel and crackers etc. during train journey. If due to some human error, a spark of fire from cigarette and bidi comes in contact with these combustible materials then there is every possibility of fire in the train. At times, anti social elements also set trains on fire in resentment.

In the railway related accidents almost 50% accidents occur on the unmanned railway gates. Large scale railway accidents also occur due to mal functioning of the signal, error on part of the driver and mistake of the management (fig.12.4). In India there are about 3700 unmanned railway crossings. From 2001 to 2006, 27.39% of the total accidents occurred on these gates. Railway gates are those places, where roads and rail routes cut across each other or cross each other and move forward. In absence of a gateman, the rail and road transport remain totally ignorant about each other's arrival and they collide with each other frequently and cause huge tragedy. For its management, it is essential to appraise common people about the necessary rules of crossing the railway gates. When two roads meet each other then gateman is not required because on every road crossing there are several precautionary indications. In big cities there are electronic signal indicators. But in Railways, in absence of gateman, accidents do occur.



Fig.12.5 Railway Crossing

Following preventive measures are essential to prevent accidents on railway crossings:-

(1) Whenever any railway crossing is approached, before crossing it, the driver himself or his helper must go to railway line and ensure that no engine, train or trolley is arriving; if not, only then railway line should be crossed carefully.

(2) Gate lamps are installed on the railway crossings which are manned. During night time if the gate lamp shows red light then it means that the gate is closed. If it shows white light then it means that gates are open. During day time whether the gates are open or closed it can very easily be detected.

(3) If someone tries to cross the gates which are manned even when the gates are closed, then the offender can be sentenced for three year imprisonment.

(4) In villages and towns, there are schools which are situated near the railway line. The teachers should give full knowledge of the rules to the students of crossing the railway line.

(c) Airways accidents and Management:

Airways are an important means of transportation. The airways travel consumes very less time. The flying of the aircraft depends on several factors; these factors also become cause for accidents. Like –

(1) Weather – If there is fog in the area where aircraft is to land then landing becomes very difficult and possibility of accident is always there. The sudden death of great Indian scientist Homi Jahangir Bhabha was due to similar type of air crash.

(2) Technical problems – Due to some technical snag in the aircraft, there is possibility of blast which takes the form of huge disaster.

(3) Cigarettes or combustible items must not be kept in the aircraft. Their use should also be prohibited. If this rule is not followed then possibilities of accidents is always there.

(4) Storm – Storms create hindrance in the flying of the aircraft because it can cause accidents.

(5) High jacking – The aircrafts are high jacked by the terrorists to get their demands fulfilled. This causes the situation of extreme mental stress for the passengers. On number of occasions the high jacked aircraft is set on fire after de boarding the passengers.

(6) Bomb attack – Accidents occur if the aircraft is attacked by the bomb which takes the lives of number of people. The Air India aircraft Kanishka was blown by bomb attack in the air when it was coming from Canada to India.

While travelling through air, it is essential to follow certain safety rules. Therefore, it is essential:-

(1) The passengers should read the safety related rules carefully and follow them.

(2) While sitting on the seat keep the seat belts fastened and follow the signals.

(3) Get prior information about emergency gate.

(4) The passengers should be scrutinised strictly.

(5) The baggage of the passengers should be checked with the help of modern electronic gadgets before boarding it in to the aircraft. Despite the precautions before the take off of the aircraft, in case the aircraft meets an accident then immediate relief and safety work is essential. In figure 12.6 a picture of this type of relief work can be seen.



Fig.12.6 A scene of relief and safety work after the crash of the aircraft.

INFORMATION OF DISASTER MANAGEMENT AT SCHOOL LEVEL

All students come to school by bus or they walk to the school through road. Therefore, it is essential for students to be apprised of the possible road accidents and safety measures to be adopted at school level. The schools should have one such period in their routine, that gives opportunity to students to learn about disaster management. In this period teachers should give following information to the students :

1. Always keep to your left on the road.
2. If you want to cross the road then cross from the zebra crossing and that too only when green signal is on.
3. There are speed breakers on the roads, the drivers must be informed in advance about slowing down the speed while crossing it.
4. The models of transport and related accident should be exhibited in the schools and students should be encouraged to make such types of models.
5. The bus drivers of the school should be trained and they should always caution students that while boarding and getting down from the bus be sure that bus is completely stopped.
6. The student should never put any part of his body outside the window while sitting inside the bus.
7. The bus must have the first aid facilities and driver should have general knowledge of it.
8. The school should have first aid facility e.g. cuts and rashes while playing must be administered with medicine immediately before sending the students to the doctor.
9. The students should be informed in the school that in case of burning cold water should be put on it immediately and if ice is available then ice pieces should also be kept on the burnt wounds.
10. The children should be informed that in case of burning it should be covered with blanket.



Fig.12.7 A scene of forest fire

DISASTER DUE TO FIRE

Among the human induced disasters, disaster caused by fire is very significant. Fire caused by human error inflicts heavy loss to life and property. It is also seen that the disaster caused by fire causes more death than the deaths caused by cyclone, earthquake and floods together.

CAUSES OF FIRE

1. **Accidents while cooking food –** The fire occurs while cooking food when nobody is present, mechanical snag in Stove or other food cooking equipments. Massive accident occurs when due to gas leak, during cooking food on gas, the fire breaks out.

Students, do you know, who should immediately be informed through telephone, in case of fire in home or neighbour?

Well, in such situations district control room or fire brigade office should be informed.

Collect phone numbers of both these offices.

2. There is always a possibility of fire from water or food material heating equipments. Particular attention must be given while cooking food on electric heater.
3. When the load of the electricity exceeds the capacity of the electric

wire at homes then the fire breaks out which damages the electric gadgets like fan, bulb, electric press, television etc. Due to weak wiring connection also there can be cases of fire.

4. After smoking Bidi and cigarette or throwing combustible materials in the forest, there is every possibility of fire to break out. The tribal population in the forests of Asia and Africa are faced with this problem every year (fig.12.7).
5. When domestic waste**s** and other useless items are burnt then there is possibility of rendering damage to nearby houses.
6. The stored items like packing materials, liquids, gases etc. combustible materials in a factory could be very dangerous, therefore it should be stored outside the campus in a safe place.
7. The chemical materials like paints, liquids, gas cylinder should be stored separately.

PREVENTIVE MEASURES TO PREVENT FIRE AT HOME

1. Don't keep highly combustible materials inside the home.
2. Keep fire extinguisher at home and train every member of the house about its operation.
3. Switch off all electrical gadgets before leaving the house.
4. Switch off the gas knob after food is cooked.
5. In case of fire, always remember the exit door.
6. Don't attach many gadgets in a single socket.
7. Don't close entrance door by putting Almirah.
8. Try to Crawl or move on your belly in the houses full of smoke.
9. In case of fire call fire brigade, give clear address of your home.
10. In case of fire through electricity, never use water because if you put water then you may receive electric shocks.
11. Never give match box in the hands of children and don't allow smoking of Bidi – Cigarettes inside the home.

COMMUNAL RIOTS AND TERRORIST ATTACKS

Students, after independence the slogan given by Mahatma Gandhi, “Hindu, Muslim, Sikh, Isai Hum Sab Hain Bhai Bhai” was on the tongue of everybody. The chanting of “Bharat Mata ki Jai” could be heard from Kashmir to kanniyakumari and everybody took a vow to ‘do or die’ under the tri color. The huge number of people sacrificed their lives chanting “Inqalab Jindabad”. But in recent years, number of incidents of communal riots and terrorist activities has increased. Number of people dying in such activities has exceeded the number of deaths in natural disasters.

It is frequently seen in the pages of News Papers that in some parts of India due to communal riots and terrorist activities, innocent people are being killed or injured.

Terrorism is human induced disaster which follows the means of violence to fulfill the political goals. It is politically motivated violence which has only one aim is to throw away the present system. Most of the prominent terrorist organizations of the world, don't work within their political peripheries; they work in more than one area. Al Qaida has became an international terrorist organisation. Their cruelty and staunchness was at their worst when they attacked the world trade center of United States of America on 11th September, 2001 with the help of passenger aircrafts. In this attack hundreds of people lost their life. In India also, there is hardly any day that the terrorist don't show their misdeeds in Jammu and Kashmir. The serial bomb blast in the cities like Bangaluru, Jaipur, Surat and Delhi by the terrorists organisations in 2008 shows their malicious ideas. The Punjab state was also a victim of terrorists in the decade of 1980. On 13th September, 2001 the terrorist attacked Indian Parliament. The most gruesome picture of terrorism was exhibited on 26th November, 2008 when the terrorists attacked several parts of Mumbai in which about 200 people lost their life. Several senior officers sacrificed their lives while fighting with the terrorists. In Fig.12.8 five star hotel Taj with huge amount of smoke coming out from it can be seen. This picture of cruelty is the testimony of terrorists attack on 26th November, 2008.

The terrorists mostly target public places like roads, main market,



Fig.12.8 Terrorist attack on Taj Hotel

public and community places, railway station and bus stands for bomb blast and indiscriminate firing. Rajiv Gandhi and Benazir Bhutto the former Prime Ministers of India and Pakistan, respectively were killed by terrorists.

The violence that emerges from communal riots and terrorist activities disturbs the communal harmony. For unity and progress of India, it is very essential to keep a check on communal riots and terrorism.

PREVENTIVE MEASURES TO CHECK COMMUNAL RIOTS

1. It is essential for the prevention of communal riots that we should not spread rumours and we should not believe them also.
2. The nearest police station should be informed of any rumour.
3. Don't give shelter to the persons involved in communal riots.
4. Constitute peace committees in villages or in mohallas of cities.
5. Through Pamphlets or by arranging meetings on public places, inform the people about the legal consequences of their involvement in the communal riots. In such cases life imprisonment, death sentence and rigorous imprisonment can be imposed.
6. The persons involved in the spread of the communal riots should be

warned that if they are caught then the life of their family will be very miserable and their family members can be an object of communal hatred.

7. The teaching in the schools should be so designed that the students should respect their religion on one hand and on the other they should not hate other religions.

PREVENTIVE MEASURES TO CHECK TERRORIST DISASTER

In the terrorist attacks mainly bombs and grenades are used. To protect ourselves from this, following precautions are essential –

1. If you see a abandon bundle then don't touch it, instead inform the police.
2. Immediately inform the police if you see suitcase, box or bag kept un-cared in any area.
3. If you notice any person with suspected activities then immediately inform the police. If you cannot approach police then inform your teacher or your parent.
4. Identify the person while giving your house to him on rent and inform his full details to the police with his photographs.
5. The government should ensure the boys involved in terrorist network that if they part with violence and start living with the common people then no punishable action will be taken against them instead along with pardon, monetary help for business will be given to them.
6. The students should be informed about problems that emerge from terrorism in their school.
7. Committees should be formed for creating social environment against terrorism in every village and in Mohalla of the cities.

Students, you have seen that due to human error and lack of understanding huge disasters occurs. These disasters disturb the existing communal harmony. India is a country of 121 crore people. Together we can neutralise the communal and terrorist elements and together we can also build a good India.

EXERCISE QUESTIONS

OBJECTIVE TYPE QUESTIONS

1. In how many categories common disasters are categorised?

(a)1 (b) 2 (c) 3 (d) 4

2. Cause of high fever?

(a) Bacteria (b) Virus (c) Fungus (d) None of these

3. From where should the roads be crossed in cities?

(a) Where there is no zebra crossing (b) Where there is zebra crossing
(c) As per your wish (d) none of these

4. On which side of the road is it deal to walk?

(a) On right (b) In the middle (c) On left (d) as per your wish

5. What are the things that should be kept in mind while travelling by train?

(a) Don't look to your left and right while crossing the railway gate.
(b) Don't carry inflammable materials while travelling by train.
(c) The children should not have knowledge of crossing the railway line.
(d) None of these

SHORT ANSWER TYPE QUESTION

1. Which are the rules of safety that should be kept in mind while travelling by air?
2. What are the things that should be kept in mind while crossing a railway crossing?
3. What important things should be kept in mind while travelling by road?
4. What is the disaster that emerges from fire?
5. Describe any three measures to prevent communal riots?
6. Describe any three measures to prevent terrorist disaster?

LONG ANSWER TYPE QUESTION

1. Give a detailed account of causes of fire and its prevention in the fire induced disaster?
2. What is terrorism? Describe in detail the measures to prevent terrorist disaster?
3. Give detailed account of school level knowledge of disaster management.
4. Give detailed account of causes and ways prevention from small scale disasters.

CHAPTER - 13

COMMUNITY BASED DISASTER MANAGEMENT

Students, you might have heard or seen when any home of the village catches fire in the extreme heat of summer, then village people joine their forces together to control the ominous fire. The village population has been facing fire, Dacoit and animal attacks from the time immemorial. This togetherness gives birth to community. Community is a group of people which emerges from the emotional attachment because of which people share their happiness and face their sorrow together. The Indian culture is very ancient and its greatest base is community.

Students, you might have seen frequent meetings of "Gram Sabha" these days in your village. The most important topic of discussion is what combined effort should be made by them to solve the problems of the village and ensure the development of the village.

INDIA: TRADITIONALLY A SOCIETY OF COMMUNITY DISASTER MANAGEMENT

People face different happenings in their life such as birth, entering in a new home, marriage, death, incidents of fire, hail storms, etc. together in a society. This togetherness automatically gives birth to community based disaster management. Since the Indus Valley Civilisation or the Mahabharta times tradition of joint family system, our community system of living has gained in strength. Though in city areas the numbers of single unit families are increasing but there also when people from whole mohalla raise their voice together for electricity, water, roads and cleanliness then it reflects the community system of living. Students, you must have seen that the festivals such as during Holi, Id and Dashehra in your mohalla, the committees are



Fig.13.1 A Gram Sabha in a Rajasthan village busy in planning to face disaster.

constituted for peace. This is a part of community management.

THE PIVOTAL ROLE OF COMMUNITY IN DISASTER MANAGEMENT

There could be any form of disaster, but its destructive impact affects the life and property. The first jolt of disaster affects human beings and this human beings also give first jolt to disaster when they begin community effort to minimise disaster.

DO YOU KNOW?

1. *No disaster strikes with prior information. In most of the cases it is forecasted.*
2. *Disaster never makes any distinction among socially uneven families.*
3. *For disaster management, community support is compulsory.*
4. *Total preparedness is essential to negotiate disasters. In absence of preparedness, the major accidents can turn into tragedy.*

The correct assessment of the real damages caused by disaster can only be done by community. The community plays a pivotal role in the accurate distribution of whatever emergency facilities are made available to them for disaster management and also ensures that these facilities reach each family. The community also informs about the forecast of the disaster

the community encounters the disaster at first. In disaster, Fire can engulf houses, houses can fall, floods may occur but community never breaks. Community is a friend of happiness and sorrow and in a rural country like India, the biggest responsibility of disaster management is of community (Fig.13.1). The administrative management work and self help institution's management work can successfully be accomplished under the guidance of the community.

THE COMMUNITY FACTOR OF DISASTER MANAGEMENT

The disaster management is an important community work. There are three major components of disaster management and the success of all three components depends upon community participation. These three components are –

1. Forecast, warning and training.
2. Management activities at the time of disaster.
3. Management work after disaster.

In all three works, family, Gram Sabha, Self help organisations working nearby and nearest school can play an important role.

It is very essential both for the administration and community to forecast the disaster. It is possible that sometimes human disaster does not occur but preparation of management is essential e.g.in every summer season occurrence of fire is almost a certain disaster. Everybody knows about it. Similarly, in extreme summer season and in rainy season the increased number of deaths due to Snake and Scorpion bites is also a type of community disaster. The forecast and information about these disasters can help in saving the life and property at large scale. If the possibility of fire is seen then prior information can be given to fire brigade. The community, at first, begins to pull out people trapped in fire engulfed houses as soon as the fire breaks out. Similarly, at times, when the fire breaks out in cultivated lands by throwing Bidi and Cigarette buds, it causes heavy damage to the crops.

Before the arrival of the fire brigade the community attempts to minimise its impact. This should be accomplished in two phases –

(1) It is essential to administer first aid to the persons who have received burn injury in a separate place. In case of fire, it is better to take them to Panchayat Bhavan or School buildings. Students, you can also help in such conditions your help may be like putting water and Sandal paste on the burnt wounds, it gives great relief to the burnt people. The application of ice on burnt wounds also gives relief. It is essential to call Ambulance through Telephone and Mobiles from the nearby hospitals to send injured and semi burnt patients to nearby hospitals (Fig.13.2). If somebody in the village is having Car or other automobile facilities then it should also be used. Students, you can't go to the hospitals but together you can help the families of the victims. If you spend few hours with the children of the victim's family, it gives emotional relief to them.



Fig. 13.2 - An Ambulance: Support At the time of disaster

It is essential for the other groups of the community to sprinkle water on the fire affected areas and in the adjacent areas also or they can remove crops from the Barn. The spread of the fire can be minimised by spreading dung and soil over the crops.

DO YOU KNOW?

For first Aid treatment of fire victim, putting water and applying Sandal wood paste or application of Burnol over the burn wounds gives great relief.

ACTIVITY

Prepare a list of families of your Village/Mohalla, where crop and house have been damaged and death of men and animal has taken place due to fire in the last one year.

Prepare a list of those families of your Village/Mohalla, where somebody has died of Snake bite.

Which type of disaster management can be arranged by you in your School – Prepare a report by taking interview of your Principal and teachers.

ACTIVITY OF COMMUNITY FOR DISASTER MANAGEMENT

Students, Village in itself is a community but if it is not active then at the time of disaster also it can be a mere spectator. It is rightly said that all works can't be achieved alone. An individual can't face a disaster successfully all alone but when many people join hands together then number of good qualities begins to combine together. These good qualities themselves compel them for disaster management.

DO YOU KNOW?

The community should posses following good qualities for disaster management –

1. The members of the community must always think about the benevolence of the community.
2. When the community constitutes a team for a collective work then it should not have shirkers in it because only brave and laborious people can face disaster.
3. In this there should not be any differentiation on the basis of

cast and creed. When the disaster does not differentiate in its fury then everybody should develop this feeling that only our unity can minimise the impact of the disaster.

4. Every person of the community must remain alert, so that they can exchange information about disaster immediately. By exchanging such information, caste and communal riots have been averted number of times. Such acts also prevent the rumour mongers from being successful in their motive. Thus the community management triumphs over the human induced disasters.
5. The members of the community must have enthusiasm, bravery and capability of using force if necessary.
6. Every person has many personal works to do but at the time of community disaster the personal work must take back seat and everybody must come forward to face it.

Students, you must have read that at the time of India's independence there was a communal riot between Hindus and Muslims. It was communal management that once again developed brotherhood amongst both the communities. Mahatma Gandhi could stop the violence at Noakhali by saying "Hindu – Muslim, Sikh – Esai Hum Sab Hain Bhai Bhai".

DO YOU KNOW?

Following are the primary activities under the Community Management–

1. As soon as the information of disaster is received then immediately, through medium of public centres, effort must be made to inform maximum people about the coming disaster and rumours should be refuted from the community places.
2. To increase brotherhood and self confidence amongst the minority religion and caste.
3. To inform administration about the disaster.

4. T inform nearest health centre.
5. To start relief work through Panchayat.
6. To invite self help organisations for relief work.
7. Coordination committee must be constituted to check any chaos in the relief work.
8. To guarantee at least the availability of clean water and fresh food for the affected people.
9. To arrange emergency relief camps.

TO ENSURE THE PARTICIPATION OF COMMUNITY IN DISASTER MANAGEMENT

In disaster management the participation of community can only be ensured when information regarding expected disaster is given to maximum people. For this, through following process administrative system Gram Panchayat, self help organisations and progressive persons themselves should come forward and ensure the participation of people:-

1) To announce among students of the nearest school the information of expected flood or storm so that they can caution their family members.
2) To inform in the temples, Mosques or Church about the expected natural or human induced disaster. The ideal time for this is the prayer time when maximum people remain present. If necessary, the expected disaster can be announced through the public address system available in these religious places.
3) To prepare a list of those families where old age persons, children, pregnant women, diseased and mentally disturbed persons are there. Special groups have to be constituted to take such persons to safer places.
4) To arrange emergency services, apart from food, like boat, life jackets, Doctors and engineers for the relief camps in Panchayat Bhavan and village school.
5) To arrange transport facility in case of fire, epidemic, caste and

communal tensions and hail storms, which can inform the concerned official in absence of Mobile and telephones.

CONSTITUTION OF DISASTER MANAGEMENT COMMITTEE AT VILLAGE LEVEL

It has been decided at the national level to constitute disaster management committee at village level, so that at the time of disaster relief and rescue operation can be operated in a systematic manner. The warning of disaster can also be given to each family by village management committee in a more effective manner. This committee comprises the following nine members:

1. Principal of the School
2. Mukhiya of the village
3. Sarpanch of the village
4. Two dedicated persons of the village
5. One Doctor of primary health centre
6. Members of the National Service scheme (NSS)
7. Gram Sevak
8. Two women of self help group

ACTIVITIES OF VILLAGE DISASTER MANAGEMENT COMMITTEE:-

1. To warn and inform on the basis of forecast – This management committee will immediately apprise the villagers of the information received from the district headquarters.
2. To select relief camps and provide relief to the affected people – The committee will inform the district headquarters about this and in case of fire will inform the fire brigade.
3. Relief work – To make available food and water to the affected people.
4. To arrange First Aid.
5. To provide security to all – To give special attention to women and children.
6. To give attention to hygiene – If hygiene is maintained then spread of the diseases can be checked.

EXERCISE QUESTIONS

OBJECTIVE TYPE QUESTIONS

1. Which one of the following is not included amongst the three components of disaster management?
   (a) Forecast, warning and training.
   (b) Management activities during disaster.
   (c) To remain satisfied after the occurrence of the disaster.
   (d) To perform management work after the disaster.

2. Which disaster is almost certain in every summer season?
   (a) Fire (b) Air crash
   (c) Rail accident (d) Road accident

3. Which one of the following is not included among the primary activities of community management?
   (a) To inform the nearest health centre.
   (b) To guarantee the availability of clean water and food to the affected people.
   (c) Not to inform the administration about the disaster.
   (d) To arrange emergency relief camp.

4. Which is the important work of village disaster management committee?
   (a) Not to arrange First Aid.
   (b) To provide security to everyone.
   (c) To select relief camp and work to provide relief.
   (d) To maintain hygiene.

SHORT ANSWER TYPE QUESTION

1. What efforts should be made by the community before the arrival of the fire brigade?
2. Who are the members included in the constitution of the village level disaster management committee?

3. Which good qualities are essentially required in the community for the disaster management?

LONG ANSWER TYPE QUESTION

1. Describe the central role of community in the disaster management.
2. Describe in detail the activities of village disaster management committee.
3. How can the participation of community be ensured in disaster management?

