

# INDIAN GEOGRAPHY

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## PHYSIOGRAPHY

- ❑ India is the largest country in the Indian subcontinent lying entirely in the Northern Hemisphere.
- ❑ The mainland extends from latitude 8°4' north to 37°6' north and from longitude 68° 7' east to 97°25' east.
- ❑ The southernmost point in Indian territory, the Indira Point is situated at 6°30' north in the Nicobar Islands.
- ❑ India stretches 3,214 km from north to south and 2,933 km from east to west.
- ❑ The total length of the mainland coastline is nearly 6,100 km and that of the land frontier is about 15,200km. The total length of the coastline including that of the islands, is about 7,500km.
- ❑ With an area of about 32,87,263 sq.km., India is the seventh largest country in the world, accounting for about 2.4% of total world area.
- ❑ The northern most point of the country lies in the state of Jammu and Kashmir and it is known as *Indira Col*.

## Administrative Divisions

- ❑ At the time of Indian indepen-

## “Fastest Continent”

India is entirely contained on the Indian Plate, a major tectonic plate that was formed when it split off from the ancient continent Gondwanaland. About 50 to 55 million years ago, in the Eocene epoch of the Cenozoic Era, the plate collided with Asia after covering a distance of 2,000 to 3,000 km (1,243 to 1,864 miles), having moved faster than any other known plate. India is thus referred to as the “**fastest continent**.” This is causing the Eurasian Plate to deform, and the India Plate to compress at a rate of 4 mm/yr (0.15 in/yr).

**The Indian mainland can be divided into five physiographic units namely**

- i. **The Great Mountains of the North**
- ii. **The North Indian Plains**
- iii. **The Peninsular Plateau**
- iv. **The Coastal Plains**
- v. **The Islands**

dence, the country was divided into hundreds of small states and principalities.

- ❑ The princely states were reorganized on the linguistic basis in 1956 to form 14 states and 6 union territories.
- ❑ Now, the Indian Union consists of 28 states, 6 union territories and one national capital territory (Delhi).
- ❑ In 23 states, the legislature is unicameral. Bihar, Jammu and Kashmir, Karnataka, Maharashtra and Uttar Pradesh have

bicameral legislatures. Legislative power is distributed between Parliament and state legislatures.

## Northern Mountains

- ❑ The mountains of the north are young fold mountains.
- ❑ The Himalayas are the most prominent among these mountain ranges. Besides this, the trans-Himalayan ranges and the hill ranges of Purvachal are the important units.

## The Himalayas

- ▶ It is one of the youngest mountain systems in the world and comprise mainly sedimentary rocks.
- ▶ The Indus valley in Kashmir and the Brahmaputra valley in Arunachal Pradesh are accepted as the western and the eastern limits of the Himalayas in India.
- ▶ The Himalayan region is considered the largest snow field in the world outside the polar ice caps.
- ▶ The Himalayan chain measures about 2,500 km from west to east and width of this fold system varies between 150 and 400km.
- ▶ According to the plate tectonics theory, the Indian plate moved northwards and its forward edge penetrated below the southern edge of the Tibetan plate. This resulted in the folding and uplift of the Himalayas.
- ▶ The Himalayas consist of three parallel ranges.
  - (i) The southernmost range, called **the Siwalik** is the lowest.
  - (ii) The ranges lying north of the Siwalik are known as the middle Himalayas or **the Himachal**.
  - (iii) The northernmost ranges of the Himalayas, known as **the Himadri**, are the highest with an average height of more than 6,000 metres above the sea level.
- ▶ The Himadri contain some of the world's highest peaks.
- ▶ Mt. Everest (8848 m) in Nepal is the world's highest peak.

## Neighbours of India

- ▶ India shares her borders with China (Chinese Tibetan Autonomous Region), Nepal and Bhutan in north, Pakistan and Afghanistan in north-west and Myanmar in east.
- ▶ Bangladesh forms almost an enclave within India on the eastern side.
- ▶ In the south, on the eastern side, the *Gulf of Mannar* and the *Palk Strait* separate India from Sri Lanka.
- ▶ The boundary between India (Arunachal Pradesh) and China is known as *McMohan Line*.
- ▶ The boundary line between the imperial India and Afghanistan is known as *Durand Line*.
- ▶ The boundary between India and Pakistan is known as *Radcliff Line*.
- ▶ India is surrounded by the Indian ocean on its three sides, thus it is a subcontinent. The Bay of Bengal and the Arabian Sea are its two northward extensions. India and its neighbours Pakistan, Nepal and Bhutan are known as the Indian sub-continent.
- ▶ The northern most tip, where the boundaries of China, India, Pakistan, Tajikistan and Afghanistan meet is known as '*Wakh Corridor*'.

- **Kanchenjunga** in Sikkim is the highest peak of the Himalayas in India. (8598 m).
- Highest Mountain Peak in India is K2 (8611 m).
  - ▶ It is in Pak occupied Kashmir.
  - ▶ The northernmost Himalayan ranges are called the *Great or Inner or Central Himalayas (Himadri)*. Beyond this range lies another range called the Tethys or the Tibetan Himalayas beyond which lies the structural zone called the Indo-Tsangpo Suture zone.

*Mount Everest or Sagarmatha*, the highest mountain peak (8,850 m) in the world belongs to **Himadri**. Other important peaks of this range are Kanchenjunga (8,598m), Makalu (8,481m) and Dhaulagiri (8,172m).

**The Himalayas is the highest mountain range in the world and also the youngest mountain range.**

▶ **Longest Mountain Range is Andes in South America.**

- ▶ To the south of the Central Himalayas lies the second major range, the Lesser or Lower or Middle Himalayas or Himachal. It is separated from the Great Himalayas by the structural zone called the Main Central Thrust Zone.
- ▶ The Himalayan rivers have cut deep gorges in the Himachal.
- ▶ In the Lesser Himalayas, slate, limestones and quartzites are the dominant rocks.
- ▶ The southernmost range of the Himalayan system is called *outer or sub-Himalayas or Siwaliks*. In between the outer Himalayas and the lower Hima-

layas lies the main boundary thrust. This valley zone is known by the name of *doons* and *duars*.

#### ***The abode of snow***

- ▶ Mountains between the Indus and the Brahmaputra are called 'the Himalayas' meaning '*the abode of snow*.'
- ▶ *Ladakh Range* lies to the south of the Karakoram Range between the Indus and its tributary the Shyok River and extends upto Mustang in Tibet, over a distance of about 1,000km. The Trans-Himalayan Kailas Range is an offshoot of this range and Mount Kailas (6,500m) is the highest peak in it.
- ▶ *Zaskar Range* lies south of the Ladakh Range and the Greater Himalayas lie to its south. It is often considered the western part of the Greater Himalayan Range. The *Nanga Parbat* (8,126m) marks its culmination in the north-west. Kamet (7,756m) is the highest peak.
- ▶ The Himalayas are known for some of the beautiful valleys of the world. The Kashmir valley

is a classical example. It is rightly described as 'paradise on the earth'.

- ▶ The other important valleys are Kulu and Kangra in Himachal Pradesh.
- ▶ The doons in the Kumayun Himalaya of Uttar Pradesh are also well known.
- ▶ The Brahmaputra marks the eastern-most geographical limit of the Himalaya.
- ▶ Mountains along the eastern

boundary of India are called Purvanchal.

- ▶ Nanga Parbat in Kashmir and Nandadevi in U.P. are the other two important peaks of the Himalaya.

### **KARAKORAM RANGES**

- ♦ The mountains extending between the Pamir plateau and the Indus river in Kashmir are known as the **Karakoram**.
- ♦ The Karakoram mountains contain the Siachen, which is the world's largest mountain glacier.
- ♦ Extend from the Pamir, east of the Gilgit River, 600 km long and the average width - 120-140 km.
- ♦ Ancient name was **Krishnagiri**.
- ♦ Trans Himalaya, originally a part of Eurasian plate.
- ♦ Abode of largest glaciers in India.
- ♦ Siachin, Baltoro, Biafo, and Hisper glaciers.
- ♦ World's second highest peak (in India): K2 or Godwin Austen (8611m).
- ♦ Other Important Peaks: Gasherbrum I or Hidden Peak, Broad Peak and Gasherbrum II.
- ♦ The *Siachin Glacier* occupying the Nubra valley is about 75 km long and it is considered the largest glacier outside the polar areas.

**The Himalayas are regionally divided into Punjab Himalayas, Kumaon Himalayas, Nepal Himalayas, Assam Himalayas.**

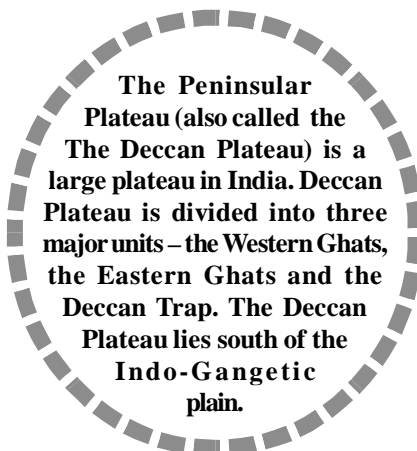
NAME	LOCATION	DISTANCE
Punjab Himalaya	Between Indus and Satluj	560 km
Kumaon Himalaya	Between Satluj and Kali	320 km
Nepal Himalaya	Between Kali and Tista	800 km
Assam Himalaya	Between Tista and Dihang	720 km

## Important passes of Himalayas

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| <ul style="list-style-type: none"> <li>▶ Kashmir : Burzil and Zoji-la</li> <li>▶ Himachal Pradesh : Bara Lacha-la, Shipki-la.</li> <li>▶ Uttaranchal : Thanga-la, Niti-la, Lipu-Lekhla</li> <li>▶ Sikkim - Nathula, Jelep</li> <li>▶ Khybar pass is the most famous pass which leads from Peshwar to Kabul.</li> <li>▶ South of Khybar pass is the Gomal Pass (it is in Pakistan).</li> <li>▶ The Bolan Pass leads from Kandahar to Quetta.</li> <li>▶ The Purvachal Hills in the north-east consist of the Patkai-Bum, the Garo-Khasi-Jaintia and Lushai Hills.</li> <li>▶ Vindhya mountains cut off the northern plain from the south.</li> <li>▶ The <b>Peninsular mountains</b> include The Western Ghats (The Sahyadris), The Eastern Ghats, The Satpura Range and The Aravallis.</li> <li>▶ The <b>Western Ghats</b> runs along the west coast from the south of Tapti river valley to Kanyakumari.</li> </ul> | <ul style="list-style-type: none"> <li>▶ The <b>Eastern Ghats</b> are irregular hill ranges that stretch from northern Orissa to the Nilgiris in Tamil Nadu across the coastal Andhra.</li> <li>▶ The <b>Satpura range</b> extends from the Narmada valley in the north to the Tapti valley in the south.</li> <li>▶ The 800 km range Aravallis stretching from the north-east to the south - west of India separates the semi-desert regions of Rajasthan from the fertile Udaipur and Jaipur regions.</li> <li>▶ <b>Aravallis</b> is the <b>oldest mountain range in India</b>.</li> <li>▶ <b>Sahyadri hills</b> is a part of the Western Ghats. Nilgiris is also a part of Western Ghats. Nilgiri is known as the <b>Blue Mountains</b>.</li> <li>▶ The southern most tip of Eastern Ghats is called Cardamom Hills.</li> <li>▶ <b>The Western Ghats and Eastern Ghats meet at Nilgiri Hills.</b></li> </ul> |
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### Peninsular Plateau (The Deccan Plateau)

- ❑ It extends over eight Indian states and encompasses a wide range of habitats, covering most of central and southern India.
- ❑ It is separated from the Gangetic plain to the north by the Satpura and Vindhya Ranges, which form its northern boundary.
- ❑ The Eastern Ghats and the Western Ghats constitute its eastern and western boundaries, respectively.
- ❑ The river Narmada, which flows through a rift valley, divides the region into two parts: the Malwa Plateau in the north and the Deccan Plateau in the South.
- ❑ The northern part of the plateau is occupied by the



Aravalli Ranges in the west, Malwa region in the centre and the Chotta Nagpur Plateau in the east.

- ❑ The Deccan Trap represents the core of the plateau region and it is in this part that the oldest rock systems of India are found. This region is made up of crystalline rocks.

- ❑ The plateau region includes a number of other minor mountains besides the Aravalli and the Eastern and Western Ghats. They include the Vindhyas and Satpuras in Central India.
- ❑ The Satpuras, which lie between the rivers Narmada and Tapi, have several hills including the Rajpipla Hills in Maharashtra, and the Maikal Range and Pachmarhi Hills in Madhya Pradesh.
- ❑ The Western Ghats separate the Deccan Trap region from the Western Coastal Plain while the Eastern Ghats lie between the Eastern Coastal Plain and the Deccan Trap.
- ❑ The Western Ghats form a continuous range from south to north and the highest range of this region is often called the *Sahyadri*.

- ❑ The Western Ghats are connected to the Eastern Ghats by the Nilgiri Hills (Blue Mountains). South of these are the Annamalai Hills (Annamudi is the highest peak in the peninsular region) which are separated from the former by the Palghat Pass.
- ❑ Two branches of the Annamalai Hills are known as the Palani Hills and the Yelagiri (Cardamom) Hills.
- ❑ The Sivasamudram Fall, the Gokak Fall and the Mahatma Gandhi Fall are important waterfalls in this area.
- ❑ The most important waterfall formed by the Narmada is the Dhuandhar Falls near Jabalpur. The river flows through marble rocks in this region and hence the Dhuandhar Fall is also called the *Marble Falls*.
- ❑ The Aravallis due to erosion over a long period of time their height has been reduced and they can be considered *relict mountains*.
- ❑ River Chambal is the most important river originating from the eastern slopes of the Aravallis.
- ❑ The Luni and the Sabarmati are the most important rivers rising from the Aravallis and flowing in a westerly direction.
- ❑ The dry north-western part of Rajasthan is part of the extensive Thar Desert that extends into Pakistan.
- ❑ East of Aravalli range, the area is less dry and there are lower hills like Bundi Hills. Chambal and its tributaries flow through

**The Aravallis are one of the oldest fold mountains in the world. The highest peak of Aravalli range is Guru Shikhar near Mt.**

**Abu (1,158m) in Rajasthan.**

- this part draining southeastern part of Rajasthan.
- ❑ The Thar Desert merges into the Rann of Kutch. Much of the Rann is a sandy area and parts of it are marshy.
- ❑ The rocks of the Deccan Trap are rich in deposits of a variety of minerals. Granite, basalt, gneiss and quartzite are the major rocks besides some limestone and sandstone.
- ❑ Some of the richest deposits of manganese are found in Madhya Pradesh. Iron and gold are seen in Jharkhand and Karnataka respectively.
- ❑ The Western Ghats mark the western boundary of the Deccan Plateau and they separate the plateau from the coastal plain. The famous Palghat, Borghat and Thalghat are important gaps that facilitate passage over this barrier.

The Western Ghats are known by different local names. In Maharashtra and Karnataka they are called Sahyadri. Further south, they are called the Nilgiris in Tamil Nadu. Still further south, along the Kerala and Tamil Nadu border, they are known as Anaimala and Cardamom Hills.

- ❑ The Anai Mudi, the highest peak, is 2,695 metres above the sea level. Udagamandalam is a well known hill station of the south located in Tamil Nadu.

## Plains of India

- ❑ The vast plains of north India are alluvial in nature and the western most portion is occupied by the Thar Desert.
- ❑ The plains of south India i.e., coastal plains are also alluvial to a large extent.
- ❑ The northern plain is known as the Ganga-Brahmaputra plain and is divided into smaller units like the western plain, eastern plain, Bihar plain, Bengal plain and Brahmaputra plain.

### Northern Plain

- ❑ This plain lies to the south of the northern mountain wall and stretches in the shape of an arc from the western most part of the country to the Brahmaputra valley in the east.
- ❑ Indo-Gangetic plain is one of the most extensive stretches of the alluvium in the world.
- ❑ The **Indo-Gangetic Plains** also known as the **Northern Plains** and **The North Indian River Plain** encompassing most of northern and eastern India, the most populous parts of Pakistan, parts of southern Nepal and virtually all of Bangladesh.
- ❑ The areas that are parts of the plains are as follows- Bangladesh, Assam, Bihar, Gujarat, Haryana, Punjab, Rajasthan, Tripura, Uttar

Pradesh, West Bengal, Nepal, Madhesh, Punjab, Sindh, Madhya Pradesh, Meghalaya, Jharkhand, Orissa, Balochistan, North-West Frontier Province, Kashmir region.

- ❑ The total length of the northern plain is about 2,400km and the width varies from 145 to 480 km.

### Western Plain

- ❑ The western part of the northern plain is also called the Indus plain or Punjab plain.
- ❑ It slopes gently towards west and extends into Pakistan through Punjab.
- ❑ The plain is drained by the Indus and its tributaries. That part of the plain that extends in India is drained into the Arabian Sea by the rivers - Sutlej, Beas and Ravi, tributaries of the Indus that join the main stream after entering Pakistan. The Indian part of the plain is also called the *Punjab and Haryana Plain*.
- ❑ Streams carrying water only during the rainy season and with their beds choked with boulders are called *chos* in Punjab.
- ❑ The water becoming sub-surface in this zone emerges on the surface in lower areas down stream and produces marshy conditions. Such marsh areas in Punjab are called *mand*.
- ❑ The only river that remains perennial in its upper course in Haryana is Ghaggar. This stream is lost in the dry area in Rajasthan.

### Eastern plain

- ❑ It comprises the flood plain

Among the largest cities of the Indo-Gangetic plain are Ahmedabad, Ludhiana, Amritsar, Chandigarh, Delhi, Jaipur, Jaisalmer, Kanpur, Lucknow, Allahabad, Varanasi, Patna, Kolkata, Dhaka, Lahore, Faisalabad, Rawalpindi, Islamabad, Multan, Hyderabad and Karachi.

and the delta plains of the Ganga and the Brahmaputra.

- ❑ It is customary to divide this part into the Ganga plain and the Brahmaputra plain.
- ❑ An important division of the plain is made in terms of the *khadar* and the *bangar* zones. The term *khadar* refers to the new alluvium and the *bangar* to the old alluvium.
- ❑ The lower part of the plain adjacent to the rivers that is prone to frequent floods is called *khadar*.
- ❑ Bangar soils frequently have beds of *kanker* or hard *pans*.
- ❑ The western part of the plain, from Haridwar to Aligarh is called *Upper Doab* and from Aligarh to Allahabad is called the *Middle Doab*.
- ❑ The northern part of Ganga-Yamuna Doab and Uttar Pradesh is covered by *Ruhelkhand Plain*. This part is drained by Ghaghra, Rapti and Gomti rivers.
- ❑ The plain is characterized by streams that flow as sub-surface channels in dry season. This area is called the *bhabhar* or the '*bhabhar zone*'.
- ❑ The marshy region at the foot of the Himalayas is called the *terai zone*. Much of this zone has been drained out and reclaimed for agriculture.

- ❑ The foot hill zones of the eastern plain in the northern parts of West Bengal and still eastward are occupied by the *Bengal Duars* and *Assam Duars*.

### Coastal Plains

- ❑ The coastal plains separate the peninsular plateau from the sea.
- ❑ The inner margins of the plains are marked by the Eastern and the Western Ghats that separate the Deccan plateau region from the coastal low lands.
- ❑ The Eastern and the Western Ghats that separate the Deccan plateau region from the coastal lowlands.
- ❑ The plain along the Bay of Bengal coast is called the *Eastern Coastal Plain* and the one extending along the Arabian Sea coast of India is called the *Western Coastal plain*.
- ❑ The Eastern coastal plain of India stretches along the Bay of Bengal from river Subernarekha to Kanya Kumari.
- ❑ The northern part of this plain is often called the *Utkal plain*, the middle one is the *Andhra Coastal Plain* and the southern most part is called the *Tamil Nadu Coastal Plain* (also called the *Coromandel coastal plain*).
- ❑ The rivers flowing into the Bay of Bengal from the plateau region have contributed to the formation of this coastal plain.
- ❑ Part of the plain that lies in the upper course of the rivers is called the *upper plain* and the part in which lie the deltas of the rivers, is called the lower plain.

- ❑ The major rivers flowing through the Eastern Coastal Plain are the Mahanadi, the Godavari, the Krishna and the Kaveri. The delta regions of these rivers are very fertile and support high densities of agricultural population.
- ❑ The western coastal plain forms a narrow strip of land along the western coast of India. It stretches from Gujarat to Kerala.
  - The Western Ghats forming the inner margin of this plain are a much higher mountain range than the Eastern Ghats that are more of a series of discontinuous hills.
  - The rivers flowing down the escarpment like slope of the Western Ghats are rapid streams and they do not form any deltas.
  - The northernmost part of

this plain is called the *Gujarat coastal plain* and the southernmost, the **Kerala coastal plain**. In between these two sections lie *Konkan Coastal Plain* in the north and the *Malabar Coastal Plain* to the South.

### The Islands

- ❑ Besides the mainland, India has two groups of Islands namely the Andaman and Nicobar Islands in the Bay of Bengal and the Lakshadweep Islands in the Arabian Sea.
- ❑ Andamans consists of a northern cluster of 204 small islands and Nicobar islands consists of a southern cluster of 19 Islands.
  - Ten degree channel separates Andaman from Nicobar.
  - Port Blair is the capital of

Andaman & Nicobar Islands.

- ❑ The southernmost tip of India, **Indira point** is in Great Nicobar islands which is the biggest island in Nicobar group.
- ❑ The Lakshadweep in the Arabian sea comprises of a group of 36 islands, about 300km to the west of Kerala coast. Only 10 of the islands are inhabited.
  - Kavarathi is the capital of Lakshadweep.
- ❑ New Moore Island lies in Bay of Bengal near West Bengal also belongs to India.
- ❑ Coco Islands North of Andaman belong to Myanmar.
- ❑ The Andaman and Nicobar Islands are close to the Indo-Australian Plate Boundary.
- ❑ Barren Island became active in 1991 after being (inactive) for over two centuries.
- ❑ Minicoy islands is separated from Maldives by 8° channel.

## RIVER SYSTEM OF INDIA

The river system of the country can be classified on the basis of their origin in to two categories:

- i. The Himalayan Rivers and ii. The Peninsular rivers

### The Himalayan rivers

The Himalayan rivers has three principal systems

1. the Indus system
2. the Ganga system and
3. the Brahmaputra system

#### 1. Indus system

**It is one of the largest river systems in the world. River Indus rises from Kailas Range in the Tibetan Plateau region and is joined by a number of tributaries in Jammu and Kashmir.**

- The most important tributaries of Indus include the Sutlej, the Chenab, the Ravi and the Beas that join it after entering into Pakistan.
- Sutlej is the largest amongst the tributaries of Indus.
- After flowing through Pakistan, Indus falls into Arabian Sea.
- River Indus is an antecedent river as it is considered as older than the Himalayas.
- River Sutlej rises beyond the Himalayas and has cut a gorge through the Central Himalayan Range.
- The Ravi is the smallest river of Punjab and is well-known as the 'River of Lahore.' It rises near the Rohtang pass in the

Sutlej, Beas, Ravi, Chenab and Jhelum are the five tributaries of Indus. Mount Kailash in Tibet is the source of Indus river. It falls into the Arabian sea.

Kulu hills of Himachal Pradesh.

- ❑ The Chenab is the largest of Indus tributaries. It has a total length of 1,800 km in India.
- The Jhelum, an important tributary of the Indus flowing through the state of Jammu and Kashmir (Srinagar Valley is the valley of the Jhelum) rises in a spring at Verinag.
- The Beas rises at *Beas Kund* near the Rohtang Pass in Himachal Pradesh.

#### 2. Ganga System

**It is the largest drainage system of India carrying the run off of about 25 percent of the total land area of the country.**

- ❑ The **River Ganga** is the longest river (2640 km) in India. Its source is at Gangotri glacier in the Himalayas.
- ❑ Ganga, the main stream, is constituted by two major head streams, the *Alakananda* and *Bhagirathi*. These two headstreams of the Ganga join at *Devprayag*.
- ❑ The source of the Alakananda is near the Tibetan border and that of the Bhagirathi near Gangotri.
- ❑ The Ganga is joined by the Yamuna near Allahabad.
- ❑ Yamuna, Gomti, Ghagra, Gandak, Ramganga, Son, Chambal, Betwa and Ken are the main tributaries of Ganga.
- Ganga flows through Uttar Pradesh, Bihar, West Bengal

**In Hindu tradition Triveni Sangam is the "confluence" of three rivers, two physical rivers Ganga, Yamuna, and the invisible or mythic Saraswati River. The site is near Allahabad, India. A place of religious importance and the site for historic Kumbh Mela held every 12 years.**

and Bangladesh and finally enters into the Bay of Bengal.

- Ganga is known by the name 'Padma' in Bangladesh.
- ❑ The river has been declared as **India's National River**.
- ❑ It has been considered the holiest of all rivers by Hindus.
- ❑ Some of the most important Hindu festivals and religious congregation (worship) such as the **Kumbh Mela** every twelve years at Media: Allahabad and the Chhath Puja.
- The Ganges Basin drains 1,000,000-square-kilometre (390,000 sq mi) and supports one of the world's highest density of humans.
- ❑ Only two rivers, the Amazon and the Congo, have greater discharge than the combined flow of the Ganges, the Brahmaputra and the Surma-Meghna river system.



### 3. Brahmaputra system

**Brahmaputra is the third major antecedent river of India flowing from the Himalayan region towards the northern plains.**

- The 2,688 km Brahmaputra is longer than the Ganges, but only one third of the river passes through India.
- Brahmaputra originates from the Manasarovar lake in Western Tibet. It flows for a long distance parallel to the Himalayan ranges in an easterly direction. Here, it is known as the *Tsangpo*.
- It takes a southward turn and enters India in eastern Arunachal Pradesh under the name *Dihang*.
- When it enters Bangladesh, it is named as 'Meghna.'
- The Ganga and the Brahmaputra join in Bangladesh and form the extensive delta of *Sunderbans*. It derives the name from the *Sundri tree* that grows widely in this region.

#### Mahanadi system

It drains a large part of Orissa.

- The Mahanadi is one of the major rivers of peninsular plateau region flowing into Bay of Bengal.
- The Seonath, the Hasdeo and the Mand join it from the north and the Jonk joins from south.
- The river forms its delta in the Cuttack district of Orissa before flowing into the Bay of Bengal.

#### Godavari System

- Godavari is the largest among the rivers of the Peninsular In-

dia. The source of the river lies in the Nasik district of Maharashtra and it traverses over a course of more than 1,400km. It is commonly known as '*Vridha Ganga*'.

#### Krishna System

- It is the second largest east flowing system of the peninsular region.
- The river rises in Western Ghats near Mahabaleshwar and flows in a north-easterly direction to Divi in Andhra Pradesh. It is commonly known as '*Dakshina Ganga*'.

#### Kaveri system

- The river Kaveri is the most southerly among the major rivers of the peninsular region flowing into the Bay of Bengal.
- It rises in the Brahmagiri Hills in Coorg district and flows towards the coast.
- It descends from South Karnataka Plateau to the Tamil Nadu Plains through the famous Sivasamudram waterfalls.

### Peninsular rivers

**It is a river that flows through the peninsular part of a country. (a peninsula is a patch of land covered by water on three sides and connected to a land on the fourth side)**

- ❑ Peninsular rivers (The Deccan rivers) are generally rainfed and comprises the rivers of peninsular India. They are shorter and seasonal in nature.
- ❑ River **Godavari** is the largest river system (1465 km long) of

peninsular India. It rises from Trambak in Nasik district in the Western Ghats.

- ❑ **Rajahmundry**, is the largest city on the banks of Godavari.
- ❑ The Peninsular rivers are generally rain-fed and, therefore, fluctuate greatly in volume. A very large number of them are non-perennial.
- ❑ Peninsular rivers contribute 30 percent of the total outflow in India.
- ❑ The major Deccan rivers are the Godavari, Krishna, Cauvery, Pennar, Mahanadi, Damodar, Sharavati, Netravati, Bharathapuzha, Periyar, Pamba, Narmada and Tapi.
- ❑ There are three major rivers – Narmada, Tapi and Sabarmati flowing into the Arabian sea from the Peninsular region. **Narmada and Tapi are the major west flowing rivers of India.** They drain into the Gulf of Cambay in the Arabian Sea.
- ❑ The river Narmada rises in the Amarkantak plateau, flows through a rift valley and makes a number of waterfalls. The *Marble Falls* near Jabalpur is a famous fall on this river.
- ❑ The Tapi (Tapi) rises near Betul district. The Parna, flowing from the Gawilgarh Hills, is the most important tributary joining the Tapi near Bhusawal.
- Satpura Mountain range lies between Narmada and Tapi.
- ❑ The Sabarmati rises in the Aravallis in Rajasthan and flows into the Gulf of Cambay in Gujarat.
- ❑ River **Krishna** rises from the north of Mahabaleswar in the

## The Main Rivers in India

Name	Length (km)	Originates from	Ends in	Passes through
Ganga (Bhagirati)	2,507	Gaumukh	Bay of Bengal	Uttar Pradesh, Bihar and W.Bengal
Yamuna (Jamuna)	1370	Garhwal in Yamunotri	Bay of Bengal	Delhi, Haryana and Uttar Pradesh
Brahmaputra	2,850	Chemayung-Dung glacier, between lake Manasarovar and Mount Kailash	Bay of Bengal	North Eastern states of India
Kaveri (Dakshina Ganga" or Ganges of the south)	765	Hills of Coorg, Karnataka	Bay of Bengal	Karnataka and Tamil Nadu
Godavari	1,465	Trimbakeshwar near Nasik Hills in Maharashtra	Bay of Bengal	South-easterly direction, through Maharashtra and Andhra Pradesh
Krishna	900	Near Mahabaleshwar in Maharashtra	Bay of Bengal	Maharashtra, Karnataka and Andhra
Narmada	1,300	Amarkantak hill in Madhya Pradesh	Arabian Sea	Maharashtra, Madhya Pradesh and Gujarat
Tapti	724	Pachmari, Madhya Pradesh	Arabian Sea	Madhya Pradesh and Gujarat
Gomti	805	Himalaya Range of Nepal	Bay of Bengal	Uttar Pradesh
Ghaghara		Shivalik mountain range of Himachal Pradesh	Disappears into the Thar Desert	Haryana, Punjab and Rajasthan
Mahanadi	860	Satpura Range	Bay of Bengal	Chattisgarh, Jharkhand, Orissa and Maharashtra

- Western Ghats. It enters into the Bay of Bengal. Krishna basin forms the third largest river basin in India.
- ❑ River **Cauvery** rises from the Brahmagiri hills in the Coorg district of Tamilnadu. It is known as **Dakshina Ganga**. About 55 percent of the Cauvery basin lies in Tamilnadu, 41 percent in Karnataka and three percent in Kerala.
  - ❑ The Cauvery water Dispute Tribunal gave its final verdict in 2006. It ordered Karnataka to release 192 TMCFT water to Tamil Nadu every year.
  - ❑ River **Pennar** rises in the Kolar district of Karnataka.
  - ▶ River Damodar is called as "Sorrow of Bengal and Jharkhand", because of fre-

- quent flood.
- ❑ Sabarmati rises from the Jai Samand lake of Udaipur, Rajasthan.
  - ❑ The Luni originates from Annasagar in the Aravallis and ends on the Sahni marshes, North of Rann of Kutch.
  - ❑ The Third river system is also called the 'Rivers of Inland Drainage Basins' which consists of small rivers in the

- sandy areas of Rajasthan.
- ❑ Some of Peninsular rivers such as Narmada and Tapti form estuaries. Other rivers such as Mahanadi, Godavari, Krishna, Cauvery form deltas.

### Drainage of the Thar Desert Region

- ❑ The greater part of Rajasthan and Gujarat is dry land, which forms a part of the Thar desert.

### Sunderban

The world's largest delta, Sunderbans is formed by the Ganges and Brahmaputra in West Bengal and Bangladesh, in the Bay of Bengal. The Sunderbans is the largest single block of tidal halophytic mangrove forest in the world. The forest lies in the vast delta on the Bay of Bengal formed by the confluence of the Ganges, Brahmaputra and Meghna rivers across southern Bangladesh and West Bengal. It became inscribed as a UNESCO world heritage site in 1997.

### **Difference between the Himalayan and the Peninsular Rivers**

- ▶ Rivers such as Indus, Sutlej, Brahmaputra etc., are antecedent rivers i.e., they are older than the landforms over which the Himalayan rivers flow.
  - ▶ Due to their sources in the snowfields, the Himalayan rivers are perennial and carry large amounts of water. Their erosional capacity is immense and they carry large amounts of silt.
  - ▶ Most of the rivers of the peninsular plateau are consequent streams and they follow the general slope of the plateau region. Their valleys are well developed and they do not change their course frequently.
  - ▶ Further, the peninsular rivers are seasonal in character as they are rainfed.
  - ▶ Due to a lesser amount of flow, the hydroelectricity generation potential of the peninsular rivers is much lower than the Himalayan rivers.
- 
- ❑ The Thar Desert (also known as the Great Indian Desert), is a large, arid region in the northwestern part of the Indian subcontinent.
  - ❑ The Cholistan Desert adjoins the Thar desert spreading into Pakistani Punjab province.
  - ❑ It is an area of internal drainage and the only river rising or flowing through this territory is the river *Luni*.
  - ❑ The river Luni rises in the Aravalli Ranges and enters the Arabian Sea through the Rann of Kutch.
  - ❑ For most of the year, Luni is dry.
  - ❑ The largest fresh water lake in India: Lake Kolleru

### **Lakes**

(Andhra Pradesh). Wular is the second largest fresh water lake.

- ❑ The largest saltwater lake : Lake Chilka (Orissa)
- ❑ The second largest salt water lake is Sambhar in Rajasthan. It is the largest inland salt lake in India.
- ❑ Dal Lake is famous for house boats.
- ❑ The lakes of India generally classified as fresh water and brakish lakes.

#### **Important lakes in India**

**Chilka (Orissa)**

**Sambar (Rajasthan)**

**Pulicat (Andhra Pradesh)**

**Vembanad (Kerala)**

**Wular (J & K)**

**Dal (J & K)**

**Uday Sagar (Rajasthan)**

**Pushkar (Rajasthan)**

**Loktak (Manipur Hills)**

**Bhimtal Lake (Nainital)**

**Roopkund Lake**

**(Uttaranchal)**

**Osman sagar lake**

**(Andhra)**

## MULTI-PURPOSE RIVER VALLEY PROJECTS

- ❑ India stands fifth in the world after Congo, Russia, Canada and the United States in potential of water power resources.
  - ❑ **Damodar River Valley project** was the first multi-purpose river valley project in Free India.
  - ❑ The project-irrigates half a million hectares of land in West Bengal and parts of south-east Bihar.
  - ❑ **The Bhakra Nangal Project** is an example of water management on scientific lines on the largest scale.
  - ❑ The project serves the states of Himachal Pradesh, Punjab, Haryana, Rajasthan and the National Capital Territory of Delhi.
  - ❑ **Indira Gandhi or Rajasthan Canal** is the longest irrigation canal in the world
  - ❑ Indira Gandhi Canal Project in Rajasthan utilized water of Satluj, Beas and Ravi to irrigate north-western parts of the country
  - ❑ **The Kosi project** in Bihar has been taken up in cooperation with Nepal.
  - ❑ Its main aim has been to control floods brought by the river Kosi, known as the 'River of Sorrow' for north Bihar.
  - ❑ The main canal is taken off from Hanumannagar barrage on the Kosi.
  - ❑ Another important joint venture of India and Nepal is the **Gandak Project**.
  - ❑ The Hirakud dam in Orissa is the longest dam in the world.
  - ❑ **The Tungabhadra Project** serves Karnataka and Andhra Pradesh.
  - ❑ **The Nagarjunasagar project** is built on the river Krishna in Andhra Pradesh irrigates 8,67,000 hectares of land.
  - ❑ The dam has been named after the Buddhist scholar Nagarjuna.
  - ❑ **The Chambal project** helps irrigate parts of Madhya Pradesh and Rajasthan.
  - ❑ The project consists of Gandhi Sagar Dam in Madhya Pradesh, and Kota Barrage and Jawahar Sagar Dam in Rajasthan.
- Hydel power projects**
- ❑ In the year 1902 the first water power house was set up on the river Kaveri at Sivasamudram in Karnataka.
  - ❑ Tata Hydro electric scheme was introduced in the western ghats of Maharashtra to furnish power to the city of Mumbai.
  - ❑ In Tamil Nadu, Pykara was the first water power station.
  - ❑ In the north, Mandi power house was the first to be developed in the Himalayan region. The next one to be taken up was the Upper Ganga Canal Hydroelectric Grid System.
  - ❑ **The Rihand project** is the largest manmade lake in India on the borders of Madhya Pradesh and Uttar Pradesh.
  - ❑ **The Koyna project** in Maharashtra is on the east flowing tributary of the Krishna. Its capacity is 880 MW. It feeds power to Mumbai-Pune industrial region.
  - ❑ **The Sharavathy project** in Karnataka is located at the Jog Falls, the highest in India.
  - ❑ Its total capacity is 891 MW. It feeds Bangalore industrial region and is also taken to the states of Goa and Tamil Nadu.
  - ❑ The Sabarigiri project in Kerala has an installed capacity of 300 MW while the Idukki project has a capacity of 390 MW.
  - ❑ The Balimela project in Orissa has an installed capacity of 360 MW and in Gujarat Ukai Project has a capacity of 300 MW.
  - ❑ In Jammu and Kashmir Salal Hydel Power project provide over a thousand MW of power.
  - ❑ Tehri Hydel Power project is a joint project of the Govt of India and Uttaranchal. Tehri Hydro Development Corporation was set up in 1988.
  - ❑ Narmada Valley Development Authority (NVDA), is an organization of Govt. of M.P. constituted for planning water resources development in Narmada basin
  - ❑ Narmada is the fifth largest river in India and largest west flowing river of Indian peninsula originating from Maikala ranges at Amarkantak in Madhya Pradesh

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### DAM and RIVER

Bhakranangal Dam .....	Sutlej
Hirakud .....	Mahanadi
Tehri Dam .....	Bhageerathi
Uri Power Project .....	Jhelum
Nagarjunasagar Dam .....	Krishna
Kosi Project .....	Kosi
Koyna Project .....	Krishna

- Garland Canal Project linked Peninsular rivers of South India and Himalayan rivers through Canals.
- The Farakka Barrage Project is designed to serve the need of preservation and maintenance of the Kolkata Port by improving the regime and navigability of the Bhagirathi-Hoogly river system.
- **The Grand Anicut** also known as the Kallanai, was built by the Chola king **Karikala Cholan** in AD 26. It is considered as one of the oldest water-diversion or water-regulator structures in the world, which is still in use.
- Uttar Pradesh occupies the First place with the total length of rivers and canals as 31.2 thousand km, which is about 17 percent of the total length of rivers and canals in the country. Other states following Uttar Pradesh are Jammu & Kashmir and Madhya Pradesh.

## MULTI-PURPOSE PROJECTS

PROJECT	RIVER	STATE	PURPOSE
Bhakra Nangal Multipurpose Project Bhakra dam: One of the highest gravity dam in the world. Govind Sagar Lake (H.P.) is a reservoir.	Sutlej (A tributary of Indus)	Joint venture of Punjab, Haryana and Rajasthan.	Irrigation, hydro electricity
Thein Dam project	Ravi (A tributary of Indus).	Punjab	Irrigation, hydroelectricity.
Dulhasti project	Chenab (A tributary of Indus)	Jammu and Kashmir	Part of the programme of cascade development for irrigation..
Salal project	Chenab (A tributary of Indus).	Jammu and Kashmir	Irrigation
Beas project	Beas (A tributary of Indus).	Joint venture of Punjab, Haryana and Rajasthan.	Hydro electricity
Sharda Sahayak Project	Ghagra (left bank tributary of Ganga).	Uttar Pradesh	Irrigation
Ramganga multipurpose project	Chuisot stream near Kalabagh	Uttar Pradesh	Irrigation, hydroelectricity.
Banasagar project	Son	M.P., Bihar and U.P.	Irrigation
Rihand Scheme Reservoir: Govind Ballabh Sagar (U.P.).	Rihand	Uttar Pradesh	Hydroelectricity for the development of south eastern industrial region of U.P.

Upper Krishna Project	Krishna	Karnataka	Irrigation (Almatti dam is being constructed).
Tungabhadra multipurpose project.	Tungbhadra (A tributary of Krishna)	Joint venture of Andhra Pradesh and Karnataka.	Irrigation, hydroelectricity.
Ghatprabha project	Ghatprabha (A tributary of Krishna).	Andhra Pradesh and Karnataka	Irrigation, hydroelectricity.
Malprabha project	Malprabha (A tributary of Krishna).	Karnataka	Irrigation
Bhima project	Bhima	Maharashtra	Irrigation
Mettur project	Cauvery	Tamil Nadu	Hydroelectricity
Shivasamudram scheme	Cauvery	Karnataka	Hydroelectricity
Kundah project	Kundah	Tamil Nadu	Hydroelectricity
Sharavati Project	Sharavati (near Jog falls)	Karnataka	Hydroelectricity
Chambal project (Gandhi Sagar Dam (M.P., Rana Pratap Sagar and Jawahar Sagar Dam or Kota Dam	Chambal (a tributary of Yamuna).	Rajasthan, Madhya Pradesh.	Irrigation, hydroelectricity.
Kakrapar Project	Tapi	Gujarat	Irrigation
Ukai project	Tapi	Gujarat	Irrigation
Sardar Sarovar Project	Narmada	Gujarat, M.P., Rajasthan Maharashtra.	Irrigation, hydroelectricity
Tawa project	Tawa (A tributary of Narmada).	Madhya Pradesh	Irrigation
Mahi project (Jamnalal Bajaj Sagar)	Mahi	Gujarat	Irrigation
Matatila project	Betwa	Uttal Pradesh, Madhya Pradesh.	Irrigation, hydroelectricity.

## INDIAN CLIMATE

- ❑ The nation has four seasons: winter (January and February), summer (March to May), a monsoon (rainy) season (June to September), and a post-monsoon period (October to December).
- ❑ The climatic conditions in India are affected the most by the tropical monsoon. Due to the overwhelming influence of the tropical monsoon on Indian climate, India is called a tropical country.
- ❑ Indian climate is greatly influenced by the presence of Himalayas in the north and the Indian Ocean in the south.
  - ▶ The climate of India is monsoonal type, fed up by two rain bearing winds.
- ❑ Latitude and the monsoon winds are the major factors affecting the Indian climate.
- ❑ The Tropic of Cancer divides India into two almost equal climatic zones namely the northern zone and the southern zone.
- ❑ Thunder storms cause upto 25 cm of rainfall along the Kerala and Karnataka coasts and about 10 cm. in the interior of South India. Such rains are called '**Cherry Blossoms**' in **Karnataka** where they prove immensely beneficial to coffee plantation. They are called as '**Mango Showers**' in South India, due to their salutary effect on mango crop.
- ❑ The normal date of the onset of the rains is 20th May in

- Andaman & Nicobar Islands and by the end of June, it is usually established over most of the country.
- ❑ Normal duration of the monsoon varies from 2 to 4 months.
- ❑ The Trans-Himalayan and Greater-Himalayan regions, Drass and Kargil of Ladakh region are the coldest regions in the country.
- ❑ **Mawsynram** in Meghalaya (1141 cm) is the rainiest place in the world.
- ❑ **Jaisalmer** in western Rajasthan is the driest place in India which receives the lowest rainfall.
- ❑ El-Nino is a complex weather system that appears once in every 3 to 7 years bringing drought, floods and other weather extremes to different parts of the world. El-Nino is used in India for forecasting long range monsoon rainfall.

### Monsoon

- ❑ India receives 90% of the total rainfall from monsoons. **Monsoons** are the seasonal winds which blow during six months of summer from ocean to land and for the six months of winter from land to sea.
- ❑ On the basis of monsoonal variations there are four seasons in India namely the cold (winter) season (December to February), the hot (summer) season (March to May), the south west monsoon (the rainy season) (June to September) and the season of retreating monsoon (October to November).
- ❑ **The South West Monsoon forms the main monsoon season in India (June to August).**

### ❑ **The North East Monsoon (October - November) brings rain mainly to Tamil Nadu.**

- ❑ The North - East Monsoons are comparatively minor monsoons confined to a smaller area of the country. They are the winds blowing out from the landmass of north-western India towards the Indian Ocean.
- ❑ Monsoon is a wind system of the tropical regions under which the direction of the winds is reversed seasonably and it results in summer rainfall and dry winters.
- ❑ During the summer season, the winds blow from sea to the continents so that the moist winds cause rainfall in this season.
- ❑ During winter, the direction of the winds is reversed so that they blow from continents towards the sea.
- ❑ The onset of monsoon in India implies the onset of the southeast monsoon (winds blowing from the Indian Ocean to the Indian subcontinent) in the beginning of the summer season so that the months from June to mid-September are rainy.
- ❑ The south-west monsoon winds are replaced from October onwards by the north-east monsoon blowing from the continental area towards the sea to the south. Hence the winter season remains by and large dry.

### Seasons

- ❑ The climatic year of India can be divided into four seasons: the hot dry season, the hot wet season, the cool dry season and the cool wet season.

- ❑ **Hot Dry Season** : It is marked by the rising temperature during the latter half of the month of March. The highest temperatures in the south are experienced in April and in the northern plains in May and June.
- ❑ This part of the year is marked by a dry spell and the north-western parts of the country experience hot, dry winds called *loo*.
- ❑ **Hot Wet Season** : The trough of low pressure over the Indo-Gangetic plain causes the equatorial winds of oceanic origin to move over to India.
- ❑ This is the onset of southwest monsoon and also the beginning of the hot wet season.
- ❑ The peninsular landmass of India divides the southwest monsoon winds into two branches, one each blowing from the Arabian Sea and the Bay of Bengal.
- ❑ The Arabian Sea branch first strikes the Western Ghats and causes heavy rainfall in the Western Coastal Plains.
- ❑ On the eastern side of the Ghats, the rainfall is much lower due to the *rain-shadow effects* of the Ghats and interior Tamil Nadu remains dry during this season.
- ❑ The direction of the winds during this season over the Bay of Bengal is modified by the presence of the low pressure over the Ganga Valley and the physical barrier of the Arakan mountains. Hence their direction over this region becomes south-easterly.



- ❑ *Cool Dry Season* : This season lasts from mid-September to mid-December. It is the period of retreating south-west monsoon in India.
- ❑ The period is characterized by low temperature, low northerly winds, clear skies and low humidity.
- ❑ Although the season is dominated by subsistent easterly or northeasterly winds over the peninsula, winds generally blow from a westerly direction in the northern part of the country.
- ❑ *Cool Wet Season* : By October, the southwest monsoon withdraws from most parts of India and the northeast monsoon establishes itself over the entire area from which the southwest monsoon has withdrawn.
- ❑ The western remains dry up to the end of November in most parts.
- ❑ The western disturbances are cyclonic systems that develop in the belt of the westerly winds and they bring unsettled weather in their wake. These disturbances cause rain or snowfall in Jammu and Kashmir and north Indian Plains and break the dry spell. This period of the year is called the cold-wet season.
- ❑ The winds blowing towards Tamil Nadu from the northeast pick up some moisture as they blow over the Bay of Bengal and they cause rainfall in Tamil Nadu and parts of Andhra Pradesh due to the obstruction posed by the Eastern Ghats and the eastern face of the Western Ghats.

- ❑ Rajasthan and Gujarat regions remain dry during this season also.

### Climatic Regions

- ❑ The wettest areas in the western coastal plain and parts of Assam fall under the category of *tropical rainforest climate*. This region receives more than 400 cm of rainfall and Mawsynram near Chirapunji, which receives the highest average annual rainfall in the world, lies here.
- ❑ The *tropical savanna climate* covers most of the peninsular region except for the semi-arid zone east of the Sahyadris. In this region, the temperature remains above 18.2°C and the range of temperature is also high. It is seasonal in character.
- ❑ *Tropical and sub-tropical steppe climate* extends over large areas in Punjab, Haryana, Kutch, parts of the Gangetic plains and some parts of the Peninsular region. Temperature in this region falls below 18°C in the winter season but may rise above 30°C in summer.
- ❑ *Tropical semi-arid steppe climate* covers the rain-shadow area of the Sahyadris

and parts of Maharashtra. Temperature remains between 20°C and 23.8°C.

- ❑ Parts of Kutch and the western parts of Rajasthan are included in the category of *tropical deserts*. It receives a rainfall of less than 25cm and the temperature may rise up to 50°C.
- ❑ A *humid subtropical climate with dry winters* covers most of the northern plains from Punjab to Assam along the Himalayas.
- ❑ The Himalayas and the Karakoram Range are included in areas identified as having a *mountain climate*. Here, the temperature and rainfall vary according to altitude and the aspect of the slopes.

## SOILS IN INDIA

### Alluvial Soil

- ❑ Alluvial soil contributing the largest share, is formed by the deposition of sediments by rivers in the interior parts of India and by the sea waves in the coastal areas of the country.
- ❑ **Alluvial soil is the best agricultural soil** because

**The Indian Council of Agricultural Research has divided the Indian soils into 8 categories. Alluvial soil, Black soil, Red soil, Laterite soil, Forest soil, Arid and Desert soil, Saline and Alkaline soils, Peaty and organic soils. Black soils (29.69%), Alluvial soils (22.16%), Red and yellow soils (28%).**

- (i) They contain a variety of salts derived from Himalayan rocks.
- (ii) They are light and porous, therefore easily tillable.
- (iii) They are good for canal irrigation because of high water table and an easily penetrable stratum.
- ❑ Alluvial soils are suitable for cultivation of almost all kinds of cereals, pulses, oil seeds, cotton, sugarcane and vegetables.
- ❑ Alluvial soils are rich in potash and poor in nitrogen and organic matter.
- ❑ Immature soils with weak profiles – Azonal
- ❑ Alluvial soils are devoted to the cultivation of wheat, rice, pulses, sugarcane, jute, oil seeds, fodder etc.

### Black Soil

- ❑ Black soil is found largely in the Deccan plateau.
- ▶ Black soil is suitable for the cultivation of cotton and therefore it is called **black cotton soil**.
- ❑ Also known as regur soils.
- ❑ Regur soils vary in colour from black to chestnut brown.
- ❑ Black soils are rich in iron, lime and aluminium content.
- ❑ Black soils have high moisture retention capacity.

### Red Soil

- ❑ Red soil is formed by the weathering of ancient metamorphic and crystalline rocks.
- ❑ They are airy and need irrigation support for cultivation. Red soil is suitable for the cultivation of pulses and coarse grains.

- ❑ Red soils are poor in nitrogen, phosphorus, potassium and organic matter.
- ❑ They are more suitable for the cultivation of rice, ragi, tobacco and vegetables.
- ❑ The colour is red because of the presence of iron oxides.
- ❑ Mainly found in the Peninsular India and hilly states of North East India.

### Laterite Soil

- ❑ Laterite soils are formed by the weathering of laterite rocks. Laterite soils are deficient in nitrogen. They are chiefly found in Karnataka, Kerala, Madhya Pradesh, Orissa and Malabar areas.
- ❑ These soils are agriculturally unimportant because of intensive leaching, low base exchange capacity and their acidic nature.
- ❑ These are the typical soil of the tropical regions with heavy seasonal rainfall and alternative dry season.
- ❑ These soils provide valuable building materials.

### Forest Soil

- ❑ Forest soils are formed by the deposition of organic matter derived from forests. They are rich in organic matter and humus. They are found mainly in Punjab, Karnataka, Manipur and Jammu & Kashmir.
- ❑ These soils are used for plantations of tea, coffee, spices and fruits.

### Arid and Desert Soils

- ❑ Arid and Desert soils are formed under arid and semi arid

conditions in the north-western parts of the country. They are rich in phosphate though poor in nitrogen.

- ❑ These soils often have a high soluble salt content and very low humus content.
- ❑ These soils are made fertile by adding gypsum.

### Saline and Alkaline Soils

- ❑ Saline and Alkaline soils are salt impregnated and infertile. These soils are found especially in the dry tracts of the north.

### Peaty soils

- ❑ Peaty soils are developed under humid conditions as a result of the accumulation of large amounts of organic matter. These soils are highly saline and rich in organic matter.
- ❑ This soil is found in Kottayam and Alappuzha districts of Kerala, where they are called kari.
- ❑ When the rain ceases they are put under paddy cultivation.
- ❑ It also occurs in the northern Bihar, Southern Uttaranchal (Almora district) and coastal areas of West Bengal, Orissa and Tamil Nadu.

### Soil erosion and Conservation

- ❑ Soil erosion by water, wind and tillage affects both agriculture and the natural environment.
- ❑ Soil erosion is just one form of soil degradation. Other kinds of soil degradation include salinisation, nutrient loss, and compaction.

- ❑ Soil erosion means removal of the top layers of the soil at a rate higher than the rate of accrual of new fertile top part of the soil is removed.
- ❑ Soil conservation is a set of management strategies for prevention of soil being eroded from the earth's surface.
- ❑ The most common methods of soil conservation include afforestation, contour cultivation, keeping land covered by crops and other plants, mulching, construction of embankments and flood channels and scientific methods of cultivation keeping in view landform characteristics.
- ❑ Cultivation on the steep slopes and excessive grazing should also be avoided.

## NATURAL VEGETATION (Forests)

- ❑ Natural vegetation in India varies from region to region due to variations in climatic conditions, soil types and relief features.

**Some major types of vegetation found in India are Evergreen forests, Deciduous forests, Dry forests, Hill forests and Tidal forests.**

- ❑ **Nearly 19.39% of the total land area in India is under forest.** The National Forest policy has laid down a target of raising the area under forest to nearly 33.3%.

- ❑ Tropical Evergreen forests are dense forests of luxuriant growth found in areas where rainfall ranges between 200 to 300 cm. eg; Western Ghats and sub-Himalayan regions.
- ❑ Dry Tropical forests are mostly prevalent in regions with an annual rainfall of 90 to 130 cm.
- ❑ Swamps or Littoral forests are also called tidal forests which occur in and around the tidal creeks and along the deltas of river Ganges, Mahanadi, Krishna and Godavari.
- ❑ Alpine forests cover the alpine areas in the Himalayas, at a height of 2880 m to 3700m.
- ❑ Siwaliks are covered with tropical moist deciduous flora such as sal and bamboo.
- ❑ Planting of trees is known as afforestation.
- ❑ Deforestation is the destruction of trees.
- ❑ Forests also help to prevent soil erosion and land slides. It maintains the ecological balance and provides forest products such as timber and industrial raw materials. Forests helps to protect wild life and rare species of trees and plants.
- ❑ **Madhya Pradesh has the largest area under forest among the Indian states.**
- ❑ **Haryana has the least area under forest.**
- ❑ Arunachal Pradesh has the largest percentage of area under forest.
- ❑ India provides about 8% of the world's hardwood and ranks third after Brazil and Indonesia.
- ❑ Mangrove forests are found in the coastal plains.
- ❑ The forests on the Ganges delta in Bengal are called

Sunderbans after the sundari trees in these forests.

- ❑ **Evergreen forests** (Tropical) are found in the Western ghats and Sub-Himalayan region. They provide hardwood like teak, rosewood, ebony etc.
- ❑ **Social forestry** aims at not only providing fuelwood, fodder and other forest products, but also to meet the requirement of ecological balance through large scale afforestation on community lands and waste lands.
- ❑ **Energy plantations are plantations of softwood and grass to meet the energy needs of households.**
- ❑ World Environment Day : June 5.
- ❑ Government of India adopted a forest policy in 1952 and further modified it in 1988. According to new forest policy, the Government will emphasise sustainable forest management.
- ❑ Forest policy aimed at 1. bringing 33% of geographical areas under forest cover, 2. maintaining environmental stability, 3. conserving natural heritage of the country, 4. checks soil erosion, 5 increasing forest cover etc.
- ❑ Out of a total of 593 districts, 187 have been identified as tribal districts. The tribal districts account for about 59.8% of total forest cover of the country.
- ❑ The National Commission on Agriculture (1976) classified social forestry into 3 categories - Urban forestry, Rural forestry, Farm forestry.

## INDIA'S WILD LIFE

- ❑ India, a country of diverse wild-life & it is the second largest country on the planet to have such diverse life forms.
- ❑ India is home to several well known large mammals including the Asian Elephant, Bengal Tiger, Asiatic Lion, Leopard, Sloth Bear and Indian Rhinoceros.
- ❑ Other well known large Indian mammals include ungulates such as the rare Wild Asian Water buffalo, common Domestic Asian Water buffalo, Nilgai, Gaur.
- ❑ India displays significant biodiversity. One of eighteen megadiverse countries, it is home to 7.6% of all mammalian, 12.6% of all avian, 6.2% of all reptilian, 4.4% of all amphibian, 11.7% of all fish, and 6.0% of all flowering plant species.
- ❑ The wild life reserves of India are of two types - the **Wild life sanctuaries** and **National parks**.
- ❑ Presently, the country has 490 Wildlife Sanctuaries, 96 National Parks and 27 Tiger Reserves.
- ❑ Wild life protection in India was given statutory status with the adoption of the Wildlife (Protection) Act, 1972 by all the Indian states except Jammu and Kashmir.
- ❑ **Keibul Lamjo** is the only floating National Park in the country, is located in Manipur in Loktak Lake.
- ❑ Trade in endangered species is subject to strict rules under the Convention on Interna-

### National Parks

India's first national park (an IUCN category II protected area) was established in 1935 as *Hailey National Park*, now known as **Jim Corbett National Park**. By 1970, India only had five national parks. In 1972, India enacted the Wildlife Protection Act and Project Tiger to safeguard the habitats of conservation reliant species. Further federal legislation strengthening protections for wildlife was introduced in the 1980s. There are 96 national parks. All national park lands encompass a combined 38,029.18 km<sup>2</sup>, 1.16% of India's total surface area.

tional Trade in Endangered Species (CITES) of wild flora and fauna, to which India is a signatory.

- ❑ Some of the endangered species are Asiatic Lion, One Horned Rhinoceros, Hangul, Royal Bengal Tiger, Wild Ass etc.
- ❑ **The Animal Welfare Board of India** was established in 1962. Research programmes in wildlife are carried out by the **Wild life Institute of India, Dehradun** and the **Salim Ali Centre for Ornithology and Natural History, Coimbatore**.
- ❑ Project Tiger is the centrally sponsored scheme launched on April 1, 1973 to save the ti-



World's rarest monkey, the golden langur typifies the precarious survival of much of India's megafauna.

### Biosphere Reserves

Biosphere reserves are multi purpose protected area to preserve the genetic diversity in representative eco system. So far fourteen biosphere reserves have been set up. They are:

Nilgiri, Nanda Devi, Nokrek, Great Nicobar, Gulf of Mannar, Manas, Sunderbans, Similipal, Dibru Saikhowa, Dehong Debang, Panchmarhi, Kanchenjunga and Agasthyamala and Achanakmar Amarkantak.

### National animal

Royal Bengal Tiger

### National aquatic animal

Dolphin

### National bird

Indian Peacock

### National tree

Banyan tree

Wildlife Institute of India (WII) is established in 1982. It is an internationally acclaimed Institution, which offers training program, academic courses and advisory in wildlife research and management.

There are about 2546 species of fishes (about 11% of the world species) found in Indian waters. About 197 species of amphibians (4.4% of the world total) and more than 408 reptile species (6% of the world total) are found in India. There are about 1250 species of birds from India (12% of the world species). There are about 410 species of mammals known from India which is about 8.86% of the world species.

gers from extinction on India. It has become the most successful conservation ventures in modern history.

- ❑ At present **Madhya Pradesh** with 912 tigers tops the state with greater number of Tigers. Madhya Pradesh is known as **the tiger state of India**. M.P was followed by Uttar Pradesh

in 1992.

- ❑ Today, there are 39 Project Tiger wildlife reserves in India.
- ❑ **Project Elephant was launched to protect the wild life and elephant population.**
- ❑ Most of India's rhinos today survive in the Kaziranga National Park.
- ❑ A wild life week is observed in

the first week of October every year.

### Flora of India

- ❑ The Flora of India is one of the richest of the world due to a wide range of climate, topography and environments in the country. There are over 15000 species of flowers in India.



Lotus, National Flower of India

## AGRICULTURE IN INDIA

- ❑ Crops in India can be classified into subsistence crops, commercial crops, plantation crops and horticulture crops.
- India's total geographical area is 328.7 million hectares of which 140.8 million hectares is the net sown area, while 192.80 million hectares is the gross cropped area.
- Agriculture contributes about 17.8% to national Gross Domestic Product (GDP) and nearly 16% to export earnings.

### Types of Cultivation

1. Sedentary Cultivation
  2. Crop rotation
  3. Shifting cultivation
  4. Mixed cropping
  5. Relay cropping
  6. Terrace cultivation
  7. Mixed farming
- ❑ Operation flood I was launched in 1970, which aimed at capturing a commanding share of the liquid milk market.
  - ❑ A centrally sponsored Com-

### ICAR

Indian Council of Agricultural Research (ICAR) is an autonomous body under the Ministry of Agriculture. Headquarters: New Delhi. The council is the apex body for co-ordinating, guiding and managing research and education in agriculture including horticulture.

- ▶ India is the world's largest producer of milk, cashew nuts, coconuts, tea, ginger, turmeric and black pepper.
- ▶ It also has the world's largest cattle population (281 million).
- ▶ It is the second largest producer of wheat, rice, sugar, groundnut and inland fish
- ▶ It is the third largest producer of tobacco.
- ▶ India accounts for 10% of the world fruit production with first rank in the production of banana and sapota.

### Crop season in India can be classified into three such as Kharif, Rabi and Zaid.

- ▶ **Kharif (rainy) crops** are sown in June/July and harvested in September / October. Rice, Jowar, Bajra, Ragi, Maize, Cotton and Jute are the important Kharif crops.
- ▶ **Rabi (winter) crops** are sown in October/ December and harvested in April/ May. Wheat, Barley, Peas, Rape-seed, Mustard and Grams are the important Rabi crops.
- ▶ **Zaid (Summer) crops** : Zaid crops are grown in the short periods after the harvest of the Kharif and Rabi crops. Sown in April, May and June. Products are mostly fruits and vegetables.

### Areas of Cultivation

#### Temperate Himalayan Region

Eastern Himalayan Region & Western Himalayan Region.

#### The Eastern Himalayan Region

Assam, Sikkim and Mishmi Hills

#### The Western Himalayan Region

Kulu, Kangra and Kashmir Valleys, Garhwal, Kumaon and Simla Hills

#### Northern Dry Region

Punjab, Haryana, Delhi, Gujarat, Rajasthan, Uttar Pradesh and Western Madhya Pradesh

#### Eastern West Region

West Bengal, Orissa, Bihar, Jharkhand, Andhra Pradesh, Tamil Nadu, Chattisgarh, Assam, Meghalaya, Manipur, Tripura and Mizoram.

#### Western Wet Region

Kerala, Karnataka

#### Southern Region

Parts of Madhya Pradesh, Andhra Pradesh, Tamil Nadu, Maharashtra, Gujarat, Karnataka and Uttar Pradesh

### Green Revolution

- ▶ To increase yield per hectare government of India introduced a programme called Green Revolution.
- ▶ The Green Revolution (first) was launched in 1967-68.
- ▶ The second Green Revolution was launched in 1983-84.
- ▶ Father of Green Revolution - Dr. Norman Borlaug
- ▶ Father of Green Revolution in India - Dr. M.S. Swaminathan
- ▶ Green Revolution focused the development of high-yielding varieties of cereal grains, expansion of irrigation infrastructure, and distribution of hybridized seeds, synthetic fertilizers, and pesticides to farmers.
- ▶ Punjab pioneered green revolution among the other states transforming India into a food-surplus country.

<i>Crop</i>	<i>Areas of Production</i>
Barley	Uttar Pradesh, Bihar, Madhya Pradesh
Cotton	Gujarat, Andhra Pradesh, Madhya Pradesh, Maharashtra, Punjab, Haryana, Tamil Nadu, Karnataka.
Jute	West Bengal, Bihar, Assam, Orissa, Tripura
Groundnut	Gujarat, Tamil Nadu, Andhra Pradesh
Mustard & rape seed	Rajasthan
Sunflower	Maharashtra, Andhra Pradesh, Karnataka
Pulses	Madhya Pradesh, Uttar Pradesh, Rajasthan, Punjab, Haryana, Karnataka, Andhra Pradesh.
Coffee	Karnataka, Kerala, Tamil Nadu, Andhra Pradesh.
Rubber	Kerala, Tamil Nadu, Karnataka
Silk	Karnataka, Jammu and Kashmir, Andhra Pradesh, Assam, Bihar (tassar)
Tobacco	Gujarat, Andhra Pradesh, Karnataka, Tamil Nadu, Orissa, Bihar.
Cardamom	Karnataka, Sikkim, Kerala, Tamil Nadu
Cashewnut	Kerala, Andhra Pradesh
Castor seed	Gujarat, Andhra Pradesh
Chillies	Maharashtra, Andhra Pradesh, Orissa
Cloves	Kerala, Tamil Nadu, Karnataka
Cocoa	Kerala, Karnataka, Tamil Nadu
Ginger	Kerala, Meghalaya
Pepper	Kerala, Karnataka, Tamil Nadu
Poppy	Uttar Pradesh, Himachal Pradesh, Punjab
Ragi	Karnataka, Tamil Nadu
Saffron	Jammu and Kashmir
Banana	Gujarat, Maharashtra, Tamil Nadu, Kerala
Pineapples	Assam, Meghalaya, West Bengal, Tripura
Mango	Uttar Pradesh, Bihar, Andhra Pradesh, Maharashtra, Tamil Nadu.
Apple	Himachal Pradesh, Jammu and Kashmir, Uttaranchal
Arecanut	Kerala, Karnataka, Assam, Meghalaya, Maharashtra and Tamil Nadu.
Coconut	Kerala, Tamil Nadu, Karnataka, Andhra Pradesh, Goa.
Grapes	Maharashtra, Andhra Pradesh, Karnataka, Punjab, Uttar Pradesh, Himachal Pradesh
Orange	Maharashtra, Karnataka, Tamil Nadu, Meghalaya, Sikkim.
Turneric	Andhra Pradesh, Tamil Nadu, Bihar, Orissa, Maharashtra.

## Rashtriya Krishi Vikas Yojana

To achieve 4% annual growth during the 11th Five Year Plan a new scheme namely Rashtriya Krishi Vikas Yojana (RKVY) was launched during 2007-08. The funds under the scheme are provided to the states as 100% grant by the Central Government. The broad objectives of RKVY is to incentives the state to increase public investment to achieve 4% growth rate in agriculture and allied sectors in the 11<sup>th</sup> Five Year Plan. The States have been provided flexibility and autonomy in the process of selection, planning, approval and execution of schemes.

### States first in production

Saffron .....	Jammu Kashmir
Tea .....	Andhra Pradesh
Spices Garden .....	Kerala
Coffee .....	Karnataka
Sandalwood .....	Karnataka
Cotton .....	Gujarath
Tobacco .....	Andhra Pradesh
Plantain .....	Maharashtra
Wheat .....	Uttar Pradesh
Sugar cane .....	Uttar Pradesh
Paddy Crop (Rice) .....	West Bengal & Andhra
Coriander .....	Rajasthan

### White Revolution

- The White Revolution in the country has been achieved by means of Operation Flood. It was carried out in three phases.  
Operation Flood I .... 1970 - 1981  
Operation Flood II ... 1981 - 1985  
Operation Flood III ... 1985 - 1996.
- White revolution launched to increase the quality and quantity of milk and dairy products.
- The Father of the White Revolution in India is Dr. Varghese Kurien. He is also known as **Milkman of India.**



mand Area Development Programme was launched in 1974-75 with the main objective of improving utilization of irrigation potential and optimizing agricultural productivity.

- ❑ **Irrigation** in India can be classified into Wells, Tanks and Canals.
- ▶ Wells account for about 48% of the total irrigated area in the country.
- ▶ Tanks account for about 10% of the total irrigated area, are used in Central and Southern India.

### NABARD

NABARD (National Bank for Agriculture and Rural Development) is set up as an apex Development Bank with a mandate for facilitating credit flow for promotion and development of agriculture, small-scale industries, cottage and village industries, handicrafts and other rural crafts. It is an apex development bank based in Mumbai, Maharashtra. It was established on 1982.

### National Food Security Mission

'National Food Security Mission', has been launched from 2007-08 to increase the production of rice by 10 million tons, wheat by 8 million tons and pulses by 2 million tons by the end of the Eleventh Plan (2011-12). The National Food Security Mission will have 3 components (i) Rice (ii) Wheat & (iii) Pulses. The Mission is functioning under the control of Ministry of Agriculture.

### Punjab is known as the Granary of India or India's bread-basket.

Punjab (Land of the five rivers) is one of the most fertile regions on earth. The region is ideal for wheat-growing. Rice, sugar cane, fruits and vegetables are also grown. It produces 14% of India's cotton, 20% of India's wheat, and 9% of India's rice. The Firozpur District is the largest producer of wheat and rice in the state.

Green Revolution .....	High Yielding Variety of Seeds
White Revolution .....	Milk & Dairy products
Silver Revolution .....	Egg and Poultry
Silver Fibre Revolution .....	Cotton
Yellow Revolution .....	Edible Oil
Blue Revolution .....	Fisheries
Pink Revolution .....	Prawns
Golden Revolution .....	Honey
Golden Fibre Revolution .....	Jute
Brown Revolution .....	Cocoa

### Animal Resources

- India has the largest number of livestock in the world.
- The rearing of various animals and obtaining different products from them is called **animal husbandry**.
- The Central Semen Production and Training Institute at Hessarghatta is one of the premier organisation in the country engaged in multiplying high pedigree animals.

### Sericulture

- Natural silk is produced from the cocoons of the silk worms. Rearing of silkworms and production of silk from them is called **sericulture**.
- Sericulture is the biggest village industry in India after handloom and khadi.
- India is the second largest silk producer in the world.
- Karnataka is the leading producer of silk in India.
- Bihar and Jharkhand are the leading producers of tasar silk.
- India has the unique distinction of being the only country producing all the five kinds of silk – Mulberry, Eri, Muga, Tropical Tasar and Temperate Tasar.
- Mulberry silk is the most popular variety in India, contributing more than 87% of the Country's silk production.
- Cultivation of mulberry plants is referred to as Moriculture.



## MINERAL RESOURCES

- ❑ India's major mineral resources include Coal (third-largest reserves in the world), Iron ore, Manganese, Mica, Bauxite, Titanium ore, Chromite, Natural gas, Diamonds, Petroleum, Limestone and Thorium (world's largest along Kerala's shores).
- ❑ India's minerals range from both metallic and non-metallic types. The metallic minerals comprise ferrous and non-ferrous minerals while the non-metallic minerals comprise mineral fuels, precious stones, among others.
- ❑ India produces 89 minerals out of which 4 are fuel minerals, 11 metallic, 52 non-metallic and 22 minor minerals.
- ❑ India also exports iron ore, titanium, manganese, bauxite, granite, and imports cobalt, mercury, graphite etc.
- ❑ India ranks 3rd in production

of coal & lignite, 2nd in bauxite, 4th in iron ore, 5th in bauxite and crude steel, 7th in manganese ore and 8th in aluminium.

- ❑ Iron Ore is the backbone of modern civilisation. Varieties of iron ore:

**Magnetite** - the best quality of iron ore and contains 72% pure iron.

**Haematite** - contains 60 to 70% pure iron.

**Limonite** - contains 40 to 60% pure iron.

- ❑ Jharkhand has the largest reserves accounting for about 25% of the total reserves of iron ore in India.
- ❑ India's richest haematite deposits are located in Barabanki valley in Orissa.
- ❑ The Bailadila mine is the largest mechanised mine in Asia

## ONGC

Oil and Natural Gas Corporation Limited (ONGC) (incorporated on 23 June 1993) is a state-owned oil and gas company in India. It was set up as a commission on 14 August 1956. It contributes 77% of India's crude oil production and 81% of India's natural gas production. Indian government holds 74.14% equity stake in this company.

from where iron ore is exported to Japan through Vishakhapatnam.

- ❑ Japan is the biggest buyer of Indian iron ore.
- ❑ India has the second largest manganese ore reserves in the world after Zimbabwe.
- ❑ India is the fifth largest producer in the world after

- ▶ **India has the world's largest reserves of Iron.**
- ▶ **India is the largest producer of mica in the world.**
- ▶ **India possesses the largest reserves of monazite known in the world.**
- ▶ **India ranks third in the world in the production of manganese.**

### ***Minerals***

### ***Areas of Production***

Antimony	Punjab, Karnataka, Rajasthan, Bihar
Asbestos	Karnataka, Rajasthan
Beryllium	Rajasthan, Jharkhand, Tamil Nadu, Andhra Pradesh
Barytes	Andhra Pradesh, Maharashtra
Diamonds	Madhya Pradesh (Panna mines)
Graphite	Orissa, Rajasthan, Andhra Pradesh
Granite	Tamil Nadu, Karnataka, Andhra Pradesh
Magnesite	Tamil Nadu, Uttaranchal
Marble	Rajasthan (Makrana)
Nickel	Orissa, Jharkhand, Tamil Nadu
Rock Salt	Gujarat, Himachal Pradesh
Sea Salt	Gujarat, Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu and Andhra Pradesh
Sulphur	Tamil Nadu
Tin	Bihar, Jharkhand, Rajasthan
Coal	Jharkhand, West Bengal, Madhya Pradesh, Andhra Pradesh, Maharashtra, Orissa
Lignite	Neyveli
Gold	Andhra Pradesh (Ramagiri), Karnataka (Kolar, Hutti)
Gypsum	Rajasthan, Tamil Nadu, Jammu and Kashmir, Uttar Pradesh, Himachal Pradesh, Gujarat
Silver	Karnataka (Kolar), Rajasthan, Jharkhand, Tamil Nadu
Chromite	Andhra Pradesh, Jharkhand, Karnataka, Maharashtra, Manipur, Orissa, Tamil Nadu
Dolomite	Madhya Pradesh, Chattisgarh, Orissa, Gujarat, Karnataka, West Bengal, Uttar Pradesh, Uttaranchal, Maharashtra
Thorium	Kerala, Tamil Nadu, Andhra Pradesh
Uranium	Jharkhand, Madhya Pradesh, Meghalaya, Himachal Pradesh, Uttar Pradesh.
Ilmenite	Tamil Nadu, Kerala
Rock phosphate	Madhya Pradesh, Rajasthan, Uttar Pradesh, Jharkhand, Andhra Pradesh.

- Brazil, Gabon, South Africa and Australia.
- The main reserves are found in Karnataka, followed by Orissa, Madhya Pradesh, Maharashtra and Goa.
- Orissa is the leading producer of manganese in the state.
- Raniganj (West Bengal), Jharia (Bihar), Singrauli (Madhya Pradesh) and Korba (Chhattisgarh) are the major coal fields in India.
- **Marble is found largely in Rajasthan.**
- Leading salt producer in India is Gujarat. It produces 60% of salt of the country.
- State with the largest mineral deposit is Jharkhand.
- Jharkhand is the state with highest mineral output in India.
- **Chottanagpur plateau is the richest mineral belt of India.**
- India's contribution to gold production across the world is less than one percent (0.75%).
- **Karnataka** is the largest producer of gold followed by Andhra Pradesh.

#### **Geological Survey of India**

GSI, established in 1851 is a government organization in India for conducting geological surveys and studies. It is one of the oldest of such organizations in the world. There are two geological parks maintained by GSI. **Saketi Fossil Park**, Saketi, Himachal Pradesh and **Nehru Park**, Hyderabad, Andhra Pradesh. The park displays life size figures of dinosaurs like T-Rex.

- ❑ There are mainly three gold fields in India:  
**Kolar gold field** in Karnataka  
**Hutti gold field** in Karnataka  
**Ramgiri gold field** in Ananta pur district of Andhra Pradesh
- ❑ Silver is mainly produced from Zawar mines of Udaipur district in Rajasthan.
- ❑ **Orissa** has the largest deposits of Nickel.
- ❑ Lignite also known as brown coal. It is a lower grade coal and contains about 40 to 55% carbon.
- ❑ It is found in Rajasthan, Neyveli of Tamil Nadu, Assam and Jammu and Kashmir.
- ❑ Jharia in Jharkhand has been recognised as the store house of the best metallurgical coal in the country.
- ❑ Coal India Ltd produces the largest quantity of coal in India followed by Singareni Collieries Comp Ltd.
- ❑ Assam is the oldest oil producing state in India.
- ❑ **Digboi in Assam is the oldest oil well of India.**
- ❑ Natural gas fields are Ankleshwar and Cambay in Gujarat, Bombay high and Assam.
- ❑ The first successful oil well was sunk at Digboi in 1889.
- ❑ Bombay High is the offshore oil field located in the coast of Maharashtra.
- ❑ Oil Refineries with the largest refining capacity-  
**Reliance Petroleum Ltd, Jamnagar**  
**Indian Oil Corp Ltd, Koyali**
- ❑ Bauxite is exported to countries such as China, Korea, Ukraine, Saudi Arabia.

#### Major Cement companies

Ambuja cement, Aditya Cement, JK Cement and L & T Cement.

#### Steel Companies

Steel Authority of India (SAIL), Bhilai Steel Plant, Durgapur Steel Plant, Rourkela Steel Plant, Bokaro Steel Plant.

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- ❑ India has the world's largest deposits of coal. Bituminous coal is found in Jharkhand and Bihar and Raniganj in West Bengal. Lignite coals are found in Neyveli in Tamilnadu.
  - ❑ Coal has been described as the bridge into the future.
  - ❑ India ranks third in the world after China and USA in coal production.
  - ❑ The Panna diamond belt is the only diamond producing area in the country, which covers the districts of Panna, Chatarpur and Satna in Madhya Pradesh, as well as some parts of Banda in Uttar Pradesh.
  - ❑ Bauxite deposits are found in western Bihar, southwest Kashmir, Central Tamilnadu, and parts of Kerala, U.P, Maharashtra and Karnataka.
  - ❑ With the recent spurt in world demand for chromite, India has stepped up its production to reach the third rank among the chromite producers of the world.
  - ❑ Recent discoveries of Krishna-Godawari off-shore basin and Rava field will have big contribution in the field of gas production in India.

#### Non - Metallic Minerals

- **Jharkhand is the leading producer of mica.** Bihar, Rajasthan and Andhra Pradesh also produce mica.

duce mica.

- ❑ Japan (19%) and USA (17%) are the major buyers of our mica.
- ❑ Limestone with more than 10% magnesium is called dolomite, when the percentage rises to 45, it becomes true dolomite.
- ❑ Iron and Steel industry is the chief consumer of dolomite.
- ❑ About 90% dolomite reserves are concentrated in Madhya Pradesh, Chattisgarh, Orissa, Gujarat, Karnataka, West Bengal, Uttar Pradesh and Maharashtra.
- ❑ Rajasthan is the largest producer of Asbestos followed by Andhra Pradesh and Karnataka.
- ❑ Gypsum is mainly used in making ammonia sulphate fertilizer and in cement industry. Rajasthan is the main producer followed by Jammu and Kashmir.
- ❑ Major deposit of magnesite are found in Uttanchal, Tamil Nadu and Rajasthan.
- ❑ Jharkhand is the largest producer of **Kyanite** in India followed by Maharashtra and Karnataka.
- ❑ In **Sillimanite** production, Orissa contributes 55.87% of the total production, followed by Kerala and Maharashtra.
- ❑ Diamond is found at **Panna** in Madhya Pradesh.
- ❑ In salt production, rock salt is taken out in Mandi district of Himachal Pradesh. Sambhar lake in Rajasthan produces about 10% of annual production. And Gujarat coast produces nearly half of our salt.

## List of Public Sector Undertakings of India

Air India Limited, Airports Authority of India	Lubrizol India Limited (LIL)
Artificial Limbs Manufacturing Corporation of India (ALIMCO)	Mahanagar Telephone Nigam Limited (MTNL)
Bengal Chemicals and Pharmaceuticals Limited (BPCL)	Manganese Ore (India) Limited (MOIL)
Bharat Coking Coal Limited (BCCL), Jharkhand	Mazagon Dock Limited, Mumbai
Bharat Dynamics Limited (BDL), Andhra Pradesh	MECON Limited
Bharat Earth Movers Limited (BEML)	Metro Railway, Kolkata
Bharat Electronics Limited (BEL), Bangalore	Mineral Exploration Corporation Limited (MECL)
Bharat Heavy Electricals Limited (BHEL)	Minerals and Metals Trading Corporation Limited (MMTC)
Bharat Refractories Limited (BRL)	Mishra Dhatu Nigam Limited (MIDHANI)
Bharat Sanchar Nigam Limited (BSNL)	MSTC Limited
Bharatiya Nabhikiya Vidyut Nigam Limited (BHAVINI)	Mumbai Railway Vikas Corporation Limited (MRVC)
Biecco Lawrie Limited	National Aluminium Company Limited (NALCO), Orissa
Bramhaputra Valley Fertilizer Corporation Limited (BVFCL), Assam	National Buildings Construction Corporation Limited (NBCC)
Broadcasting Engineering Corporation of India Limited (BECIL)	National Fertilizers Limited (NFL), Noida, Uttarpradesh
Cement Corporation of India Limited (CCI)	National Film Development Corporation (NFDC), Mumbai
Central Coalfields Limited (CCL)	National Handloom Development Corporation Limited (NHDC)
Central Cottage Industries Corporation of India Limited	National Hydroelectric Power Corporation Limited (NHPC)
Central Mine Planning and Design Institute Limited (CMPDI)	National Insurance Company Limited (NICAL)
Central Warehousing Corporation (CWC)	National Mineral Development Corporation Limited (NMDC)
Centre for Railway Information Systems (CRIS)	National Minorities Development and Finance Corporation (NMDFC)
Coal India Limited (CIL), Kolkata	National Projects Construction Corporation Limited (NPCC)
Cochin Shipyard Limited, Kerala	National Research Development Corporation (NRDC)
Container Corporation of India Limited (CONCOR)	National Scheduled Castes Finance and Development Corporation (NSFDC)
Cotton Corporation of India Limited (CCI), Maharashtra	National Scheduled Tribes Finance and Development Corporation (NSTFDC)
Dredging Corporation of India	National Small Industries Corporation Limited (NSIC)
Educational Consultants India Limited (EDCIL)	National Textile Corporation Limited (NTC)
Engineers India Limited (EIL)	National Thermal Power Corporation Limited (NTPC)
Ennore Port Limited, Tamil Nadu	Neyveli Lignite Corporation Limited (NLC), Tamil Nadu
Export Credit Guarantee Corporation of India Limited (ECGC)	North Eastern Electric Power Corporation (NEEPCO)
FCI Aravali Gypsum and Minerals India Limited (FAGMIL)	Northern Coalfields Limited (NCL)
Ferro Scrap Nigam Limited (FSNL)	Nuclear Fuel Complex
Fertilisers and Chemicals Travancore Limited (FACT), Kochi	Nuclear Power Corporation of India Limited (NPCIL)
Food Corporation of India (FCI)	Oil and Natural Gas Corporation Limited (ONGC), Dehradun
Garden Reach Ship Builders and Engineers Limited (GRSE)	Oil India Limited (OIL), New Delhi
Gas Authority of India Limited (GAIL)	Pawan Hans Helicopters Limited (PHHL)
Goa Shipyard Limited	Power Finance Corporation Limited
Handicrafts and Handlooms Export Corporation (HHEC)	Power Grid Corporation of India Limited (POWERGRID)
Heavy Engineering Corporation Limited (HEC)	Power Trading Corporation of India Limited (PTC)
Heavy Water Board (HWB)	Praga Tools Limited
Hindustan Aeronautics Limited (HAL), Bangalore	Projects and Development India Limited (PDIL)
Hindustan Antibiotics Limited (HAL), Maharashtra	Pyrates, Phosphates and Chemicals Limited (PPCL)
Hindustan Copper Limited (HCL), Kolkata	RailTel Corporation of India Limited
Hindustan Insecticides Limited (HIL)	Railway Electrification Project Circle (REPC)
Hindustan Latex Limited (HLL), Trivandrum	Rajasthan Atomic Power Station / Project
Hindustan Petroleum Corporation Limited (HPCL)	Rashtriya Chemicals and Fertilizers Limited (RCF), Mumbai
Hindustan Newsprint Limited, Kerala	Rashtriya Ispat Nigam Limited (RINL)
Hindustan Machine Tools Limited (HMT), Bangalore	RITES Limited, Gurgaon, Haryana
Hindustan Shipyard Ltd, Vishakhapatnam	Rural Electrification Corporation Limited
Hospital Services Consultancy Corporation (H) Limited (HSCC)	Semiconductor Complex Limited (SCL)
Housing and Urban Development Corporation Limited (HUDCO)	Shipping Corporation of India Limited (SCI), Mumbai
India Trade Promotion Organisation (ITPO)	South Eastern Coalfields Limited (SECL)
Indian Airlines Limited (IA)	Sponge Iron India Limited (SIIL)
Indian Oil Corporation Limited (IOCL), New Delhi	State Trading Corporation of India Limited (STCI)
Indian Railway Catering and Tourism Corporation Limited (IRCTC)	Steel Authority of India Limited (SAIL)
Indian Rare Earths Limited, Mumbai	Telecom Factory, BSNL
Indian Renewable Energy Development Agency Limited (IREDA)	Telecom Stores Organisation
Indian Telephone Industries Limited (ITI)	Telecommunications Consultants India Limited (TCIL)
Instrumentation Limited, Kota, Rajasthan	Uranium Corporation of India Limited (UCIL)
IRCON International Limited	Water and Power Consultancy Services (India) Limited (WAPCOS)
Konkan Railway Corporation Ltd, Navi Mumbai	Western Coalfields Limited (WCL), Nagpur, Maharashtra
Kudremukh Iron Ore Company Limited (KIOCL)	

- ▶ Bureau of Indian Standards (BIS) is a quasi governmental institution for drawing up standards for the products of Indian industry. It was established in 1947.
- ▶ National Productivity Council (NPC) is an autonomous body formed to inculcate productivity in industries, established in 1958.

- ❑ Uranium deposits occur in Jadugoda of Singhbhum and Hazaribagh districts of Jharkhand.
- ❑ Thorium, a likely future substitute for Uranium as a fission material in atomic reactors, occurs in considerable quantities as  $\text{ThO}_2$  in the beach sands of Kerala coast.
- ❑ Monazite deposits of commercial value are found in about 160 kms between Cape Comorin and Kollam in Kerala.
- ❑ Thorium is also derived from monazite. Zirconium is also found in Kerala coast.
- ❑ Uranium compounds occurs in Singhbhum - copper belt of Jharkhand, Aravalli's and central Himalaya.
- ❑ microwave ovens, and washing machines.
- ❑ Industry accounts for 28% of the GDP and employ 14% of the total workforce.
- ❑ The Industrial policy adopted by the Government of India envisages a mixed economy, i.e., the co-existence of public and private sectors.
- ❑ Textile Industries includes cotton, jute, wool, silk and synthetic fibre textiles. It accounts for 24.6% in total exports.
- ❑ **Cotton textiles is the oldest industry in India. It has the largest number of workers employed in an industry.**
- ❑ Kanpur is famous for textiles and clothing, large modern tanneries, leather works and shoe manufacturing.
- ❑ Sholapur is famous for important textiles based on cotton grown in local regur soils.

## MAJOR INDUSTRIES IN INDIA

- ❑ The first Industrial Policy was brought in 1948.
- ❑ Major industries include telecommunications, textiles, jute and sugar industries, chemicals, food processing, steel, transportation equipment, cement, mining, petroleum, machinery, information technology enabled services and pharmaceuticals.
- ❑ Some of the major items manufactured in India are computers, communication equipment, broadcasting and strategic electronics, television sets,
- ❑ The first modern cotton textile mill was established in Bombay in 1851.
- ❑ Dharwar Belgaum are known for cotton textiles, railway and general engineering goods.
- ❑ The first modern cotton mill was established in 1818 at Ghosury (West Bengal).
- ❑ The first jute mill was started in 1855 at Rishra near Kolkata.
- ❑ The modern woollen textile industry was started with the establishment of Lal Imli at Kanpur in 1876.
- ❑ Ludhiana produces 90% of

woolens in India and is also Known as the **Manchester of India.**

- ❑ Tirupur has gained universal recognition as the leading source of hosiery, knitted garments, casual wear and sportswear.
- ❑ India is the only country producing all the five known commercial varieties of silk, viz. Mulberry, Tasar (Tropical), Oak Tasar, Eri and Muga.
- ❑ **Karnataka is the largest producer of silk. Second position goes to West Bengal.**
- ❑ First modern silk factory - was set up at Howrah in 1832.
- ❑ India is fifteenth in services output. It provides employment to 23% of work force, and it is growing fast.
- ❑ In 2009, seven Indian IT firms were listed among the top 15 technology outsourcing companies in the world.
- ❑ In 1870, the first steel industry, 'Bengal Iron Company' was set up at Kulti, West Bengal.
- ❑ Three integrated steel plants were set up at Bhilai, Durgapur and Rourkela. Later two more steel plants, at Bokaro and Vishakhapatnam, were set up. Private sector plants, of which the Tata Iron and Steel Company (TISCO), Jamshedpur is the biggest.
- ❑ Bhilai plant was set up in collaboration with Russia on the Kolkata - Nagpur Railway line in the Durg district (Chhatisgarh).
- ❑ Rourkela steel plant in Orissa was set up under the second five year plan in association with Germany.

Industry	Area of Production
Woollen textiles	: Punjab, Maharashtra, Uttar Pradesh, Gujarat, Karnataka, Jammu and Kashmir
Copper smelting	: (Khetri) Rajasthan, Madhya Pradesh, Maharashtra
Heavy machinery	: Ranchi, Visakhapatnam, Durgapur
Machine tools	: Bangalore, Pinjore, Kalamassery, Hyderabad, Srinagar
Heavy electricals	: Bhopal, Hyderabad, Tiruchirapalli, Haridwar.
Railway equipment	: Chittaranjan (electric engines), Varanasi (diesel engines), Jamshedpur and Bhopal (electric engines), Integral Coach Factory Perambur (Tamil Nadu), Rail Coach Factory, Kapurthala (Punjab)
Shipbuilding	: Visakhapatnam, Mumbai
Cars	: Mumbai (Fiat), Calcutta (Ambassador), Gurgaon (Maruthi)
Buses, trucks	: Chennai, Mumbai
Jeeps, tempos, trucks	: Mumbai, Pune, Gurgaon
Two-wheelers	: Pune, Mumbai, Faridabad, Chennai, Mysore, Ludhiana, Tirupati
Cycles	: Mumbai, Asansol, Sonapat, Delhi, Chennai, Jalandhar, Ludhiana
Tractors	: Faridabad, Pinjore, Delhi, Mumbai, Chennai
Fertilisers	: Tamil Nadu, Uttar Pradesh, Gujarat, Kerala, Andhra Pradesh
Pharmaceuticals	: Hyderabad, Rishikesh, Gurgaon, Chennai, Muzaffarpur
Pesticides	: Delhi, Alwaye
Cement	: Tamil Nadu, Madhya Pradesh, Gujarat, Karnataka, Andhra Pradesh, Rajasthan, Chhattisgarh, Jharkhand.
Leather goods	: Agra, Kanpur, Mumbai, Calcutta, Delhi.
Glass	: Uttar Pradesh, Maharashtra, West Bengal
Paper	: West Bengal, Andhra Pradesh, Orissa, Maharashtra, Karnataka, Madhya Pradesh, Bihar.

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- ❑ Bokaro, the biggest plant in Asia was set up under the fourth five year plan in association with the Russian Government. It is located in Jharkhand.
  - ❑ The public sector steel plants are managed by the Steel Authority of India (SAIL). SAIL was established in 1973.
  - ❑ India is now the eighth largest producer of steel in the world.
  - ❑ The first on-shore steel plant in India was setup at Vishakhapatnam.
  - ❑ Indian Aluminium Corporation Ltd was formed in 1937.
  - ❑ **BALCO** came into being in 1965, **NALCO** in 1981.
  - ❑ Aluminium companies with the highest sales in descending order - **HINDALCO**, **NALCO**, **INDAL**, **MALCO**.
  - ❑ Indian Copper Corporation was set up in 1924 which was taken over by Hindustan Copper Ltd (established in 1967), in 1972.
  - ❑ Presently, there are four zinc smelters in the country - Alwaye (Kerala), Debari and Chanderi (Rajasthan) and Vishakhapatnam (Andhra Pradesh).
  - ❑ Among the Third-World countries, India is a major exporter of heavy and light engineering goods. The engineering industry has shown its capacity to manufacture large-size plants and equipment for various sectors like power, fertilizer, and cement.
  - ❑ Heavy Engineering Corporation Ltd was set up at Ranchi (Jharkhand) in 1958.
  - ❑ **Kirloskar Brother Ltd** is the pioneer company in the manufacturing of machine tools.
  - ❑ Hindustan Machine Tools (HMT) is the largest manufacturer of machine tools in the country.
  - ❑ **Locomotives:** Chittaranjan Locomotive Works, Diesel Locomotive Works (Varanasi), Tata Engineering and Locomotive Works (Jamshedpur).
  - ❑ The Integral Coach Factory at Perambur near Chennai was set up in 1955 with Swiss collaboration.
  - ❑ Top four automobile companies with the highest sales: **Tata Motors**, **Maruti Udyog Ltd.**, **Mahindra & Mahindra Ltd.**, **Ashok Leyland Ltd.**

- ❑ In medium and heavy commercial vehicles, Tata Engineering and Locomotive Company (**TELCO**) is the leading producer.
- ❑ There are four main centres of ship building industry at **Vishakhapatnam, Kolkata, Kochi** and **Mumbai**.
- ❑ Hindustan Shipyard Ltd, Vishakhapatnam set up in 1941, is the first ship building yard in the country to receive ISO-9001 certification.
- ❑ Cochin Shipyard Ltd, Kochi was incorporated in 1972. It also manufactures ships for Indian Navy.
- ❑ Mazgaon Dock at Mumbai builds cargo ships, passenger ships, dredgers etc. for Indian navy.
- ❑ The first aircraft industry was set up at Bangalore in 1940 under the name of Hindustan Aircraft Ltd. Later, Hindustan Aircraft Ltd was merged into Aeronautics India Ltd in 1964 to form Hindustan Aeronautics Ltd, Bangalore.
- ❑ Major companies in integrated refining and marketing are HPCL, BPCL and IOC.
- ❑ Godavari - Krishna delta is known for local tobacco, sugarcane, rice, oil, cement and small textiles.
- ❑ The industry associated with sports materials mainly located at Agra, Meerut (UP), Ludhiana, Jalandhar (Punjab) and Delhi.
- ❑ Pinjore in Haryana and Jalahalli in Bangalore are associated with watch industry.
- ❑ Moradabad is famous for brass utensils with engraving and polishing.
- ❑ Indian Explosives factory is located at Gomia in Hazaribagh (Jharkhand).
- ❑ First fertilizer plant was set up at Ranipet of Tamil Nadu in 1906.
- ❑ First public sector fertilizer plant is at **Sindri** (Jharkhand).
- ❑ The first super-phosphate factory was set up at Ranipet in Tamil Nadu in 1906.
- ❑ India is now the third largest producer of nitrogenous fertilizers in the world.
- ❑ Fertilizer companies with the highest sales are - National Fertilizer Ltd, Tata Chemicals Ltd, Rashtriya Chemicals & Fertilizers Ltd.
- ❑ The first successful attempt was made in 1912 - 13 when the Indian Cement Co Ltd set up a plant in porbander (Gujarat).
- ❑ The Indian Cement industry is the second largest in the world after that of China.
- ❑ Madhya Pradesh and Chhattisgarh, are the leading producer of total cement production in India.
- ❑ Leather industry is divided into two parts - tanning and leather goods.
- ❑ For tanning, Kanpur, (1st tannery centre), Chennai, and Kolkata are three largest Centres.
- ❑ The Central Leather Research Institute at Chennai is the largest of its kind in the world.
- ❑ **Uttar Pradesh** is the leading producer of glass in India followed by West Bengal and Maharashtra.
- ❑ **Firozabad** in Agra district is the largest producer of glass.
- ❑ The first synthetic rubber factory was started in **Bareilly** in 1955.
- ❑ The first successful effort was made in 1870 with the setting up of the Royal Bengal Paper Mills at Ballyganj near Kolkata.
- ❑ The important centres for paper products are Lucknow, Titagarh, Raniganj, Pune, Naihati etc.
- ❑ Maharashtra is the largest producer of paper followed by Andhra Pradesh, Gujarat.
- ❑ Uttar Pradesh has the largest number of paper mills.
- ❑ Paper companies with the highest sales are Ballarpur Industries Ltd, Orient Paper & Industries Ltd and Tamil Nadu Newsprint & Paper Ltd.
- ❑ **West Bengal** is the leading state in paper manufacturing.
- ❑ In India, **Jharkhand** is the largest producer of Lac (50%), followed by Madhya Pradesh and Chhattisgarh. India is the largest exporter in the world.
- ❑ Lac is obtained from an insect named *Cerria lacca* which lives on trees.
- ❑ Sugar Industry is the second largest agro-based industry in India after cotton textile industry.
- ❑ India is the largest sugar producing country with over 15% share of the global output.
- ❑ India is world's largest producer of sugarcane and sugar as well.
- ❑ Maharashtra is the largest sugar producer followed by Uttar Pradesh and Tamil Nadu.