















Garo-Rajmahal Gap separates it from the main block of peninsular plateau

## **CHOTANAGPUR PLATEAU**

Highest peak- Parasnath (1,366m) in the Hazaribagh Plateau.

Situated in the north eastern part of Indian Plateau includes the region of Bihar, adjoining Madhya Pradesh and West Bengal.

It consists of the Ranchi Plateau in the south, the Hazaribagh Plateau in the north, and the Rajmahal Hills in the northeast.

Described as the “Ruhr of India”

Pat lands are one of the chief characteristics of Chotanagpur Plateau.

Very rich in mineral resources.

## **DECCAN PLATEAU**

South of the Satpura Range in the peninsula is called the Deccan Plateau.

### **(1)The Deccan Lava Plateau Region**

Northwestern part of Deccan Plateau is the region of Basaltic lava.

It includes the Western Ghats north of 16° north latitude, plateau of Maharashtra (except the east of Nagpur) and the adjoining parts of Madhya Pradesh, Karnataka and Andhra Pradesh.

### **(2) Telengana Plateau**

Part of the Deccan Plateau, comprises of the interior region of Andhra Pradesh.

North of Krishna River is the plateau of Telengana.

South of the Krishna River, lying in the Rayalseema plateau region.

### **(3)The Karnataka Plateau**

Situated to the south of Deccan Lava Region.

Malnad and Maidan are two physiographic regions of Karnataka plateau.

#### **Malnad**

Hilly and dissected plateau region about 64km wide lying close to the Western Ghats.

#### **(ii) Maidan**

Situated in the eastern part of Malnad, relatively large rolling plains with low granitic hills.

### **THE WEST COASTAL PLAIN**

Runs from Rann of Kachchh to Kanyakumari and are confined to a narrow belt about 10-15 km wide.

#### **KATHIAWAR COAST(Total length:500km)**

The West Coastal Plain between Daman in the north and Goa in the south is examples of coast of submergence due to vertical movements , and is consequently dissected.

Coastal lowland is uneven and is interspersed with river valleys, creeks and ridges.

#### **(iii) Malabar Coast**

Extends from Goa in the north to Kanyakumari in the south is a coastline of emergence.

Southern coastal region receives more rainfall during summer monsoon season.

## **THE EAST COASTAL PLAIN**

Extends from the deltaic plains of the Ganga in the north to Kanyakumari in the south for 1100 km with an average width of 120km.

#### **(I)UTKAL COAST**

Extends for about 400km from deltaic plains of the Gango to the Mahanadi delta.

#### **(II)ANDHRA COASTAL PLAINS**

Extends from the southern limit of Utkal plains to Puliant lake(Andhra Pradesh). It has large deltas of the Krishna and the Godavari rivers.

#### **(III)TAMIL NADU PLAINS**

Extends about 675km, from the north of Chennai to Kanyakumari in the south. It has the deltaic plains of Kaveri and is popularly called the Granary of South India.

## **IMPORTANT GULFS**

### **GULF OF KACHCHH**

**Separates:**

Kachchh and Kathiwar Penisual.

Location: West if Gujarat

Information: Region with highest potential of tidal energy generation.

**GULF OF CAMBAY**

Separates: Kathiawar Peninsula and Gujarat

Location: Gujarat

Information: Tapi, Narmada, Mahi and Sabarmati rive drain into the Gulf.

**GULF MANNAR**

Separates: Sri Lanka and Southern India

Location: South east of Tamil Nadu

Information: Asia's first marine biosphere reserves.

**IMPORTANT LAGOONS AND LAKES****VEMBNAD LAKE**

State: Kerala

Information: Large sized lagoons of Kerala, have fertile alluvial islands, 63 km in length.

**KAYALS**

State: Kerala

Information: Popularly called back water in Kerala.

A chain of lakes which are connected with each other y canal.

Peaty soils of backwaters are called Kari in Kerala.

**CHILKA LAKE**

Maximum length -64km

Maximum breadth- 20km

Average width -150km

State: Orissa

Information: Situated to the south west of the Mahanadi Delta.

Enclosed by the sand pit, has an opening which permits sea connection.

Largest brackish water lake in Asia.

## **FRESH WATER LAKE**

### **WULAR LAKE:**

State: Jammu and Kashmir

Information: Largest fresh water lake of India

### **KOLLERU LAKE:**

State: Andhra Pradesh

Information: A part of the sea enclosed between the deltas of Godavari and the Mahanadi and has a number of islands in it.

### **PULICAT LAKE:**

State: Andhra Pradesh

Information: Situated on the southern border of Andhra Pradesh.

Lagoon formed due to enclosure by sand bar.

### **JAISAMAND LAKE:**

State: Rajasthan

Information: Largest fresh water lake of Rajasthan

### **NAKKI LAKE:**

State: Rajasthan

Information: A small natural lake near Mt. Abu surrounded by hills important as tourist place.

### **LOKTAK LAKE:**

State: Manipur

Information: Site hydroelectricity power generation an example of centripetal drainage.

## **SALINE WATER LAKES:**

### **SAMBHAR LAKE**

State: Rajasthan

Information: Largest Lake of Rajasthan lies on the border of Jaipur and Nagaur District.

Sodium chloride (common salt) and sodium sulphate are produced mainly by the Hindustan Salt Ltd.

### **DEEDWANA LAKE**

State: Rajasthan

Information: Situated near Deedwana Town of Nagaur District.

### **GEOLOGY TIME SCALE**

<b>CENOZOIC ERA</b>	<b>HOLOCENE</b>		
	<b>PLEISTOCENE</b>	From upper Pliocene to Pliocene	Upliftment of Outer Himalayas(Siwalik). Main Boundary Thrust(MBT)formed.
	<b>PLIOCENE</b>	From Miocene to Pliocene	Main Central Thrust(MCT)formed. Upliftment of Lesser Himalaya(Second Phase)
	<b>OLIGOCENE EOCENE</b>	From Eocene to Oligocene	Upliftment of Central Himalaya.
	<b>PALAEOCENE</b>	From the Cretaceous to Eocene	Collision of Indian and Eurasian plate begins.(Continent continent collision)- Indus Tsangpo Suture Zone formed (ITSZ)formed.
<b>MESOZOIC ERA</b>	<b>CRETACEOUS (LATE)</b>		Extensive eruption of basalt leading to formation of Deccan Lava Plateau.

			Enclosure of Tethys which start shrinking.
<b>PALAEOZOIC ERA</b>	<b>UPPER</b>	From Carboniferous to Permian	Deposition in three great graben like basins Mahanadi, Damodar and Godavari Known as Gondwana deposits.(Region with rich coal reserves)
	<b>LOWER</b>	From Cambrian to Carboniferous(Early)	Formation conspicuously absent
<b>PRECAMBRIAN</b>	<b>UPPER PROTEROZOIC</b>		Vindhyan syncline- devoid of metalliferous minerals. Vindhyan Mountain – formed of shales, slates, clay and limestone
	<b>MIDDLE PROTEROZOIC</b>		Satpura, Shillong Plateau Formation and deposition in Cuddapah depression.
	<b>EARLY PROTEROZOIC</b>		Delhi Aravalli orogeny took place
	<b>CLOSE ARCHEN</b>		Dharwar system- cover whole length of Karnataka(region with rich iron ore reserves)

	<b>LATE ARCHEAN</b>		Peninsular Gneiss and Eastern Ghat formation
	<b>MIDDLE ARCHEAN</b>		Singhbhum & Keonjhar Orogeny (rich iron orereserves)

## PHYSIOGRAPHIC REGIONS

### MAJOR DIVISIONS:

#### WESTERN HIMALAYA

(i) **Jammu and Kashmir state** – Comparatively cool, arid and semi-arid over a large area. Rains during summer season occurs only over a small area in the southern part.

(ii) **Punjab and Kumaun :**

Himalaya Region(between Nepal in the east to Jammu and Kashmir in the north west)- Wetter, more densely forested and more thickly populated region than Jammu and Kashmire state.

#### ASSAM REGION-includes

Arunachal Pradesh, Nagaland, Manipur, Mizoram, Meghalaya, Tripura and Assam.

- (i) Assam Himalaya
- (ii) The Brahmaputra or Assam Valley
- (iii) The Meghalaya Hills or Shillong plateau including he Garo, chasi, Jaintia and Mikir- It is a part of peninsular plateau and structurally a granitic block.
- (iv) The Eastern Highlands- Young fold mountains running from North to South

#### THE PLAINS OF NORTHERN INDIA

-Rainfall is the main criterion used for dividing this alluvial plain into regions.

(i) **The West Bengal Plain**-Rice and Jute producing area.

**(ii) The West Bengal duars and the Sikkim, Darjeeling, Himalaya-** Wetter than West Bengal Plain, semi-evergreen forest and tea plantation.

**(iii) The Ganga Plain**

Comprising alluvial plain of U.P and Bihar- Decrease in the amount of summer rainfall in the west.

**(iv) The Punjab-Haryana Plain**

Situated to the west of Yamuna and North of arid and semi-arid Rajasthan desert.- Extensive well irrigation coupled with canal-irrigation in the northern districts.

**(v)The Rajasthan desert**

Situated to the west of Aravalli-Region deficient in rainfall. Entirely different in character from the highly plains of the Ganga and Brahmaputra.

## **THE INDIAN PLATEAU**

### **Deccan Lava Region**

Includes plateau area of Maharashtra and neighbouring states of M.P., A.P. and Karnataka.- Receives annual rainfall between 50cm and 100cm. Region has Black soil and produces cotton, jowar and groundnut.

### **The North Western Plateau and the Aravalli Range.**

Situated to the north of Deccan lava region.

- Receives less rainfall during summer than the Deccan lava region and is relatively cooler in winter.

### **The Karnataka Plateau**

Situated to the south of the Deccan lava region-Relatively cooler in summer than neighbouring areas due to its high elevation.

### **Telengana and Rayalseema**

Situated to the East of Karnataka state – Receives less rainfall than coastal Andhra Pradesh.

### **The North Eastern Plateau**

Situated to the east of the Deccan lava region and includes interior part of Orissa, the Jharkhand Plateau and eastern M.P.-Regions very rich in minerals.

### **THE COASTAL LOWLANDS**

- More productive soils , heavier rainfall and better irrigation facilities than the Indian Plateau.

#### **Eastern Coastal Region**

- (i) Coastal Plain of Andhra Pradesh and Orissa in the North.
- (ii) Tamil Nadu Region - Receives rainfall during winter also.

#### **Western Coastal Region**

- (i) Gujarat Region North of Daman
- (ii) The Konkani Region between Daman in the north and Goa in the south.- Largely semi –arid, millet and cotton producing region. Dominated by port and industries of Mumbai.
- (iii) Goa and littoral of Karnataka, Kerala. – Plantation and wet crops producing region.

## **INDIA- MAJOR SOIL TYPES**

### **ALLUVIAL SOIL**

**DISTRIBUTION:** 7.7 lakh km<sup>2</sup> (24% of the country's total area)

#### **Formation:**

Formed due to deposition of alluvium brought by rivers over millions of years. Newer alluvium is called khadar and the old alluvium is called Bhangar  
Terai Soil: Bhabar infertile soil: Usar

#### **Characteristics:**

Very fertile soil, rich in potash and lime, deficient in humus, nitrogen and phosphorus.

#### **Regions&States:**

Northern plains or river basin: Punjab, Haryana, eastern part of Rajasthan, Gujarat, U.P., Bihar, West Bengal and Assam Valley.

## **BLACK COTTON SOIL OR REGUR SOIL.**

**Distribution:** 5.18 lakh km<sup>2</sup> (16%)

**Formation:** Formed over Deccan lava, gneiss and granites.

### **Characteristics:**

Black in colour due to presence of Fe and Mg. Deficient in nitrogen and phosphoric acid. Rich in potash and lime.

### **Regions&States:**

It covers lateaus of Maharashtra, South Orissa, Northern Karnataka, Parts of Rajasthan (two districts of Bundi and Tonk) Central and South Tamil Nadu.

## **RED SOIL**

**Distribution:** 5.18 lakh km<sup>2</sup> (16%)

**Formation:** The soil developed on old crystalline rock under moderate to heavy rainfall. It is in different shades of Red and Yellow.

### **Characteristics:**

Red colour due to presence of Fe. Deficient in organic plant material, phosphorus, nitrogen and lime content. Potash and alumina content are satisfactory. Acidic like laterite but less leached than laterite soil.

### **Regions& States:**

Larger part of Tamil Nadu, Andhra Pradesh and Karnataka. Southern parts of Maharashtra, Eastern Mp, parts of Orissa and Chotanagpur and Bundelkhand.

## **LATERITE SOIL:**

**Distribution:** 1.26 lakh km<sup>2</sup>

### **Formation:**

The Laterite soil is a result of intense leaching due to heavy tropical rains with alternate wet and dry seasons.

### **Characteristics:**

More acidic on higher areas due to presence of Al and Fe. Deficient in nitrogen, potash, magnesium and phosphoric acid.

**Regions & States:**

Tropical humid areas where rainfall is more than 200 cm e.g., Western Ghats, Karnataka, Tamil Nadu, Chotanagpur Plateau and slopes of North Eastern states.

**ARID OR DESERT SOIL**

**Distribution:** 1.42 lakh km<sup>2</sup>

**Formation:**

Sand and wind blown. Weathering due to temperature help in the formation of these soils. Developed under arid or semiarid conditions in the north western part of the country.

**Characteristics:**

Deficient in humus and nitrogen, rich in phosphorus, Due to less leaching mineral content is high.

**Regions& States:**

Punjab, Southern parts of Haryana, Western Rajasthan and Rann of Kachchh in Gujarat.

**MOUNTAIN SOILS****Formation:**

Formed by the deposition of organic matter derived from the forest growth, Characteristic of soil varies with variation of rocks, ground configuration and climate.

**Characteristics:**

Rich in humus but deficient in potash, phosphorus and like. Most suitable for plantation crops like tea, coffee etc.,

**Region& states:**

Himalayan region of Jammu and Kashmir, Himachal Pradesh. Also in Western and Eastern Ghats as well as in some region of Peninsular plateau.

## **PEATY AND ORGANIC SOIL:**

### **Formation:**

Developed in hot humid conditions as a result of accumulation of large amount of organic matter.

### **Characteristics:**

Dark and almost black in colour, very strongly acidic and saline.

### **Region & States:**

They are confined to depression caused by dried lakes in alluvial and coastal plain areas and developed under water logged environments. For example, Regions like Kari in Kerala, T.N., coastal Orissa, W.B. and North Bihar.

## **MEAN ANNUAL RAINFALL**

### **AREA OF HEAVY RAINFALL**

#### **Rainfall between 200- 400 cm**

The Arabian Sea branch of south west monsoon cause rainfall all along the western Ghats and Western coastal regions from June to September.

In North East India, the Bay of Bengal branch of monsoonal winds which causes monsoon in the southern hills of Shillong Plateau, Garo, Khasi, Jaintia hills (Meghalaya) and other states.

In These regions Orographic features play an important role because the moisture laden monsoon winds strike against physical barriers the like mountains, to cause heavy rainfall.

### **AREA OF MODERATE RAINFALL**

#### **Rainfall between 100 – 200 cm**

The average rainfall over North Indian Plain generally remains between 100 to 200 cm. Other areas of moderate rainfall are northeastern parts of Peninsular India, highlands of Central India, and Tamil Nadu.

**Rain fall between 60 – 100 cm** occurs in the upper Ganga Valley, eastern parts of Aravallis, eastern Gujarat, internal parts of Andhra Pradesh, Tamil Nadu, Maharashtra and Karnataka.

The intensity of rainfall decreases from east to west and north to south in the Northern Plains.

### **AREA OF SCANTY RAINFALL**

#### **Rain fall between 40 – 60 cm**

Parts of Punjab, Haryana, northern and western Rajasthan and Kachchh and Kathiawar regions of Gujarat. A narrow strip of land, lying in rain shadow areas of Peninsular India receives rainfall below 60cm.

The dry regions of Rajasthan, west of the Aravalli hills receives rainfall below 20cm, Northern parts of Gujarat and Jammu and Kashmir are other regions which receive scanty rainfall.

### **AREAS OF WINTER RAINFALL**

- (i) The northwestern parts of India-Jammu & Kashmir, Punjab and U.P. plains.
- (ii) Tamil Nadu: Rainfall due to North East monsoon.

## **INFORMATION ABOUT HIMALAYAN RIVERS**

### **THE INDUS SYSTEM(INDUS AND ITS TRIBUTORIES)**

#### **1.INDUS:**

**(One of the world's largest river)**

**Source:** Tibet, at an altitude of 5,180 m near Mansarovar Lake.

**Total length:**2,880km (709km in India)

**River Basin:** 1,165,00 sq.km (321,290 sq.km in India)

#### **Information:**

Mountain tributaries; Gilgit Shyok, Skardu, Shigoo.

Plain tributaries: Jhelum, Chenab, Ravi, Sutlej and Beas.

#### **2.JHELUM:**

**(An important river of Kashmir and is the main waterway)**

**Source:** Rises in Verinag at the foothills of Pirpranjol.

**Total length:** 400 km

**River Basin:** 28,490 sq.km (in India)

**Information:**

Its basin lies between Great Himalaya and Pir Pranjol Range.

It flows through Vale of Kashmir and Wular Lake before entering into Pakistan.

### **3.CHENAB**

**(largest of all the Indus tributaries)**

**Source:** Rises in snow covered Kullu hills of Himachal Pradesh.

**Total length:** 1,800 (in India)

**River Basin:** 26,755 sq.km (in India)

**Information:**

Flows through Chamba state for 160 km in the trough between the Greater Himalaya and the Pir Panjal.

### **4.RAVI**

**Source:** Kullu hills of H.P

**Total Length:** 725 km

**River Basin:** 5,957( in India)

### **5. SUTLEJ**

**(Second largest tributary of Indus)**

**Source:** Rakas Lake, at an altitude of 4,555 m in Tibet

**Total Length:**1050km (in India)

**River Basin:** 25,087 sq.km(in India)

**Information:**

It enters India through Shipki La and flows through Himachal Pradesh and Punjab before entering into Pakistan.

### **6. BEAS**

**Source:** Kullu hills at an altitude of 4,000 m

**Total Length:** 470 km (in India)

**River Basin:** 25,900 sq.km (in India)

**Information:** It joins Stulej near Harike.

## **THE GANGA SYSTEM (GANGA AND ITS TRIBUTARIES)**

### **The Ganga:**

Formed by two head streams **Alaknada** and **Bhagirathi** which join at **Devprayag**.

**Source:** Rises in Gangotri glacier of the Great Himalaya. Above Devprayag it is called as Bhagirathi and below it is referred to as the Ganga.

**Total Length:** Of its total length of 2,525 k.m, 1,450 k.m in Bihar and 520 km in West Bengal.

**River Basin:** 838,200 sq.km. Largest river basin in India, Covers more than fourth of the country's total surface

### **Information:**

Left Bank tributaries; Ramganga, Gomati, Ghagra, Gandak, Burhi Gandak, Kosi. Right Bank tributaries; Yamuna, Son. The Bhagirathi – Hooghly is the western most distributary of the river. Beyond Frakka it bifurcates itself into Bhagirathi Hooghly in West Bengal and Padma-Meghna in Bangladesh.

### **The Yamuna** (Largest and the most important tributary of Ganga)

**Source:** Rises in the Yamunotri glacier which is west of Ganga source.

**Total Length:** 1,376 km from its source to Allahabad where it joins Ganga.

**River Basin:** 3,59,000 sq. km

**Information:** Important tributaries; Chambal (rises in Mhow in the Vindhya) Sidh. Betwa and Ken.

### **The Son**

#### **(Right bank tributary of Ganga)**

**Source:** Rises from the Amarkantak Plateau

**Total Length:** 780 km

**River Basin:** 71,900 sq.km

**Information:** It joins Ganga near Ramnagar.

**Ramganga:**

**Source:** Rises in the Kumaun Himalaya near Nanital

**Total Length:** 690 km

**River Basin:** 32,800 sq.km

**Information:** It joins the left bank of Ganga near Chapra (Bihar).

**Ghagra:**

**Source:** Rises from east of Gangotri,

**Total Length:** 1,080 km

**River's Basin:** 127, 500 sq.km More than half of its basin is in Nepal.

**Information:** It joins the left bank of Ganga near Chapra(Bihar).

**Gandak:**

**Source:** Rises near the Nepal-China border at an altitude of 7,600m in the Central Himalaya.

**Total Length:**425 km(in India)

**River Basin:**48,500, 9,500 sq.km (in India)

**Information:** It flows through eastern Nepal, enters Bihar in Champaran district and turn south east to join the left bank of Ganga near Sonapur.

**Kosi**

(formed by the confluence of the Son Kosi, the Arun Kosi and the Tamur Kosi)

**Source:** Rises from the peak of Nepal Tibet and Sikkim

**Total Length:** 730km (in India)

**River's Basin:**86,900, 21,500 sq, km (in India)

**Information:** It flows through eastern Nepal, enters Bihar in Saharasa district and joins the left bank of Ganga below Bhagalpur (Bihar).

The river is notorious for shifting its course and causing floods, thus often termed as the 'Sorrow of Bihar.'

**Damodar**

(Sorrow of Bengal)

**Source:** Rises in Chota Nagpur plateau in the Palamau district (Jharkand)

**Total Length:** 541 km

**River's Basin:** 22,000 sq.km

**Information:** It joins the Bhagirathi Hooghly in West Bengal

## **THE BRAHMAPUTRA SYSTEM (BRAHMAPUTRA AND ITS TRIBUTARIES)**

**Brahmaputra or Tsangpo (Tibet)**

**Source:** Rises in the Chemayungdung glacier in the Kailash Range and Mariam La pass separates it from Mansarovar Lake.

**Total Length:** 2,900 km one of the longest rivers of the world.

**River's Basin:** 240,000 sq.km

**Information:** Important tributaries: Subansiri Kameng, Dhansiri, Dilhang, Lohit, Tista, Torsa. Manas; Burhi Dihing, etc. It flows through Tibet, India and Bangladesh and forms the large delta of the world along with Ganga.

## **PENINSULAR RIVERS**

**Mahanadi**

(An important river of the peninsular India)

**Source:** Northern foothills of Dandakarnaya near Shiawa in Raipur district.

**Length:** 857km

**River's Basin:** 141,600 sq.km in M.P., Orissa, Bihar and Maharashtra

**Information:** Left bank tributaries; Sheonath, Hasdeo, Ib and Mand. Right bank tributaries ; tel, Ong, and Jonk.

**Subarnarekha, Brahmi and Baitarni:**

**Information:**

These smaller river basins are interposed between the Ganga and the Mahanadi basin.

## THE GODAVARI RIVER SYSTEM (GODAVARI AND ITS TRIBUTARIES)

### Godavari:

**Source:** Trimbak plateau of north Sahyadri near Nasik (Maharashtra)

**Length:** 1465 (longest river of Peninsular India)

**River's Basin:** 312,812 half of which lies in Maharashtra and also in Andhra Pradesh, M.P., Orissa, and Karnataka.

**Information:** Largest river system of the Peninsular India and is next only to the Ganga system in India. Left bank tributaries; Penganga, Wardha, Wainganga, Indravati and Sabri Right Bank tributaries: Manjra.

## KRISHNA RIVER SYSTEM (KRISHNA AND ITS TRIBUTARIES)

### Krishna

(Second largest east flowing river of the Peninsula)

**Source:** North of Mahabaleshwar in the Western Ghats.

**Length:** Flows for a distance of 1,400 km to the Bay of Bengal

**River's Basin:** 258,948 sq.km. Lies in Karnataka, Andhra Pradesh and Maharashtra.

**Information:** Important tributaries: Bhima, Tungabhadra, Ghatprbha, Malaprabha, Musi and Koyna.

### Kaveri

**Source:** Rises in the Brahmgi Range of Western Ghats.

**Length:** 800km

**River's Basin:** 87,900 sq.km.- Shared by Kerala, Karnataka, and Tamil Nadu.

**Information:** Left bank tributaries: Herangi, Hemavati, Shimsha, Arkavati, etc.  
Right bank tributaries: Kabani, Bhavani and Amravati etc.

## WEST FLOWING RIVER

**Sabarmati:**

**Source:** Mewar hills in Aravalli Range.

**Length:** 320km

**River's Basin:** 21,674 sq. km. Shared by Rajasthan and Gujarat.

**Information:**

Important tributaries: Hathmati, Sedhi, Wakul, etc.

**Mahi**

**Source:** Vindhya Range at an altitude of 500 m.

**Length:** 533km

**River's Basin:**34,862sq.km

**Information:** Madhya Pradesh, Rajasthan and Gujarat share the river basin.

**Narmada**

(Largest west flowing Peninsular river)

**Source:** Rises in Amarkantak in Madhya Pradesh.

**Length:** 1312 km ( from its source to its estuary in the Gulf of Khambhat)

**River's Basin:**98,796 sq.km which it shared by M.P. Gujarat and Maharashtra.

**Information:**

Left bank tributaries: Tawa Burhner, etc. Right Bank tributaries: Hiran world's famous Dhuan Dhar or Cloud of Mist Falls is located on this river. It flows through a rift valley between the Vidhyas and the Satpura Range.

**Tapi or Tapi**

(Second largest of west flowing river of Peninsula)

**Source:** Rises near Multai on the Satpura Range in Betul district (M.P)

**Length:** 740 km

**River's Basin:** 65,145 sq.km in M.p., Maharashtra and Gujarat

**Information:** Left bank tributaries: Purna, Veghar, Girna, Bari and the Punjhar  
Right Bank tributaries: Betul, Arunavati, Ganjal and Gomai. It is also Known as the 'twin' or handmaid of the Narmada.

## RIVER VALLEY PROJECTS

### **Bhakra Nangal Multipurpose Project.**

Bhakra dam: One of highest gravity dam in the world.

Govind Sagar Lake (H.P) is a reservoir.

River: Sutlej(A tributary of Indus)

State:Joint venture of Punjab, Haryana and Rajasthan

Purpose: Irrigation, Hydro electricity.

### **Thein Dam Project:**

River: Ravi ( A tributary of Indus)

State: Punjab

Purpose: Irrigation, hydroelectricity

### **Dulhasti project:**

River: Chenab (A tributary of Indus)

State: Jammu and kashmir

Purpose: Part of the prgramme of cascade development for irrigation

### **Salal project:**

River: Chenab

State: Jammu and Kashmir

Purpose: Irrigation

### **Beas project:**

River: Beas (A tributary of Indus)

State: Joint venture of Punjab, Haryana and Rajasthan

Purpose: Hydro electricity

### **Sharda Sahayak Project:**

River: Ghagra ( left bank tributary of Ganga)

State: Uttar Pradesh

Purpose: Irrigation

### **Ramganga multipurpose project**

River: Chuisot stream near Kalabagh

State: Uttar Pradesh

Purpose: Irrigation, hydroelectricity

### **Banasagar project**

River: Son

State: M.P., Bihar and U.p.,

Purpose: Irrigation

Rihand scheme Reservoir: Govind Ballabh Sagar (U.P)

River: Rihand

State: Uttar Pradesh

Purpose: Hydroelectricity for the development of south eastern industrial region of U.P.

### **Damodar Valley multipurpose project**

Four dams: Tilaiya and Maithon (on the Barakar River), konar (konar River) and Panchet (Damodar River)

River: Damodar

State: West Bengal(also shared by Jharkhand)

Purpose: Flood control, Irrigation, Hydroelectricity.

### **Mayr kashi project**

River: Mayrkashi

State: West Bengal (also shared by Jharkhand)

Purpose: Flood control, Irrigation, Hydroelectricity.

### **Mayur Kashi project**

River: Mayrkashi

State: West Bengal

Purpose: Irrigation, Hydroelectricity

### **Hirakud multipurpose project (world's longest main stream dam)**

River: Mahanadi

State: Orissa

Purpose: Irrigation , Hydroelectricity

### **Poochampad Project**

River: Godavari

State: Andhra Pradesh

Purpose: Irrigation

### **Jaykawadi Project:**

River: Godavari

State: Maharashtra

Purpose: Irrigation

Nagarjuna Sagar

River: Krishna

State: Andhra Pradesh

Purpose: Irrigation, Hydroelectricity

### **Upper Krishna Project**

River: Krishna

State: Andhra Pradesh

Purpose: Irrigation

### **Tungbhadra multipurpose project**

River: Tungbhadra (A tributary of Krishna)

State: Joint venture of Andhra Pradesh and Karnataka

Purpose: Irrigation, Hydroelectricity.

### **Ghat Prabha project**

River: Ghatprabha ( A tributary of Krishna)

State: Andhra Pradesh and Karnataka

Purpose: Irrigation

### **Malprabha project:**

River: Malprobha( A tributary of Krishna)

State: Karnataka

Purpose: Irrigation

**Bhima project:**

River: Bhima

State: Maharashtra

Purpose: Irrigation

**Mettur projects**

River: Kavery

State: Tamil Nadu

Purpose: Hydroelectricity

Shivasamudram Scheme on Cauvery Falls

River: kavery

State: Karnataka

Purpose: Hydroelectricity

**Kundah project:**

River:Kundah

State: Tamil Nadu

Purpose: Hydroelectricity

**Sharavati project (near Jog falls)**

River: Sharavati

State: Karnataka

Purpose: Hydroelectricity

**Chambal project:(Gandhi Sagar Dam M.P), Rana Pratap Sagar and Jawahar Sagar Dam or Kota Dam**

River: Chambal (a tributary of Yamuna)

State: Rajasthan, Madhya Pradesh

Purpose: Irrigation, Hydroelectricity

**Kakrapara Project**

River: Tapi

State: Gujarat

Purpose: Irrigation

**Ukai project**

River: Tapi

State: Gujarat

Purpose: Irrigation

**Sardar Sarovar Project**

River: Narmada

State: Gujarat, M.P., Rajasthan Maharashtra

Purpose: Irrigation, Hydroelectricity

**Tawa project:**

River: Tawa ( A tributary of Narmada)

State: Madhya Pradesh

Purpose: Irrigation

**Mahi project (Jamnalal Bajaj Sagar)**

River: Mahi

State: Gujarat

Purpose: Irrigation

**Matatila project:**

River: Betwa

State: Uttar Pradesh, Madhya Pradesh,

Purpose: Irrigation, Hydroelectricity.

**FOOD CROPS DISTRIBUTION**

**RICE(KHARIF CROP)**

**Conditions Required**

**Temperature:** not below 21° C

**Rainfall:** More than 125cm

**Soil:** Clayey loam best suited

**Distribution (in order of Production)**

1. West Bengal

2. U P
3. Andhra Pradesh
4. Punjab
5. Tamil Nadu
6. MP
7. Orissa
8. Bihar
9. Assam
10. Karnataka
11. Maharashtra
12. Haryana
13. Kerala

## **WHEAT (RABI CROP)**

### **Conditions Required**

**Temperature:** 10 – 15° C (winter) 21° - 26° C (Summer)

**Rainfall:** 75cm -100cm (moderate)

**Soil:** Well drained fertile, friable loams, and clay loams

### **Distribution (In order of Production)**

1. Uttar Pradesh
2. Punjab
3. Haryana
4. Madhya Pradesh
5. Rajasthan
6. Bihar
7. Gujarat
8. Maharashtra

## **MILLETS**

### **BAJRA**

**Condition Required****Temperature:** 25° - 30° C**Rainfall:** 40 – 50cm**Soil:** Poor light sandy soils, black and red soils**Distribution (in order of Production)**

1. Rajasthan
2. Maharashtra
3. Gujarat
4. Uttar Pradesh
5. Haryana

**BARLEY****Condition Required****Temperature:** 10 - 15° C**Rain fall:** 75 cm to 100cm**Soil:** Light clay and alluvial soil**Distribution(In order of production)**

1. Uttar Pradesh
2. Rajasthan
3. Madhya Pradesh
4. Haryana
5. Punjab
6. Bihar
7. Himachal Pradesh
8. West Bengal

**CASH CROPS****COTTON****Conditions Required**

Kharif crop of tropical and subtropical areas.

**Temperature :** 21° - 30° C but not below 21° C.

210 frost free days.

**Rainfall:** 50 – 100cm or irrigation facility.

**Soil:** Deep black soil (regur), even grows in alluvial soils and laterite soils.

**Distribution ( In order of Production)**

1. Punjab
2. Maharashtra
3. Gujarat
4. Haryana
5. Andhra Pradesh
6. Rajasthan
7. Karnataka
8. Tamil Nadu
9. Madhya Pradesh

## **JUTE**

### **Condition Required**

Second important fibre crop of India, crop of hot and humid climate.

**Temperature:** 24° - 35° C

**Rainfall:** heavy rainfall of 120 – 150 cm with 80 – 90 percent of relative humidity.

**Soil:** light sandy or clayey loams.

**Distribution ( In order of Production)**

1. West Bengal (70 percent of the production, over 60 percent of the area)
2. Bihar
3. Assam
4. Orissa

## **SUGAR CANE**

**Temperature:** 21° - 27° C

**Rainfall:** 70 – 150 cm or irrigation facilities with high humidity.

**Soil:** tolerate any type of soil that can retain moisture.

**Distribution (In order of Production)**

1. Uttar Pradesh
2. Maharashtra
3. Tamil Nadu (highest yield/hectare)
4. Karnataka
5. Andhra Pradesh
6. Gujarat
7. Bihar
8. Haryana
9. Punjab
10. Orissa

## **TOBACCO**

### **Condition Required**

Plant of tropical and subtropical climates and frost is harmful

**Temperature:** 16° - 35° C

**Rainfall:** 50 – 100 cm or irrigation facilities

**Soil:** Well- drained friable loam

**Distribution (In order of Production)**

1. Gujarat (90 percent of Tobacco from Vadodara and Kheda districts).
2. Andhra Pradesh (West and East Godavari, Prakasham, Kurnool and Nellore are the main producing districts) Other areas of minor production (a) Uttar Pradesh (b) Karnataka (c) West Bengal.

## **PLANTATION CROPS**

### **TEA**

#### **Condition Required**

Tropical and subtropical plant, which thrives well in hot and humid climate.

**Temperature:** 20° - 30° C

**Rainfall:** 150 – 300cm (well distributed)

**Soil:** forest soil rich in humus and iron content is the best suited.

**Distribution ( In order of Production)**

1. Assam (the Brahmaputra valley, Soorma valley)
2. West Bengal (the Duars, Darjeeling)
3. Tamil Nadu (highest yield per hectare)
4. Kerala (Kottayam, Kollam and Tiruvananthapuram district).

Other areas of minor production

- (a) Tripura
- (b) Karnataka
- (c) Uttar Pradesh
- (d) Himachal Pradesh (Kangra valley)

## **COFFEE**

Condition Required

Crops of hot and humid climate

**Temperature:** 15° - 28° C but does not tolerate frost.

**Rainfall:** 150 – 250cm

**Soil:** well drained rich friable loams with rich in humus, iron and calcium.

**Distribution (In order of Production)**

1. Karnataka (80 percent of total coffee production)
2. Kerala (13 percent of total production)
3. Tamil Nadu

## **RUBBER**

Condition Required

**Temperature:** 25° - 35° C

**Rainfall:** about 300 cm (well distributed throughout the year)

**Soil:** well drained loamy soil of hilly region.

**Distribution ( In order of Production)**

1. Kerala(above 90 percent of total production, Kottayam, Ernakulum, Kozhikode and Kollan are the main producing districts)
2. Tamil Nadu
3. Karnataka

## OTHER CROPS

### MAIZE

**Condition Required**

Rainfall Kharif Crops

**Temperature:** 21° - 27° C

**Rain fall:** 50 – 100 cm

**Soil:** well drained alluvial, or red loams

**Distribution (In order of production)**

1. Bihar
2. Uttar Pradesh
3. Karnataka
4. Andhra Pradesh
5. Madhya Pradesh
6. Rajasthan
7. Himachal Pradesh

### JOWAR

**Conditions Required**

Both Kharif and Robi crops

**Temperature:** 26° - 33° C for kharif crops and not below 16°C for rabi crops

**Rainfall:** >30 cm but <100 cm; rainfed crop in dry farming areas

**Soil:** Variety of soil including clayey, sandy

**Distribution ( In order of Production)**

1. Maharashtra
2. Karnataka
3. Madhya Pradesh
4. Andhra Pradesh
5. Tamil Nadu
6. Uttar Pradesh
7. Rajasthan
8. Gujarat

**RAGI**

Conditions Required

Temperature: 20° - 30° C

Soil: red, light black and sandy loams

**Distribution ( In order of Production)**

1. Karnataka
2. Tamil Nadu
3. Maharashtra
4. Uttar Pradesh
5. Andhra Pradesh

**GRAM**

Conditions Required

Most important of all pulses

Temperature: 20° - 25° C

Rainfall: 40 – 45cm

Soil: Grows well in loamy soil

**Distribution (In order of Production)**

1. Madhya Pradesh

2. Uttar Pradesh
3. Rajasthan
4. Haryana
5. Maharashtra (These five states produce over 90 percent gram of India)

## **NON METALLIC MINERALS**

### **MICA, ASBESTOS, GYPSUM, LIMESTONE, DOLOMITE, ATOMIC MINERALS DIOMAND**

#### **MICA:**

(Abhrak) valuable mineral in electrical and electronic industry.

**Distribution:** Bihar – Gaya, Hazaribagh (now in Jharkhand), (Largest mica producing state of India)

Andhra Pradesh – Nellore.

Rajasthan – Ajmer, Bewar, Tonk, Bhilwara, Udaipur, and Banswara.

#### **LIME STONE:**

75% used in cement industry 16% in irons and steel industry. 4% in chemical industry.

#### **Distribution:**

Madhya Pradesh- Satna, Jabalpur, Betul, Sagar and Rewa.

Chhattisgarh – Bilaspur, Raigarh, Raipur and Durg.

Andhra Pradesh-Adilabad, Warangal, Nalgonda, Mohboobnagar, Guntur

Karnataka – Bijapur, Gulbarga, Shimoga (cement grade limestone)

Rajasthan – Jhunjhunu, Bikaner, Nagaur, Jodhpur, Pali, Sirohi, Udaipur

Chittorgarh, Ajmer, Sawai Madhopur, Bundi, Banswara.

Gujarat – Banaskantha, Amreli Junagadh, Surat, Kachchh, Kheda and Panchmahals.

#### **DOLOMITE:**

#### **Distribution:**

Bihar –Rohtas

Jharkhand – Chaibasa in Sighbhum district and Palamau district.

Orissa (largest produces)-Sundargarh, Sambalpur, and Koraput districts

Madhya Pradesh – Chhindwara, Jhabua, Jabalpur, Balaghat,

Chhatisgarh – Bilaspur, Durg and Bastar district.

Gujarat – Bhavnagar and Vadodara district.

### **ASBESTOS:**

Used for making fire proof cloth, rope, paper, paint, etc. and also asbestos cement products like sheets etc.

#### **Distribution:**

Rajasthan – Alwar, Ajmer, Pali, Udaipur and Dungarpur districts,

Andhra Pradesh – Cuddapah district.

Karnataka – Shimoga, Chickmagalur, Hassan, Mandya and Mysore districts.

### **GYPSUM:**

Mainly used in making of ammonia sulphate fertilizer in cement industry and in making plaster of paris, etc.

#### **Distribution:**

Rajasthan – (largest producer of gypsum in India): Churu, Ganganagar, Bikaner, Jaisalmer, Nagaur and Pali districts produce 95 percent of the total gypsum of India.

Jammu and Kashmir – Baramula and Doda districts.

Tamil Nadu – Tiruchirapalli

### **DIAMON:**

#### **Distribution:**

Madhya Pradesh – Panna

Andhra Pradesh – Anantpur, Kurnoot

Marnataka – Bellary.

## **ATOMIC MINERALS (URANIUM, THORIUM)**

**URANIUM:****Distribution:**

Bihar – Gaya

Jharkhand – Hazaribagh and Singhbhum.

Uttar Pradesh – Saharanpur

Rajasthan – Udaipur.

Kerala – Uranium from monazite sand of coastal regions.

**THORIUM:****Distribution:**

Bihar, Tamil Nadu, Kerala and Rajasthan.

**METALLIC MINERALS**

**(IRON, BUXITE, COPPER, LEAD/ZINC, MANGNESE, MAGNESIUM, GOLD.)**

**IRON:****Distribution:**

Jharkhand: Singhbhum (Noamundi, Sindurpur, Kiriburu)

Orissa – Mayurbhanj( Gurumahisani., Badampahar, Sulaiput), Keonjhar

Madhya Pradesh – Jabalpur, Balaghat

Chhatisgarh – Durg (Dalli Rajara), Bastar (Bailadila)

Andhra Pradesh – Guntur, Kurnool

Tamil Nadu – Salem, Tiruchirapalli

Maharashtra – Surajgarh, Lohra-Piplagaon Ratnagir.

Kerala – Kozhikode

**BAUXITE:**

**Distribution:**Jharkhand – Palamanu, Ranchi

Madhya Pradesh – Katni, Amarkantak, Maikata Range.

Chhattisgarh – Sarguja, Raigarh and Bilaspur.

Orissa – Kalahandi, Koraput

Tamil Nadu – Salem, Nilgiri, Coimbatore and Madurai.

Gujarat – Sabarkantha, Jamnagar, Surat.

Maharashtra – Kalaba, Ratnagiri, Kolhapur.

Karnataka – Belgaum.

## **COPPER**

### **Distribution:**

Jharkhand – Hazaribagh, Singhbhum.

Madhya Pradesh – Balaghat (Malanjkhand belt)

Andhra Pradesh – Khammam, Guntur and Kurnool

Rajasthan – Jhunjhunu, Khetri, Alwar, Bhilwara and Udaipur.

Maharashtra – Chandrapur

Karnataka – Chitradurga, Hassan.

## **LEAD AND ZINC:**

### **Distribution:**

Sikkim, Meghalaya, Andhra Pradesh (Cuddapah)

Rajasthan- Zawar(Udaipur) Aguncha – Rampura (Bhilwara)

Gujarat \_ Banaskantha, Panchmaha, Vadodra, Surat.

## **LIGNITE COAL:**

### **Distribution:**

Tamil Nadu – Neyveli

Jammua and Kashmir, Rajasthan (Palana in Bikaner dist.)

Gujarat (Umrasar)

## **TERTIARY COAL FIELD:**

### **Distribution:**

Assam – Makum (Sibsagar), Najtra, Janji

Meghalaya, Arunachal Pradesh(Namchik, Namphuk)

## **OIL FIELDS:**

### **Distribution:**

Assam – Digboi, Naharkatia, Moran, and Sibsagar.

Gujarat – Mehsana, Cholka, Kalol, Nawagam, Ankaleshwar and Kosamba

## **OFF SHORE OIL FIELDS**

### **Distribution:**

1. Mumbai High
2. Bassein
3. Ravva
4. Aliabet

## **OIL REFINERIES:**

### **Distribution:**

Assam – Digboi(IOC), Guwahati (IOC), Bongaigaon

Bihar – Barauni (IOC)

Uttar Pradesh – Mathura

Gujarat – Koyali, Jamnagar (largest oil refineries)

Maharashtra – Mumbai (BPCL)

Karnataka – Mangalore(MRPL)

Kerala – Kochi(CRI)

West Bengal – Haldia (IOC)

Andhra Pradesh – Vishakhapatnam (HPCL)

Tamil Nadu – Chennai (MRI)

## **IMPORTANT INDUSTRIES OF INDIA**

### **COTTON TEXTILE INDUSTRY:**

The oldest and the largest organized modern industry of India.

### **MANUFACTURING CENTRES:**

Maharashtra (122mills)

- Mumbai (63 mills), largest centre,
- Other centre: Nagpur, Amaravati, Wardha, Jalgaon, Aurangabad, Pune, Satara, Scholapur, and Kolhapur.

## Gujarat (118 mills)

- Ahmedabad (73 mills), Second largest centre after Mumbai
- Other centres: Porbandar, Rajkot, Vadodra, Surat.

## Madhya Pradesh:

- Bhopal, Indore, Dewas, Ujjain, Ratlam, Gwalior, Jabalpur, etc

## Tamil Nadu

- Coimbatore. (Most important centre). Other centres – Chennai, Perambur, Salem, Tirchirapalli, Madurai, Tirunelveli, Tuticorin, etc,

## West Bengal

- Kolkata (Most important centre).
- Other centre: Howrah, Serampur, Murshidabad, etc.

## Uttar Pradesh

- Kanpur (largest centre). Other centres: Varanasi, Mirzapur, Lucknow, Agra, Modinagar, Saharanput, etc.

## Rajasthan

- Jaipur, Pali, Bhilwar, Kota, Udaipur, Ganganagar.

## Karnataka

- Bangalore, Mysore, Mangalore, Chitradurga, Belgaum.

## Orissa

- Cuttack

## Punjab

- Amritsar, Dhariwal, Phagwara, Ludhiana.

## Kerala

- Thiruvananthapuram, Alleppey

## Bihar

- Patna, Gaya, Bhagalpur.

## Andhra Pradesh

- Hyderabad, Secunderabad, Rajahmundry, East Godavari and Udayagiri.

## **JUTE TEXTILE INDUSTRY**

- First large scale industry was established in 1855 at Rishra,(near Serampur) in Bengal.
- This industry suffered a great setback because of partition in 1947 because 80 percent of Jute producing area went to Bangladesh while all Jute mills remained in India

### **MANUFACTURING CENTRES**

West Bengal (56 mills)

- Kolkata (Calcutta)
- Other centres: Rishra, Serampore, Titagarh etc. mainly along the both banks of Hooghli river.

### **ANDHRA PRADESH**

- Vishakapatna, Eluru, Guntur and Ongole.
- Other important states:

### **UTTAR PRADESH**

- Kanpur, Gorakhpur and Shahjawan.

BIHAR

- Darbhanga, Samastipur, Purnea, Katihar and Gaya

### **CHHATTISGARH**

- Raigarh

### **ORISSA**

- Cuttack

## **WOOLLEN TEXTILE INDUSTRY**

- One of the oldest textile Industries of India

### **MANUFACTURING CENTRES**

**PUNJAB (257 mills)**

- Dhari (largest centre).
- **Other centres:** Amristsar, Ludhianan and Patiala

## **MAHARASHTRA (31 mills)**

- Mumbai (industry based on imported wool)
- **Other centres:** Jalgaon, Ambernath.

## **UTTAR PRADESH**

- Kanpur (Largest Woollen Textile centre in the state)
- **Other centres:** Modinagar, Allahabad, Varanai and Mirzapur.

## **GUJARAT**

- Jamnagar, Kalol, Vadodara.

Other important states:

Karnataka : Bangalore, Bellary      Tamil Nadu: Chennai, Salem

Jammu and Kashmir: Srinagar      Himachal Pradesh: Kullu

West Bengal: Kokata.

## **SILK & SYNTHETIC FIBRE INDUSTRY**

### **MANUFACTURING CENTRES**

Karnataka: Bangalore, Kolar, and Mysore

West Bengal: Murshidabad, Bankura, 24 Parganas and Birbhum district

Jammu and Kashmir: Srinagar (big centre);

Other Centres: Baramula, Anantnag, Udhampur, Jammu

Other important states:

Bihar: Bhagalpur (famous for silk industry), Patna, Gaya.

Jharkhand: Palamu, Hazaribagh.

Madhya Pradesh: Birlanagar, Viragram and Indore.

Uttar Pradesh: Varanasi

### **CHEMICAL INDUSTRIES:**

Fourth largest set of industries after textiles, iron and steel and engineering industries.

Products of chemical industry are more multifarious than of any other industries of equal importance.

## **HEAVY INORGANIC CHEMICALS**

Alkali Chemicals:

### **Caustic Soda**

Widely used to manufacture paper, textile, soaps and detergents and alumina.

### **Manufacturing Centres**

**West Bengal:** Kolkata, Titagarh **Gujarat:** Porbandar, Mithapur

**Maharashtra:** Thane, Nepa paper mills in Nagpur

### **Soda Ash**

Sodium Chloride and Limestone mainly used in the manufacture of soap, paper, textile, glass, detergents and refined petroleum.

Manufacturing Centres:

Gujarat: Mithapur, Okha, Uttar Pradesh: Varanasi Punjab: Nangal

Tamil Nadu: Tuticorin

### **Acids**

Sulphuric Acid:

Used for manufacturing synthetic fibre, fertilizer, plastics, paints and dyestuffs.

Nitric Acid:

Bulk of production from fertilizer factory.

Manufacturing Centres:

Rajasthan: Hindustan Zinc, Debari, Hindustan Copper, Khetri

Maharashtra: Mumbai, FCI in Trombay (largest producer)

Tamil Nadu: Chennai Jharkhand: Jamshedpur Kerala: Alwaye

West Bengal: Kolkata, Delhi

## **ORGANIC CHEMICALS**

## **Petrochemical Industry:**

Raw materials derived from petrochemical resources and industries are concentrated near petroleum and coal fields region.

Used to produce petroleum byproducts like synthetic fibres, plastics and rubber.

Manufacturing centres:

Trombay: Union Carbide India Ltd. (First petrochemical industry)

Koyali: Udex plant      Vadodara: Indian Petrochemical Ltd (IPCL), first public sector enterprises. Chennai: Madras Petrochemical Ltd. Thane: National Organic Chemicals Ltd.      Bongaigon: Second public sector enterprises.