STANDARD TEN

GEOGRAPHY

Unit - 1

India – Location, Relief and Drainage

Learning Objectives

- To understand the strategic importance of India's absolute and relative location in the world
- To know the distinct characteristics of major physiographic divisions of India
- To compare the regions of Great Indian plains
- To understand the drainage system of India
- To differentiate the Himalayan and peninsular rivers

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Introduction

India is the seventh largest country in the world and second largest country in Asia. It forms a part of south Asia and is separated by the Himalayas from the rest of the continent. India accounts for about 2.4 % of the total area of the world with an area of 32,87,263 sq.km. many of the India states are larger than several countries of the world.

India's Land and Water Frontiers

India shares its 15,200 km long land frontier with Pakistan in the west, Afghanistan in the north-west, China, Nepal and Bhutan in the north and Bangladesh and Myanmar in the east. India's longest border is with Bangladesh (4156 km)while the shortest border is with Afghanistan.(106 km)

About 6,100 km long coastline of India is washed on three sides of the country by the Indian Ocean and its two arms namely the Arabian sea in the west and the Bay of Bengal in the east. The total length of the coast line of India including the islands is 7,516.6 km. India and Sri Lanka are separated by a narrow and shallow sea called Palk Strait.

India and the World

The Indian land mass has a central location between, the East and the West Asia. India and the southward extension of the Asian continent. The trans Indian ocean routes which connect the countries of Europe in the west and the countries of East Asia provide a strategic central location to India. Thus it helping India to establish close contact with West Asia, Africa and Europe from the western coast and with South East, east Asia from the eastern coast.

India: A Subcontinent

India along with the countries of Myanmar, Bangladesh, Pakistan, Nepal, Bhutan and Sri Lanka is called a subcontinent. This region is separated from the rest of Asia by a chain of mountains in the northwest, north and northeast and by seas in the south. This region also possesses a distinct continental characteristics in physiography, climate, natural vegetation, minerals, human resources etc. Hence India is known as '**subcontinent**'.

1.1 Location and Extent

India extends from **8°4'N** to **37°6'N** latitudes and **68°7'E** to **97°25'E** longitudes. Hence India is located of the north Eastern hemisphere

The southernmost point of the country is Pygmalion Point or Indira Point (6°45'N latitude) located in the Andaman and Nicobar Islands. The southernmost point of main land of India is **Cape Comorin** (Kanniyakumari). The north-south extent of India is **3,214** km and it extends from **Indira Col** in Jammu and Kashmir in the north to Kanniyakumari in the south. The east-west extension is **2933** km and it stretches from Rann of Kutch (Gujarat) in the west to Arunachal Pradesh in the east. The Tropic of Cancer (23°30' N) passes through the middle of the country dividing it into two halves as northern temperate and southern tropical lands. India has been politically divided into 29 states and 7 union territories for administrative convenience.

FIND OUT

- The number of Union Territories along western coast and eastern coast
- Area wise which is the smallest and largest state?
- The states which do not have an international border or lie on the largest state
- Classify into four groups each having common frontiers with i) Pakistan ii) China iii) Myanmar and iv) Bangladesh

DO YOU KNOW?

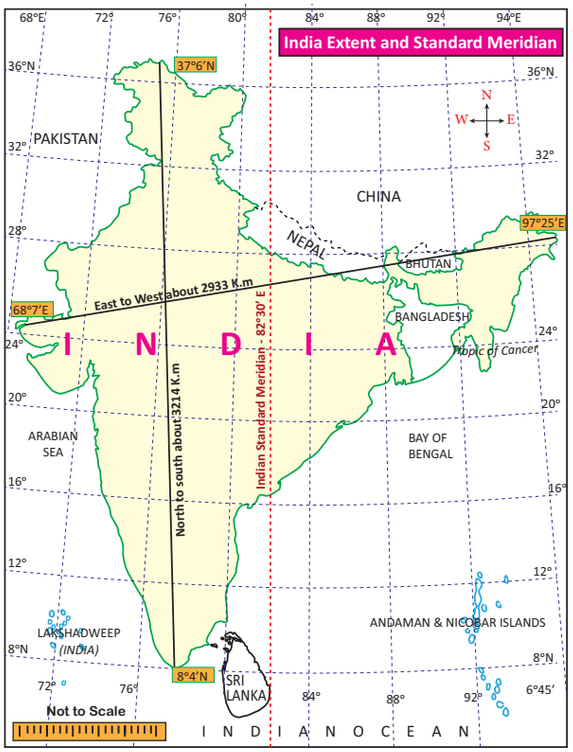
Amaravati is the new capital of Andhra Pradesh But according to Andhra Pradesh Reorganization Act, Hyderabad will be the capital for both the states of Andhra Pradesh and Telungana till 2024 (For 10 years from the act passed).

1.1.1 Indian Standard Time (IST)

The longitudinal difference between Gujarat in the west and Arunachal Pradesh in the east

India - States and Union Territories

is about 30°. The Earth rotates through its axis around 360° in 24 hours. Thus, a difference of 1° longitude will make a difference of 4 minutes in time. The difference in longitude between Gujarat (68°7'E) and Arunachal Pradesh (97°25' E) is 29°18'. Hence the difference in local time between these two places is 29°18' X 4' (minutes) = 1 hour 57 minutes 12 seconds (approximately 2 hours). Since Arunachal Pradesh is towards east, it will have sunrise about two hours earlier than the sunrise at Gujarat which is in the west.



In order to avoid these differences, Indian standard time is calculated. The local time of the central meridian of India is the standard time of India. **India's central meridian is 82°30' E longitude.** It passes through Mirzapur and roughly bisects the country in terms of longitude. The IST is 5.30 hrs ahead of Greenwich Mean Time (GMT).

1.2 Major Physiographic Divisions of India

The majestic Himalayan peaks in the north, the beautiful beaches in the south, the great Indian desert in the west and the breathtaking natural heritage in the east make India a geographically vibrant, colourful and truly incredible country.

There is a varied nature of physiographic divisions in India. Though the country has many landforms based on the major differences, it is divided into the following five physiographic divisions:

1. **The Himalayan Mountains**
2. **The Great Northern Plains**
3. **The Peninsular plateau**
4. **The Indian Desert**
5. **The Coastal Plains**
6. **The Islands**

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1.2.1 Himalayan Mountains

The Himalayan Mountains (Northern Mountains) consist of the youngest and the loftiest mountain chains in the world because they have been formed only few millions years ago and also they were formed because of the folding of the earth crust due to tectonic activity. It stretches for a distance of 2,500 km from the Indus gorge in the west to Brahmaputra gorge in the east. The width of the Northern Mountains varies from 500 km in Kashmir to 200 km in Arunachal Pradesh. The Pamir Knot, popularly known as the **"Roof of the World"** is the connecting link between the Himalayas and the high ranges of Central Asia. From the Pamir, Himalayas extend eastward in the form of an arc shape. The term "Himalaya" is derived from Sanskrit. It means **"The Abode of Snow"**. The Northern Mountains that function as a great wall is grouped into three divisions. **1) The Trans-Himalayas, 2) Himalayas, 3) Eastern or Purvanchal hills**.

DO YOU KNOW?

Aravalli range is the oldest fold mountain range in India.

FIND OUT

Find the Hill stations which are located in Himalayan Mountains.

1. The Trans-Himalayas

It is also known as western Himalaya's. It lies to the north of the great Himalayan range. It lies in Jammu and Kashmir and Tibetian plateau. As its areal extent is more in Tibet, it is also known as Tibetean Himalayas. The Trans-Himalayas are about 40 km wide in its eastern and western extremities and about 225 km wide in its central part. They contain the Tethys sediments. The rocks of this region contain fossils bearing marine sediments which are underlain by 'Tertiary granite'. It has partly metamorphosed sediments and constitutes the core of the Himalayan axis. The prominent ranges of Trans Himalayas are Zaskar, Ladakh, Kailash, and Karakoram.

2. The Himalayas

It constitutes the core part of northern mountains. It is an young fold mountain. It was formed by the movement of Angara land mass in the north and Gondwana land mass in the south. The Tethys sea found between these two land masses was uplifted by the compression and the resultant landform was the Himalayas. It consists of many ranges. The main divisions of the Himalayas are the ***(i) Greater Himalayas, (ii) the Lesser Himalayas and (iii)the Siwaliks***

Peak	Country	Height in metres
Mt. Everest	Nepal	8848
Mt.K2 or Godwin Austen	India	8611
Kanchenjunga	India	8598
Makalu	Nepal	8481
Dhaulagiri	Nepal	8172
Nanga Parbat	India	8126
Annapurna	Nepal	8078
Nanda Devi	India	7817
Kamet	India	7756
Namcha Barwa	India	7756
Gurla Mandhata	Nepal	7728

Himalaya is the home of several high peaks. However, it holds the record of having the maximum number of highest peaks among any mountain range in world. Out of 14 heights peaks in this world, Himalayas holds 9.

(i) The Greater Himalayas or the Himadri

The Greater Himalayas rise abruptly like a wall north of the Lesser Himalayas. The Greater Himalayas are about 25 km wide. Its average height is about 6,000 m. The Greater Himalayas receive lesser rainfall as compared to the Lesser Himalayas and the Siwaliks. Physical weathering is less effective over the Greater Himalayas as compared to the other ranges. Almost all the lofty peaks of Himalayas are located in this range. The notable ones are Mt. Everest (8,848 m) and Kanchenjunga (8,586 m). Mt.Everest is located in Nepal and Kanchenjunga is located between Nepal and Sikkim. This range is the most continuous of all ranges. It is region of permanent snow cover. So, it has many glaciers. **Gangothri, Yamunothri and Siachen** are some of them.

(ii) The Lesser Himalayas or The Himachal

It is the middle range of Himalayas. Height of this range varies from 3, 700 to 4,500 m. Its width varies upto 80 km. The major rocks of this range are slate, limestone and quartzite. This region is subjected to extensive erosion due to heavy rainfall, deforestation and urbanization. Pir Panjal, Dhauladhar and Mahabharat are the mountain ranges found in this part. Major hill stations of the Himalayas are located in this range. **Shimla, Mussourie, Nainital, Almora, Ranikhet and Darjeeling** are the familiar ones.

The major passes in the Himalayan are Karakoram pass (Jammu and Kashmir), Zojila pass, Shipkila pass (Himachal Pradesh), Bomdila pass (Arunachal Pradesh), Nathala pass (Sikkim) and Jhelepla pass (Sikkim). The Khyber pass which connects Pakistan and Afanisthan, and Bolan pass in Pakistan are important passes of the Indian subcontinent

(iii) The Siwaliks or Outer Himalayas

The Siwaliks extend from Jammu and Kashmir to Assam. It is partly made by the debris brought by the Himalayan rivers. The altitude varying between 900-1100 metres elevation of this range is 1300 m. The width of Siwaliks vary from 10 km in the east to 50 km in the west. It is the most discontinuous range.

The longitudinal valleys found between the Siwaliks and the Lesser Himalayas are called Duns in the west and Duars in the east. These are the ideal sites for the development of settlements in this region.

3. Purvanchal Hills

These are the eastern off-shoot of Himalayas. It extended in the north-eastern states of India. Most of these hills are located along the border of India and Myanmar while others are inside India. Dafla Hills, Abor Hills, Mishmi Hills, Patkai Bum Hills, Naga Hills, Manipur Hills, Mizo Hills, Tripura Hills, Mikir Hills, Garo Hills, Khasi Hills and Jaintia Hills are the hills which are collectively known as **purvanchal Hills**.

Importance of Himalayas

- Himalayas blocks southwest monsoon winds and causes heavy rainfall to north India.
- It forms a natural barrier to the sub-continent.
- It is the source for many perennial rivers like Indus, Ganges, Brahmaputra etc.
- The Northern Mountains are described as the paradise of tourists due to its natural beauty.
- Many hill stations and pilgrim centres like Amarnath, Kedarnath, Badrinath and Vaishnavidevi temples are situated here.
- It provides raw material for many forest based industries.
- It prevents the cold winds blowing from the central Asia and protects India from severe cold.
- Himalayas are renowned for the rich biodiversity.

Longitudinal Divisions of Himalayas

1. The Kashmir Punjab Himachal Himalayas- Located between the rivers of Indus and Sutlej.
2. The Kumaun Himalayas- Located between the rivers of Sutlej and Kali.
3. The Central-Nepal Himalayas- Located between the rivers of Kali and Tista.
4. The Assam Eastern Himalayas- Located between rivers of Tista and Dihang.

1.2.2 The Great Northern Plains

The fertile land extending across seven north Indian states forms the Great Northern Plains. This extensive plain lies to the south of the northern mountains. This plain is one of the most extensive stretches of the alluvium in the world and is deposited by the rivers Indus, Ganga, Brahmaputra and their tributaries. The length of the plain is about 2,400 km and the width varies from 240 to 320 km. Its width increases from east to west. It covers an area of over 7 lakh sq.km.

The Great Plains of India is remarkably a homogeneous surface with an imperceptible slope. They are formed mostly by the depositional process of the Himalayan and Vindhyan rivers. These rivers deposit enormous quantity of sediments deposited along the foothills and flood plains. The important characteristics featuress of sediment deposition in the plains areas as follows.

a) The Bhabar Plain

This plain is made up of gravels and unassorted sediments deposited by the Himalayan rivers. The porosity of this plain is so high that most of the small streams flow over this region disappear. It lies to the south of the Siwalik from west to east (Jammu Division to Assam). Its width varies from 8 to 15 km. It is wider in the western plains (Jammu Division) than in the east (Assam). This plain is not suitable for cultivation, only big trees with large roots thrive in this region.

b) The Tarai Tract

It is a zone of excessive dampness, thick forests and rich wild life. This tract lies to the south of Bhabar plains. The width of this belt is 15-30 km. The Tarai is wider in the eastern parts of the Great Plains, especially in Brahmaputra

Valley due to heavy rainfall. In many states, the Tarai forests have been cleared for cultivation.

c) The Bhangar Plains

The Bhangar represent the upland alluvial tracts of the Great Plains of India, formed by the older alluviums. The Bhangar land lies above the flood limits of the rivers. This soil is dark in colour, rich in humus content, well drained and useful for agriculture.

d) The Khadar Plains

The new alluvium tracts along the courses of the rivers are known as the 'Khadar' or 'Bet' lands. The Khadar tracts are enriched by fresh deposits of silt every year during rainy seasons. The Khadar land consists of sand, silt, clay and mud. It is highly fertile soil.

e) Delta Plains

The deltaic plain is an extension of the Khadar land. It covers about 1.9 lakh sq.km in the lower reaches of the Ganga River. It is an area of deposition as the river flows in this tract sluggishly. The deltaic plain consists mainly of old mud, new mud and marsh. In the delta region, the uplands are called '**Chars**' while the marshy areas are called '**Bils**'.

1.2.3 The Peninsular Plateaus

The plateau region lies to the south of the Great Northern Plains. This is the largest physiographic division of our country. It covers an area of about 16 lakh sq.km (about half of the total area of the country). It is an old rocky plateau region. The topography consists of a series of plateaus and hill ranges interspersed with river valleys.

Aravalli hills mark the north-western boundary of the plateau region. Its northern and north-eastern boundaries are marked by the Bundelkhand upland, Kaimur and Rajmahal hills. The Western Ghats and the Eastern Ghats mark the western and eastern boundaries respectively. The altitude of a large portion of the plateau is more than 600 m from mean sea level. **The peak of Anaimudi is the highest point in the plateau**. Its height is 2,695 m and is located in Anaimalai. The general slope of this plateau is towards east. The Great Plateau

On the basis of deposition of sediments by various rivers and topographical characteristics, the Northern Plains of India is divided into the following four major regions:

a) **Rajasthan Plains:** It is located to the west of Aravalli range. It covers an area of about 1,75,000 sq.km. Rajasthan plain is formed by the deposition of the river Luni and the long vanished river Saraswathi. There are several salt lakes in Rajasthan. The Sambhar salt lake (Pushkar Lake) near Jaipur is the prominent one.

b) **Punjab - Haryana Plains:** It lies to the north-east of the Great Indian Desert. This plain is found over an area of about 1.75 lakh sq.km. The Punjab - Haryana plains are formed by the deposition of the rivers Sutlej, Beas and Ravi. This plain acts as water - divide (doab). The two major watershed it divides are Yamuna – Sutlej and Ganga – Yamuna.

c) **Ganga Plains:** It extends from the Yamuna River in the west to Bangladesh in the east. The total area covered by this plain is about 3.75 sq.km. River Ganga and its tributaries such as Ghaghra, Gandak, Kosi, Yamuna, Chambal, Betwa etc. constitute this plain by their sediments and make a great plain in India. It is the largest plain of India. The general slope of the entire plain (upper, middle and lower Ganga plains) is towards east and south-east.

d) **Brahmaputra Plains:** It is located mainly in the state of Assam. It is a low - level plain located in the eastern part of the Great Plains of India and is formed by the deposits of river Brahmaputra. It covers an area of about 56,275 sq.km. These plains create alluvial fans and marshy tracts.

is a part of the Gondwana (very ancient one) land mass. Due to the old age, the rivers in this region attained their base level and developed broad and shallow valleys.

The river Narmada divides the plateau region of India broadly into two parts. The region lying to the north of the Narmada is called the Central Highlands and the region lying to the south of Narmada is called the Deccan Plateau. All the major rivers (Mahanadi, Godavari, Krishna, Kaveri etc.) lying to the south of the Vindhyas flow eastwards and fall into the Bay of Bengal. Narmada and Tapti are the two rivers situated to the south of the Vindhyas flow westward. Their movement towards west is due to the presence of a rift valley in the region.

a) Central Highlands

The Central Highlands extend between the river Narmada and the Northern Great Plains. The Aravallis form the west and northwestern edge of the Central Highlands. These hills extend from Gujarat, through Rajasthan to Delhi in the northwesterly direction for a distance of about 700 km. The height of these hills is about 1,500 m in southwest while near Delhi the height is hardly 400 m. **Gurushikhar with 1,722 m is the highest peak of this range**.

The Western part of the Central Highland is known as the Malwa Plateau. It lies to the southeast of Aravallis and to the north of Vindhyachal Range. The rivers Chambal, Betwa and Ken drain the Malwa Plateau before they join the river Yamuna. The part of the Central Highlands which extends to the east of Malwa Plateau is known as Bundelkhand and its further extension is known as Bagelkhand. The eastern part of the Central High lands which lies in the north-eastern part of the Indian Plateau is known as Chhota-Nagpur Plateau. It covers much of Jharkhand, adjacent parts of Odisha, West Bengal, Bihar and Chhattisgarh. This region is very rich in mineral resources particularly iron ore and coal.

b) Deccan Plateau

This physiographic division is the largest part of the plateau region of India. The shape of this plateau is roughly triangular. One of the sides of this triangle is marked by the line joining Kanniyakumari with Rajmahal Hills and this line passes through the Eastern Ghats. The second arm is marked by the Satpura Range, Mahadeo Hills, Maikal Range and the Rajmahal Hills. The third arm is marked by the Western Ghats. The area of this Plateau is about 7 lakh square km and the height ranges from 500 to 1000 m above sea level.

The Western Ghats forms the western edge of the Peninsular Plateau. It runs parallel to the Arabian Sea coast. The northern part of this range is called as Sahyadris. The height of the Sahyadris increases from north to south. Anaimudi is a sort of tri-junction of the Anaimalai Range, the Cardamom Hills and the Palani Hills. Kodaikanal is a beautiful hill resort situated on the Palani Hills. Eastern Ghats run from southwest to northeast form the eastern edge of this Plateau. This range is also called as Poorvadri. The Eastern Ghats join the Western Ghats at the Nilgiri hills, bordering Karnataka and Tamil Nadu. The Eastern Ghats are not continuous like the Western Ghats. The rivers of Mahanadi, Godavari, Krishna, Pennar and Kaveri have dissected this range at many places.

1.2.4 The Indian Desert

The Thar desert, also known as the Great Indian desert is a large arid region in the north western part of the Indian subcontinent that covers an area of 2,00,000 km^2 and forms a natural boundary between India and pakisthan. It is the world 7^{th} largest desert, and world 9^{th} largest sub tropical desert located in Western part of the India.

The desert lies in the western part of the aravalli range and covers 2/3 of Rajasthan state. There are two major divisions in the Thar desert. They are known as the Actual

desert region (Marusthali) and the semi desert region (Bhangar). Many different types of sand dunes and salt lakes (Dhands) are seen here.

Thar Desert

1.2.5 The Coastal Plains

The Peninsula Plateau of India is flanked by narrow coastal plains of varied width from north to south, known as the Western Coastal Plains and the Eastern Coastal Plains. They were formed by the depositional action of the rivers and the erosional and depositional actions of the sea-waves. The Indian coastal plains are divided into the following two divisions: 1) The Western Coastal Plains and 2) The Eastern Coastal Plains.

1. The Western Coastal Plain

It lies between the Western Ghats and the Arabian Sea. It extends from Rann of kutch in the north to Kanniyakumari in the south and its width varies from 10 to 80 km. It is mainly characterised by sandy beaches, coastal sand dunes, mud flats, lagoons, estuary, laterite platforms and residual hills. The northern part of the West Coastal Plain is known as Konkan Plain. The middle part of this plain is known as Kanara. The southern part of the plain is known as Malabar coast which is about 550 km long and 20-100 km wide. This part of the coast is characterized by sand dunes. Along the coast, there are numerous shallow lagoons and backwaters called **Kayals** and **Teris**. **Vembanad** is a famous back water lake found in this region.

2. The Eastern Coastal Plain

It lies between the Eastern Ghats and the Bay of Bengal and, stretches along the states of West Bengal, Odisha, Andhra Pradesh and Tamil Nadu. These plains are formed by the alluvial fillings of the littoral zone by the east flowing rivers of India. The coastal plain consists mainly of the recent alluvial deposits. This coastal plain has a regular shoreline with well-defined beaches. The coastal plain between Mahanadi and Krishna river is known as the Northern Circars and the southern part lies between Krishna and Kaveri rivers is called Coromandal coast. The **Marina beach** on this coast in Chennai and it is the second longest beach in the world. Among the back water lakes of this coast, lake **Chilka** (Odisha) is the largest lake in India located to the southwest of the Mahanadi delta, the **Kolleru Lake** which lies between the deltas of Godavari and Krishna and the **Pulicat Lake** lies in the border of Andhra Pradesh and Tamil Nadu are the well known lakes in the east coastal plain.

1.2.6 The Islands

India has two major island groups namely Andaman and Nicobar and Lakshadweep. The former group consists of 572 islands and are located in Bay of Bengal, and the later one has 27 islands and are located in Arabian Sea. The islands of Andaman and Nicobar are largely tectonic and volcanic origin. India's only active volcano is found on Barren Island in Andaman and Nicobar group of Islands, while the islands of the Arabian Sea are mainly coral origin.

a) Andaman and Nicobar Islands

Andaman Islands

These islands are located in an elevated portion of the submarine mountains. Since these islands lie close to the equator, the climate remains hot and wet throughout the year and has dense forests. The area of the island group is about 8,249 sq.km. The entire group of islands

is divided into two. They are Andaman in the north and the Nicobar in the south. These island groups are of great strategic importance for the country. Port Blair is the administrative capital of the Andaman and Nicobar islands. The **Ten Degree Channel** separates Andaman from Nicobar group. The southernmost tip, the **Indira Point** is a part of Nicobar Island.

b) Lakshadweep Islands

This is a small group of coral islands located off the west coast of India. It covers an area of 32 sq. km. Kavaratti is its administrative capital. Lakshadweep islands are separated from the Maldive Islands by the Eight Degree Channel. The uninhabited "**Pitt Island**" of this group has a bird sanctuary. Earlier, it had three divisions namely Laccadive, Minicoy and Amindivi. It was named as Lakshadweep in 1973.

c) Offshore Islands

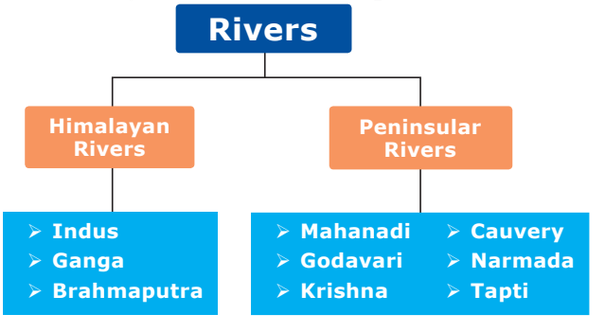
Besides the two group of islands, India has a number of islands along the Western Coast, Eastern Coast, in the delta region of Ganga and in the Gulf of Mannar. Many of these islands are uninhabited and are administered by the adjacent states.

1.3 Drainage System of India

A drainage system is an integrated system of tributaries and a trunk stream which collects and drains surface water into the sea, lake or some other body of water. The total area drained by a river and its tributaries is known as a drainage basin. The drainage pattern of an area is the result of the geological structure of the respective areas. The river system provides irrigation, drinking water, navigation, power as well as grant livelihoods for a large number of population. The drainage system of India is broadly divided into two major groups on the basis of their location. They are Himalayan rivers and the Peninsular rivers.

1.3.1 Himalayan Rivers

These rivers are found in north India and originate from Himalayas. So, they are also called as Himalayan rivers. These are perennial rivers.



a) The Indus River System

The Indus River is one of the largest rivers of the world. It originates from the northern slope of the Kailash range in Tibet near Manasarovar Lake at an elevation of about 5,150 m. Its length is about 2,880 km (Only 709 km is in India). The river has a total drainage area extending 11,65,500 sq km in which 321,289 sq km areas are drained in India. The river flows through the Ladakh and Zaskar ranges and creates deep gorges. The river runs through Jammu and Kashmir, turns south near Chillar and enters Pakistan. Its major tributaries are Jhelum, Chenab (Largest tributary of Indus), Ravi, Beas and Sutlej. It enters into with the Arabian Sea.

b) The Ganga River System

Ganga River - Haridwar

The Ganga River system is the largest drainage system of India it extend over and area of 8,61,404 sq km in India. The Ganga plain is the most densely populated place in India and many towns are developed on the banks of this river. The river Ganga originates as Bhagirathi from the Gangotri Glacier in Uttar Khasi District of Uttarkhand state, at an elevation of

7,010 m. The length of the river Ganga is about 2,525 km. Its major tributaries from the north are Gomti, Gandak, Kosi and Ghaghra and from south, Yamuna (largest tributary of Ganga), Son, Chambal etc. The river Ganga is known as the River Padma in Bangladesh. The combined river of Ganga and Brahmaputra creates the World's largest delta known as Sundarbans in Bangladesh before joining the Bay of Bengal.

c) The Brahmaputra River System

The river Brahmaputra originates from the Chemayungdung Glacier of the Kailash range to the east of Lake Manasarovar in Tibet at an elevation of about 5,150 m. The total area is about 5,80,000 sq km but the drainage area lying in India is 1,94,413 sq km This river is known as Tsangpo (Purifier) in Tibet. The length of this river is about 2,900 km (900 km in India). It enters into India through a gorge in Arunachal Pradesh namely Dihang. It has many tributaries. Tista, Manas, Barak, Subansiri are some of them. This river is called as Jamuna in Bangladesh. After it joins with the river Ganga in Bangladesh, the river is called as Meghna.

Characteristics of Himalayan Rivers

- Originate from Himalayas
- Long and wide
- Perennial in nature
- Unsuitable for hydro power generation
- Middle and lower courses are navigable

1.3.2 Peninsular Rivers

The rivers in south India are called the Peninsular rivers. Most of these rivers originate from the Western Ghats. These are seasonal rivers (non–perennial). They have a large seasonal fluctuation in volume of water as they are solely fed by rain. These rivers flow in valleys with steep gradients. Based on the direction of flow, the peninsular rivers are divided into the West flowing and East flowing rivers.

1.3.3 East Flowing Rivers

a) Mahanadi

The river Mahanadi originates near Sihawa in Raipur district of Chattisgarh and flows through Odisha. Its length is 851 km. Seonath, Telen, Sandur and Ib are its major tributaries. The main stream of Mahanadi gets divided into several distributaries such as Paika, Birupa, Chitartala, Genguti and Nun. All these distributaries form the Delta of Mahanadi which is one of the largest deltas in India. The Mahanadi empties its water in Bay of Bengal.

b) Godavari

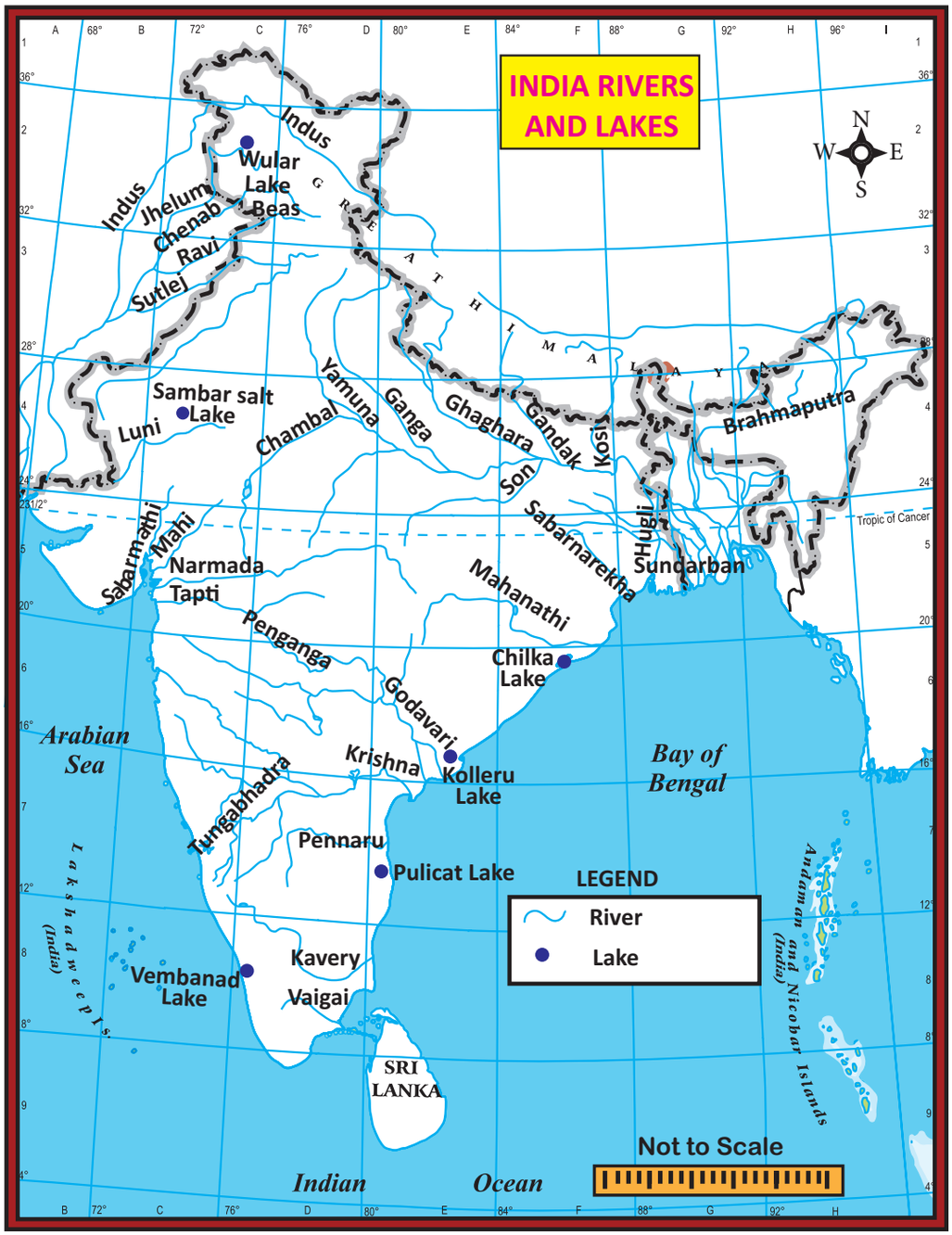
Godavari is the longest river (1,465 km) with an area of 3.13 lakh km^2 among the Peninsular rivers. It is also called Vridha Ganga. It originates in Nasik district of Maharashtra, a portion of Western Ghats. It flows through the states of Telangana and Andhra Pradesh before joining Bay of Bengal. Purna, Penganga, Pranitha, Indravati, Tal and Salami are its major tributaries. The river near Rajahmundry gets divided into two Channels called Vasistha and Gautami and forms one of the largest deltas in India. Kolleru, a fresh water lake is located in the deltaic region of the Godavari.

c) Krishna

The river Krishna originates from a spring at a place called Mahabaleshwar in the Western Ghats of Maharashtra. Its length is 1,400 km and an area of 2.58 lakh sq km. It is the second longest Peninsular river Bhima, Peddavagu, Musi, Koyna and Thungabhadra are the major tributaries of this river. It also flows through Andhra Pradesh and joins in Bay of Bengal, at Hamasaladeevi.

d) Kaveri

The river Kaveri originates at Talakaveri, Kudagu hills of Karnataka. Its length is 800 km. The river kaveri is called Dhakshin Ganga or Ganga of south Harangi, Hemavati, Kabini, Bhavani, Arkavathy, Noyyal, Amaravathi etc are the main tributaries of the river Kaveri. In Karnataka the river bifurcates twice, forming



the sacred islands of Srirangapatnam and Sivasamudram. While entering Tamil Nadu, the Kaveri continues through a series of twisted wild gorges until it reaches Hogenakkal Falls and flows through a straight, narrow gorge near Salem. The Kaveri breaks at Srirangam Island with two channels, river Coleroon and Kaveri. At last, it empties into the Bay of Bengal at Poompuhar.

1.3.4 West Flowing Rivers

a) Narmada

This river rises in Amarkantak Plateau in Madhya Pradesh at an elevation of about 1057 m and flows for a distance of about 1,312 km it covers and area of 98,796 sq km and forms 27 km long estuary before outfalling into the Arabian Sea through the Gulf of Cambay. It is the largest among the west flowing rivers of Peninsular India. Its principal tributaries are

Burhner, Halon, Heran, Banjar, Dudhi, Shakkar, Tawa, Barna and Kolar.

b) Tapti

The Tapti is one of the major rivers of Peninsular India with the length of about 724 km. It covers an area of 65,145 sq km. Tapti river rises near Multai in the Betul district of Madhya Pradesh at an elevation of about 752 m. It is one of only the three rivers in Peninsular India that run from east to west - the others being the Narmada and the Mahi. The major tributaries are Vaki, Gomai, Arunavati, Aner, Nesu, Buray, Panjhra and Bori. It outfalls into the Arabian Sea through the Gulf of Cambay.

In which river the Gerosappa (jog) fall is found?

Recap

- India has been physiographically divided into five divisions. They are **Northern Mountains, Northern Great Plains, The Plateau region, Coastal Plains and Islands**.
- Northern Mountains are classified into three divisions as Trans-Himalayas, Himalayas and Eastern Himalayas.
- Northern Great Plains are divided into four as Rajasthan Plains, Punjab-Haryana Plains, Gangetic Plains and Brahmaputra Plains.
- The Plateau region of India has two divisions namely the Central Highlands and the Deccan Plateau.
- Andaman and Nicobar Islands and Lakshadweep are the two major island groups of India.
- The Drainage System of India is classified into the north Indian (Himalayan) and Peninsular rivers.
- The Indus River system, the Ganga River system and the Brahmaputra River system have made the agricultural lands of north India as fertile land. These rivers are perennial in nature.
- Narmada, Tapti, Mahi and Sabarmathi rivers confluence with the Arabian Sea.
- Mahanadi, Godavari, Krishna and Cauvery are the major east flowing rivers and drain into Bay of Bengal.

A-Z GLOSSARY

Back waters: The part of a river which are stagnant and do not reach the sea as they are pushed by the current.

Distributary: A branch or outlet which leaves a main river and does not rejoin it, carrying its water to the sea or a lake.

Doab: A land between the two converging rivers.

Estuary: Mouth of a river where it enters the sea through a single channel with a hollow.

Perennial Rivers: The rivers which flow throughout the year and have permanent source of water.

Pass: A narrow gap through the mountains providing a route or passage way.

Peninsula: The land area covered with ocean on three sides. **Subcontinent:** A large area of a continent that stands distinct from the rest of the continent and possesses almost all the characteristics of a continent.

Standard Time: The local time of central meridian of ones country.

Tributary: A river or stream which contributes its water to main river.

EXERCISE

Characteristics of South Indian Rivers

EGWSPV

- Originate from Western Ghats
- Short and narrow
- Non perennial in nature
- Suitable for hydro power generation
- Not useful for navigation

I. Choose the correct answer

1. The north-south extent of India is
   a. 2,500 km b. 2,933 km
   c. 3,214 km d. 2814 km
2. The Southern most point of India is
   a. Andaman b. Kanniyakumari
   c. Indira Point d. Kavaratti
3. The extent of Himalayas in the east-west is about
   a. 2,500 km b. 2,400 km
   c. 800 km d. 2,200 km
4. _____ River is known as 'Sorrow of Bihar'.
   a. Narmada b. Godavari
   c. Kosi d. Damodar
5. Deccan Plateau covers an area of about _____ sq.km.
   a. 8 lakh b. 6 lakh
   c. 5 lakh d. 7 lakh
6. A landmass bounded by sea on three sides is referred to as _____.
   a. Coast b. Island
   c. Peninsula d. Strait
7. The Palk Strait and Gulf of Mannar separates India from _____
   a. Goa b. West Bengal
   c. Sri Lanka d. Maldives
8. The highest peak in South India is
   a. Ooty b. Kodaikanal
   c. Anaimudi d. Jindhagada
9. _____ Plains are formed by the older alluviums.
   a. Bhabar b. Tarai
   c. Bhangar d. Khadar
10. Pulicat Lake is located between the states of
    a. West Bengal and Odisha
    b. Karnataka and Kerala
    c. Odisha and Andhra Pradesh
    d. Tamil Nadu and Andhra Pradesh

II. Match the following

1.	Tsangpo	—	Tributary of River Ganga
2.	Yamuna	—	Highest peak in India
3.	New alluvium	—	River Brahmaputra in Tibet
4.	Mt. Godwin Austen (K2)	—	Southern part of East Coastal Plain
5.	Coromandel Coast	—	Khadhar

III. Give Reasons

1. Himalayas are called young fold moutains
2. North Indian Rivers are perennial
3. Chottanagpur Plateau is rich in mineral resources
4. The great Indian desert is called Marusthali
5. The Eastern states are called seven sisters
6. The river Gothavari is often referred as Vridha Ganga.

IV. Distinguish between the following

1. Himalayan rivers and Peninsular rivers.
2. Western Ghats and Eastern Ghats.
3. Himadri and Himachal.
4. Western Coastal Plains and Eastern Coastal Plains.

V. Answer in brief

1. Name the neighbouring countries of India.
2. Give the importance of IST.
3. Write a short note on Deccan Plateau.
4. State the west following rivers of India.
5. Write a brief note on the island group of Lakshadweep

VI. Answer in a paragraph

1. Explain the divisions of Northern Mountains and its importance to India.
2. Give an account on the major peninsular rivers of India.
3. Give a detailed account on the basin of the Ganga.

VII. Map exercises

Mark the following in the outline map of India

1. Major mountain ranges – Karakoram, Ladakh, Zaskar, Aravalli, Western Ghats, Eastern Ghats.
2. Major rivers – Indus, Ganga, Brahmaputra, Narmada, Tapti, Mahanadi, Godavari, Krishna & Kaveri.
3. Major plateaus – Malwa, Chotanagpur, Deccan.

VIII. Activities

1. Observe the Peninsular Plateau map of India and mark the major plateau divisions of India
2. Prepare a table showing the major West flowing and East flowing rivers of peninsular India.
3. Assume that you are travelling from West Bengal to Gujarat along the beautiful coasts of India. Find out the states which you would pass through?
4. Find out the states through which the river Ganga flows.
5. Prepare a table showing the major rivers in India and findout it's tributaries, origin, length and area.

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Unit - 2

Climate and Natural Vegetation of India

Learning Objectives

- To describe the factors controlling the climate of India.
- To understand the characteristics of different seasons in India.
- To know about the rainfall distribution.
- To study the different types of natural vegetation and wild life in India.

7NTJBX

Introduction

We drink more water during summer and do not drink the same amount of water during winter. Why do we wear cotton or lighter clothes during summer season and heavy woollen clothes during cold weather season in north India? Why do not we wear woollen clothes in south India? This is because of the prevalence of varying weather conditions between north and south India. In the previous chapter, you have learnt about the landforms and drainage of our country, which dealt with the natural environment. In this chapter, you will learn about the climate, rainfall distribution, natural vegetation and wildlife of our country.

Equable climate is also called as the British climate, Which is neither too hot nor too cold.

2.1 The factors affecting the climate

Climate of India is affected by the factors of latitude, distance from the seas, monsoon wind, relief features and jet stream.

2.1.1 Latitude

Latitudinally, India lies between 8°4'N and 37°6'N latitudes. The Tropic of cancer divides the country into two equal halves. The area located to the south of Tropic of cancer experiences high temperature and no severe cold season throughout the year whereas, the areas to the north of this parallel enjoys sub-tropical climate. Here, summer temperature may rise above 40°C and it is close to freezing point during winter.

2.1.2 Altitude

When the altitude increases, The temperatures decreases. Temperature decreases at the rate of 6.5ºC for every 1000 metres of ascent. It is called **normal lapse rate.**

Hence, places in the mountains are cooler than the places on the plains. That is why the places located at higher altitudes even in south India have cool climate. Ooty and several other hill stations of south India and of the Himalayan ranges like Mussourie, Shimla etc., are much cooler than the places located on the Great Plains.

Find out the temperature of Ooty (2240m) if it is 35ºC in Chennai (6.7m)

2.1.3 Distance from the Sea

Distance from the sea does not cause only temperature and pressure variations but also affects the amount of rainfall. A large area of India, especially the peninsular region, is not very far from the sea and this entire area has a clear maritime influence on climate. This part of the country does not have a very clearly marked winter and the temperature is equable almost throughout the year. Areas of central and north India experience much seasonal variation in temperature due to the absence of influence of seas. Here, summers are hot and winters are cold. The annual temperature at Kochi does not exceed 30°C as its location is on the coast while it is as high as 40°C at Delhi, since it is located in the interior part. Air near the coast has more moisture and greater potential to produce precipitation. Due to this fact, the amount of rainfall at Kolkata located near the coast is 119 cm and it decreases to just 24 cm at Bikaner which is located in the interior part.

2.1.4 Monsoon Wind

The most dominant factor which affects the climate of India is the monsoon winds. These are seasonal reversal winds and India remains in the influence of these winds for a considerable part of a year. Though, the sun's rays are vertical over the central part of India during the mid-June, the summer season ends in India by the end of May. It is because the onset of southwest monsoon brings down the temperature of the entire India and causes moderate to heavy rainfall in many parts of the country. Similarly, the climate of southeast India is also influenced by northeast monsoon.

- Weather refers to the state of atmosphere of a place at a given point of time.
- Climate is the accumulation of daily and seasonal weather events of a given location over a period of 30-35 years.

2.1.5 Relief

Relief of India has a great bearing on major elements of climate such as temperature, atmospheric pressure, direction of winds and the amount of rainfall. The Himalayas acts as a barrier to the freezing cold wind blows from central Asia and keep the Indian subcontinent warm. As such the north India experiences tropical climate even during winter. During southwest monsoon, areas on the western slope of the Western Ghats receive heavy rainfall. On the contrary, vast areas of Maharashtra, Karnataka, Telangana, Andhra Pradesh and Tamil nadu lie in rain shadow or leeward side of the Western Ghats receive very little rainfall. During this season, Mangalore, located on the coast gets the rainfall of about 280 cm whereas the Bengaluru located on the leeward side receives only about 50 cm rainfall.

2.1.6. Jet Streams

Jet streams are the fast moving winds blowing in a narrow zone in the upper atmosphere. According to the Jet stream theory, the onset of southwest monsoon is driven by the shift of the sub tropical westerly jet from the plains of India towards the Tibetan plateau. The easterly jet streams cause tropical depressions both during southwest monsoon and retreating monsoon.

2.2 Monsoon

The word '**monsoon**' has been derived from the Arabic word '**Mausim**' which means 'season'. Originally, the word 'monsoon' was used by Arab navigators several centuries ago, to describe a system of seasonal reversal of winds along the shores of the Indian Ocean, especially over the Arabian Sea. It blows from the south-west to north-east during summer and from the north-east to south-west during winter.

Monsoons are a complex meteorological phenomenon. Meteorologists have developed a number of concepts about the origin of monsoons. According to the Dynamic concept, Monsoon wind originates due to the seasonal migration of planetary winds and pressure belts following the position of the sun. During summer solstice, the sun's rays fall vertically over the Tropic of cancer. Therefore, all the pressure and wind belts of the globe shift northwards. At this time, **Inter -Tropical Convergence Zone** (ITCZ) also moves northward, and a major part of Indian landmass comes under the influence of southeast trade winds. While crossing equator this wind gets deflected and takes the direction of southwest and becomes south-west monsoon. During the winter season, the pressure and wind belts shift southward, thereby establishing the north-east monsoon (trade winds) over this region. Such systematic change in the direction of planetary winds is known as monsoon.

DO YOU KNOW?

Atacama desert is the driest place on the earth.

2.2.1 Seasons

T3D6IE

The meteorologists recognize the four distinct seasons in India. They are;

1. **Winter or cold weather season (January - February).**
2. **Pre Monsoon or summer or hot weather season (March - May).**
3. **Southwest monsoon or rainy season (June - September).**
4. **Northeast monsoon season (October - December).**

1. Winter or cold weather season

During this period, the vertical rays of the sun falls over tropic of capricorn which is far away from India. Hence, India receives the slanting sun's rays which results in low temperature. The cold weather season is characterized by clear skies, fine weather, light northerly winds, low humidity and large day time variations of temperature. During this season a high pressure develops over north India and a north-westerly wind blows down the Indus and Ganges valleys. In south India, the general direction of wind is from east to west. The mean temperature increases from north to south, the decrease being sharp as one moves northwards in the north-western part of the country. The mean daily minimum temperatures range from 22°C in the extreme south, to 10°C in the northern plains and 6°C in Punjab. The rain during this season generally occurs over the Western Himalayas, Tamil nadu and Kerala. Western disturbances and associated trough in westerlies are main rain bearing system in northern part of the country. 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 winter wheat.

2. Pre Monsoon or summer or hot weather season

During this season, the vertical rays of the sun falls over the peninsular India. Hence, there is a steady increase in temperature from south to north. It is practically hot and dry in the entire country in the initial part of this season. Weather over the land areas of the country is influenced by thunderstorms associated with rain and sometimes with hail mostly in the middle and later part. During this season, temperature starts increasing all over the country and by April, the interior parts of south India record mean daily temperatures of 30°C–35°C. Central Indian land mass becomes hot with day-time maximum temperature reaching about 40°C at many locations. Many stations in Gujarat, North Maharashtra, Rajasthan and North Madhya Pradesh exhibit high day-time and low night-time temperatures during this season.

Because of the atmospheric pressure conditions, the winds blow from southwest to northeast direction in Arabian Sea and Bay of Bengal. They bring pre monsoon showers to the west coast during the month of May. There are few thunder showers called "**Mango Showers**" which helps in quick ripening of mangoes along the coast of Kerala and Karnataka. "**Norwesters**" or "**Kalbaisakhis**" are the local severe storms or violent thunderstorms associated with strong winds and rain lasting for short durations. It occurs over the eastern and north eastern parts over Bihar, West Bengal and Assam during April and May. They approach the stations from the northwesterly direction.

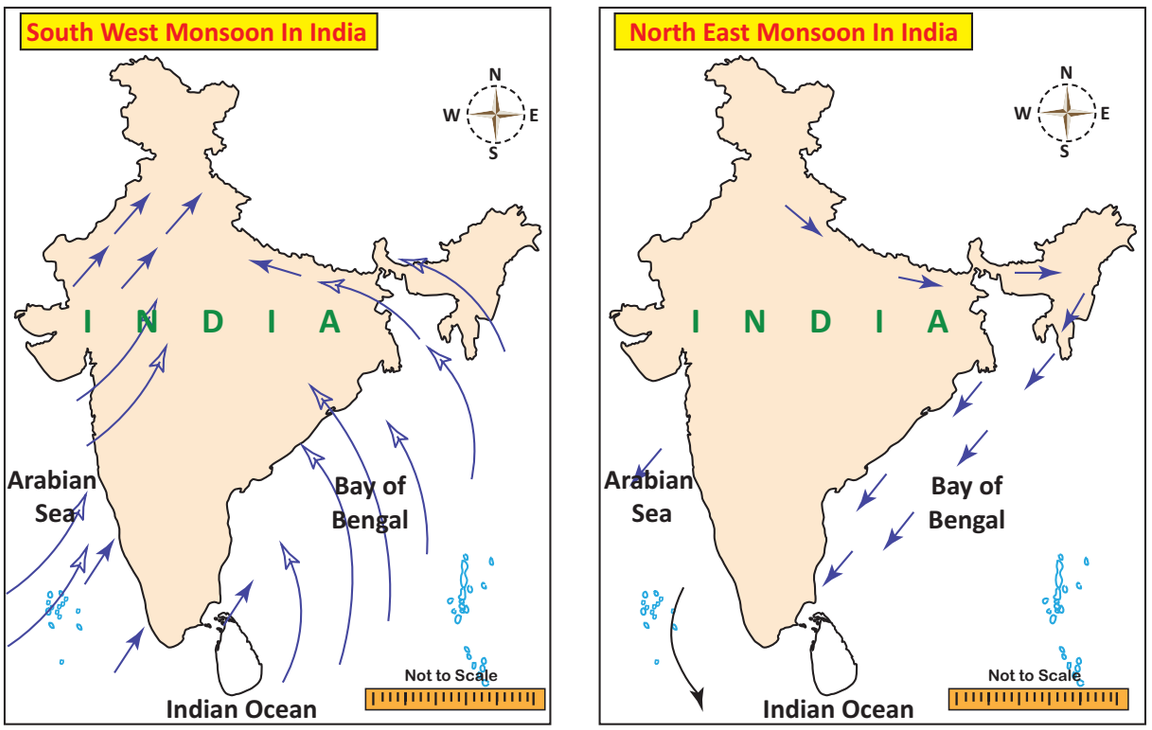
3. Southwest monsoon or Rainy Season

The southwest monsoon is the most significant feature of the Indian climate. The onset of the southwest monsoon takes place normally over the southern tip of the country by the first week of June, advances along the Konkan coast in early June and covers the whole country by 15th July. The monsoon is influenced by global phenomenon like **ElNino**.

Prior to the onset of the southwest monsoon, the temperature in north India reaches upto 46°C. The sudden approach of monsoon wind over south India with lightning and thunder is termed as the '**break**' or '**burst of monsoon**'. It lowers the temperature of India to a large extent. The monsoon wind strikes against the southern tip of Indian land mass and gets divided into two branches. One branch starts from Arabian sea and the other from Bay of Bengal. The Arabian sea branch of southwest monsoon gives heavy rainfall to the west coast of India as it is located in the windward side of the Western Ghats. The other part which advances towards north is obstructed by Himalayan Mountains and results in heavy rainfall in north. As Aravalli Mountain is located parallel to the wind direction, Rajasthan and western part do not get much rainfall from this branch. The wind from Bay of Bengal branch moves towards northeast India and Myanmar. This wind is trapped by a chain of mountains namely Garo, Khasi and Jaintia are mainly responsible for the heaviest rainfall caused at **Mawsynram** located in Meghalaya. Later on, this wind travel towards west which results in decrease in rainfall from east to west. Over all about **75% of Indian rainfall is received from this monsoon**. Tamil nadu which is located in the leeward side receives only a meagre rainfall.

4. Post monsoon or Retreating or Northeast monsoon season

The southwest monsoon begins to retreat from north India by the end of September due to the southward shifting pressure belts. The southwest monsoon wind returns from Indian landmass and blows towards Bay of Bengal. The coriolis force deflects this wind and makes it



India Monsoons

to blow from northeast. Hence, it is known as Northeast monsoon or Post-monsoon season. The season is associated with the establishment of the north-easterly wind system over the Indian subcontinent. Andhra Pradesh, Tamil nadu, Kerala and south interior Karnataka receive good amount of rainfall accounted for 35% of their annual total. Many parts of Tamil nadu and some parts of Andhra Pradesh and Karnataka receive rainfall during this season due to the storms forming in the Bay of Bengal. Large scale losses to life and property occur due to heavy rainfall, strong winds and storm surge in the coastal regions. The day time temperatures start falling sharply all over the country. The mean temperature over north-western parts of the country shows a decline from about 38°C in October to 28°C in November.

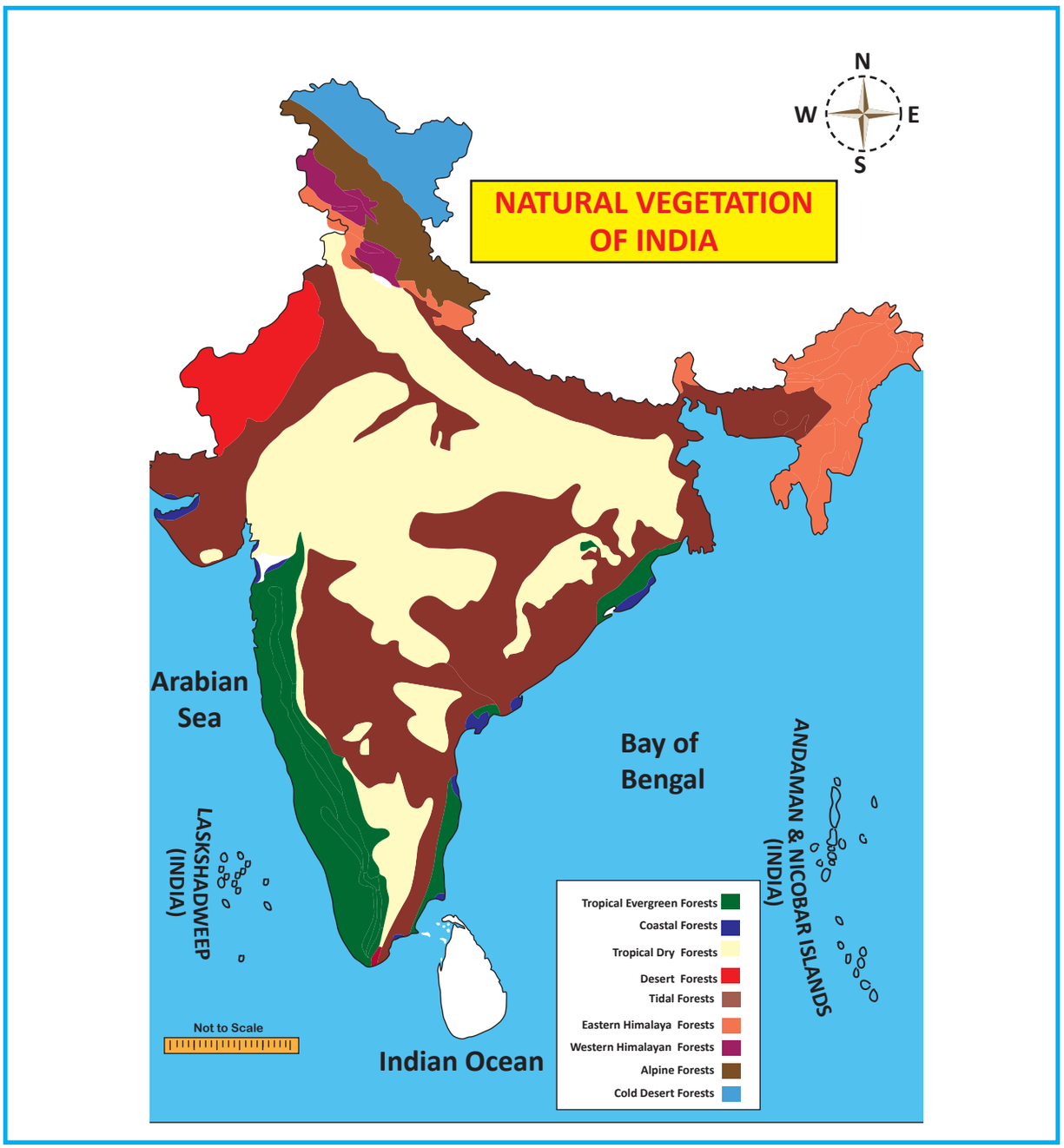
Mawsynram, the place which receives highest rainfall (1141 cm) in the world. It is located in Meghalaya.

Hots

Why is Mawsynram, the wettest place in the world.

2.3 Distribution of rainfall

The average annual rainfall of India is 118 cm. However, spatial distribution of rainfall in the country is highly uneven. About 11% area receives over 200 cm of annual rainfall, 21% area receives 125 to 200 cm, 37% area receives 75 to 125 cm, 24% area gets 35 to 75 cm and 7% area gets less than 35 cm. The Western coast, Assam, South Meghalaya, Tripura, Nagaland and Arunachal Pradesh are the heavy rainfall areas which get more than 200 cm rainfall. The whole of Rajasthan, Punjab, Haryana, Western and Southwestern parts of Uttar Pradesh, Western Madhya Pradesh, the entire Deccan Trap or Plateau region east of Western Ghats except for a narrow strip along Tamil nadu coast receive a low rainfall of less than 100 cm. The rest of the areas receive a rainfall ranging between 100 and 200 cm.



2.4 Natural Vegetation

Natural vegetation refers to a plant community unaffected by man either directly or indirectly. It has its existence in certain natural environment. Natural vegetation includes all plant life forms such as trees,

bushes, herbs and forbs etc, that grow naturally in an area and have been left undisturbed by humans for a long time. Climate, soil and landform characteristics are the important environmental controls of natural vegetation.

On the basis of the above factors the natural vegetation of India can be divided into the following types.

2.4.1 Tropical Evergreen Forest

These forests are found in areas with 200 cm or more annual rainfall. The annual temperature is about more than 22°C and the average annual humidity exceeds 70 percent in this region. Western Ghats in Maharashtra, Karnataka,

Kerala, Andaman-Nicobar Islands, Assam, West Bengal, Nagaland, Tripura, Mizoram, Manipur and Meghalaya states have this type of forests. The most important trees are rubber, mahogany, ebony, rosewood, coconut, bamboo, cinchona, candes, palm, iron wood and cedar. These have not been fully exploited due to lack of transport facilities.

2.4.2 Tropical Deciduous Forest

These are found in the areas with 100 to 200cm. annual rainfall. These are called '**Monsoon Forests**'. The mean annual temperature of this region is about 27°C and the average annual relative humidity is 60 to 70 percent. The trees of these forests drop their leaves during the spring and early summer. (Sub Himalayan - Region from Punjab to Assam, Great Plains- Punjab, Haryana, Uttar Pradesh, Bihar, West Bengal, Central India - Jharkhand, Madhya Pradesh, Chattisgarh, South India - Maharashtra, Karnataka, Telangana, Andhra Pradesh, Tamilnadu and Kerala states are notable for this type of natural vegetation.) Teak and sal are the most important trees. Sandalwood, rosewood, kusum, mahua, palas, haldu, amla, padauk, bamboo and tendu are the other trees of economic importance. These forests also provide fragrant oil, varnish, sandal oil and perfumes.

2.4.3 Tropical Dry Forest

These are found in the areas with 50 to 100 cm. annual rainfall. They represent a transitional type of forests. These are found in east Rajasthan, Haryana, Punjab, Western Uttar Pradesh, Madhya Pradesh, Eastern Maharashtra, Telangana, West Karnataka and East Tamilnadu. The important species are mahua, banyan, amaltas, palas, haldu, kikar, bamboo, babool, khair etc.,

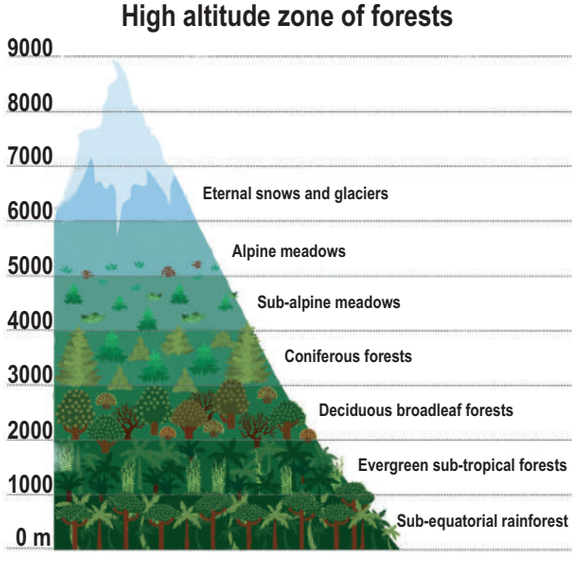
Desert and Semi-desert Vegetation: These are also called as 'Tropical thorn forests'. These are found in the areas having annual rainfall of less than 50 cm. They have low humidity and high temperature. These forests are found in north-west India which includes west Rajasthan, south-west Haryana, north Gujarat and south-west Punjab. They are also found in the very dry parts of the Deccan plateau in Karnataka, Maharashtra and Andhra Pradesh. Babul, kikar and wild palms are common trees found here.

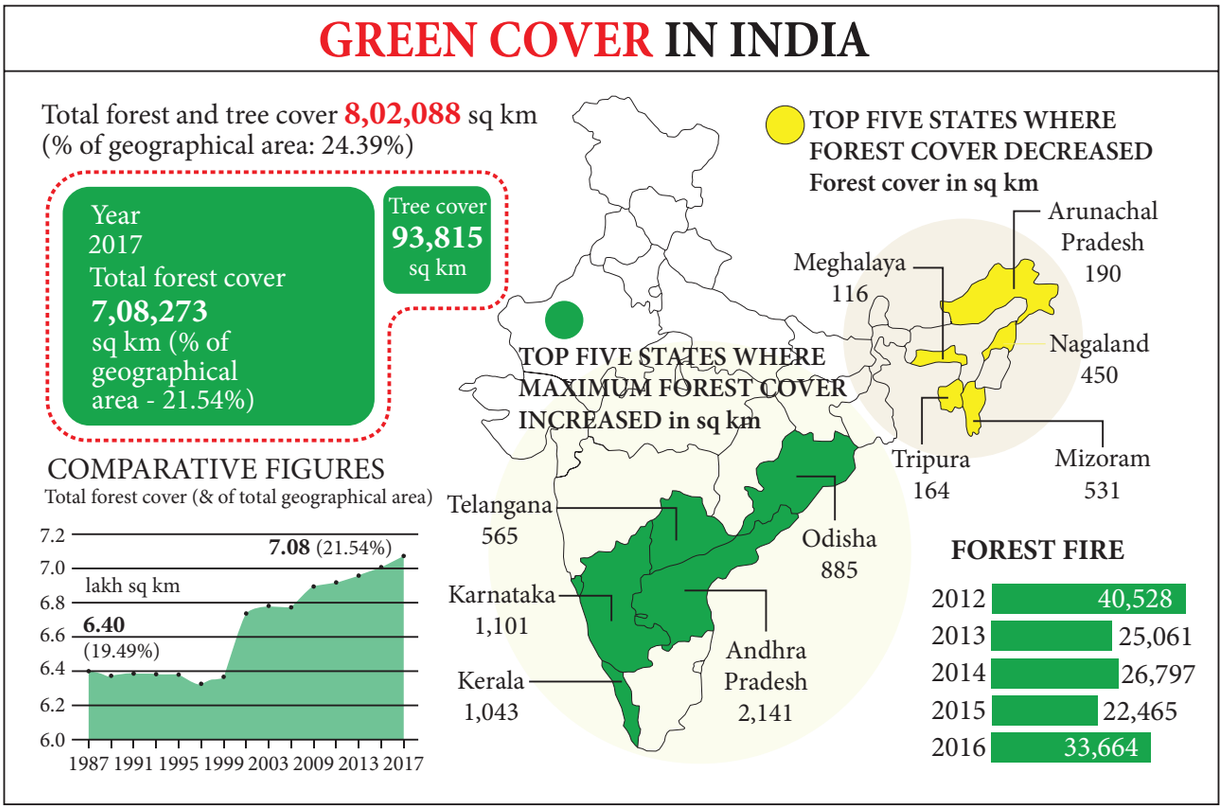
2.4.4 Mountain or Montane Forest

These forests are classified on the basis of altitude and amount of rainfall. Accordingly two different types of forests namely Eastern Himalayas Forests and Western Himalayas Forests.

i. **Eastern Himalayan Forest:** These are found on the slopes of the mountains in north-east states. These forests receive rainfall of more than 200 cm. The vegetation is of evergreen type. The Altitude between 1200-2400 m found in this type of forest sal, oak, laurel, amura, chestnut, cinnamon are the main trees from 1200 to 2400 m altitude oak, birch, silver, fir, fine, spruce and juniper are the major trees from 2400 to 3600 m height.

(ii) **Western Himalayan Forest:** The rainfall of this region is moderate. These forests are found in the states of Jammu and Kashmir, Himachal Pradesh and Uttarakhand. Upto 900 m altitude semi desert vegetation is found and it is known for bushes and small trees. In altitude from 900 to 1800 m, chir tree is the most common tree. The other important trees of this region are sal, semal, dhak, jamun and jujube. (height





from 1800 to 3000 m is covered with semi temperate coniferous forests.) Chir, deodar, blue pine, poplar, birch and elder are the main trees of this region.

2.4.5 Alpine Forest

It occurs all along the Himalayas with above 2400 m altitude. These are purely having coniferous trees. Oak, silver fir, pine and juniper are the main trees of these forests. The eastern parts of Himalayas has large extent of these forests.

2.4.6 Tidal Forest

These forests occur in and around the deltas, estuaries and creeks prone to tidal influences and as such are also known as delta or swamp forests. The delta of the Ganga-Brahmaputra has the largest tidal forest. The deltas of Mahanadi, Godavari and Krishna rivers are also known for **tidal forests**. These are also known as **mangrove forest**.

2.4.7 Coastal Forest

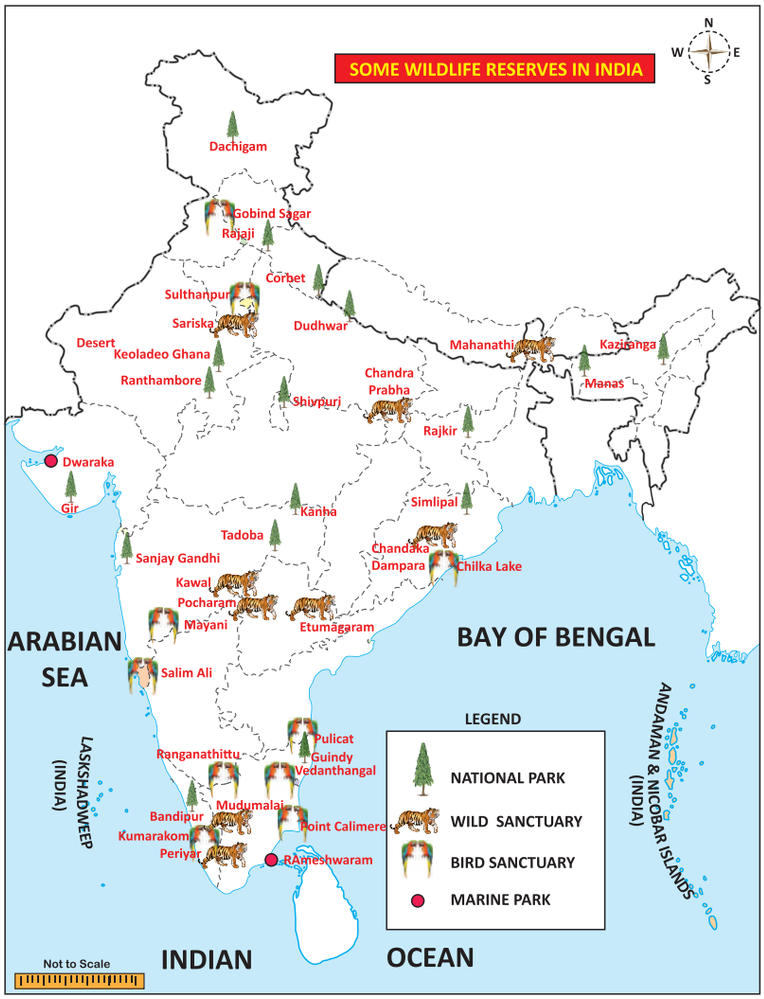
These are littoral forests. Generally, coastal areas have these types of forests. Casurina, palm and coconut are the dominant trees. Both the eastern and western coasts have this type of forests. The coasts of Kerala and Goa are known for this type.

2.4.8 Riverine Forest

These forests are found along the rivers on Khadar areas. These are known for tamarisk and tamarind trees. The rivers of Great Plains are more prominent for this type of natural vegetation.

2.5 Wildlife

The term '**Wildlife**' includes animals of any habitat in nature. Wild animals are non-domesticated animals and include both vertebrates (fish, amphibians, reptiles, birds and mammals) and invertebrates (bees, butterflies, moths etc.). India has a rich and diversified wildlife. The Indian fauna consists of about 81,251 species of animals out of the world's total of about 1.5 million species. The faunal diversity of the country consists of about 6500 invertebrates, 5000 molluscs, 2546 fishes, 1228 birds, 458 mammals, 446 reptiles, 204 amphibians, 4 panthers and about 60,000 species of insects.

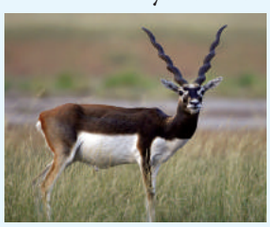


DO YOU KNOW?

The Nilgiri Tahr is facing a major threat in the Western Ghats. Continuous poaching activities and Eucalyptus cultivation hampering its habitat, the Nilgiri Tahr population is continuously decreasing.

DO YOU KNOW?

The Black Buck is the state animal of Andhra Pradesh, Haryana and Punjab.



Our country is home to tigers, lions, leopards, snow leopards, pythons, wolves, foxes, bears, crocodiles, rhinoceroses, camels, wild dogs, monkeys, snakes, antelope species, deer species, varieties of bison and the mighty Asian elephant. Hunting, poaching, deforestation and other anthropogenic interferences in the natural habitats have caused extinction of some species and many are facing the danger of extinction. In view of this and the role of wild life in maintaining ecological balance, conservation and management of biodiversity of India is necessary at present situation.

The **Indian Board for Wildlife** (IBWL) was constituted in 1952 to suggest means of protection, conservation and management of wildlife to the government. The Government of India enacted Wildlife (Protection) Act in 1972 with the objective of effectively protecting the wild life of the country and to control poaching, smuggling and illegal trade in wildlife and its diversities. United Nations **Convention on Biological Diversity** (CBD) in 1992 recognizes the sovereign rights of states to use their own Biological Resources.

To preserve the country's rich and diverse wildlife a network of **102 National Parks** and about **515 Wildlife Sanctuaries** across the country have been created.

2.5 Biosphere Reserves

Biosphere reserves are protected areas of land coastal environments wherein people are an integral component of the system.

The Indian government has established **18 Biosphere Reserves** in India which protect larger areas of natural habitat and often include one or more National Parks preserves along with buffer zones that are open to some economic uses.

Eleven of the eighteen biosphere reserves (Gulf of Mannar, Nandadevi, the Nilgiris, Nokrek, Pachmarhi, Simlipal, Sundarbans Agasthiyamalai, Great Nicobar, Kanjanjunga and Amarkantak) of India fall under the list of Man and Biosphere programme of UNESCO.

S. No.	Biosphere Reserves	State
1	Achanakmar-Amarkantak	Madhya Pradesh, Chattisgarh
2	Agasthyamalai	Kerala
3	Dibru Saikhowa	Assam
4	Dihang Dibang	Arunachal Pradesh
5	Great Nicobar	Andaman and Nicobar Islands
6	Gulf of Mannar	Tamil nadu
7	Kachch	Gujarat
8	Kanchenjunga	Sikkim
9	Manas	Assam
10	Nanda Devi	Uttarakhand
11	The Nilgiris	Tamil nadu
12	Nokrek	Meghalaya
13	Pachmarhi	Madhya Pradesh
14	Simlipal	Odisha
15	Sundarbans	West Bengal
16	Cold desert	Himachal Pradesh
17	Sesahachalam hills	Andhra Pradesh
18	Panna	Madhya Pradesh

Project Tiger was launched in April 1973 with the aim to conserve tiger population in specifically constituted "Tiger Reserves" in India.

This project is benefited tremendously, with an increase of over 60% - the 1979 consensus put the population at 3,015 - while other equally disturbed species like the barasingha (swamp deer), rhino and elephants also fought back from the brink of oblivion.

Recap

- Climate of India is labelled as "Tropical Monsoon Type".
- There are four seasons in India. They are winter season, hot weather, southwest monsoon, and northeast monsoon.
- Prior to the onset of the southwest monsoon, the temperature in north India reaches upto 46°C. The sudden approach of monsoon wind over south India with lightning and thunder is termed as – 'the break' or 'burst of monsoon'.
- Natural vegetation refers to a plant community unaffected by man either directly or indirectly.
- Natural vegetation can be classified as tropical evergreen forests, tropical deciduous forests, tropical dry forests, desert and semi desert vegetation, mountain forests, Alpine forests, Tidal forests, etc.,
- Biosphere reserves are protected areas of land coastal environment whereby people are an integral component of a system.

A-Z GLOSSARY

Climate: The weather conditions prevailing in an area in general or over a long period.

Meteorology: The branch of science concerned with the processes and phenomena of the atmosphere, especially as a means of forecasting the weather.

Season: Each of the four divisions of the year (spring, summer, autumn, and winter) marked by particular weather patterns and daylight hou.

Weather: The state of the atmosphere at a particular place and time as regards heat, cloudiness, dryness, sunshine, wind, rain, etc.

Wildlife: Wild animals collectively; the native fauna (and sometimes flora) of a region.

EXERCISE

I. Choose the correct answer.

LA9X5G

1. Meteorology is the science of _____.
   a) Weather
   b) social
   c) political
   d) human

2. We wear cotton during _____.
   a) Summer b) Winter
   c) Rainy d) Northeast monsoon

3. Western disturbances cause rainfall in _____.
   a) Tamilnadu b) Kerala
   c) Punjab d) Madhya Pradesh

4. _____ helps in quick ripening of mangoes along the coast of Kerala and Karnataka.
   a) Loo b) Norwester
   c) Mangoshowers d) Jetstream

5. _____ is a line joining the places of equal rainfall.
   a) Isohyets b) Isobar
   c) Isotherm d) Latitudes

6. Climate of India is labelled as _____.
   a) Tropical humid
   b) Equatorial climate
   c) Tropical monsoon climate
   d) Temperate climate

7. The monsoon forests are otherwise called as _____.
   a) Tropical evergreen forest
   b) Deciduous forest
   c) Mangrove forest
   d) Mountain forest

8. _____ forests are found above 2400m Himalayas.
   a) Deciduous forests
   b) Alpine forests
   c) Mangrove forests
   d) Tidal forests

9. Sesahachalam hills, a Biosphere reserve is situated in _____.
   a) Tamilnadu b) Andhra Pradesh
   c) Madhya Pradesh d) Karnataka

10. _____ is a part of the world network biosphere reserves of UNESCO
    A) Nilgiri b) Agasthiyamalai
    c) Great Nicobar d) Kachch

II. Match the following.

1.	Project Elephant	—	Desert and semi desert vegetation
2.	Biodiversity hotspot	—	October-December
3.	North east monsoon	—	Littoral forest
4.	Tropical thorn forests	—	Protect the elephants
5.	Coastal forests	—	The Himalayas

III. Consider the given statements and choose the correct option from the given below ones.

1. **Assertion(A):** Monsoons are a complex meteorological phenomenon

   Reason(R): Meteorologists have developed a number of concepts about the origin of monsoons.
   a) Both (A) and (B) are true: R explains A
   b) Both (A) and (B) are true: R does not explain A
   c) (A) is correct (R) is false
   d) (A) is false (R) is true

2. **Assertion(A):** The Himalayas acts as a climatic barrier.

   Reason(R): The Himalayas prevents cold winds from central Asia and keep the Indian Sub-continent warm.(Give option for this questions)

   a) Both (A) and (B) are true: R explains A
   b) Both (A) and (B) are true: R does not explain A
   c) (A) is correct (R) is false
   d) (A) is false (R) is true

IV. Choose the inappropriate answer.

1. Tidal forests are found in and around____.
   (a) Desert
   (b) The deltas of Ganga and Brahmaputra
   (c) The delta of Godavari
   (d) The delta of Mahanadhi
2. Climate of India is affected by_____.
   (a) Latitudinal extent
   (b) Altitude
   (c) Distance from the sea
   (d) Soil

V. Answer briefly.

1. Define 'Meteorology'.
2. What is meant by 'normal lapse rate'?
3. What are 'jet streams'?
4. Write a short note on 'Monsoon wind'.
5. Name the four distinct seasons of India.
6. What is 'burst of monsoon'?
7. Name the areas which receive heavy rainfall.
8. State places of mangrove forest in India.
9. Name the trees of tropical evergreen forest.
10. Write any five biosphere reserves in India.
11. What is 'Project Tiger'?

VI. Distinguish between.

1. Weather and climate
2. Tropical evergreen forest and deciduous forest.
3. North east monsoon and South west monsoon.

VII. Give reasons for the following topics.

1. Western coastal plain is narrow.
2. India has a tropical monsoon climate.
3. Mountains are cooler than the plains.

VIII. Write in detail.

1. Write about southwest monsoon.
2. Describe the forests of India.
3. Write the names of biosphere reserves and their location in India.

IX. Map.

Mark the following on the outline map of India.

1. Direction of south west monsoon wind.
2. Direction of north east monsoon wind.
3. Areas of heavy rainfall.
4. Mountain forests.
5. Panna biosphere reserve
6. Agasthiyamalai biosphere reserve

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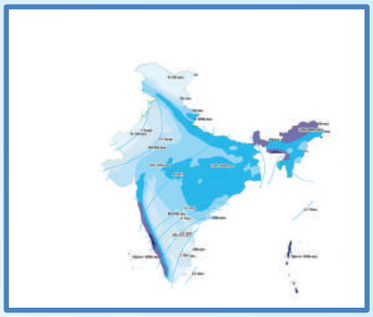
ICT CORNER

Unit-2 CLIMATE AND NATURAL VEGETATION OF INDIA

Visit **school Bhuvan?**

School Bhuvan visualizes natural resources, environment and their sustainable development in India.

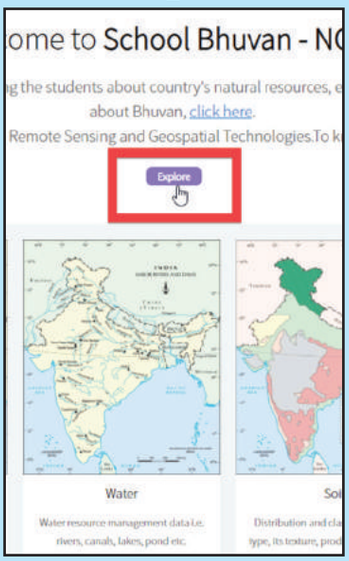


Steps

- Open the Browser and type the URL given below (or) Scan the QR Code.
- Scroll Down and click on 'Explore'
- Click on 'Climate' in left side menuandSelect 'Annual Rainfall'

Step -1

Step -2



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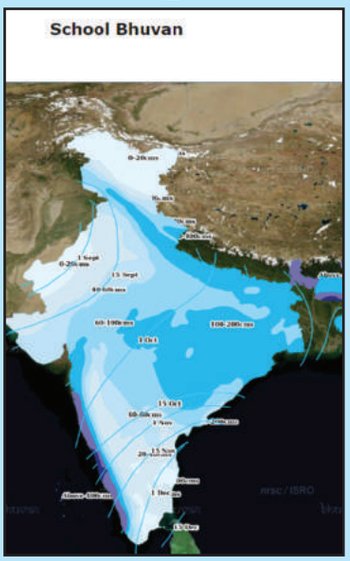

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Unit - 3

Components of Agriculture

Learning Objectives

- To understand the nature of India's soil types and their distribution.
- To know about the importance of irrigation and multi-purpose projects in India.
- To study about the agriculture, its types and importance.
- To understand the livestock and fishing resources of India
- To comprehend the problems of farming in India.

ZVQAXZ

Introduction

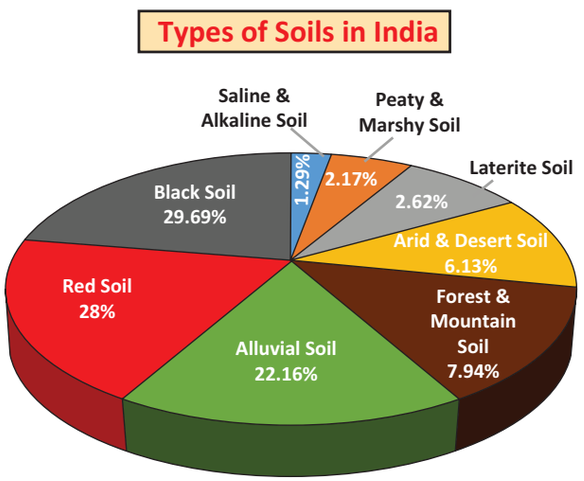
Soil is one of the most important natural resources. India's varied natural environments resulted in a great variety of soils compared to any other country of similar size in the world. The rich, deep and fertile soils support high density of population through agricultural prosperity.

3.1 Soils

Soil is the uppermost layer of the land surface, usually composed of minerals, organic matter, living organisms, air and water. Grains in the soil are of three categories namely, clay, silt, and sand. Soils are generally formed by the weathering of rocks under different conditions. Some soils are formed by the deposition of agents of denudation. Soils can vary greatly from one region to the other.

3.1.1 Types of Soils

The Indian Council of Agriculture Research (ICAR) set up in 1953 divides the soils of India into the following eight major groups.



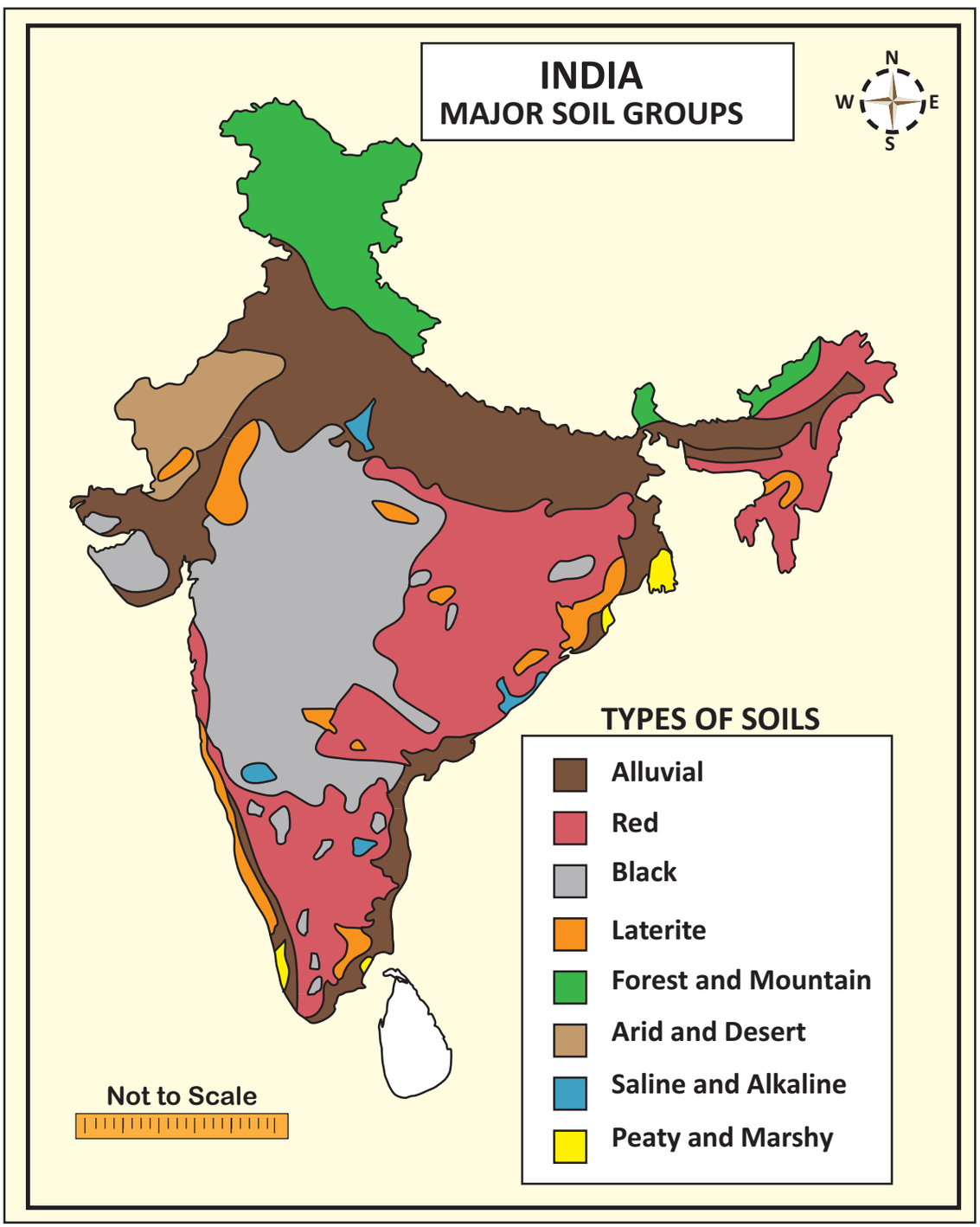
Soil Type	Characteristics	Distribution	Crops growing
Alluvial soil	**Khadar** – light coloured, more siliceous. **Bhangar** – the older alluvium composed of lime nodules and has clayey composition. It is dark in colour. **Formation** - sediments deposited by streams and rivers when they slowly loose **Chemical properties** - rich in potash, phosphoric acid, lime and carbon compounds but poor in nitrogen **Nature** –Sandy-loam-silt-clay profile shows no marked differentiation	Ganga and Brahmaputra river valleys; Plains of Uttar Pradesh, Uttaranchal, Punjab, Haryana, West Bengal and Bihar	Rice, Wheat, Sugarcane and Oilseeds
Black soils	**Formation** - Derived from basalts of Deccan trap. **Colour** - black colour, due to presence of titanium, iron. **Chemical properties** - Consist of calcium and magnesium arbonates, high quantities of iron, aluminium, lime and magnesia. Rich in potash lime, Aluminium calcium and magnesium poor in Nitrogen Phosphoric acid and humus **Nature** - Sticky when wet High degree of moisture retentivity	Maharashtra and Malwa plateaus, Kathiawar peninsula, Telangana and Rayalaseema region of Andhra Pradesh and northern part of Karnataka	Cotton, Millets, Tobacco and Sugarcane
Red soils	**Formation** - decomposition of ancient crystalline rocks like granites and gneisses and from rock type **Chemical properties** - rich in minerals such as iron and magnesium. Deficient in nitrogen, humus, phosphoric acid and lime. **Nature** - Light texture, porous friable presence of limited soluble salts Clay fraction of the red soils generally consists of Kaolinitic minerals.	Eastern parts of Deccan plateau, southern states of Kerala, Tamil Nadu, Karnataka and Chota Nagpur plateau (Jharkhand)	Wheat, Rice, Cotton, Sugarcane and Pulses
Laterite soils	**Formation** - formed in the regions where alternate wet and hot dry conditions prevail. It is formed by the process of leaching **Chemical properties** - Composed mainly of hydrated oxides of iron and aluminium, **Nature** - More acidic on higher areas poor in high level, cannot retain moisture while plains they consist of heavy loam and clay and easily retain moisture	Assam hills, hill summits of Kerala and Karnataka and eastern Ghats and region of Odisha	Coffee, Rubber, Cashew nut and Tapioca

Soil Type	Characteristics	Distribution	Crops growing
Forest and mountain soils	Differ from region to region depending on climate. **Formation** - due to mechanical weathering caused by snow, rain, temperature variation **Chemical properties** - are deficient in potash, Phosphorus and lime. **Nature** - light, sandy, thin and found with the pieces of rock. Their character changes with the parent rocks. Very rich in humus. slow decomposition makes it acidic	Coniferous forest belts of Jammu and Kashmir, Himachal Pradesh, Uttarakhand and Sikkim. Eastern and Western Ghats	Coffee, tea, rice, maize, potato, barley, tropical fruits and various types of spices
Arid and desert soils	**Formation** - Due to prevalence of the dry climate, hightemperature and accelerated evaporation, the soil is dry, it also lacks humus content due to the absence of vegetative cover **Chemical properties** - Contain high percentages of soluble salts, alkaline with varying degree of calcium carbonate and are poor in organic matter; rich enough in phosphate though poor in nitrogen **Nature** - light in colour, low humus,friable structure, low in moisture	Rajasthan, Northern Gujarat and southern Punjab	millets, barley, cotton, maize and pulses (with irrigation)
Saline and alkaline soils	**Formation** - formed due to ill drainage which causes water logging, injurious salts are transferred from subsurface to the top soil by the capillary action, it causes the salinisation of soils **Chemical properties** - liberate sodium, magnesium and calcium salts and sulphurous acid **Nature** - Consists of un decomposed rock and mineral fragments which on weathering	Andhra Pradesh and Karnataka. In the drier parts of Bihar, Uttar Pradesh, Haryana, Punjab, Rajasthan and Maharashtra	
Peaty and marshy soils	**Formation** - formed in humid regions from the organic matter. It is found in the areas of heavy rainfall and high humidity Peaty soils are black, heavyand highly acidic. **Chemical properties** - deficient in potash and phosphate. Contain considerable amount of soluble salts and 10-40 per cent of organic matter; and high proportion of vegetable matter. **Nature** - Contain considerable amount of Soluble salts and 10-40 per cent of organic matter; and high proportion of vegetable matter.	Kottayam and Alappuzha districts of Kerala; and coastal areas of Odisha and Tamil Nadu, Sundarbans of West Bengal, in Bihar and Almora district of Uttarakhand	Paddy, jute

Activity

Soil Texture (sand, silt, clay) influence on some properties of soils including water holding capacity. Find out water holding capacity of soils which given above based on following table.

Property/behaviour	sand	silt	clay
Water holding capacity	low	Medium to high	high



Soil degradation

Soil degradation is an acute problem in India. According to a 2015 report of the Indian institute of remote sensing (IIRS). The estimated the amount of soil .erosion that occurred in India was 147 million hectares.

The main problems of the Indian soils are i) soil erosion (sheet erosion, Rill erosion, Gully erosion, Ravine and Badland) ii) Degradation of Soil, iii) Water-logging, iv) Saline and Alkaline, and v) Salt Flats, types of soils are different erotion.

Methods of Conservation and Management of Soil

1. **Afforestation**
2. **Constructing Dams and Barrages**
3. **Prevention of Overgrazing**
4. **Improved methods of Agricultural practices**
   - **Contour method**
   - **Rotation of crops**
   - **Contour bunding**
   - **Strip cropping**
   - **Planting of shelter belts**
   - **Adopting the techniques of sustainable agriculture are different conservation methods for better soil management.**

3.2 Irrigation

Watering of agricultural plants through artificial means is called irrigation. Being a hot country with seasonal and irregular rainfall, it always needs irrigation to carry out agricultural activities during dry period. Beside erratic rainfall, prevalence of high temperature, cultivation of annual crops and hydrophytes, commercial farming and porous soil make irrigation an essential one for the agriculture of our country.

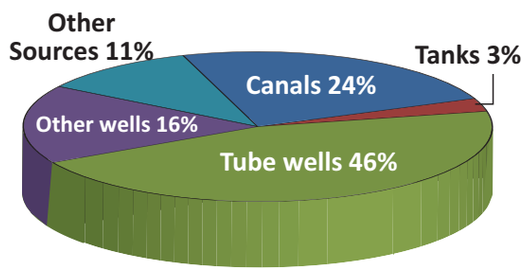
3.2.1 Sources of Irrigation

In India, different sources of irrigation are used depending upon the topography, soils, rainfall, availability of surface or groundwater, nature of river (whether perennial or non-perennial), requirements of crops etc. The main sources of irrigation used in different parts of the country are

- Canal irrigation
- Well irrigation and
- Tank irrigation

a) Canal Irrigation

It is the second most important source of irrigation in our country. Percentage of area under canal irrigation in our country is 24% (source:Statistical year book 2017 during 2013-2014)



Area under Irrigation

Canals are the effective source of irrigation in areas of low level relief, deep, fertile soils, perennial source of water and extensive command area. The canals are of two types:

1. **Inundation Canals:** In this, water is taken out directly from the rivers without making any kind of barrage or dam. Such canals are useful for the diversion of flood water from the rivers and remain operational during rainy season.
2. **Perennial Canals:** These are developed from perennial rivers by constructing barrage to regulate the flow of water. In our country, most of the canals fall under this category. These canals are useful for irrigation.

In India the total area under canal irrigation is about 15.8 million hectares in 2014. About 60 percent of the canal irrigated area falls in the northern plains of India, particularly in Uttar Pradesh, Punjab, Haryana, Rajasthan, and Bihar. In south and central India, Andhra Pradesh, Maharashtra, Karnataka, Madhya Pradesh, Chattisgarh, Odisha, and Tamil Nadu are the important states where canal irrigation is found.

b) Well Irrigation

A well is a hole or trough, usually vertical, excavated in the earth for bringing groundwater to the surface. Well irrigation is the most important source of irrigation as it contributes about 62 percent of net irrigated area in India. It is a cheap, dependable, and popular source of irrigation in the country. Well irrigation is unavoidable in the region of low rainfall and becomes an essential one where the canals and tank irrigation are not available. Wells are of two types: i) Open wells and ii) Tube wells

As per the Irrigation – Statistical Year Book India – 2017, the following states are the top five with respect to the percentage of areas under well irrigation during 2013-14.

Sl. No.	Name of the State	Area in %
1.	Uttar Pradesh	26.6
2.	Madhya Pradesh	14.6
3.	Rajasthan	13.1
4.	Gujarat	7.8
5.	Punjab	7.1

Source: Irrigation-Statistical Year Book of India – 2017

1. **Open Wells:** This type of irrigation is widely practiced in the areas where groundwater is sufficiently available. The areas are in Ganga Plains, the deltaic region of Mahanadi, Godavari, Krishna, Cauvery and parts of Narmada and Tapti valleys.
2. **Tube Wells:** Tube wells are developed in the areas of low water table, sufficient power supply and soft subsurface geological units. Tube wells are predominant in the states of Gujarat, Maharashtra, Punjab, Madhya Pradesh and Tamil Nadu.

c) Tank Irrigation

A tank is a natural or man-made hollow on the surface developed by constructing a small bund around it across a stream. It is used to collect and store water for irrigation and other purposes. Irrigation by tanks is a very old system in India. It also includes irrigation from lakes and ponds.

The tank irrigation is popular in the peninsular India due to the following reasons:

- The undulating relief and hard rocks make difficult to dig canals and wells.
- Natural depressions serve as reservoirs.
- Absence of perennial rivers.
- Impermeable rock structure which do not permit percolation.
- The scattered nature of population and agricultural fields

The following table shows the **five leading states in tank irrigation**:

Sl. No.	Name of the State	Area in Lakh Hectares (2013-14)
1.	Tamil Nadu	3.78
2.	Andhra Pradesh	3.40
3.	Madhya Pradesh	2.64
4.	Telangana	2.30
5.	Karnataka	1.54

Source: Irrigation – Statistical Year Book India – 2017

Modern irrigation methods

There are many ways in Modern Irrigation among them mostly practiced and following in India are using drips, sprinklers and poly houses central pivot irrigation

Drip System is used to watering like drops at near the roots of plant. It will cover a tiny area at plant, but suitable for big trees and horticulture plants too which used to grow bigger

Rain Gun: Rain gun used to spread water like rain as in name and used to serve for crops which used to grow upto 4 feets or high also but we have to adjust sprinklers height as per crop size. typical usage of Rain guns are in sugarcane, maize crops.

Pivot irrigation

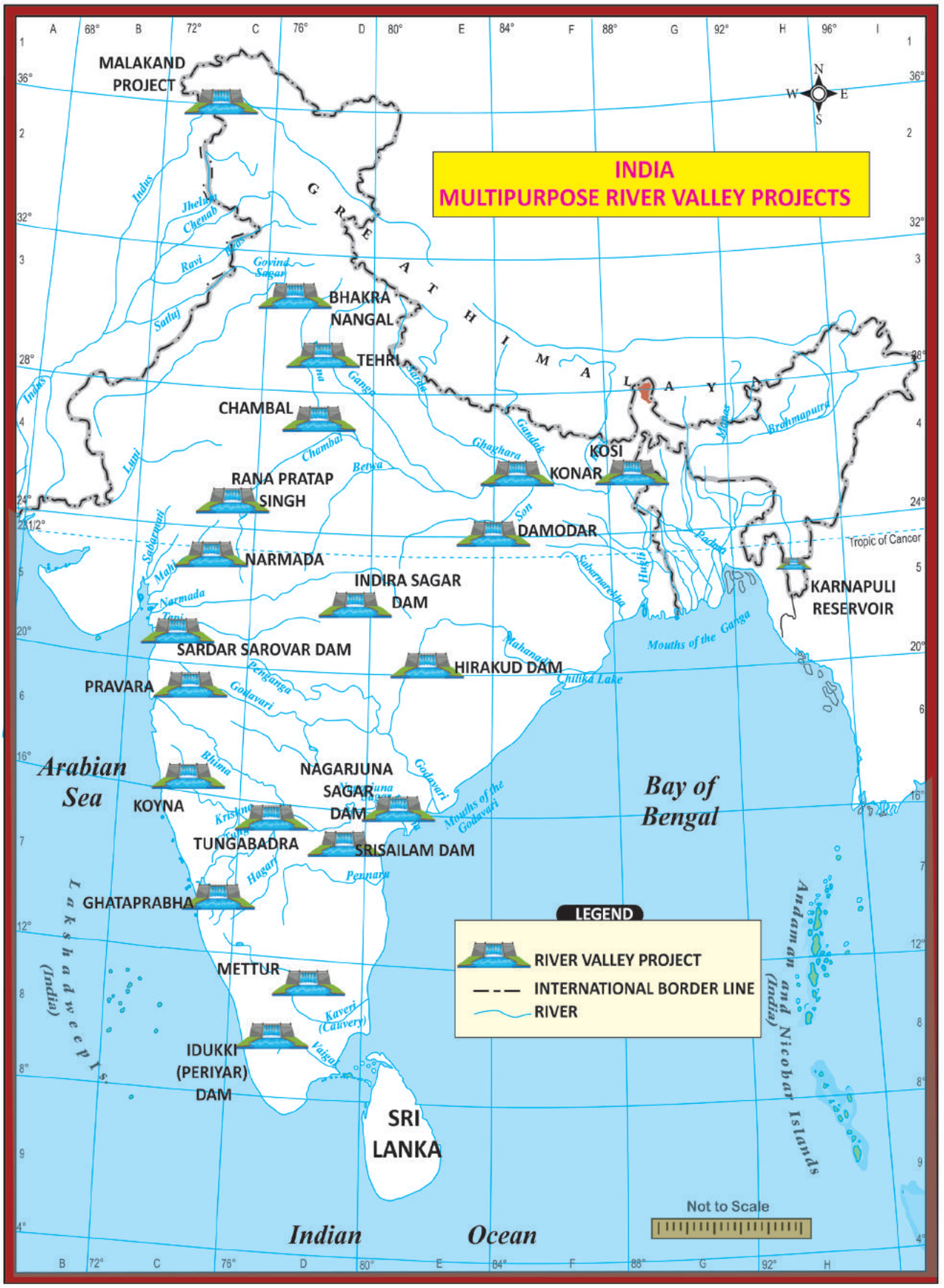
Center-pivot irrigation (sometimes called **central pivot irrigation**), also called **water-wheel** and **circle irrigation**, is a method of crop irrigation in which equipment rotates around a pivot and crops are watered with sprinklers

3.2.2 Multipurpose River Valley Projects

It is a scientific management of water resources in our country. Construction of dam across rivers is aimed at many purposes. Hence,

4PEG4B

Name of projects	River	Benefit States	Irrigation (sq km)	Hydropower (Megawatts)
Damodar Valley project	Damodar	Jharkhand, West Bengal	5,150	.260
Bhakra-Nangal Project (highest gravity dam in the world)	Sutlej	Punjab, Haryana and Rajasthan	52,609	1,500
Hirakud Project (longest dam in the world)	Mahanadi	Orissa	1,41,600	347.5
Kosi Project	Kosi '(Sorrow of Bihar'.)	Bihar & Nepal	8,750	19.2
Tungabhadra Project	Tungabhadra	Andhra Pradesh and Karnataka	1,968	35.
Tehri Dam:	Bhagirathi	Uttarakhand	6000	1,000 MW
Chambal Valley Project	Chambal	Rajasthan and Madhya Pradesh	-	-
Nagarjuna Sagar Project	Krishna	Andhra Pradesh		
Sardar Sarover Project	Narmada	Madhya Pradesh, Maharashtra, Rajasthan	18,450	250
Indira Gandhi Canal Project	Satlaj	Rajasthan, Punjab and Haryana	-	-
Mettur Dam	Kaveri	Tamil Nadu	-	40



it is termed as multi-purpose river valley projects. The various purposes of a dam serves are irrigation, hydro power generation, water supply for drinking and industrial purpose, controlling floods, development of fisheries, navigation etc. Generally, majority of multipurpose projects are combination of irrigation and hydro-power which are the major aims of the projects.

3.3 Agriculture

Agriculture is the process of producing food for people, fodder for cattle, fiber and many other desired products by the cultivation of certain plants and the raising of domesticated animals (livestock). Though India is industrially a fast developing nation, still the agriculture in India employs more than 50 percent of the population of the country and accounts for about 25 percent of the national income.

3.3.1 Determinants of Agriculture

Agriculture in India is determined by a set of factors. Some of the important factors:

1. Physical factors: relief, climate and soil.
2. Institutional factors: Size of farm holdings, land tenure, and land reforms.
3. Infrastructural factors: Irrigation, power, transport, credit, market, insurance and storage facilities.
4. Technological factors: High yielding varieties of seeds, chemical fertilisers, insecticides and machinery.

3.3.2 Types of Farming

Owing to variations in the physical environment and culture, a variety of farming practices and cultivation systems have evolved in different parts of India.

a) Subsistence Farming

A considerable proportion of farmers in the country practice subsistence farming. In this, agricultural land holding is small. As the farmers are poor, they can't apply the modern inputs which cost more. They grow crops with the help of family members and consumes almost the entire farm produce with little surplus to sell in the market. Preference is given to food crops. In addition to the food crops, sugarcane, oilseeds, cotton, jute and tobacco are also cultivated. Traditional farming method results in low productivity. In Punjab, some parts of Rajasthan, Uttar Pradesh and Madhya Pradesh subsistence farming is practiced.

b) Shifting Agriculture

This type of agriculture is performed by tribal people in a piece of forest land after clearing the trees through felling and burning the trunks and branches. Once the land is cleared, crops are grown for two to three years and the land will get abandoned as the fertility of the soil decreases. The farmers then move to new areas and the process will be repeated. They cultivate some grains and vegetable crops using the manual labour. It is also called as "Slash and burn" cultivation.

Different names of shifting agriculture in different regions in India

Name	Place
Jhum	Assam
Poonam	Kerela
Podu	Andhra Pradesh, Odisha
Beewar, Mashan, Penda, Beera	Various Parts of Madhya Pradesh

c) Intensive Farming

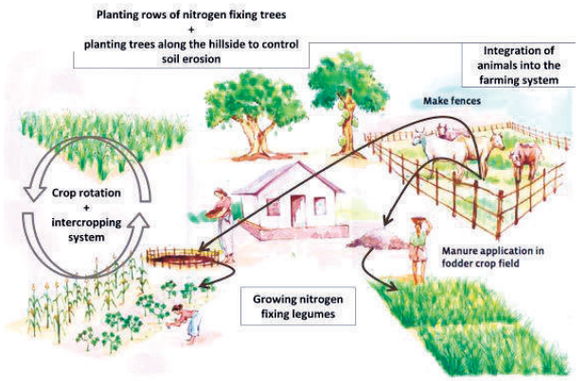
Intensive farming is an agricultural intensification and mechanization system that aims to maximize yields from available land through various means, such as heavy use of pesticides and chemical fertilizers. This intensification and mechanization has also been applied to the raising of livestock with billions of animals, such as cows, pigs and chickens, being held indoors. They have become known as factory farms. Intensive farming is practiced in Punjab, parts of Rajasthan, Uttar Pradesh, and Madhya Pradesh in India.

d) Dry Farming

This type of farming is practiced in arid areas where irrigation facilities are lacking. Crops cultivated in these areas can withstand dry conditions. The crops grown generally with the help of irrigation are also grown under dry farming. In such circumstances, the yields are generally low. Most of the areas under dry cultivation entertain only one crop per year. This is practiced in drier parts of Rajasthan, Gujarat, Madhya Pradesh etc.

e) Mixed Farming Agriculture

Mixed farming is defined as a system of farm which includes crop production, raising livestock, poultry, fisheries, bee keeping etc. to sustain and satisfy as many needs of the farmer as possible.



Mixed Farming Agriculture

PER DROP MORE CROP: (Improving water use efficiency) - Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)

The Government of India has been implementing Centrally Sponsored Scheme on Micro Irrigation with the objective to enhance water use efficiency in the agriculture sector by promoting appropriate technological interventions like drip & sprinkler irrigation technologies and encourage the farmers to use water saving and conservation technologies.

The following are the five leading states which account for 78% of the total progress under Micro Irrigation scheme: 1. Andhra Pradesh, 2. Karnataka, 3. Gujarat, 4. Maharashtra, and 5. Tamil Nadu.

f) Terrace Cultivation

This type of cultivation is practiced specially in hilly areas, where lands are of sloping nature. The hill and mountain slopes are cut to form terraces and the land is used in the same way as in permanent agriculture. Since the availability of flat land is limited, terraces are made to provide small patches of level land. Soil erosion is also checked

Cropping Seasons in India

Cropping Seasons	Major crops cultivated	
	Northern States	Southern States
Kharif Season June–September	Rice, Cotton, Bajra, Maize, Jowar, Tur	Rice, Ragi, Maize, Jowar, Groundnut
Rabi Season October–March	Wheat, Gram, Rapeseeds, Mustard, Barley	Rice, Maize, Ragi, Groundnut, Jowar
Zaid Season April–June	Vegetables, Fruits, Fodder	Rice, Vegetables, Fodder

due to terrace formation on hill slopes. In our country, terrace cultivation takes place in the states of Punjab, Meghalaya, Haryana, Uttar Pradesh, Himachal Pradesh, and Uttrakhand.

Terrace Cultivation

3.4 Major Crops Cultivated in India

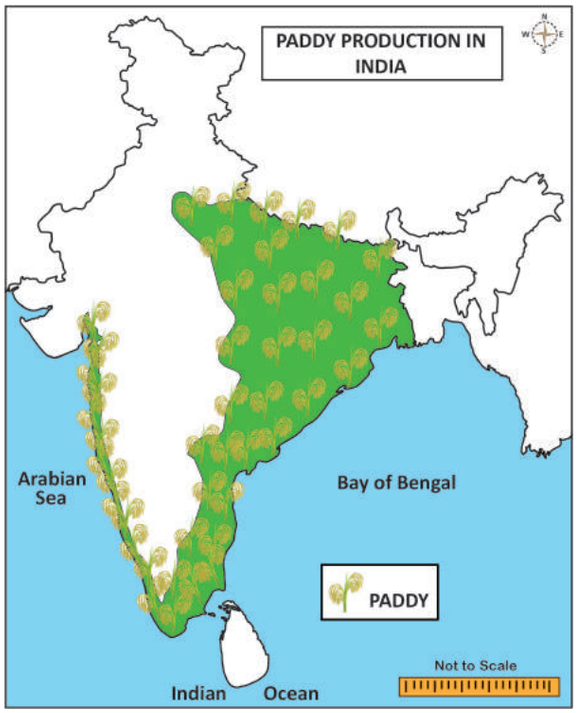
The major crops of India are divided into four major categories as follows:

1. Food crops (wheat, maize, rice, millets, pulses etc.).
2. Cash crops (sugarcane, tobacco, cotton, jute, oilseeds etc.).
3. Plantation crops (tea, coffee and rubber).
4. Horticulture crops (fruits, flowers and vegetables).

1. Food Crops

Due to its large population, Indian agriculture is largely dominated by the food crops. Food crops include cereals and pulses, amongst which rice, wheat, jowar, bajra, maize, barley, ragi, gram and tur are important.

Rice: Rice is an indigenous crop. India is the second largest producer of rice in the world after China. It is mainly a tropical crop, growing mainly with mean temperatures of 24°C and annual rainfall of 150 cm. Deep fertile clayey or loamy soils are suited well for rice cultivation. It also needs abundant supply of cheap labour. Rice in India is sown in three ways: i) Broadcasting, ii) Ploughing or drilling, and iii) Transplanting. Due to increased use of High Yielding Variety (HYV) seeds (CR Dhan 205, AR Dhan 306, CRR 451 etc.), many of the indigenous varieties were disappeared. In 2016, the first 10 leading rice producing states are West Bengal (First in India) Uttar Pradesh, Punjab, Tamil Nadu, Andhra Pradesh, Bihar, Chhattisgarh, Odisha, Assam, and Haryana.

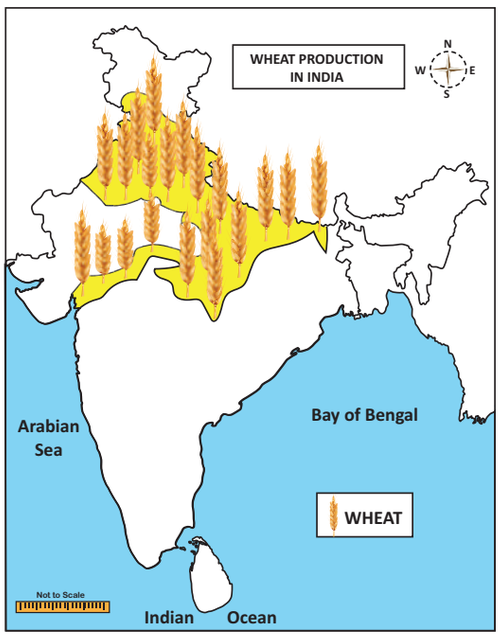


Paddy Cultivation

Wheat: Wheat is the second most important food crop of the country, after rice. It accounts for 22 percent of the total area and 34 percent of the total production of food grains in the country. It requires 10-15°C at the time of sowing and 20-25°C at the time of ripening of grains.

Over 85% of the India's wheat production comes from 5 states namely Uttar Pradesh,

Punjab, Haryana, Rajasthan and Madhya Pradesh. Apart from these regions, the black soil tract of the Deccan covering parts of Maharashtra and Gujarat also contribute a major wheat production.



Jowar: Jowar is the third important food crop of our country. It is an indigenous plant of Africa. The plant has a tendency to grow in adverse climatic conditions. Its grains are rich in carbohydrates, protein, minerals, and vitamins. Hence, it provides cheap food to the large section of the poor population. It is also used as fodder in many parts of the country. Jowar is essentially a crop of the Peninsular India. Maharashtra, Karnataka, and Madhya Pradesh are the leading producers of Jowar.

Bajra: Bajra is an indigenous plant of Africa. This forms the staple food for poor people. Its stalks are used as fodder for cattle and for thatching purposes. Bajra is a crop of dry region. Rajasthan is the largest producer of bajra followed by Uttar Pradesh, Haryana, Gujarat and Maharashtra.

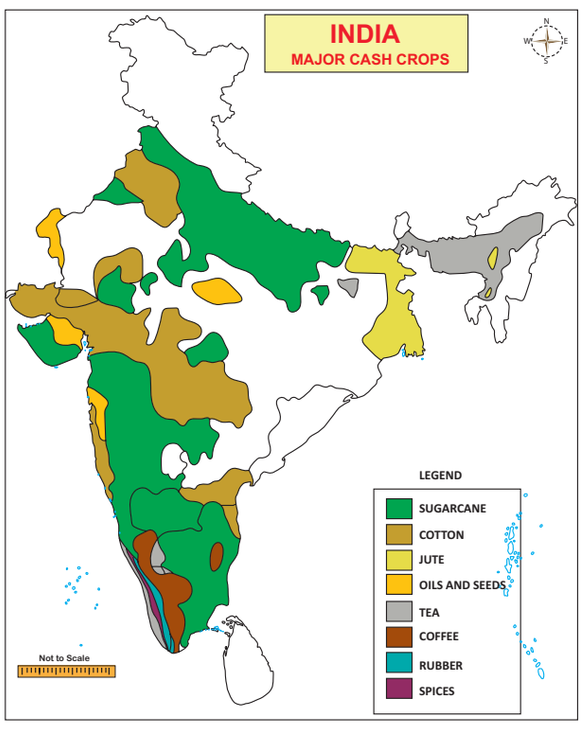
Barley: Barley is one of the important cereals of our country. Besides, being poor man's diet, it is used for making barley water, beer and whiskey. Rajasthan and Uttar Pradesh are the two leading producers of Barley.

Pulses: Pulses include a large number of crops which are mostly leguminous and rich in vegetable protein. They are used as human food and feeding cattle. They fix atmospheric nitrogen in the soil and hence are usually rotated with other crops. India is the largest producer of pulses. The major pulse growing areas are Madhya Pradesh, Uttar Pradesh, Rajasthan, Maharashtra and Andhra Pradesh.

2. Cash Crops

The crops which are cultivated for commercial purpose are called cash crops. These crops include sugarcane, tobacco, fibre crops (cotton, jute, and mesta) and oilseeds.

Sugarcane: Sugarcane is the most important cash crop of India and is the second largest producer in the world. This crop provides raw material for the sugar industry which is the second largest industrial category of our country. Besides providing sugar, gur and khandsari, it supplies molasses for alcohol industry and bagasse for paper industry. India is ranked third in sugar production in the world after Cuba and Brazil. At the state level, Uttar Pradesh is the leading producer of sugarcane followed by Maharashtra, Karnataka, Tamil Nadu and Gujarat.



India - Cash crops

Cotton: Cotton is the most important cash crop of India. It provides raw material to the largest industry of India. India ranks second next to China in the production of cotton.

About 79% of the total area and production in the country were contributed by four states viz., Gujarat, Maharashtra, Andhra Pradesh and Punjab.

Jute: It is a tropical fibre crops, grows well in the alluvial soil. It provides raw material for Jute industry. It is used for manufacturing of gunny bags, carpets, hessian, ropes and strings, rugs, clothes, tarpaulins, upholstery etc. West Bengal is the leading state both in cultivation and production of jute. The other cultivators of jute are Bihar, Assam and Meghalaya.

Oil Seeds: Oil seeds, the premier source of fat in the Indian diet are derived from number of crops like groundnut, rapeseed, mustard, sesame, linseed, sunflower, castor seed, cotton seed, niger seed etc. These provide oil and oilcake which are used for making lubricants, varnish, medicine, perfume, candles, soaps, manure and cattle feed. Gujarat is India's largest oilseeds producing state. Other major producer of oilseeds are followed by Rajasthan Madhya Pradesh, Maharashtra and Andhra Pradesh. In groundnut production, India is the second largest producer in the world after China.

3. Plantation Crops

Plantation crops are cultivated for the purpose of exports. These are cultivated in large estates on hilly slopes. Cultivation near the coast is preferable as it facilitates exports. Tea, coffee, rubber and spices are the major plantation crops of India.

Tea: Tea is an evergreen plant that mainly grows in tropical and subtropical climates. Tea is a labour intensive and grows faster under light shade. Tea plants require high rainfall but its root cannot tolerate water logging. Two major varieties of tea are cultivated in India. They are i) **Bohea** originated from China and ii) **Assamica** from India. A number of hybrid varieties have been developed by mixing these two. India is the second largest producer of tea after China in the world. Assam is the larger producer of tea in India. Other states are Tamil Nadu, Kerala and West Bengal.

Coffee: Coffee is grown in shade and it grows effectively in the altitudes between 1,000 and 1,500 m above mean sea level. There are two main varieties of coffee. They are i) **Arabica** (High quality-cultivated more in India) and ii) **Robusta** (Inferior quality).

India is the 7th largest producer of coffee globally. Karnataka is the leading producer of coffee in India. It produces 71% in India, and 2.5 % in the world (source; coffee board of India-2018).

Rubber: Rubber plantation were first established in Kerala in 1902. It needs hot and wet climatic conditions (temperature above 20°C and rainfall above 300cm). Most of the land under rubber belongs to small land holders. The major rubber growing areas are Tamil Nadu, Kerala, Karnataka and Andaman and Nicobar Islands.

Spices: India has been world famous for its spices since ancient times. These spices mostly used for flavouring or tampering cooked food and for preparing medicines, dyes etc. Pepper, chillies, turmeric, ginger, cardamom, clove and areca nut are the major spices cultivated in India. Kerala is the leading producer of spices in India.

4. Horticulture Crops

It refers to the cultivation of fruits, flowers and vegetables. Fruits and vegetables are important supplement to the human diet, as they provide essential minerals, vitamins, and fibres required for maintaining health. India is in the second position in the production of fruits and vegetables. Apple is mostly produced in Himachal Pradesh, Jammu and Kashmir and Uttarakhand. Production of banana is concentrated in Tamil Nadu and Maharashtra. Orange is cultivated in Maharashtra, Uttarakhand, Himachal Pradesh, Jammu and

Kashmir, Tamil Nadu and Karnataka. Grape is cultivated mainly in Uttarakhand, Himachal Pradesh, Jammu and Kashmir, Maharashtra, Andhra Pradesh, Tamil Nadu and Karnataka. India contributes about 13% of the world's production of vegetables.

3.5 Livestock

Livestock is an integral component of the farming system in India. The livestock sector is socially and economically very significant due to its multi-functional outputs and contribution to socio-cultural security. It also helps to improve food and nutritional security by providing nutrient-rich food products, generate income and employment and act as a cushion against crop failure, provide draught power and manure inputs to the crop subsector.

Livestock sector contributes approximately 4 percent of national GDP (Gross Domestic Product) and 25.6 percent to agriculture GDP. As per 19th Livestock Census, conducted in 2012 (Government of India, 2014), India's livestock sector is one of the largest in the world with 11.6 percent of world livestock population, which consists of cattle (37.3 percent), goats (26.4 percent), buffaloes (21.2 percent), sheep (12.7 percent) and pigs (2.0 percent) etc.

Distribution of Livestock in India in 2012

Sl. No.	Name of the State	Total No. of Livestock in Lakhs (2012)
1.	Uttar Pradesh	687.2
2.	Rajasthan	577.3
3.	Andhra Pradesh	561.0
4.	Madhya Pradesh	363.3
5.	Bihar	329.4
Source: 19th Livestock Census, Department of Animal Husbandry, Dairying & Fisheries		

3.5.1 Cattle

Cattle constitute 37.3 percent of livestock population in India. India has second largest cattle population after Brazil at World level. Among the states, Madhya Pradesh leads with 10.3 percent followed by Uttar Pradesh (10.2 percent) and West Bengal (8.7 percent). Cattle population in India belongs to different breeds. These include: 1) Milch Breed, 2) Draught breed, and 3) Mixed or General breed.

The following table shows the Livestock population of India in 2012

Sl. No.	Name of the Livestock	Population in Lakhs (2012)
1.	Cattle	1.91
2.	Goats	1.35
3.	Buffaloes	1.09
4.	Sheep	0.65
5.	Pigs	0.10
Source: 19th Livestock Census, Department of Animal Husbandry, Dairying & Fisheries		

3.5.2 Goats

The goat is the poor man's cow providing milk, meat, skin and hair. It is the main source of meat for the country. While looking at the current status of goat population among Indian states, Rajasthan records first with 16 percent followed by Uttar Pradesh and Bihar.

3.5.3 Buffaloes

Buffaloes are an important source of milk supply for India. Uttar Pradesh has the highest number of buffaloes (28.2%) followed by Rajasthan (9.6%) and Andhra Pradesh (7.9%).

Livestock Census: First Livestock Census in India was conducted with the title of Dairy Cattle Census in 1919. Following this, the 19th Livestock census was conducted in October 2012 and it takes place at every five years.

DO YOU KNOW?

How is livestock census conducted in Tamil Nadu?

State Government is conducting Livestock Census with the help of Department of Animal Husbandry at state level and Regional Joint Director at Distric level under the guidelines of Government of India Ministry of Agriculture and farmers welfare, Department of Animal Husbandary Dairying and Fisheries.

The Livestock Census in the country started in the year 1919 – 1920. Since then it has been conducted once in every 5 years. So far 19 livestock census has been conducted and the last census was held in the year 2012. The 20 th Live stock Census – 2017 was scheduled to be conducted from 16 th July and will end on 15 th October 2017.

Source: Government of India – Instruction manual 201th Livestock Census.

Livestock

3.5.4 Dairy, Meat and Wool Production

According to State / UT Animal Husbandry Department, during 2016-17, the total production of milk in our nation is 163.7 million tonnes. At this time, the leading producer was Uttar Pradesh with 27.6 million tonnes (16.8 percent) followed by Rajasthan with 19.4 million tonnes (11.8 percent) and Madhya Pradesh with 13.4 million tonnes (8.2 percent) in total milk production.

While looking at the meat, the total production is 7.4 million tonnes. Uttar Pradesh is the leading producer with 1.3 million tonnes (18.2 percent), where Maharashtra and West Bengal are estimated with 0.8 million tonnes (11.4 percent) and 0.7 million tonnes (9.6 percent) respectively in the total country's production.

The total wool production of our nation is 43.5 million kilograms. The leading state in the wool production is Rajasthan with 14.3 million kilograms (32.9 percent) followed by Jammu and Kashmir with 7.3 million kilograms (16.7 percent) and Karnataka with 6.6 million kilograms (15.1 percent) in country's total wool production.

3.6 Fisheries

Fisheries in India are a very important economic activity and a flourishing sector with varied resources and potentials. Fishing in India is a major industry in its coastal states, employing over 14 million people. It produces about 3 percent of World's fish and occupies second place among the fish producing nations of the world after China. It also helps in augmenting food supply, generating employment, raising nutritional level and earning valuable foreign exchange. The length of Indian coastline is 7,517 km including the coastline of the islands, however the mainland's length is 6,100 km. In India, fishing is categorised into two types: they are

Fisheries

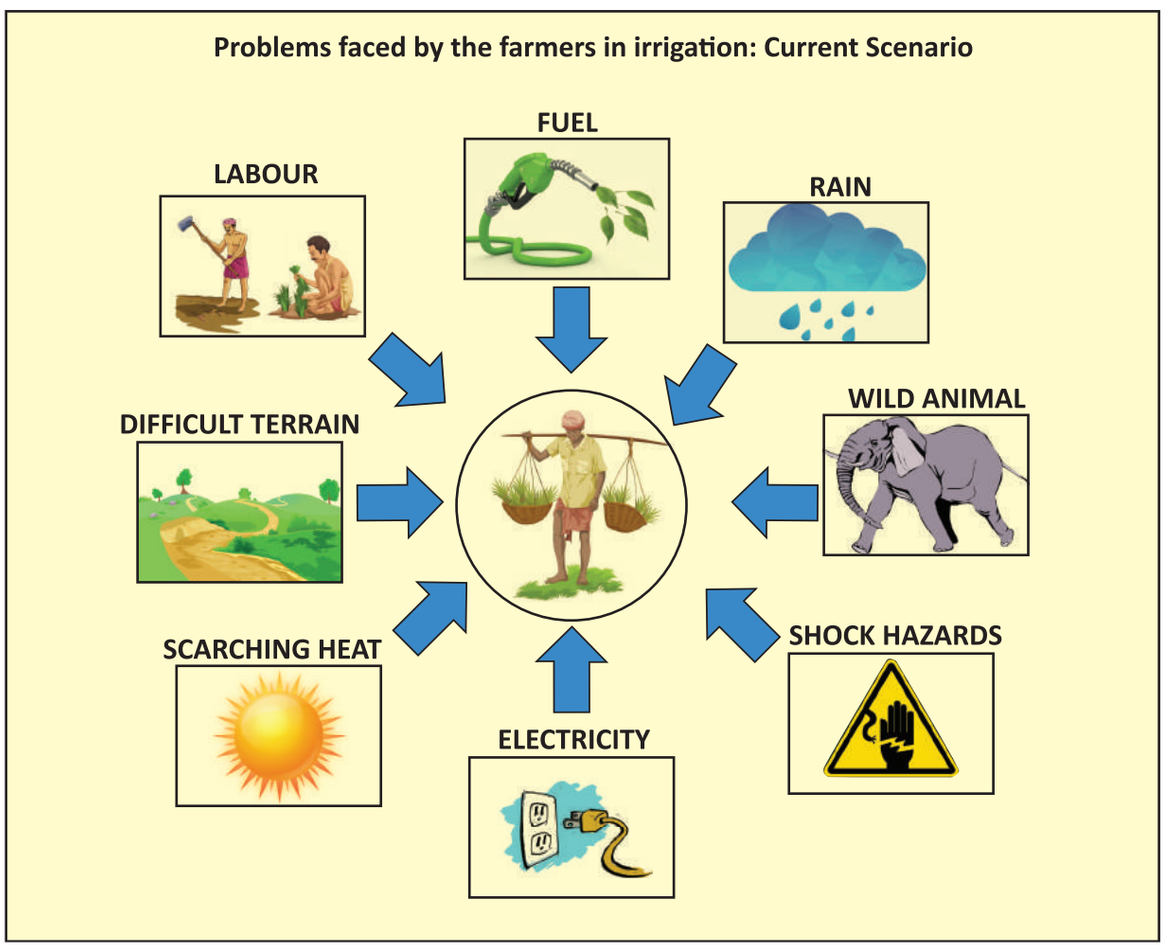
1. **Marine or Sea Fisheries:** It includes coastal, off-shore and deep sea fisheries mainly on the continental shelf upto a depth of 200 m. Among the coastal states, Kerala leads in the marine fish production in India.
2. **Inland or Fresh Water Fisheries:** Rivers, lakes, canals, reservoirs, ponds, tanks etc. are the sources of fresh water and provide fresh water fisheries. About 50 percent of the country's total fish production comes from the inland fisheries and Andhra Pradesh is the leading producer in India.

In India, the important varieties of fishes caught by the fisherman are Cat fish, Herrings, Mackerels, Perches, Eels, Mullets etc. In 2014-15, the total inland or fresh water fish production was 65.77 lakh tonnes and the total marine fish production was 34.91 lakh tonnes. In India, the top five fish producing states are Andhra Pradesh, West Bengal, Gujarat, Kerala, and Tamil Nadu.

3.7 Major issues faced by farmers in india

Indian agriculture and Indian farmers are plagued by several problems; some of them are natural and some others are manmade.

- **Small and fragmented land-holdings:** The problem of small and fragmented holdings is more serious in densely populated and intensively cultivated states in India. About 67 percent of operational land holdings in India are marginal holdings (< 1 hectare).
- **High Costs of Inputs:** Seed is a critical and basic input for attaining higher crop yields and sustained growth in agricultural production. Unfortunately, good quality



Major Issues of Farmers

seeds are out of reach for many small and marginal farmers due to their high price.

- **Infertile Soil:** Indian soils have been used for growing crops over thousands of years without caring much for replenishing. This has led to depletion and exhaustion of soils resulting low productivity.
- **Lack of Irrigation:** Only one-third of the cropped area falls under irrigated area. To make agriculture reliable, irrigation facility has to be developed.
- **Lack of mechanization:** In spite of the large scale mechanization of agriculture in some parts of the country, most of the agricultural operations in larger parts are carried on by human hand using simple and conventional tools.
- **Soil erosion:** Large tracts of fertile land suffer from soil erosion by wind and water. Such kind of areas must be properly treated and restored to its original fertility.
- **Agricultural marketing:** In rural India, agricultural marketing continues in a bad shape. Due to the absence of sound marketing facility, the farmers have to depend on local traders and middlemen for the disposal of their farm products which is sold at low price. Besides, there is a fluctuation in the prices of agriculture products.
- **Inadequate storage facilities:** Storage facilities in the rural areas are either totally absent or grossly inadequate. Under such conditions the farmers are compelled to sell their products immediately after the harvest irrespective of the condition of market.
- **Inadequate transport:** One of the main handicaps with Indian agriculture is the lack of cheap and efficient means of transportation. Even at present there are lakhs of villages which are not well connected with main roads or with market centres.
- **Scarcity of capital:** Agriculture is an important industry which requires a huge capital. The role of capital plays a major role in the purchase of advanced farm machineries and equipments.

List of important Agricultural Revolutions in India

Revolution	Related Product
Yellow Revolution	Oil seed Production (Especially Mustard and Sunflower)
Blue Revolution	Fish Production
Brown Revolution	Leather / Cocoa / Non-Conventional Products
Golden Fibre Revolution	Jute Production
Golden Revolution	Fruits / Honey Production / Horticulture Development
Grey Revolution	Fertilizers
Pink Revolution	Onion Production / Pharmaceuticals / Prawn Production
Evergreen Revolution	Overall Production of Agriculture
Silver Revolution	Egg Production / Poultry Production
Silver Fibre Revolution	Cotton
Red Revolution	Meat Production / Tomato Production
Round Revolution	Potato
Green Revolution	Food Grains
White Revolution	Milk Production

Recap

- Soil is the finest particle found on the earth surface.
- Alluvial soil, black soil, red soil and laterite soil are the major types of soil in India.
- The main sources of irrigation found in India are canal irrigation, well irrigation and tank irrigation etc.
- Damodar valley projects, Bhakra-Nangal project and Hirakud project are the important Multipurpose projects of India.
- Kharif, Rabi, and Zaid are the three cropping seasons of India.
- The agricultural crops of India can be divided into food crops, cash crops, plantation crops and horticultural crops.
- Fishing in India is categorized into marine fishing and inland fishing

GLOSSARY	
Soil	Soil is the uppermost layer of the land surface composed of minerals, organic matter, living organisms and water
Khadar	Newer alluvium soil found in valley flooded almost every year
Bhangar	Older alluvium soil found in30 mts above flood level
Soil erosion	Removal of top soil
Soil conservation	Prevention of soil from erosion and protecting its fertility.
Irrigation	Watering of plants through artificial means.
Multipurpose projects	Construction of dams across rivers aimed at many purposes
Agriculture	It is the process of producing food, feed, fibre and many other desired products by the cultivation of certain plants and the raising of domesticated plants

EXERCISE

I. Choose the correct answer

WWB7QD

1. The soil which is rich in iron oxides is _____.
   a) Alluvial b) Black
   c) Red d) Alkaline
2. Which of the following organization has divided the Indian soils into 8 major groups?
   a) Indian Council of Agricultural Research
   b) Indian Meteorological Department
   c) Soil Survey of India
   d) Indian Institute of Soil Science
3. The soils formed by the rivers are:
   a) Red soils b) Black soils
   c) Desert soils d) Alluvial soils
4. _____ dam is the highest gravity in India.
   a) Hirakud dam
   b) Bhakra Nangal dam
   c) Mettur dam
   d) Nagarjuna Sagar dam
5. _____ is a cash crop.
   a) Cotton b) Wheat
   c) Rice d) Maize

6. Black soils are also called as:
   a) Arid soils b) Saline soils
   c) Regur soils d) Mountain soils
7. The longest dam in the world is _____.
   a) Mettur dam b) Kosi dam
   c) Hirakud dam d) Bhakra-Nangal dam
8. The leading producer of rice in India is _____.
   a) Punjab b) Maharashtra
   c) Uttar Pradesh d) West Bengal
9. Which crop is called as "Golden Fibre" in India?
   a) Cotton b) Wheat
   c) Jute d) Tobacco
10. The state which leads in the production of coffee is
   a) West Bengal b) Karnataka
   c) Odisha d) Punjab

II. Consider the given statements and choose the right option given below

1. **Assertion (A):** Horticulture involves cultivation of fruits, vegetables, and flowers.
   Reason (R): India ranks first in the world in the production of mango, banana, and citrus fruits.
   (a) Both (A) and (R) are true and (R) explains (A)
   (b) Both (A) and (R)are true: (R) does not explain (A)
   (c) (A) is correct (R) is false
   (d) (A) is false (R) is true
2. **Assertion (A):** Alluvial soil is formed by the deposition of eroded and decayed materials brought by the rivers.
   Reason (R): Paddy and wheat are grown well in the soil.
   (a) Both (A) and (R) are true and (R) explains (A)
   (b) Both (A) and (R)are true and (R) does not explain (A)
   (c) (A) is correct (R) is false
   (d) (A) is false (R) is true

III. Pick the odd one out

1. a) Wheat b) Rice
   c) Millets d) Coffee
2. a) Khadar b) Bhangar
   c) Alluvial soil d) Black soil
3. a) Inundational canals
   b) Perennial canals
   c) Tanks
   d) Canals

IV. Match the following

1. Sugar bowl of India	a) Mahanadi
2. Coffee	b) Golden revolution
3. Tehri	c) Karnataka
4. Hirakud	d) Uttar Pradesh and Bihar
5. Horticulture	e) Highest dam in the India

V. Answer in brief

1. Define soil.
2. Name the types of soil found in India.
3. State any two characteristics of black cotton soil.
4. What is Multipurpose project?
5. Define Agriculture.
6. State the types of agriculture practices in India?
7. Name the seasons of agriculture in India?
8. Mention the plantation crops of India.
9. What do you mean by livestock?
10. Write a brief note on the categories of fisheries in India?

VI. Give reasons

1. Agriculture is the backbone of India.
2. Rain water harvesting is necessary.
3. Small farms are predominant in India.

VII Distinguish between the following

1. Rabi and Kharif crop seasons.
2. Inundational canal and perennial canal.
3. Marine fishing and Inland fishing.
4. Alluvial soils and Black soils.

VIII. Answer in a paragraph

1. State the types of soil in India and explain the characteristics and distribution of soil.
2. Write about any two Multipurpose projects of India.
3. Bring out the characteristics of Intensive and Plantation farming.
4. Examine the geographical conditions favourable for the cultivation of rice and wheat.

IX. Hot questions

1. Can you imagine a world without agriculture?
2. Can you give solutions for the prevailing water disputes in South India (construction of dams / raising of dams / cleaning of tanks)?

X. Map exercise

1. Demarcate the major tracts of alluvial soils.
2. Delineate the main regions of black soil.
3. Locate the Hirakud dam, Mettur dam and Damodar dam.
4. Shade the regions of jute cultivation..
5. Mark any three tea and coffee growing areas.
6. Demarcate the regions of desert soil.
7. Locate the fishing hubs: Tuticorin, Chennai, Cochin, Mumbai, Machilipatnam
8. Demarcate: Cauvery delta, Godavari delta

ACTIVITY - 2

Complete the following table by your day to day life experience.

Sl. No.	Food	Sources
1.	Main Food	Rice / Wheat / Millets / _____
2.	Milk	Cow / Buffalo / Goat / _____
3.		
4.		
5.		

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INTERNET RESOURCES

Unit - 4

Resources and Industries

Learning Objectives

- To learn about the resource and its types.
- To understand the concept of renewable and non- renewable resources.
- To identify the different types and distribution of industries in India.
- To analyse the problems of Indian industries.

IAUTWU

Introduction

Any matter or energy derived from the environment that is used by living things including humans is called a natural resource. Natural resources include air, water, soil, minerals, fossil fuels, plants, wild life etc. Many natural resources are used as raw materials. They play a vital role in the economic development of any region. Natural resources are classified on several basis. Based on continued availability, the resources are categorised into two types. Renewable Resources are those which have natural regeneration after their utilisation.

Solar energy, wind energy, biogas, tidal energy, wave energy etc. are the renewable resources. Non- Renewable resources are the sources that cannot be replaced again after utilisation. Coal, petroleum, natural gas etc. fall under this category.

4.1 Minerals

Mineral is a natural substance of organic or inorganic origin with definite chemical and physical properties. The process of extracting mineral from the earth is known as mining. The mines near the earth crust are known as open pit mines while the deep mines are known as shaft mines.

4.1.1 Types of Minerals

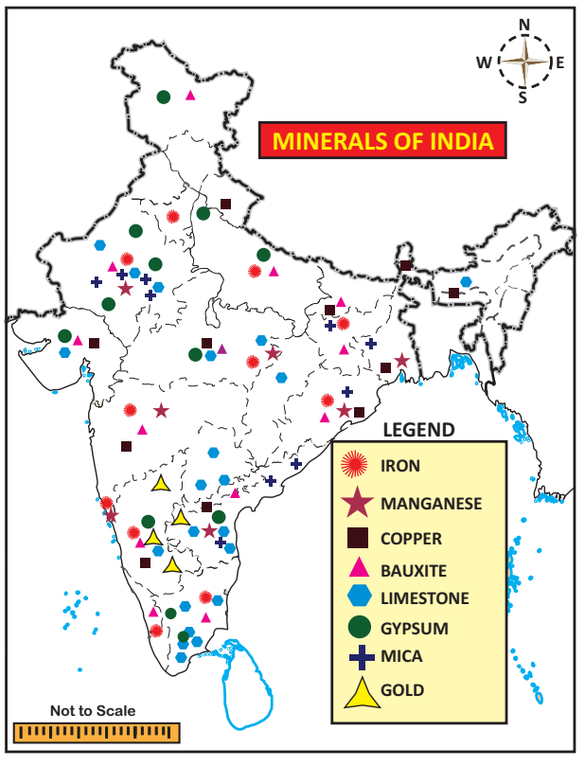
On the basis of chemical and physical properties, minerals are broadly grouped under two categories. They are metallic and non-metallic minerals.

DO YOU KNOW?

The organisations associated with minerals in India are the Geological Survey of India (Headquarter is at Kolkata), Indian Bureau of Mines (Headquarter at Nagpur) and Non-Ferrous Material Technology Development Centre (NFTDC), located at Hyderabad. The Ministry of Mines is responsible for the administration of all mines and minerals (Development and Regulation Act, 1957).

a) Metallic Minerals

Metallic minerals are the minerals which contain one or more metallic elements in them.



Metallic minerals occur in rare, naturally formed concentrations known as mineral deposits. These deposits consist of a variety of valuable metals such as iron, manganese, copper, bauxite, nickel, zinc, lead, gold etc.

i) Iron ore

Iron ore is the most widely distributed elements of the earth crust, rarely occurs in a free state. It enters into the composition of many rocks and minerals especially from igneous and metamorphic rocks. The total recoverable reserves of iron ore in India are about 9602 million tons of haematite and 3408 million tons of magnetite. About 79% haematite deposits are found in Assam, Bihar, Chhattisgarh, Jharkhand, Odisha and Uttar Pradesh. About 93% magnetite deposits occur in Andhra Pradesh, Goa, Karnataka, Kerala and Tamil Nadu. Karnataka alone contributes about 72% of magnetite deposits of India.

Jharkhand is the leading producer of iron ore with 25% the country's production. Singhbhum, Hazaribagh, Dhanbad and Ranchi districts are its major producers. Odisha with 21% production ranks second. Sundargarh, Mayurbhanj, Sambalpur and Keonjhar districts are its major producers. The magnetite production of Chhattisgarh is 18% (Rajgarh and Bilaspur are its leadings districts) and the Karnataka is 20% (Chikmangalur, Chitradurga, Shimoga and Dharwad districts are its major producers). Andhrapradesh and Karnataka produce about 5% each. Kurnool, Guntur, Cuddapah and Anantapur districts in Andhra Pradesh and Salem, Namakkal, Tiruvannamalai, Tiruchirappalli, Coimbatore, Madurai and Tirunelveli districts in Tamil Nadu are notable for the production of iron ore.

SAIL (Steel Authority of India Limited): The Ministry of Steel is responsible for planning and development of iron and steel industry in India.

DO YOU KNOW?

Iron ores are rocks and minerals from which metallic iron can be economically extracted. The ores are usually rich in iron oxides and vary in colour from dark grey, bright yellow, or deep purple to rusty red. The iron is usually found in following form.

Form of Iron ores	Iron Content (%)
Magnetite	72.4%
Hematite	69.9%
Goethite	62.9%
Limonite	55%
Siderite	48.2%

ii) Manganese

Manganese is a silvery grey element. It is very hard and brittle in nature. It is always available in combination with iron, laterite and other minerals. It is an important mineral used for making iron and steel and serves as basic raw material for alloying. It is the most important mineral for making iron and steel. Nearly 10 kg manganese is required for

manufacturing one ton of steel. It is also used in the manufacturing of bleaching powder, insecticides, paints and batteries.

MOIL- Manganese Ore India Limited state-owned manganese-ore mining company headquartered in Nagpur. With a market share of 50%, it was the largest producer of manganese ore in India.

Manganese deposits occur mainly as metamorphosed bedded sedimentary deposits. Th e largest deposits of manganese is found in Odisha(44%) followed by Karnataka (22%), Madhya Pradesh (12%), Maharashtra & Goa(7% each), Andhra Pradesh (4%) and Jharkhand (2%). Rajasthan, Gujarat, Telengana and West Bengal together constitute about 2% of the India's manganese resource. Nagpur, Bhandara and Ratnagiri districts in Maharastra and Balaghat and Chhindwara districts in Madhya Pradesh are the leading producers. Odisha is the third largest producer with 24% (Sundargarh,Kalahandi, Koraput and Bolangir districts are the major ones). Other producers are Andhra Pradesh (13%) and Karnataka (6%). Srikakulam, Visakhapatnam, Cuddapah and Guntur districts in Andhra Pradesh and the districts of Shimoga, Bellary, Chitradurga and Tumkur are the important districts of Karnataka. It is the most important mineral for making iron and steel. India is the fift h largest producer of manganese in the world.

iii) Copper

Copper is the first metal that prehistoric man has started using for many purposes. Being flexible, it can be made into utensils of any shape. Brass and Bronze are obtained when the copper alloys with zinc and tin respectively. Copper has been commonly used for making cooking utensils and other objects of common utility. In modern days, it is extensively used in vast variety of electrical machinery, wires and cables

Largest reserves of copper ore is in the state of Rajasthan (53.81%) followed by Jharkhand (19.54%) and Madhya Pradesh (18.75%). Th e states of Andhra Pradesh, Gujarat, Haryana, Karnataka, Maharashtra, Meghalaya, Nagaland, Odisha, Sikkim, Tamil Nadu, Telangana, Uttarakhand and West Bengal account for 7.9% of the total copper reserves of India.

Hindustan Copper Ltd is a Government-owned-corporation in the central public Enterprise under the Ministry of minies, India. HCL is the only vertically integrated copper producer in India engaged in a wide spectrum of activities ranging from Mining, Beneficiation, Smelting, Refining and Continuous Cast Rod manufacturer.

Jharkand is the largest producer of copper with 62% of India's production. Singhbhum and Hazaribagh districts are its leading producers of copper. Odisha is the other major producer with 50.2% production. Rajasthan ranks third with 28% production. Th e districts of Khetri, Alwar and Bhilwara are notables in this state. Th e states of Uttarakhand(Dehradun and Garhwal districts),Andhra Pradesh (Guntur, Kurnool and Nellore districts), Karnataka (Chitradurga and Hassan districts) and Tamil Nadu contributes about 7% of production each.

iv) Bauxite

Bauxite is an important ore from which aluminium is extracted. It is found in the rock consisting mainly of hydrated aluminium oxides. Bauxite is widely distributed as surface deposits in the areas of laterite soil.

DO YOU KNOW?

Bauxite is an oxide of aluminium; the name has been derived after the French word Le Baux.

Being light in weight and tough, aluminium is used in the manufacture of aircraft s and automobile engines. Bauxite is also used in the manufacture of cement and chemicals.

The main bauxite deposits occur in Odisha – 50.2%, Gujarat – 15.8% (Junagadh, Amreli and Bhavnagar districts), Jharkhand – 11.9% (Ranchi and Gumila districts), Maharashtra – 9.9% (Sindhu durg and Ratnagiri), Chhattisgarh – 6.2% (Ballarpur and Durg districts), and Tamil nadu – 2.7%. Being light in weight and tough, aluminium is used in the manufacture of aircraft s and automobile engines. Bauxite is also used in the manufacture of cement and chemicals. Orissa is the largest producer of bauxite in India with approx. 1,370.5 million tonnes. India's State and Central Government is very supportive in production of Bauxite and other Industrial Minerals in Orissa, Jharkand, Tamil Nadu.

National Aluminium Company Limited, abbreviated as NALCO, (incorporated 1981) has units in Odisha at places like Angul and Damanjodi. It was incorporated as a public sector enterprise of the Ministry of Mines, Government of India in 1981.

नालको NALCO

b) Non-Metallic Minerals

These minerals do not contain metal in them. Mica, limestone, gypsum, nitrate, potash, dolomite, coal, petroleum etc are the non- metallic minerals.

i) Mica

In ancient time, Mica was used in ayurvedic medicine. Mica became very popular with the development of electrical industry. Abhrak is a good quality mica. It is translucent, easily splitable into thin sheets, flat, colourless, elastic and incompressible. Mica is used in making of insulating properties, as it withstands high voltage and has low power loss factor. Since it is a non conductor of electricity, it is exclusively used in electrical goods. It is also used in making of lubricants, medicines, paints and varnishes.

The major deposits of mica are found in Andhra Pradesh(41%) with Nellore, Visakhapatnam, West Godavari and Krishna are its major districts. Other important states in mica deposits are Rajasthan(21%) and Odisha(20%). Bhilwara, Jaipur and Ajmer are the notable districts in Rajasthan and, Rayagada, Bolangir and Sundargarh districts are the major producers in Odisha. Dhanbad, Palamu, Ranchi and Singhbum districts are the major mica mines in Jharkhand state.

ii) Lime Stone

Limestone is associated with rocks composed of either calcium carbonate or the double carbonate of calcium and magnesium or mixture of both. Limestone also contains small quantities of silica, alumina, iron oxides, phosphorous and sulphur. Limestone is used in the industries of chemicals for soda ash, caustic soda, bleaching powder, paper, cement, iron and steel, glass and fertilizers. The major producing areas: Andhra Pradesh produces about 20% with major concentration in Cuddapah, Kurnool and Guntur districts. Telengana also accounts for about 20% of the country's production with the districts of Nalgonda, Adilabad, Warangal and Karimnagar as major producers. Rajasthan produces about 18% (Jodhpur, Ajmer, Bikhaner and Kota districts), Madhya Pradesh about 12% (Jabalpur and Satna districts) and Tamilnadu about 8.4% (Salem, Kancheepuram, Tiruchirappalli, Thoothukkudi, Tirunelveli and Virudhunagar districts) of limestone production of India. In terms of the reserves of limestone, the state of Karnataka leads with 27%, followed by Andhra Pradesh and Rajasthan (12% each), Gujarat (10%), Meghalaya (9%), Telangana (8%), Chhattisgarh and Madhya Pradesh (5% each) and the remaining by other states.

iii) Gypsum

Gypsum is a hydrated sulphate of calcium which occurs as white, opaque or transparent minerals in beds of sedimentary rocks such as limestone, sandstone and shale. Gypsum is used in the manufacture of cement, fertilizers, wall board, plaster of paris and in soil conditioning. The state of Rajasthan alone accounts for 81% of its reserves. 14% of its reserves is found in Jammu and Kashmir and 2% in Tamil nadu. The remaining 3% resources are found in the states of Gujarat, Himachal Pradesh, Karnataka, Uttarakhand, Andhra Pradesh and Madhya Pradesh.

Rajasthan produces 82% of the country's production. Jodhpur, Bikaner and Jaisalmer are notable districts. Jammu and Kashmir produces 14% of country's gypsum. Baramula, Doda and Uri districts are its major producers. The states of Gujarat (Bhavnagar and Jamnagar districts), Uttarkhand (Dehradun and Mussourrie districts), Andra pradesh (Nellore, Guntur and Prakasam districts) and Tamil nadu are the other producers with about 4% each.

4.2 Energy Resources

The resources from which the electricity generated are called energy resources. Electricity is an important component of our life. No day to day activity takes without the use of this energy. It is also the key factor for all economic activities and industrial development. Energy resources can be classified into renewable and non-renewable. Coal, petroleum, natural gas and nuclear minerals are the sources of non renewable energy. Water, sun light, wind, bio gas, tides etc., are the sources of renewable energy.

BHRKIW

4.2.1 Non-Renewable Energy

a) Coal

Coal is an inflammable organic substance composed mainly of hydrocarbons.

Coal is available in the form of sedimentary rocks. It is used in the generation of thermal power. It has close association with the industrial development of any country. Since it is a valuable one, it is called as "**Black Gold**". Based on carbon content, it is classified in to the following types.

Anthracite: contains 80 to 90% carbon

Bituminous: contains 60 to 80% carbon

Lignite: contains 40 to 60% carbon

Peat: contains less than 40% carbon

Coal is an important source of energy in India with its varied and innumerable uses. It can be converted into gas, oil, electricity and thermal power. Besides, it forms a basic raw material for the production of chemicals, dyes, fertilizers, paints, synthetic and explosives.

Indian coal is mostly associated with Gondwana series of rocks and is primarily found in Peninsular India. The states of Jharkhand, odisha, West Bengal and Madhya Pradesh alone account for nearly 90% of coal reserves of the country. About 2% of India's coal is of tertiary type and is found mostly in Assam and Jammu & Kashmir.

Jharkhand is the largest coal producing state in the country followed by odisha, Chhattisgarh, West Bengal, Madhya Pradesh, Andhra Pradesh and Maharashtra. The major coal fields of Jharkhand are Bokaro, North Karanpura, South Karanpura, Giridih, Ramgarh, Daltongunj and Rajmahal. Talcher and Ranapur in Odisha, Korba and Chirmiri in Chhattisgarh, Umaria and Singrauli in Madhya pradesh, Tandur, Singareni, Kothagudem and Ramagundam in

Coal India Limited (CIL) is an Indian state-controlled coal mining company headquartered in Kolkata, West Bengal, its field offices are located at Dhanbad, Ranchi, Bilaspur, Nagpur, Sambalpur, Kothagudam and Asansol. It is the largest coal-producing company in the world.

Andhra Pradesh, Wardha, Ballarpur, Chanda and Kampati in Maharastra and, Raniganj, Asansol and Mejia in West Bengal are the other major coal fields of India.

Indian lignite (brown coal) deposits occur in the southern and western parts of Peninsular India particularly in Tamil nadu, Pudhucherry and Kerala.

The Ministry of coal has over all responsibility of determining policies and strategies in respect of exploration and development of coal resource in India. Coal India Limited (CIL), NLC India Limited (NLCIL) and Singareni Collieries Company limited (SCCL) are its public sector under takings.

b) Petroleum (or) Crude oil

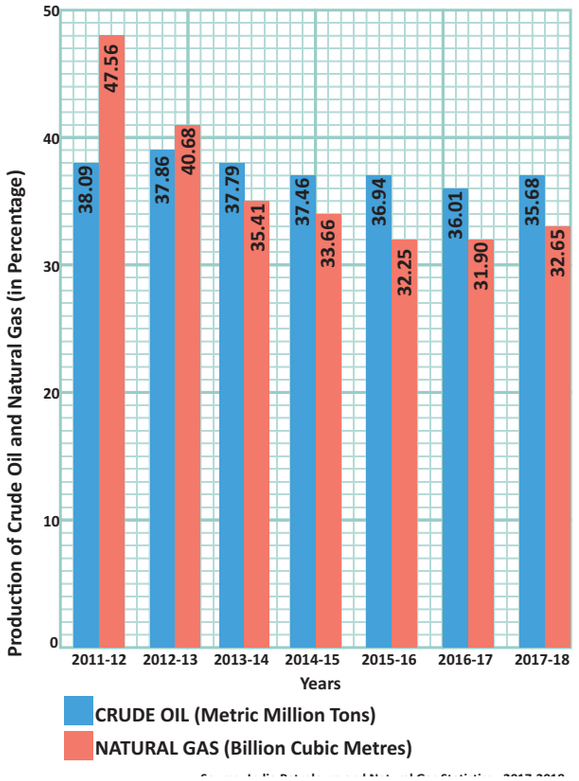
The word petroleum has been derived from two Latin words petro (meaning – Rock) and oleum (meaning oil). Thus petroleum is oil obtained from rocks of the earth. Therefore, it is also called mineral oil. Petroleum is an inflammable liquid that is composed of hydrocarbons which constitute 90-95% of petroleum and the remaining is chiefly organic compounds containing oxygen, nitrogen, sulphur and traces of organ metallic compounds.

Petroleum is used as a source of power and fuel for automobiles, aeroplanes, ships and locomotives. Lubricants, kerosene, vaseline, tar, soap, terylene and wax are its by products. Oil in India is obtained from both from on-shore and off-shore areas.

The Ministry of Petroleum and Natural Gas (MOP&NG) is a ministry of the Government of India. It is responsible for the exploration, production, refining, distribution, marketing, import, export, and conservation of petroleum, natural gas, petroleum products, and liquefied natural gas in India.

सत्यमेव जयते

Crude oil and Natural Gas Production in percentage



As of 2017, the total estimated crude oil reserves of the country is 604.10 million tons. From this, 324.24 million tons (54%) are found in onshore and 279.86 million tonnes (46%) are in offshore areas.

The production of crude oil fluctuates from year to year from 2011-12 to 2017-18 but only with marginal variations. The change is invariably in negative. In natural gas production also the trend is negative except the last year. The change is high in the first three years and it is low to moderate in the remaining years.

India - Oil refinery

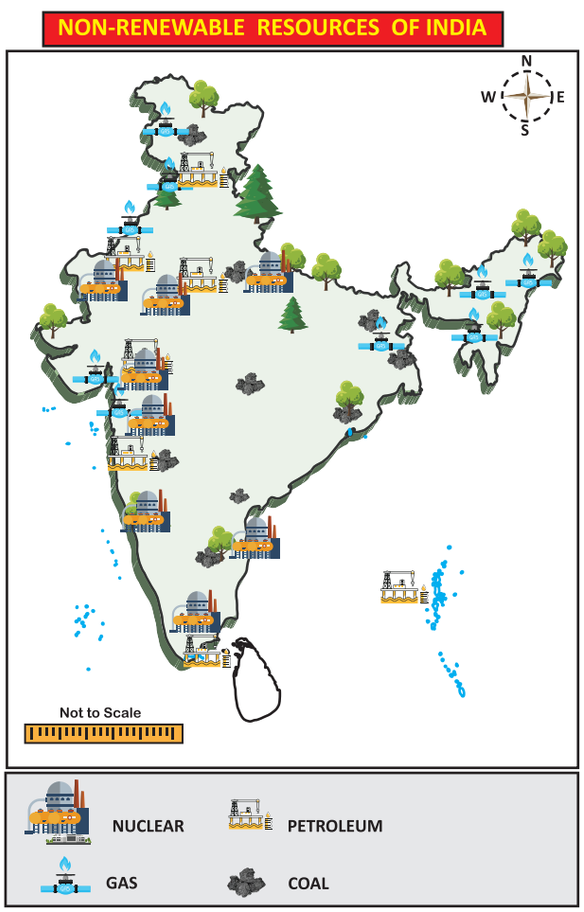
Western coast offshore oil fields	Eastern coast offshore Fields
1. Mumbai high oil fields (largest 65%)	Bharmaputra valley (Dibrugarh and Sibsagar districts of upper Assam.)
2. Gujarat coast (2nd largest)	Digboi oil feilds (oldest fields in country)
3. Basseim oil feild, south of Mumbai high	Nahoratiya oil fields (south west of digboi)
4. Aliabet oil feild, south of Bhavanagar	Moran-Hugrijan oil field (Southwest of Nahoratiya)
5. Ankleshwar	Rudrasagar-Lawa oil feilds (sibsagar districs of assam)
6. Cambay-Luni Region	Surrma valley (Badarpur, Masimpur, Patharia)
7. Ahemedabad-Kalol Region	offshore of Andaman and Nicobar, Gulf of mannar, Baleshwar coast, Punjab, Haryana and Uttar Pradesh.

c) Natural Gas

Natural gas usually accompanies the petroleum accumulations. It is naturally occurring hydro carbon gas mixture consisting primarily of methane, but commonly includes varying amounts of other higher alkanes and sometimes a small percentage of carbon dioxide, nitrogen and hydrogen sulphides. It is formed when layers of decomposed plants and animals are exposed to intense heat and pressure over thousands of years. It is used as a source of energy for heating, cooking and electricity generation. It is also used as fuel for vehicles and as a chemical feedstock in the manufacture of plastics and other commercially important organic chemicals.

India has a very large proportion of tertiary rock and alluvial deposits

Gail (India) Limited (GAIL) (formerly known as Gas Authority of India Limited) is the largest state-owned natural gas processing and distribution company in India. It is headquartered in New Delhi. It has the following business segments: natural gas, liquid hydrocarbon, liquefied petroleum gas transmission, petrochemical, city gas distribution, exploration and production, GAILTEL and electricity generation.



particularly in the extra peninsular India. These sedimentary rocks, which were once under the shallow seas, hold the possibility of harbouring oil and gas deposits. The highest concentration of natural gas is found in the Bombay high and basseim oil fields. Jagatia and Gogha in Gujarat, Nahorkatiya and Moran in Assam, Neypaltur, Mangmadam in Thanjavur district in Tamil nadu, Baranura and Atharnure ranges in Tripura, Barmer and Charaswala in Rajasthan, Miao Pung and Laptang areas in Arunachal Pradesh, Firozpur district in Punjab, Mausar and Maradpur areas in Jammu and Kashmir and Medinipur in West Bengal are the other areas where natural gas reserves have been discovered.

The Gas Authority of India Ltd [GAIL] is doing pioneer work in the field of natural gas exploration. Discovery of gas made rapid strides in the 1985. Oil strikes at Cauvery offshore, at Nanda in Cambay basin and Tarot in Jaisalmer basin in Rajasthan were major discoveries during 1988-89. Recently, it has been found that Krishna- Godavari delta has reserves of Natural gas.

Compressed natural gas (CNG) (methane stored at high pressure) is a fuel which can be used in place of gasoline, diesel fuel and propane/LPG. In comparison to other fuels, natural gas poses less of a threat in the event of a spill, because it is lighter than air and disperses quickly when released. Biomethane – cleaned-up biogas from anaerobic digestion or landfills – can be used. Natural gas vehicles are increasingly used in Delhi, Ahmedabad, Mumbai, Pune, Kolkata Lucknow, Kanpur, Varanasi, etc.

4.2.2 Conventional Energy Sources

a) Thermal power

Thermal power is generated using fossil fuels like coal, diesel, petroleum and Natural gas. National Thermal Power Corporation [NTPC] was established in 1975. At present NTPC has 13 coal based super thermal power projects and 7 gas / liquid fuel based combined cycle projects in the states of Assam, Bihar, Jharkhand, Chhattisgarh, Mizoram and West Bengal. It accounts for over 90% of the installed capacity. Tamil nadu produces about 5% of the total thermal electricity produced in India. Neyveli, Mettur, Thoothukudi and Ennore (Chennai) are the important thermal power stations in Tamil nadu.

b) Nuclear power

The energy released during nuclear fission or fusion is used to generate electricity.

Nuclear energy is generated mainly from the minerals of Uranium and Thorium. Nuclear power programme in India was initiated in 1940's when 'Tata Atomic research commission was incorporated in August 1948. The first nuclear power station was setup at Tarapur near Mumbai in 1969 with the capacity of 320 mw. Later atomic reactors were installed at Rawatbhata (335 MW), near Kota in Rajasthan (100 MW), Kalpakkam (440 MW) and Kudankulam (2,000 MW) in Tamil nadu and Narora (235 MW) in Uttar Pradesh, Kaiga in (235 MW) in Karnataka and Kakarapara (235 MW) in Gujarat.

The Nuclear Power Corporation of India Limited (NPCIL) is an Indian public sector undertaking based in Mumbai, Maharashtra. It is wholly owned by the Government of India and is responsible for the generation of nuclear power for electricity. NPCIL is administered by the Department of Atomic Energy (DAE) is responsible for designing, constructing and operating the nuclear power stations in India.

4.2.3 Renewable or Non-Conventional Energy Resources

a) Hydro power

Power generated from water is termed as hydroelectricity. Hydro power is the energy harnessed from running water. Hydro power is considered as one of the most economic and non-polluting sources of energy. It contributes nearly 7% of global electricity production. The cost of production of hydroelectricity is relatively low, making it a competitive source of renewable energy. It is also a flexible mode of power generation as the quantity of production can either be increased or decreased very quickly adapting to changing demands.

NHPC Limited (National Hydroelectric Power Corporation) is located in Faridabad, India

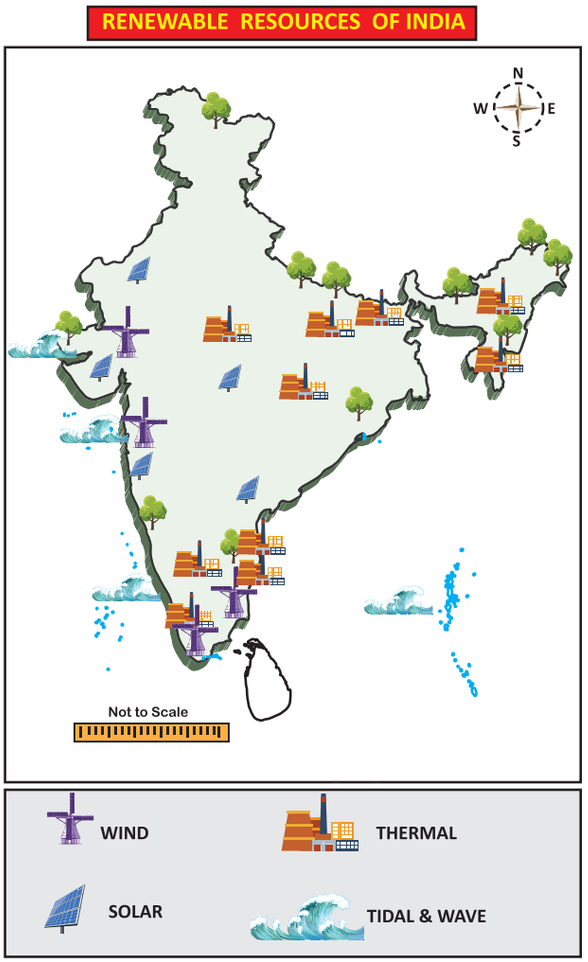
India is fortunate to have a large potential of hydro- power potential. It is quite unevenly distributed in India. Of the total hydro-electric potential of the country, rivers of Assam, Arunachal Pradesh, Manipur, Nagaland and Tripura account for 30.4%, eastward flowing rivers of the peninsular India 20.9%, westward flowing rivers of the western Ghats (South of the Tapti) 10.5%, the Ganga Basin (excluding the potential of Nepal) 11.7%, the Indus Basin 16.0% and the rivers of central India 10.5%.

DO YOU KNOW?

The first hydro-electric power station in India was established at "Darjeeling" in 1897.

b) Solar Energy

Solar Power is the conversion of sunlight into electricity, either directly using photovoltaics (PV) or indirectly using concentrated solar power (CSP). Concentrated solar power systems use lenses or mirrors and tracking system to focus a large area of sunlight into a small beam. Photovoltaics convert light into an electric current using the photovoltaic effect.



Solar Energy Corporation of India Limited

(A Government of India Enterprise) head quarter is located at New Delhi.

The mass objectives of the solar thermal energy programme, being implemented by the Ministry of Non-Conventional Energy Source (MNES) are market development,

commercialisation and utilisation of heat energy requirement of different applications in domestic, institutional and industrial sectors. Solar power is used in water heaters, refrigerators, drying, street lighting, cooking, pumping, power generator, photovoltaic cells, salon parts etc. Andhra Pradesh, Gujarat, Rajasthan, Maharashtra and Madhya Pradesh are the major solar power producers.

c) Wind Energy

Wind energy is extracted from air flow using wind turbines. It is a cheap and pollution free source of energy. Power from wind mills are used for pumping water and to sail propel ships. Wind power is plentiful, renewable, widely distributed, clean and produces no greenhouse gas emissions during operation. These plants occupy only a less space.

Tamil nadu has the largest installation of wind turbines in the country in the Muppandal-Perungudi area near Kanniyakumari is the largest concentrations of wind farm capacity at a single location in the world.

The development of wind power in India began in 1986 with first wind farms were set up in coastal areas of Gujarat (Okha), Maharashtra (Ratnagiri) and Tamil nadu (Thoothukudi) with 55 KW Vestas wind turbines. The capacity has significantly increased in the last few years. India has the fourth largest installed wind power capacity in the world.

The National Institute of Wind Energy (NIWE), Chennai was established in Tamil Nadu in 1998 as an autonomous institution under the administrative control of the Ministry of New and Renewable Energy. CIWE main activities include resource assessment and testing & certification.

d) Biomass Energy

Bio energy may be obtained through bio-degradable materials like animal dung, kitchen wastes, water hyacinth, agricultural residues and city wastes etc. It is clean and cheap source of energy. India has a potential of about 18 GW of energy from Biomass. Currently, about 32% of total primary energy used in India is derived from Biomass. Energy derived from biomass is mostly used for domestic purposes.

e) Tidal and wave Energy

There are two main sources of ocean energy. They are Ocean tides and Ocean waves. It is estimated that India possesses 8,000-9,000 MW of tidal energy potential. The Gulf of Cambay is the best suited area with about 7,000 mw potential of tidal energy. This is followed by Gulf of Kachch (1,000MW) and sunderbans (100MW). At present a 900mw tidal power plant is proposed to be set up in the Gulf of Kachch region.

Wave energy potential in India is estimated to be 40,000 MW. An wave energy power plant of 150 KW(maximum) has been installed at vizhinjam near Thiruvananthapuram. An another plant of this kind has been set up near Andaman& Nicobar Islands.

4.3 Industries

It refers to the activities which converts the raw materials into finished products. This sector is called as the value addition sector. On the basis of the source of raw materials, Industries are classified into the Agro based industries, Forest based industries and Mineral based industries.

4.3.1 Agro based industries

These industries draw their raw materials from agricultural sector. The following part discusses the agro based industries in India.

a) Cotton Textile Industry

Textile is a broad term which includes cotton, jute, wool, silk and synthetic fibre textiles. This sector in India with 3400 textiles

mills with installed capacity of more than 50 million spindles and 842000 rotors is the second largest in the world.

DO YOU KNOW?

The first cotton textile mill was established at Fort Gloster near Kolkata in 1818.

Traditional sectors like hand loom, handicrafts and small power-loom units are the biggest source of employment for millions of people in rural and semi urban areas. The cotton textile industries contribute about 7% of industrial output, 2% of India's GDP and 15% of the country's export earnings. It is one of the largest sources of employment generation in the country. With over 45 million employees, the total employment in this industry is well over 25million worker. At present there are 1,719 textiles mills in the country. Out of which 188 mills are in public sector, 147 in cooperative sector and 1,284 in private sector.

DO YOU KNOW?

Byssinosis, also called "brown lung disease" or "Monday fever", is an occupational lung disease caused by exposure to cotton dust in inadequately ventilated working environments.

Currently, India is the third largest producer of cotton and has the largest loom arc and ring spindles in the world. At present, cotton textile industry is the largest organized modern industry of India. About 16% of the industrial capital, 14% of industrial production and over 20% of the industrial labour of the country are engaged in this industry.

Ginning is the process of cotton fiber is separated from the cotton seed.

The higher concentration of textile mills in and around Mumbai, makes it as "**Manchester of India**". Presence of black cotton soil in Maharastra, humid climate, presence of Mumbai port, availability of hydro power, good market and well developed transport facility favour the cotton textile industries in Mumbai.

The major cotton textile industries are concentrated in the states of Maharashtra, Gujarat, West Bengal, Uttar Pradesh and Tamil nadu. Coimbatore is the most important centre in Tamil nadu with 200 mills out of its 435 and called as "**Manchester of South India"**. Erode, Tirupur, Karur, Chennai, Thirunelveli, Madurai, Thoothukudi, Salem and Virudhunagar are the other major cotton textiles centres in the state.

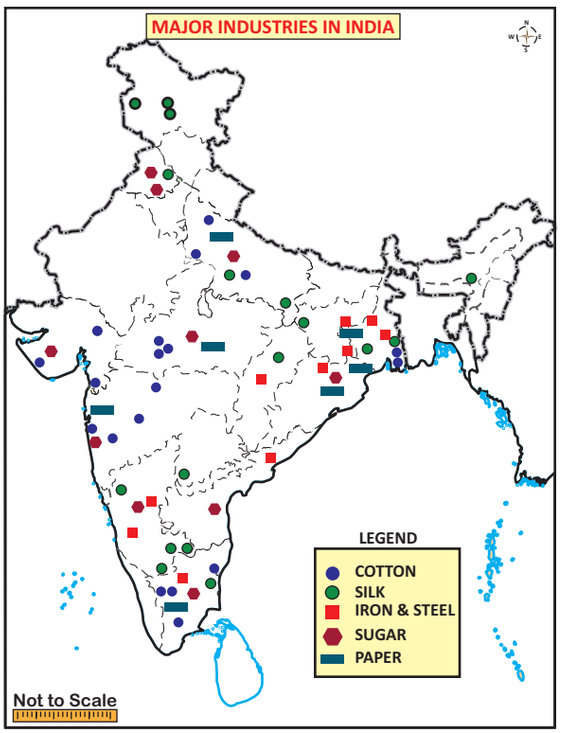
b) Jute Textiles

Jute is a low priced fibre used mainly for making package materials like gunny bags. Today jute is blended with cotton and wool to produce textiles. India is the largest producer of jute goods contributing 35% of the world's total output. This is the second important textile industry in India after cotton textiles. Jute is the golden fibre which meets all the standards of goods packing with its natural, renewable, bio degradable and eco-friendly products.

National jute board is headquarter at Kolkata.

NATIONAL JUTE BOARD

The first jute mill in India was established at Rishra near, Kolkata in 1854 by the English man George Auckland. India tops in the production of raw jute and jute goods and second in the export of jute goods next to Bangladesh. Jute production includes gunny bags, canvas, pack sheets, jute web, carpets, cordage, hessians and twines. Now jute is also being used in plastic furniture and insulation bleached fibres to blend with wool. It is also mixed with cotton to make carpet and blankets. The major jute producing areas are in West Bengal and concentrated along the Hooghly river within the radius of six kilometre of Kolkata. Titagarh, Jagatdat, Budge-



Budge, Haora and Bhadreshwar are the chief centres of jute industry. Andhra Pradesh, Bihar, Uttar Pradesh, Assam, Chhattisgarh and Odisha are the other jute goods producing areas.

DO YOU KNOW?

The first attempt to produce iron and steel unit was set up at Porto Novo in Tamil nadu in 1830.

c) Silk Industry

CSTRI is the only research institute in the country dedicated to the Research & Developmental activities related to silk technology. CSTRI was established in the year 1983 by the Central Silk Board, Ministry of Textiles, Govt. of India having head quarter at Bangalore

India has been well known for the production of silk. Since the ancient times, India is the second largest producer of raw silk next only to China. Sericulture is a labour intensive industvry and provides employment to 7.56 million people make to weaker and marginalised sections of society.

SILK MARK

Karnataka is the largest producer of silk with an average of 8200 metric tons every year which is about one third of the total silk production of India. Other major producers of silk are West Bengal, Jammu Kashmir, Bihar, Jharkhand, Chhattisgarh, Uttar Pradesh, Punjab, Assam and Tamil nadu states. India exports exclusively silk fabrics, silk scarves, dress material and sarees. It exports to the principal countries like Europe, U.S.A, U.K, Russia, Saudi Arabia, Kuwait and Singapore.

DO YOU KNOW?

Development Commissioner for Handlooms was set up as an attached non-participating office on 20th November, 1975 under the Ministry of Commerce. At present it is functioning under the Ministry of Textiles having headquarters at Udyog Bhawan, New Delhi.

d) Sugar Industry

Sugar can be produced from sugar cane, sugar-beets or any other crop which have sugar content. In India, sugar cane is the main source of sugar. At present this is the second largest agro based industry of India after cotton textiles. India is the world's second largest producer of sugar cane after Brazil. This industry provides employment to 2.86 lakh workers. Sugar industry is decentralized and located near the sugarcane growing areas as they are weight loosing and bulky to transport.

Uttar Pradesh is the largest producer of sugar, producing about 50% of the country's

total. Other major producers are Maharashtra, Uttar Pradesh, Karnataka, Andhra Pradesh, Tamil nadu, Bihar, Punjab, Gujarat, Haryana and Madhya Pradesh states. These states account for more than 90% of the sugar mills and sugar production.

4.3.2 Forest based industries

Forest provide us with different types of material which are used as raw material for certain industries like paper, lac, sports goods, plywood etc.

a) Paper industry

Paper Industry has emerged as a diversified and specialized industry in India that produces numerous types of papers that comes in various use such as sheet paper, paper boxes, tissues, paper bags, stationery, envelopes and printed-paper products such as books, periodicals, and newspapers. In India the Soft wood is the principal raw material used for making paper especially newsprint and high class printing papers. Paper is the pre-requisite for education and literacy and its use is an index of advancement in these two fields as well as the overall well being of the society.

Paper Industry in India

The first paper mill of India was started in 1812 at Serampore in West Bengal.

The first successful effort was made in 1867 with the setting up of the Royal Bengal paper mills at Ballyganj near Kolkata. Subsequent successful efforts were made at Lucknow in 1879, Titagarh in 1882, Pune in 1887, Raniganj in 1892, Kankinra in 1892 and Naihati in 1918.The raw materials for paper industry includes wood pulp, bamboo, salai and sabai grasses, waste paper and bagasse. West Bengal is the largest producer of paper in the country followed by Madhya Pradesh, Odisha and Tamil nadu states.

National Newsprint and Paper Mills (NEPA) is at Nepanagar in Burhanpur District of Madhya Pradesh.

4.3.3 Mineral based industries

Mineral based industries use both metallic & non metallic minerals as raw materials. The major mineral based industry of country is the iron steel industry

a) Iron and steel industries

Iron and steel industry is called a basic metallurgical industry as its finished product is used as raw material by host of other industries. Several industries like engineering, heavy machines and machine tools, automobile, locomotives and railway equipment industries use iron and steel as their primary raw material. Due to this, the steel producing capacity of a country is generally taken as an indicator of its level of industrial development.

Chennai is nicknamed as the "Detroit of Asia" due to the presence of major automobile manufacturing units and allied industries around the city.

The modernization of the industry was started in 1907 with the establishment of Tata Iron and Steel Company at Sakchi, now called Jamshedpur. Iron and steel industry of India is mainly concentrated in the states of Jharkhand,

S.No	Name of Industry	Place	Establishment Year	Product
1	Tata Iron and Steel Company(TISCO)	Jamshedpur, Jharkhand	1911	Pig Iron
2	Indian Iron and Steel Company (IISCO)	Burnpur,Hirapur, Kulti, West Bengal	1972	Pig Iron & Crude steel
3	Visweshwaraya Iron Steel Ltd(VISL)	Bhadravati,Karnataka	1923	Alloy and Sponge steel
4	Hisdustan Steel Ltd (HSL) Collaborated with Russia	Bhilai, Chattisgarh	1957	Railway Equipments and Ship Building
5	Hindustan Steel Ltd(HSL) Collaborated with Germany	Rourkela,Odisha	1965	Hot and Cold rolled sheets, Galvanized sheets and electrical plates
6	Hindustal Steel Ltd(HSL) Collaborated with United kingdom	Durgapur,West Bengal	1959	Alloy steel, Construction materials and railway equipments
7	Hisdustan Steel Ltd(HSL) Collaborated with Russia	Bokaro, Jharkhand	1972	Sludge and Slog
8	Salem Steel Ltd	Salem, Tamil Nadu	1982	Stainless Steel
9	Vijayanagar Steel Plant	Tornagal,Karnataka	1994	Flat steel and Long Steel
10	Visakhapatnam Steel Plant(VSP)	Visakhapatnam, Andhra Pradesh	1981	Hot Metal

West Bengal and Odisha. Proximity to the coal fields of Jharia, Raniganj, Bokaro and Karanpura and the iron ore mines of Mayurbhanj, Keonjar and Brona are responsible for this. This area also has sufficient deposits of limestone, dolomite, manganese, silicon and dolomite which are required for the industry.

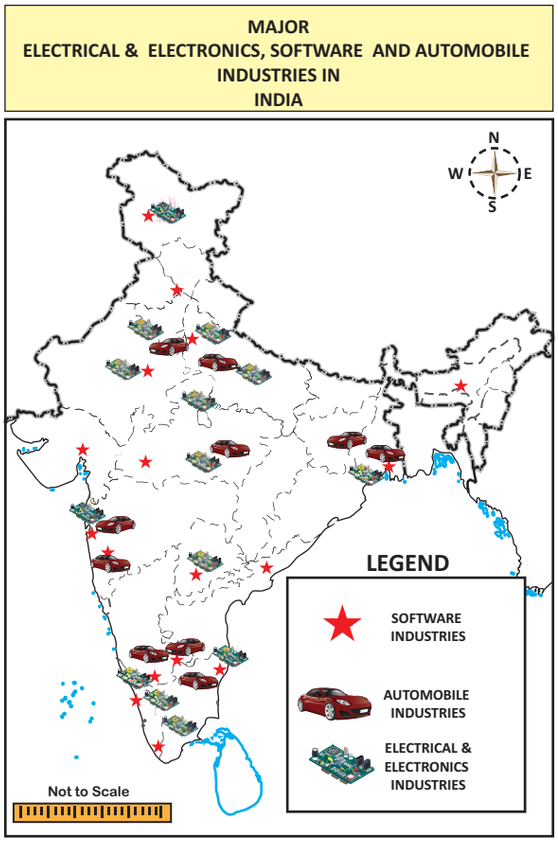
4.3.4 Automobile Industry

India is set to emerge not only as a large domestic market for automobile manufacturers, but also as a crucial link in the global automotive chain. It is one of the most dynamic industrial groups in India.

The first automobile industry of India was started in 1947. The industry is the Premier Automobiles Ltd located at Kurla (Mumbai). It was followed by the Hindustan Motors Ltd at Uttarpara (Kolkata) in 1948. At present, India is the 7th largest producer of automobile manufacturers which include two wheelers, commercial vehicles, passenger car, jeep, scooty, scooters, motor cycles, mopeds and three wheelers. Major centres are at Mumbai, Chennai, Jamshedpur, Jabalpur, Kolkata, Pune, New Delhi, Kanpur, Bengaluru, Sadara, Lucknow and Mysuru.

Make in India program was launched in 2014 to put India on the world map as a major hub for global design and manufacturing.

Tata Motors, Maruti Suzuki, Mahindra & Mahindra and Hindustan Motors are the largest passenger car manufacturers of Indian companies in the country. Presence of foreign car companies such as Mercedes Benz, Fiat, General Motors, Toyota and the recent entry



of passenger car manufacturers BMW, Audi, Volkswagen and Volvo makes the Indian automobile sector a special one. Tata Motors, Ashok Leyland, Eicher Motors, Mahindra & Mahindra and Ford Motors are the major Indian companies which manfacture commercial vehicles. MAN, ITEC, Mercedes-Benz, Scania and Hyundai are the foreign companies engage in the manfacture of commercial vehicles. Two-wheeler manufacturing is dominated by Indian companies like Hero, Bajaj Auto and TVS.

The automobile industries are found in four clusters viz; Delhi, Gurgaon and Manesar in North India, Pune, Nasik, Halol and Aurangabad in West India, Chennai, Bengaluru and Hosur in South India and Jamshedpur and Kolkata in East India.

4.3.5 Electrical and Electronic Industries

Heavy electrical industries manufacture equipment used for power generation, transmission and utilization. Turbines for steam and hydro power plants, boilers for thermal power plants, generators, transformers, switch gears etc. are the chief products of this industry. The most important company in the field of heavy electrical is Bharat Heavy Electricals Ltd (BHEL). It has its plants at Hardwar, Bhopal, Hyderabad, Jammu, Bengaluru, Jhansi and Tiruchirappalli. This Industry covers a wide range of products including television sets, transistor sets, telephone exchanges, cellular telegram, computers and varied equipments for post and railway, defence and meteorological department.

Bengaluru is the largest producer of electronic goods in India, hence it is called as the "Electronic Capital of India". The other major producers of electronic goods centers are Hyderabad, Delhi, Mumbai, Chennai, Kolkata, Kanpur, Pune, Lucknow, Jaipur and Coimbatore.

4.3.6 Software Industry

India is home to some of the finest software companies in the world. The software companies in India are reputed across the globe for their efficient IT and business related solutions. The Indian Software Industry has brought about a tremendous success for the emerging economy.

Tidel Park, Chennai

In India, software industry began in 1970 with the entry of Tata Consultancy

Services (TCS). Along with this, L & T, Infotech, i-Flex, Accenture, Cognizant, GalexE Solutions India Pvt Ltd and ITC Infotech are the major software industries in the country. At present, there are more than 500 software companies all over India. It exports software service to nearly 95 countries in the world.

The main centres of IT parks are located in Chennai, Coimbatore, Thiruvananthapuram, Bengaluru, Mysuru, Hyderabad, Visakhapatnam, Mumbai, Pune, Indore, Gandhi Nagar, Jaipur, Noida, Mohali and Srinagar.

4.3.7 Major challenges of Indian Industries

Industries in India face many problems. Some major problems are listed below.

- Shortage and fluctuation in Power Supply.
- Non- availability of large blocks of land.
- Poor access to credit.
- High rate of interest for borrowed loan.
- Non- availability of cheap labourers.
- Lack of technical and vocational training for employees.
- Inappropriate living conditions nearby industrial estates.

Challenges of Indian Industries

Recap

- Natural resource - raw materials obtained naturally from the earth.
- Renewable resource – the resources that can be replenished.
- Non renewable resource - the energy that cannot be replenished easily.
- Agro based industry – the industries that depend on agriculture for their raw materials.
- Mineral based industries – the industries that use minerals as raw materials.
- Forest based industries – the industries run with the help of forest products.

A-Z GLOSSARY

Biogas: The production of methane and carbon- di- oxide from plants and animal wastes.

Fossil fuel: Any naturally occurring carbon or hydrocarbon coal, oil and natural gas.

Ore: It is a deposit in the earth crust with one or more value minerals

Solar power: Heat radiation from the sun converted into electricity.

Thermal power station: An electricity generating plants which burns coal or oil.

EXERCISE

I. Choose the correct answer.

Q47YCF

1. Manganese is used in_____.
   a) Storage batteries
   b) Steel Making
   c) Copper smelting
   d) Petroleum Refining
2. The Anthracite coal has _____.
   a) 80 to 95% Carbon
   b) Above 70% Carbon
   c) 60 to 7% Carbon
   d) Below 50% Carbon
3. The most important constituents of petroleum are hydrogen and
   a) Oxygen b) Water
   c) Carbon d) Nitrogen
4. The city which is called as the mancestor of south India is
   a) Chennai b) Salem
   c) Madurai d) Coimbatore
5. The first Jute mill of India was established at
   a) Kolkata b) Mumbai
   c) Ahmedabad d) Baroda
6. The first Nuclear Power station was commissioned in
   a) Gujarat b) Rajasthan
   c) Maharashtra d) Tamil nadu
7. The most abundant source of energy is
   a) Bio mass b) Sun
   c) Coal d) Oil
8. The famous Sindri Fertilizer Plant is located in
   a) Jharkhand b) Bihar
   c) Rajasthan d) Assam
9. The nucleus for the development of the chotanagpur plateau region is
   a) Transport
   b) Mineral Deposits
   c) Large demand
   d) Power Availability
10. One of the shore based steel plants of India is located at _____.
    a) Kolkata b) Tuticorin
    c) Goa d) Visakhapatnam

II. Match the following.

1.

a.	Bauxite	1)	Cement
b.	Gypsum	2)	Aircraft
c.	Black Gold	3)	Electrical goods
d.	Iron ore	4)	Coal
e.	Mica	5)	Magnetite

2.

a.	Detroit of India	1)	Gujarat
b.	Thermal power plant	2)	Thiruvananthapuram
c.	Wind farm	3)	Andhra Pradesh
d.	Tidal energy	4)	1975
e.	Solar power	5)	Chennai

III. Answer the following Questions briefly.

1. Define the resource and state its types.
2. Name the states that lead in the production of Iron ore in India.
3. What are the minerals and its types?
4. State the uses of magnesium.
5. What is natural gas?
6. Name the different types of coal with their carbon content.
7. Mention the major areas of jute production in India.
8. Name the important oil producing regions of India.

IV. Distinguish between.

1. Renewable and non-renewable resources.
2. Metallic and non-metallic minerals.
3. Agro based industry and mineral based industry.
4. Jute industry and sugar industry.
5. Conventional energy and non- conventional energy.

V. Answer the following in a paragraph.

1. Write about the distribution of cotton textile industries in India.
2. Explain the factors responsible for the concentration of jute industries in the hoogly region.
3. Write an account on the major iron and steel industries of India.

VI. On the outline map of India mark the following.

1. Iron ore production centres.
2. Centres of Petroleum and Natural Gas production.
3. Coal mining centres.
4. Areas of cultivation of cotton.
5. Iron and Steel industries.

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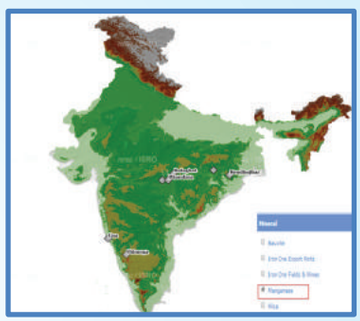

Steps

- Open the Browser and type the URL given below (or) Scan the QR Code.
- Scroll Down and click on 'Explore'
- Click on **'Thematic Serious 2'** in top menuandSelect **'Mineral'**

Website URL:

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Unit - 5

India - Population, Transport, Communication & Trade

Learning Objectives

- To study the levels of urbanization and its impacts in India.
- To know about the Human Development in India.
- To learn the transport systems of India.
- To understand the communication system of India.
- To assess the nature of trade in India.

4PNC5Y

Introduction

The study on human population is one of the most important aspects in geography of any region. The human population has many components but the most fundamental are its number, composition, distribution and density. Therefore, it is essential to study these components. The study on these aspects also would reveal the workforce of the country.

The population of India as per 2011 census is 1,210.19 million (1,21,01,93,422). It shows an increase of 19.31crores from the population of 2001. Population Census of India provides the detailed information about the demography of India. Along with population, we will study about the transport and communication of India in this chapter.

5.1 Population

The total number of people residing in a country at a specified period of time is called the **'Population'** of that country. India is the second most populous country in the world next only to china. India covers only 2.4 percent of the land area of the world, but is the home of about 17.5 percent of the world's population. It shows that the proportion of population of India is far higher than the proportion of its area. Thus, a little more than one out of every six persons in the world is from India. Our population is almost equal to the combined population of the USA, Indonesia, Brazil, Pakistan, Bangladesh and Japan and total population of these six countries is 1214.3 million.

5.1.1 Census

Population census is the total process of collecting, compiling, analysing or otherwise disseminating demographic, economic and social data pertaining, at a specific time, of all persons in a country or a well-defined part of a country. It happens in an interval of ten years. The data collected through the census are used for administration, planning, policy making as well as management and evaluation of various programmes by the government.

5.1.2 Distribution and Density of Population

The term **'Population Distribution'** refers to the way the people are spaced over the earth's surface. The distribution of population in India is quite uneven because of the vast variation in the availability of resources. Population is mostly concentrated in the regions of industrial centres and the good agricultural lands. On the other hand, the areas such as high mountains, arid lands, thickly forested areas and some remote corners are very thinly populated and some areas are even uninhabited. Terrain, climate, soil, water bodies, mineral resources, industries, transport and urbanization are the major factors which affect the distribution of population in our country.

In India the first census was carried out in the year 1872. But the first complete and synchronous census was conducted in 1881. And the 2011 census represents the fifteenth census of India.

Uttar Pradesh is the most populous state in the country with a population of 199.5 million followed by Maharashtra (112.3 million), Bihar (103.8 million) West Bengal (91.3 million) and the combined Andhra Pradesh (84.6 million). These five states account for about half of the country's population. More than one fourth of the population live only in the two states of U.P and Maharashtra. Sikkim is the least populous state of India(0.61 million). Delhi with 16.75 million population tops among the Union territories.

The uneven distribution of population in the country is the result of several factors such as physical, socio-economic and historical ones. The physical factors include relief, climate, water, natural vegetation, minerals and energy resources. Socio-economic factors consists of the religion, culture, political issues, economy, human settlements, transport network, industrialization, urbanization, employment opportunity etc.

Hots

What could be the reasons for uneven distribution of population in India?

5.1.3 Density of population

Population density is a better measure of understanding the variation in distribution of population. It is expressed as number of persons per unit area usually per sq km. According to 2011, the average density of population of India is 382 persons per sq.km. India is one of the most thickly populated ten countries of the world. The most densely populated state of India is Bihar and the state with least population density is Arunachal Pradesh. Among the union territories, Delhi is the densely populated one with 11,297 per sq.km, while Andaman and Nicobar Islands have the lowest density of population.

Hots

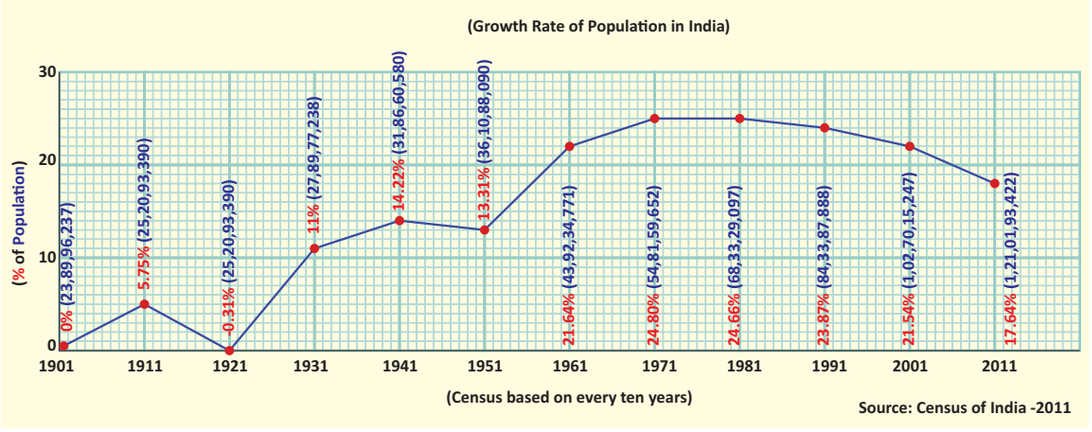
What are the reasons for the rapid growth of population in India?

Spatial pattern of population Density	
Density	Places
Very Low Density (less than 150 persons per sq.km)	Arunachal Pradesh (17), Andaman and Nicobar Islands (46), Mizoram (52), Sikkim (86) Nagaland (120), Manipur (122), Himachal Pradesh (123), Jammu and Kashmir (124) and Meghalaya (132)
Low Density (150 to 300 persons per sq.km)	Arunachal Pradesh (17), Andaman and Nicobar Islands (46), Mizoram (52), Sikkim (86) Nagaland (120), Manipur (122), Himachal Pradesh (123), Jammu and Kashmir (124) and Meghalaya (132)
Moderate Density (300 to 500 persons per sq.km.)	Gujarat (308), The combined Andhra Pradesh (308), Karnataka (319), Tripura (350), Maharashtra (365), Goa (394), Assam (397) and Jharkhand (414) are the states with moderate population density. Assam has tea estates, Andhra Pradesh, Karnataka and Jharkhand
High Density (500 to 1000 persons per sq km.)	Punjab (550), Tamil Nadu (555), Haryana (573), Uttar Pradesh (828) and Kerala (859) The union territory of Dadra and Nagar Haveli(698)
Very High Density (greater than 1000 persons per sq km)	West Bengal (1029), Bihar (1102), Lakshadweep (2013), Daman and Diu (2169), Puducherry (2598), Chandigarh (9252) and Delhi (11,297).

5.1.4 Population Growth and Change

The growth rate of population is an important demographic feature. It not only helps in understanding the population change that a society has undergone in the past but also helps in predicting the future demographic characteristics of an area. Population growth refers to the change in the number of inhabitants of a country/territory during a specified period of time. The growth of population is expressed in percentage and is described as the growth rate of population. The following table shows the decadal growth rate of population from 1901 to 2011.

Growth of population in India has gone through the different phases. Population of the country in 1901 was 238 million and it grew to 1,210 million over a period of little more than a century. The following are the different stages of population growth of India.



The Period of Stagnant Population (1901-1921): During the first phase of 20 years (1901-1921), the population of India grew by 15 million. The year 1921 registered a negative growth rate of -0.31% which happened only once throughout the demographic history of India and is called the year of Great Demographic Divide.

The Period of Steady Growth (1921-1951): During the second phase of 30 years (1921-1951), the population of India grew by 110 million.

The Period of Steady Growth (1951-1981): During the third phase (1951-1981), the population of India grew from 361 million in 1951 to 683 million in 1981. Growth rate in this period is almost doubled when compared to the previous phase of growth rate. This period is often referred to as the period of population explosion.

The period of High Growth with Definite Signs of Slowing Down (1981-2011): Population of India increased from 685 million to 1210 million during this phase. The growth rate of population decreased from one census to other. This marks the beginning of a new era in the demographic history of India.

Population change refers to an increase or decrease of population of an area from one period to another period. Population growth is influenced by the birth rate, death rate and migration. These three make the changes in population.

Birth rate refers to the number of live births per thousand people in a year and the Death rate refers to the number of deaths per thousand people in a year. The rapid decline in death rate is the major cause of the rapid growth of population in India.

5.2 Migration

It is the movement of people across regions and territories. It can be internal (within a country) or international (between the countries). Internal migration does not change the size of population of a country but it influences the distribution of population in a nation. It plays an important role in changing the composition and distribution of population. In India, the mass migration is from rural to urban. Unemployment and under employment in the rural areas are the push factors and the employment opportunity and higher wages in the urban areas caused by the industrial development are the pull factors of migration in the country. 45 out of 121 crores of people in India are reported to be migrants as per 2011 census. Migrants constitute about 37% of population. Migrants are 48% from female and 52% from male.

Activity

Collect the pictures and make an album of various types of migration.

5.2.1 Population composition

Population composition refers to the characteristics such as age, sex, marital status, caste, religion, language, education, occupation etc. The study of composition of population helps us to understand the social, economic and demographic structure of population.

5.2.2 Age composition

The age composition of population refers to the number of people in different age groups in a country. It is one of the most basic characteristics of a population. It helps us

to understand the proportion of population in dependent and independent category. Population of a nation is generally grouped in to three broad categories. In India, the children who has less than 15 years of age constitute 29.5% and the people above 60 years constitute 8.0%. So, the dependent population in India is 37.5%and the independent population (16-59 yrs) is 62.5%. It shows that our country has enormous manpower.

5.2.3 Sex Ratio

Sex ratio is defined as the number of females per 1000 male population. This is an important social indicator to measure the extent of equality between males and females in a society at a given time.

Hots

The sex ratio in our country is always unfavourable to females. Give reasons.

According to 2011 census, the sex ratio of the country is 940 females per 1000 males. This suggests that the size of female population is lower than males. Only in the state of Kerala and the union territory of Puducherry the sex ratio is greater than 1000. It is 1084 in Kerala and 1038 in Puducherry. The lowest sex ratio is recorded in the union territory of Daman and Diu(618).

The ratio between the economically active and economically inactive of population is termed as Dependency Ratio.

5.2.4 Literacy Rate

The people who are able to read and write are known as **literates**. It is an important indicator of quality of people. The percentage of literate people to the total population is termed as **literacy rate**. There has been a steady improvement in the literacy levels in India. India's literacy rate as per 2011 census is 74.04%. From this, the literacy rate of male is 82.14% and the female is 65.46%. It shows that still there is a vast gap (16.68%) between the male and female literacy rates. Kerala ranks first in the country with a literacy rate of 93.91% followed by union territory Lakshadweep with 92.28%. The lowest literacy rate is found in Bihar (63.82 %).

5.2.5 Occupational structure

The economically active part of a country's population is enumerated during the census operations and stated as workers. Workers are placed under three fold categories in census record. They are main workers, marginal workers and non-workers. According to the Census of India, all those who had worked for the major part of the preceding year (at least 6 months or 183 days) are recorded as main workers. Those who worked for less than six months are recorded as marginal workers and the people who have not worked at all comes under non workers. Work participation rate denotes the percentage of total workers i.e., total main and marginal workers to the total population in an area. The work participation rate in India is 39.79% in 2011, out of which the work participation rate of male is 53.25% and the female is 25.51%. From the workers, main workers constitute 75.23% and the remaining 24.77% of the people belong to marginal workers.

5.2.6 Population Dynamics

Human population dynamics is a field that tracks factors related to changes in the size of population and its characteristics. Predicting population changes is an important aspect of population studies. The demographic trend affects the economic, social, and environmental systems. An increase in human population can affect the quality of natural resources like biodiversity, air, land, and water. The size of Population and characteristics undergoes changes constantly. These changes are reflected clearly in every other aspect of our country.

5.2.7 Problems of over Population

In India, growing pressure of Population on resource base, created many socio-economic, cultural, political, ecological and environmental problems. The Population problems vary in space and time and differ from region to region. Some of the major issues created by the overpopulation in our country are overcrowding, unemployment and under employment, low standard of living, malnutrition, mismanagement of natural and agricultural resources, unhealthy environment etc.

5.3 Urbanization

The process of society's transformation from rural to urban is known as urbanization. The level of urbanization of a place is assessed based on the size of population of the towns and cities and the proportion of population engaged in non agricultural sectors. These two are closely linked to the process of industrialization and expansion of the secondary and tertiary sectors of economy.

5.3.1 Urbanization in India

The level of urbanization is measured in terms of percentage of urban population. The level of urbanization in the country has increased more than three times from 1901 to 2011. The percentage of urban population of India was 27.82% in 2001 and it rose to 31.16% in 2011 shows an increase of 3 % in a decade.

The level of urbanization varies widely among the states. Goa is the most urbanized state with 62.17% of urban population. Himachal Pradesh is the least urbanized state with 10.04% of urban population. Among the Union territories, Delhi is the most (97.50 %) urbanized region followed by Chandigarh (97.25%). Among the major states, Tamil Nadu continues to be the most urbanized state with 48.4% percent of urban population followed by Kerala (47.7%) and Maharashtra (45.2%).

S. No.	Type of Towns/ UAs/OGs	2001 (in Numbers)	2011 (in Numbers)
1	Statutory towns	3799	4041
2	Census Towns	1362	3894
3	Urban Agglomeration	384	475
4	Out Growths	962	981
Source: Statistical data 2011			

As per 2011 Census, there are 7,935 towns (statutory and census) in the country. The number of towns has increased to 2,774, from 2001 census. In 2011, 475 Urban agglomeration (UAs) with 981 outgrowths (OGs) have been identified as Urban Agglomerations as against 384 UAs with 962 OGs in 2001 Census. Out of 468 UAs belongs to Class I category, 53 UAs have the population of one million and above each and these urban centres are known as **"Million Cities"**. These are the major urban centres in the country. Among the Million Cities, there are three major Urban Agglomerations with more than 10 million population each and are known as "Mega Cities". They are Greater Mumbai UA (18.4 million), Delhi UA (16.3 million) and Kolkata UA (14.1million).

5.3.2 Impact of Urbanization

Urbanization and population concentration go hand – in – hand and are closely related to each other. A rapid rate of urbanization in a society is taken as an indicator of its economic development. Urbanization is increasing rapidly in the developing countries including India. Rural to urban migration leads to population explosion in urban areas. Metropolitan cities like Mumbai, Kolkata and Delhi have more population than that can accommodate.

The urban population of India had already crossed the 377million in 2011, which

is more than the total population of USA. By 2030, more than 50% of India's population is expected to live in urban areas. The following are the **major problems of urbanization** in India.

- It creates urban sprawl.
- It makes overcrowding in urban centres.
- It leads to shortage of houses in urban areas.
- It leads to the formation of slums.
- It increases traffic congestion in cities.
- It creates water scarcity in cities.
- It creates drainage problem.
- It poses the problem of solid waste management.
- It increases the rate of crime.

5.3.3 Human Development

Dr. Mahabub-ul-haq defined as "it is a process of enlarging the range of people's choice, increasing their opportunities for education, health care, income and empowerment. It covers the full range of human choices from a sound physical environment to economic, social and political freedom".

5.3.4 Human Development Indicators: (as per UNDP)

Population trends, health outcomes, education achievements, national income and composition of resources, work and employment, human security, human and capital mobility, supplementary indicators: perceptions of well-being and status of fundamental rights treaties are the human development indicators.

5.3.5 Measuring of Human Development

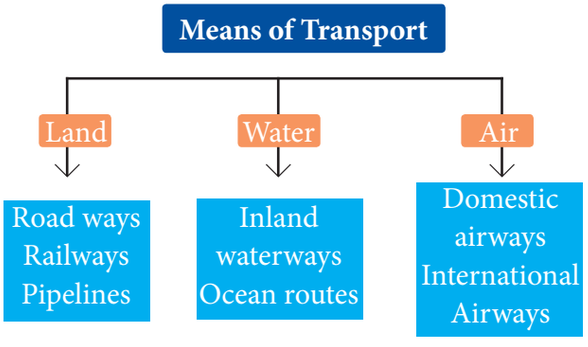
Human Development Index (HDI) is a composite index focusing on three basic dimensions of human development: i) Health - Life expectancy at birth ii) Education - Expected years of schooling for school age children and average years of schooling for the adult population. iii) Income - Measured by gross national income and percapita income.

5.3.6 Human Development Classification

HDI classifications are based on HDI fixed cut off points, which are derived from the quartiles of distributions of the component indicators. The HDI of less than 0.550 is used for low human development, 0.550 - 0.699 stands for medium human development, 0.700 - 0.799 for high human development and 0.8 or greater for very high human development.

5.4 Transportation

Transport is a system in which passengers and goods are carried from one place to another. Transport system is considered as the **lifeline of a country**. Earlier man travelled on foot or used animals for transport. With the discovery of wheel, transport was made easier and gradually different means of transport were developed. There are three major means of transport in the world.



5.4.1 Transport Network in India

Transport is one of the most important components of infrastructure and it is essential for economic development of a country, especially for a large country like India. India has a good transport network of roads, railways, airways and waterways providing necessary connectivity between different parts of the country.

5.4.2 Roadways

Roads play an important role in carrying goods and passengers for short, medium and long distances. It is highly suitable for short distance services. It is comparatively easy and cheap to construct and maintain roads. Road transport system can establish easy contact between farms, fields, factories and markets and can provide door to door transport services. Roads are the most universal mode of transport. Indian roads are cost efficient. It is used by all sections of people in the society. India has the second longest road network in the world with a total length of 56,03,293 km as of 2016. About 85% of passengers and 70 % of freight traffic are carried by roads every year.

DO YOU KNOW?

Sher shah suri built the shahi (Royal) road to strengthen and consolidate his empire from the Indus valley to the Sonar valley in Bengal. This road from Kolkata to Peshawar was renamed as **Grand Trunk**(GT) road during the British period. At present, it extends from Amristar to Kolkata. It is bifurcated into 2 segments: (a) (NH)-1 from Delhi to Amristar, and (b) NH-2 from Delhi to Kolkata.

For the purpose of construction and maintenance, roads are classified into National Highways (NH), State Highways (SH), District Roads, Rural Roads (Village roads), Border Roads and International Highways.

1. Classification of Roads in India

a) National Highways (NH)

National Highways form the most important system of road transportation in India. These highways are running through length and breadth of the country connecting capitals of states, major Ports, rail junctions, industrial and tourist centres. Ministry of Road Transport and Highways of India,

India - Roads

FIND OUT

The import and National Highways in India and label it on the outline map of India.

is responsible for the development and maintenance of National Highways in India. The total length of the National Highways (NHs) in India is 1,01,011 km which accounts for 1.8 % of the total road network length in 2016. The longest National highway is NH-7 which runs from Varanasi in Uttar Pradesh to Kanniyakumari in Tamil Nadu covering a distance of 2369 km. The shortest national highway is NH-47A, which runs from Ernakulum to Kochi port (Willington Island) covering a distance of 6 km.

b) State Highways

The state highways are usually roads that link important cities, towns and district headquarters within the state and connect them with national highways or highways of neighbouring states. These roads are administered and financed by state governments. State Highway runs to the length of 1, 76,166 km as of 2016.

c) District Roads

District Roads provide connectivity between the district and taluk headquarters with the state highways and national highways. District Roads are constructed and maintained by the Public Works Department of the states. The total length of the road of this category is 5,61,940 km(16.81%) in 2016.

d) Rural Roads (Village Roads)

Rural roads connectivity is a key component of rural development. These roads are vital for providing links in the rural areas. It links the different villages with their neighbouring towns. They are maintained by Village Panchayats. The total length of rural roads in India is 39,35,337 km as of 2016. Rural roads consist of Panchayat roads, (Zilla Parishad, Panchayat Samiti, Gram Panchayat); roads of the Pradhan Mantri Gram Sadak Yojana (PMGSY) and those constructed by the State PWDs.

Hots

Find out what are the functions of NHAI.

National Highways Authority of India (NHAI) was established in 1995. It is an autonomous body under the Ministry of Surface Transport.

e) Border Roads

These are the roads of strategic importance in border areas. They are constructed and maintained by Border Roads Organization. It was established in 1960 for the development of the roads of strategic importance in the northern and northeastern border areas. Border Roads Organization has constructed world's highest road joining Chandigarh and Leh in Ladakh. This road runs at an average altitude of 4,270 meters.

Golden Quadrilateral: 5,846 km long road of 4/6 lanes connecting, India's four metropolitan cities: Delhi-Kolkata-Chennai-Mumbai-Delhi. This project was launched in 1999.

North–South and East-West Corridors: North-South corridor aims at connecting Srinagar in Jammu and Kashmir with Kaniyakumari in Tamil Nadu (including Kochi-Salem Spur) with 4,076km long road. The East-West corridor has been planned to connect Silchar in Assam with the port town of Porbandar in Gujarat with 3,640km of road length. The two corridors intersect at Jhansi.

Hots

What are the highlights and benefits of the Golden Quadrilateral Highways?

f) Expressways

These are multi-lane good quality highways for high speed traffic. Some of the important expressways are; (i)Mumbai-Pune Road, (ii) Kolkata-Dumdum Airport road (iii) Durgapur-Kolkata road and (iv) Yamuna expressway between Delhi and Agra.

Mumbai-Pune Road

g) International Highways

These are the roads that link India with neighbouring countries for promoting harmonious relationship with them. These highways have been constructed with an aid from world bank under an agreement with the Economic and Social Commission for Asia-Pacific (ESCAP). These roads connect important highways of India with those of the neighbouring countries such as Pakistan, Nepal, Bhutan, Bangladesh and Myanmar. In India the densest road network is found in the northern plains where it is relatively easy to construct roads. In mountainous area, it is quite difficult to construct roads. Road density is the highest in Kerala and lowest in Jammu &Kashmir.

5.4.3 Railways

Indian railway system is the main artery of the country's inland transport. Railways cater to the needs of large scale movement of traffic, both for freight and passenger, thereby contributing to economic growth. Railways are considered as the backbone of the surface transport system of India. It promotes national integration by bringing people together. It also promotes trade, tourism, education etc. Railways help in the commercialization of the agriculture sector by facilitating the quick movement of perishable goods. Its role in transporting raw materials to industries and finished goods to markets is invaluable. Indian railways network is the largest in Asia and second largest in the world. The length of Indian railways network as of 2017 is 67,368 km with 7,349 railway stations.

DO YOU KNOW?

The first train steamed off from Mumbai to Thane in 1853, covering a distance of 34 km. In 1951, the systems were nationalized as one unit "**The Indian Railways**". The headquarter of Indian Railways is **New Delhi.**

For operations and management, the Indian Railways is organized into 16 zones. 1) Northern Railway - Delhi 2) North-Western Railway - Jaipur 3) North-Central Railway- Allahabad 4) North-Eastern Railway - Gorakhpur 5) North-East Frontier Railway - Guwahati 6) Eastern Railway - Kolkata 7) East coast Railway - Bhubaneswar 8) East-Central Railway - Hazipur 9) West-Central Railway - Jabalpur 10) Central Railway - Mumbai (VT) 11) Western Railway - Mumbai (Churchgate) 12) Southern Railway - Chennai 13) South-Central Railway - Secunderabad 14) South Eastern Railway - Kolkata 15) South-Western Railway - Hubball and 16) South East Central Railway - Bilaspur. The Northern Railway accounts for the longest route length, followed by the Western Railway.

Activity

Prepare a seminar topic about "Role of Railways in Indian Economy"

On the basis of width of the track, the Indian railways fall under four categories. Broad gauge with a width of 1.676 meter, Meter gauge with a width of 1 meter and Narrow gauge with a width of 0.762 meter and Light gauge with 0.610 meter.

In recent times, many developments have taken place in the Indian railways. The arrival of Konkan Railway Corporation (KRC), Mass Rapid Transit System (MRTS), Metro and Sub-Urban railways provide easy and efficient means of transport. These are

India - Railways

very helpful in avoiding traffic congestion and over crowding in urban areas.

DO YOU KNOW?

- The first sub-urban railway was started in 1925 in Mumbai.
- Chennai becomes the sixth Indian city with metro railway.
- Gatiman Express is the fastest operational train in India. This train connects New Delhi and Agra and touches 160 km/h. This train takes a travel time of 105minutes to cover 200km journey.

a) Konkan railway

One of the important achievements of Indian Railways has been the construction of Konkan Railway in 1998. It connects Roha in Maharashtra to Mangaluru in Karnataka and the track measures 760 km. It is considered as an **engineering marvel**. On its routes, the railway crosses 146 rivers and streams, nearly 2000 bridges and 73 tunnels. Asia's longest tunnel nearly 6.44 km long is in this route. The states of Maharashtra, Goa and Karnataka are partners in this undertaking.

The rail link between Banihal in Jammu region and Qazigund in Kashmir valley was opened in 2013. This rail line passes under the Pir Panjal Range through a 11.2 km long tunnel.

b) Metro Railways in India

There are 8 cities with metro rail connectivity in India. They are Kolkata (West Bengal), Chennai (Tamil Nadu), Delhi, Bengaluru (Karnataka), Gurgaon (Haryana), Mumbai (Maharashtra), Jaipur (Rajasthan) and Kochi (Kerala). The metro in Kolkata is the first one in India. It is also called as Mass Rapid Transit System (MRTS). As of September 2018, India has 507 km of operational metro lines and 381 stations.

DO YOU KNOW?

The state of Meghalaya has no railway network.

5.4.4 : Pipeline transport:

Pipelines provided a very convenient mode of transport to connect oil and natural gas fields, refineries and to the markets. In the past, these were used to transport water to cities and industries. Now solids can also be transported through a pipeline when converted into slurry. The initial cost of laying pipeline is high but subsequent running cost is minimum. It can be laid through difficult terrain as well as under water. It ensures steady supply of goods and reduces the transshipment losses and delays are the major advantages of pipeline transport. Oil field in upper Assam to Kanpur, from Salaya in Gujarat to Jalandhar in Punjab and gas pipeline from the Hazira in Gujarat ot Jagadispur in Uttar Pradesh are the three important network large network of pipeline in the country.

5.4.5 Waterways

A waterway is an important mode of transport for both passenger and cargo traffic in India. It is the oldest and also the cheapest means of transport and most suitable for carrying heavy and bulky materials from one country to another. It is a fuel-efficient and eco-friendly mode of transport. The water transport is of two types- Inland Waterways and Ocean water ways(sea routes).

a) Inland Waterways

India has an extensive network of inland waterways in the form of rivers, canals, lakes and backwaters. It depends upon the depth and width of the waterways and the continuity of the water flow. The total navigable length of our country is 14,500 km, out of which about 5,200 km length of rivers and 4,000 km length of canals can be used by mechanized crafts. The total cargo carried by inland waterways is just about 0.1% of the total inland traffic of India. For the development, maintenance and regulation of national waterways in the country, the Inland water ways Authority was setup in 1986. The major national waterways are: National Waterway 1: It extends between Haldia and Allahabad, measures 1620 km and includes the stretches of the Ganga-Bhagirathi-Hooghly river system. National Waterway 2: This waterway includes the stretch of the Brahmaputra river between Dhubri and Sadiya a distance of 891 km. National Waterway 3: This waterway extends between Kollam and Kottapuram in the state of Kerala. It is the first national waterway in the country with 24 hour navigation facilities along its entire stretch of 205 km.

b) Oceanic Routes

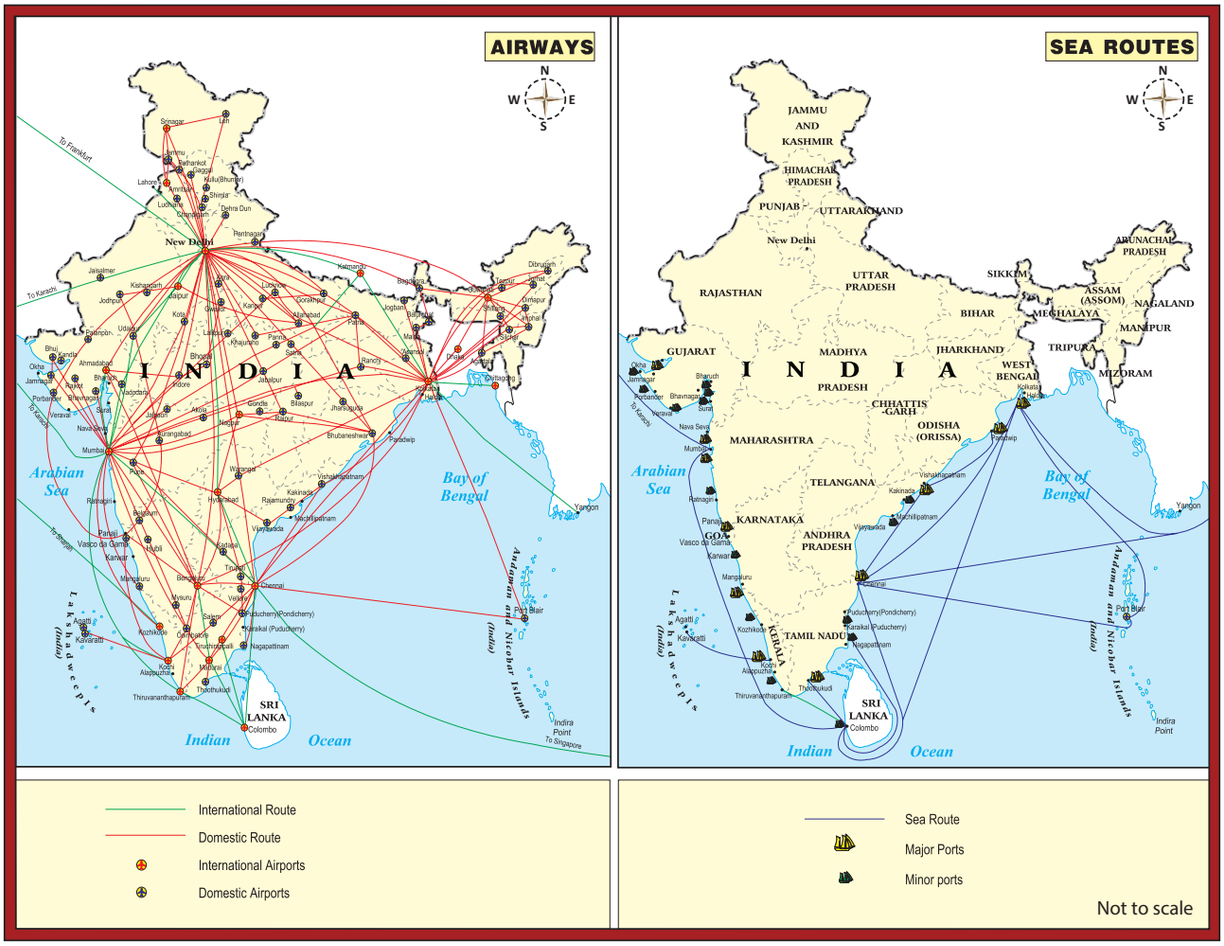
Oceanic routes play an important role in the transport sector of India's economy. About 95% of India's foreign trade by volume and 70 percent by value moves through ocean routes.

Coastal shipping plays an important role in transport of bulk goods in India. Shipping is not only the most economical mode of transport, it is also an environment friendly mode. The sea and oceanic routes are mainly used for international trade and are connected through ports. There are 13 major and 200 minor or intermediate ports in India. The major ports are administered by the Central Government and minor ports are managed and administered by various state governments. The major ports on the east coast are Kolkata (including Haldia Dock), Paradip, Visakhapatnam, Chennai, Ennore and Tuticorin. The major ports on the west coast are Kandla, Mumbai, Nhava Seva (Jawaharlal Nehru Port), New Mangalore, Marmagao and Kochi.

India has four major shipyards. Hindustan shipyard in Vishakhapatnam, Garden Reach workshop in Kolkata, Mazagaon Dock in Mumbai, Kochi Shipyard in Kochi. India is the second largest ship owning country in Asia and ranks 16th in the World.

5.4.6 Air Transport

Airways are the quickest, costliest, most modern and comfortable means of transport, Air transport facilitates connectivity on a national, regional and international scale. It has made accessibility easier by connecting difficult



terrains like high mountains and sandy deserts. It carries passengers, freight and mail. Air transport plays a key role in times of emergency as well as in the event of natural and man-made calamities like floods, epidemics and wars.

Air transport in India made a beginning on 18th February, 1918 when Henry Piquet carried a mail from Allahabad to Naini. In 1953, eight different airlines which were in operation in the country were nationalised.

Domestic Airways fly within the boundaries of a country and **International Airways** connect major cities of the world. The Indian Air lines and Air India are the two airline services run by the government of India. **Indian Air lines** provides the domestic air services and **Air India** provides international air services. Presently, there are 19 designated international airports available in the country. These airports are managed by Airports Authority of India. Some of them are Netaji Subhash Chandra Bose International Airport, Kolkata, Chennai International Airport, Chennai, Indira Gandhi International Airport, Delhi, Chhatrapati Shivaji International Airport, Mumbai, Thiruvananthapuram International Airport, Thiruvananthapuram, Sardar Vallabh Bhai Patel International Airport, Ahmedabad, Bangalore International Airport, Bengaluru, Rajiv Gandhi International Airport, Hyderbad etc. Besides this, there are about 80 domestic airports and about 25 civil enclaves at defence air fields.

Hots

Why is air travel preferred in the north eastern states?

a) Pavan-Hans Helicopter Ltd

Pavan-Hans Helicopter Ltd has been providing Helicopter support services to the petroleum sector, including ONGC and oil India Ltd. It is a public sector company based in New Delhi. Its operations are based at the Juhu Aerodrome in Vile Parle (West) Mumbai. Pavan-Hans is a Mini Ratna–I category public sector undertaking. It often provides services to various state governments in India particularly north east India Inter Island, Ferry services in Andaman & Nicobar Islands, services to Lakshadweep Island etc.,

b) Airports Authority of India (AAI)

Airports Authority of India (AAI) was constituted in 1995. It provides security to Indian Airports. AAI under the ministry of Civil Aviation is responsible for creating, upgrading, maintaining and managing civil aviation infrastructure in India.

5.5 Communication

Communication is a process that involves exchange of information, thoughts and ideas. Technology does wonders in communication fields. Communication is categorized in to personal and mass communications.

5.5.1 Personal Communication

The exchange of information between the individuals is called personal communication. It includes post and telegraph services, telephone, mobile phone, short message services, fax, internet, e-mail etc. Personal Communication system enables the user to establish direct contact.

The Indian postal network is the largest in the world with 1,55,000 post offices. Of these more than 1,39,000 post offices are located in rural areas. The postal service was opened to the public in the country in 1837. The first Indian postal stamp was issued in 1852 in Karachi. Collecting and delivering mail is the primary function of the department of posts. It introduced the Quick Mail Service in 1975 and today it covers the entire country. The Quick Mail Service functions on the basis of the system of PIN (Postal Index Number) code which was introduced in 1972. The premium products include the Money order, e-money order, Speed Post, Express Parcel Post, Business Post, Media Post, Satellite Post, Retail Post, Greeting Post, Data Post, Speed Net and Speed Passport Services.

In 2007, the Government of India merged the Air India and Indian Airlines under National Aviation Corporation of India Limited **(NACIL).** In which **NACIL (A)** provides international services, **NACIL (I)** provides domestic services and services to neighboring countries in south east Asia and middle East.

Cards and envelopes are considered first-class mail and are airlifted between stations covering both land and air. The second-class mail includes book packets, registered newspapers and periodicals. They are carried by surface mail, covering land and water transport.To facilitate quick delivery of mails in large towns and cities, six mail channels have been introduced recently. They are called Rajdhani Channel, Metro Channel, Green Channel, Business Channel, Bulk Mail Channel and Periodical Channel.

India has one of the largest telecommunication networks in Asia. Apart from the urban areas more than two-thirds of the villages in India have already been covered with **Subscriber Trunk Dialing (STD)** telephone facility, while International communication can be made through **ISD (International Subscriber Dialing).** There is an uniform rate of STD facilities all over India. Telephone is a form of oral communication. It is considered very essential for the growth of commerce. It is the most preferred form as it provides instant communication. Mobile phone, fax and internet are the other personal communication used in the country.

5.5.2 Mass Communication Systems

Mass Communication enables millions of people to get the information at the same time. It is a great way to provide education as well as entertainment. It helps in creating awareness among the people regarding various national policies and programmes. The Mass Communication Systems can provide the information to people in two methods. They are Print Media and Electronic Media.

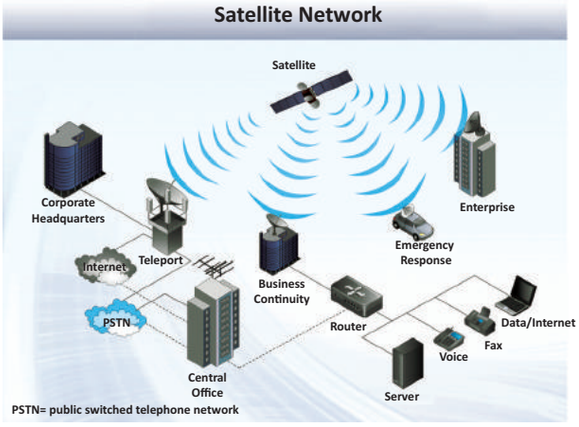
Electronic Media: Radio broadcasting in India was started in 1923 by the Radio club of Bombay. Since then it gained immense popularity and changed the social and cultural life of people. It was named as All India Radio (AIR) in 1936 and again it was renamed as Akashwani in 1957. It broadcasts a variety of programs related to information, education and entertainment. Special news bulletins are also broadcasted on special occasions like session of parliament and state legislatures.

Television broadcasting has emerged as the most effective audio-visual medium for disseminating information and educating the masses. Television network in India is known as Doordarshan (DD) which started Common National Program (CNP) services and it is extended to the backward and remote rural areas.

Internet (contraction of **interconnected network**) is the global system of interconnected computer networks that use the Internet protocol suite to link devices worldwide. **Social media** are interactive computer-mediated technologies that facilitate the creation and sharing of information, ideas, career interests and other forms of expression via virtual communities and networks. With over 460 million internet users, India is the second largest online market, ranked only behind China. By 2021, there will be about 635.8 million internet users in India. Despite the large base of internet users in India, only 26 percent of the Indian population accessed the internet in 2015. This is a significant increase in comparison to the previous years, considering the internet penetration rate in India stood at about 10 percent in 2011. Furthermore, men dominated internet usage in India with 71 percent to women's 29 percent.

Print Media: Newspapers are the most common but powerful means of communication come under print media. India has many newspapers which carry information on local, national and international events to the people.

5.5.3 Satellite Communication



The use of Satellite in getting a continuous and synoptic view of larger area has made this communication system very vital for the country. Satellite images are used for weather forecasting, monitoring of natural calamities, surveillance of border areas etc. The communication through satellites emerged as a new era in communication in our country after the establishment of **Indian Space Research Organization (ISRO)** in 1969.

Satellite system in India can be grouped into two-the Indian National Satellite System (INSAT) and the Indian Remote Sensing Satellite System (IRS).The INSAT, established in 1983, is a multipurpose system for telecommunication, meteorological observation and for various other programs. The INSAT series are used for relaying signals to television, telephone, radio, mobile phone.

It is also useful in weather detection, internet and military applications.

The INSAT series, GSAT series, KALPANA-1, HAMSAT, EDUSAT are the major communication satellite used for communication purpose. GSAT–7A is the recent launch (December 19, 2018) for communication programs. INSAT-1B launched on 30th August 1983 is the first communication satellite in INSAT series.

5.6 Trade

Trade is an important phenomenon that decides the economic growth of a country. Trade is an act (or) process of buying, selling or exchanging of goods and services. The primitive method of trade was known as the Barter system where goods were exchanged for goods. Later on, money was introduced as a medium of exchange in buying and selling of goods. The difference in value between the imports and exports is called balance of trade. The situation in which the value of exports exceeds the value of imports is termed as favourable balance of trade and the reverse position is termed as unfavourable balance of trade.

Activity

Collect the names fo different types of goods and differentiate it and make a table as perishable and non-perishable goods.

5.6.1 Types of Trade

Trade in general, is of two types. They are Internal and International. The trade carried on within the domestic territory of a country is termed as **Internal trade.** It is also called as **Domestic trade** or **Local trade.** Land transport (roadways and railways) plays a major role in this trade. Local currency is used in internal trade. It helps to promote a balanced regional growth in the country i.e, tea from Assam, coffee from Karnataka, Rubber and spices from Kerala, minerals from Jharkhand etc., are supplied to different parts of our country.

Trade carried on between two or more countries is called **International trade.** It is also called as external trade or foreign trade. Export and Import are two components of International trade. Export means goods and services sold for foreign currency. Import means goods and services bought from overseas producers. Waterways and Airways play a vital role in this type of trade. Foreign currency is involved in international trade. The trade between any two countries is called **Bilateral trade.** The trade between more than two countries is called **Mutilateral Trade.**

Hots

Find out the major trade blocs which are useful for multilateral trade.

5.6.2 Exports

The major exports of India are tea, marine products, ores and minerals, leather products, gems and jewels, sports goods, chemicals and related products, plastics and rubber articles, articles of stones, plaster, cement, asbestos, mica, glass ware, paper and related products, base metals, optical, medical and surgical instruments, electronic items, machinery, office equipments, textiles and allied products.

5.6.3 Imports

The major imports are petroleum products, pearls, precious stones and semi-precious stones, gold and telecom instruments.

Activity

Collect the countries names and make it as a table of Bilateral trade and multilateral trade countries.

5.6.4 India's Trade Performance

The volume of India's foreign trade has increased many fold since independence. During 2008 -2009, the volume of trade was 840755 crores and it rose to 1039797 crores in 2016-2017. The import during 2008-2009 was 1374436 crores and was with a deficit of

40679 crores. The import during 2016–2017 rose to 1396352 crores and was with the deficit of 356555 crores. It reveals that not only the balance of trade is unfavourable but also the increase in the level of deficit.

Recap

- The total number of people residing in a country at a specified period of time is called the size of population of that country.
- The growth of population is determined by the birth rate, death rate and migration of people.
- The process of society's transformation from rural to urban is known as urbanization.
- Communication is classified into the personal and mass communications.
- Trade is an exchange of goods and services. Internal and International trades are its types. Import and exports are the components of an International Trade.

GLOSSARY

Barter: A direct exchange of goods between any two parties.No money is involved in the trade.

Foreign exchange: The mechanism or process by which payments between any two places operating under different national currency systems are effected without passing of actual money or gold, etc.

Harbour: An extensive stretch of deep water near the seashore where vessels can anchor securely. It is used for exports and imports of goods.

Port: The commercial part of a harbour with the facility of loading and unloading of goods and space for the storage of cargo.

EXERCISE

I. Choose the correct answer

1. The scientific study of different aspects of population is called
   a) Photography
   b) Demography
   c) Choreography
   d) Population density.

WWK3S1

2. The state with highest literacy rate as per 2011 census is _____.
   a) Tamil nadu b) Karnataka
   c) Kerala d) Uttarpradesh.
3. Human Development is measured in terms of _____.
   a) Human Resource Index
   b) Per capita index
   c) Human Development Index
   d) UNDP
4. _____ transport provides door to door services.
   a) Railways b) Roadways
   c) Airways d) Waterways.
5. The length of Golden Quadrilateral superhighways in India is
   a) 5846 km b) 5847 km
   c) 5849 km d) 5800 km
6. The length of navigable Inland waterways in India is
   a) 17,500 km b) 5000 km
   c) 14,500 km d) 1000 km
7. The National Remote sensing Centre(NRSC) is located at _____.
   a) Bengaluru b) Chennai
   c) Delhi d) Hyderabad
8. The transport useful in the inaccessible areas is

a) Roadways b) Railways
c) Airways d) Waterways

9. Which of the following is associated with helicopter service?
   a) Air India b) Indian Airlines
   c) Vayudoot d) Pavan Hans
10. The major import item of India is
   a) Cement b) Jewells
   c) Tea d) Petroleum

II. Match the following

1	Border Road Organisation	-	Satellite communication
2	INSAT	-	Impact of Urbanization
3	Mazagaon Dock	-	1990
4	Urban sprawl	-	Mumbai
5	Konkan Railways	-	1960
		-	Hyderabad

III. Answer the following Questions briefly

1. What is Human Development?
2. What is migration? State its types.
3. Write any four advantages of railways.
4. Write a note on Pipeline network transport in India
5. State the major Inland waterways of India
6. What is communication? What are its types?
7. Define "International trade".
8. State the merits of Roadways.

IV. Distinguish between

1. Density of population and Growth of population.
2. Personal communication and mass communication.
3. Print Media and Electronic Media.
4. Roadways and Railways.
5. Waterways and Airways.
6. Internal trade and International trade.

V. Answer the following in a paragraph

1. What is urbanization? Explain its impacts.
2. Explain the importances of satellite communication in India.
3. Bring out the distribution and density of population in India.
4. Explain the process of measuring Human Development.
5. Classify and explain the roadways in India.

VI. On the outline map of India mark the following

1. National Highway NH-7
2. Major seaports in India.
3. Major International Airports in India.
4. Densely populated state of India.
5. State of highest literacy in India
6. Railways zones of India.

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INTERNET RESOURCES