

GEOGRAPHY AND ECONOMICS

Matriculation Standard X



**TAMILNADU
TEXTBOOK CORPORATION**

**GEOGRAPHY
AND
ECONOMICS**

MATRICULATION

10

Untouchability is a sin
Untouchability is a crime
Untouchability is inhuman



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PREFACE

Based on the Tenth Matriculation Syllabus, this book aims to throw light upon Geography and Economics through a seamless blend of topics such as agriculture, industries, transport and communication and latest developments in remote sensing techniques.

This book, not only describes the nature of resources, their availability and utilisation but also their conservation and sustainable development. The diffusion of science and technology in all sectors has been described well, along with the emphasis on values of cultural heritage.

It is imperative that a student who learns geography should also know about the economy of the country he lives in. So that, he can judiciously utilise the available resources to the optimum extent. With humble pride, we present this Tenth standard book on Geography and Economics to the students. We believe that this book will be a perfect handbook to the teachers of Geography and Economics. We hope that this book will be of immense value for the students to inspire them to be great Geographers and Economists in future.

Tmt. M. Manimekalai
Chairperson

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UNIT I
Chapter 1
INDIA - POSITION

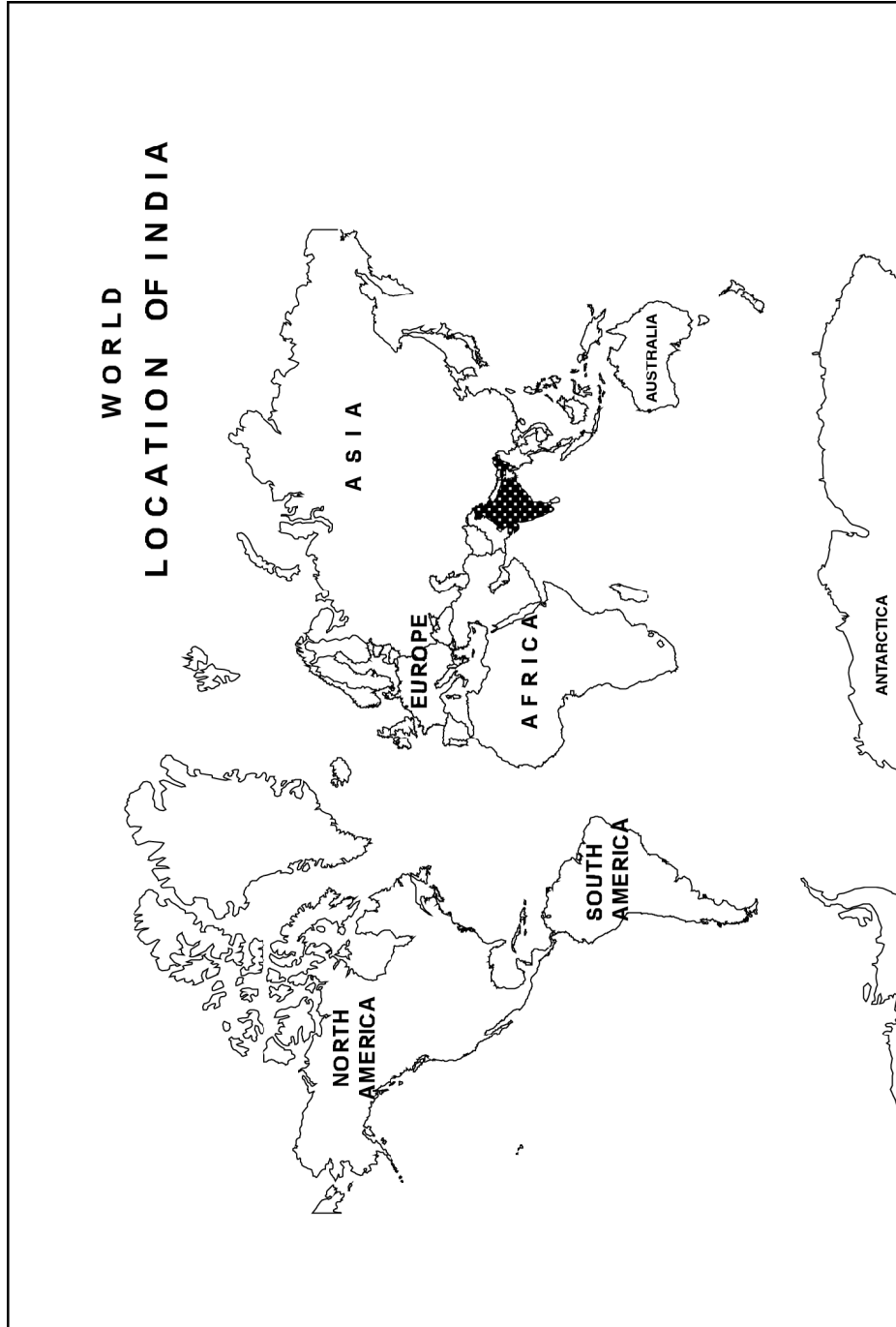
Learning Objectives

- To know the location and position of India.
- To identify India as a subcontinent.
- To understand the administrative divisions of India.
- To appreciate the unity in diversity of India.
- To identify and locate the state and union territory with their capitals.

“India is a country of great geographical extent. Its size is so vast that it is often described as a subcontinent. Like a giant, it sprawls between the snowy height of the Himalayas and the shores of the Indian Ocean, which washes the land for thousands of Kilometres from Bengal to Kutch. The land stretches on all sides encompassing the vast expansion of the northern plains, the thirsty sands of the Thar in the west, the intricate maze of Indo-Myanmar hills on the east, the uneven plateau surface, the ancient hills and the coconut bearing coastal plains on the south, and the lofty snowcapped mountains on the north. The land gets abundance of sunshine from the tropical sun and splashing rains from the monsoons - the two elements together exerting a tremendous impact on the diversity of its teeming millions. This is India, the dispenser of our destiny - a destiny having a remarkable continuity, defying time and still changing like the patterns in a Kaleidoscope”.

Location and Extent

India is situated in the southern part of Asia. It covers an area of 3.2 million sq.kms, which occupies 2.5% of the world's land area. It extends between 8°4' North and 37°6' North latitude and between 68°7' East and 97°25' East longitude. It stretches from Kashmir in the north to Kanyakumari in the south for 3214 kms and from Gujarat in the west to Arunachal Pradesh



in the east for 2933 kms. The Tropic of Cancer $23\frac{1}{2}^{\circ}$ North runs across the country and divides it into two equal halves. Obviously, India is the seventh largest country with respect to area. It is four times bigger than Pakistan and three times smaller than USA. Thus India is “neither a pigmy nor a giant among the nations of the world”.

Position and Relation

India has a predominant position in the Indian Ocean realm. No other country has such a large coast line. The Deccan Peninsula projects itself into the Indian Ocean thus making it possible for India to look both ways - towards Africa and Europe from its western coast and towards South East Asia and the Far East from its eastern coast. The tapering topography of land favours monsoonal climate to promote agricultural activities. India's position is favourable for trade, commerce and economic activities by connecting India with Europe through Suez Canal and also with China, Japan and Australia through Malaccan strait.

India and its boundaries

The countries which border India are Bhutan, Nepal and China in the north, Pakistan and Afganistan in the west and Bangladesh and Myanmar in the east. Palk strait separates India and Srilanka in the south. Himalayas along with Hindukush and Karakoram provide a natural boundary in the north. Pakistan in the west and Bangladesh in the east are manmade boundaries demarcated by mutual agreements. The Islands of Andaman and Nicobar and Lakshadweep are the parts of Indian Union situated in Bay of Bengal and Arabian sea respectively.

India - a sub continent

A continent has varied characteristics of diversified physical features, climatic conditions, natural vegetation, mineral resources, human habitation, cultural norms and ancient ethnic and linguistic groups, etc. All these distinctive characteristics are found in India. Hence we consider India as a subcontinent.



IST : Indian standard time

The Central Meridian of India is $82\frac{1}{2}^{\circ}$ East longitude which runs from north to south through the city of Allahabad. The local time of the meridian is used for calculating the Indian Standard time, which is followed by all the places within the country. It is usually $5\frac{1}{2}$ hours ahead of Greenwich mean time of the world. The 0° meridian passes through Greenwich in England. Each degree of the meridian accounts for four minutes of time and that the difference between Greenwich and Indian standard time is $82\frac{1}{2}^{\circ} \times 4 = 330$ minutes which is $5\frac{1}{2}$ hours.

Political Divisions

India has been divided into 28 states and 7 union territories on basis of language for administrative convenience. The population, area and the capital cities of the states and union territories are given below.

S.No.	State and Union territory	Capital	Area (sq.kms)	Population (in million) 1 mi=10 lakhs
1.	Andhra Pradesh	Hyderabad	275,008	76
2.	Arunachal Pradesh	Itanagar	83,743	1.1
3.	Assam	Dispur	78,483	2.7
4.	Bihar	Patna	99,200	83
5.	Chattisgarh	Raipur	135,194	21
6.	Goa	Panaji	3,702	1.3
7.	Gujarat	Gandhinagar	196,024	50
8.	Haryana	Chandigarh	44,212	21
9.	Himachal Pradesh	Shimla	55,673	6
10.	Jammu and Kashmir	Srinagar, Jammu	222,236	10
11.	Jharkhand	Ranchi	74,677	26
12.	Karnataka	Bangalore	191,791	52
13.	Kerala	Thiruvananthapuram	38,863	31
14.	Madhya Pradesh	Bhopal	308,252	60
15.	Maharashtra	Mumbai	307,690	96
16.	Manipur	Imphal	22,327	2

S.No.	State and Union territory	Capital	Area (sq.kms)	Population (in million) 1 mi=10 lakhs
17.	Meghalaya	Shillong	22,429	2
18.	Mizoram	Aizawl	21,081	0.8
19.	Nagaland	Kohima	16,579	1
20.	Orissa	Bhubaneshwar	155,707	36
21.	Punjab	Chandigarh	50,362	24
22.	Rajasthan	Jaipur	343,239	56
23.	Sikkim	Gangtok	7,096	0.5
24.	Tamil Nadu	Chennai	130,058	62
25.	Tripura	Agartala	10,486	3
26.	Uttaranchal	Dehradun	51,125	8
27.	Uttar Pradesh	Lucknow	243,286	166
28.	West Bengal	Kolkata	88,752	80
Union Territories				
1.	Delhi	Delhi	1,483	13
2.	Andaman and Nicobar Islands	Port Blair	8,249	0.3
3.	Chandigarh	Chandigarh	114	0.9
4.	Dadra and Nagar Haveli	Silvassa	491	0.2
5.	Daman and Diu	Daman	112	0.1
6.	Lakshwadeep	Kavaratti	32	0.06
7.	Pondicherry	Pondicherry	492	0.9

The above table tells us the capital, area and population of the states and union territories. From the given table, one can find out the state with the highest population and lowest population. The highly populated state in India is Uttar Pradesh, whereas the sparsely populated state is Mizoram having a population of 0.8 millions. Considering the density of population - Kerala is densely populated with 820 persons living per sq.km on the contrary Sikkim has got lowest density in population of 0.5 million. The density of population is calculated as per the number of persons living per sq.km. Rajasthan is the largest state in area, while

Goa is the smallest state. Jharkhand is the latest formed state. In spite of the implied diversities in natural and cultural regions India has an individuality of its own and this diversity is the basis of India's self contained economy.

Unity in Diversity

India has unique landscape ranging from the highest peaks to the lowest plains. Godwin Austin known as Mount K² is the highest peak of India and the coastal plains are the lowest in the South. The climate varies from the tropical to the temperate zone. **Cherrapunji** in Meghalaya receives the highest amount of rainfall, whereas the Thar desert receives the minimum rainfall. We have wet dense tropical forest in the western ghats, mangrove trees in the Sunderbans of West Bengal and Shrubs, and sparse vegetation in the Thar desert. The diversity in the physical environment and climate has made India an ideal habitat of flora and fauna. Hence a wide variety of plants and animals are found in India.

India is a secular country with total freedom of worship. People follow Hinduism, Christianity, Islam, Sikhism, Buddhism, Jainism and Zoroastrianism with cultural diversities. In spite of its physical, religious and racial varieties culture unites all people. Hence India is known for her **unity in diversity**. People forget their religious and linguistic differences and stand together when there is a crisis. The best examples are Kargil invasions and occurrences of floods and Tsunami, etc. "Conservation and transmission of this cultural unity are our prime duty".

EVALUATION

I. Choose the best answer

1. The extent of India from Kashmir to Kanyakumari is _____.
a) 3000 kms b) 3800 kms c) 3214 kms
2. The Arabian sea is located to the _____ of India.
a) west b) south c) east
3. Palk strait separates India from _____.
a) Burma b) Srilanka c) Bangladesh

4. The central meridian of India passes through _____
a) Ahmedabad b) Hyderabad c) Allahabad
5. The _____ is desert found in to the west of India.
a) Gobi b) Thar c) Sahara
6. _____ receives the highest amount of rainfall in India.
a) Kollam b) Cherrapunji c) Mumbai
7. The capital city of Assam state is _____
a) Gauhati b) Digboi c) Dispur
8. The highest populated state in India is _____
a) Andhra Pradesh b) Madhya Pradesh c) Uttar Pradesh
9. The islands of Andaman and Nicobar are situated in _____
a) Arabian Sea b) Bay of Bengal c) Indian Ocean
10. Itanagar is the capital of _____
a) Gujarat b) Arunachal Pradesh
c) Jammu & Kashmir

II. Fill in the blanks with suitable answers

1. India is situated in the _____ part of Asia.
2. India is located between _____ and _____ latitudes and _____ and _____ longitudes.
3. The _____ divides India into two halves.
4. India is _____ hours ahead of the Greenwich Mean Time.
5. India consists of _____ states and _____ union territories for administrative convenience.
6. The lowest populated state of India is _____.
7. The highest peak of India is _____.
8. India is a _____ country with total freedom of worship.
9. Deccan plateau projects itself into _____ ocean.
10. India is connected with Europe through _____ canal.

III. Match the following

A	B
1. 82½ degree east	Standard time of the world
2. Goa	Largest state
3. Kerala	Standard time of India
4. Rajasthan	Highest density of population
5. Greenwich meridian	Smallest state

IV. Answer the following questions briefly

1. Write the latitudinal and longitudinal extent of India.
2. How is Indian standard time calculated?
3. What is known as density of population?
4. What are the neighbouring countries of India?
5. Why there is wide variety of flora and fauna found in India?

V. Answer following questions in a paragraph

1. Describe the location of India.
2. "India is a sub continent" - Prove.
3. "Unity in diversity in India" - Justify.
4. Write a note on India's position and its boundaries.

VI. Mark the following in the map of India

1. Natural boundaries of India.
2. Union territories of India.
3. Capitals of the following states.
(a) Haryana (b) Bihar (c) Uttaranchal (d) Jharkhand (e) West Bengal

Chapter 2

INDIA - PHYSIOGRAPHY

Learning objectives

To understand the physiographic divisions of India.

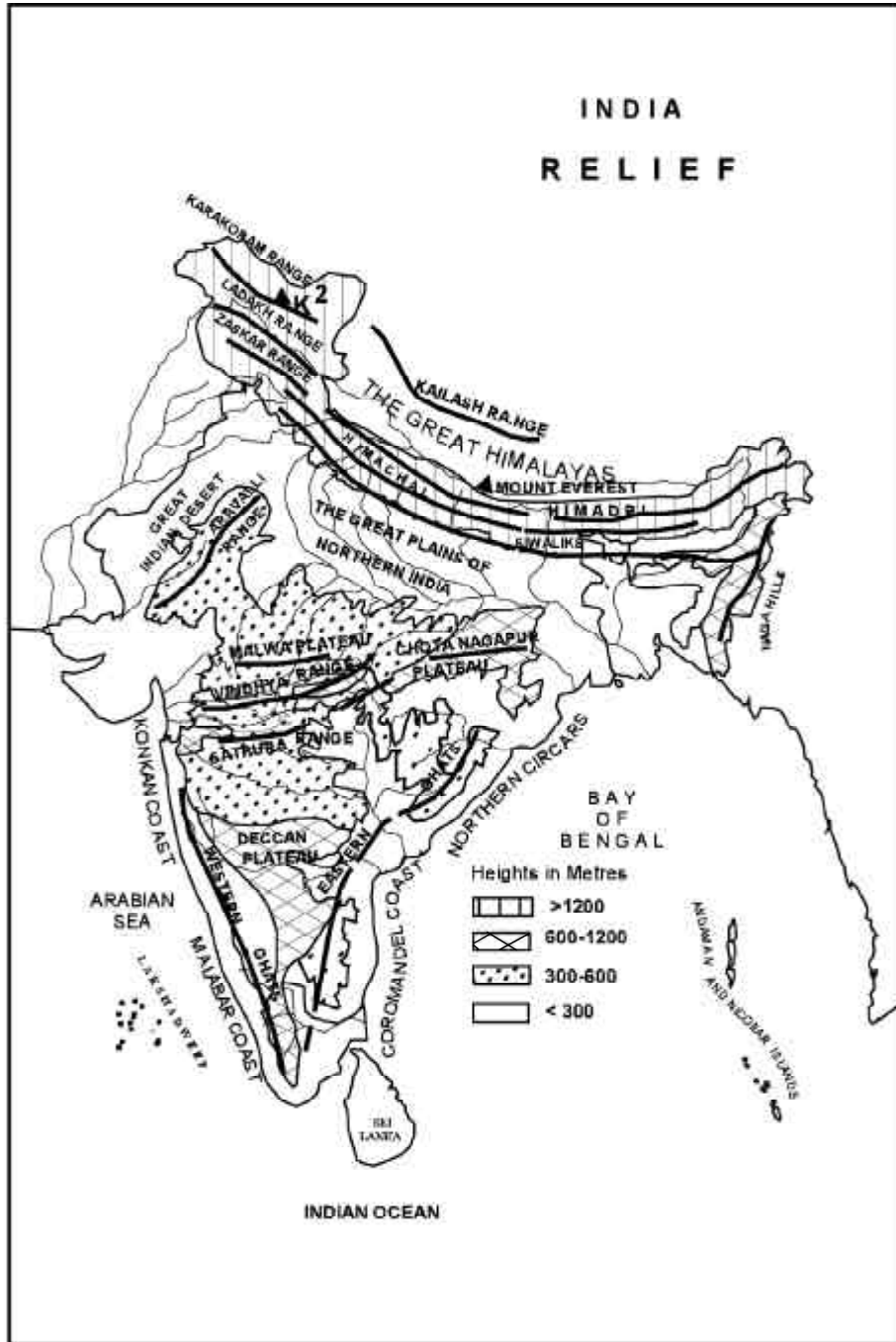
To know the structure and formation of Himalayas, Great plains and peninsular plateau, coastal plains and Islands.

To learn about the significance of each physiographic divisions of India.

Physiography means the description of the physical relief features of a country. India has a well defined physiographical entity. The present physiography of India have evolved in the course of a long chequered geological history. The remains of flora and fauna preserved in different layers of the rocks help to determine their age. To understand the varied physical features of India, let us have a glance on geological history of India.

Geologists believe that the earth was originated from a gaseous mass that separated from the sun and condensed to form spherical in shape over a long time. The, then earth was in a single composite land mass called '**pangea**', surrounded by a water body called panthalasa. Due to certain forces the pangea was divided into two landmasses known as Angara in the north and Gondwana in the south, leaving an elongated shallow sea called '**Tethys**' in the middle. For millions of years, denudation of these two landmasses by rivers, resulted in deposition of silt into the Tethys. The compressional forces acting from two opposite directions made the Tethys sea, not only shrink further but buckle up forming a mighty folded mountains such as **Himalayas** of today. As the Himalaya began to gain great height, the rivers and other agents of denudation became increasingly active in eroding them and carrying huge amounts of silt to deposit in the evershrinking Tethys sea. The result of the silt deposition has been the '**Northern Gangetic plain**' of today.

INDIA RELIEF



Major physiographic divisions

The land of India is characterised by a great diversity in its physical features. Based on the structure, India may be divided into five major physiographical units. They are,

- The Himalayan Mountains
- The Northern Great Plains
- The Peninsular Plateau
- The Coastal Plains
- The Islands

I. The Himalayan Mountains

The Himalayas in the Northern India, consists of series of parallel mountain ranges with bold relief and complex topography. They were formed by earth movements which affected the relief of the earth in the last phase of its geological history. Because of this young age which is evident from the striking contrast in relief, Himalayan ranges are called young mountains.

The Himalayas are further subdivided into 3 parts. They are,

- The Western Himalayas
- The Central Himalayas
- The Eastern Himalayas

The Western Himalayas

The Western Himalayas are also known the Trans Himalayas. The lofty Karakoram extends eastwards from Pamirknot, which lies in the north west of India. These ranges form India's frontier with Afganistan and China in the Southwest of Kashmir. Godwin Austin known as K2 (8611 metres) the world's second peak belongs to this range. The 'Karakoram pass' has acquired a special importance now. There are big glaciers such as 'Baltoro' and 'Siachin'. To the south of Karakoram lie two parallel ranges, known as 'Ladakh and Zaskar ranges. The extension of Ladakh range is '**Ladakh plateau**' which is the highest plateau of India, lies in the north west of Kashmir.

The Central Himalayas

The Himalayas, the abode of snow radiate from Pamirknot in the south east direction. It stretches from Kashmir in the west to Arunachal Pradesh in the east for about 2500 km. The width varies from 400 km in the west to 150 km in the east. The height of the eastern half is greater than the western half. The steep slopes and high pointed peaks and parallel ranges of these central Himalayas indicate that Himalayas are young fold mountains. These ranges are interspersed by valleys and plateaus. There are three parallel ranges found in the central Himalayas from north to south. They are,

- i) Himadri
- ii) Himachal
- iii) Siwaliks

i) Himadri

Himadri, the northern most range of Himalayas looks like an arc. It has an average height of 6000 metres. It extends from Indus valley in the north to Brahmaputra in the north east for about 2500 km. It consists of several peaks of the world. **Mt. Everest** is the highest peak of the world with an altitude of 8848 mts. Kanchan Junga (8598 mts), Nanga Parbat (8126 mts), Dhaulagiri (8167 mts) and Nanda Devi (7817 kms) are the other peaks of the Himalayas, lying in Himadri. Many glaciers, the source of rivers are found in Himadri. For example Gangotri and Yamunotri glaciers are the sources of Ganga and Yamuna rivers respectively.

‘Passes’ are the natural gap across the mountains which provide route to link us with neighbours. Such passes are found in Himadri. **Zojila** in Kashmir, **Shipkila** in Himachal Pradesh, **Nathula** and **Jelepla** in Sikkim are the most important passes across Himadri.

ii) Himachal

Himachal lies between the Himadri in the north and Siwalik in the south. It extends over a variable width of 80 kms in average. The altitude varies from 3700 mts to 4500 mts. It is a highly rugged topography consisting of spurs and

dissected uplands. “Pirpanjal” in Kashmir is the longest range of Himachal region. ‘Dhauladar ranges’ stretches from Jammu and Kashmir across Himachal Pradesh. The easily accessible Kashmir valley, Kangra valley, Kula valley are situated in between these ranges. The popular hill resorts, Srinagar, Pahelgam, Gulmarg, Mussourie, Simla and Nainital are located here. The places of pilgrim interests such as Amarnath, Kedarnath, Badrinath and Vaishnavidevi temple are the assets of Himachal ranges.

iii) Siwaliks

Siwaliks is the southern most range of Himalayas with an average height of 1000 mts. It is a discontinuous range, made up of mud and soft rocks. The narrow longitudinal valleys called ‘Duns’ are found in siwalik. The best example is ‘Dehra Dun’. Along the foothills of siwalik, pebbles and gravels are being deposited by the rivers. ‘Tarai plain’ with the deposits of fine silt in the south of siwalik, supports the growth of thick forests and marshy lands.

The Eastern Himalayas

Brahmaputra marks the eastern most geographical limit of the Himalayas. These Mountains along the eastern boundary of India are called Purvachal. They are of medium height. They comprise of Patkai Bum, and the Naga hills in the North, and the Mizo Hills in the south. At the center, they take a westward turn along the Bangladesh – India border in Meghalaya. Here they consist of Jaintia, Khasi and Garo hills from east to west.

Significance of Himalayas

1. Himalayas are effective climatic barriers as they check the incoming cold winds from the north.
2. It helps the plains free from frost and snow during winters.
3. South west monsoon winds are prevented from moving beyond resulting in copious rainfall.
4. These great mountains provide a physical barrier in the north protecting our country from invasions.

5. Himalayas is the source of all perennial rivers of India, which bring alluvium and help the cultivation of crops in the great plain.
6. The dense forests on the slopes besides sheltering wild life provide timber and other forest products.
7. The scenic beauty and pleasant climate attracts movie makers and tourists to the hill stations.

II. The Northern Great Plains

The great plains lie between the mountains of the north and the peninsular plateau of the south. It extends over a length of 2400 km. It has a width of 2400 km in Bihar to 500 km in Punjab.

The Great plains is a flat low lying land made up of Alluvium – the fine silt brought down by the rivers. The plain in the past was a huge depression where the rivers have deposited layers of alluvial sediments.

The three big rivers draining this region are Indus, Ganga and Brahmaputra. They collect their water from Himalayan glaciers. The rivers cross the lofty Himalayan range through narrow deep gorges or deep canyons and enter the plains. Geologists consider that these three rivers were older than the Himalayas that as the Himalayas lifted themselves up, the rivers have eroded their valleys. The northern plains are the youngest as they are made up of sediments laid down by the denudation of the Himalayas.

The surface relief of great plains are classified into four types based on the structure of soil.

- i. The **Bhabar** lies all along the foot hills of siwalik. It is a pebble – studded zone of porous beds. It is a narrow belt with 8 to 16 kms.
- ii. The **Terai** belt is marked by excessive dampness with the growth of thick forest and a variety of wild life.
- iii. The **Bhangar** is the older alluvium of the plain.
- iv. The **Khadar** is the new alluvium of the plain. They form a continuous belt of alluvium. These plains may be subdivided into the following basins.

- The Indus basin
- The Ganga basin
- The Brahmaputra basin
- The Ganga – Brahmaputra Delta

i) The Indus basin

The Indus river has its source in the Kailash range to the north of Manasarovar lake. It was the cradle of ancient Indus valley civilization. It flows in a north westerly direction. It takes a turn to the south through Ladakh range. It enters Pakistan through Kashmir. It receives water from Jhelum, Chenab, Ravi, Beas and Sutlej. All the rivers except Sutlej rise in the Himalayas. The Sutlej originates in the Manasarovar region in Tibet and enters the plain through deep narrow gorges. The Indus then flows across the desert plains of Sind and drains into the Arabian sea.

ii) The Ganga basin

The river Ganga is 2480 km long. It rises in the gangotri glacier in the Himalayas at a height of 6000 mts. It cuts deep gorges through the Siwalik range and enters into the plain at Haridwar. The Ganga plain occupies an area of about 3,37,000 sq.km covering the states of Uttar Pradesh, Bihar and West Bengal.

The river Yamuna rises in Yamunotri glacier. After flowing for a distance of about 1300 km, it joins Ganga on its right bank at Allahabad. The rivers Chambal, Betwa, Son and Ken rise in the Deccan plateau and join Ganga on its right bank. The Ghandak, the Gomti, the Ghaghara and the Kosi join the Ganga on its left bank. It is covered by thick alluvial sediments. The Ganga plain slopes gently from Haryana and drains into Bay of Bengal. It is covered by thick alluvial sediments. The largest distributory of Ganga is Hooghly. Most of the Ganga Delta lies in Bangladesh. The seaward of the delta has tidal estuaries, sand banks and islands known as sunderbans.

iii) Brahmaputra basin

The river Brahmaputra originates from a glacier, south east of manasarovar region. It flows through deep gorges and enters into the lowlands

of Assam. The valley slopes from east to west. It is frequently flooded and takes away a heavy toll of life during the monsoon. It joins the lower course of Ganga and flows into Bay of Bengal.

iv. The Ganga Brahmaputra Delta

It is the largest and fastest growing delta of the world. The Brahmaputra after joining the Ganga splits into numerous distributaries. Due to the gentle slope, the river becomes sluggish, and enormous amount of silt is deposited. The lower part of delta becomes marshy where fresh water and sea water gets mingled owing to high and low tides.

Significance of Plains

1. These vast plains are called granaries of our country, growing rice and wheat in large quantities.
2. The climatic conditions favour cultivation of a wide variety of crops namely cotton, Jute, Sugarcane, pulses and oilseeds.
3. Numerous perennial rivers enable irrigation in areas of erratic rainfall.
4. Dams have been constructed across these rivers which help in generating hydro electric power.
5. This in turn leads to the development of industries.
6. The flat nature of the plains facilitate construction of roads and railway lines.
7. A large number of towns have come up in the plains as industrial, pilgrimage, commercial and educational centres.
8. All these factors have favoured a high concentration of population in the great plains.

III. The Peninsular Plateau

The peninsular plateau lies to the south of the Great plains. It is triangular in shape with its broad base in the north. The plateau features a series of mountain ranges that rise abruptly from the adjoining plains. It has a senile topography dominated by erosional surface and broken by striking ridges and

trough valleys. When the Gondwana land was subjected to earth movements there occurred a number of fissures in the northwestern parts. Through these fissures lava flowed out and deposited on the peninsular plateau. Thus, this lava plateau underwent several geological changes.

The peninsular plateau is subdivided into 2 parts. They are :

1. The Central Highlands
2. The Deccan Plateau.

1.The Central Highlands

The northern part of the peninsular plateau is called the Central Highlands. It is made up of hard, igneous and metamorphic rocks. It is an ancient land that has denuded over millions of years. In northwest it is flanked by the Aravallis, which is relic of the world's oldest mountain system. Aravallis extend from the northeast to south for about 800 kms. Gurushikar on Mt-Abu is the highest peak of the Aravallis. Further west the plateau covered by the sandy and rocky deserts of Rajasthan called '**Thar desert**' is extended.

The northern part of peninsular India is bounded by Vindhya mountains. This old mountains form the sharp edge of 'Malwa plateau'. The plateau, located to the north of Vindhyas consists of 'Malwa' and 'Chotanagpur plateau'.

Malwa Plateau

This plateau is drained by the North flowing chambhal and its tributaries. The plateau is composed of extensive lava flows and covered with black soil. It is dissected by many rivers. Its eastern part is covered by Bundhelkand and Bhagelkand.

Chotanagpur Plateau

This plateau extends eastwards from Baghelkhand plateau. It covers southern part of Bihar, the adjoining eastern fringes of Madhya Pradesh and Purulia district of West Bengal. The average height of the plateau is 700m. Its continuity ends in Rajmahal hills in the east. Then there is the gap through

which the Ganga flows. The eastern plateau continues further east as Shillong plateau in Meghalaya.

Deccan Plateau

The Deccan Plateau is the largest plateau of the peninsular region. It is triangular in shape bounded by the **'Satpura – Mahadev – Maikala ranges'** in the north, the Western Ghats in the west and the **'Eastern Ghats in the east'**. The north-western part of the Deccan plateau is made up of lava flows or the igneous rock called basalt or Deccan trap as it is specially known. These rocks, several 100 meters thick, are spread over the whole of Maharashtra and parts of Gujarat and Madhya Pradesh and form the Maharashtra plateau. The south eastern part of the Deccan plateau is known as Telengana while south – western side is called Karnataka plateau. Its eastward flowing rivers suggest that it slopes gently from west to east.

Western Ghats

Western ghats run parallel to the coast from the south of Tapti valley upto Kanyakumari. The Western ghats are known by different local names. In Maharashtra and Karnataka they are called **'Sahyadri'**. In Tamil Nadu where the Eastern and Western ghats meet, they are called the Nilgris. Further south, along Kerala and Tamil Nadu border they are known as Anai Malai and Cardamam hills. The **Anai Mudi** is the highest peak. (2695 mtrs). Udagamandalam is a well known hill station in the Nilgris in Tamil Nadu. There are various passes like **'Thalghat and Bohrghat'** in Sahyadri and **'Palghat'** in Nilgiris.

Eastern Ghats

Eastern ghats is discontinuous and less sharp. It is widely dissected into small hills by the rivers Mahanadi, Godavari, Krishna and Kaveri. The eastern ghats are known by different names in different areas. In Andhra Pradesh it is called as 'Nallamala hills'. In Tamil Nadu, they are called as 'Javadi hills' in North Arcot District, 'Gingi hills' in South Arcot, Kolli hills and Pachai hills in Trichirapalli, 'Sherveroys' and 'Gondu hills' in Salem and 'Biligiri Rangan' hills in Coimbatore District. Eastern ghats rarely exceed 900 mts of height.

Significance of Peninsular Plateau

1. This plateau is made up of crystalline rocks which provide useful building material.
2. The Chotanagpur is rich in minerals which lead to the industrialization of the region. Iron and steel transport equipment, cement, chemicals etc. are some of the industries established there.
3. Though conditions are not so suitable for cultivation, a number of crops like cotton, wheat, millets and oil seeds etc. are grown in different parts of the plateau region.

Rivers of Peninsular Plateau

Narmada and **Tapti** have their source near Amarkandak hills and flow westwards. They cut deep gorges and drain into Arabian sea creating estuaries. Narmada is 1290 km long and Tapti is 644 km long. **Sharavati** is another important river drains into Arabian sea. It has its source in the western ghats. It has a falls at Jog. It is not useful for irrigation. **Mahanadhi** has its source in Amarkandak plateau in Madhyapradesh. It flows through Orissa and drains into Bay of Bengal. Tel is its tributary. Its length is 858 km.

Godavari is the longest and largest of the peninsular rivers. It rises in Nasik in Maharashtra, flows through Andhra Pradesh and drains into Bay of Bengal. Its length is 1465 km. Ghatprabha, Malaprabha, Manjra, Penganga and Weinganga are its tributaries. The **Krishna** rises in Mahabaleshwar hills in Maharashtra, flows through Karnataka and Andhra Pradesh and drains into Bay of Bengal. It makes a fertile delta close to that of Godavari. Bhima and Tungabadra are its tributaries.

The **cauvery** rises in the hills of Coorg district in Karnataka. It flows through Tamil Nadu and drains into Bay of Bengal. It runs for a distance of 800 kms. It waters the districts of Salem, Trichy and Tanjore in Tamilnadu. It makes a fertile delta near Kaveripoombatinam and it is known as the 'Granary of the South'. Amaravathi, Noyyal and Bhavani are its tributaries. Vennar, Vettar and Kudamurutti are its distributaries.

The **Vaigai** river rises in the Cardamam hills and flows through Madurai and Ramathapuram. It joins palk strait near Rameswaram. **Periyar** river rises

in **Cardamam hills** and flows westwards and drains into Arabian sea. A dam at Thekkadi on the border of Tamilnadu provides irrigation facilities to Tamilnadu. The **Thamiraparani** river rises in Agasthiar hills and waters the district of Tirunelveli. Chitra and Manimutharu are its tributaries.

Coastal Plains

The Deccan plateau is flanked by the coastal plains along the western and eastern side. These coastal plains are the '**West Coast Plain**' between the Deccan plateau and the Arabian sea on the west and the '**East Coast Plain**' between the Deccan plateau and Bay of Bengal in the east. The coastal strip runs for the distance of about 6000 kms from Rann of Kutch in the west to the Ganga Brahmaputra delta in the east.

West Coast Plain

West coast plain is located between Western Ghats and Arabian sea. This coastal plain extends from Rann of Kutch in the North to Kanyakumari in the South. The coastal plain covers the states of Gujarat, Maharashtra, Goa, Karnataka and Kerala. In Maharashtra and Goa it is referred to as Konkan Coast; while in Karnataka as '**Canara Coast**' and in Kerala as '**Malabar Coast**'. This plain is drained by River Narmada, Sabarmathi and Mahi which flows into Gulf of Khambhat. The Konkan has some features of marine erosion like cliff and reef which in turn forms natural harbours. The Malabar coast contains a number of long and narrow lagoons. '**Vembanad**' is the largest lagoon.

East Coast Plain

East coast plain lies between the Eastern ghats and East coast of India. It extends from West Bengal to Kanyakumari. The Northern half of this plain is known as Northern circars while the Southern half of the coast is called '**Coromandal Coast**'. It covers the states of Orissa, Andhra Pradesh and Tamilnadu. It is marked by several lagoons and deltas. The most prominent are '**Chilka lake, Kolleru lake and Pulicat lakes**'. It is a fertile deltaic region formed by the major peninsular rivers like Mahanadi, Godavari, Krishna and Cauvery.

Significance of Coastal Plains

- The indented coast lines in the East provide natural harbours.
- The coastal plains are areas of intensive cultivation because of fertile deltaic soil and equable climate.
- The development of ports have contributed to the growth of trade and commerce.
- The import and export activities have attracted industries thereby promoting economic development.
- The back waters and lagoons along the coast are ideal for fishing.

V. The Islands

Besides the mainland, Indian territory also extends into the Arabian and the Bay of Bengal in the form of the Lakshadweeps and the Andaman and Nicobar Islands respectively. The Lakshadweeps are small Coral Islands. The Andamans and Nicobars are cluster of Islands stretches almost in a line. There are as many as 200 islands in the Andamans Group extending for 350 kms. There are 19 islands in the Nicobar group. Some of the islands are of volcanic origin. **'Barren island'** is an active volcano. This is the only active volcano of India.

The physical features of India, though different from each other, they are complementary to one another. It influences the climatic conditions and favours man's varied activities.

EVALUATION

I. Choose the best answer

1. The Highest peak in Western Himalayas
a) Everest b) Kanchan Junga c) Godwin Austin
2. The source of River Ganga
a) Yamonotri b) Siachen c) Gangotri
3. The pass located in Himachal Pradesh
a) Zojila b) Nathula c) Shipkila

4. Malwa plateau is drained by
 - a) Krishna
 - b) Godavari
 - c) Chambal
5. Peninsular plateau lies to the south of
 - a) Great plains
 - b) Western ghats
 - c) Chotanagpur plateau

II. Fill in the blanks with suitable answers

1. The composite and single mass of the earth was called _____.
2. The shallow sea divided the Angara and Gondwana land was _____.
3. The western Himalayas are also known as _____.
4. The narrow longitudinal valley in Siwalik is _____.
5. Eastern Himalayas are called _____.
6. Northern half of the East coast plain is called _____.
7. The active volcano is _____ island.
8. The peninsular plateau is made up of _____ rocks.
9. The highest peak in Tamilnadu is _____.
10. The south eastern part of the Deccan plateau is known as _____.

III. Match the following

A	B
1. Pilgrim centre	Thar
2. Tarai plain	Mount Abu
3. Western ghats in Karnataka	Marshy lands
4. Gurushikar	Sahyadri
5. The desert	Vaishavidevi temple

IV. Distinguish between the following

1. Himadri and Himachal.
2. Western ghats and Eastern ghats.
3. East coast plain and West coast plain.
4. Northern great plains and Coastal plains.
5. Himalayas and Western ghats.

V. Answer the following questions in brief

1. What are the major physiographical units of India.
2. Write any two points on significance of Himalayas.

3. What is Bhabar?
4. Mention the sub divisions of peninsular plateau.
5. Name the islands belong to India.

VI. Answer the following questions in a paragraph

1. Write a short note on geological history of Himalayas.
2. List out the significance of Himalayas.
3. How are relief of great plains are classified on the basis of structure of soil? Explain.
4. Explain western ghats.
5. Explain in brief about Ganga plains.

VII. Answer the following questions in detail

1. Write an essay on the Himalayan mountains.
2. Write in detail about peninsular plateau.

VIII. Locate the following in the given map of India

- (1) Deccan plateau (2) Ladakh range (3) Kailash range (4) Mount Everest (5) Mt. Godwin Austin (6) Palk Strait (7) Gulf of Mannar (8) Northern Circars (9) Coramandal Coast (10) Anadaman & Nicobar Islands (11) Port Blair (12) Gulf of Khambhat (13) Gulf of Kutchh (14) Aravalli Hills (15) Chotanagpur plateau.

Chapter 3

CLIMATE, SOIL, VEGETATION AND WILDLIFE

Learning Objectives

- To know about the factors that influence the climate.
- To understand about the cycle of seasons.
- To learn about the different types of soil.
- To study about the flora and fauna in the Ecosystem.

Climate

Human beings exist on the earth because all the favourable conditions are available here for the survival of life. Air, water, soil, climate, vegetation are the vital requirements for human existence. The elements of climate such as temperature, pressure, wind, humidity and rainfall differ from one place to another on the earth. The variations on climatic elements give rise to variety of vegetation. India, being a sub-continent has varied climatic conditions, which has greater influence on the vegetation, food, clothing, shelter, life style and human activities.

The determining factors of climate

As the size of India is so large, it is bound to have significant climatic contrasts between different parts. Yet there is a peculiar uniformity in the climate of India due to its unique physiography. The mighty Himalayas in the North and the Oceans on the south play a vital role in influencing the climate of India. The location and relief, the oceans, the surface winds and upper air currents are the main factors that affect the climate of India.

Location and relief:

The Himalayas prevent the cold polar winds blowing from central Asia in the north during winter. They obstruct the moisture bearing monsoon winds

blowing from the south during summer and cause heavy rainfall to India. Here the Himalayas act not only as a physical barrier but also a climatic barrier. The triangular shape of India is responsible for diversion of monsoon winds and causes orographic rainfall over the entire coastal area. Western ghats and Shillong plateau act as barriers here.

Oceans

The coastal areas enjoy '**equable climate**' because of the moderating influence of the sea breeze. Chennai is an example for experiencing this climate. The range of temperature is not high in these areas, where as the interior of the plateau and the northern plains have a '**continental climate**' because their location is far away from the influence of the seas. Continental climate is characterised by extreme conditions of very hot summer and very cold winter For example, Delhi experiences continental climate.

Direction of Surface winds

The pressure belts and the wind systems follow the apparent movement of the sun. During summer, the sun shines vertically overhead in the Northern Hemisphere. So, a low pressure trough develops over the interior of the land mass and high pressure crest forms in the Ocean. Winds normally blow from high pressure to low pressure trough. The velocity of winds depends upon the pressure gradient. The South East trade winds originate in the ocean and blow over hot land during summer. The conditions are reversed during winter.

Upper air currents

In the upper layers of the troposphere, there are strong westerly winds concentrated in a relatively narrow and shallow stream known as '**Jet streams**'. They are positioned in the Troposphere. They blow from west to east. Due to the obstruction caused by the mighty Himalayas a branch of these winds descends over north western parts of India in winter like jet streams. It plays an important role in bringing the westerly winds to India and causes rainfall in north west India.

Though the above factors influence the climate of India the unifying factors remains to be the "monsoon winds". The general climate of India is

described as Tropical monsoon type. The word, monsoon is derived from the Arabic word “Mausim” meaning reversal of winds.

Seasons

On the basis of the monsoon variations, the meteorologists recognize the four distinct seasons in India such as :

1. Winter (December to February)
2. Summer (March to May)
3. South West Monsoon. (June to September)
4. North East Monsoon (October to November).

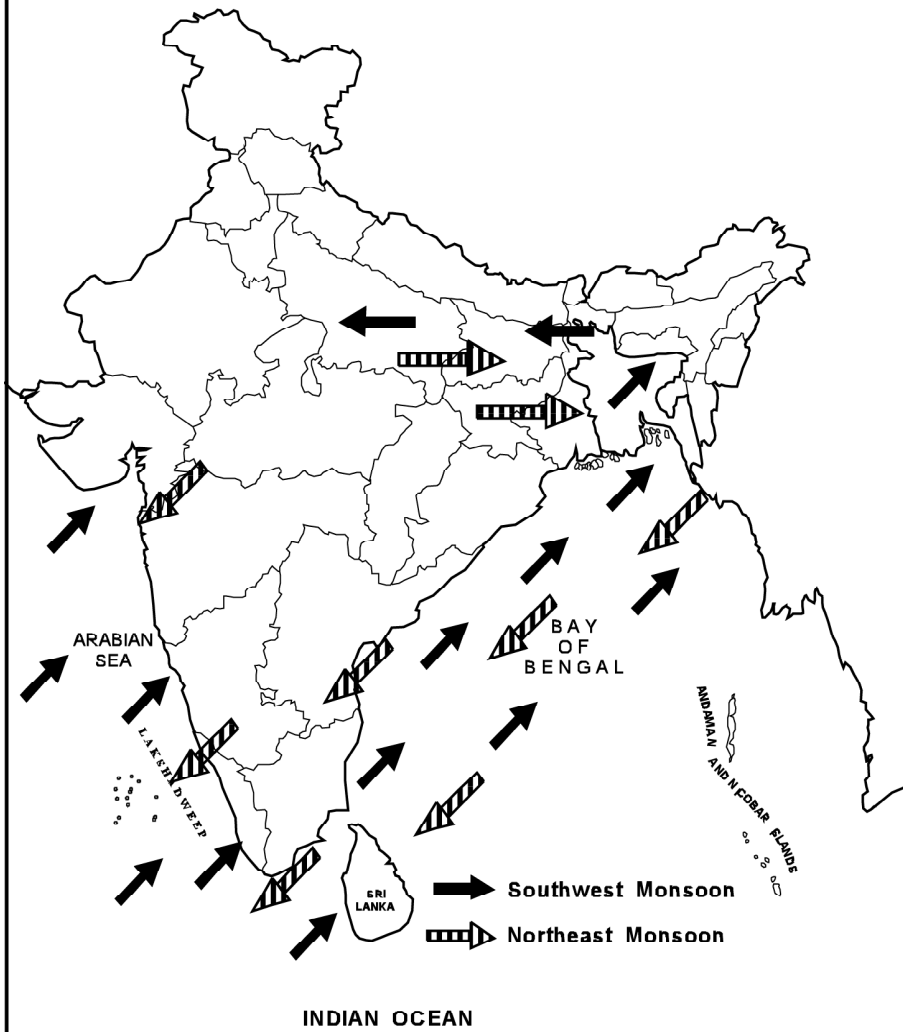
Winter (December to February)

During winter, the sun is overhead in the Tropic of Capricorn. The land mass becomes cold in North India where the day mean temperature remains below 21°C and the night temperature is about 22°C. No obvious difference is found in the temperature during day and night.

In the meantime high pressure develops in the northwestern part of India because of prevalence of low-temperature. In contrast to this, a low pressure area forms in the South India, that is both in the Arabian sea and the Bay of Bengal. Consequently the winds blow from the high pressure area towards South India. These winds are called the ‘**Retreating monsoon winds**’ which blow from land to sea and do not cause much rainfall. But these winds absorb some moisture while crossing the Bay of Bengal and gives winter rainfall to Tamil Nadu and South Andhra Pradesh.

During this period, a low pressure depression originates over the Mediterranean sea and travel eastwards across Iran and Pakistan and reach India. This low pressure depressions are called ‘**Western disturbances**’. The Jet stream plays a dominant role in bringing these disturbances to India. These disturbances cause rainfall in Punjab, Haryana and Himachal Pradesh and snowfall in the hills of Jammu and Kashmir. This rainfall is very useful for the cultivation of wheat.

INDIA
MONSOONS



Summer (March to May)

The summer season starts in March and continues up to May. During this season the sun's rays are vertical over the Tropic of Cancer. Therefore the temperature is very high in the northern parts of the India. At some places in northwest India the day temperature may be as high as 45°C to 47°C. Low pressure conditions prevail over northern part of India because of this high temperature. Strong hot winds blow during daytime over northern and northwest parts of India which is called as '**Loo winds**'. Contrary to this the Southern parts of India has moderate weather conditions because it lies nearer to sea. The mean maximum temperature here varies from 26°C to 30°C. High pressure develops here due to low temperature.

Because of the atmospheric pressure conditions, the winds blow from south west to north east direction in Arabian Sea and Bay of Bengal. They bring pre monsoon showers to the west coastal areas during May. There are a few thunder showers called '**Mangoshowers**' which helps in quick ripening of mangoes along the coast of Kerala and Karnataka. North Eastern part of India also experiences local storms called '**Nor Westers**'. These thunder storms are also called as Kalbaisakhi (Calamity of the month of Baisakh) in Punjab.

South West Monsoon (June to September)

After the summer season, rainy season starts with the onset of the south west monsoon. The high temperature gives rise to low pressure and by the end of May a large area of low pressure is formed over the north west part of the country. At the same time, the oceans become cool and a high pressure area develops over the oceans. Winds always blow from high pressure to low pressure. These winds are called the South East Monsoons.

When they cross the equator, they get deflected and blow as South West Monsoon. These South West Monsoon winds are moisture laden winds because it originates from Indian ocean. When it approaches the Southern part of Kerala it rains with violent thunderstorms indicating the onset of the monsoon. The occurrence of heavy rainfall all of a sudden with violent thunder and lightning is often termed as the '**monsoon burst**'.

The South West Monsoon is normally divided into two branches because of the peninsular shape of the country. They are Arabian sea branch and Bay of Bengal branch.

1. Arabian Sea Branch

The Arabian sea branch of monsoon wind is more powerful and brings heavier rainfall. Blowing from the Arabian sea it first strikes against the Western Ghats. This moisture laden wind is forced to ascend the slopes, condenses and gives heavy rainfall to western coastal regions. After crossing the Western Ghats it loses much of its moisture and gives very little rainfall to the eastern slopes which lies in the rain shadow region. Mumbai gets a heavy rainfall of over 150 cms as it lies on the windward side of Western Ghats while Pune gets less than 50 cms of rainfall as it lies on the leeward side (rainshadow) of the Western Ghats.

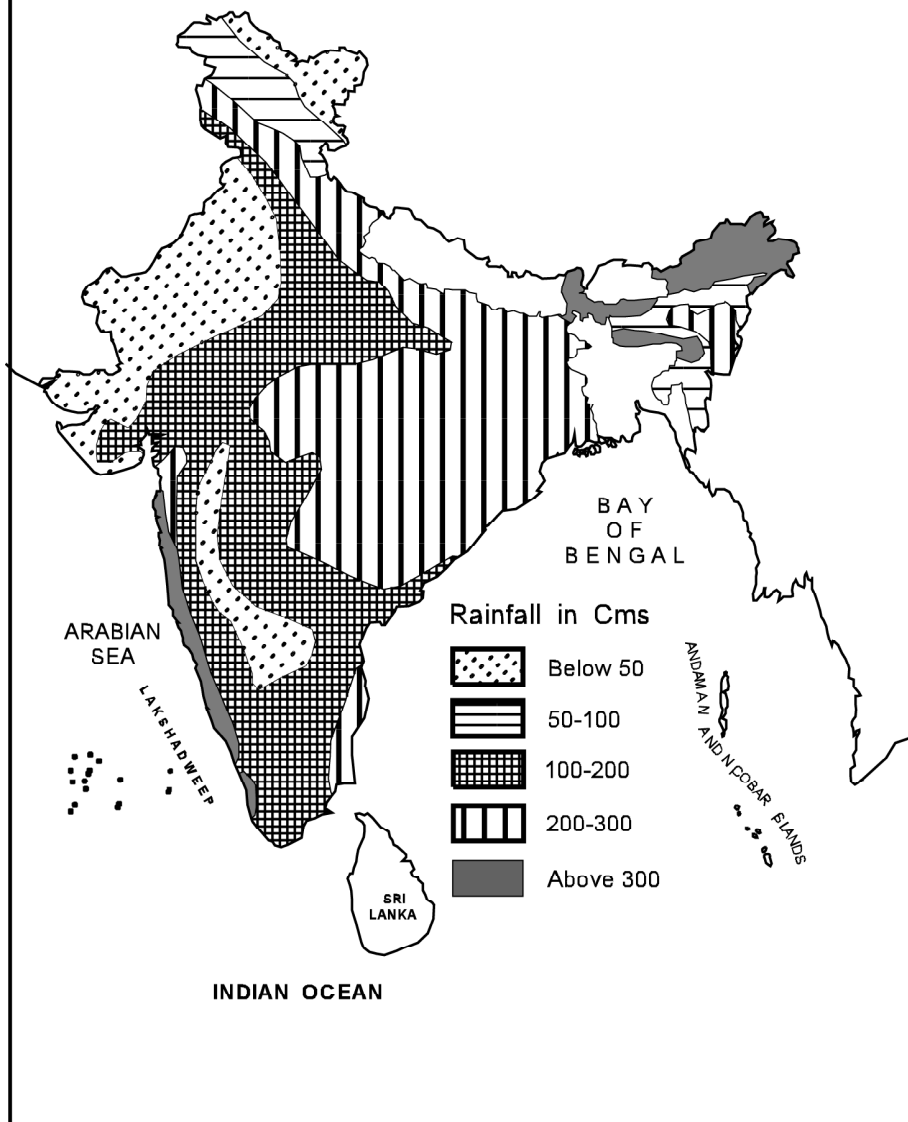
The second branch of this wind blow through the Vindhya – Satpura ranges and strikes against the Rajmahal hills and causes heavy rainfall in the Chotanagpur Plateau region.

Another branch of this wind moves towards Rajasthan where the Aravalli Mountains stand parallel to the direction of this wind. Hence it is notable to strike against the mountains and does not give any rain to Rajasthan. This is the reason why a part of Western Rajasthan remains to be a desert. This wind then reaches Himachal Pradesh and combines with the Bay of Bengal branch. It get obstructed by the Shiwalik hills and gives a good rainfall to the foot hills of this region.

2. Bay of Bengal Branch

This branch of monsoon, blowing from the Bay of Bengal is ‘moisture bearing winds’. It strikes against the Kasi, Garo, and Jaintia Hills. This moisture laden wind takes a sudden rise over the funnel shaped hills and causes heavy rainfall in Cherrapunji, which receives the highest rainfall in India. A part of this branch is deflected by the Himalayas and move towards the west giving rain to the Gangetic plains. As it moves further westwards, it loses its moisture content and gives scanty rainfall to Punjab and Haryana. Finally these winds meet the Arabian Sea branch of monsoon winds at the foot hills of the

INDIA ANNUAL RAINFALL



Himalayas and gives heavy rainfall along the Siwaliks. Tamil Nadu remains dry during this period because it lies in the rain shadow area of the Arabian sea branch and lies parallel to the Bay of Bengal branch.

North East Monsoon (October to November)

The South West Monsoon begins to retreat from the Northern India by second week of September because of the apparent movement of the sun towards tropic of Capricorn. The land mass of India starts losing heat and there is fall in the temperature. But the sea is still in warm condition. High pressure develops over the land and low pressure over the sea. Therefore wind blows from high pressure to low pressure that is from land to sea. It is cold dry wind and gives no rainfall to land mass. But, when it crosses the Bay of Bengal, absorbs moisture and gives heavy rain to the Coromandal coast. So Andhra Pradesh and Tamil Nadu get good rainfall during winter. There are frequent cyclones formed in the Bay of Bengal and they cause damage to life and property along the Coromandal coast.

Distribution of Rainfall

The amount of rainfall varies from place to place and from season to season in our country. Based on the amount of rainfall our country can be divided into following rainfall regions.

- **Regions of very heavy rainfall** includes west coastal plains and western slopes of the Western Ghats, the southern slopes of Khasi and Jaintia hills, Assam and West Bengal. They receive more than 200 cm of rainfall.
- **Regions of heavy rainfall** includes the middle Ganges Valley, the Western Ghats, eastern Maharashtra, Madhya Pradesh and Orissa which receive 100 to 200 cm of rainfall.
- **Regions of Moderate rainfall** includes the upper Ganga Valley, Eastern Rajasthan and Punjab, Southern plateaus of Karnataka. Andhra Pradesh and Tamil Nadu which get 50 to 100 cm of rainfall.
- **Regions of scanty rainfall** includes Northern part of Kashmir, Western Rajasthan and Punjab and Deccan Plateau which receive less than 50 cm of rainfall.

In India, 85% of the rain is received from the South West Monsoon. But the monsoon winds are highly erratic and the rainfall is also not uniform. Though rainfall is not uniform in India, it is an unifying factor in the agricultural and other activities of the people of India. All our activities revolve round the monsoons. Hence monsoons play a dominant role in the life and economy of the people of India.

Soil

The term 'soil' refers to the thin surface layer on the earth, comprising mineral particles, decayed organic material, living organism, water and air. Its formation is mainly related to the parent rock material, surface relief, climate and natural vegetation. Apart from these animals, insects and man also play an important role in soil formation.

India has various types of soil. They are as follows :

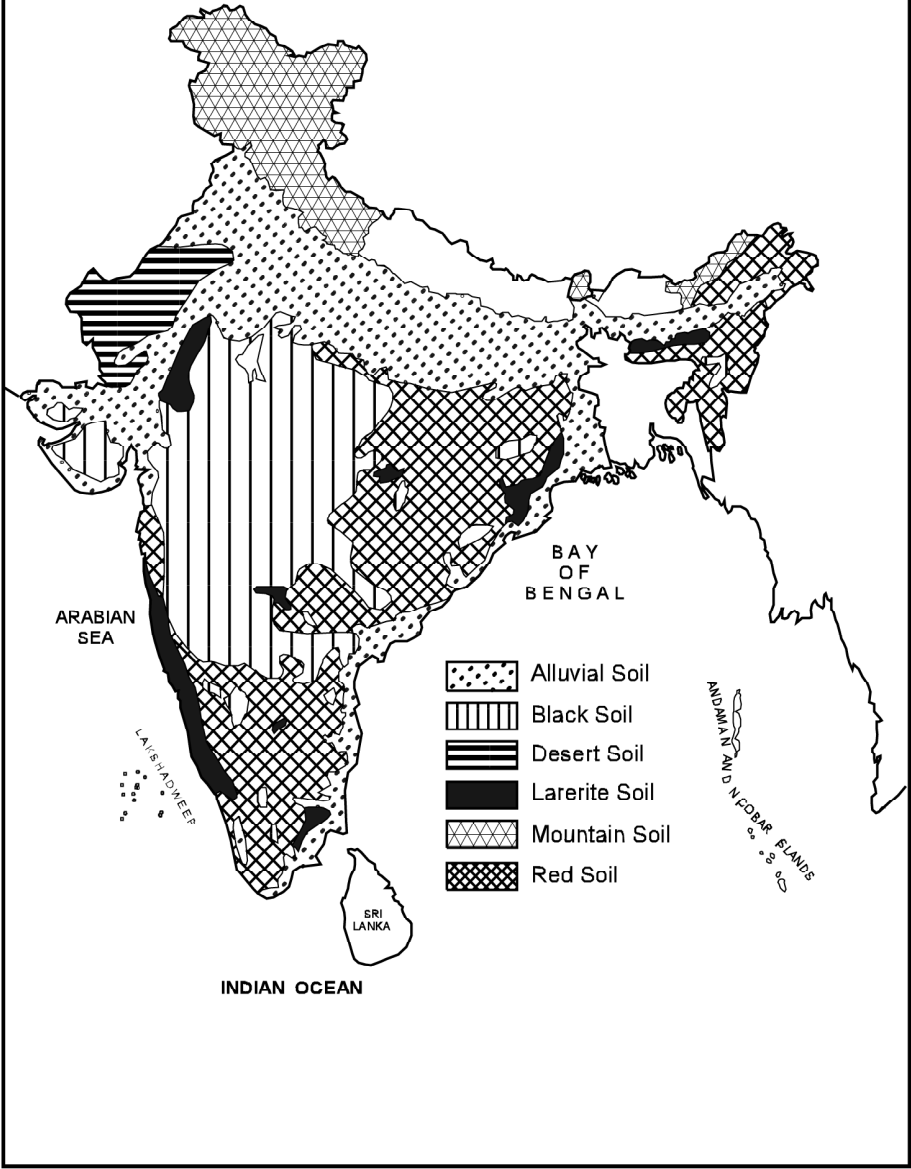
Alluvial Soil

Alluvial soil is formed by the deposits of the rivers along the river valleys, flood plains, delta region and along the coastal plains. It is very fertile soil, rich in potash, phosphoric acid, and lime, but lacks nitrogen and humus. Alluvial soil is divided into two types. 1, The older and coarse alluvium is called Bhangar. 2. Fine and fertile new alluvium is called Khadar. Rice, Sugarcane, Jute and Pulses grow well in this soil. This soil is predominant in Coastal plains and great Indian Plains. High agricultural productivity is due to its fertility, this in turn contributes towards the growth of Indian economy.

Black Soil

This soil is also known as Regur soil or Cotton soil. As cotton grows well in this soil it is also known as black cotton soil. The black soil has been formed by the solidification of lava spread over large areas during volcanic activities in Deccan Plateau over thousands of years ago. This soil is found in Maharashtra, Madhya Pradesh, Gujarat, Tamil Nadu, Karnataka and Andhra Pradesh.

INDIA SOIL



This soil is rich in calcium carbonate, magnesium, potash, lime and iron but deficient in phosphorous. It is clayey and impermeable which has great capacity to retain moisture for a long time. It becomes sticky when wet but develops cracks during dry summer season. This soil is suited for dry farming due to its high moisture retentivity. Cotton and sugar cane grow well in this soil region.

Red Soil

This soil is reddish in colour due to wide diffusion of iron in crystalline and metamorphic rocks. This soil is non-retentive of moisture. Hence, the cultivation can be done only with irrigation facilities. It is found in Tamil Nadu, Karnataka, Andhra Pradesh, South Eastern Maharashtra, Eastern parts of Madhya Pradesh, parts of Orissa and Chotanagpur area. It is rich in ferro manganese compounds but deficient in phosphorous, nitrogen, lime and humus. Rice, ragi, tobacco and vegetables may be cultivated in this soil.

Laterite Soil

This is the product of weathered laterite rocks. It is formed as a result of intense leaching leading to the removal of silica from laterite rocks. Laterite soil is found in the areas of the plateau, and are common in Karnataka, Kerala, Tamil Nadu, Maharashtra, Madhya Pradesh and the hilly areas of Orissa and Assam. This soil is deficient in lime, phosphoric acid, potassium, magnesium and nitrogen. It is acidic in nature, which favours the cultivation.

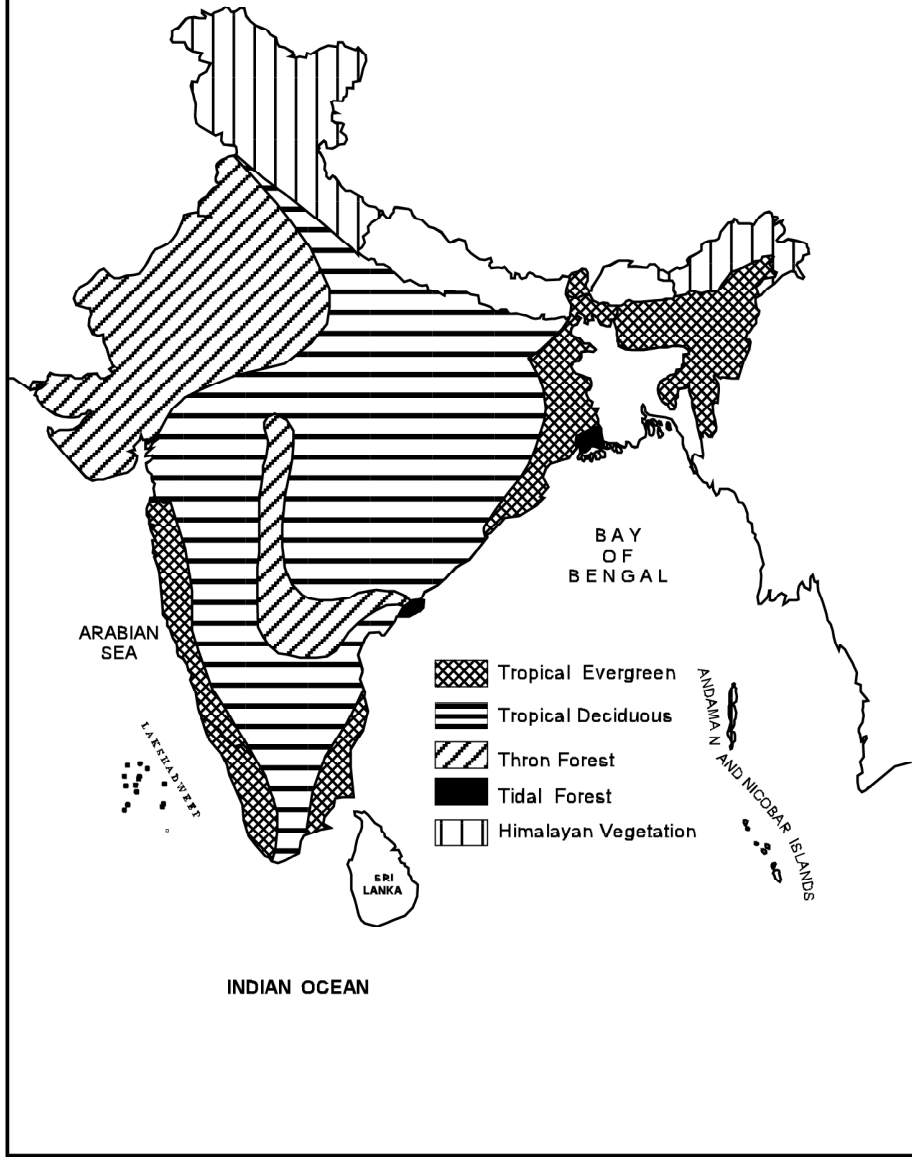
Forest and Mountain Soil

This soil is found in the mountainous regions such as the Western and Eastern Ghats, the Himachal and Siwalik regions. This soil is very rich in humus and Organic matter. Plantation crops such as tea, coffee and rubber grow well. Assam and West Bengal in Eastern Himalayas are principal growers of tea.

Arid and Desert Soil

This soil is sandy in nature. It is highly found in Rajasthan and dry areas of Gujarat. It is deficient in nitrogen and humus content and is highly infertile.

INDIA
NATURAL VEGETATION



Soil is a valuable natural resource of a country. Fertile soils attract human settlement and other economic activities. Dense population is found wherever the soil is fertile and has high productivity. As India is primarily an agricultural country, the proper management of soil resource will lead to self-sufficiency in food production as well as raw material production cater to our growing needs.

Natural Vegetation and Wild life

Natural vegetation is the primary plant cover, unaffected either directly or indirectly by man. It includes trees, plants and grass which grow in a particular environment. Vegetation is always correlated to the amount of rainfall, the temperature, topography and the soil of a region. Forest refers to the natural vegetation. The Indian forests can be divided into five types, namely Tropical Evergreen forests, Tropical Deciduous forests, Thorn and scrub forest, Mangrove forests and the Himalayan forests.

Tropical evergreen forests

These forests are found where the annual rainfall is more than 200 cm. The main areas are on the western slopes of the Western Ghats, and parts of North eastern states. Andaman Nicobar islands also have similar forests. The chief trees are ebony, Mahogany, bamboo, rubber, rose wood and iron wood.

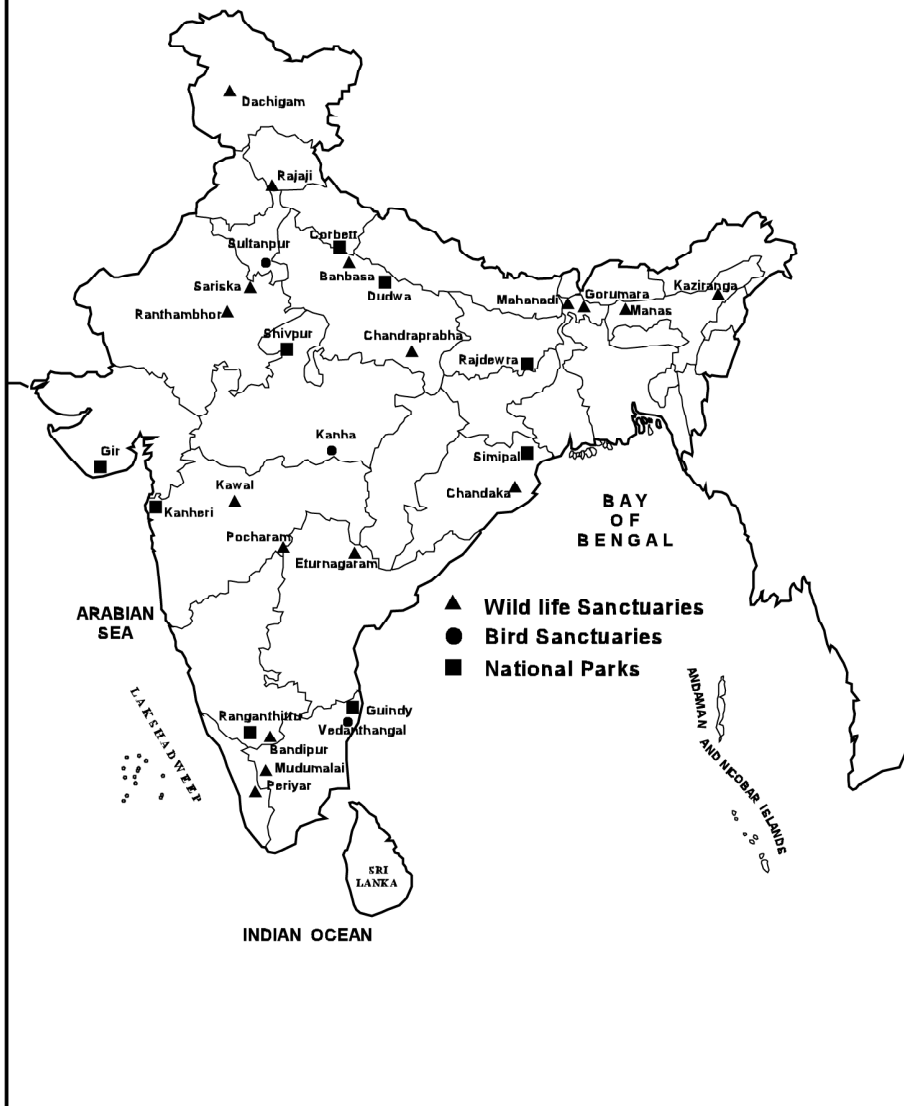
Tropical deciduous monsoon forests

This kind of forests cover a large area of the peninsula and northern India, where the rainfall is from 100 to 200 cm. The trees of the forests shed their leaves for a few weeks in early summer. The main trees are teak, sandalwood, deodars, sisam, sal and red wood.

Thorn and Scrub forests

These forests are found in parts of the Deccan Plateau and in north Western India where the rainfall is between 50 and 100 cm. Only Thorny trees like the babul, kikhar and the acacia are common here. In the Deccan region palmyra is also found.

INDIA
SANCTUARIES & NATIONAL PARKS



Mangrove forests

These are salt tolerant forests, mainly found in the tropical and sub tropical coastal areas. Mangroves occur along the Indian coast line in the Ganga delta region, sheltered estuaries, back water and salt marshes. These forests act as a bulwark against erosion by the sea and stabilize the shoreline. These trees have protruding or aerial roots, which absorb oxygen and survive in the salt water. In the Ganga delta, Sundari trees are found in abundance. So these forests are popularly known as 'Sunderbans'. In Tamil Nadu mangroove forests are found in Vedaranyam and Pichavaram areas.

Himalayan forests

The trees of these forests differ according to the height. The Siwalik slopes are covered with evergreen vegetation, which consists of Bamboo and Sal. The Himachal region is characterised with temperate deciduous forests. The important trees are pine oak, silver, fir, cedar, chestnut, walnut, apple, pears, apricots and peach. Indian maple tree grows well in the Kashmir valley. Pine tree grows well along the slopes of the Himadri and merge into shrub vegetation below the snowline. Thus the trees growing in the Himalayan region vary according to the heights.

Wildlife

Wild life is a gift of nature and it is our bounded duty to preserve and conserve it. The wild life Act of India protects and conserves this great heritage of nation. The first week of October is observed as wild life week of India.

Types of Animals

India has a vast variety of wildlife . The major animal species of India include the elephants, tigers, lion, wild buffalo, wild ass, camels and rhinoceros. Elephants are found in the forests of Western Ghats of Kerala, Karnataka, and Assam. The rhinoceros and hippopotamus are found in swampy and marshy areas of Assam and West Bengal. Wild ass is found in the forests of Assam. The Kashmir stag, spotted deer, musk deer and gazelle are some varieties of deer spread over different parts of the forest regions. The four-horned antelope is unique to north western parts of India. Tiger is the

national animal of India. 'Project tigers' reserves have been established to preserve these species. Bengal tiger is found in the sunderbans. Snow leopard of Himalayas, Lion-tailed monkey, Macaque are also some noteworthy species.

Birds life in India is rich and colourful. The most beautiful bird peacock is the national bird of India. Pheasants, geese, ducks, mynahs, pigeons, cranes, hornbills belong to the forests and wet lands of India.

India is specially rich in flowering and non flowering plants. This in turn contributes to rich animal life. This great diversity of life forms known as biological diversity contributes substantially to health and economic welfare of the people.

The following table shows the National parks with varied wildlife.

S.No.	National Park / Sanctuary	State	Species
1.	Corbett National Park	Uttaranchal	Elephant, Tiger, Panther,
2.	Dachigam Sanctuary	Jammu & Kashmir	Leopard, Musk deer
3.	Dudwa National Park	U.P.	Tiger, Panther,
4.	Ghana bird Sanctuary	Rajasthan	Siberian, Crane, Chital.
5.	Gir National Park	Gujarat	Lion, Panther
6.	Hazaribagh Sanctuary	Jharkhand	Tiger, Leopard,
7.	Kanha National Park	Chattisgarh	Tiger, Panther, Rhinoceros, Elephant
8.	Kaziranga National Park	Assam	Elephant, Tiger.
9.	Manas Sanctuary	Assam	Elephant, Tiger
10.	Periyar Sanctuary	Kerala	Tiger, Panther
11.	Sariska Sanctuary	Rajasthan	Elephant, Tiger
12.	Mudumalai Sanctuary	Tamil Nadu	Elephant, Panther
13.	Padaman Sanctuary	Jharkhand	Elephant, Panther.

The replacement of the communities of nature by man-made communities has been the law of life. However, the principles that govern the life of natural communities have to be observed if the man-made communities are to thrive. People must think less about conquering nature and more about learning to work with nature.

EVALUATION

I. Choose the best answer

1. The place that gets rainfall from the western disturbance is _____.
a) Jammu, Kashmir b) Mumbai c) Ahmedabad
2. The local storms in the north eastern part of India during the hot weather season are called _____.
a) Loo b) norwesters c) mango showers
3. The coastal areas enjoy _____ climate.
a) Continental b) equable c) humid
4. The mountain stand parallel to the direction of the south west monsoon winds is _____.
a) Vindhya b) Aravalli c) Satpura
5. The predominant soil in the coastal plains and north Indian plains is
a) Alluvial b) Black c) Arid

II. Fill in the blanks

1. The climate of India is described as _____.
2. The cold polar winds from Central Asia is prevented by _____.
3. The low pressure depressions originate over the Mediterranean sea is called _____.
4. Thunder showers in Kerala during may are called _____.
5. The occurrence of sudden rainfall with violent thunder and lightening is termed as _____.
6. Black soil is also known as _____ soil.
7. The crop that grow well in black soil is _____.
8. Red soil gets the colour due to the diffusion of iron in _____ rocks.
9. The places receive more than 200 cms of rainfall have _____ forests.
10. The triangular shape of India is responsible for _____ winds.

III. Match the following

- | | |
|----------------------------------|---------------------|
| 1. The north-east monsoon season | Cotton |
| 2. The cold weather season | North Eastern India |
| 3. Regur soil | October - November |
| 4. Burst of monsoons | December - February |
| 5. Norwesters | Kerala |

IV. Distinguish between the following

1. Windward and leeward of the mountains.
2. South west monsoon and North east monsoon.
3. Laterite soil and red soil.
4. Monsoon forests and Mangrove forests.
5. Western disturbances and Tropical cyclones.

V. Answer the following questions briefly

1. What do you mean by monsoon?
2. How are the western disturbance significant in the hills of Jammu and Kashmir.
3. Name the regions of heavy rainfall in India.
4. What are the factors responsible for the formation of soil.
5. How is the new alluvium known as?
6. Mention the trees found in the tropical ever green forests.
7. Explain the steps taken to conserve wild life.

VI. Answer the following in a paragraph

1. Give a brief note on retreating monsoon.
2. Give a brief account on mangrove forest.
3. Write a short notes on wild life of India.
4. Why does the western coastal plains receive heavy rainfall from the south west monsoon?
5. Give an account on Alluvial soil.

VII. Answer the following question in detail

1. Write an essay on south west monsoon.
2. Explain about the distribution of rainfall.

VIII. Locate the following in the given map of India

1. The direction of Arabian and bay of Bengal branches.
2. Show the areas receiving more than 250 cms of rain fall.

Chapter 4

IRRIGATION AND MULTIPURPOSE PROJECTS

Learning Objectives

To understand about the importance of Irrigation.

To Know the various sources of Irrigation.

To understand the importance of Multipurpose Projects and its uses.

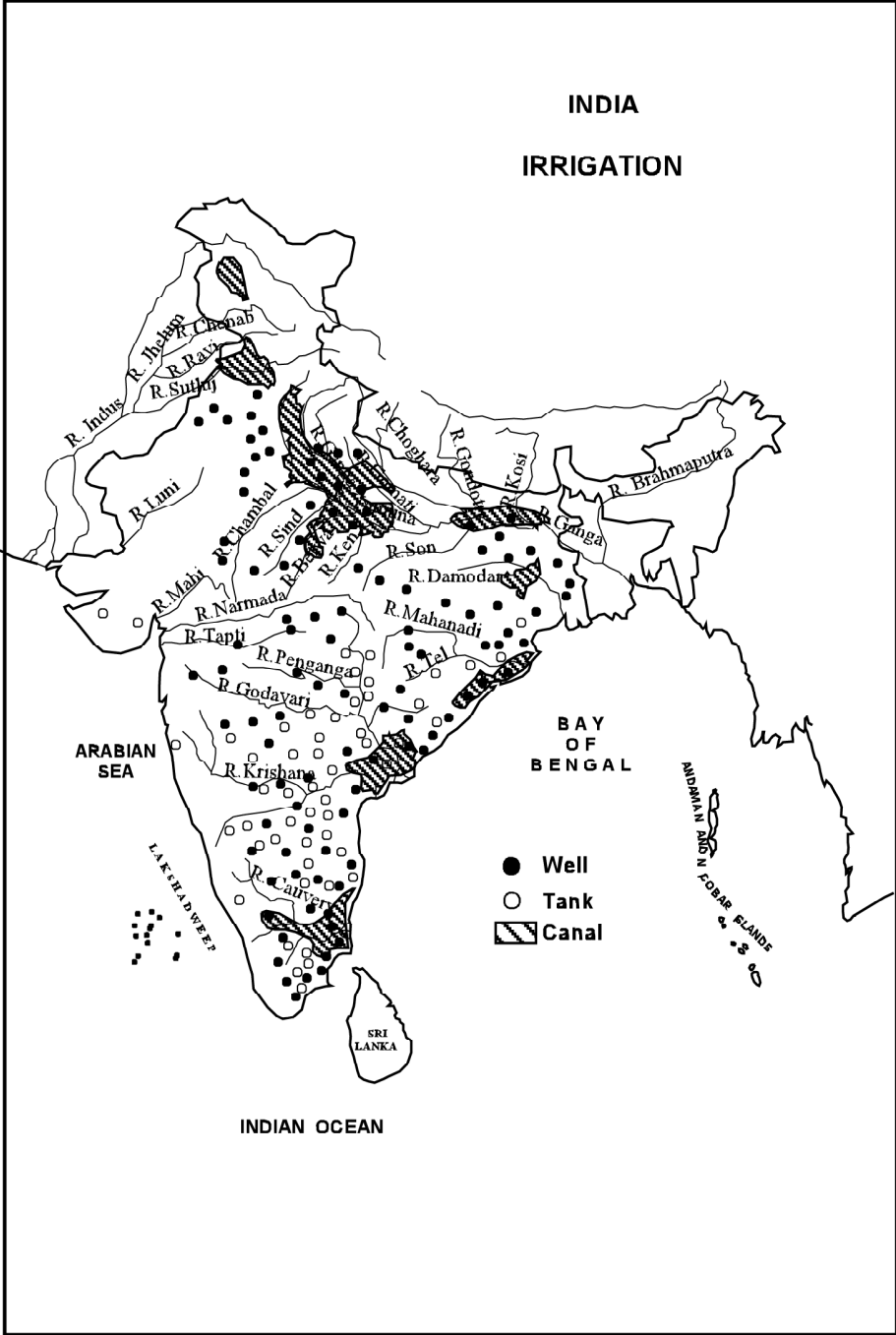
Water forms an important input in agricultural productivity. The prime source of water is rainfall. But rainfall in India is mostly confined to a few monsoon months in a year and there is great variations in its incidence from year to year. Moreover rainfall in a large part of the country is low and uncertain in its distribution. Even where it is high, the available soil moisture in the winter and summer months is not adequate to support multiple cropping. These vagaries of weather frequently give rise to ‘drought’ and ‘scarcity’. Therefore there is an increased need for providing assured supply of water through irrigation systems.

Role of irrigation

“Irrigation is the supply of water by artificial methods to cultivate lands where rainfall is inadequate”.

Irrigation has two roles to play in the agricultural development of our country.

1. The ‘protective’ role to minimize the moisture deficiency in soils during cropping season, so as to ensure proper and sustained growth of the crops.
2. ‘Additional land use’ role to enable second or third crop being raised on the lands which otherwise could not be cultivated efficiently during past or pre-monsoon period. Thus, irrigation gives an insurance against the vagaries of nature and helps to raise the productivity of land.



Development of irrigation has conferred immense advantages to the Indian agriculture.

1. helps to promote greater utilisation of land.
2. enlarge the average size of farm.
3. generate demand for additional farm labour.
4. bring a shift in crop pattern in favour of new and improved varieties of crops.
5. increase additional productive investments in farm business.
6. bring favourable input - output ratio.
7. widen the scope for increase in land revenue.

Sources of Irrigation

Depending on the availability of surface of ground water, types of relief, soils and the moisture requirement of crops, various types of irrigation are practised in India. More important among them are wells, canals and tanks.

1a. Well irrigation

Wells provide the most widely distributed source of irrigation in India. Wells make use of the underground water. Well irrigation, therefore is possible even in low rainfall areas, provided sufficient quantity of ground water is available. Well irrigation is also within the reach of small farmers. It accounts for about 40% of the total irrigated area in the country.

b. Tube well irrigation

Tube wells make a significant contribution to irrigation system. It is well suited to areas of small holding where the construction of wells rises a difficult finance problem. During drought seasons these wells give unabated supply of water to the fields. In Peninsular, India, farmers are used to get water from tube wells because, of feasibility to erect tubes in the rugged topography. In Ahdhra Pradesh, Tamil Nadu and Karntaka tube wells are commonly source of irrigation.

2. Canal irrigation

Canal is also an important source of irrigation. India has one of the world's largest canal systems stretching over more than one lakh km and serving more than 20 million hectares.

Canals are of two types

1. Inundation canals
2. Perennial canals

Canals taken out from rivers without any regulating system are called "Inundation canals". Punjab has got a large number of Inundation canals, drawing water from Sutlej river.

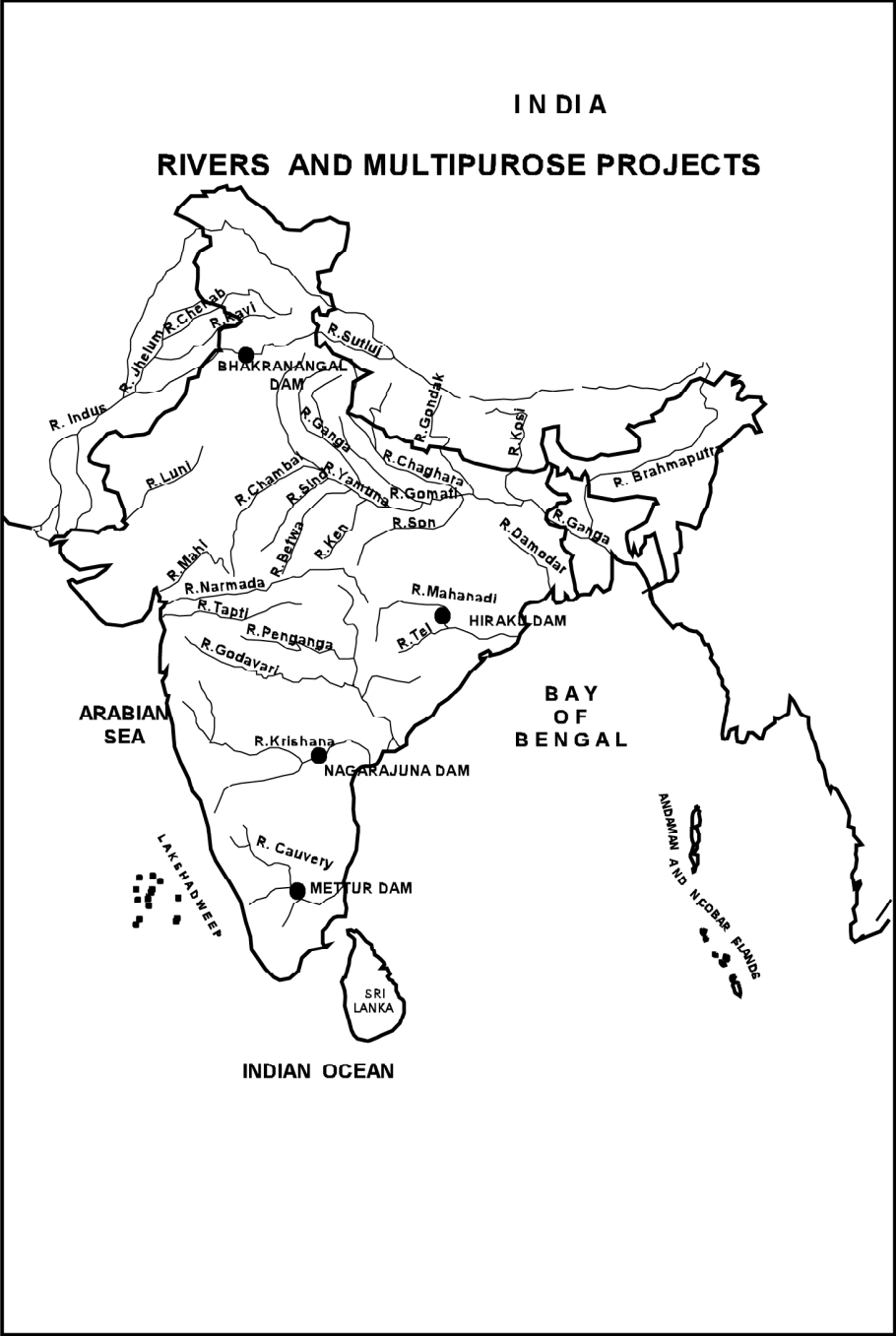
Perennial canals are taken off from perennial rivers or reservoirs with the weir system to regulate the flow of water, which is maintained throughout the year. These canals either take off from barrages on perennial rivers, the water being nearly diverted into them, on large dams. Reservoirs may be necessary, if the level and flow of water in the river is weak. These canals are found in Punjab, Haryana and Uttar Pradesh. Jamuna Canal, the Ganga Canal, Sirhind Canal are a few important perennial canals of these states.

3. Tank irrigation

Tank irrigation is a very old system of irrigation in India and is well suited for farmers of Peninsular India. The undulated topography of Peninsular region forms large depressions to collect water which becomes tanks. Since it involves a high rate of evaporation the tanks go dry very soon. Moreover it occupies large areas of fertile land. Most of the tank become shallow and the water spreads over a long area. Therefore wherever canal irrigation has been introduced, tanks are reclaimed for cultivation.

Based on Investments, the irrigation systems can be classified into two broad groups. They are

1. Minor irrigation
2. Medium and major irrigation



Minor irrigation system works with wells, tube wells, tanks etc. The main advantage is that they require small investment and can be completed within a short period to effect immediate agricultural productivity. If quick returns are required from investment on irrigation, minor irrigation works are more suitable for the Indian farmers.

Irrigation projects with a culturable command Area (CCA) between 2000 and 10000 hectares are classified as medium projects and those with CCA of more than 10000 hectares are as major projects.

Major irrigation system involves a huge investment and long period for completion but they have large irrigation capacity. This system offers a complete protection against famines and floods. Moreover these projects are multi purpose projects which are planned and executed by Government of India.

What is a multipurpose project?

A comprehensive river valley project which, serves a number of purposes simultaneously is called a '**Multi purpose project**'. Multi purpose projects serve the following purposes.

1. They help to store water, that can be utilised, when water is in greater demand both for agricultural and domestic purposes.
2. They check floods and famines.
3. Afforestation is undertaken in the catchment areas of river, which helps conservation of water, soil and wild life. Thus it keeps ecosystem intact.
4. Production of hydro electricity is also another purpose of these projects. It is a pollution free form of energy and is renewable energy.
5. Development of fisheries yield income.
6. They attract tourists and develops tourism industry.
7. Soil conservation and land reclamation are other purposes of these projects.

For all these above reasons multi purpose river valley projects are called the 'new temples of modern India'. We shall briefly learn about most important multi purpose projects of India.

Damodar valley project

Damodar valley project sets an example towards managing our water resources on scientific lines. Damodar though a small river, was called the 'river of sorrow' owing to devastating floods it caused. It flows from Chotanagpur in South Bihar to West Bengal. This project consists of series of small dams on the tributaries of Damodar. There are few hydel power stations at Tilaya, Konar, Maithon and Panchet. They have been integrated in a common grid for the growing industrial complexes around South East Bihar and West Bengal. It irrigates half-a-million hectares of land in parts of South Bihar and West Bengal.

The Bhakra - Nangal Project

India's biggest multipurpose river vally project is 'Bhakra Nangal Project' It has been built at a strategic point where two hills on either side of the Sutlej are very close to each other. It is the highest gravity dam in the world. Its height is 226 metres from the river bed. The canals taken out are 1100 kilometres long. The 'Nangal Power Plant' on the Sutlej produces electricity, and serves the states of Himachal Pradesh, Punjab, Haryana, Rajasthan and New Delhi. The distributaries are 3400 kilometres in length. It irrigates an area of 1.4 million hectares.

3. Indira Gandhi Project (Rajasthan Canal)

This project is an ambitious scheme to bring new areas under irrigation so that more areas could be cultivated. The waters of the River Beas and the Ravi are diverted to the River Sutlej. The 'Pong' Dam on the River Beas has been constructed to divert the Beas water into the Sutlej in a regulated manner. So that 'Rajasthan canal', the longest irrigation canal in the world, can irrigate Gandhi Nagar, Bikaner and Jaisalmer districts of North West Rajasthan. i.e., a part of Thar desert. The main canal, now called 'Indira Gandhi Canal' is 468 kilometres long runs entirely in Rajasthan. Waters of Sutlej, Beas and Ravi are

now being fully utilised for irrigating thirsty lands of South Western Parts of our country.

4. The Hirakud project

The Hirakud dam is the longest dam in the world, built across 'Mahanadhi' river in Orissa. Three canals across Mahanadhi delta supply water for irrigation. The project has greatly checked the disastrous floods, which occur lower Mahanadhi every year.

5. The Kosi project

The Kosi project in Bihar has been taken up in co-operation with Nepal. Its main aim is to control floods brought by the river Kosi in North Bihar. It has a capacity to irrigate 873000 hectares of land in Bihar. The chief aim of this project is to control floods. This project consists of three units

- i. a huge storage dam at Hanuman Nagar.
- ii. Flood embankments
- iii. Three Irrigation canals and a power house.

At Indo-Nepal border near Hanuman Nagar, dam was built with facilities of flood-control, Irrigation and provision of hydroelectricity.

6. The Nagarjunasagar project

The Nagarjunasagar project is built on the river Krishna in Andhra Pradesh. It irrigates 867000 hectares of land.

7. Projects of Tamil Nadu

- i) **The Cauvery delta canal system** : It is one of the oldest irrigation systems in India and belongs to the pre Christian era. It consists of the grand and upper anaicuts across the Cauvery River. These great system of canals covering the whole delta in the districts of Thiruchirapalli and Thanjavur. The total length of the canal exceeds 6000 km and 4 lakh hectares of land are irrigated.

- ii) **The Mettur dam** : The dam has been constructed across the Cauvery at Mettur to generate 200 MW of electricity and to irrigate about 4 lakh hectares of land in Salem and Coimbatore districts.
- iii) **The Lower Bhavani project** : The Bhavani river is one of the major tributaries of the Cauvery in Tamil Nadu. A dam has been constructed across the Bhavani in Coimbatore district. An area of more than 80,000 hectares of land in Coimbatore and Thiruchirappalli districts are irrigated by this project.
- iv) **The Periyar project** : The Periyar river has its source in the cardamom hills in Kerala and flows into the Arabian sea. A dam was built across the river near its source. Above the dam, the waters of the river form a great lake. On the eastern side of the hills a tunnel was cut through the hills to reach the waters of the lake. The water in the lake is taken through the tunnel to the Vaigai River which is the only drainage of importance in Madurai district and it is through the Vaigai River that the waters of Periyar are utilised for irrigation. ‘**The Pykara**’ scheme was developed in 1932 on the Pykara River in the Nilgris district and the power is transmitted to Coimbatore, Thiruchirapalli and Madurai etc. The Pykara, Mettur and Papanasam schemes have been interconnected to form an electric grid. Tamilnadu ranks first in rural electrification.

EVALUATION

I. Choose the best answer

1. The Nagarjunasagar Project is built on the river _____.
 a) Krishna b) Mahanadi c) Cauvery
2. The _____ is known as the sorrow of Bihar
 a) Krishna b) Damodar c) Kosi
3. The Periyar river has its source in the state of _____.
 a) Tamilnadu b) Karnataka c) Kerala
4. The _____ ranks first in the village electrification.
 a) Kerala b) Orissa c) Tamilnadu)

5. Waters of periyar are utilized for irrigation through the _____ river.
a) Vaigai b) Cauvery c) Krishna

II. Fill in the blanks

1. The prime source of water is _____
2. Well irrigation accounts for about _____ of the total irrigated area.
3. Canals taken out from reverse without regulating system are called _____.
4. River Damodar flows from _____ in South Bihar.
5. The _____ is the largest dam in the world.

III. Match the following

- | | |
|----------------------------|----------------------|
| 1. Punjab, Haryana | Peninsular India |
| 2. Tank irrigation | Indra Gandhi Project |
| 3. Bhakra – Nangal project | Hirakaud |
| 4. Mahanadi | Perennial canal |
| 5. Rajasthan | Sutlej |

IV. Distinguish between the following

1. Perennial canals and Inundation canals.
2. Well irrigation and Tube well irrigation.
3. Minor irrigation system and major irrigation system.
4. Tank irrigation is a very old system of irrigation in peninsular India.

V. Answer the following questions briefly

1. What are the different types of irrigation systems in India?
2. What is a multipurpose project?
3. Why a tank irrigation is more prevalent in South India than North India?
4. Write a note on periyar project?
5. Write any two advantages of irrigation in Indian Agriculture.
6. What are the two main roles of irrigation?
7. What are the two types of Canals?

VI. Answer the following questions in a paragraph

1. What is a multipurpose project and explain its purposes?
2. Write a brief account on Damodar Valley project?

3. What are the different sources of irrigation and explain the sources and its distribution?

VII. Answer the following questions in detail

1. What is multipurpose project? Explain Indira Gandhi Project and Bhakra-nagal Project.
2. Explain various types of irrigation.

VIII. Map the following in the given map of India

1. Damodar valley project.
2. Bhakra-nagal project
3. Hirakud project
4. Periyar project
5. Mettur dam project

Chapter 5

ENVIRONMENTAL ISSUES AND MANAGEMENT

Learning Objectives

To know the environmental issues.

To understand the need for conservation and management of water, soil, air, forests and wild life.

To know the types of disaster, disaster management and its mitigation.

Global concern for environmental issues and disaster is of recent origin. It is being increasingly realised that if environmental degradation continues unabated, the very survival of mankind will be at stake. Therefore a thorough understanding of our environment and its issues is necessary for participation in the protection and sustenance of the environment.

Man has lived for continuously in harmony with nature. Man's capacity to adjust with natural and man made environment and to transform environment itself has passed through various phases by scientific and technological revolution. It is human intervention in the natural process during last decades, which has created "Ecological imbalances" and "Environmental issues" of serious magnitude.

Environment

Environment is the surroundings of organisms in which they live and interact. It includes both natural and man made. Natural environment is found in the form of Biosphere.

Biosphere

Mother earth is unique in the planetary system, in providing necessary life support of resources such as sunlight, air, soil, water, etc. to enable life to

evolve and diversify. The life supporting resources of earth are confined to a band called “biosphere”. It is an efficient self regulating, integrated ecological mega system capable of capturing, converting, storing and utilising solar energy. Biosphere which includes Lithosphere (Land), Hydrosphere (Water) and Atmosphere (Air) gives life support to all living organisms. Biosphere consists of a large number of eco systems.

Ecosystems

“Communities of different species of plants, animals and microbes along with non living environment such as soil, air, water, etc. for a dynamic and self regulating integrated system is called ‘eco system’”. A lake, a pond, a grass land, a forest are examples of ecosystem. In an ecosystem living and non-living substances are constantly flowing in and out of the system and maintain the ‘ecological balance’.

All living organisms are inter-dependent but each contributes in its own way to the environment. Thus each and every organism is essential for maintenance of ‘ecological system’. We depend on the environment for our basic needs. Needs multiply with increase in population. To meet these needs, all natural resources in the environment are being used at a rapid rate. Perhaps most abused natural resources are forests which are converted into cultivable lands. As a result ‘ecological balance’ gets upset and it leads to long term adverse effects such as drought, floods, water crisis, pollution etc. These adverse effects become ‘**Environmental issues**’ of entire human beings. Unless urgent remedial steps are taken in appropriate time, continued damage to constituents of biosphere (land, air, water) which is the sole life support system, cannot be prevented.

Major environmental issues are as follows :

- Urbanisation
- Pollution
- Deforestation
- Green house effect and global warming
- Acid rain
- Ozone depletion

- Loss of bio-diversity
- Disaster

Urbanization

The natural increase of population in cities and migration of people from rural areas to cities in search of gainful employment and better amenities of life result in 'Urbanisation'. The adverse impacts of urbanisation on environment reflects mainly through deforestation leading to other ecological problems such as (1) pollution (2) proliferation of slums (3) energy crisis (4) health hazards, etc.

The adverse impact of urbanization on the ecosystem can be managed by (1) proper planning of the cities with adequate governmental programmes on housing (2) providing pollution control system (3) encouraging rural and small industries to check large scale migration from rural areas to the cities and (4) use of eco-friendly technology in all day today activities.

Pollution

It refers to the deterioration of environment in terms of quantity and quality. Pollution becomes an inseparable part of our population growth and use of energy and materials. Air, water and soil are essential for living organism. Every day tonnes of harmful wastes go into the air, water and soil. The wastes poison the environment. Pollution can be controlled to some extent by various methods. It can be done by avoiding direct disposal of household, industrial and other wastes into the sources of water like rivers, ponds, lakes and public places.

Water pollution

Without water all life ceases. Water is getting increasingly polluted. Water pollution may be defined as a natural or induced change in the quality of water which renders it injurious to human and animal life. Contaminated water can spread disease. For healthy life we have to drink only purified water. Water borne diseases like cholera, malaria and typhoid spread fast during the rainy season. Diseases causing germs spread through contaminated water.

How do we check water pollution and conserve water?

Let us have a view on it.

1. Drainage from residential areas can be collected in sewage pipes and taken to a 'sewage treatment plant'.

2. All the effluents of the factories should be treated first, before they are let to flow into the rivers and lakes.

3. To meet the enormous demand of water, the runoff water during rainy season should be stored in wells, lakes and dams. The government has also taken some programmes to conserve water through the programme of "**Rain Water Harvesting**". Instead of allowing the rainwater to drain into the sea, it should be allowed to seep into earth to store as ground water. The water that is stored in the rainy season may be used during other season. To get more water through rains we should grow more trees and conserve our forest resources.

Rainwater Harvesting

Techniques for keeping the rain water in reserves are termed as rain water harvesting. Rain water can be harvested in the following ways :

- By digging ponds and tanks
- By building embankments and check dams
- By making arrangements for storage of rain water on rooftops
- By constructing concrete underground reservoirs.
- By constructing reservoirs in parks and public places and covering them with concrete slabs
- Building plans should invariably be approved only when there is a provision of water harvesting.
- Adequate grounds should be left free to facilitate rain water percolate into the ground.
- Rural areas where open spaces are abundantly available should be encouraged to provide water harvesting facilities and provisions.

- Artificial rainmaking and desalination of sea water are used to overcome water scarcity.

Air pollution

Atmosphere is the life blanket of earth, the essential ingredient for all living things. Air constitutes about 80% of man's daily intake by weight. We breathe about 2,200 times a day inhaling around 16 kg of air. It is therefore essential that we know more about the atmosphere and the ways in which it is polluted.

Air pollution is a major environmental problem causing adverse effect on human beings and natural ecosystems. The major sources of air pollution are industries, automobiles and domestic fuels.

A list of air pollutants cover not only smoke, dust and other gases but also noise, heat or cold, fog, radio activity, excess radiation, etc.

Soil pollution

Soil is needed for crops, building houses, making utensils, toys and so on. Plants grow and depend on soil. Animals depend on plants. We depend on both animals and plants. Therefore, without soil, life on earth would not be possible. Losses from runoff due to flood, disposal of polythene materials application of fertilizers and pesticides are the causes for soil pollution. We can reduce the soil pollution by preventing the runoff from floods by water detention, minimising the application of fertilizers etc.

Deforestation

Increasing population growth has placed heavy demands on forest resources resulting in deforestation. The process of clearing the forests for cultivation, grazing, housing, timber, fuel etc. by mankind is called deforestation. It has seriously affected the quality of environment, by increasing temperature, erratic rainfall, top soil erosion (recurring floods) and loss of biodiversity. The two key ecological zones of India - the Himalayas and western ghats - are witnessing fast deforestation which results to delayed monsoons, floods and droughts, health hazards, etc.

Government has taken step to control the deforestation. They are as follows :

Our forest resources are to be used judiciously, so as to conserve the precious wild life and maintain the ecological balance. For this purpose government has passed 'Forest Protection Act,' 'Wildlife Protection Act', etc. To develop awareness among the children, 'Social Forestry Clubs' are formed in schools.

Green house effect and global warming

The presence of carbon-di-oxide, methane, CFCs, nitrous oxide, and ground level ozone gases in the atmosphere which surrounds the earth enables to form a '**green house**' for earth by retaining the heat that are radiating from earth.

Increase in carbon di oxide in the atmosphere is a major challenge, facing mankind today. CO₂ is a natural constituent in atmosphere. It is 0.032% by volume, having a ratio of 1:450 with oxygen. In spite of its relatively small proportion, CO₂ plays a very important role in the biosphere. On account of industrialization, fossil fuel consumption is growing. As a result CO₂ concentration in the atmosphere is steadily increasing. CO₂ absorbs heat radiations. It lets the sun rays to the earth but retains the heat radiation from the earth. Thus the '**global warming**' phenomenon exists.

Due to burning of fossil fuels and deforestation, the quantity of green house gases has grown by about 50%. The release of chloro fluoro carbon (CFC) from refrigerators into the atmosphere has also aggravated the green house effect. If the increase of green house gases continues, it is anticipated that global temperature will rise by 1.5°C to 4.5°C by the year 2030. This in turn, will lead to melting of polar ice caps which may result in rise of sea level, salt water intrusion into aquifers and submerge coastal wetlands. Economic productivity will be lost with rising sea level. The proposed location or expansion of ports, cities, agricultural activities, coastal developments, etc. should be reconsidered. Warmer climate will promote evaporation of water and increase cloudiness and rainfall. Tropical cyclones will become more

intensive and their ferocity will increase. Green house effect will sweep changes in the biosphere.

To manage this conditions, people may be encouraged to use less polluting fuels. Awareness programme to be conducted to all the people.

Acid rain

Acid rain is an increasing threat to India, where emission of acidic gases is sharply increasing. The term '**acid rain**' is used to describe all forms of precipitation, rain, snow, sleet, dew which is more acidic than normal. Acid rain is a man made phenomenon. Emission of sulphur di oxide and oxides of nitrogen and carbon di oxide are prime contributors to atmospheric acidification, as they readily dissolve in the atmosphere moisture forming sulphuric and nitric acids which make the rain acidic.

Acid rain often produces irreversible changes. It has corroding effect on the plant leaves and predisposes them to pests and insects. The soil become thus acidic, a condition which releases toxic heavy metal ions in the soil and promotes the loss of calcium, magnesium from the soil which are essential plant nutrients. The cumulative effect is the gradual decline in soil and forest productivity. In aquatic systems, the acidic rain raises the level of toxic heavy metals, resulting fish killings and reproductive failure. Acid rain contaminates surface waters by direct deposition of pollutants.

It is very essential that smoke precipitators should be used in every factory so that smoke is devoid of all solids like ash.

Ozone depletion

Earth is surrounded by atmosphere. In the atmosphere, between 15 to 50 kms above the earth's surface, there is a protective layer of ozone which protects the earth from harmful ultra violet rays of the sun. Ultra violet rays damages the genetic material DNA and is a main cause for skin cancer. Damage to ozone layer is fatal to all life on earth. The major threat to ozone layer is from CFCs (chloro fluoro carbons) which are the family of human made carbons. CFCs are being used extensively for refrigeration aerosols, foams

and solvents. Once the CFCs reach the stratosphere, the chlorine atoms of the CFCs do damage. The UV radiation in the stratosphere is strong enough to split the chlorine atoms of the CFC molecule. The free chlorine atom then attaches the ozone molecule, resulting in the splitting of an oxygen atom. Thus, results in the ozone (O_3) molecule being reduced to plain oxygen (O_2) and the chlorine atom joining with split of oxygen atom to form chlorine monoxide. It is estimated that a single chlorine atom can destroy upto 100,00 ozone molecule.

The vienna convention between various countries was signed in 1985 to protect ozone layer by limiting and phase out the use and manufacture of CFCs.

Loss of biodiversity

The wide variety of living organism including plants and animals and micro-organisms are collectively referred to '**Biodiversity**'. They provide the most vital underpinning for human sustenance and economic development. India is one of the 12 countries identified as mega-centres of biological diversity. India immense biological diversity which is estimated to be over 45,000 plant species represents about 7% of world's flora and 6.5% of world's fauna respectively.

Large scale deforestation, over exploitation of plants, animals, fishes and destruction of natural wild life habitats by the modern man has greatly accelerated the depletion of biodiversity. However 25% of earth's total biological diversity is at risk of extinction during next 20-30 years.

"Loss of biodiversity" is a process by which ecosystems species and genes become extinct "conservation of biodiversity" may be viewed as a long term insurance for human welfare.

Biosphere reserves are multipurpose protected areas to preserve the genetic diversity in representation eco-systems. Its main aims are (1) to conserve diversity and integrity of plants animals and micro-organisms (2) to promote research on ecological conservation and other environmental aspects and to provide facilities for education awareness and training. There are 12 Biosphere reserves. Nilgiri, Nandadevi, Manas, Sunderbans and Pachmarchi

are some examples. The National Wild Life Action Plan provides the framework of strategy as well as programme for conservation of wild life. 'ECOMARK' is a labelling for environment friendly household and other consumer goods which satisfy the requirements of Indian environmental standards for that product. The Bureau of Indian standards, Directorate of Marketing and Inspection is the implementing agency for this scheme. The main objectives are as follows :

1. To encourage citizens to purchase products which have less harmful environmental impacts.
2. To improve the quality of environment and to encourage the sustainable management of resources.
3. To provide an incentive for manufacturers and importers to reduce adverse environmental impact of products.

Disaster

Disaster has been defined by World Health Organisation as "Any occurrence that causes damage, ecological disruption, loss of human life, deterioration of health on a large scale, sufficient to warrant an extraordinary response from outside the affected community". For example flood is an event which causes heavy damage to the property and loss of life until it is checked or controlled by external agencies.

Disasters may be classified into two types. They are (1) Natural disasters (2) Manmade disasters.

Natural disasters

The disasters which are caused by natural forces are called 'natural disasters'. Earthquakes, volcanoes, landslides, avalanches, floods, cyclones, drought etc. are some of the natural disasters.

How do they occur?

A number of factors contribute to natural disasters. These can be traced to the process of evolution of earth and the impact of developmental activities on nature and environment.

Inside the earth, there is radiogenic heat that melt rocks. The molten rocks called 'magma' always tries to find its way to the surface of the earth. The dynamic force thus generated inside the earth is the basic driving force of natural disasters. On the surface of the earth, the solar radiation becomes the main force for disintegration of rocks through climatic factors that cause weathering, winds, atmospheric pressure, storms and rain fall etc. All these happenings continue for about billions of years on the earth. Human beings cannot stop these forces but can understand the happenings and can take measures to protect life from disasters.

Some of the dangers posed by these natural forces are :

- Earthquake
- Volcanic eruptions
- Tsunami
- Flood
- Drought
- Cyclone

These damages can take place anywhere at anytime in furious form and begin to destroy life and property.

Earthquake

The occurrence of earthquake in India is due to the drifting of the so called Indian plate. Scientists divide the globe into a number of major tectonic plates that drift very slowly. Whenever and wherever these plates slide against each other, a tremendous amount of energy is released and causes the terrific destruction. In the last decade the worst affected areas of earthquake in India are Latur in Maharashtra on 30th September 1993 and Kachch in Gujarat on 26th January 2001. Killing thousands of people and causing heavy damages to life and property. The recent earthquake of Maharashtra, Gujarat, Andaman Nicobar islands give us good estimate of the damage caused by natural disaster.

Some of the effects of earthquakes are :

1. Earthquakes disturb the land use by uprooting the building and causing heavy damage to life and property.
2. Due to tremors the electricity lines are cut thereby causing electricity, shock or fire.
3. Earthquake taking place at seismic zone of oceans give rise for high tides like the recent - Tsunami.
4. Earthquakes dismantles all infrastructure like roads, railway lines, runway and coastal areas.

To mitigate this disaster.

- Early warning system can help the people to evacuate to safer places.
- If a person stays at out door can move to an open area away from electrical poles and wires.
- Earthquake resistant buildings should be constructed.

Volcanic eruptions

Volcanic eruptions is caused due to sudden and violent outbreak of molten materials from inside the earth crust. Due to eruption the thick lava sheets cover the whole cities or towns. Loss of life and property can be avoided through effective warning systems and careful planning for mitigating the vulnerable group who are exposed to volcanic eruption.

Tsunami

A tsunami is a disastrous long wave, that is caused by a coastal earthquake or volcanic eruption. It travels across the ocean at a tremendous speed. To a depth of 4000 mtrs for instance, the corresponding wave speed is about 720 kms per hour. In open ocean the height of Tsunami may be more than one metre and thus pass unnoticed. The speed of tsunami is reduced when it approaches the continents where the height increases dramatically and causes enormous destruction of life and property.

Twenty sixth December, 2004 has witnessed a destructive Tsunami waves, which destroyed more life and property of the people of Indonesia, Sri Lanka and India. Over 8000 people were killed following a massive undersea earthquake of Sumatra. In Indonesia over 28000 were killed in Sri Lanka, and 4560 in Thailand as the quake triggered tidal waves lash the regions. Tamilnadu is also the most affected state in the world by Tsunami. Most of the coastal areas in Tamilnadu particularly Kanyakumari, Nagapattinam and Cuddalore districts were damaged greatly.

Tsunamis do not have a season and do not occur regularly or frequently. Yet they pose a major threat to the coastal populations all over the world. Nothing can be done to prevent them as it is nature, but adverse impact on the loss of property can be reduced with proper planning. Our country is taking necessary measures in fullfledged manner to fix a machine to identify the Tsunami before it occurs.

The vagaries of monsoon very often results in twin problems such as floods, and droughts. Let us have a look at them now.

Floods

Heavy rainfall in the catchments of rivers result in flood. Human intrusions into flood plains with habitations and mismanagement of watersheds of rivers add to the problem, Rapidly melting snow, failure of man-made dam, rock debris from a landslide may also release surge of water down stream. High tides and cyclonic storm winds cause flooding by driving sea water up stream from a river mouth. Let us know see the effect of flood.

- Floods have the most damaging effect on the crops and livestock.
- Equally damaging is its effect on houses and property.
- Floods result in shortage of basic needs of the people.
- Transport and communication links are damaged due to floods.
- People are exposed to many water borne diseases.

Now we shall look into the measures to control the flood.

- Embankment could be strengthened to check the floods.
- Appropriate warning helps the people to save the life and property of people.

- Administrative planning helps the people to evacuate to safer places.
- Supply of hygienic food and drinking water could be provided to the people who were affected due to floods.
- Social service organisation can be mobilised to lend a helping hand for rescue activities.

Drought

Deficiency of rainfall over certain period of time causes drought effects. It results in failure of crops and soil erosion, famine, shortage of water and energy. Due to drought agricultural labourers are thrown out of job resulting in unemployment. It results in rise in prices of commodities. Starvation deaths in human and animals are caused due to drought conditions. Main problems faced in the drought prone area is famine.

- To overcome the drought conditions the water harvesting structures could be constructed to conserve rain water.
- Small dams could be constructed to store water in sufficient quantities.
- Afforestation could be undertaken to conserve water.
- Drought resistant crops could be cultivated to withstand dry conditions.
- Farmers should be encouraged to join the seed crop insurance scheme which would enable them to overcome the severity of drought.

Cyclones

Cyclones are masses of air circulating spirally inwards from a high pressure area to a smaller calm area. A cyclone usually proceeds with high speed and travels as much as 400 km in 24 hours span. When it passes over the sea it churns and pulls up the water to maximum height. High wind speeds and rising mass of water can bring maximum damage.

- Cyclones cause great damage to life and property.
- Floods caused due to cyclone inundates the coastal areas.
- The crops are submerged in the flood water.
- It results in spread of epidemics.

To manage this disaster the following measures may be undertaken.

- Proper cyclone warning system could be installed to help the people from the risk of cyclone hazards.
- People who live near the coast should be protected against the damage caused by cyclones.
- Cyclone prone areas should be supplied with adequate facilities and basic needs.

Man made disaster

The disaster caused by man due to his negligence, ignorance and carelessness are called man-made disaster.

If nature is destroying one part of earth, it is renewing, in another part. But man is only a destructive agent and that too in very short time. These destructive man made disasters are generally associated with pollution, fires, drought, bad effects causes by wrong waste disposal methods, other civil strifes, etc.

Fire

Fire is a chemical reaction producing gas or vapour accompanied by heat. The energy released in the form of heat or light is very destructive while it combines with oxygen in air.

Fire can be caused due to negligence. The damage is great even when a spark of fire comes into contact with combustible substance or a short circuit caused by electricity. Forest fire bring out the total destruction of forests and the habitat of wild animals. Some of the bad effects of fire are

1. Loss of life and property of humans.
2. Injury and partial disablement.
3. Disturbance in the social set up of the victim.
4. Lose of confidence in the mines of victims may develop inferiority complex.

In order to manage this situations,

1. Provision of first aid for the victims of fire should be arranged.
2. Immediate evacuation of all people from that area is to be done.
3. Provision of psychological therapy to the vulnerable people must be done.
4. Every establishment and organisation should be provided with fire extinguisher and people must have the basic adequate knowledge of operating fire extinguisher.

Disaster management

The disaster management experts have focussed on ‘capacity building’ to mitigate the sufferings of the victims who are related to most environmental related disasters.

‘Mitigation’ means ‘making something less severe’. It is also considered as a powerful factor in preventing something from happening. Man can stop manmade disasters from happenings but the same is not true in natural disasters. For example, an epidemic disease, which kills the lives of hundreds of people could be prevented by immunising them against that disease. But what can one do if an earthquake strike unannounced? That is why there is a need to understand disaster management. Government has taken enormous steps to mitigate the disasters and educate the vulnerable people.

Conclusion

Concern for environment is not a new phenomenon but during the last few years, it has reached a much higher intensity and become widespread in our country. There was a conflict between environmental conservation and economic development. Now, there is growing realisation that if a country’s natural resources are not conserved and managed with care, its economic development will sooner or later be undermined. Thus, increasing reference is made to “sustainable development” defined by the Brundtland commission as “development that meets the needs of the present, without compromising the ability of future generations to meet their own needs”.

EVALUATION

I. Choose the best answer

1. The surroundings of organisms in which they live and interact is called
a) Environment b) Eco-system c) Lithosphere
2. The life supporting resources of earth are confined to a hand called
a) Lithosphere b) Atmosphere c) Biosphere
3. The process of clearing the forests by mankind is called as
a) afforestation b) deforestation c) cultivation
4. The process by which eco-system species and gene become extinct is
a) Loss of bio-diversity b) Deforestation c) Acid rain
5. A disastrous wave that is caused by submarine earthquake or valcanic eruption is
a) Wave b) Tsunami c) Flood

II. Fill in the blanks with suitable answers

1. Biosphere consists of a large number of_____.
2. Techniques used for keeping rainwater in reserves are termed as _____.
3. Atmosphere is the life blanket of _____.
4. A cyclone usually proceeds with _____ and travel as much as 400km in a 24 hours span speed.
5. The recent earth quake in _____ islands give us good estimate of damage caused by natural disaster.

III. Match the following

- | A | B |
|----------------------------|--------------------------|
| 1. Eco-system | Ozone depletion |
| 2. Tsunami | Seismic zone |
| 3. CFC | Environmental management |
| 4. Earthquake | Disaster waves |
| 5. Eco-friendly technology | Biosphere |

IV. Distinguish between the following

1. Green house effect and global warming.
2. Natural disaster and man made disaster.
3. Deforestation and afforestation.

V. Answer the following questions briefly

1. What is the necessity of understanding our environment and its issues?
2. Write any four of the adverse impacts of urbanisation on environment?
3. What are the two ecological zones of India?
4. What is called Biosphere?
5. Explain the types of disaster.

VI. Answer following questions in a paragraph

1. Mention the major environmental issues.
2. Mention the gases found in the atmosphere that enable the form of green house effect.
3. What does the term 'acid rain' mean?
4. Mention the adverse effects of acid rain.
5. What is pollution? Mention the types of pollution?

VII. Answer the following in detail

1. Urbanisation leads to pollution, deforestation, ozone depletion - Explain.
2. Mention some of the environmental issues and explain your role in managing the issues.

UNIT II

Chapter 6

AGRICULTURE

Learning Objectives

- To understand the importance of agriculture in Indian economy.
- To know about the factors affecting major crops and their distribution.
- To learn about the impact of Globalisation on Indian agriculture.

Nature has given us enormous resources which include land, fertile soil, climate, water, vegetation and minerals. We use these natural resources for satisfying our basic needs through agricultural activities.

The term ‘agriculture’ is derived from two Latin words. “Agra” and “Culture” which mean land cultivation. Thus agriculture is the act of land cultivation, animal husbandry, horticulture, etc. for the use of man kind.

India is primarily an agricultural country. Though science and technology has developed rapidly, agriculture remains as the backbone of Indian economy. It provides food for the entire population. It supplies raw materials to the agro based industries. It contributes to the export trade. More than 69% of the total population is engaged in agriculture and its allied activities.

Major determinants of agriculture

The major determinants of agriculture are land forms, climatic conditions soil, availability of water and density of population. Agricultural diversity is due to variation in all these determining factors.

Landforms

The major relief features are mountains, plateaus and plains. Among them, the plain with abundant alluvial soil determines the agricultural productivity. For example : North Indian Plain, coastal plains and deltaic plains of South India favour agriculture activity. Paddy and Wheat are the main crops cultivated in this region.

Climate

Topography of India favours monsoon type of climate. The seasonal rainfall contributes for the cultivation of crops in all seasons and the cropping pattern is rather decided by the amount of rainfall. Rice is grown wherever the rainfall is abundant and millets are grown in drier interior parts of India.

Human resource

The density of population in the plain regions contributes to the practice of agriculture for it involves. It requires more labour.

Agricultural patterns of India

Agricultural practices may be classified on the basis of availability of land, water, volume of production and market. In India the following types of farming are practised.

Subsistence agriculture

It is a type of agriculture in which crops grown are consumed by the farmer and his family members. They concentrate on cultivation of food crops only. Large scale improvement has been made in Indian agriculture after independence. The farmers intensively cultivate the available land with high input of fertilizers, manures, high yielding variety of seeds, farm machineries and irrigational facilities wherever possible, with the aim of obtaining maximum yield. So this type of agriculture is also known as the intensive subsistence agriculture. Normally this type of farming is practised in great alluvial plain and deltaic regions along the east coast. Mainly staple food of Indians is cultivated through this agriculture pattern. Rice is the staple food of South Indians whereas wheat is of North Indians.

Commercial agriculture

It is the type of farming in which crops are raised on a larger scale with the view of exporting them to other countries and earning money. Wheat,

cotton, sugar cane etc. are commercial crops. This type of farming is practised in Gujarat, Punjab, Haryana and Maharashtra.

Plantation agriculture

It is the practice of farming in which crops are cultivated on hundreds of hectares of land in a highly specialised form on the lines of factory organisation. Rubber, tea, coffee, etc. are plantation crops. This type of agriculture is developed in hilly areas of north eastern areas, West Bengal, Nilgiris, Anaimalai and Cardamom hills in Peninsular India.

Dry farming

This is practised in dry areas of the country such as Western, North Western and Central India. Moisture maintaining crops such as Gram and Peas are raised in this practice of farming. It mainly depends on irrigation.

Wet farming

It is a type of farming which mainly depends upon rains. It is prevalent in the north, North eastern, Eastern India and on the western slopes of the Western Ghats. Rice and Jute are grown in this type of farming.

Cropping patterns

The prudence of farmers decides the cropping patterns. Cropping patterns are the patterns in which agricultural crops are raised. The following cropping patterns are prevalent in India.

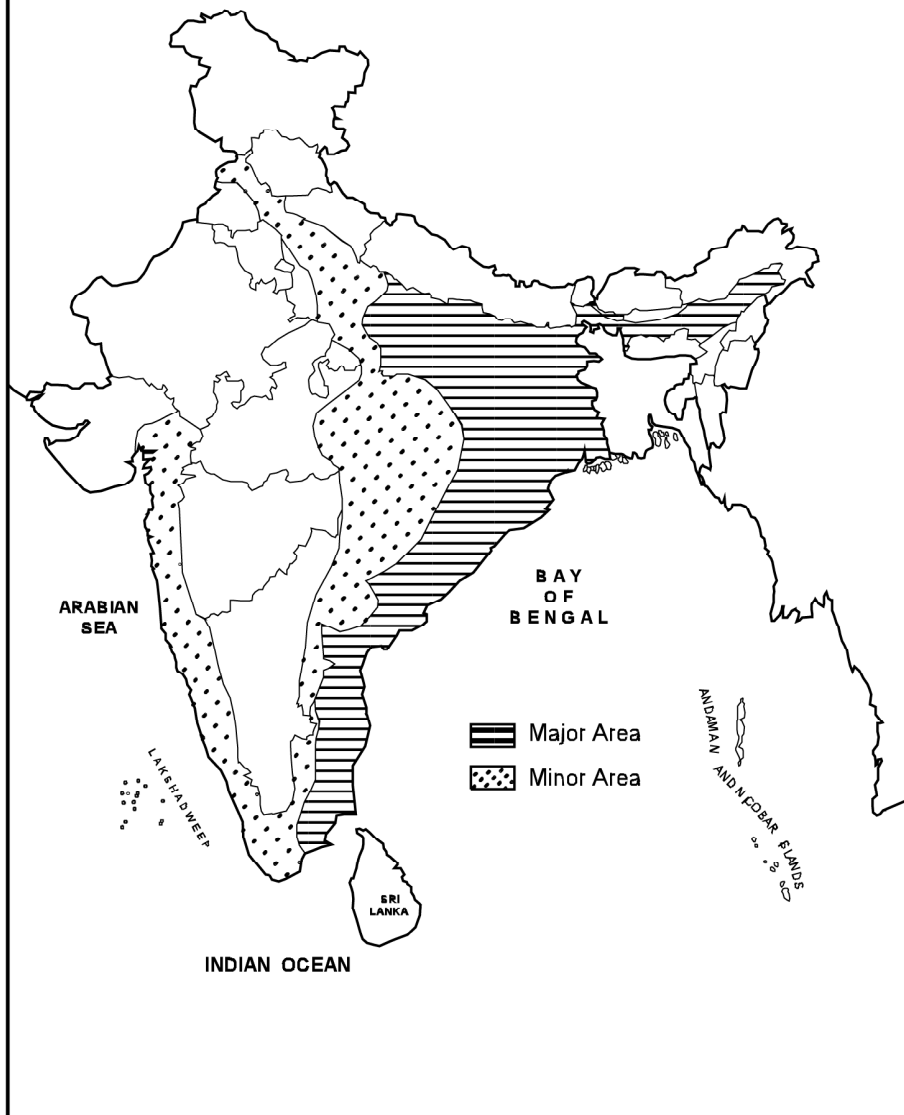
1. Unicropping pattern or Monoculture

In this method, only one crop is raised on an agricultural field at one time. (e.g.) Tea, coffee, sugarcane, etc.

2. Dual cropping (Double cropping)

Two crops are raised on a farm at a time. (e.g.) Wheat is cultivated along with mustard.

INDIA
PADDY CULTIVATION



3. Multiple cropping pattern

In multiple cropping, more than two crops are raised on a farm simultaneously. (e.g.) Barely - mustard - wheat; Jowar - Bajra - groundnut. Dual and multiple cropping is practised with a view that the soil nutrients are shared by the crops in turn.

Agricultural seasons of India

India has three major cropping seasons.

Kharif : The Kharif cropping season begins just before the monsoon and ends after the autumn (i.e.) from June to October. The important Kharif crops are rice, millet, cotton, jute and sugarcane.

Rabi : The Rabi season starts in the beginning of winter and ends in the beginning of summer (i.e) from November to May. Wheat, barely, gram and oil seeds are some important crops.

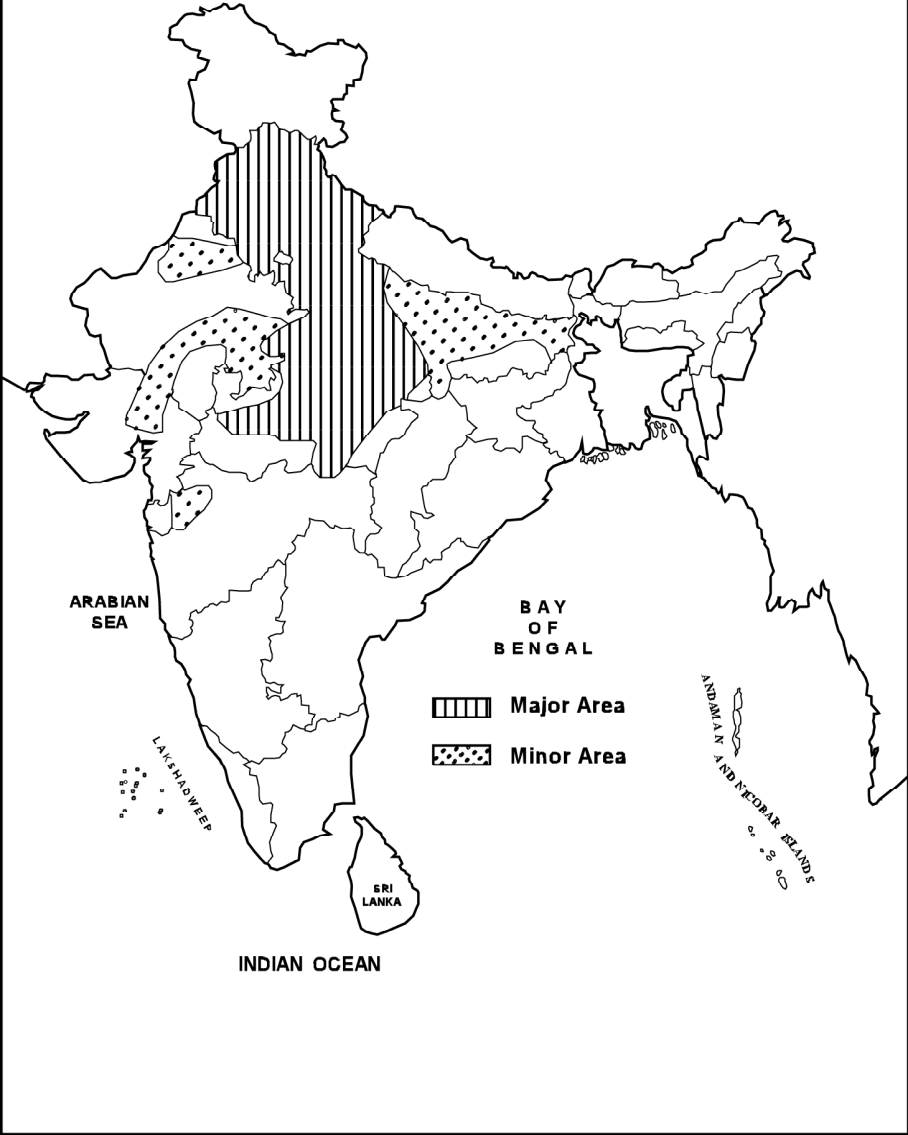
Zaid : The crops which require high temperature are grown with the help of irrigation. The farmers grow fruits and vegetables in the summer months of April, May and June. (e.g.) Watermelon, cucumber and vegetables are important zaid crops.

Regional pattern of major crops

Paddy

India is the second largest producer of rice in the world. It is a tropical crop which is grown well in alluvial plains and river deltas. It requires a mean monthly temperature of 24°C, average rainfall of 150 cm and deep fertile alluvial soil for its growth. In areas of less rainfall particularly in Punjab and Haryana, it is grown with the help of irrigation. The major rice lands are deltas, estuaries, flood plains and coastal plains. Cheap labour is required for sowing, weeding, harvesting and other processes. Drilling, dibbling and transplanting are the different methods of rice cultivation. Sugandh 5, Sukaradhan 1 are the hybrid variety seeds, recommended for the cultivation in the areas of Haryana, Delhi, Jammu and Kashmir and upland hills of Himachal Pradesh and Uttaranchal.

INDIA
WHEAT CULTIVATION



The rice producing states are West Bengal, Punjab, Uttarpradesh, Bihar and Orissa in North India and Tamil Nadu and Andhra Pradesh in South India. Most of the production is consumed locally due to dense population. Rice is cultivated two to three times a year intensively in the deltas of the Mahanadi, the Godavari, the Krishna and the Kaveri.

Wheat

Wheat is a temperate crop. Its cultivation is mainly confined to the north western part of India. India produces both winter wheat and spring wheat.

It requires 10°C at the time of sowing and 15°C to 20°C temperature at the time of ripening and an average rainfall of 50 to 60 cm. It can be cultivated with the help of irrigation in the areas of less than 20 cm of rainfall. Well drained clayey, loamy and black soils are ideal for its cultivation.

Uttar Pradesh, Punjab and Haryana are the major producers. Rajasthan, Madhyapradesh, Chattisgarh, Maharashtra, Gujarat and Andhra Pradesh are the other wheat producing states. The production of wheat has been increased in Punjab and Haryana due to the impact of Green revolution. (e.g., Suratgarh farm). The country is now in a position to export wheat.

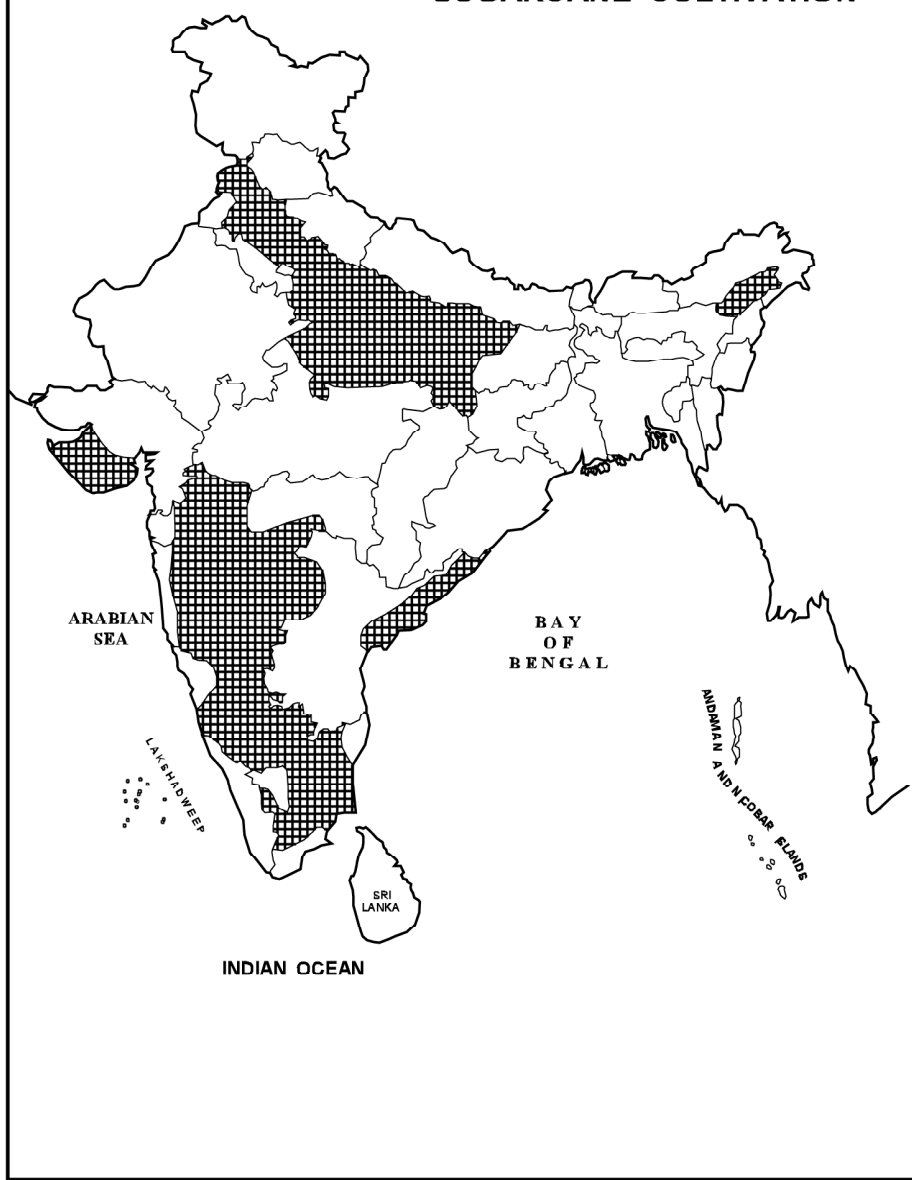
RAINBOW OF REVOLUTIONS

Title	Associated with the production of
Green revolution	Agricultural crops
White revolution	Milk and Milk Products
Grey revolution	Eggs and Poultry
Golden revolution	Horticulture
Yellow revolution	Oil Seeds
Blue revolution	Marine Products

Sugar Cane

It is a major cash crop. We make sugar and sweetening material from sugar cane. It grows well in hot and humid climate with the temperature of

INDIA
SUGARCANE CULTIVATION



21°C to 27°C and rainfall of 75 cm to 100 cm. Deep fertile alluvial soil is ideal for its growth.

There are two varieties of sugarcane such as tropical and sub tropical varieties. Tropical varieties of sugarcane are grown in Tamil Nadu, Karnataka, Andhra Pradesh and Maharashtra, whereas subtropical varieties are common in Uttarpradesh, Bihar, Haryana and Punjab.

Fibre Crops

Cotton and Jute are the two important fibre and cash crops of India.

Cotton

Cotton fibre is used in making cloth and its seeds give us edible oil. Commercially cotton is graded according to the length, fineness and strength of the staple cotton variety. Based on the length of fibre, cotton may be classified into long staple, medium staple and short staple cotton. Long staple cotton has great value in the world market.

Cotton grows well in areas having temperature ranging from 20°C to 30°C and rainfall from 50 to 100 cm. The black cotton soil of the Deccan plateau and alluvial soil of the Northern plains are best suited for cotton. It needs cheap and skilled labour at the time of plucking of cotton balls. The seeds are separated from the fibre by means of a process called “**ginning**”.

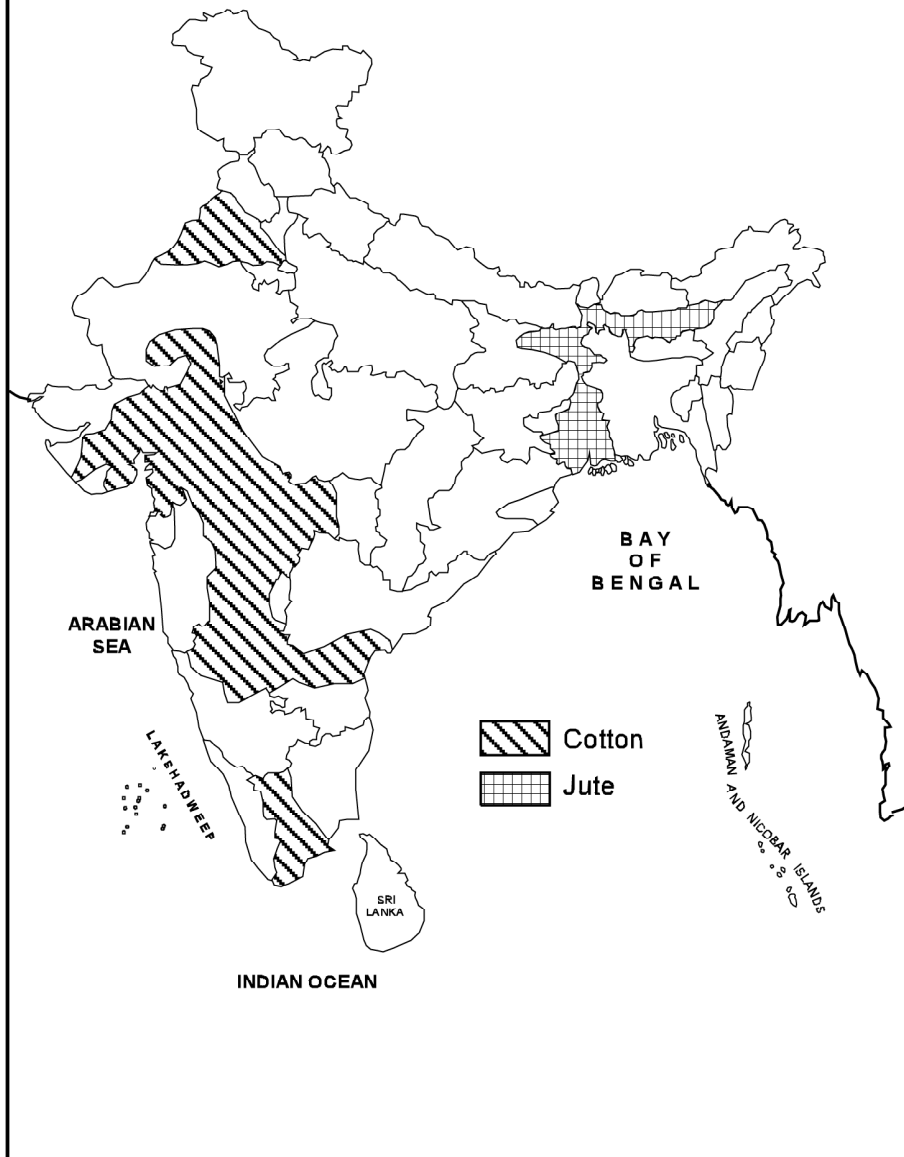
The main cotton producing states are Maharashtra, Gujarat, Tamil Nadu, Karnataka, Madhya Pradesh, Andhra Pradesh, Punjab, Haryana and some parts of Rajasthan.

Jute

Jute is called the “golden fibre of India” because India earns valuable foreign exchange by exporting Jute. Its fibre is used in manufacturing jute textiles and packing materials.

Jute requires a high temperature of 30°C and rainfall of more than 150 cm. Well drained fertile alluvial and loamy soils are ideal for cultivation of jute. Cheap and skilled labour is required to obtain the fibre by retting of the plant.

INDIA
COTTON AND JUTE CULTIVATION



`Retting` is a microbiological process, which loosens the outer bark and makes it easier to remove fibres from the stalk. Plant is dipped in stagnant water for 2-3 weeks in order to soften the outer bark.

West Bengal, Bihar, Assam, Orissa and Meghalaya are the major producers of jute.

Tea

Tea grows well in hot and humid climatic conditions. It requires 20°C to 30°C temperature and rainfall between 150 cm and 250 cm for its growth. Soil should be rich in humus and iron content and well drained. Gently sloping land is best suitable for tea cultivation. Pruning should be done regularly which requires cheap and skilled labour. Trimming of over grown branches of tea plant is known as pruning.

The main tea growing areas are hill slopes in the Brahmaputra and Surma Valleys in Assam and the hill slopes of western ghats. Wyanad in Kerala and Anaimalai and Nilgiri hills in Tamil Nadu are the tea producing areas in South India. Darjeeling tea of West Bengal is known for its quality.

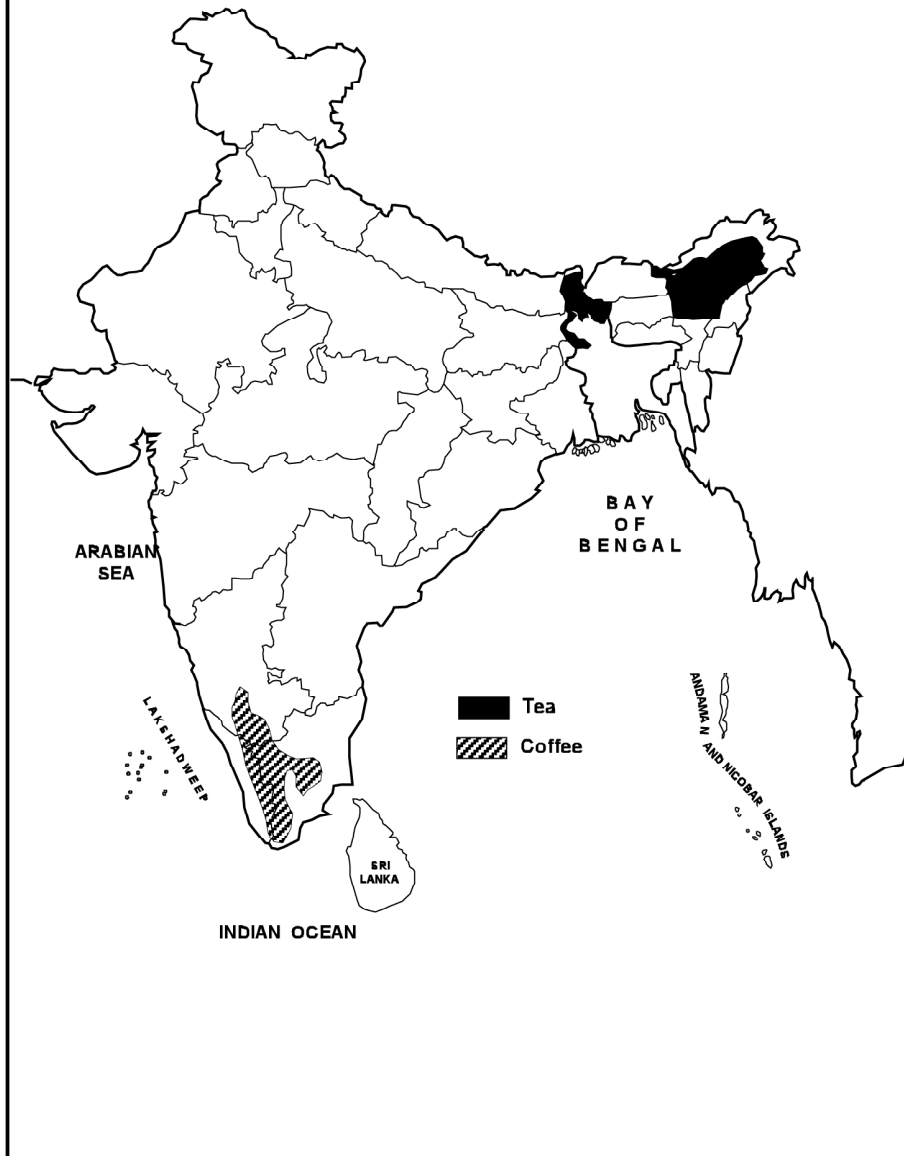
Coffee

Coffee is a beverage crop. Indian coffee is known for its quality. It has more demand in the international market. UK is the major importer of Indian Coffee.

It requires warm and humid conditions for its growth. Temperature between 15° and 28°C and rainfall between 150 and 200 cm are favourable for coffee cultivation. It grows well in the slope areas. In general, coffee bushes are planted under the shade of taller plants. Arabica and Robusta are two varieties of coffee grown in India. Arabica is the better variety grown in 60% of the coffee cultivation area.

Coffee cultivation is mainly confined to Karnataka, Tamil Nadu and Kerala. Chickmangalur district and Kodagu hills (Coorg) of Karnataka and Nilgiri hills of Tamil Nadu are the major areas of coffee cultivation. Wynad of North Malabar in Kerala also has many coffee estates. A coffee research centre is located at “Yercaud”.

INDIA
TEA AND COFFEE



Rubber

It is grown exclusively in Kerala at an altitude between 300 to 700 metres. It can grow in a variety of soils, even on poor laterites, provided if adequate fertilizers are applied. It requires well distributed heavy rainfall throughout the year (300 cm) with constant humidity and a temperature is more than 20°C. The entire produce is used extensively for manufacturing tyres.

Horticulture

Under horticulture, flowers, vegetables and fruits are cultivated intensively. A variety of tropical and temperate fruits and vegetables are grown side by side with other food crops.

Animal husbandry

It is the art of rearing animals for milk, skin, hide and horns and farm works. India has a farming ecosystem. Farming ecosystem means the inter relationship and inter dependence between the farm animals and farmers.

India is now the largest producer of milk in the world, which is largely due to White revolution. The main aim is to increase the milk production to meet the growing demand of milk in the country. Dairy Co-operatives have been set up in rural India for rural development. The best example of such a unit is the Anand Dairy Development Board in Gujarat.

Of late, poultry has started playing an important role both in the farmers' economy and the diet of the Indian people. Poultry farms have been set up all over the country. It looks into the production of eggs and poultry meat through increased availability of quality chicks and support facilities such as storage, marketing, balanced food, health care and other infra structural amenities.

Challenges in agriculture

Agriculture faces many challenges. Following are the reasons for low productivity in agriculture.

- The prosperity of Indian agriculture mainly depends on the success or failure of monsoons. This leads to uncertainty of crops from year to year both in terms of quality and quantity.

- The agricultural lands on inheritance get fragmented. It becomes uneconomical in hiring the agricultural equipments for sub-divided and fragmented lands.
- The over cropping in a land leads to the exhaustion of soils.
- Declining trend is seen in the productivity of the land.
- Exploitation of land with excessive use of fertilizers, pesticides and insecticides leads to land degradation.
- The land under cultivation of food grains has been declining due to construction of industries and residential buildings etc.
- There is inefficient water management.

Strategies to overcome the challenges

In order to overcome the above challenges the government and private organizations initiate research activities and focus on high yielding good quality crops.

Measures taken are as follows :

- The introduction of better inputs and new equipments help the farmers to get more output from a given piece of land.
- The government has set up agricultural demonstration farms. e.g. Suratgarh farms in Rajasthan. It demonstrates the potential of the new agricultural technology with the help of Indira Gandhi Canal where extensive irrigation facilities have been made.
- Steps have been taken to consolidate the small and fragmented holdings into larger holdings. Such consolidation of holdings is almost in process in Punjab, Harayana and Uttra Pradesh.
- Improved farm tools such as eight row self-propelled, pre-germinated, rice-seeder and vibration isolators for power tillers are designed and fabricated for the use of the farmers.
- Co-operative societies and development banks play a significant role in providing improved seeds to farmers on subsidised rates and on loan basis.

- In order to conserve the soil fertility, crop rotation and multiple cropping methods are adopted.
- `Crop rotation' is the process in which crops are grown alternatively. (e.g.) intensive crops like sugarcane are rotated with cereal crops. The selection of crops purely depends on the local soil conditions and expertise of the farmers.
- Multiple cropping means raising more than one crop in the same field during the same season. (e.g.) wheat, gram and mustard are grown in the same field. This method helps to reduce the crop failure.
- Government has opened `Agricultural Universities' and `Research institutes' which help to improve the knowledge of cultivation.
- Drip irrigation and sprinkler irrigation methods are used to conserve soil moisture and water.
- `Bio-fertilisers' are being used on large scale for increasing farm yields.
- Marketing facilities have been provided to them along with the maximum price of the commodities. Food Corporation of India (FCI) purchases especially cereals from farmers directly.
- `Crop Insurance scheme' has been started to help at the time of natural calamities like flood and drought.
- Besides all these measures, Indian Council of Agricultural Research Organisation (ICAR) is giving good support to the agricultural sector for the development. ICAR is one of the agricultural research organisations in the workers for improved method of farming.
- Agricultural Universities give accreditation to the quality education for the farmers. It supplies high variety of sapplings and seedlings to the farmers. It provides daily weather information on its website for timely planning of agricultural operations.

M.S.Swaminathan Research Foundation is providing information to the farmers in improved method of farming. It is doing many research work on sustainable agricultural and rural development. Dr. M.S.Swaminathan research foundation at chennai is providing information to the farmers to improve methods of farming. As per Dr. M.S.Swaminathan's views, agriculture should serve as an instrument of income, livelihood and opportunity to the local community. In order to get maximum benefit it requires some action plans to conserve agro biodiversity. Internet and GIS mapping are considered to be a tool of promoting revolution in agriculture.

The National Research Centre on plant Biotechnology was established in 1985 to under take research, teaching and training personnel in the modern areas of 'Molecular Biology and Biotechnology'. Biotechnology can be used as a tool in agriculture to modify the process of crop production genetically. **Biotechnology** is a science, which modifies biological processes. The National research centre on plant Biotechnology was established at Dehradun in 1985.

Indian agriculture is being called upon to meet new challenges posed by the development process. So it needs to be given a new scientific and technological base.

The two main considerations for the need for higher technology :

1. Reduction in the cost of production without sacrificing the yield.
2. Optimising the economic benefits from the available resources of land, water and labour through multiple cropping, mixed cropping, mixed farming etc.

The main aim of introducing the latest technology is (i) to make rainfed and dryland agriculture economically viable and sustainable (ii) to raise the income levels of the weaker sections of the farming community.

What are the benefits of adopting biotechnology in agriculture?

- Adopting Biotechnology is environmentally safe and sustainable.
- Cost of production of the farmers will be decreased.

- Water requirement for the crop is minimised.
- It makes crops more resistant to insects, pests and diseases.
- The yield of the crops per hectare can be increased.
- Farmers can get more income.

The impact of globalisation on Indian Agriculture

- Farmers have been exposed to the new agricultural environment.
- More inputs of capital and advanced technology has made the agricultural sector a vibrant one.
- Every effort is made to the efficiency of the human labour.
- Indian farmers get a steady national market.
- In order to withstand the Global competition India has to use its vast potential of agriculture by adopting modern technologies in farming.

At present we can say that India is in a comfortable position in food production. But in future India's population might increase to 1300 million approximately by the year 2020. At that time with efficient management of natural resources and by adopting modern technology in farming, food supply will be adequate to meet the increasing demand.

EVALUATION

I. Choose the best answer :

1. Block soils are ideal for the cultivation of _____
 a) Rice b) Jute c) Cotton
2. The major crop grown in the alluvial plains and delta is _____
 a) Wheat b) Rice c) Tea
3. The type of farming which is practiced in Punjab & Haryana is _____
 a) Subsistence farming b) Commercial farming c) Wet farming
4. The major importer of Indian coffee is _____
 a) UK b) Iran c) China
5. The staple food of south Indian is _____
 a) Rice b) Wheat c) Millets

II. Fill in the blanks

1. The two important fibre crops are _____ and _____.
2. The golden fibre of India is _____
3. Wheat is a _____ crop.
4. The _____ tea of West Bengal is known for its quality.
5. A coffee research centre is located at _____.

III Match the following

a) Crop	Largest producers
Coffee	Assam
Sugarcane	West Bengal
Wheat	Karnataka
Tea	Punjab
Jute	Uttar Pradesh
b) Terms	Crops
Ginning	Rice
Retting	Cotton
Pruning	Coffee
Sugandha 5	Tea
Arabica	Jute

IV. Distinguish between the following

1. Kharif crop and Rabi crop.
2. Unicropping and dual cropping.
3. Food crops and cash crops.
4. Subsistence and commercial farming.
5. Wet farming and Dry farming.
6. Crop rotation and multiple cropping.
7. Horticulture and animal husbandry.

V. Answer the following question in brief

1. Explain how land farms influence the pattern of agriculture.
2. Mention the various types of agricultural patterns of India.
3. Give a brief note on Agricultural seasons of India.
4. Explain multiple cropping pattern of cultivation.
5. What are the two main aims of introducing latest technology.
6. Write any two impacts of globalisation on Indian agriculture.

VI. Write the following question in a paragraph

1. What are the benefits of adopting bio technology in agriculture?
2. What are the impacts of globalisation on Indian agriculture?
3. List out any five challenges faced today in the field of agriculture?
4. Explain in brief on cropping patterns of India.
5. What are the agricultural patterns of India. Explain.

VII. Answer the following questions in detail

1. List out the strategies to overcome the challenges of Indian Agriculture.
2. Discuss about the regional pattern of major crops.

VII. Map the following in the given map of India

1. Shade the areas of paddy cultivation in peninsular India.
2. Shade the areas of cotton growing areas.
3. Shade the areas of jute cultivation.
4. Shade the areas of tea and coffee cultivation.

UNIT III

Chapter 7

INDUSTRIES

Learning Objectives

- To learn about the significance of industries.
- To know about the localisation of industries.
- To learn about the various types of industries.
- To understand the role of industries in Indian Economy.

The literal meaning of manufacturing is 'to make by hand'. But in the present day context, "The conversion of raw material into more useful and valuable fabricated articles with the help of machines is called Manufacturing". The basic principle of manufacturing industries is that, "the more a material is changed in its form, the greater will be its value and utility". For example the value and utility of iron ore increases only if it is converted into iron and steel. But it further increases in its value and utility when it is transformed into machines and tools.

History of Industrial development in India

The first step in the history of manufacturing was the early man's attempt to make tools from stones. India's handicrafts such as pottery, cotton textile, articles and wares made of bronze were famous through out the world. The Industrial Revolution of Europe brought about changes in the modern manufacturing industries.

In India modern cotton textile industry was started in Bombay (Mumbai) in 1854. The two major world wars encouraged industries like sugar, cement, chemical, iron and steel and also other consumer industries.

Launching of Five Year Plan gave new impetus and vigour to Indian industries. The new industrial policy was announced in 1991, according to which the government decided to do away with the industrial licencing for all

industries except 15 industries. This has led to phenomenal growth of industries in India.

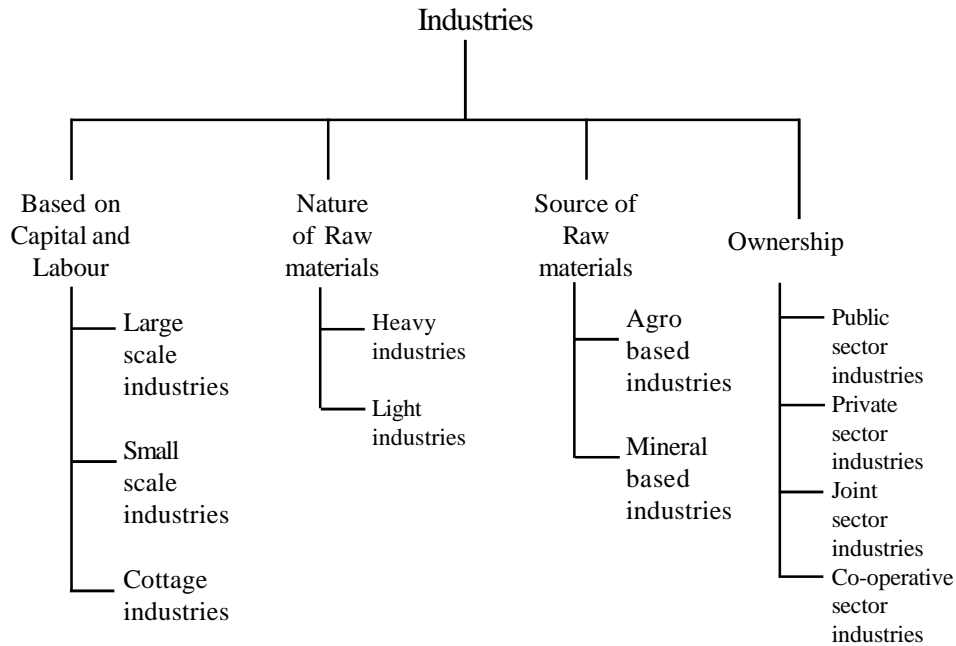
Localisation of industries

The location of industries in a country is determined by the following factors :

1. **Raw material** : Most of the industries are located near the source of raw material (eg) Iron and Steel industries are always located near the coal mines or iron ore mines. Sugar factories are located near the sugarcane producing areas to facilitate the quick transportation of raw material to sugar factories.
2. **Power** : Power is the basic necessity to run the machinery. Proximity to hydel power or thermal power stations attract more industries (e.g) Chemical and aluminium industries which consume large quantities of power are located near the source of power.
3. **Labour** : Light consumer goods industries and agro-based industries require a lot of manpower. Hence these industries are located in the regions which are densely populated with skilled and semi-skilled workers.
4. **Transport** : If the raw material and finished products are heavy and bulky, then the transportation cost is very high. The Heavy industries such as oil refineries are located near the source of transport like railway station or port.
5. **Market** : It is essential for quick disposal of manufactured goods. eg. Most industries and factories are located close to big cities where the number of customers determine the size of the market.
6. **Government Policies** : Government may provide added incentives and facilities like power, banking, transport or even tax concessions. The enthusiasm and interest shown by the governments in the southern states to attract software industry is an example. The government can play a vital role in the location of an industry. Besides these factors, the availability of water, favourable climate, capital, banking facilities, insurance etc. determine the location of industries.

Classification of Industries

Industries can be classified into several groups. The given table gives an understanding about them.



1. Agro based industries

Industries that require raw materials from agriculture are known as agro-based industries (eg) Cotton textile, sugar and vegetable oil industries.

2. Mineral based industries

Industries which depend on minerals for raw materials are called mineral-based industries (eg.) iron & steel, aluminium and cement industries.

3. Heavy industries

Industries, which use heavy and bulky raw materials and produce heavy and bulky products are called heavy industries. Iron and steel industry presents a good example.

4. Light Industries

Light industries manufacture light products. They are also called consumer goods industries. Light industries manufacture light products like electric fans and sewing machines. Since they manufactured consumer goods, they are also known as 'consumer good industries'.

5. Large Scale Industries

These industries involve huge investments and labour. They manufacture goods at large scale eg. Iron and steel, cotton textile industries.

6. Small Scale Industries

Industries which employ less number of people and require less investment are termed as small scale industries (eg)) Packaging industry, Ancillary industries.

7. Cottage Industries

Industries carried on wholly or primarily with the help of members of the family either as a whole or a part time occupation. This is a labour intensive, and traditional industry. (eg) Coir making, mat-weaving, bamboo works, pottery, carpentry etc.

8. Public Sector Industries

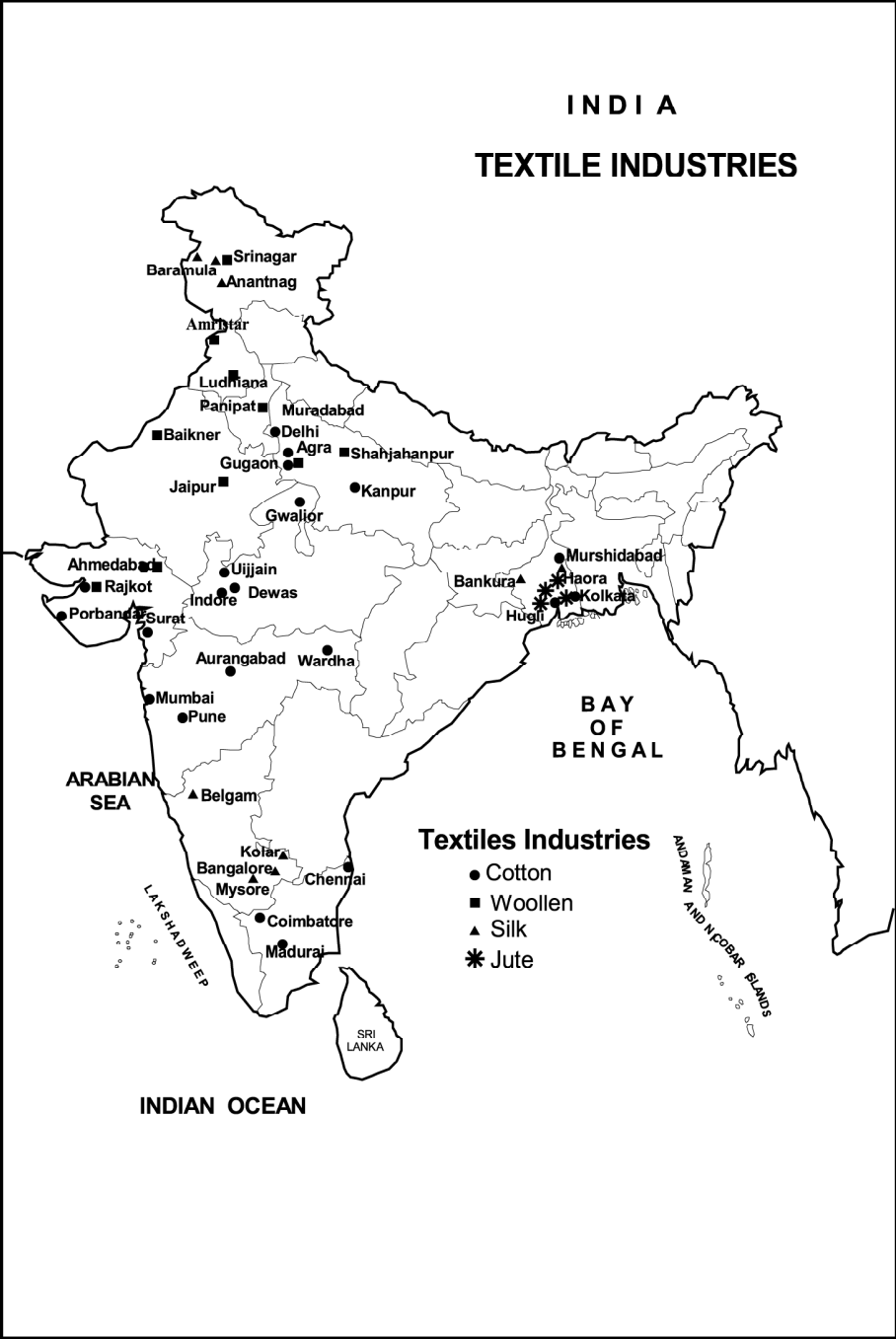
Industries which are owned and controlled by the government are public sector industries (eg) Hindustan Aeronautics Ltd., Hindustan Machine tools, BHEL, SAIL, NLC etc..

9. Private Sector Industries

Industries which are owned and controlled by private capitalists (eg) Bajaj Auto, TISCO, Reliance industries, etc.

10. Joint Sector Industries

Industries owned jointly by the Private firms and the state or its agencies such as Gujarat Alkalis Ltd. or Oil India Ltd.



11. Co-operative Sector Industries

Industries owned and run by a group of people who are generally producers of raw materials used in the industry, dairy industries owned and run by farmers are the co-operative sectors (eg) Sugar factories.

MAJOR INDUSTRIES IN INDIA

There are thousands of industries producing a large variety of goods. Some of them are major industries where more capital, raw materials, labour and finished products are involved. Let us learn a few of the Agro based and mineral based industries of India.

Agro Based Industries

Textile Industry

India is not only self sufficient in its textile requirements, but also exports textile fabrics and readymade garments. The textile industry plays a dominant role in the Indian economy. Its contribution is significant in industrial production, generation of employment and foreign exchange earnings.

Cotton Textile Mills

The first organized cotton textile mill was established in Calcutta (Kolkatta) in 1818. But a modern cotton textile mill was later established in Mumbai in 1854. The Swadeshi Movement which voiced against the import of British manufactured cloth, helped the growth of the textile manufacturing industry in India.

Over the years most of the mills were located in the states of Maharashtra and Gujarat due to the availability of cotton, humid climate, improved transport facilities and favourable market etc. Today these industries are decentralised and spread throughout the country. They are also concentrated in West Bengal, Uttar Pradesh, Madhya Pradesh and Tamil Nadu.

‘**Mumbai is called Manchester of India**’. It has 63 mills out of Maharashtra’s total of 122 mills. The main reasons are as follows :

1. The black cotton soil in the hinterland of Mumbai provides cotton as the basic raw material.
2. Mumbai is a part which helps in the import of machinery and long staple cotton for raw material.
3. It enjoys humid climate which is essential for the smooth spinning of threads. The thread tends to break if there is less humidity in the air. But these days artificial humidity is created with improved technologies.
4. Cheap labour can be drawn from the thickly populated areas of the surrounding provide cheap labour with a minimal wage.
5. There is a sizeable market for Mumbai products both in India and abroad.
6. There is no dearth of capital inputs as there are rich Parsi, Gujarati and Marwari capitalists. Mumbai, Sholapur, Pune, Kolhapur, Satara, Wardha and Nagpur are the centres of cotton textile industries in Maharashtra.

‘**Gujarat**’ is the second largest producer of cotton textiles. Ahmedabad is the main centre. Other centres are Vadodara, Surat, Porbandar, Bhavnagar, etc. Most of the textile mills in Ahmedabad produce cloth at a marginal rate which as an extensive market in india . Compared to Mumbai, land is cheaper in Ahmedabad. Availability of raw material, improved transport and communication facilities, hydel power, cheap and skilled labour are the other reasons for the development of textile industries in Ahmedabad.

Kolkatta, Howrah, Murshidabad, Hooghly are the important centres of textile mills in West Bengal. Kanpur, Varanasi, Agra, Bareilly, Aligarh, Muradabad are the textile centres of Uttarpradesh.

Amongst the southern states, Tamil Nadu is an important cotton textile producer. Coimbatore is the most important centre. Chennai, Madurai, Tirunelveli, Tiruchirapalli, Salem, etc. are the other centres.

Kanpur is called as - Manchester of Uttar Pradesh

Coimbatore is called as - Manchester of Tamil Nadu

Problems faced by cotton industries

The Indian cotton textile industry is facing numerous problems. These problems include scarcity of good quality cotton, fluctuations in the price of raw cotton, erratic power supply, old outdated machinery, low productivity, high cost of production and stiff competition.

Jute Industry

The jute industry is concerned mainly with the production of gunny bags or sacks, gunny cloth, coarse carpets, rugs, waterproof covers, tarpaulins and canvas.

The first jute mill in India was established at '**Rishra**' near **Kolkata** in 1855 by the English men George Aukland. Before 1947 India enjoyed a monopoly in the production of raw jute as well as manufactured jute. In 1947, the country was partitioned and jute mills remained in India where as the major jute growing areas were partitioned to Bangladesh (East Pakistan). At present the country has self sufficiency in the production of raw Jute.

Most of the Jute mills of India are centralised in '**Hooghly Basin**' of the West Bengal. Let us study about the factors responsible for the concentration of Jute Industry in Hooghly Basin region.

- Ganga, Brahmaputra delta regions grow about 90% of India's Jute and provides raw material to jute mills.
- Coal for power is obtained from Raniganj coalfields.
- Hooghly River provides cheap water transport and soft water for washing, processing, retting and dyeing jute.
- Humid climate is favourable for spinning and weaving.
- Cheap labour is available from West Bengal, Bihar and Uttra Pradesh.
- Conducive port facility of Kolkata for export and import at Kolkata.

In addition to West Bengal, Jute mills are also located in Andhra Pradesh, Uttar Pradesh, Bihar, Madhya Pradesh and Orissa.

India exports jute products to Australia, U.K., Thailand, U.S.A., Canada, Argentina, East Africa, Newzealand and Indonesia.

Problems faced by Indian Jute industries are:

- Production of jute is insufficient in spite of our efforts.
- The demand for jute products is gradually decreasing in the international market.
- Tough competition with synthetic packing materials.
- In India the input cost is quite high.

Steps taken by our government to improve the jute production.

- The National Jute Manufacturing Corporation has undertaken the modernisation of jute fibre.
- A research programme has been started to find out the new uses of the jute fibre.
- Stabilisation of the price of raw jute at the remuneration levels to enhance the international trade.
- Steps were taken to bring more lands for jute cultivation.
- Steps were taken to improve the quality of goods at reduced cost to develop new products.
- Long term policies are formulated by the Government for the promotion of Jute products.
- Development of new hybrid varieties of jute seeds.
- Mechanisation introduced to lessen the labour problems.
- Educating the farmers on the scientific way of retting even with stagnant water to increase the quality of fibre.

Woollen Textile Industry

The modern woollen textile industry was first started in Kanpur in 1876 which was followed by Dhariwal in Punjab in 1881, Mumbai in 1882 and Bangalore in 1886. The industry concentrated mainly in Punjab, Hariyana,

Maharashtra, Uttar Pradesh, Gujarat, Karnataka, West Bengal, Tamil Nadu and Jammu and Kashmir. Kashmir woollen products are prepared from the fine quality wool. There are more than 10,000 hosiery units manufacturing a variety of products like, sweaters, pullovers, shawls, caps, socks, gloves, mufflers, etc.

Silk Industry

India is one of the large producer of raw silk.

'**Sericulture**' is the process of rearing silkworm

The chief silk weaving centres are Srinagar, Amritsar, Murshidabad, Varanasi, Pune, Mysore, Bangalore, Salem, Arani and Kanchipuram, Karnataka is famous for silkworm rearing.

India exports exclusively silk fabrics like scarves, dress-materials and sarees. The principal buyers of Indian silk are West Germany, Singapore, USA, UK, Russia, Saudi Arabia and Kuwait.

Sugar Industry

The Sugar Industry is the raw material oriented industry and located in the midst of sugarcane producing area. India is the fourth major sugar producing country in the world. The first three countries are Russia, Brazil and Cuba. Sugar industry employs more than 3.25 lakh workers, besides creating extensive indirect employment and income for 25 million cultivators of sugarcane. It is also an important source of excise duty for the central government.

Uttarpradesh, Bihar, Maharashtra and Tamil Nadu are the major producers of sugar cane. The major areas of sugar industry are found in the states of Uttar Pradesh, Bihar, Haryana and Punjab in North India and Maharashtra, Karnataka, Tamil Nadu and Andhra Pradesh of the southern India.

Jaggery, Kandasari and crystal sugar are the three products of the sugar industry. Bagasse and Molasses are the main by products of sugar industry.

The crushed cane or Bagasses is used for the manufacture of paper, pulp, cardboard and the fuel. Molasses is a thick dark syrup got from raw sugar and is used in the manufacture of industrial alcohol. It is also helpful in the development of subsidiary and byproduct industries like fruit canning, confectionary, pharmaceutical and manufacturing of insulation board etc.

Inspite of non perennial rivers, sugar industry is well developed in the southern states for the following reasons.

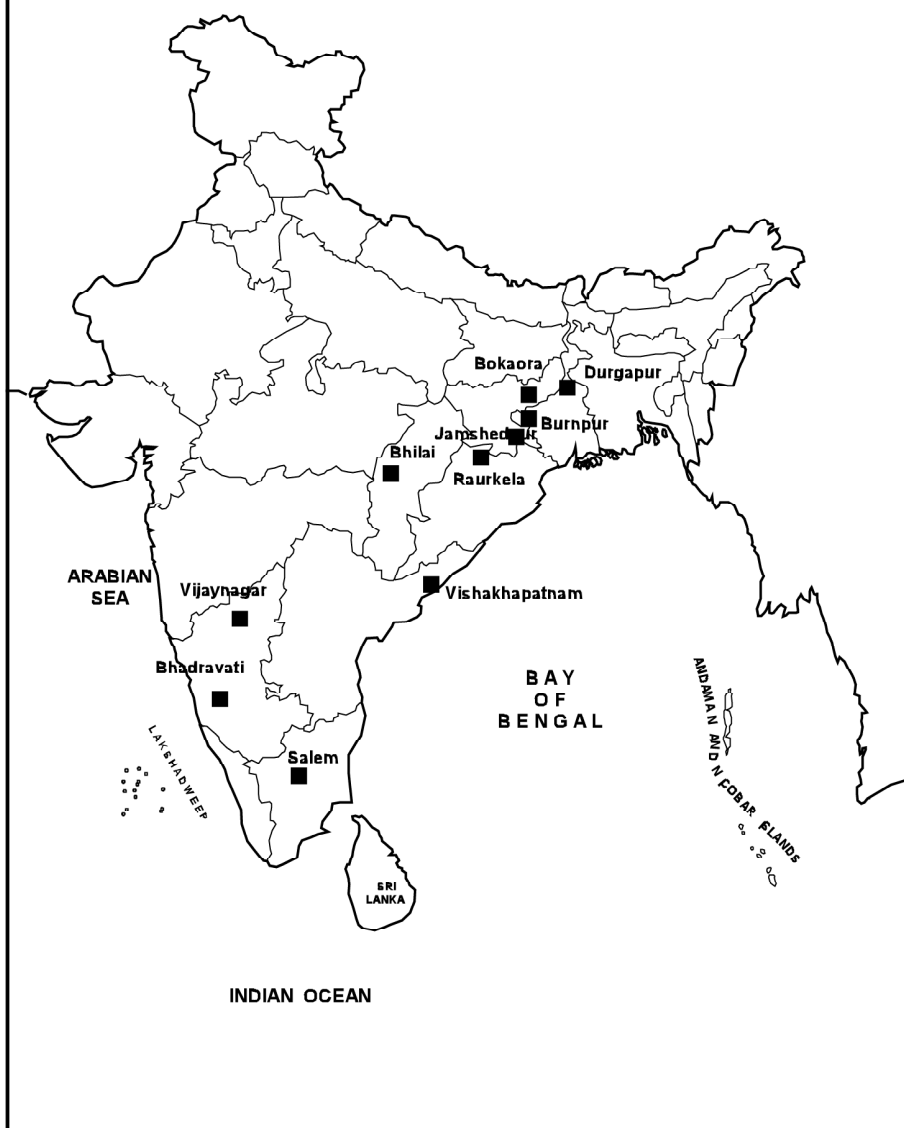
- Peninsular India has tropical climate, which helps, in higher yield per acre as compared to Northern India.
- The sucrose content is also higher in tropical variety of sugarcane in the south.
- The crushing season is much longer in the South than in the North.
- Excellent system of transport.
- Availability of modern sophisticated technology is used.
- The co-operative sugar mills are better managed in the south than in the north.

Low yields of sugarcane, short crushing season, high cost of production, old and obsolete machinery, under utilisation of by products are some of the burning problems of sugar industry.

The Commission for Agricultural Cost and Price recommends certain measures for improved productivity.

1. Incentives and liberal loans are made available for sugarcane growers and wide use of drip irrigation.
2. Research and development programmes are encouraged both in private and public sector for better production of sugar and sugarcane.
3. To capture international market the reduction in the cost of production of sugar has been recommended.

INDIA
IRON & STEEL INDUSTRIES



Mineral based industries in India

Iron and Steel Industry

Iron and steel industry is a key or basic industry and lays the foundation for other industries. These industries form the economic backbone of a country.

At present there are 10 primary integrated plants. Besides these large number of decentralised secondary units known as mini steel plants are also functioning in India.

Tata Iron and Steel company is the oldest and the largest iron and steel centre of India. It was established in 1907 by Sir Jamshedji Tata at Sakchi and Singhbhum district of Jharkhand. This industry started producing steel since 1912.

The three plants set up at Kulti, Hirpur and Burnpur in West Bengal were later merged together and known as Indian Iron and Steel Company. The other public sector plants are located at Bhadravati, in Karnataka, Burnpur in West Bengal, Rourkela in Orissa, Bhilai in Chhatisgarh, Durgapur in West Bengal and Bokaro in Jharkhand. Most of the private sector companies have been reoriented into public sector units and various NRI schemes have been introduced for the development of Indian Industries.

The map over leaf shows you the concentration of iron and steel industries, you can see that most of the iron and steel plants are located in Chota Nagpur plateau. The following factors are responsible for the localization of iron and steel industries.

1. Raw Materials

Availability of high grade haematite iron ore in '**Noamundi**' mines of '**Singhbhum**' in Jharkhand and '**Gurumahisi**' mines of Mayurbhanj in Orissa. Coal is an essential mineral of iron and steel industries which is obtained from Jharia and Raniganj mines. Besides these the other raw materials Dolomite, limestone and fineclay are also available in Orissa.

2. Labour

Skilled and Cheap labourers are available in Bihar and Orissa.

3. Power

Damodar valley project provides cheap and abundant hydroelectricity.

4. Transport

All the major cities are well connected with other big cities by both roads and railways. Export and import is carried on through the port of Kolkatta.

The diversification plan adopted by the Ministry of Mines tried to decentralise the iron and steel plants from Chotanagpur region. The Government has set up new steel plant at Salem in Tamilnadu, at Vijaymagan in Karnataka and at Vishakapatnam in Andhra Pradesh. Recently the government of India is taking concerted efforts to improve the efficiency of public sector industries.

Vishakapatnam steel plant is the first short based integrated steel plant in the country. It is a major export oriented steel plant. It has an expansion programme of producing liquid steel and mild steel.

Salem steel plant started its commercial production since 1982. It is a major producer of world-class stainless steel, which is to export to USA, Mexico, Australia and some other countries of South East Asia.

The steel plant gets its iron ore from '**Kanchamalai hills**'. Mettur dam provides necessary power. Skilled and unskilled labour is drawn from the neighbouring areas.

Mini steel plant

Mini steel plants are decentralized secondary units, which produce steel by using steel scrap as raw material.

Most of the mini steel plants are located in areas far away from the integrated steel plants, so that they could meet the local demands. They help

in recycling of iron and making the scrap useful and profitable. They suit the Indian economy because they require less investment. As these units are smaller in size, they can be conveniently located in industrial towns.

Automobile Industry

The Growth of Automobile industry in India is only after the independence. The first automobile industry was established at the Premier Automobiles Ltd. at Kurla (Mumbai) in 1947 and the Hindustan Motors Ltd. at Uttarpara (Kolkata) in 1948. The manufacture of various automobile parts has progressed very fast in India. A new life has been given to this industry with the manufacturing of various automobile parts.

Among the production of two-wheelers, Motor Cycles are manufactured at Faridabad, Haryana and Mysore. While Scooters are manufactured at Lucknow, Satara, Akudi (Pune), Panki (Kanpur) and Odhav (Ahmedabad). The cars produced at Haryana, Kolkata, Mumbai and Chennai are Maruti, Ambassador, Fiat, Ford and Hyundai etc.

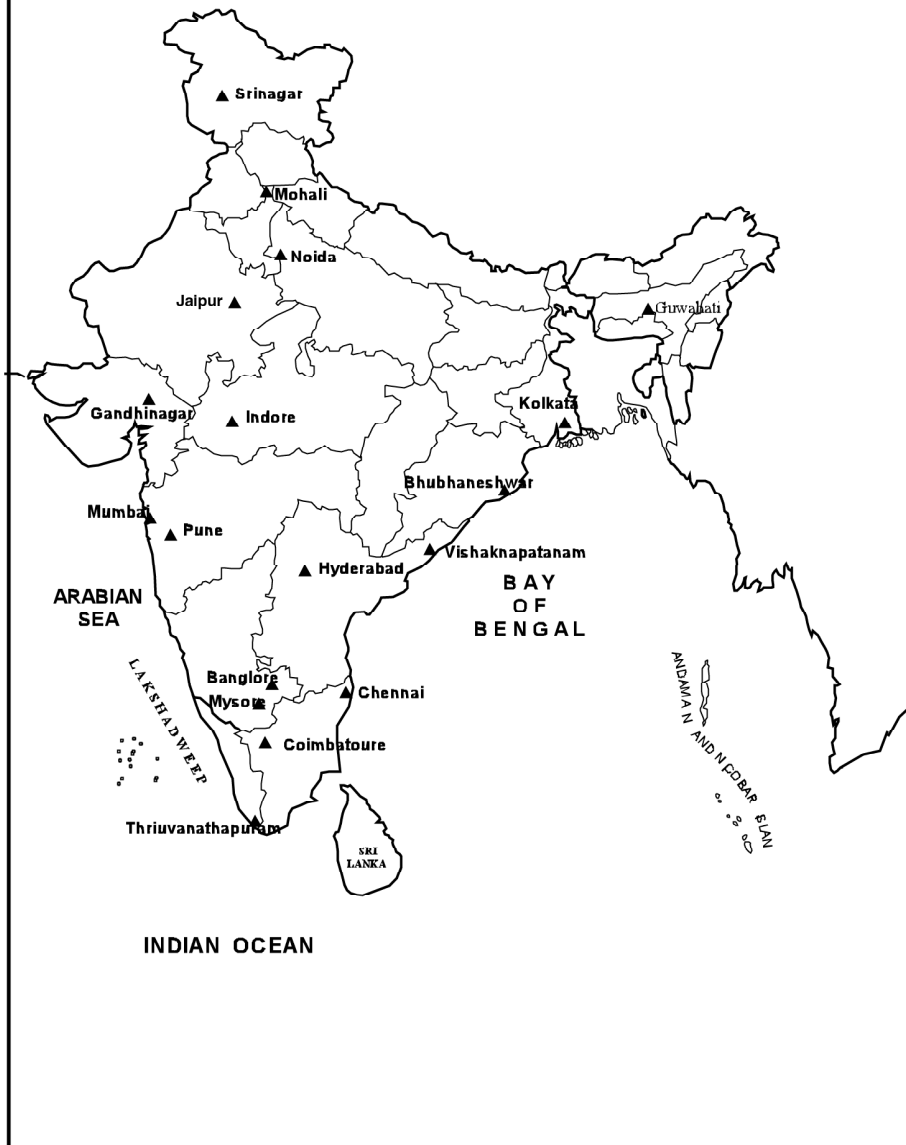
Several new joint venture agreements for the manufacture of cars have recently been signed by the Indian companies and renowned car manufacturers of the world. The Indian auto industry is set to take a big leap in the near future. This is expected to provide much more competitive environment to the industry and a wide choice of ultramodern cars to the consumers. This is the fast growing industry of India.

Electronics Industry

India has made remarkable progress in electronic and computer technology since 1996. **'Bangalore'** is known as the Electronic Capital of India as it is the leading centre for the production of electronic goods. The other centres are Hyderabad, Delhi, Mumbai, Chennai, Kolkata, Kanpur, Pune, Lucknow, Jaipur, Coimbatore, etc. India can now boast as the leading exporter of electronic goods.

The revolution in electronics industry has changes the life style of the peple to a greater extent. It covers a wide range of products including

INDIA
SOFTWARE TECHNOLOGY PARKS



television, transistor, telephone, cellular phones, computers and varied equipments for posts and telegraph, defence, railway and meteorological departments.

Software industry

The Indian software industry truly symbolizes India's strength in the knowledge based economy. Highly skilled human resources coupled with world class quality have transformed India into a global powerhouse in the Information Technology (IT) software services and solutions sectors. Software and services exports are expected to account for more than 50 per cent of the turn over of the IT industry.

India has a large base of English speaking, skilled man power resource with experience on state-of-the-art hardware and software platforms. India currently exports software to around 95 countries around the globe. The growth of India as a software hub has also been facilitated by the initiatives taken by the Union and State Governments. Many State Governments have set up Hi-Tech and implemented e-governance projects. Many global software major have set-up operations in India. They include Microsoft, Oracle, Adobe, etc.

Besides Special Economic Zones (SEZs) and Export Promotion Zones (EPZs), the government is encouraging the setting up of Software Technology Parks (STPs). Foreign companies can set-up operations in these zones either through incorporation of the company as per the Indian Companies Act, through a joint venture with an Indian company or through a wholly owned subsidiary.

Contribution of industries to National economy

The level of the development of manufacturing industries decides the strength of a country's economy. Since independence, India has adopted the policy of rapid and broad-based industrial development as the most important element of its growth, strategy and development.

In the present day world of territorial specialization, our industries need more efficiency and competitive spirit. Our quality of goods must be on par

with those of the other countries in the international market. Failing to achieve this will not fetch foreign exchange and increase our national wealth. Therefore the success of Indian industries depends on their ability to innovate and improve the quality of the products and services to attract global customers.

Today India's information technology industry is in a strong position to make India as a self-sufficient country with the high industrial growth. Each nation maintains the quality of their goods to capture global market and thereby earn profitable foreign exchange. The 'quality' is key factor for economic growth and prosperity of a nation.

EVALUATION

I. Choose the best answer

1. Industries which use heavy and bulky raw materials and produce heavy and bulky products are called _____
a) a public sector b) small scale c) heavy industries
2. Manchester of Tamilnadu is _____
a) Coimbatore b) Cochin c) Tuticorin
3. Reliance industries is an example for _____
a) Public b) Private c) Joint sector industries)
4. The second largest producer of cotton textiles is _____
a) Tamilnadu b) Andhra Pradesh c) Gujarat)

II. Fill in the blanks

1. Industries owned and controlled by the government are _____.
2. Electric fans and sewing machines are manufactured in _____ industries.
3. The first organized cotton textile mill was established in _____
4. The first jute mill in India was established at _____ near Kolkata.
5. Kanpur is called the _____.
6. The by products of the sugar industry are _____ and _____.
7. Most of the jute mills of India are centralized in _____ basin of the west Bengal.

III. Match the following

Dhariwal	Sugar industry
Mysore	Iron and Steel industry
Uttar Pradesh	Woollen textile
Vishakapatnam	Silk textile
Faridabad	Electronic goods
Bangalore	Motor cycles

VI. Distinguish between the following

1. Agro based and Mineral based industries.
2. Heavy industries and light industries.
3. Large scale and small scale industries.
4. Public sector and private sector industries.
5. Joint sector and co-operation sector industries.

V. Answer the following questions briefly

1. What is meant by manufacturing?
2. List out the factors which determine the localisation of industries.
3. How is climate an important factor for the location of textile industries in Mumbai?
4. List out the major products from the jute industries.
5. When was the jute mill in India established?

VI. Answer the following questions in paragraph

1. How are the industries classified? Give an example for each of them.
2. What is cottage industry? Why these industries are located in villages?
3. Enumerate the steps taken by the government to improve jute production.
4. Enumerate that automobile industry in the fast growing industry in India.
5. How was the Fifth five year plan instrumented in the spectacular growth of Indian industries?

VII. Answer the following questions in detail

1. Classify the industries and explain.
2. Explain in detail about the Iron and Steel Industries of India.
3. Write about the software industry in the present Indian scenario.

VIII. Locate the following in the map of India

1. The major steel plants of India.
2. Software technology parks of India.
3. Cotton textile industries.

Chapter 8

TRANSPORT AND COMMUNICATION

Learning Objectives

To know about the significance of transport and communication.

To learn about the achievement and progress made in the field of transport and communication.

To understand the role of transport and communication network in the economic development of India.

Transport and communication plays an important role in the development of our country towards the goal “Developed India”. Hence efficient handling is necessary to equip the infrastructural base for speedy growth and development. Transport system helps for the easy movement of men and materials from one place to another It is an important link between the areas of production and consumption. Therefore transport system can be considered ‘arteries and veins’ of National development.

A transport system involves origin, destination, route and the carrier. ‘Origin’ is the point where the traffic originates, ‘destination’ is the point where it terminates, ‘route’ is the surface on which movement takes place, and the ‘carrier’ is the vehicle that moves the passenger or cargo.

Communication network carries information from one place to another physically like postal service or through wires like telegraph and telephone, or through air like radio and television. Both transport and communication systems play a vital role in the upgradation of sustained economic growth of the country.

Modes of transport

Roadways, Railways, Waterways and Airways are the important means used for mobility of men and materials. Pipe lines are used for the transportation of liquid and gas.

Roadways

Roadways is an effective and increasing roadway transportation for the past few decades, as they are able to connect most of the remote villages. This has enhanced the development of village industries by marketing the finished products and also serves as feeders for railways.

Advantages of the roadways

- Roadways are easier to construct and maintain.
- Roads can negotiate high gradients and sharp turns which railways cannot do.
- Roads allow more halts and provide service at the door-step.
- Quick transportation of perishable goods is possible only through roads.
- They are very essential during the time of war and at the time of natural calamities.
- Roadways reach the very heart of the village.
- Industrialisation of rural areas is made possible only through the growth of road transport.
- Road transport offers employment opportunities.
- Roadways link backward areas, mountaneous terrain and coastal areas.
- Roadways help to the movement of men and materials for defence purposes.

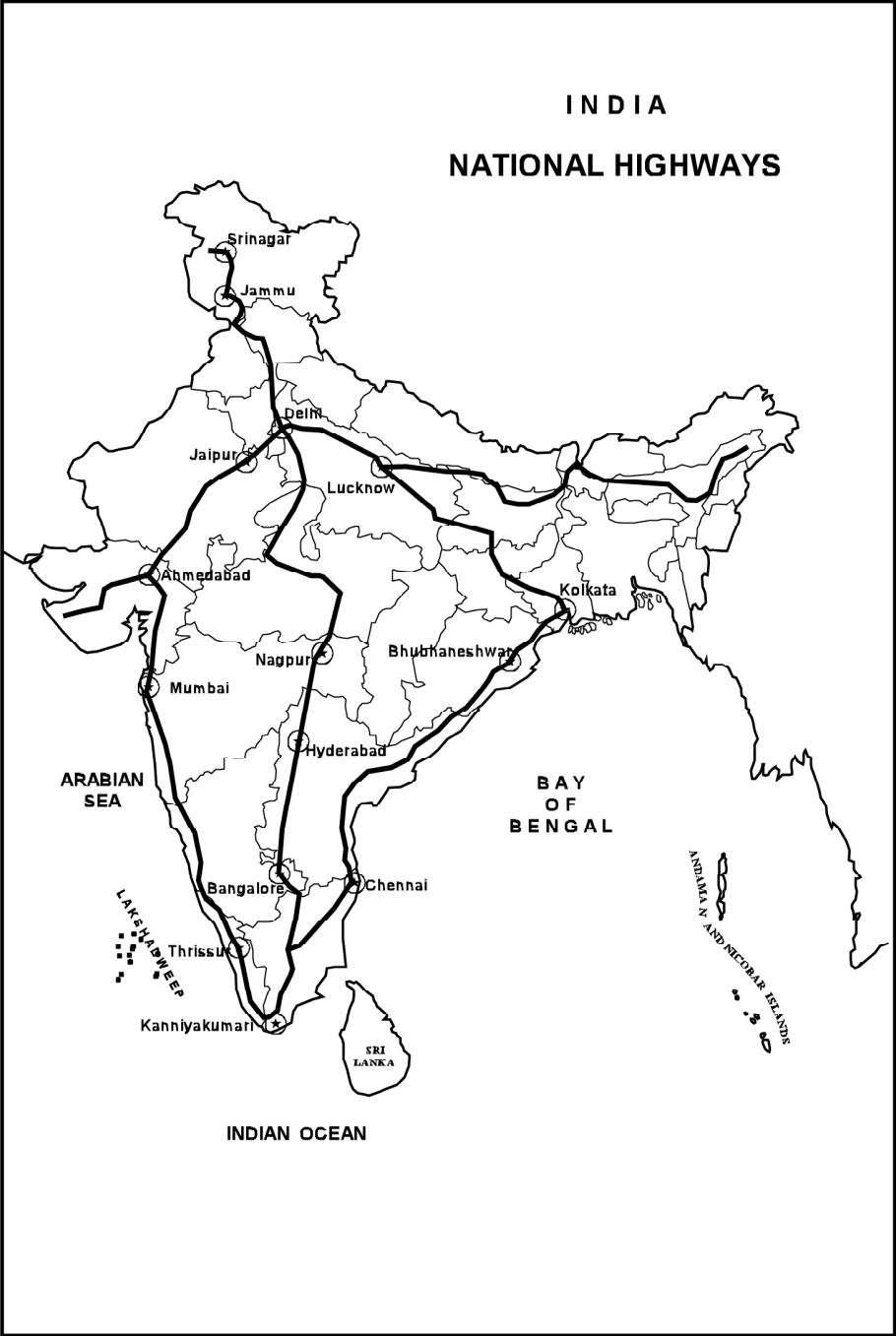
Classification of roads

Village Roads

Village roads link the different villages with main roads. Village panchayats maintain these roads. District authorities also help in laying the village roads. Pucca roads are laid thereby facilitating smooth transport system.

District Roads

District roads link the different villages with district head quarters. They are maintained by the municipalities.



State Highways

These roads connect the state capitals with other important cities of the state. The state governments maintain these roads. These roads are considered to be the main arteries of passenger and freight transport. Chennai-Coimbatore State Highway is an example.

National Highways

National highways connect the important cities and capitals of the country. They are constructed and maintained by the central government.

Border Roads

The central government has set up the “Border Roads Development Board” which maintains the existing roads and builds new one and surface them. These roads help in accelerating the economic development in border areas. (e.g.) The Northern and North Eastern hilly states have been made more accessible through the development of these roads.

International highways

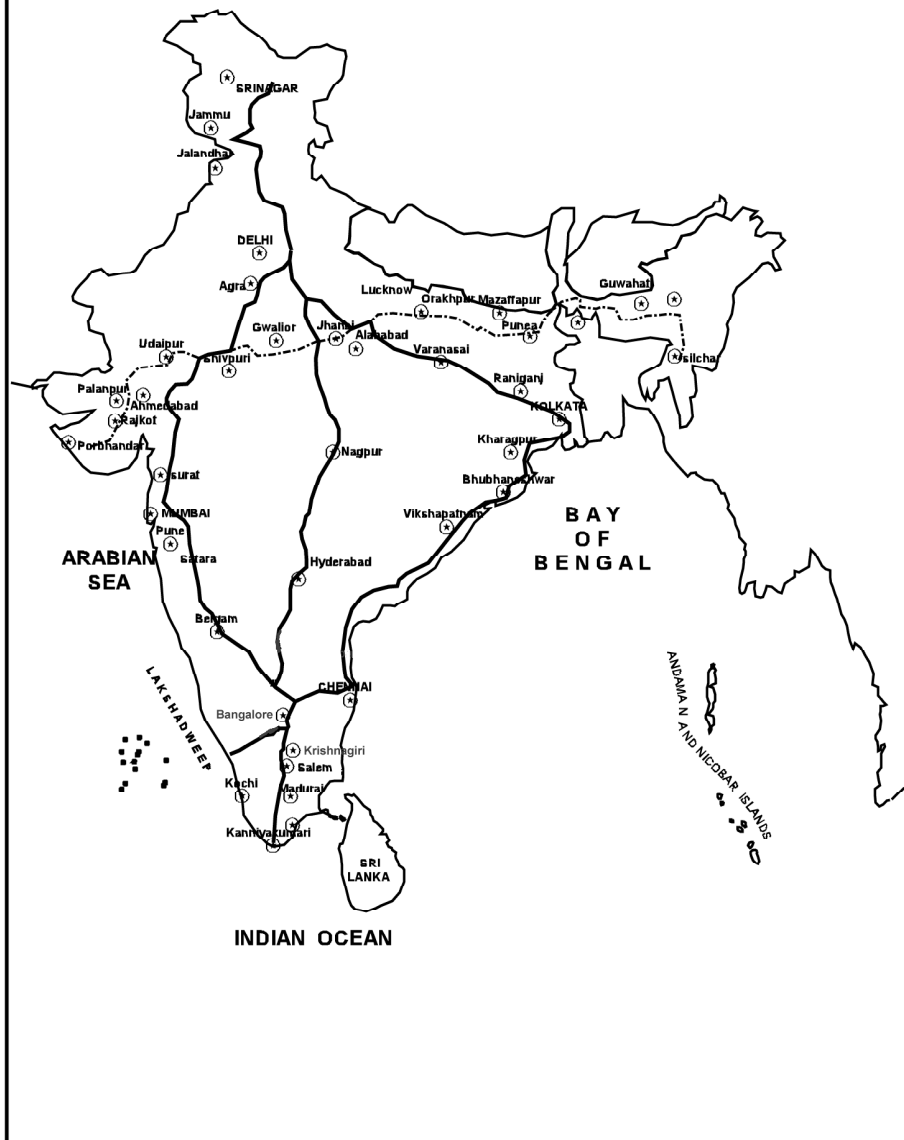
Some of the National Highways of India have been linked with important roads of neighbouring countries as per the agreement made with the ESCAP (Economic and Social Commission on Asia and Pacific). The construction and maintenance are financed by the World Bank. (e.g.) The major arterial road joining capital of neighbouring country is the “International highway of India and Lahore in Pakistan”.

In order to meet the requirements of fast traffic ‘Express way National High ways’ have been planned. 4 to 6 lane National highways of 14,846 kms distance are proposed to be constructed.

Express Way National Highways are grouped as follows

1. The Golden Quadrilateral connecting four metropolitan cities. Delhi - Kolkata - Chennai - Mumbai and Delhi (2846 kms) is under progress.
2. North - South and East - West corridors (7300 kms) which will connect Srinagar to Kanyakumar and Silchar to Saurashtra respectively.

INDIA
NATIONAL HIGHWAY PROJECTS



3. National highway of 363 km length will connect major ports.

This task involves a heavy expenditure and measures have been taken by the Government to speed up the project.

'National High Ways Act' has been amended to enable the government to levy fee on certain sections of the National High Ways.

This amendment enables the private sector to undertake the construction, maintenance and operation of roads under "Build, Operate and Transfer basis" (BOT).

Railways

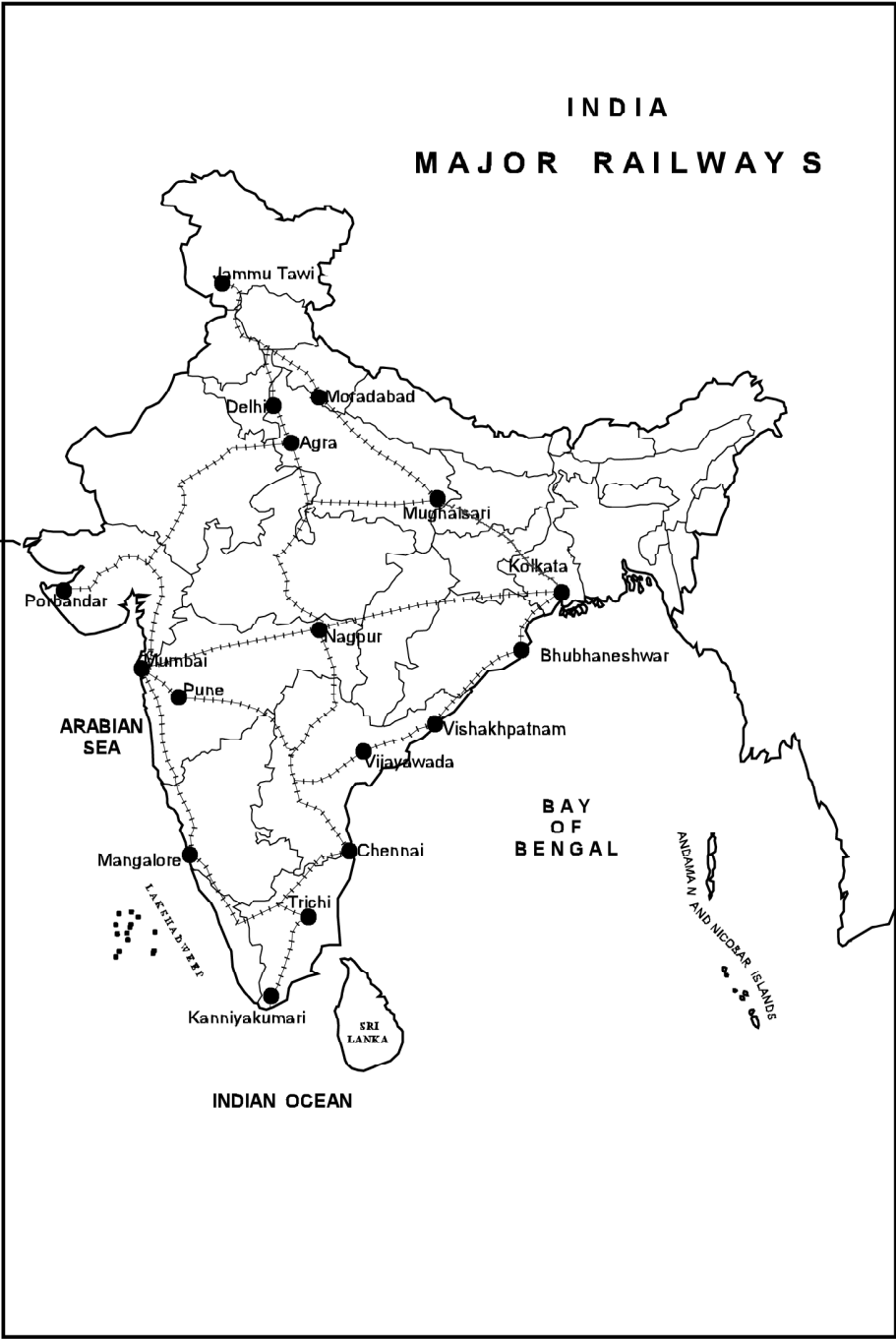
Indian railway system is the largest in Asia and the fourth largest in the world.

There are at present sixteen railway zones under Indian railways. It forms the lifeline of the country and it is one of the best developed transport networks catering to the needs of bulk movement of traffic - both freight and passenger. The first railway line was laid between **Thane** and **Mumbai** in 1853. It was introduced by the British mainly for the economic exploitation. After the Independence, the government paid special attention towards the development of railways.

The pattern of Indian railway network has been influenced by geographical, political and economic factors.

Railway network is dense in the 'North Indian Plains'. It is highly linked to the level of agricultural and industrial development. 'Delhi' is the focal points from where railway lines radiate in all directions. Railway network is dense in the Peninsular region also. Gujarat and Tamil Nadu have a denser rail network than other parts. Trunk routes connect Mumbai with Chennai, Chennai with Delhi and Chennai with Hyderabad.

Railway network is sparse in the mountainous terrain of the Himalayas. The rugged terrain, topography of hills and valleys, backward economy and sparse population are the factors responsible for the sparse rail network in this



region. Only few railway lines are found in western Rajasthan and due to its arid tract. Bihar and Brahmaputra Valley have very few lines due to flood plains. The rail network between Eastern Coastal Plains and Western Coastal Plains has a distinct contrast. A long trunk route runs all along the East Coast. Whereas it has not been developed along west coast due to the western ghats, which lie very close to the coast, '**Konkan Railway**' has been built between Mumbai and Mangalore along the West Coast.

Significance of Railways

Railways have contributed a lot for the development of agriculture and Industries. Railways have strengthened our national integration. The hinterlands are also well connected by railways. So they are responsible for enormous growth of trade. Iron and steel industry solely depends upon the railways as they transport raw materials and finished goods of the industry from one place to another.

Railways provide employment to a huge number of people in the country. The '**Railway Mail Service**' adds value to the service of railways.

After the Independence, some steps have been taken for the further improvement of Indian railways. '**Steam engines**' have been replaced by more powerful diesel or electric engines. The number of tracks on important routes have been increased. '**Computerised reservation system**' has also been introduced and on line booking saves time for commuters. Railways have introduced long distance super-fast trains. e.g. Redshank Express, Shatabdi, Janshatabdi trains, etc. Chair car with provision of good food are another special facilities offered by the railways. '**Super fast trains**' like Rajdhani connecting major metros is a boon to the people of India. '**Container Corporation of India**' has introduced container services which provide door to door service for goods and commodities. Metro railway track system (MRTS) are being planned in major metropolitan cities of India like Chennai and Kolkatta.

The '**Interactive telephone enquiry system**' provides upto date information about reservation availability, current status, waiting list,

Reservation against cancellation (RAC) tickets and arrivals and departure of trains. The major improvement in railways are the facility, for booking tickets through internet and payment of tickets through credit card facilities.

Waterways

Waterways are the cheapest means of transport. It may be divided into “**Inland waterways**” and “**ocean transport**”.

Inland waterways

Inland water transport is carried on through internal waterways like rivers canals and lakes. Some of them are

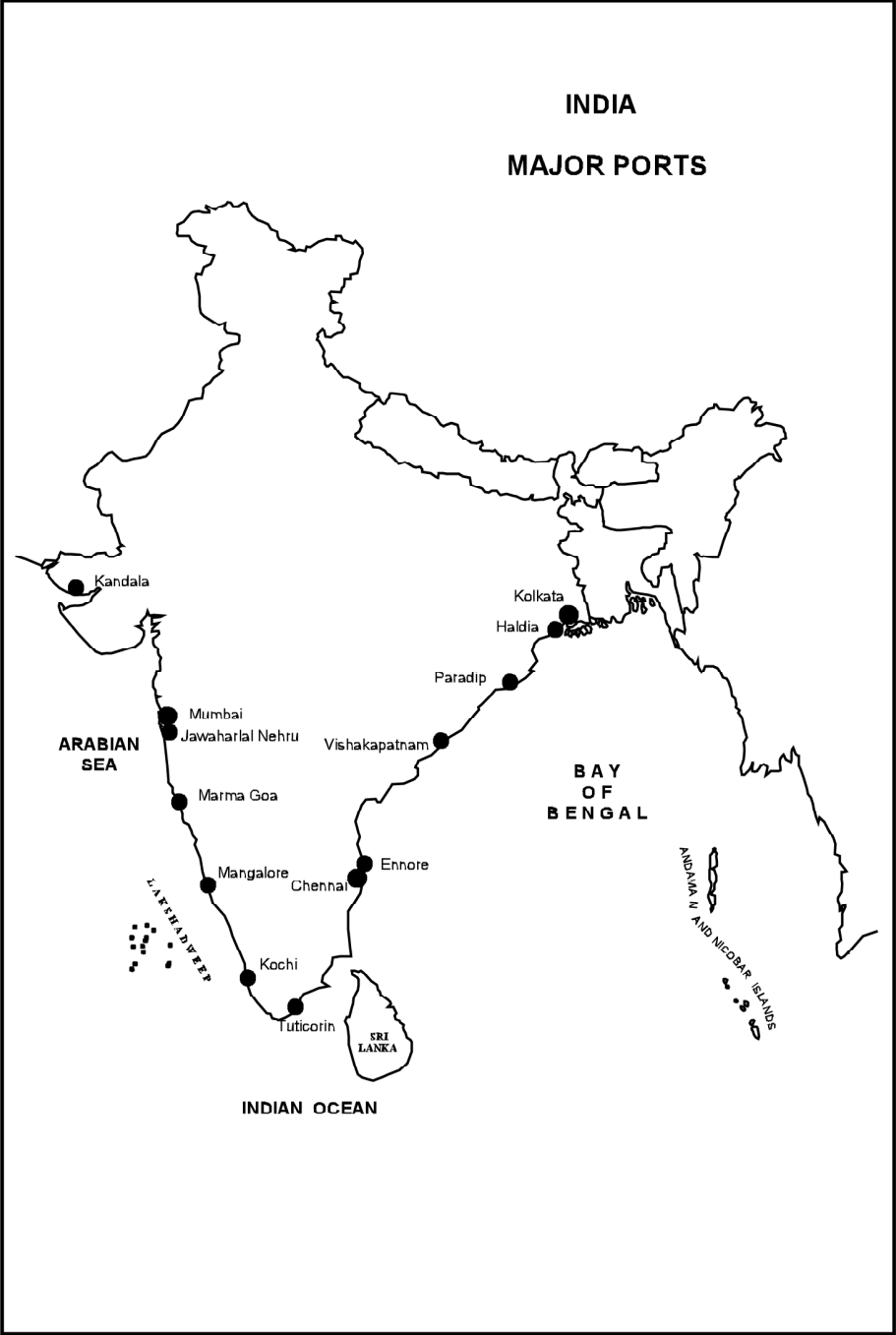
- River Ganga is navigable upto Varanasi.
- River Hooghly helps in connecting the major ports of Kolkata with its hinterland.
- Number of canals re constructed on as Mahanadi, Godavari and Krishna in peninsular India.
- Kurnool - Cuddapah canal is Andhrapradesh.

Factors affecting the development of inland waterways

- The rivers and canals should have regular flow of sufficient water.
- The presence of waterfalls and cataracts in the course of river hinders the development of water ways.
- Silting of the river bed always create problems for navigation.

Ocean transport

India has a long coastlines (including Andaman and Nicobar and Lakshadweep islands). Twelve major ports and 181 medium and minor ports are located on this coast line. The major ports are managed and controlled by ‘**Port Trust**’ under the Central Government. State Governments control medium and minor ports. More than 70% of sea-borne trade is handled by major ports in India. The major ports located on the west coast are Kandla, Mumbai, Jawaharlal Nehru (Nhava Sheva near Mumbai), Murmagao (Goa),



Mangalore and Cochin.

Tuticorin, Chennai, Ennore, Vishakhapatnam, Kolkata / Haldia and Paradip are the major ports located on the East coast of India. The important intermediate ports are Kakinada, Machulipantam, Cuddalore, Nagapatnam on the east coast, Thiruvananthapuram, Kollam, Alleppey, Kozhikodu, Bhavnagar and Porbandhar on the west coast.

India is the second largest ship - owning country in Asia and ranks sixteenth in the world. India has major ship building yards. They are the Hindustan Shipyard at Vishakhapatnam, Garden Reach workshops at Kolkata, Mazagaon Dock at Mumbai and Cochin Shipyard.

Government of India has issued guide lines for private investment in the port sector. Indian government has awarded a licence to the port of Singapore Authority for the development of a container terminal on BOT basis for a 30 year period. Indian Ports Act 1908, and Major Port Trusts Act, 1963 have been made flexible to allow private investment in ports.

Air Transport

Airways is the fastest and costliest means of transport which carry passengers, freight and mail. They connect local, regional, national and international cities. Air transport is necessary in North eastern parts of the country because of strategic reasons and difficult terrain. Helicopters are becoming popular in our mountainous border area. In 1953 air transport was nationalised Civil Aviation controls and supervises the activities of the airlines and gives guidelines for the safe operations of the craft.

Now a days there are two air services in operation. They are Air India, and Indian Airlines.

Air India provides International air services. Indian airlines caters to our domestic needs linking major cities and towns of India.

There are two types of airports such as international and domestic airports, International airports handle air traffic between India to the rest of the world. There are around 13 international airports and 63 domestic airports in

India. Domestic airports handle air traffic within the country and to neighbouring countries. Airports are managed by the '**Airport Authority of India**'.

Besides this Government services, Pawanhans helicopters Ltd., provides helicopter services. Private airlines such as Air Sahara, Air Deccan, Jet Airways, King Fisher Airlines, etc. provide domestic air services in India.

Airways of India has come to occupy a place of increasing importance in the transportation system of the country.

Major international air routes are

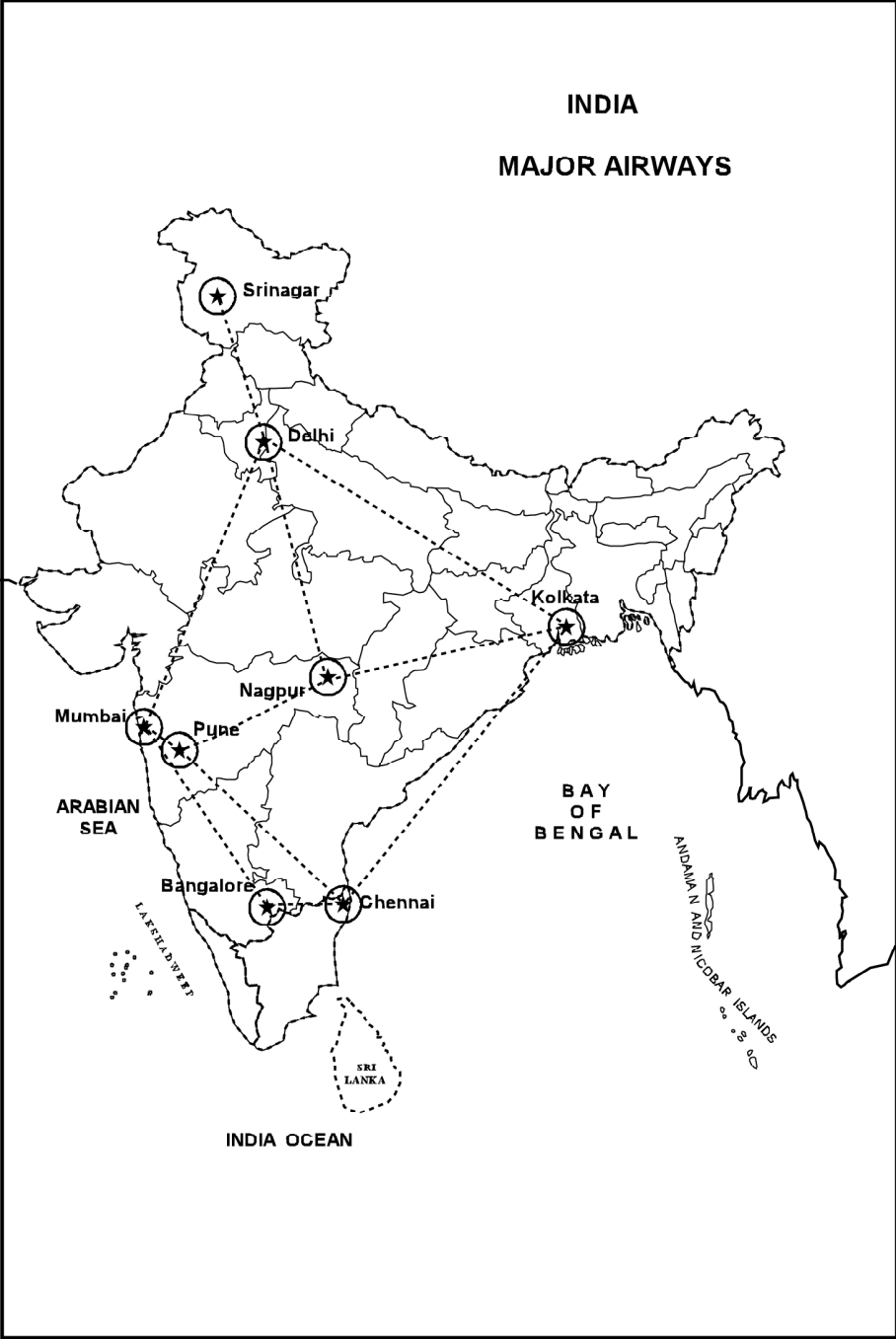
- Delhi - Rome - Frankfurt
- Mumbai - London - New York
- Delhi - Moscow
- Kolkata - Tokyo
- Kolkatta - Perth

Pipeline

Pipelines are used for transporting crude oil, petroleum products and natural products and natural gas from oil fields to the refineries, factories and big thermal power plants. Pipe lines are more reliable and considerably safer mode of transportation. The possibility of pilferage or product loss on pipelines is almost negligible. The basic limitations of pipelines is that they are capital intensive mode of transportation.

There are some important networks of pipeline transportation in the country.

- Pipeline from upper Assam oil fields to Kanpur via Guwahati, Barauni and Allahabad.
- Gas pipeline from Hazira in Gujarat to Jagdishpur in U.P. via Bijapur in M.P. is another pipe line connects Mumbai High (in the sea) with Mumbai and Mumbai with pune.



Communication

“The means through which we exchange our ideas and send information is called the means of communication”. They are two types (1) Personal communication (2) Mass communication net work.

Personal communication includes postal service, telegram, telephone, internet, e-mail, fax etc.

Mass communication network plays a vital role in creating awareness about national policies and programmes by providing information and education. Mass communication can be divided into two categories:

1. Print Media (Books, journals, magazines, newspapers etc.)
2. Electronic media (Radio, television, tele communication, mobile telephone, e-mail, e-commerce, teleprinters and cables)

Bharath Sanchar Nigam Ltd. looks after the telecommunication services in India. STD and ISD telephone services are now available. Private companies have been given licences to start cellular mobile telephone services. In recent times, a number of other value added services like voice mail, audio text, e-mail, radio etc. are in operation in India.

Postal Service

Three fourth of Indian population live in villages which has been connected by mail service. The postal department of India has introduced “**Air Mail service**”, “**Railway Mail service**” and “**Speed Post**” to facilitate faster delivery of mails.

ELECTRONIC MEDIA

All India Radio was constituted in 1936. It is also known as Akashwani. Now AIR has 208 stations and 327 transmitting centers. These stations and transmitting centers provide services to 99% of the population and covers 90% areas of our country. Private broadcasters have set up FM Radio Stations. All India Radio broadcasts a variety of programmes related to information, education, agriculture and entertainment.

“Doordarshan”, the national television of India is one of the largest terrestrial net works in the world. It brings its viewers all the major programmes of national and international importance through live telecast. It transmits educational programmes for schools and universities through **“edusat”**.

Computers have a wide range of uses and play an important role in our society in the field of **education, banking, and business transactions at the global level**. The world has been shrunk since the introduction of internet.

Satellite is the latest means of communication, which has brought revolution in the communication system in India and the world. Satellite systems in India can be grouped into two on the basis of two satellites namely **“Indian National Satellite” (INSAT)** and **“Indian Remote sensing Satellite” (IRS)**. These satellites collect data in several spectral band and transmit them to ground stations for various uses. The communicator and remote sensing satellites INSAT and IRS have revolutionized India’s communication system, metrological studies and natural resource management. The National Remote Sensing Agency (NRSA) at Hyderabad provides facilities for acquisition of data and its processing. There is no doubt that India has irrefutably arrived as a space power in the world.

Our need of the hour is to connect the far-flung regions together to strengthen the **“national economy”** and **“unity”**. Thus transport network and communication enhance economic development of our country on one hand and nationa integration through mutual understanding on the other hand.

EVALUATION

I. Choose the best answer :

1. The fast movement of traffic are established by
 - a) National highways
 - b) Express highways
 - c) International highways
2. Postal service and telegraph are some of the _____ communication.
 - a) Personal
 - b) Professional
 - c) Mass

3. The _____ have more railways than the Himalayan Mountain.
a) Northern plains b) Coastal plains c) Deccan plateau
4. The head quarters of the North Eastern Railway is at _____
a) Jabalpur b) Allahabad c) Guwahati
5. The cheapest means of transport is
a) Roadways b) Railways c) Waterways
6. The first railway line was laid between _____ in 1853.
a) Delhi and Kolkata b) Mumbai and Kolkata
c) Mumbai and Thane

I. Fill in the blanks :

1. The systems play a vital role in the upgradation of sustained economic growth of the country is _____.
2. Our National Integration is strengthened by _____.
3. Container services of goods and commodities in India is introduced by _____.
4. _____ have been replaced by more powerful diesel or electric engines.
5. The important navigation canal in Tamilnadu is _____.
6. There are _____ major ports located on the coast line of India.
7. Crude oil, petroleum and natural gas are transported by _____ .
8. The largest terrestrial network of the world is _____.
9. The latest means of communication is _____.
10. The multipurpose satellite system for telecommunication is _____.

III. Match the following :

- | | |
|--------------------------|-----------------------------|
| 1. Eastern Railways | Telecommunication |
| 2. Major Ports | India with Lahore |
| 3. Bharath Sanchar Nigam | Kolkata |
| 4. Satellite System | Port Trust of India |
| 5. Major arterial roads | Indian Remote sensing (IRS) |

IV. Distinguish between the following

1. Roadways and railways.
2. State Highways and National Highways.

V. Answer the question briefly

1. Name the important means of transport.
2. List out the major inland waterways of India.
3. What are the special characteristics of airways?
4. Mention the different means of communication.

VI. Answer the following question in paragraph :

1. Explain briefly how transport system form an integral part of national development.
2. Briefly describe the classification of roads.
3. Explain briefly about the significance of railways.
4. Mention the factors affecting the development of inland waterways.
5. Explain pipeline transportation.
6. Explain the role of speed post service.

VII. Answer the following questions in detail :

1. Answer in details about the advantages of road transport.
2. Discuss in detail the factors responsible for the pattern of Indian railway network.
3. Enumerate the steps taken by the government for the improvement of Indian railways.
4. Explain in detail the role of electronic media in communication network.

VIII. Locate the following in the map of India :

1. Show the railway route connecting Mumbai with Chennai.
2. Show the railway route connecting Chennai with Delhi.
3. Show the railway route connecting Chennai with Hyderabad.
4. Important airports of India.
5. Important ports of India.

UNIT IV

Chapter 9

PROJECT WORK

Learning Objectives

- To know the importance of project work.
- To understand procedures of the project work.
- To develop skill in writing project report.
- To develop confidence to undertake research work.

How does a village change in 20 years? How does a quality of environment differ between two areas of a town? How could the environment of a town be improved? What are the causes of pollution in nearby pond? Is it possible to prevent pollution?

These are some of the questions that arise in our mind when we think of our environment. Could we find answers to these questions within the classroom? No! We need to collect information on them by visiting the actual places through a set of planned activities. When these planned activities are done within a specific period of time and the available cost we use the term 'project' for entire work. Hence, a **project work** may be defined as, "a set of interrelated planned activities specifying the targets to be achieved within specific period of time, cost and to find solutions for a problem".

Importance of project work in geography

Geography is the study of the interrelationships between man and his physical environment such as land, water and air. Advancement in technology brings constant changes in the physical environment. Man, in turn, finds new way of life to adjust the changing physical environment. These interrelationship cannot be studied in a laboratory like science subject. Nature serves as a laboratory for doing any number of experiments for learning geography and gaining personal experience. Therefore, it is inevitable to undertake project work to understand the facts and concepts of geography.

Let us see how a project work can be planned.

1. In a class of 40 students, the class can be divided into 5 or 6 groups.
2. Elect a leader.
3. Select a topic, from the lessons of your syllabus (preferably on environmental problem).
4. Topic chosen should not be wide. For example do not select a project on pollution of rivers of district or a state.
5. Restrict to local area. For example choose a simple project - water pollution of a pond / tank in your area. It will be easier to collect any information needed on the topic.
6. A topic thus chosen must be informed to all students of the group.
7. The group leaders will assign different tasks to each of his team mates. For example, 2 or 3 students can collect information on the origin of the pond.
8. Next group may draw maps, prepare charts, take photographs of the pond and the surrounding areas. Another group may prepare a set of questions in a questionnaire form on the topic.
9. Next group, which is a co-ordinating group collect all the data from the other groups and analyse and interpret them.
10. The last group may prepare a good report on the project undertaken.

The teacher would act as a guide throughout the project and help the students to conduct the project at every stage. During any occasion or school function the project report can be released. The copy of the project can also be sent and brought to the notice of the local civic authorities.

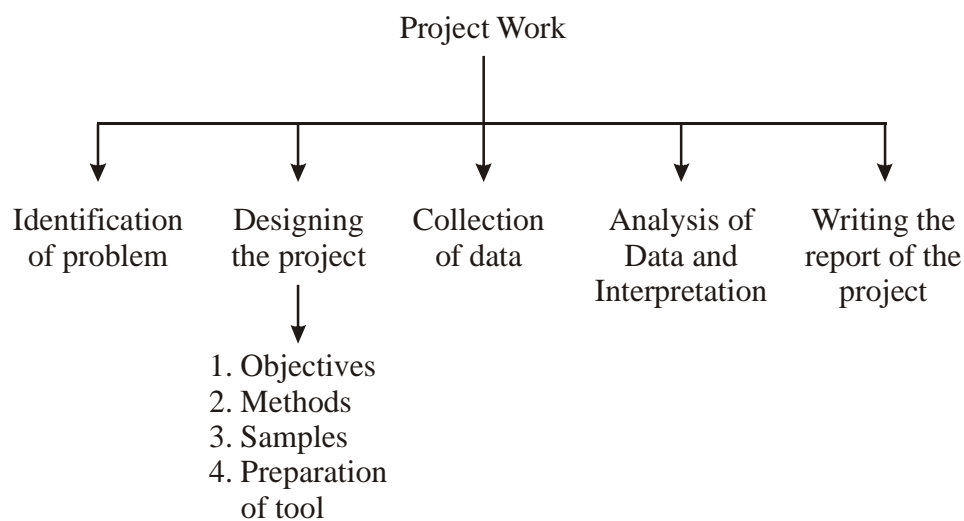
Before going to understand the project work in detail let us know some of the terms, related to any project work.

- | | | |
|------------------|---|--|
| 1. Investigation | - | A scientific way of finding solutions to any problems. |
| 2. Investigator | - | One who undertakes a project. |
| 3. Problem | - | Topic for project. |

- 4. Solutions - Answers arrived through project by following specific scientific procedure.
- 5. Sample - People / events / objects / on whom the project study is undertaken.
- 6. Tool - The questionnaire / interview / achievement test paper etc. for getting answers / responses from samples.
- 7. Data - Information and statistical details related to this problem.

Steps to be undertaken in a project work

Any project work should be carefully planned by the investigator with the guidance of a teacher or an expert. The following activities are to be carried out in a logical steps, for a successful completion of a project.



Let us learn each activity in detail.

1. Identification of Problem

Identifying a problem from our environment is the first step to be undertaken while doing a project work. Problems may be identified from our environment. Some of the problems are given below :

- Agricultural ‘land use survey’ of a limited area in the neighbourhood
- ‘Household survey’ of a village or locality at different hours of the days.
- Means of ‘personal transport’.
- ‘Traffic flow survey’ of the locality at different hours of the day.
- Area served by a school.
- ‘Occupational pattern’ of people in two or three localities.
- Pollution of the lake / ponds / rivers.
- Noise pollution.
- Dumping of waste materials.
- Drainage system.
- Use of public toilets and its maintenance.

The identified problems should be **observable** and **verifiable**.

2. Planning the project design

Planning the project design is the second step. It includes

- a) Objectives of the study
- b) Methods of the study
- c) Sample of the study
- d) Preparation of the tool

To study the problem in a scientific way we must frame the objective in a precise manner. Objectives should reflect the aim and method of project work. The whole study should be based on achieving these objectives. For example, **“To study the Household survey of a village or a locality”**. If we take a problem project design should involve in 4 stages. Let us see how these four steps are involved in this problem.

a) Objectives of the study

The following objectives are to be framed as a first stage.

- to collect information regarding the size of the family.
- to know about the marital status, educational background and occupational structure of the members of the family.

- to make an assessment of the income of the family and its sources.
- to classify the families of neighbourhood on the basis of their size and income.

b) Methods of the study

Selecting different families of the village or locality is the second stage. Care should be taken in representating all types of families. It is therefore, necessary to select minimum sample of 50 families of various types. This includes sample of the study also.

c) Preparation of the tool

Observation, interviews and survey are the common methods of study used in a project work. Depending upon the problem of the study, any of these methods can be used.

In order to undertake a project, data should be collected from people / events / objects on whom / in which the project study is undertaken. For example, on the Household survey of a village or locality, the selected 50 families may be taken as samples.

Tool preparation is significant in the project work. Questionnaire, interview schedule and observation schedule should be prepared on the basis of the problem undertaken for the study. The tool is an important source to collect data from samples.

Questionnaire for study of agricultural crop pattern

1. Name of the Respondent -

M	F
---	---
2. Age -
3. Educational Qualification -
4. Occupation -
5. Location of agricultural area -
6. Ownership -

Own	Lease
-----	-------

- 7. Annual income -
- 8. Cultivation of crops -

Once	Twice	Thrice
------	-------	--------
- 9. Type of crop cultivated -
- 10. If it is monocrop, name the crop -
- 11. If it is dual crop, name the crops -
- 12. If it is multiple crops, name the crops -

3. Collection of Data

Collection of information and details from the samples by using the tool is the third step involved in the project work. Through this activity, the investigation collects the details of the problem, causes and effects in a real sense. Data are collected through the methods of interview, observation and questionnaire. By using ‘interview schedule’ and ‘questionnaire’ the views of the samples may be collected. During the data collection the investigation must establish good rapport with samples of the study.

For example, the questionnaire has to be prepared for each and every house. Therefore prepare the number of copies of the questionnaire equal to the number of families to be surveyed. Collect the data for each household by personally visiting them. It is better if the students are divided into small groups of 4 to 5 students each. This will enable to collect the information quickly and efficiently. It is very important to explain the purpose of the survey to the members of the family before collecting the information. This will help you in collecting the information correctly and quickly.

4. Analysis of Data and Interpretation

The data analysis and the interpretation of the data is the fourth step of a project work. The data collected through various tools on selected samples are to be tabulated and interpreted to find a solution. Care must be taken at every step of the project.

5. Writing of Report

This is the last step involved in a project work. The effectiveness of project work depends not only in finding solutions for a problem but also in presenting a good report on it. The investigator has to write a detailed report of the complete activities undertaken so far from the beginning, namely identification of the problem, planning of project design, collection of data, analysis of data, interpretation and suggestions. The style and language of the report should be precise and simple. This report is known as project report. The following general format may be adopted to write a project report.

General format of the project report

- I. Title page
 - i) Title of the study
 - ii) Name of the investigator and address of the institution
 - iii) Date of submission of report
- II. Introduction
 - i) Identification of the problem
 - ii) Need for the study
 - iii) Definition of the problem
 - iv) Specific terms used in the project
- III. Planning of project design
 - i) Objectives of the study
 - ii) Methods of study
 - iii) Tool preparation
 - iv) Sample
- IV. Analysis of data and interpretation
 - i) Data collection
 - ii) Data analysis
 - iii) Interpretation of results -Text, tables and figures
- V. Suggestions
 - i) Suggestion of the project work
 - ii) Conclusion

Though a project work needs a lot of planning, execution and reporting, it has got its own merits. Some of them are

- Project work is based on the principle of ‘Learning by doing’. Hence one can acquire knowledge, attitude and skill through real experience.
- It develops social qualities among the individuals such as co-operation, adjustment, interpersonal relationship, self responsibilities and team spirit, etc.
- It helps to understand the topic of study by bridging the gap between the classroom learning and the actual learning experience in the field.
- It develops spirits of exploration.

Thus a project work has great significance in research and development of any field.

Based on the above mentioned general format of report specific example is given below for a clear understanding. Student are advised to take a specific project and submit the report as per the general format.

I. Title Page

(i) Title of the study : “Household survey of a village”.

(ii) Name of the investigator : x x x x x x

Address of the institution : x x x x Matriculation School
x x x x District

(iii) Date of submission of a report : x x x x

II. Introduction

This household survey is conducted to know about the population size, marital status and age structure, educational background, occupation and economic base of a village. Family of different size with different status live in Indian society. These seems to be a close relation between the size and economic well-being of a family and this is known by household survey.

i) Identification of the problem

There are vast differences in the social, cultural and economic characteristics between different families of a village. These differences must

be classified and the reasons for these differences also to be identified through household survey.

ii) Need for the study

The status of the society is based on the economic in flow into the society. The differences in the status of individual house differed due to percapita income, family size and educational status etc. Hence there is a need to survey each house of the village, undertaken for study.

iii) Definition of the problem

A study on the relationship between the size of the family and economic welfare of the family by doing household survey.

III.Planning of project design

i) Objectives of the study

- To collect information regarding the size of the family.
- To know about the marital status, educational background and occupational structure of members of family.
- To make an assessment of the income of the family and its sources.
- To classify the families of neighbourhood on the basis of their size and income.

ii) Methods of study : Survey method

iii) Tool preparation : A questionnaire is to be prepared, for collecting information from samples.

iv) Sample : 50 houses in a village.

IV. Analysis of data and interpretation

i) Data collection : The questionnaire prepared for the study are supplied to each and every house. The filled up questionnaire are to be collected for analysis.

- ii) **Analysis of data** : The information thus collected and analysed are interpreted based on the aims and objectives of the study. The collected data are to be classified on the basis of the objective of the study.
- iii) **Interpretation of results** : Marital status, economic background and occupational structure of members of the families in the village are to be expressed in numerical terms (bar graph, pie chart, percentage, average, etc.)

V. Suggestions

- i) **Suggestions of the project work** : Based on the result, suggestions may be made for further study.
- ii) **Conclusion** : The experience of the investigator can be explained.

EVALUATION

I. Fill in the blanks with suitable answers :

1. The set of planned activities performed within specific period of time at the available cost is termed _____.
2. The person who undertakes a project is named _____.
3. The third step in a project to be undertaken is _____.
4. Data should be collected from the _____.
5. Investigator must establish a good _____ with samples of the study.
6. Questionnaire should be prepared on the basis of the _____ undertaken for the study.

II. Answer the following questions briefly :

1. What is meant by project work?
2. Why is it essential to undertake a project work in geography?
3. Define the following terms :
 - (i) Investigator
 - (ii) Sample
4. What are the steps involved in project design?

5. Visiting a small local factory in your area or land use in your locality is the area of your study. List two objectives of your study.
6. Write two important points to be considered for the collection of data.

III. Answer the following questions in a paragraph :

1. Write the general format of the project report.
2. Briefly narrate the importance of project work in Geography.
3. What are the merits of doing a project work.

IV. Answer the following questions in detail :

1. Write in detail about the steps to be undertaken in a project work.
2. Prepare a questionnaire for the given problem.
 - (i) Agricultural crop pattern in your area.
 - (ii) Household survey of a village or a locality.

UNIT V

Chapter 10

REMOTE SENSING

Generally to learn about our environment we use our senses of seeing, touching, smelling and hearing. These senses help to sense an object from close proximity. In the same way if the resources of the earth have to be surveyed or sensed for small areas, ground survey was much in use. Ground survey of resources can cover only small areas at a time. It takes many months to make a comprehensive survey of all resources in a district. So ground survey was difficult to cover large areas simultaneously.

In order to cover larger areas, surveys from elevation was undertaken. The first attempt was made by attaching a camera to a balloon which flew over Paris in 1858. After the first world war, aeroplanes carried cameras to take pictures of the ground below. Systematic air photographs were taken from low flying air craft so as to eliminate the effect of clouds. Thus air photographs are taken for relief, drainage land use pattern of the earth and were used to prepare maps showing relief, drainage, vegetation etc.

Now-a-days with the improvement of science and technology, especially after the development of remote sensing technology, we are able to collect data on any part of the earth within short span of time without visiting the places personally. Without trodding into the thick equatorial forest of Congo basin region, wading through snow bound Antarctica, and footing on sandfilled Thar desert, we are able to collect even minute details about these regions without any physical contacts.

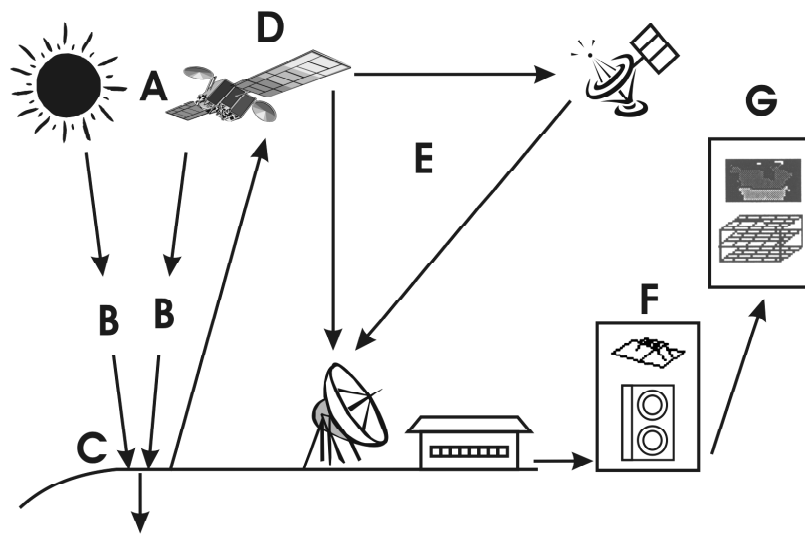
What is Remote sensing

“Remote sensing is a technique which provides up-to-date information about an area such as relief features, climate, vegetation, mineral, marine resources etc. with the help of “Sensors”, without having any direct physical contact with the objects of the area.” Remote sensing is simply the observation of an object from a distance.

Sensor is a device used in the Remote sensing, which senses the objects without having direct physical contact just like operating a Television or an Air Conditioner with the help of a remote control unit.

Prior to remote sensing technology various forms of aerial photography have been used to create maps of the earth's surface since the eighteenth century. Satellite remote sensing can be traced back to the mid-1940s and the launch of various rockets from White Sands in New Mexico and which contained cameras on board. The first satellite sensor dedicated to the multi-spectral remote sensing of earth's surface was launched in 1972. Initially it was as Earth Resources Technology Satellites (ERTS). This series was renamed 'Landsat' in 1975 and is still in operation today.

Process involved in remote sensing



The picture given here explains the process involved in remote sensing. Let us see the process step by step.

1. Energy source (A)

The first requirement for remote sensing is to have an energy source, which provides electromagnetic energy to the object of our study. The sun provides

electromagnetic energy in the form of light waves. This energy consists of electromagnetic waves, which travel in a sinusoidal motion. All waves travel in the same speed, but the wavelengths may vary. This resulting range of wavelengths gives rise to the electromagnetic spectrum. Wavelengths are measured in micro metres. 1 micro metre = 10^{-6} metres.

The basic principle underlying remote sensing is the measurements of electromagnetic energy reflected or emitted by various features on the earth's surface as well as in the atmosphere Refer 'A' in the picture. At one end of the spectrum are radio waves and microwaves that have very long wavelengths. At the shorter end of the spectrum are x-rays and gamma rays and in the middle is the narrow range of optical wavelengths visible to human eyes. Various sections of the spectrum are of use in remote sensing. These are primarily atmospheric 'windows' – bands of wavelengths where the radiation passes easily through the atmosphere to the surface of the earth. The most commonly used are **visible and infrared wavelengths**.

- Visible portion, consisting of blue, green and red : 0.4 μm to 0.7 μm .
- Infrared portion, consisting of near, short-wave and thermal : 0.7 μm to 14 μm .

A satellite sensing system will be designed to 'image' a certain portion of the spectrum, i.e. to record the amount of radiation reflected or emitted at various wavelengths. In order to collect a sufficient amount of energy to provide a reliable measurement, satellite sensors will record the reflectance over an interval of wavelengths. These are referred to as channels or wavebands. The Advanced Very High Resolution Radiometer (AVHRR) for example images at one visible channel, one near infrared channel, two short-wave infrared channels and two thermal infrared channels. It is therefore a multispectral sensor, as it images over more than one waveband of the electromagnetic spectrum.

So the sources of Electro magnetic radiation (EMR) are

- i. Natural source
- ii. Man made source

The material sources of EMR is the sun and the emitted and reflected energy from the earth's Surface. The artificial source of EMR is Radar Systems, which operates in the microwaves band of the electromagnetic spectrum.

2. Sunrays and Atmosphere (B)

The sunrays passing through the atmosphere interact with it and get into contact with the earth's object. These rays reflect back to the sensor, through the atmosphere again (Refer B in the Picture) because Electro magnetic energy passing through the atmosphere is distorted or scattered.

3. Sunrays and object on the earth (C)

After getting into contact with the object on the earth, the rays interact with the object. The interaction depends upon the properties of the objects or features such as tone, size, shape, texture form and colour (Refer 'C' in the picture) so the amount and characteristics of radiations emitted or reflected from the earth's surface is dependent upon the characteristics of the objects on the earth surface.

4. Recording of the energy by the sensor (D)

The reflected, emitted and scattered radiations carry information about the objects and areas on the earth surface and it varies from object to object. The reflected and emitted long wave radiations recorded by the sensors are called special signatures.

The reflected sunrays from the object are recorded by the sensor. They carry information about the objects and their properties which vary from object to object according to their physical properties for example the information about a mountain may differ from that of an ocean (Refer 'D' in the picture).

Satellite sensors record the intensity of electromagnetic radiation (sunlight) reflected from the earth at different wavelengths. Energy that is not reflected by an object is absorbed. Each object has its own unique 'spectrum'.

Remote sensing relies on the fact that particular features of the landscape such as bush, crop, salt-affected land and water reflect light differently in different

wavelengths. Grass looks green, because it reflects green light and absorbs other visible wavelengths. This can be seen as a peak in the green band in the reflectance spectrum for green grass above. The spectrum also shows that grass reflects even more strongly in the infrared part of the spectrum. While this cannot be detected by the human eye, it can be detected by an infrared sensor.

Instruments mounted on satellites detect and record the energy that has been reflected. The detectors are sensitive to particular ranges of wavelengths, called 'bands'. The satellite systems are characterised by the bands at which they measure the reflected energy. The Landsat TM satellite, which provides the data used in this project, has bands at the blue, green and red wavelengths in the visible part of the spectrum and at three bands in the near mid infrared part of the spectrum and one band in the thermal infrared part of the spectrum. The satellite detectors measure the intensity of the reflected energy and record it as a number between 0 and 255.

5. Transmission, Reception and processing (E)

The recorded information by sensor are transmitted to processing station where the data is processed into image. The term 'image' is used for any pictorial representation of data. Two types of images are photographs and digital image. Refer 'E' in the picture.

6. Interpretation and Analysis (F)

These imageries are interpreted by the ground stations in visual, digital and electronic forms. (Refer 'F' in the picture). Here Data collection is in the form of Satellite imageries, from which the details regarding objects can be obtained based on their spectral reflectance properties and variations in the photo elements like tone, texture, shape, size, pattern etc.

7. Processing of the data

The processing of the data is carried out using instruments like photographic enlarger. Classification of data, otherwise called as grouping of data is based on their spectral response once the grouping is done. There is a need to determine the accuracy of the classification. The remote sensing data has to be supplemented by ground truth.

8. Application 'G'

The extracted information by the ground station are used for better understanding of the objects on the earth's surface. It may reveal new information and solutions to the problem of particular area (Refer 'G' in the picture).

Mapping of the processed information

The grouped or classified data has to be transferred on to a plain sheet for effective communication. With the help of computers, cartographers, the map makers draw maps. Computer aided design programmes (CAD) are of much use in mapping.

Advantages of Remote Sensing

1. Remote sensing detect features which are not visible to the human eye. Eg. the dense forest, Antarctic region and inaccessible areas.
2. It provides up to date and continuous information about an area. Eg. The changing pattern of wealth, land use etc.
3. It helps the planners for formulating policies and programmes to achieve the holistic functioning of environment, because of its speedy, accurate and upto date information.
4. It caters the information needed by the agriculturists to identify the areas affected by pests, crop disease, water logging, wasteland etc.
5. It spots the areas of natural disasters such as Tsunami, drought prone, flood affected and cyclone hit areas. It is highly useful for detecting damage, estimating the loss, for providing relief, rehabilitation and, helps in reconstruction.

The most important utility of Remote sensing is into the science of cartography. It enables the cartographers to prepare thematic maps like geological maps, soil maps, population maps etc with greater accuracy and speed.

GIS (Geographical Information Systems)

We have learnt the latest technique of collecting data of objects through remote sensing. These collected data are classified, manipulated and analysed for future plans through the system of GIS.

What is GIS?

GIS is a Geographical information system. “It is an organized collection of computer hardware, software, Geographical data and personal, designed to efficiently capture, store, update, manipulate, analyse and display all forms of Geographically referenced information”. The data stored in GIS can be used for computer mapping with 3 Dimensional (3D) effects.

GIS is also used by planners, engineers, cartographers, construction companies, surveyors, architects, marketing analysts etc. GIS is also used for analysing data on population distribution, traffic movements, land availability, real estate prices, environmental hazards, soil types, flood zones, disaster zones etc.

GPS – Global positioning system

The recent device used for identifying the position and movement of an object on the earth surface is called “**Global positioning system**”. It looks like a mobile phone which captures signals from multiple satellites and provides information on the location of a place, giving details about the latitudes and longitudes. This device is highly useful for defence purpose to find out the location of enemy camps, missing soldiers, aircrafts etc. Thanks to scientists and technologists for inventing these wonderful digital systems of Remote sensing, GIS and GPS for providing us a lot of information in our National building task.

Over the last three decades earth observation has become increasingly sophisticated. With a large number of countries including those in the developing world recently launching their own remote sensing satellites, such as India, Brazil, China and Pakistan. Remote sensing data has proved invaluable in a wide range of research fields, from making maps of the earth surface, to monitoring renewable and non-renewable natural resources, to urban planning. Its success is due to its unique capability to provide near real time information of the earth’s surface at a variety of scales. In addition, the continuous nature of the data acquisition, the regular revisit of the sensor to previously imaged areas of the earth, and the digital nature of the data have all added to its success and reliability.

EVALUATION

I. Fill in the blanks :

1. One can collect minute details about the regions without physical contacts through _____ technique.
2. _____ is a device used in the technique of Remote sensing, which senses the objects without having direct physical contact.
3. The first requirement for remote sensing is to have an _____ source.
4. The _____ provides electro magnetic energy in the form of light waves.
5. _____ detect features which are not visible to the human eye.
6. Remote sensing helps the planners for formatting _____ and programmes.
7. The term _____ is used for any pictorial representation of data.
8. The data stored in _____ can be used for computer mapping with 3D effects.
9. The _____ is very useful for defence purposes.
10. The _____ is a recent device used for identifying the position and movement of an object on the earth surface.

II. Answer the following question briefly :

1. What is remote sensing?
2. List out the process involved in remote sensing.
3. List out the any two points on advantages of remote sensing.
4. What are special signatures?

III. Answer the following question in a paragraph :

1. Write short note on the development of remote sensing.
2. What are the advantages of remote sensing.
3. Write a short notes on GIS & GPS.

IV. Answer the following questions in detail :

1. Explain in detail the process involved in Remote sensing.
2. Explain about the work of sensor.
3. Explain how sunrays has its impact on the object of the earth.

ECONOMICS

Introduction

In class IX you learnt about the meaning and type of goods and services, different sectors of economy, demand, supply etc. As a continuation of these concepts, in Class X, you will learn about how a country's economic development and growth are responsible for increase in National Income. You will learn about the meaning of trade and why trade is called as an "engine of growth". If trade, development and growth have to take place in an economy, resources have to be utilised carefully. Hence the study of resources is dealt in this book. Price, cost, revenue, profit and loss are the important concepts in economics. Meaningful learning of these topics, create an interest for a joyful learning.

UNIT I
Chapter 1
ECONOMIC DEVELOPMENT AND
ECONOMIC SYSTEMS

Learning Objectives

- to know the meaning of economic development and economic growth
- to understand the meaning of per capita income
- to know about the factors affecting economic development
- to identify the different types of economic system

The nature and scope of economics have already been discussed in the previous class and in this chapter you will be learning about the meaning of economic development, economic growth and how both are indispensable for the nation.

Economic Development

Traditionally economic development has been considered as synonymous with economic growth. Economic growth has been defined as “an increase in real terms of the output of goods and services that is sustained over a long period of time, measured in terms of value added.” Modern economists have defined economic development “as the process of increasing the degree of utilization and improving the productivity of the available resources of a country which leads to an increase of the economic welfare of the community by stimulating the growth of National Income”. In the words of Prof. J.A. Schumpeter “**Development is a discontinuous and spontaneous change in the stationary state which forever alters and displaces the equilibrium state previously existing**”. According to United Nations expert committee, **Development** concerns not only mans material needs but also the improvement of the social conditions of his life. Hence one can say economic development is the process as well as an increase in Real National Income. The term development is normally used to describe the happenings in developing countries. Economic development is of utmost significance to any nation. It is the process by which a country may experience economic growth and allocation of resources from primary sector to tertiary sector. Economic development is also associated with the policy of free trade and open economy.

The policy of free trade means trade which is not restricted by import controls such as tariffs, quotas or other methods. Under free trade output can be increased where each country specializes in producing the goods and services. The growth of free trade has always been associated with economic development.

E.g. In India since January 1981, a single point clearance with regard to industrial licensing, foreign collaboration, import of capital goods and raw material is given for setting up 100% export oriented units (EOUs) by a board headed by commerce secretaries like EPZ (export processing zone) on the lines of free trade zones of Singapore and Hong Kong. EPZ have been set up to facilitate free imports and exports. Each zone provides basic infrastructural facilities like developed land, standard design for factory building, roads, power, water, drainage and other fiscal incentives. Custom clearance facilities are offered within the zone at no extra cost. Banking, post office, clearing agents are also available in the service centres allocated to each zone.

Open economy is an economy in which trade plays a predominant role in the country. Exports contribute significantly to aggregate demand and imports form a significant proportion of total purchases of the country. Almost all present day economy are open economy only. E.g. India has an open economy where significant development has taken place in the field of commerce.

Economic Growth

Economic growth means an increase in production of goods and services in an economy. It is an increase in output and Real National income. It is usually measured using Gross Domestic Product (GDP) Rapid economic growth is one of the common aim of all developing countries.

Economic Growth = Size of Output (A quantitative aspect)

Economic Development = Size of Economic Output + Welfare
(A qualitative aspect)

Economists for the sake of convenience have divided the economies of various countries into two categories.

1. Developed countries
2. Developing countries

Developed countries are characterized by (1) higher levels of aggregate output (2) increase of consumption (3) more saving (4) more investment. These countries are in a position to provide better food, more clothing, comfortable housing and numerous comforts and luxuries. E.g. of these type of countries are USA, UK, Japan, Germany, etc.

Following are characteristics of a developing economy.

- Low per capita income
- High population growth
- Unemployment and disguised unemployment
- Vicious circle of poverty and low standard of living
- Predominance of agriculture
- Environmental pollution and degradation
- Uncompetitive foreign trade

1. Low per capita income

Per capita income is one of the main indicators of development. Per capita income is calculated by dividing National Income by population. A low level of National Income is due to low level of productivity, low saving and low investment. Hence low per capita income is one of the characteristics of developing economy. E.g. India.

Table 1.1 : Per capita income of different countries

Name of the Country	Per capita income (in dollars) per annum
Switzerland	44320
Japan	37850
USA	28740
Germany	28620
UK	20710
China	860
Pakistan	460
India	390
Kenya	330
Bangladesh	270

Source : World Development Report, 1998 - 99, PP. 1990-19

Based on the table countries like India, Kenya, Bangladesh, Pakistan are termed as underdeveloped or developing economy.

2. High population growth

Most of the under developed countries or developing countries experience a higher population growth rate as compared to the developed countries.

Table 1.2 : Average annual growth of population

Sl.No.	Country - Group	Annual growth rate	
		1980-1990	1990-2002
1.	Low Income Economies	2.3	2.0
2.	High Income Economies	0.6	0.7

Source : World Development Report, 2004

High income economy is an economy with a high growth rate and high per capita income. Developed countries are known as High income economies. (e.g., USA and Japan). Low income economy is an economy having low annual growth rate and very low per capita income. Developing countries are also known as low income economy. (e.g., India and China)

3. Unemployment and disguised unemployment

Widespread unemployment is one of the common characteristics of most of developing countries. Unemployment is caused by a number of factors like

- Population pressure
- Low level of economic activity
- Poor growth rates
- Use of more capital intensive techniques of production
- Unrelated education
- Rigid wage structure and
- Lack of investment opportunities

The proportion of unemployment in developing economy is roughly between 8% and 35% of the total labour force.

4. Vicious circle of poverty

A vicious circle is a situation in which it is not possible to discriminate between the cause and the effect of a phenomena. Both cause and effect act and react on each other. Vicious circle poverty is a phenomenon where poverty is both the cause and an effect.

The vicious circle of poverty is so much deep rooted in the economies that the developing countries cannot get out of it in the short period. Every developing country faces the problem of poverty which is explained here by means of a diagram.

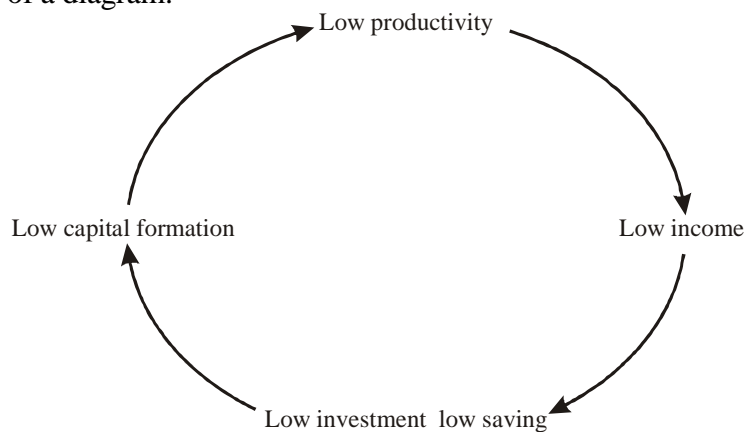


Fig.1.1 : Vicious circle of poverty

Here any developing country having **low income** has **low savings**. Due to low savings **investments are low**. When investments are low **productivity is low**. Hence India as a developing country is caught up in the vicious circle of poverty.

5. Predominance of agriculture

Majority of the population in developing country depends on its agriculture for living. On an average 70 to 75% of population depends on agriculture. 21% of the GDP in the developing country originates in the agricultural sector. The productivity in the agricultural sector has remained low, whereas the pressure of population on land has been mounting. Developing countries get relatively a large proportion of their National Income from

agricultural sector. In developing countries like India agriculture is a large sector of the economic activity. Agriculture has a crucial role to play in the country's economic development by providing food, raw materials and employment to a very large proportion of population.

6. Environmental pollution and degradation

Rapid population growth and poverty are responsible for environmental degradation. Any developing country requires industrial progress. Industrial progress can result in environmental degradation. When natural resources are exploited unscrupulously there is every possible danger of environmental degradation. **A proper balance has to be struck between industrial progress and protection of eco system.** Unpolluted village atmosphere has to be maintained while paving the way for development.

7. Uncompetitive foreign trade

Foreign trade forms a small part of the National Income in many of the developing countries. Most of the developing countries exports their primary products at a very low rate. The countries also experience unfavourable or adverse balance of trade position with imports exceeding their exports. Low volume of trade is also one of the characteristics of developing country. i.e. $X < M$ (X-Exports, M - Imports) where exports are lesser than imports.

Factors affecting economic development

Economic development is the function of several factors which can be classified into two namely (a) economic factors (b) Non economic factors.

Economic factors :

- Natural Resources
- Capital formation
- Capital output ratio
- Technological progress
- Infrastructure
- Population and Human resources
- Size of the market

1. Natural Resources

Bio climatic Resources are Land and water bodies from which plant and animal products are derived. Fossil fuels and non fuel Mineral Resources are basically divided according to function they perform. There are also other resources like solar energy which forms the base and an instrument for economic development.

2. Capital Formation

Capital is one of the four basic factors of production. The other three being land, labour and organization. The word capital implies that it can be used to generate any income stream over a period of time. Capital is a factor of production consisting of buildings, plant and machinery which can be used in the production process. With the other factors of production it can be combined to produce goods and services. Thus capital occupies a very important position in the process of economic development.

3. Capital - output Ratio

C - OR measures the amount of capital employed in producing a given amount of output. The productivity of capital in an economy is determined by C-OR. It is the relationship between the amount invested and the annual growth in output. A high capital - output ratio will indicate capital - intensive production. A highly developed nation has a high capital output ratio. e.g. USA. A developing country has low capital output ratio. e.g. India.

4. Technological Process

Technological process implies the application of improved technology in the production process. Technological progress facilitates more use of capital goods which in turn increases the productivity. Most of the developing countries have slow growth in technology compelling them to import technology from abroad (i.e. transfer of technology).

5. Infrastructure

Infrastructure is also known as **social overhead capital** (SOC) which comprises of activities like (1) transport and communication (2) energy

(3) increasing the productivity of natural resources like irrigation, drainage, afforestation etc. (4) science and technology (5) information system (6) banking and finance (7) piped water supply, sanitation, drainage, solid waste collection and disposal, piped gas etc. and (8) Human resource development. Thus in short, infrastructure creates the conditions on which the super structure of economic activities is built up. Infrastructure is one of the basic factors determining the development of a country.

6. Human Resources

Human resources are instruments for economic development. As an essential factor service, human resources help other factors work i.e. improvement in entrepreneurial ability determines the size of the total output in the economy. All developmental activities in an economy is undertaken to provide better living conditions to human beings. Human Resources play a dual role in an economy i.e. (1) providing factor services (2) providing as units of consumption.

7. Size of market

Size of market refers to the extent of demand for consumer goods. In the developing countries market is limited by low income of the people. In these countries purchasing power of the rural people is very low. Hence there will be low demand for consumer goods. Demand for capital goods or producer goods is derived from the demand for consumer goods. A low demand for consumer goods restricts the level of demand for capital goods.

8. Non-economic factors

The following non-economic factors affect the rate of economic development.

- The willingness and attitude of the people to develop and apply science in the field of economics.
- Peoples desire and willingness to accept innovations.
- Social customs and traditions.
- Value that the people attach to economic incentives, material rewards etc.
- Political and social factors.
- Economic nationalism

Economic Systems

Economic system refers to the way in which resources are allocated in the economy. In any economic system there are various economic institutions operating both at Micro and Macro level.

Economic system can be classified into

1. Traditional economy or Self contained economy
2. Capitalist economy or Market economy
3. Socialist economy or Command economy
4. Mixed economy

Market economies or Capitalism allocate resources using price mechanism which creates incentives for producers to earn profit. Centrally planned economies or Socialism allocate resources according to the government decisions.

1. Traditional Economy

In this type of economy social relations play a predominant role. They are mostly governed by customs and conventions. Traditional economy is also called village economy. Village economy is always a self sufficient and self reliant economy. Traditional economy is also called a closed economy. E.g., (1) people living in inaccessible areas like rugged mountainous region (2) Remote islands with meagre population.

Features of Traditional economy

- Barter System (Exchange of goods is prevalent in this type of economy).
- Division of labour is followed where women attend to household work and men go for work.
- Specialisation of work is mostly based on castes.
- Market is not powerful in this type of economy.
- Goods and services are produced only on a small scale.
- Economic stability is possible due to equalisation of consumption and production i.e. **what is to be consumed is produced and what is produced is consumed.** Surplus stock will not be available for sale.

- Absence of profit motive - Almost all goods and services are produced for self consumption and not for sale.
- The techniques of production used in this type of economy is simple, traditional and outdated.

II. Capitalistic Economy or Capitalism

The term capitalism was introduced by Karl Marx. Capitalism is the system in which Price mechanism is used, to determine how resources are allocated. Land and Capital are owned by individuals who will decide how they are used on the basis of profit that can be obtained. **Capitalist economy** is also called as market economy.

An economy where individuals are free to earn, own and control their economic resources without government interferences is called capitalist economy.

Features of Capitalist Economy :

- Existence of private property
- Operation of invisible hand - i.e. price mechanism
- Consumer is the king or sovereign
- Freedom of enterprise

Under Capitalism factors of production are owned by firms and industries. They have Profit motive which acts as a guiding force.

Basic economic functions like production, distribution and exchange are in the hands of private individuals or private sector. Governments do not interfere in the economic activity of the private sector. Hence governments role is very minimum in Capitalist economies.

In capitalism, the consumer is the sovereign or king. Market is controlled by tastes, preferences and decisions of the consumer. The basic problems facing the economy like (a) What to produce (b) How to produce and (c) For whom to produce are tackled by market forces only. Producers produce those goods which are demanded by consumers. **Since goods available in the market are many, consumers make the ultimate choice as what to purchase? Thus the consumer is like a 'king'.**

Every firm in an industry under capitalist economy has freedom to enter the industry or quit. There is no restriction on the private initiative of a person to start a new firm or enterprise.

Merits of capitalistic economy

Capitalistic economy has the following advantages.

- Economic freedom
- Maximum utilisation of resources
- Higher standard of living
- Growth in Research and development
- Rewards according to ability
- Every individual is free to adopt business and profession of his choice. Productive activities are not owned and controlled by the state.
- The individuals of the economy makes best possible use of land, labour, capital, tools, equipments and other resources, so that they can earn more and more profit.
- Individuals work very hard to earn higher income. Increased income results in higher standard of living. Mechanisation and large scale production increase National income and per capita income which result in an increase in the standard of living.
- In capitalist economies each firm or industry has to be always engaged in research and development. A firm will engage in inventing new goods and services. Thus one of the merits of capitalism is possibility of **invention**.

III.Socialism or command economy

Socialism is an economic system which involves collective ownership of the means of production. State plays a major role in providing services to the people to improve the welfare of the community.

Features of socialism

- Socialist economy is also called command economy
- Market has a limited role to play
- Absence of private ownership of factors of production
- Absence of profit motive
- Central planning
- Lesser inequalities of income

- More thrust given to basic and key industries
- Economic stability

Under socialism the factors of production are owned by the state. In a socialist economy, market has only limited role to play. The basic problems of the economy like what to produce, how to produce for whom to produce are solved by central planning authority or state. All resources are allocated and controlled by the government or state. Thus market forces of demand supply has minimum role to perform in the functions of the society. In the command economy, private ownership of property, acquiring wealth and assets are restricted. In socialist economy all economic decisions are taken by the state. States plans, sets goals for the economic welfare and security of weaker sections of society. Absence of profit motive is the main reason for equal distribution of income and wealth among the people. Government plans and directs all the economic activities. **State decides what goods to be produced and how to be produced and for whom to be produced.** Hence socialism is also called the command economy. Importance are given to basic and key industries. Socialist economy is also free from business cycle fluctuations like boom (inflation), depression (deflation), recovery and recession.

IV. Mixed Economy

Mixed economy is one in which both public and private sectors co-exist. In the real world no economy is a pure traditional economy, a pure capitalist economy or a pure socialist economy. All economies contain all elements of these three economic systems. E.g. India is an example for mixed economy.

Features of Mixed Economy

- Government and public sector plays a predominant role
- Existence of economic planning
- Administered prices
- Public and private sector co-exist

In a mixed economy public sector act as one of the arms of the state. Industrial policy resolution of 1948 and subsequent policy resolution under the guidance of Pandit Jawaharlal Nehru drew a blue print for economic development of India and India adopted the Mixed economic system. After independence public sector enterprises played a predominant role in the

economic development of the country. India followed centralised planning. Objectives of planning were aimed to improve the welfare of the people. The implementation of the five year plan made India march towards the path of growth.

One of the significant features of mixed economy is the fixation of administered prices by the government. Administered prices are imposed by the government to protect the interest of the consumer. e.g. minimum support price of sugarcane, procurement prices for paddy etc.

In India certain industries are reserved for public sector and certain industries are in the private sector. Large scale industries like iron & steel, cotton textile which are called as basic industries are controlled by the state. Medium scale, small scale and cottage industries are in the private sector. In a mixed economy public sector and private sector are **not competitive but complementary** in nature. However with the introduction of new macro economic policy of 1991, there is more emphasis on Globalisation, Liberalisation and Privatization and it has increased the importance of private sector. In developing nation like India, the complementary role played by public and private sector can take India to the status of developed nations in few years time. **Days are not far off where India will emerge as one of the advanced nations of the world.**

EVALUATION

I. Choose the best answer :

1. Economic development is the process as well as an increase in
 - (a) real national income
 - (b) percapita income
 - (c) personal income
2. Economic growth means are increase in products of
 - (a) goods and services
 - (b) raw materials
 - (c) semi finished product
3. Percapita income is calculated by dividing national income by
 - (a) population
 - (b) depreciation
 - (c) indirect taxes
4. On an average 70 to 75% of population depends on
 - (a) agriculture
 - (b) industry
 - (c) trade and commerce

5. Traditional economy is also called
 - (a) closed economy
 - (b) open economy
 - (c) developed economy
6. Co-existence of public and private sector is prevalent in
 - (a) capitalist economy
 - (b) socialist economy
 - (c) mixed economy

II. Fill in the blanks :

1. Open economy is an economy in which _____ plays a predominant role in the country.
2. Economic growth means an increase in output and real _____.
3. Poverty is a situation in which peoples standard of living is very ____.
4. Majority of the population in under developed countries depend on ____.
5. All most all under developed countries have _____ economy.

III. Distinguish between the following :

1. Economic development and economic growth.
2. Low income economy and high income economy.
3. Capitalism and socialism.
4. Capitalism and mixed economy.

IV. Define the following terms :

1. Economic development
2. Economic growth
3. Disguised unemployment
4. Capital output ratio
5. Infrastructure

V. Answer the following questions briefly :

1. Explain the vicious circle of poverty with the help of diagram.
2. Explain the concept of economic development.
3. What is an economic system? Explain its classification.
4. What are the features of Capitalism.
5. List out the features of Socialism.
6. What is mixed economy and explain the features of mixed economy.

V. Answer the following questions in detail :

1. What are the characteristic features of developing economy?
2. Explain the factors affecting economic development.
3. Define traditional economy. Does it have a place in the present economic scenario.
4. Distinguish between socialism and mixed economy.
5. What are the characteristics features of Capitalistic Economy?

UNIT II

Chapter 2

NATURAL RESOURCES AND ECONOMIC PROBLEMS FACING OUR COUNTRY

Learning objectives

- To identify the different types of Resources available in our country and learn about renewable and nonrenewable resources.
- To analyse the role of man in utilising the available resources in the most judicious manner.
- To understand the importance of transport and communication.
- To compare the trends in population in India and analyse the effect of economic development on population growth.
- To learn about the theory of demographic transition and to understand the term Human Resources.
- To distinguish between Rural and Urban unemployment.
- To know about the economic problems facing the country and the various poverty alleviation programmes.

Resources given to us by nature have a vital bearing on the economic life. Since very long past, when man started interacting with nature, natural resources have been made available in different varieties and varying quantities. Natural resources constitute a key factor in the economic development of a country. Resources are potential wealth and if they are fully explored and properly utilized, economic development of a country can be accelerated. In general one can define Natural resources as resources consisting of all that, is **given by nature on, above and under the surface of the earth**. Natural resources fall into two broad categories i.e. (1) the Nonrenewable resources like minerals and (2) renewable resources like forests and water. The conservation and economic exploitation of the Nonrenewable resources and the proper utilization of the renewable resources are essential for accelerating the economic growth of a country.

The most important natural resources are the land resources, soil resources, water resources, fisheries, mineral resources, forest resources and

power resources. Economic resources of a country include Natural, human and capital resources. Natural resources are the gift of nature but human and capital resources are the outcome of human effort. Economic resources are used to produce those goods and services which satisfy human wants and they also determine the growth and economic structure of a country.

Land and soil

Land a renewable resource is in a fundamental sense the most important endowment of the nature. The geographical area and the types of soil provide the basis for economic activity of a country. Land is put to various uses, i.e. cultivation of food, fodder and forests, besides the non agricultural uses of land like construction of buildings, laying of railways, roads, etc. Hence the land available in the country and also the pattern of its use are of great importance to the people. It is necessary to make an optimum use of land.

Soil may be defined as a thin layer of the earths surface formed by the breaking down of the mantle rocks into tiny particles. It also consists of decayed organic materials and living organism, etc. India posses 2.4% of the land surface area of the world. It is also bestowed with different types of soil. Soil cover helps agricultural production and agriculture supports 75% of the population of India.

Climate and rainfall

India is land of diverse climatic conditions. Our climatic conditions and the distribution of rainfall varies from place to place due to location topography and latitude.

Fisheries

The rivers, canals, ponds, lakes etc comprise the Inland fishery resources. “In India, marine resources are found in Indian ocean and in a large number of gulfs and bays all along the coast”.

Water resources

Rivers are the main source of water in India. Water is required for domestic consumption, irrigation, industrial use and also for generating electricity.

Forest resources

Uses of forests

- Forest resources are renewable.
- Nearly about 75 million hectares of land is under forest cover. Concerted efforts are made to bring about desirable area under forests.
- Among the resources of India forests occupy a very high place which is called “green umbrella”
- India possesses an infinite variety of forests which is very unique in the entire world. They are a) evergreen forests b) deciduous forests c) mountain forests d) coastal e) dry forests . All these forests cover 20.2% in total geographical area of India and cover 66.7 million hectares of land.
- 1/3 area of the existing forest has good raw materials where as 2/3 comprise of scrub or is burdened with rights of local people who fell trees unscrupulously.
- Most of the valuables of the forests were not put into proper use due to lack of transport and communication in the inaccessible areas.
- Programmes under afforestation have been taken up to preserve the forest cover. Government of Tamil Nadu is taking various steps to protect our environment. By celebrating “Vanamahotsava” a festival to preserve forest cover people are made to understand the importance of forests.
- Forests play an important role in the economic development of country.
- Forests supply the basic needs of the people in the form of fodder, food and housing materials.

Role of forests in economic development

- Indian forests are considered as a great national asset. Forests play protective and as well as productive role.
- Protects the land area against floods and regulates air currents.

- They preserve moisture and lessen the severity of drought and save the nation from dreadful famine.
- They are the rich sources of raw materials.
- Forests are also home of rich and varied wild life.
- Ecological balance is maintained.
- Forests provide fruits, nuts, berries etc and many agro based industries use the raw materials from forests.
- Sizeable amount of foreign exchange earnings enter the Indian economy through exports of agro based resources. E.g. export of tinned and canned fruits to the global market.
- “Wood” used as an industrial raw material help the developing country to enter into the world trade.

Water resources

Water resources are of two types (1) Inland water resources (2) Marine Resources.

Inland water resources can be utilized for irrigation and hydel power. Rainfall in India is not only uncertain but also inadequate. Hence there is utmost need for agriculture to tap other sources of water like canals, rivers, lakes, wells and tube wells. Hydel power happens to be the cheapest sources of energy in India. (e.g., Damodar Valley Project, Hirakud, Bakhara Nangal, etc.)

Marine resources

Huge amounts of money are invested to exploit the marine resources. Large amounts are being invested to boost the fish catch. Fisheries department undertakes all measures to safeguard coastal fishing and deep sea fishing. The other major ocean resources is the off shore oil resources. Bombay High already accounts for nearly 2/3 of the national production of crude oil. The ONGC (Oil and Natural Gas Commission) is conducting massive survey operations for finding oil in the deep sea waters off Andhra coasts and in the south coast of Kerala.

Mineral Resources

Minerals occupy an important and strategic position in the rapid economic development of the country. Large variety of minerals are tapped from mother earth. These resources are exploited fruitfully for industrial development. Judicious use of the mineral resources help a nation to march towards industrial progress. Coal and petroleum are the chief source of motive power. 'Wheels of Industry' is moved with the help of the mineral resources. Iron and steel and other metallurgical industries, cement, chemical, electrical and most of the other key industries are essentially based on minerals. In the absence of mineral wealth, a country will remain in the state of backwardness and will be termed as economically poor nation. Mineral fuels like crude petroleum and coal are termed as 'Power Resources'.

Iron ore

Iron ore is the key mineral for industrialisation of any country. Iron ore found in India are of the richest in kind having more than 55% of iron content in them. Besides most of the iron ore fields lie in close proximity to the coal mines and the source of other smelting materials. Thus India is in a position to produce iron at very cheaper rate and also in abundant quantities. Damodar Valley in Bihar is the leading producer of iron followed by Orissa and Karnataka. Iron ore has also entered the export market.

Manganese ore

It is known as the 'Jack of all trade' due to its increasing use of this mineral in all industrial units. It is mainly required for the manufacture of steel and is also widely used in chemical plastics, dry batteries etc. India is the largest producer of high grade manganese ore next to USSR.

Mica

This is a mineral of great strategic importance. This mineral is of great demand in electrical industry where it is mainly used as an insulating medium. India is one of the important sources and also share worlds 70 to 80% of sheet mica. Hazaribagh and Gaya districts in Bihar are the main centres of production. The other two sources are Rajasthan and Andhra Pradesh.

Bauxite

Bauxite is the main source of aluminium which has recently come to be regarded as wonder metal. Bauxite is widely used in air craft industry. India is rich in high grade bauxite. Bihar is the principal producer followed by Gujarat. Madhya Pradesh, Tamil Nadu and Karnataka. Sizeable deposits are also found in Orissa and Andhra Pradesh.

Gypsum

Gypsum ranks next to coal and iron as a mineral of great importance. Gypsum is used as a raw material in fertilizer industries. Gypsum deposits are found in Rajasthan and Tamil Nadu.

Titanium

Titanium minerals are widely distributed in India. The beach sand contain this mineral which is used in the manufacture of paints and high speed steel.

Thorium

Thorium is a source of mineral used in atomic energy. India has large reserves of monazite containing 8 to 9% of thorium oxide. It is widely found in Kerala. Thorium plants have been set up at Trombay in Maharashtra and Alway in Kerala.

Uranium

Uranium is also another source of atomic energy. Its deposits are found in Singhbhum district of Bihar, Udaipur district of Rajasthan and Chickmagalur districts of Karnataka.

Chromite

It is another source of raw material used as an industrial mineral widely used in manufacturing stainless steel. It is the source of Chromium which is used in the electroplating, dyeing and paint manufacturing industries. Like manganese ore and mica chromite is largely exported. Karnataka, Bihar and Orissa are the principal suppliers of chromite. Besides the above minerals,

India possesses adequate sources of structural minerals like lime stone, clays, suitable for pottery, tiles and pipes manufacture and various kinds of sands suitable for the manufacture of glass. There are also several refractory minerals used in a wide range of industries. Apart from these minerals. India has lesser deposits of the following minerals. They are copper, lead, zinc and tin (non ferrous metals) with regard to resource utilization on the whole, nature has been very generous to India. India's biggest gift is the Mighty Himalayas. The Indo – Gangetic Plain is a perennial source of rich economic life.

India possesses rich mineral resource in varied quantities. They are the source of raw materials to our industries. Natural resources constitute a vast potential wealth of the country. If these resources are properly and adequately utilised they can be the key factor in the process of economic growth and development of the country. Effective utilisation of resources will make it possible to conserve the available resources thereby reducing the cost of production and it will also solve many cases of problems of pollution and environmental degradation.

Transport and Communication

Agricultural and industrial growth in the economy is closely linked to the availability of transport and communication network.

Importance of Transport and Communication

The Transport and communication system provides the essential infrastructure for the development of the country. Economic development of a country depends on the basic infrastructure like Roadways, Railways, Airways and communications services.

On the social side it is an important means of raising the standard of living and spread of education and culture. **On the political side** it promotes national unity and integration. It also helps to strengthen the national defence. **On the economic front** it helps in linking the remote areas and make it accessible. Well developed transport network helps in the movement of raw materials, finished products and labour etc. It also helps in the development of markets. It also helps the people to come out of isolation and provide an opportunity to interact with the outside world.

Uses of Transport and Communication

- Transport and communication links the remotest villages to the urban cities.
- Villages have improved due to improvement in infrastructure E.g. Rural electrification.
- Setting up of educational institutions thereby implementing the new scheme of X five year plan called Sarva Shiksha Abhiyan.
- Providing finance to the villages through setting up of rural banks.
- Weekly market like “Sandhai” where traders from nearby villages will meet and exchange their goods.
- Pucca roads were laid facilitating the vehicular movement
- Extending community health programme to the villages and all these are possible due to the improvement of transport and communication.

Following are the services offered by government in the communication sector

- Postal services
- Telegraph services
- Overseas communication
- Radio and Television Services
- Print and Electronic Media
- E-commerce
- Electronic mail service
- E-governance etc.
- E-Tutoring and Edusat Programmes.

Transport and Communication in Tamil Nadu

Tamil Nadu has 82000 Km of surfaced roads which account for a share of 1% on the national figure. It has a total length of 3937 km railway route facilitating the movement of freight carriages of food grains and raw materials. On November 15 1995 the country’s first elevated multi crore suburban railway scheme known as Mass Rapid Transit System (MRTS), was opened

in Chennai. Tamil Nadu is an important maritime state. Chennai is the major port. The intermediate port at Tuticorin is being developed as a major port. Cuddalore and Nagapattinam are the two other major intermediate ports. Besides there are nine minor ports. The airports at Chennai, Madurai, Tiruchirappalli & Coimbatore are important centres of airborne traffic. Likewise there are 25 post offices for every one lakh population against the national average of 2.1. Due to improvement in communication the government of Tamil Nadu reached the people who were affected by Tsunami. Every district head quarters was connected through electronic mail services and government could reach the victims very quickly. Prompt action taken by government authorities is due to the improvement in Transport and communication.

HUMAN RESOURCES

The term “Human Resource” refers to total knowledge, skills, creative abilities, talents aptitudes as well as population of a country. Adam Smith included the acquired and useful abilities of human beings in his analysis of capital as Human Resources. Alfred Marshall considered the investment in human beings as the most valuable of all capital. Human capital consists of knowledge and skills acquired by individuals. It may be acquired in a formal way through education or employers training programmes. Investing in human capital makes people more productive and can increase their earnings, provided there is demand for the particular skill and knowledge. Human capital is an important element in the process of economic growth.

Human Resources Management (HRM)

Human resource management is that part of the Management process which involves the ways in which people develop their skills. The potential capacities of the people are to be developed in the most productive manner. The process of developing these competencies in people is termed as Human Resource Development. At present, all National governments and International agencies like UNDP (United Nations Development Programme), World Health Organisation (WHO), International Labour Organisation ILO, UNESCO (United Nations Educational Scientific and Cultural Organisation) recognises the importance of Human Resource Development, for a given

period of time and also advocated that HRD should be constantly upgraded. Human capital formation refers to the financial investment in raising the skills and abilities of people.

Human Resource and Economic Development

As a resource, people are available as factors of production to work in combination with other factors. As consumers human being contribute demand for the national product of the economy. Therefore the size of population is a crucial determinant of economic development.

Trends in Population in India

India is the second largest populated country in the world with the total population enumerated in the 2001 census at 102.7 crores. This accounts for 16% of the total population of the world. In other words every sixth person on the earth is an Indian. India has got only 2.4% of the total land area.

Table 2.1 : Trends in Population in India

Year	Population (in crores)
1901	23.8
1911	25.2
1921	25.1
1931	27.9
1941	31.87
1951	36.10
1961	43.92
1971	54.81
1981	68.33
1991	84.63
2001	102.70

Source:Census of India 2001 Provisional Population Totals paper 1 of 2001).

An interesting feature of India's population is the different size of different states in terms of the number of people. The growth rate of population is a function of **migration, birth rate** and **death rate** in a country. The difference between the birth rate and the death rate measures the growth rate of population. It is expressed in percentage.

Demography is the science that studies about population. Demographic transition means the various stages that a country undergoes in the process of Economic Development.

Demographic transition

Stage I : High birth rate and High death rate

Before an economy undergoes economic development it is characterized by the prevalence of high birth rate which are stable at high level and high mortality rates. Birth rates are high due to universal and early marriages and due to the influence of customs, traditions and attitudes.

Death rate is high owing to poor diet, bad sanitary conditions and absence of preventive medicines. **High Birth rate** and **high death rate** was prevalent in underdeveloped economies.

Stage II : Low death rate and High birth rate

Economic development brings about an improvement in the economic conditions of the people. It raises the standard of living and better medical facilities are available to the public. There is an increasing awareness of the benefits of small families. Improvement in medical field and good sanitary conditions helps to eradicate many diseases. The cumulative effect of all these developments reduces substantially the incidence of disease and death. However birth rate remains to be high. **Fall in the death rate** and **high Birth rate** results in rise in Population. All developing countries are in the second stage.

Stage III : Low birth rate and Low death rate

In this stage there is deliberate limitation of the size of the family, Advancement in science and technology results in fall in death rate. Thus a

country passes from a position of low per capita income, high birth rate and death rates to new equilibriums of **high per capita income, low birth rate** and **low death rate**. The shift is caused by the development of new technology and accumulation of capital. Most of the developed economies are in the third stage.

Obviously India is in the second stage of demographic transition characterized by a **decline in the death rate** but **high birth rate**. If family planning programmes are intensified, India will enter the final stage in a very short span of time.

Growth of population

The major causes responsible for the fast growth of population during the last five decades can be grouped into two

1. Those responsible for persistent high fertility as indicated by high birth rates.
2. Those responsible for declining mortality as indicated by falling death rates.

Causes of growth of population

- Climate, social and economic factors all combine to cause the birth rate to remain high
- Marriage is considered as a universal phenomenon in India.
- Joint family system
- Preferences for a male child
- Widespread poverty
- Indifference towards family planning

Causes for declining death rate

A declining death rate is a characteristic feature of a developing economy. Chronic diseases no longer pose a threat.

- Diseases like plague, small pox, typhoid which used to take a toll of full villages together are no longer dreaded.

- Antibiotics and other life saving medicines are now freely available that causalities resulting from those diseases have been drastically reduced.
- Growing awareness and facilities for sanitation and cleanliness have helped to reduce the incidence of mortality.
- The provision of better maternity and postnatal care has helped to bring down the impact of mortality rate.
- Dreaded famines have been a phenomenon of the past.
- Famines does not occur frequently because of responsible administrative arrangements and also primarily due to the availability of the vast network of transport and communication facilities.

Effects of population growth on economic development

In under developed countries rapid population growth would increase the pressure of population on land, leading to unemployment and under employment.

- Adverse effect on savings
- Unproductive investment
- Slow growth of per capita income
- Environmental degradation
- Under utilization of labour
- Growing pressure on land
- Adverse effect on quality of population

1. Adverse effect on savings

The population acquires an increasing proportion of people in the non – working age groups relative to those of working age. Unplanned population growth retards capital formation. Increase in consumption results for low saving.

2. Unproductive investment

Increase in population raises only the “**Social overhead capital**”. The composition of Investment is altered in an unproductive direction. In

developing countries investment will be mainly on consumption goods rather than producer goods.

3. Slow growth of per capita income

Per capita income is calculated by dividing the National Income by population. Per capita product in India is undoubtedly lower due to continuous increase in population. Every increase in National output is accompanied by an equal or even more number of consumers.

4. Environmental degradation

As population grows there will be more strain on already available scarce resources. Problems like pollution, loss of soil cover, excessive use of underground water poses threat to life and society.

5. Under utilization of labour

Growing population adds to the problem of under utilization of labour. Rapid population growth prevents change in occupational distribution in a developing country. With increase in labour force it may not be possible to expand job opportunities due to absence of complementary resource and effective man power planning.

6. Growing pressure on land

Expansion of labour force puts enormous pressure on the single most important natural resource in a predominantly agrarian economy namely land, which is more or less fixed in physical terms, Excessive pressure on land will have adverse effect on its productivity as there will be constraint on moisture availability of the land.

7. Adverse effect on quality of population

Increasing population affects the quality of people. It also erodes the quality of human resources. Due to poverty, illiteracy and under employment the standard of life of people are very low. The capacity of the people to contribute for the productivity of the nation is also reduced to a great extent. Adoption of family planning is the only solution to control population growth.

National population policy was announced on February 15, 2000 to control population growth.

The main objectives of the policy are as follows

- To meet the needs of health personnel
- To bring down the fertility rate by 2010
- To bring out stabilization of population by 2045.

The policy has outlined 16 promotional measures for controlling population growth. Among the most important are the following

- Rewards were announced for panchayats and zila parishad for promoting small family norm.
- Strict enforcement of child marriage restraint act
- Health Insurance cover of Rs.5,000 for couples living below and poverty line who adopts small family norm.
- Rewards for couples below poverty line who marry after legal age
- Funds and loans sanctioned for providing ambulance services in rural areas.

Remedial measures suggested to control population growth

- Postponement of marriageable age.
- Effective propaganda for small family norm through mass media
- Spread of population education in rural as well as urban areas.
- Adopt poverty alleviation programme.
- Development of backward area.
- To narrow down the regional disparities.
- Adult literacy programme to be launched in each and every village.

Census

The term Census can be defined as “the process of collecting, compiling, evaluating, analysing and publishing the demographic, economic and social data relating to all persons in a country or a well delimited part of a country

at a specific time". Census is being taken once in 10 years. The first census was taken in India in the year 1871.

Uses of Census

- Population census provides necessary information required for economic planning.
- It is more useful for administrators to divide the urban cities & rural village for electoral constituencies.
- It is more useful for government to undertake various welfare measures and schemes.
- Census provides an authentic, complete, comprehensive data regarding the country's population.

Following details are recorded in the population census

- Life expectancy
- Age composition
- Literacy rate
- Density of population
- Sex composition & Sex ratio
- Growing urbanization
- Occupational pattern of the people living in a country
- Rural versus urban population
- Skilled and non skilled workers
- Distribution of population according to language and religion

Some important concepts and terms

- Growth rate of population : Difference between the crude Birth rate and crude Death rate, measured in a year.
- Birth Rate : Number of births per 1000 population during a year.
- Death Rate : Number of deaths per 1000 population during a year.
- Life expectancy : No. of years a person can hope to live
- Age composition : Distribution of population by different age groups.
- Sex composition : The proportion of males and females in Total population. Generally it is enumerated as number of females per thousand males.

- Urbanization : Migration of people (labour force) from villages to towns and cities.
- Human Capital formation : Financial Investment in increasing the skills and abilities of the people.
- Population explosion :A stage where the population of a country increases very fast, this is primarily due to a rapid decline in death rate, whereas the birth rate are slow to fall.
- Mortality - otherwise known as death rate.

We have discussed in detail the adverse effect of population on economic development, However, positive aspects of population growth and its impact on economic development is discussed below.

Population growth works as a factor in economic development

- Large population forms as a base of uninterrupted supply of labour.
- Large population helps in better utilization of available natural resources.
- Population growth helps in augmenting saving and capital.
- Population growth acts as a contributing factor for increasing entrepreneurship.
- Large population provides larger market for all types of goods and services.

Instead of viewing population growth as economic problem, the human being as “Resources” can be utilized in the most productive manner thereby making the **Human Resources** as a contributory factor for economic development of our country. Hence our government rightly named it the educational ministry as Human Resource Development Ministry.

ECONOMIC PROBLEMS FACING OUR COUNTRY

Unemployment

Unemployment is a problem encountered when there are people, who are able and willing to work but unable to find jobs. This leads to a loss of potential output. In India, there has always been a serious problem of

unemployment, underemployment and disguised unemployment. India being mainly an agricultural country, the great majority of unemployed and underemployed people are in rural areas. In the urban areas, the unemployment problem is very acute among the educated people.

Nature of unemployment

The nature of unemployment in developing countries is different from that to be found in developed countries. In the advanced countries the nature of unemployment is purely temporary, or frictional or cyclical. But in the developing countries like India, the nature of unemployment is different. It is chronic rather than temporary. It is largely due to slow growth of capital formation as compared with the increase in labour force.

The important forms of Unemployment as follows:

- Cyclical unemployment
- Technological unemployment
- Seasonal unemployment
- Structural unemployment
- Frictional unemployment
- Disguised unemployment

Unemployment in developing countries

Unemployment takes three forms i.e. 1) Open unemployment (2) under unemployment (3) disguised unemployment

1. Open unemployment refers to a situation where large labour force does not get jobs that may yield them regular income.

2. Under employment Can be defined in two different ways. 1) a situation in which a person does not get the type of work he is capable of doing due to lack of suitable jobs. 2. A Situation in which a person does not get sufficient work to absorb him for the total length of the working hours a day.

This type of unemployment is known as seasonal unemployment and is caused largely by natural circumstances.

3. Disguised unemployment : Mostly prevalent in agriculture when more people are engaged in a job than actually required. They are called as disguised unemployment. If a part of the labour force is withdrawn and the total productivity remains unchanged, this withdrawn labour will be known as disguised unemployed labour.

Problem of unemployment in India

While treating the problem of unemployment in India, we need to distinguish between the nature of unemployment in rural India and that in urban India. These two respective situations can be called as rural unemployment and urban unemployment.

Rural unemployment

In the rural economy, both unemployment and underemployment exist side by side. In the rural areas increasing population puts enormous pressure on land. In the agricultural sector, the pressure on land has resulted in an increase in the number of agriculturists. This has largely contributed to the problem of unutilized labour in the form of disguised unemployment. In short the major feature of rural unemployment is the existence of unemployment in the form of disguised unemployment and seasonal unemployment rather than open unemployment that exists in urban areas.

Urban unemployment

Urban unemployment is largely the offshoot of rural unemployment. Due to urbanization, there is large scale exodus of people moving from rural areas to urban areas. This type of migration increases the size of labour force in urban areas and in turn, adds to the already unemployed labour.

One of the special features of urban unemployment in India is that the rate of unemployment is higher among the educated than among the uneducated people.

To sum up rural unemployment in India is characterized by the existence of **under employment, seasonal unemployment** and **disguised unemployment**. Whereas urban unemployment is characterized by the existence of **both open** and **educated unemployment**.

Causes of unemployment

1. Pressure of Population

In India the pressure of population of land is very high and hence the responsibility for creating new jobs is largely borne and shared by the secondary and tertiary sectors of the economy.

2. Slow growth of agricultural sector

Agricultural sector has been growing at a slow pace. Productivity in this sector continues to be one of the lowest. Due to prevalence of disguised and seasonal unemployment, India could not fully exploit the employment potential from the agrarian sector.

3. Nature of technology used in agriculture

The landless labour is basically employed by the large farmers. Introduction of new technology has increased the possibilities of substituting capital for labour. This results in lower labour absorption and thereby reducing the income of the tenants who are small farmers.

4. Educational system

There should be perfect co-ordination between the labour force who are productive with the available jobs in the economy. Educational system should pave the way for fuller absorption of men and women who come out of schools and colleges.

5. Planning techniques

Planning should be done to stop the drift of rural people migrating to urban cities. Hence, rural areas should be made more attractive and ensure better living condition Tenth Plan emphasizes on rural development which will definitely help to solve the problem of unemployment.

Measures to solve urban unemployment

1. Reforms to be undertaken in the educational system 2. Deliberate promotion of low capital intensity in industrial production 3. Promotion of labour – intensive techniques of production. 4. In planning Investment, long gestation periods should be avoided (gestation period – period of

manufacturing to period of sale of output) 5. Promotion of Industrial activities. 6. Promotion of small industries and encouragement to self employment. 7. Investment in consumer goods industries may help to generate employment.

II. POVERTY – As an Economic Problem facing the country

Poverty is a situation in which people standard of living is low. Poverty can be classified as

1. Absolute poverty

Inability to provide the needs of a person for sustenance. It also means that a person's basic needs such as food, clothing and shelter are not being met and a poor standard of health may also result.

2. Relative poverty

It is an extreme form of inequality. It depends on the standards being applied and implies that within a particular society a given standard of living is unacceptably low.

Important terms and concepts

1. Poverty alleviation

Schemes organized by the government for the people living below poverty line.

2. Redistribution

The process of altering the existing distribution of income or wealth in a society.

The principal aim of economic planning in India has been to remove poverty and raise the standard of living of the people. Government has taken various poverty alleviations programmes throughout the planning era.

Magnitude of Poverty in India

Poverty is a chronic economic problem facing all parts of the world. India as a developing country is also not free from this problem. One of the most

important and most common manifestations of poverty is the denial of access to the basic necessities of people.

Extent of poverty in India

In India poverty has been defined as a situation in which an individual could not earn sufficient income for his bare necessities of life.

The Planning Commission has defined the “Poverty line” on the basis of recommended nutritional requirements of 2400 calories per person per day for **rural areas** and 2100 calories for **urban areas**. For a household of five members, the poverty line has been fixed at an annual income of Rs. 13,680 in rural areas and Rs. 15,840 in urban areas.

Table 2.2 : The percentage of population below the poverty line

	1972-73	1977-78	1987-88	1993-94	1999-00	2007*
Rural	54.10	51.20	39.00	37.27	27.09	21.1
Urban	41.20	38.20	38.20	32.36	23.62	15.1
All India	51.50	48.30	38.86	35.97	26.10	19.3

* Projection

Source : Economic survey 2002 – 03

According to the Planning Commission more than 26% of India’s total population is about 265 million, who live below the poverty line.

Nature and causes of poverty

Poverty is prevalent both in rural and urban sectors of the economy. However the nature of poverty differs in both the sectors. In the rural sectors, the major group of the poor consists of landless agricultural labourers. In urban areas poverty can be identified with people who are unemployed, underemployed or employed in various low productivity occupations.

Poverty and Five year plans

Poverty alleviation and improving the living standards of people have been the central theme of Economic planning. In recent years a number of Poverty Alleviation Programmes (PAP) have been launched.

They are as follows.

1. IRDP

Integrated Rural Development Programme – launched in 1979

2. TRYSEM

Training of Rural Youth for Self Employment – August 15, 1979

3. JRY

Jawahar Rozgar Yojana – April 1989

4. NRY

Nehru Rozgar Yojana – Urban counterpart of JRY – It has been in operation since October 11, 1989.

5. SUME

The Scheme of Urban – Micro Enterprises

6. SUWE

The Scheme of Urban – Wage Employment

7. EAS

Employment Assurance Scheme Operational from October 2nd 1993

8. PMRY

Prime Ministers Rozgar Yojana launched on October 2nd 1993

9. PMIUPEP

Prime Ministers Integrated Urban Poverty Eradication Programme launched in November 1995.

10. NSAP

National Social Assistance Programme implemented from 15th August 1995.

11. GKY

Ganga Kalyan Yojana – became operational from 26th January 1997

12. SJSRY

Swarna Jayanthi Shahari Rozgar Yojana came into effect – Scheme from December 1st 1997.

13. SJGSY

Swarna Jayanthi Gram Swarozgar Yojana – Scheme became fully operative from 1st April 1999. (It comprises of IRDP, DWCRA and TRYSEM).

14. JGSY

Jawahar Gram Samridhi Yojana – launched on 23rd June 1999.

15. PMGY

Pradan Mantri Gramodaya Yojana – Introduced in 2000 – 01 focussing village level development in five crucial areas like. 1. Health 2. Primary Education 3. Safe drinking water 4. Housing 5. Rural roads.

16. JPRGY

Jai Prakash Rozgr Guarantee Yojana – proposed in the Union budget of 2002 – 03 to provide employment guarantee to the unemployed youths of distressed districts.

Economic Policy (1991)

After independence five year plans have been evolved wherein various macro economic reforms have taken place. Now we are in the tenth five year plan. New economic reforms were undertaken by India to remove poverty which is deep rooted and it emphasized the fact that Rapid Economic growth is a necessary condition for removal of poverty from the country.

Major causes responsible for widespread poverty are 1. Rise in population 2. Illiteracy 3. Low productivity in agriculture 4. Under utilized natural resources 5. Inequalities of income and wealth. The government by launching various programmes aims to solve the problem of poverty and illiteracy thereby making the country march towards the path of development.

EVALUATION

I. Choose the best answer

1. Natural Resources fall into _____ broad categories
a) Two (b) five c) three
2. _____ occupy an important and strategic position in the rapid economic development of a country.
(a) climate (b) minerals (c) rivers
3. _____ transport is the cheapest mode of transport because it provides readymade pathway for ships.
(a) air (b) road (c) internal water
4. _____ helps in the movement of petroleum products and gases in bulk over long distances.
(a) pipelines (b) communication (c) network
5. The term _____ resources refers to total knowledge, skills, talents as well as population of a country.
(a) agricultural (b) industrial (c) human

II. Fill in the blanks

1. _____ is the most important feature for the economic development
2. _____ are called green umbrella.
3. The _____ is conducting massive survey operations for exploring oil in deep sea waters.
4. _____ is used as a raw material in fertilizer industries.
5. The differences between the birth rate and death rate measures the _____ rate of population.
6. Increase in _____ raises the "Social overhead capital".
7. _____ is calculated by dividing National income by population
8. The first Census was taken in the year _____
9. _____ Provides various data regarding age, religion, literacy, and languages.
10. Increasing population affects the _____ of the people.

III. Distinguish the following

1. Renewable resource and non-renewable resource.
2. Birth rate and death rate.
3. Rural unemployment and urban unemployment.

IV. Define the following terms

1. Life expectancy
2. Age composition
3. Urbanization
4. Population explosion
5. Crude Birthrate
6. Crude Death rate
7. Census

V. Expand the following

1. IRDP
2. JRY
3. EAS
4. TRY SEM
5. JGSY
6. PAP
7. PMGY

VI. Answer the following questions briefly

1. What is resource? Explain the various economic resources.
2. Explain the role of forests in economic development of a country.
3. Explain the role of transport and communication in the economic growth of a country.
4. Name the services offered by the Government in the communication sector.

5. Explain the term “Human Resource Management” and explain how size of population is a crucial determinant of economic development.
6. Explain the causes of high birthrate.
7. Explain the uses of Census
8. Write down the remedial measures suggested to control population growth.

VII. Answer the following questions in detail :

1. Write in detail about economic importance of mineral resources.
2. Explain the theory of “Demographic transition”.
3. Write in detail the effects of population growth in economic development.
4. What is unemployment? Explain the nature of unemployment in India.
5. Write about the causes of unemployment in India.
6. Write about the measures to solve urban unemployment in India.

UNIT III

Chapter 3

PRICE AND COST THEORY

Learning objectives

- Understand the meaning of price, cost and revenue.
- To understand the meaning of the term inflation and deflation and its effect on economic growth.
- To analyse the effect of price on the income of the individual in an economy.
- To differentiate the various types of cost incurred by a firm.

Price

Price is defined as the money value of anything which is bought and sold in the market place, including goods and services, assets and factors of production.

Price Theory

It is the area of economics which is concerned with the determination of price, through the study of demand and supply and their interaction. Price mechanism has a significant place in a planned economy. Changes in price bring about changes in the purchasing power of money also. Consumers buy **more quantities at lower price** and **less quantities at higher price**. Economists believe that a slight increase in prices (i.e. mild inflation) is necessary for the growth of the economy. But if the prices increase beyond a particular limit they may prove to be disastrous for the economy if it is uncontrolled. Increase in price will worsen the problems of unemployment or underemployment and the economy may become stagnant.

Price mechanism has a significant role to play in a planned economy. Changes in prices bring changes in the purchasing power of money also. At high prices money commands lesser commodities and at lower prices more commodities. Economists believe that a slight increase in price (mild inflation) is necessary for the growth of an economy. But if the prices increase beyond a particular limit they may prove dangerous for the country. In developing

countries like India where unemployment is very high – rising prices stagnate the economy. Welfare measures undertaken by the Govt. are disrupted. It increases the gap between ‘haves’ and ‘havenots’ ie rich and poor. Steep rise in price level increases the disparities of income and wealth.

Indicators of Price Trends

Price trends in a country like India can be shortened with the help of two types of indicators. (1) Index number of prices and (2) Price deflators. In India two types of index numbers are prepared (a) index numbers of wholesale prices (b) index numbers of consumer prices.

$$\text{Price deflators} = \frac{\text{GDP at current price}}{\text{GDP at constant price}}$$

Of the various indicators, the most convenient and better index of price situation are the index numbers of wholesale prices.

Inflation

Inflation means a sustained increase in general price level.

Inflation can be of two types

- a) Cost – push inflation
- b) Demand – pull inflation

Cost push inflation

Cost push inflation means inflation due to increase in costs. In a **developing country like India** this type of inflation is determined by wage push and profit push factors. Wage push factor is related to increase in wages for the workers. In most of the developing countries like India, Trade Union have better bargaining power and they demand higher wages for the worker from their employers.

The payment of higher money wages will result in the increase in the cost of production. Thus the employees will tend to raise the price of their goods. This type of increase in price level is known as wage cost – push inflation. This

in turn will further aggravate the situation for demanding higher wages. Similarly profit push refers to the behaviour of certain firms which raise the prices of their products to offset the increase in labour and production costs and also to earn higher profits. In developed country like USA one can witness the profit push inflation. Profit push inflation sometimes may be negligible in some of the developed countries.

Demand pull inflation

Demand pull inflation means inflation caused due to increase in aggregate demand which means increase in consumption demand, investment demand and government demand. Demand pull inflation is a situation of rise in price level where consumption demand, investment demand and government demand exceeds the available supply of goods and services. In this type of inflation aggregate demand ($C + I + G$) is greater than aggregate supply. When ever there is a demand more than available supply of goods it will result in pushing the price level.

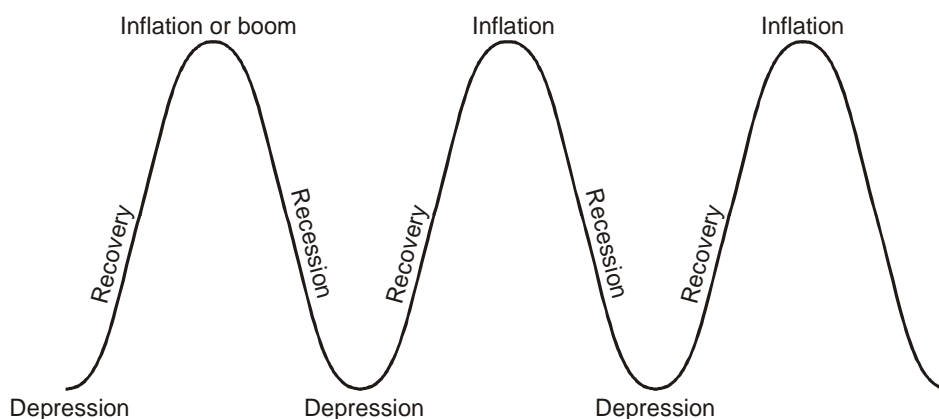


Fig. 3.1 : Trade cycles or Business cycles

Nature and causes of inflation

Inflation is generally characterized as a sustained rise in the general price level. A small rise in prices cannot be termed as inflation. It is only a persistent and appreciable rise in general prices can be called as inflation. During inflation country will witness rise in costs of all factors of production. Inflation causes the value of money to fall.

Economists have classified inflation into 5 kinds. They are Moderate inflation, Creeping inflation, Walking inflation, Galloping inflation and Hyper inflation.

1. Moderate inflation

When the price rises in single digit say (5% to 7%) it is called moderate inflation. The rise in prices is very slow.

2. Creeping inflation

It refers to a type of inflation where the price level increases slowly over period of time.

3. Walking inflation

It denotes a rise in price level that in such a type of inflation price level raises by 5% per annum.

4. Galloping inflation

When prices rise at double or triple digit rates of 20%, 100% in a year it is called galloping inflation.

5. Hyper inflation

Galloping inflation, sooner or later leads to hyper inflation. Prices rise at a 1000 million or trillion percent annually.

Inflation and Economic growth

Inflation may retard economic development in the following way

- Leads to lopsided development which means that investment do not take place in all the sectors of the economy.
- Adversely affect savings. Increase in price level reduces the purchasing power of the people thereby reducing the level of savings.
- Adverse effect on balance of payments position. Inflation reduces the inflow of foreign exchange reserves.

- Economy witnesses uncertainty and instability. Rise in price impede the rational planning of Consumption and Investment expenditures. It is also caused by excessive increase in money supply.
- Unchecked inflation may change into hyper inflation. If **inflation is not checked** it may accelerate and in the end will result in Social and economic chaos.

Causes of Price rise

- Prices tend to rise when there is inadequate supply of goods and services in the economy.
- More people chasing few goods. When demand for goods and services increases more than supply, it results in pushing the price level.
- When purchasing power of the people increases it results in increasing the demand for goods and services.

Consequences of Price rise

- Rising prices adversely affect the level of investment and savings.
- Rising prices affect the ability and willingness of the people to save more than income.
- Rising prices of agricultural goods will further increase the demand for higher wages.
- A countrys balance of payments position is adversely affected due to rise in prices.
- Rising prices promote inequalities of income and wealth.

Remedies to check the price rise

Since the price rise is the result of number of factors, a suitable policy has to be evolved by the govt to check the rising prices.

- Suitable monetary policy should be followed. Rise in interest rates will attract the people to save more and restrict the consumption of goods.
- A proper fiscal policy, and tax structure will create incentives for growth in the economy. Schemes like compulsory Deposit scheme will force the people to demand less goods in the market.

- All possible efforts to be made to increase the productivity in agricultural and industrial sectors of the economy.
- Revamped public distribution system will unearth the available supply of essential commodities. By this hoarding, black marketing is controlled to a great extent. PDS (Public Distribution System) helps the people to buy essential commodities at a cheaper rate.
- Exports and imports are the two arms of commercial policy. Exports should be increased.
- A suitable population policy is necessary to implement all anti-inflationary measures.

Deflation

A fall in general price level is called deflation. Deflation and Inflation are not suitable for the growth of the economy. Deflation and inflation are two extreme situations of business or trade cycles.

Deflation is a term which is used in two different ways. It can be (1) a fall in general price level (2) a period of reduced economic activity. Economy experience a fall in aggregate demand, fall in output, fall in national income and fall in employment. These conditions of depression can be accompanied by falling prices.

Revenue

Revenue means receipts from the sale of output by a firm in a given period. There are 3 main concepts of revenue ie **Total revenue**, **Average revenue** and **Marginal revenue**.

Total Revenue

Total Revenue is normally referred as TR which means the total amount of income received by the firm by selling a given amount of output.

$$TR = P \times Q$$

where TC = Total Revenue, P = Price, Q = Quantity

For eg. If a firm sells 20 units of a product at Rs. 15 per unit then Total revenue is Rs. 300 (15 x 20).

Average Revenue Data

Average Revenue is the revenue earned per unit of the product (AR)

$$AR = \frac{TR}{Q} = \frac{PQ}{Q}, \text{ where } Q=\text{Quantity, } TR=\text{total revenue, } P=\text{Price}$$

If all the units of a commodity are sold at the same price then Average Revenue is equal to the price of the commodity. Using previous eg.

$$AR = \frac{TR}{Q} = \frac{\text{Rs.300}}{20} = \text{Rs.15}$$

Marginal Revenue

Marginal revenue is defined as the addition to total revenue which results from the sale of one additional unit of output (MR).

$$MR_n = TR_n - TR_{n-1}$$

$$\text{Marginal revenue can also be expressed as } MR = \frac{\Delta TR}{\Delta Q}$$

Where, ΔTR represents a **change in total Revenue** and ΔQ represents a **small change in outputs**. Production decisions of the firms are normally based on its cost and revenue conditions.

REVENUE SCHEDULE – I

Table 3.1 : Total revenue, average revenue and marginal revenue (with uniform price level)

Price Per unit (Rs)	Total sales (units)	T.R. (Rs)	AR (Rs)	MR (Rs)
5	100	500	5	500
5	200	1000	5	500
5	300	1500	5	500
5	400	2000	5	500

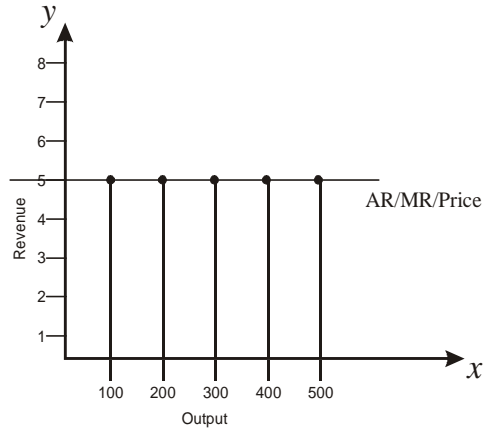


Fig. 3.2 : Average revenue / marginal revenue / price

REVENUE SCHEDULE – II

Table 3.2 : Total revenue, average revenue and marginal revenue (with different price level)

Price Per unit (Rs)	Total sales (units)	T.R. (Rs)	AR (Rs)	MR (Rs)
100	1	100	100	-
95	2	190	95	90
90	3	270	90	80
85	4	340	85	70
80	5	400	80	60

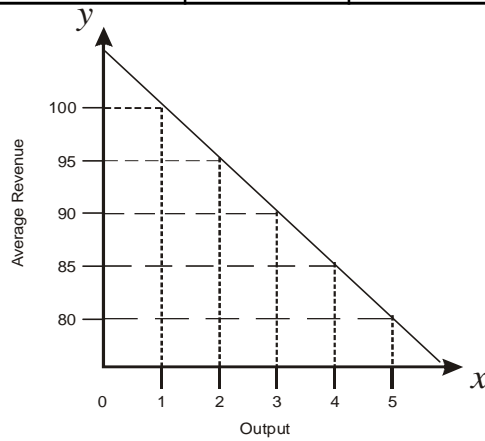


Fig. 3.3 : Average revenue

REVENUE SCHEDULE – III

**Table 3.3 : Total revenue, marginal revenue and average revenue
(with price at Rs. 5/-)**

Qty sold	Tr p x q	MR	AR
1	5	-	5
2	10	5	5
3	15	5	5
4	20	5	5
5	25	5	5
6	30	5	5
7	35	5	5

Concept of cost

Cost is defined as the value of all the inputs used in the production. These will include the factors of production like land, labour, capital, raw material, inputs, energy and transport, etc.

A firm is a unit of production producing goods and services. In order to produce goods and services the firm hires factors of production like **land, labour, capital** and **organization**. A producer while hiring the factors, make payments in the form of **rent to land, wages and salaries to labour, interest to capitalist, and takes or reserves profit for organization**. Therefore cost of production is the total of all these factor payments. i.e. (Total cost) $TC = \text{Rent} + \text{wages} + \text{interest} + \text{profit}$.

These costs can be classified under the following heads.

- Money costs
- Real costs
- Economic cost
- Private costs
- Social costs

Money costs

Money costs refers to the total money expenditure incurred by a producer for producing a commodity. Since producer make all payments in the form of money they are called as money costs. Eg. Payment of rent, wages, interest, advertising costs, repairs, maintenance, replacing old machinery, transport cost, insurance etc.

Real costs

For producing a commodity money costs are involved. More precisely a producer has to put lots of efforts and pains to produce a commodity. Eg. a producer has to undergo pain and exertion to earn the profit. Earning Profit will be a pleasure but the pains and efforts undertaken by him is called as real cost. Real cost may vary from person to person.

Economic cost

Economic cost is the total of Explicit cost and Implicit cost

Explicit Cost

Explicit cost is the direct money payments made by the firm to produce a commodity eg. – Payments to factors of production, taxes, insurance etc.

Implicit Cost

These costs are known as imputed costs. Implicit cost refers to the imputed (estimate) value of the inputs owned by the firm and used by it in its own production unit. These are to be found in the self employed, and self owned enterprises. Eg. enterprises of silk weavers, petty shop owners, farmer cultivating in his own piece of land etc.

Private Cost

Private cost refers to the cost of production incurred by an individual firm in producing goods services. Ex. As a private sector unit, when a private operator runs a business in a govt college. When he gets subsidy to sell the item at less rate, he deducts the subsidy from total cost incurred by him.

$$\text{Private Cost} = \text{TC} - \text{Subsidy}$$

Eg. Cost of selling a meal in a Govt. mess = Rs. 20/-
Subsidy he receives from Govt. = Rs.10
Private cost = Rs. 20 – 10 = Rs.10.

Social Cost

Social cost refers to the Cost that a Society has to bear on account of production of a commodity. Social cost refers to the pain, pleasure, utility and disutility enjoyed or felt at social level eg. cost involved in payment for doctor due to emission of smoke from a factory located at residential area. **The cost that a society has to undergo due to industrialization and pollution etc.**

Cost function analysis, divide the time periods into short run cost function and long run cost function.

Fixed costs and variable costs

Factors of production in the short run are classified into two categories (1) fixed factors (2) variable factors.

Fixed Costs

Fixed costs are those costs which remain constant whether output produced is less or more. Even when output is zero fixed costs are incurred. Upto a certain level of output, fixed costs remain constant. Fixed costs include 1) costs on managerial and administrative staff 2) expenditure on depreciation or obsolescence 3) Maintenance cost of the factory etc. **They are also called as over head costs.** They are also short run cost.

Variable costs

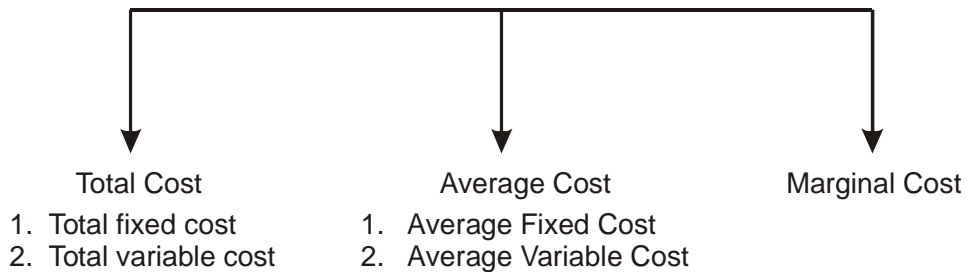
Variable costs are the cost of production which vary directly with the amount of output and are used in the actual **production / production** process.

They are the functions of output changes. When output increases variable cost increases and when output decreases variable costs also decrease. Examples of variable costs are

- Cost of raw materials
- Costs involved in direct labour
- Running Expenses in maintaining fixed capital assets.

Thus cost function depends upon the total volume of output and the prices of factors of production which are a) fixed factors & b) variable factors.

Total costs are costs which are incurred on both fixed and variable factors. ie $TC = TFC + TVC$. Where TC – Total costs, TFC = Total fixed cost, TVC = Total variable cost.



It is represented below through schedule and diagram.

COST SCHEDULE-I

Table 3.4 : Total cost and average variable cost

TQ Units	TC (Rs.)	TFC (Rs.)	TVC (2-3) (Rs.)	AVC (4÷1) (Rs.)
(1)	(2)	(3)	(4)	(5)
0	60	60	0	-
1	90	60	30	30.00
2	110	60	50	25.00
3	140	60	80	26.60
4	170	60	110	27.50
5	200	60	140	28.00

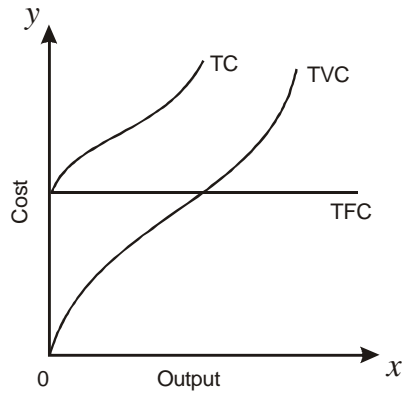


Fig. 3.4 Cost curves

COST SCHEDULE-II

Table 3.5 : Total cost, average cost and marginal cost

TQ Units	TC (Rs.)	AC (Rs.)	MC (Rs.)
0	60	A	-
1	90	90.00	30
2	110	55.00	20
3	140	46.66	30
4	170	45.00	30
5	200	40.00	30

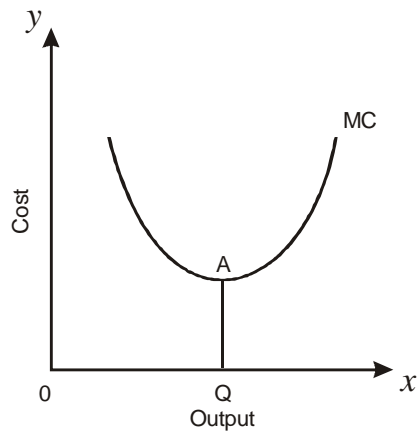


Fig. 3.5 Marginal cost

Average Cost

Average cost is per unit cost. It is total cost divided by the number of units produced.

There are 3 types of Average cost. They are (1) Average fixed cost (2) Average variable cost (3) Average total cost.

Average fixed cost – It is the per unit cost of the fixed factors.

$$\text{AFC} = \frac{\text{TFC}}{\text{Q}}$$

AFC = Average fixed cost

TFC = Total fixed cost

Q = Total units of output produced

Average Variable cost

Average variable cost is the per unit cost of the variable factors of production.

$$\text{AVC} = \frac{\text{TVC}}{\text{Q}}$$

AVC = Average variable cost

TVC = Total variable cost

Q = Total units of output produced

Average cost or Average total cost is the per unit cost of both fixed and variable factors of production. It is obtained by dividing the total cost by the total units of output.

$$\text{AC} = \text{ATC} = \frac{\text{TC}}{\text{Q}}$$

AC = Average cost

ATC = Average Total cost

TC	=	Total cost
Q	=	Total units of output produced
AC	=	AFC + AVC
AC	=	Average cost
AFC	=	Average fixed cost
AVC	=	Average variable cost

Marginal Cost

Marginal cost is the addition to total cost as one more unit of output is produced.

$$MC = \frac{\Delta TC}{\Delta Q}$$

where MC = Marginal cost
 Δ is the greek letter to show a change
 ΔTC is the change in Total cost
 ΔQ is change in the quantity of output

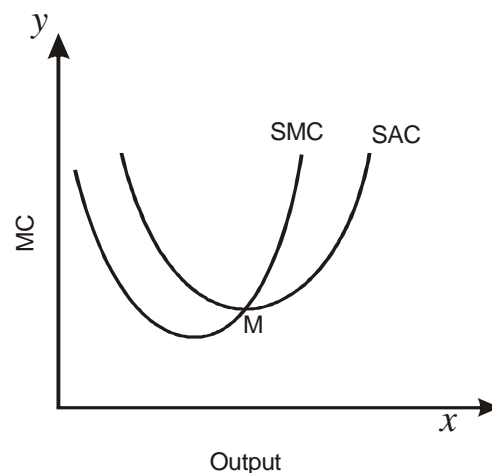


Fig. 3.6 : Relationship between SAC (Short run average cost) & SMC (Short run marginal cost)

In the short run, the shape of the average cost is determined by SFC and SVC (Short run fixed cost and short run variable cost).

- When $SMC < SAC$ it means that addition to total cost for every additional unit of output is smaller, thus reducing the SAC.
- When $SMC > SAC$ it implies that addition to Total cost for every additional unit of output is larger. Thus increasing the SAC.

Profit

A simple definition of profit is what is left from sales revenue after all costs have been deducted. i.e.

$$\text{Revenue} - \text{Cost} = \text{Profit}$$

Profit is that part of factor income which is received by the factor of production known as entrepreneurship.

While incomes of other factors of production are contractual in nature, profit is a non – contractual income. Profit is the residue which an entrepreneur takes after paying all factors of production.

According to Prof. Leftwich “Economic profit is a pure surplus or an excess of total receipts over all costs incurred by the firm”.

Profit is considered as a reward for certain entrepreneurial abilities like enterprise, innovation, risk and uncertainty bearing. Normal profit is defined as the minimum payment which a producer must get in order to induce him to under take the risk of production and also to stay in the business.

Normal profit is where **Total Revenue is equal to Total Cost (TR-TC)**

$$\begin{array}{lcl} \text{TR} = \text{TC} & \text{eg.} & \text{Total revenue} = \text{Rs.1000/-} \\ & & \text{Total cost} = \text{Rs. 500/-} \\ & & \text{Profit} = \text{TR-TC} \\ & & = \text{Rs. 1000-500} \\ & & = 500 \end{array}$$

Loss

Loss is the difference between total costs and sales revenue. Loss indicates that demand for the product is declining.

Loss is a situation where the firms average cost is more than average revenue. Abnormal profit is a situation where Average cost is less than average revenue ($AC < AR$). Loss in a situation where total revenue is less than total cost.

eg. Total cost = Rs.1500/-
 Total revenue = Rs. 800/-
 Loss = TR-TC
 = Rs. 800-1500
 = (-) Rs. 700

EVALUATION

I. Choose the best answer :

1. Inflation means a sustained increase in general _____ level.
 (a) price (b) cost (c) revenue
2. Demand pull inflation means inflation caused due to increase in _____.
 (a) aggregate demand (b) aggregate supply (c) exports
3. Inflation causes the value of money to _____.
 (a) fall (b) increase
 (c) remain stationary
4. Marginal revenue is defined as the addition made to _____.
 (a) AR (b) TR (c) Quantity
5. $TC = TFC +$ _____.
 (a) TVC (b) AVC (c) AC
6. Normal profit is where the total revenue is equal to _____.
 (a) Total cost (b) Marginal cost (c) Average cost

II. Fill in the blanks :

1. Price trends in a country like India can be shortened with the help of _____ types of indicators.
2. Cost push inflation occurs due to increase in _____.
3. Demand pull inflation is caused due to _____ in aggregate demand.
4. When the price rises in single digit it is called _____ inflation.
5. When prices rise at double or triple digit rates it is termed as _____ inflation.
6. Deflation means a _____ in general price level.

7. Total revenue refers to the total amount of _____ received by the firm by selling a given amount of output.
8. Marginal revenue is the addition to _____ which results from the sale of one additional unit of output.
9. Cost refers to the value of _____ used in the production process.
10. Explicit costs are called as _____
11. Implicit costs are also known as _____ costs.
12. Social cost refers to the cost that a _____ has to bear on account of production of a commodity.
13. Profit is that part of a factor _____ which is received by the factor of production known as entrepreneurship.
14. Loss is a situation where the firms average cost is _____ then average revenue.

III. Distinguish the following :

1. Inflation and deflation.
2. Demand pull inflation and cost push inflation.
3. Revenue and cost.
4. Explicit cost and implicit cost.

IV. Answer the following questions briefly :

1. What is Inflation and explain the type of inflation.
2. Name and explain the different kinds of inflation as classified by economists.
3. Explain Total revenue, marginal revenue and Average revenue with the help of schedule.
4. Explain about private costs and social costs.

V. Answer the following questions in detail :

1. What are the types of Inflation and explain how inflation affect a country's economic growth.
2. Explain the following costs
 - a. Explicit cost
 - b. Implicit cost
 - c. Economic cost
 - d. Total cost
 - e. Total fixed cost

- f. Total variable cost
- g. Average cost
- h. Average fixed cost
- i. Average variable cost
- j. Marginal cost

3. Fill in the following table

Units	TC	TFC	TVC	MC	AC	AFC	AVC
1	150	100					
2	220	100					
3	350	100					
4	450	100					
5	550	100					
6	600	100					

4. Calculate **average** cost and **marginal** cost from the data given below

Total output (units)	0	10	20	30	40	50
Total cost (Rs)	100	1200	1800	2200	3000	4600

- 5. With the help of diagram explain inflation and deflation.
- 6. From the cost function of a firm given below, find out 1. Total fixed cost
2. Total variable cost 3. Average variable cost

Output (units)	0	1	2	3	4
Total cost (Rs.)	50	70	90	100	110

7. From the data given below calculate

- 1. Average fixed cost
- 2. Average variable cost
- 3. Marginal cost

Output (units)	0	1	2	3	4	5
Total cost (Rs.)	30	90	110	120	140	180

UNIT IV

Chapter 4

TRADE

Learning objectives

- To learn about the meaning of trade
- To understand that the Trade is engine of growth
- To appreciate that the development of a country is due to Internal and International trade.
- To know about the new economic policy
- To understand the term Globalisation, Liberalisation and Privatisation.

Economic growth of a developing economy is conditional by the international economic environment in which it operate. A countrys capacity to import goods and services is defined by its ability to export their goods and services. The type of goods and services that a country exports and imports provides a mirror image of the structure of the economy.

Trade means exchange of goods and services either within the country or between different countries. Trade are of two types. They are internal trade and international trade.

Internal trade or domestic trade

Trade carried on within the domestic territory of the country is termed as Internal Trade.

International trade or External trade

Resources and skills of people are not evenly distributed among the nations of the world. Hence every nation will concentrate on the production of goods and services for which it is more suited, and imports, her other

requirements from other countries where they are available at a cheap rate. Thus international trade is evolved.

Trade carried on between two or more than the two countries are termed as International Trade. International trade can be bilateral or multi lateral in nature Trade is carried on between nations primarily to exchange their surplus and make up their deficits. Foreign trade contributes to economic development in a number of ways. The structure of foreign trade can be studied with reference to a) value and volume of trade b) composition of trade c) direction of trade.

Volume of trade

Volume of trade means total transactions in goods measured in physical units.

Value of trade

Value of trade refers to the total transactions in goods that constitute exports and imports.

Direction of Trade

Direction of trade means a country entering into trade relation with other country.

Trade policy

Trade policy refers to all the policies that have either direct or indirect bearing on the trade behaviour of a country.

Terms of trade

It means a relationship between the prices of exports and prices of imports. Trade is called 'engine of growth'

- It explores the means of procuring imports for the process of development.
- It helps in flow of technology
- Generates dynamic change in the export front
- Trade increases technology transfers from industrially advanced country to developing countries.

Foreign trade and economic development

Foreign Trade contributes to the economic development in a number of ways.

- Primary function is to import capital goods without which the process of economic development cannot take place.
- It provides a flow of technology which increases the factor productivity.
- Helps in better allocation of resources.
- Exports, allow for fuller utilisation capacity and absorption of new technology. Trade increases technology transfers from industrially advanced country to developing countries.
- Improves the welfare of the worker.
- Enables the workers to be more productive and value of goods produced increases in the world trade.
- Increased openness to trade has been strongly associated with the reduction of poverty in the most developing countries like India.
- Generates dynamic change in the export front.

The share of Exports in GDP has increased over the years from mere 31% in 1965 – 66 to 8.50% in 1999 – 2000.

Exports

Exports mean goods and services sold for foreign currency. Goods from the primary or secondary sector are termed as visible exports while services such as tourism or insurance are termed as invisible exports. It also means that goods are dispatched from one country to another country.

India's total exports have increased by more than 300 times during the last five decades from Rs. 606 crore in 1950 – 51 to Rs. 2,50,130 crores in 2002-2003.

The share of exports in Gross Domestic Product too has increased over the years from a mere 3.1% in 1965 – 66 to about 9% in 2002 – 03. This witnesses the fact that export sector is growing significantly in the Indian economy. Exports of India are

1. agriculture and allied products which include coffee, tea, cashew, kernal, spices, raw cotton, etc.
2. ores and minerals like manganese, mica and iron ore.
3. manufactured goods which include textiles, readymade garments, jute, leather, handicrafts, semiprecious stones, chemicals, engineering goods, iron and steel.
4. mineral fuels and lubricants.

Exports from Tamil Nadu

Tamil Nadu has been in the forefront in the country's attempt to enlarge export base and earn valuable foreign exchange as would be seen from the data below.

Table 4.1 : Exports from Tamil Nadu

Rs. in Crores

Year	Value of Exports from TN	G.R. T.N Exp.	GR of Indian Exp.
1991 – 92	5437.00	-	-
1992 – 93	6808.00	25%	22%
1993 – 94	9082.00	33%	31%
1994 – 95	12454.00	37%	18%

It would be seen that exports from TN have been increasing at a faster rate than the over all Exports of the country. Tamilnadu's share in the overall Exports presently stands at about 15%.

The principal commodities of Export include granite, leather, readymade garments, cotton textiles, handloom, marine products and engines, etc.

Imports

Imports means goods and services bought from overseas producers (goods brought in to a country from other countries).

The composition of imports changes according to the needs of the economy. India's imports can be classified into 3 parts 1. Consumer goods. 2. raw materials and intermediaries 3. capital goods. Imports of consumer goods in the past decades have been restricted and imports of raw materials and intermediaries and capital goods have shown an upward trend. During the last five decades significant changes have been observed in the volume, composition and direction of trade.

Balance of Payments : Balance of payments (BOP) is a systematic record of all international economic transactions of both **visible** and **invisible items** of a country during a given period usually a year. Balance of payments is generally studied in its two forms.

1. Balance of payments on current account
2. Balance of payments on capital account.

India's balance of payments has always been in deficit. Moreover the size of deficits has been increasing in recent years. India's total trade has multiplied manifold over the last five decades although the trend has been fluctuating, with imports increasing more than exports. India's foreign trade is becoming more diversified as far as direction of trade is concerned. The major steps taken to solve the balance of payments problem are 1. Import substitution and 2. Export promotion.

As the scope for **import substitution** is limited in the economy, the emphasis in the government policy has been on **export promotion**.

Foreign exchange : The mechanism or process by which payments between any two places, operating under different national currency system. They are effected without passing of actual money, gold etc.

Foreign exchange resource : Foreign exchange resource are the stocks of foreign currency held by the central bank and available by the government to pay its imports. If the balance of payments position is to be favourable the value of exports in 'visible' and 'invisible' items should exceed the value of imports in **visible** and **invisible** items.

Favourable balance of trade

During a given period of time if the value of exports is in excess of the value of imports, balance of trade is said to be **favourable**.

Unfavourable or adverse balance of trade

If the value of imports is greater than the value of exports, the balance of trade is **unfavourable** and the country is said to be experiencing adverse balance of trade position. If exports and imports are exactly equal the balance of trade is said to be **balanced**.

Budget

A budget is an annual statement of actual and anticipated revenues and expenditure of the government. Estimated revenues are collected through taxes levied by the government. Budget is an important financial instruments which helps the country to implement various Macro Economic reforms.

Budget is classified into Revenue budget and Capital budget. The Revenue and capital budget may be a surplus, **balanced** or **deficit**.

Types of Budget

- Union budget is the budget of the central government.
- State budget is the budget of the state government
- Supplementary budget is the budget to deal with certain eventualities.

Following are the objectives of budget

- To help in promoting economic development
- To promote balanced regional development
- To reduce the inequalities of distribution of wealth
- To promote full employment
- To achieve price stability
- To promote saving and investment

Importance of Government Budget

- Government budget helps in the planned approach of its activities.
- It also helps in integrated approach to fiscal operation.

- Helps in influencing economic activities
- It acts as instrument of economic policy

Balanced Budget

deficit budget

surplus budget



Receipts = Expenditure Receipts < Expenditure Receipts > Expenditure

Surplus Budget

A budget is said to be a surplus budget, where all taxes and other revenues of government exceeds the expenditure planned by the government during a fiscal year.

Balanced budget

When budgetary receipts and payments of the government are equal it is known as balanced budget.

Deficit budget

If the payments of the governments during a given period **exceeds** the receipts of the government it is called deficit budget.

New Economic Policy

New economic policy was introduced from the year 1991. Objectives of the policy are

- To make the country witness the globally oriented vibrant economy and derive maximum benefits from expanding global market opportunities.
- To stimulate the sustained economic growth.
- To enhance the technological strength and efficiency of Indian agriculture, industries and services thereby improving the competitiveness for internationally accepted standards of quality.
- To facilitate for the availability of quality goods at a cheaper rate.

Globalisation, Liberalisation and Privatisation

A prominent development witnessed in the recent years is increasing interdependence of globalisation of markets which means trade is extended globally. **Globalisation** refers where a country can draw raw materials from any source of the world and manufacture the goods and services. The finished products also find a place in the global market. Globalisation create an environment in a developing country for the flow of labour, capital, and technology from one country to different countries of the world. Globalization also means that a country becomes economically interdependent at the global level. Many producers outside India can produce and sell their products, similarly Indian manufacturer can produce and sell goods and services to other countries. Entrepreneurs are free to invest on other countries. Globalisation means not only movement of capital but also labourers from one country to another country.

The new policy helps India to relate to the world economy. It also helps in removing restriction and in reduction of taxes on imported goods. Thus globalisation encourages foreign investors to invest in India. Most of the non resident Indians (NRI) have invested in Indian market thereby contributing for Indias Industrial development.

Liberalisation

Liberalisation means movement towards a free market system which means that market forces will become more important in determining the decision. Liberalisation is very important both in internal as well as in international trade. In a domestic economy controls of any kind are avoided. Competition is encouraged. Prices are determined according to market forces i.e. demand and supply. In the international front liberalisation means eliminating or reducing tariffs and non tariff barriers which means the economy will move towards free trade. World Trade Organization (WTO) encourages liberalisation by organising world wide negotiations to reduce import controls. Liberalisation helps to relax rules and regulations which posed restriction on private sector. Private sectors are encouraged to enter into core industries like iron and steel, electricity, air travel, ship building and heavy machinery etc. Private sectors are freed from regulations like

- licensing
- permission to import raw materials
- regulating price
- restriction on investment by large business companies

Many formalities have been simplified to facilitate industrialists to produce goods in India.

Privatisation

Privatisation means transforming all economic activities from public sector to the private sector. It also refers to the setting up of private units in public utility services. Privatisation increase the efficiency of the people and service. It also helps in motivating the people to work up to the optimum level. The efficiency level also increases and government of India in its new macro economic policy adopts GLP i.e. Globalisation, Liberalisation and Privatisation. The sizeable increase in foreign exchange reserves is due to the benefits of Globalisation, Liberalisation and Privatisation, adopted and experienced by India.

The increasing extent of globalisation has resulted in the spectacular growth of trade in goods and services. From 25% of the world GDP in 1970 it has increased to 46% of GDP. Capital flow amount has also increased. The new IT revolution has helped to reduce the cost incurred in transport and communication. Global producers aim to supply superior quality goods at low cost. There is also sizeable increase in the world trade in GDP ratio.

EVALUATION

I. Choose the best answer :

1. Trade carried on within the domestic territory of the country is termed as
 (a) internal trade (b) external trade (c) barter system
2. Balance of payments is generally studied in its
 (a) three forms (b) two forms (c) four forms

3. When the value of exports are more than the value of imports balance of trade is said to be
 (a) favourable (b) unfavourable (c) balanced
4. Liberalisation helps to relax rules and regulations which posed restriction on
 (a) private sector (b) public sector
 (c) secondary sector
5. The new I.T. revolution has halped to reduce the cost incurred in
 (a) transport and communication (b) industry
 (c) agriculture

II. Fill in the blanks :

1. Trade carried on within the domestic territory of the country is termed as _____ trade.
2. Trade policy refers to all the policies that have either direct or indirect bearing on the _____ behaviour of a country.
3. Balance of payment is a systematic record of all International economic transactions of both _____ and _____ items of a country during a given period.
4. If the value of imports is _____ than the value of exports the balance of trade is said to be unfavourable.
5. Budget is classified into _____ budget and _____ budget.

III. Distinguish the following :

1. Internal trade and International trade
2. Volume of trade and value of trade.
3. Exports and imports.
4. Surplus budget and defecit budget.
5. Favourable balance of trade and adverse balance of trade.

IV. Define the following terms :

1. Trade
2. Volume of trade
3. Direction of trade
4. Exports

5. Imports
6. Value of trade
7. Budget
8. Foreign exchange reserves

V. Answer the following questions briefly :

1. Explain about a) surplus budget b) balanced budget c) deficit budget.
2. Explain about favourable balance of trade and adverse balance of trade position.
3. Explain the importance of trade in the economic development of a country.

VI. Answer the following questions in detail :

1. Explain in detail about exports, imports of India with special reference to Tamil Nadu.
2. Expand the term GLP and explain about globalization, Liberalization and Privatization.

UNIT V
Chapter 5
NATIONAL INCOME

Learning objectives

- To analyse the meaning of the term National Income and its components.
- To realise that National Income is the index for the economic growth of a country.

National income means total income of the economy as a whole. National income is a measure of the economic performance of an economy. According to the national income estimation committee of 1951, national income measures the volume of commodities and services produced during a given period counted without duplication.

Following are the four basic concepts of National Income. They are

1. Gross Domestic Product - GDP
2. Net Domestic Product - NDP
3. Gross National Product - GNP
4. Net National Product - NNP
5. Per Capita Income - PCI

1. Gross Domestic Product

Gross Domestic Product is known as **GDP**. “Gross domestic product” is the money value of final goods and services produced in the domestic territory of a country during an accounting year. GDP does not include income earned from abroad.

2. Net Domestic Product

NDP is net domestic product which is the sum total of money value of final goods and services produced in the country in an accounting year excluding **depreciation** cost.

3. Gross National Product (GNP)

Gross National Product or Gross National Income is the total measure of the flow of goods and services at market value resulting from current production in a year including Net Factor Income Earned from Abroad (NFYEA).

$$\text{GNP} = \text{GDP} + \text{NFYEA}$$

4. Net National Product

Net National Product is the sum total of money value of final goods and services produced in an accounting year excluding depreciation cost. Net National Product includes Net Factor Income Earned From Abroad. Net National Product at factor cost is also known as National Income.

$$\text{i.e. } \text{NNP}_{\text{FC}} = \text{National Income}$$

5. Per capita income

Per Capita Income refers to the income per head of the people of a country. It is obtained by dividing the National Income by the population of a country.

$$\text{Per capita income} = \frac{\text{National Income}}{\text{Population}}$$

National income and Per capita Income are the indicators of economic growth and development of a country.

Gross National Product = Gross domestic product + Net Factor Income Earned from Abroad. (NFYEA)

Net National Product = Gross National Product – Depreciation.

Net National Product = Net Domestic Product + Net factor income earned from abroad. (NFYEA)

To analyse the growth potential in India let us understand the composition of National Income.

Table 5.1: Sectoral Composition of Gross Domestic Product as percentage

Year	Primary	Secondary	Tertiary	Total
1950 – 51	56.45	15.05	28.05	100
1980 – 81	39.64	24.6	35.99	100
2000 – 01	22.27	24.81	48.92	100

Source : CSO (Central Statistical Organization)

Above table explains the contribution of primary, secondary and tertiary sector towards National Income.

Primary sector consists of agriculture, forestry, mining, fishing and quarrying, **Secondary sector** consists of manufacturing industries, construction, water supply and electricity. **Tertiary sector** includes activities like transport, communication, storage, trade, banking insurance, real estates, business services, community services, personal services, business outsourcing, public administration and defence. The shift in the contribution of agriculture towards tertiary sector stands testimony for the growth of IT and IT enabled services in India.

The state income refers to the total money value of goods and services produced in the state during a year. Per capita state income can be calculated by dividing **state income** of the year by **population** of the year in the state. The state income is calculated in the form of net state domestic product at factor cost.

1. Tamilnadu generates about 6.7% of NNP of the country.
2. Tamilnadu accounts for about 6.6% of the total population and about 3.90% of the total land area of the country. The state income is the sum of contribution of productive activities like cultivation, animal husbandry, manufacturing, trade and commerce etc.

The various activities are classified as

1. Primary Sector – deals with agriculture and allied activities.

2. Secondary sector – includes manufacturing, electricity, gas and water supply.
3. Tertiary sector – includes transport and communication, trade, banking, finance, insurance, real estate and other services.

Table 5.2: Net state domestic product by industry of origin at constant prices

Sector	1960-61	1970-71	1980-81	1984-85	1989-90	1995-96
1.Primary	52	40.9	28.9	28.0	20.5	20.2
2.Secondary	17.6	23.6	32.7	27.2	30.9	31.0
3.Tertiary	30.4	35.5	38.4	44.8	48.6	48.8
Total	100	100	100	100	100	100

From the above table we can conclude that there has been a steep decline in the share of the primary sector in the net state domestic product of Tamilnadu between 1960-61 and 1989-90 and there has been sizeable increase in the share of the tertiary sector.

Tamilnadu is ranked first among the industrially advanced states of India. Tamilnadu is the 11th largest state in the country. The total land area of the state is 1.31 lakh sq.km and forms about 4% of the total land area of the country.

Need for the study of National Income analysis

- The National income estimates are useful in a number of ways.
- It is very much useful for policy makers to formulate plan, fix targets for the development of the country.
- Helps the business people to formulate suitable business policy.
- Trade union and labour organization uses the estimates for demanding wages and to know about the contribution of labour in the industrial sector.
- National income statistics serve as an important indicator for the level of economic growth and welfare of the country.
- National Income estimates helps the nation to compare themselves with other International Organisation.

National Income series in India

National Income of India for the post independence period has been estimated in four different series. They are

1. The conventional series
2. The Revised Series
3. A new series
4. CSO's latest series (Central Statistical Organisation).

Methods of Computing National Income

There are three approaches or **methods** of measuring national income. The **income method** or income approach sums all forms of income, wages, salaries, rent, profits and net income from abroad. The **expenditure method** or expenditure approach sums, consumption, investment, government expenditure and net exports which means (exports – imports) $C + I + G + (X - M)$. The output method or output approach takes the total value of all output.

National Income refers to the total value of goods produced or receipts or payments to the factors of production on expenditure by the people on the goods produced.

Net National Income = National Expenditure = National Product (output)

National Income is calculated using 3 methods They are (1) Product or output Method (2) Income Method (3) Expenditure Method.

- Product or value added method estimates National Income from the output side.
- Income method estimates National Income from the distribution side of the economy, i.e. factor income paid to four factors of Production (like rent, wages and salaries, interest and profit).
- Expenditure method estimates National Income from the expenditure side is consumption expenditure + investment expenditure + Government expenditure + Net exports Symbolically we can write as $C + I + G + (X - M)$.

where, C = Consumption Expenditure
 I = Investment Expenditure

G = Government Expenditure
 X = Exports Expenditure
 M = Imports Expenditure

In India the National Income from agriculture and manufacturing sector is derived by the calculation of product method. National Income of service sector is calculated by income method. In India the households do not maintain proper accounts, hence expenditure method is not widely used in India.

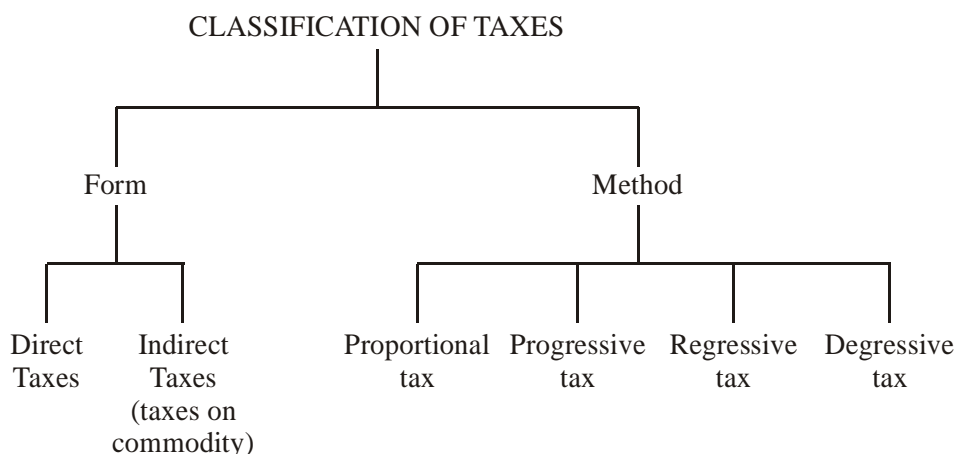
Tax

A tax is legally compulsory payment imposed by the Government eg. income-tax, sales tax, excise tax etc., Tax revenue of a country consist of the proceeds of taxes and other duties levied by the central government. A tax can be termed as compulsory contribution payable to the government by a person without any expectation in return.

There is an element of compulsion involved in taxes. A tax payer does not receive a definite, direct and proportionate benefit from the government for payment of taxes.

Taxes can be classified on the basis of their form, nature, content, volume and methods.

On the basis of form, taxes are classified as Direct and Indirect taxes on the basis of method taxes are classified as Proportional tax, Progressive tax, Regressive tax and Degressive tax.



Direct Taxes

Direct taxes are taxes imposed on personal income, properties etc., The Direct tax are imposed on and collected from the same person. Direct taxes can not be shifted to another person. The incidence and impact is on the same person eg : income tax, wealth tax, corporate tax, gift tax, estate duty, expenditure tax etc.

Indirect taxes

Indirect taxes are levied on commodities and services. The burden of indirect tax can be shifted. The incidence and impact of the tax will be on different person. Under Indirect tax the burden can be shifted to another person eg : entertainment tax, excise duties, sales tax, service tax, taxes on rail travel and bus fares etc.

1. Proportional tax - Rate of taxation will remain the same at all levels of income. Tax paid by an individual person will be fixed as per the income and wealth that he earns.
2. Progressive tax - Rate of tax increases as the income or wealth of a person increases – eg. income tax which is generally progressive.
3. Regressive tax - Rate of tax will fall with an increase in income. Here relatively person earning low income will pay more tax than that of a person earning high income.
4. Degressive tax - It is a mixture of progressive and proportional taxation – Rate of tax increases as the income of a person increases but it goes up to a maximum limit. Eg. bus fare.

Practical Sums

- I. Calculate the following with the help of a data given below.

GNP, NNP, NDP		Crores
GDP	=	20,000
Depreciation	=	2000
NFYEA	=	(-) 1200

$$\begin{aligned}
1. \text{ GNP} &= \text{GDP} + \text{NFYEA} \\
&= 20000 + (-) 1200 \\
&= 18800 \\
2. \text{ NNP} &= \text{GNP} - \text{depreciation} \\
&= 18800 - 2000 \\
&= 16800 \\
3. \text{ NDP} &= \text{GDP} - \text{depreciation} \\
&= 20000 - 2000 \\
&= 18000
\end{aligned}$$

II. Calculate the following with the help of data given below.

GDP, GNP, NDP		Crores
NNP	=	15000
Depreciation	=	1500
NFYEA	=	(-) 800
1. GNP	=	NNP + depreciation
	=	15000 + 1500
	=	16500
2. GDP	=	GNP – NFYEA
	=	16500 - (-) 800
	=	16500 + 800
	=	17300
3. NDP	=	GDP - depreciation
	=	17300 – 1500
	=	15800

EVALUATION

I. Choose the best answer :

1. Net national product at factor cost is also known as
 - (a) percapita income
 - (b) domestic income
 - (c) national income

2. Primary sector consists of
(a) trade (b) construction (c) agriculture
3. Income method sums all forms of
(a) income (b) expenditure (c) taxes
4. National income is calculated using _____ methods
(a) three (b) four (c) two
5. Product method estimates national income from the
(a) output side (b) expenditure side
(c) income side

II. Fill in the blanks :

1. National income is a measure of the _____ performance of an economy.
2. Primary sector consists of _____ and allied activities.
3. Secondary sector is also called as _____ sector.
4. Tertiary sector is also called as _____ sector.
5. The _____ income refers to the total money value of goods and services produced in the state during a year.

III. Distinguish the following :

1. Gross domestic product and gross national product.
2. National income and percapita income.
3. Direct tax and indirect tax.
4. Progressive tax and regressive tax.
5. Primary sector and tertiary sector.

IV. Define the following terms :

1. GDP
2. NDP
3. GNP
4. NNP
5. PCI

V. Answer the following questions briefly :

1. What is a tax? Mention the classification of taxes.
2. Explain about Direct taxes with the help of examples.
3. Define Indirect taxes and explain Indirect taxes with the help of examples.

VI. Answer the following questions in detail :

1. What do you mean by National Income. Explain in detail the various concepts of National income.
2. Distinguish between direct taxes and indirect taxes.
3. Calculate GDP, NDP, NNP with the help of data given below
GNP = 15000 (Rs. Crore)
Depreciation = 2000
Net factor income earned from abroad = (-) 1000
4. Calculate GNP, NDP, NNP with the help of data given below :
GDP = Rs. 35,500 (Rs. Crores)
Depreciation = Rs. 3200
NFYEA = (-) 1800
5. Define National Income and mention the four concepts of National Income.

