

**GEOGRAPHY – MODULE 3 - DRAINAGE SYSTEM**

**DRAINAGE SYSTEM**

- Indus valley civilization
- Flow of water through well-defined channels \_ drainage
- Network of such channels – drainage system
- The drainage pattern results in – geography, landscape, topography, slope, etc.
- Drainage area – 77% - Ganga, Brahmaputra, Mahanadi, Krishna- Bay of Bengal
- 23% - Narmada, Tapti, Mahi, Periyar – Arabian sea.
- Catchment area of the river- river drain is a specific area.
- Drainage basin- area drained by the rivers and tributaries.
- Watershed area- boundary line separating one basin from another.

**Major drainage pattern**

Dendritic	Tree branches with twigs	Northern plain
Radical	Rivers originate from a hill and spreads in all directions	Amarkantak
Centripetal	Rivers discharge water from all directions into a lake	Loktak lake in Manipur
Trellis	Primary tributaries of the main river flow parallel each other and secondary tributaries join them at right angles	Rivers in the upper part of Himalayan region.

**Classification of drainage**

- Based on the mode of nature, origin, characteristics drainage is classified into:
  - Himalayan drainage and peninsula drainage
  - Indus, Ganga, Brahmaputra- major Himalayan drainage.
  - **Indus**

## **E ▶ ENTRI**

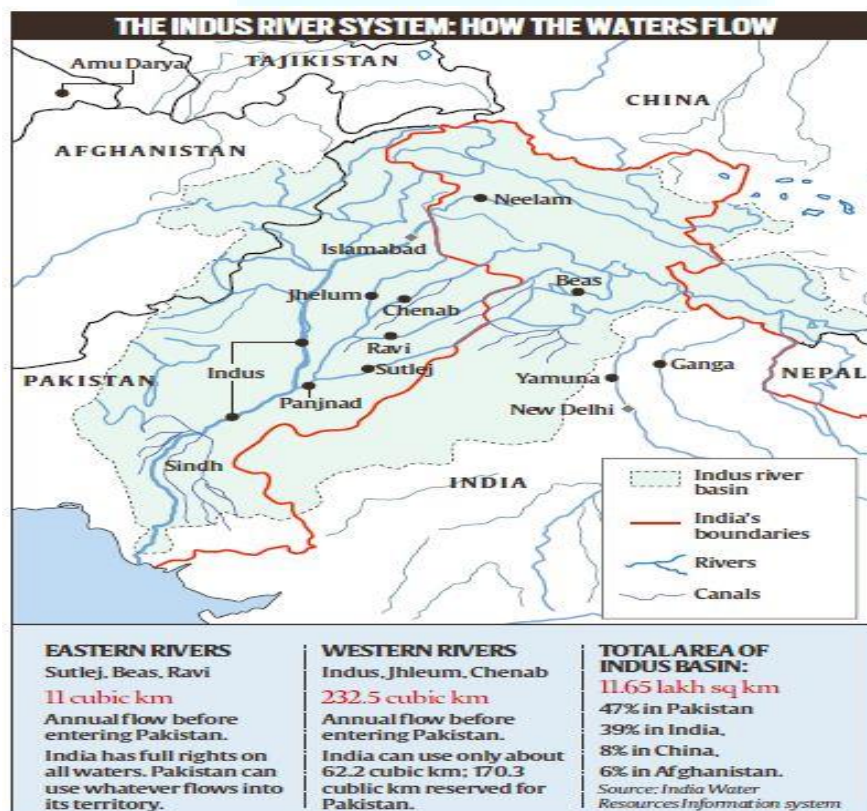
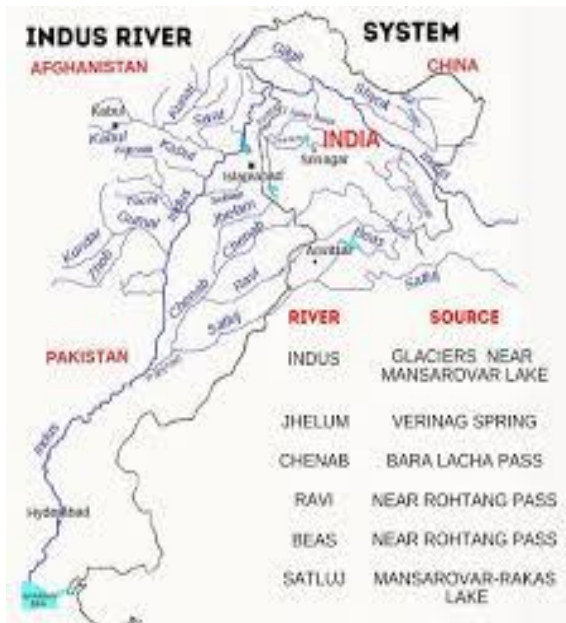
- Total strength- 2880 km
- India- 1114 km
- Another name – Sindhu.
- Western most part of Himalayan River.
- Originates in the glaciers of Bikhar Chu in the Tibetan region I the Kailash Mountain ranges.
- In Tibet- Indus is known as - lions mouth – Singi Khamban.
- Indus enters into Pakistan near Chillar in the Dardistan region.



### **Major tributaries:**

- Shylok, Gilgit, Zaskar, Hunza, Nubra, Shigar, Gasting, Dras – Upper Part.
- Satluj, Beas, Ravi, Chenab, Jhelum – Lower Part.
- Indus discharges into the Arabian sea near – Karachi, Pakistan.

## ENTRI



- **Jhelum** – rises from: spring at Verinag – foot of the Pir Panjal – flows through: Srinagar and Wular Lake – enters into Pakistan – 813 km – joins with Chenab: Jhang in Pakistan. Another term of Jhelum – Hidaspus.
- Neelum River or Kishenganga River – largest tributary of Jhelum.
- Kishanganga Project.

## E ▶ ENTRI

### ➤ Tulbul Project

### ➤ Uri Project

- Waters of Jhelum are allocated to Pakistan under Indus Water Treaty.
- Ends at confluence of Chenab in Pakistan.
- **Chenab** – largest tributary of Indus – formed by two streams – Chandra and Bhaga – Chandrabhaga – flows about 1180km - enter into Pakistan – originates: near Bara Lacha Pass in Lahul Spiti part of Zaskar range – Himachal Pradesh.
- Flows through the Punjab Plain in Jammu and Kashmir.
- 1960 – September – 10 – Indus Water Treaty – Terms: the water of Chenab is allocated to Pakistan – India: Jawaharlal Nehru and Pakistan: Ayub Khan.
- Baghliar Dam – constructed.
- Chenab Bridge – world's highest railways bridge – river crossing in Jammu and Kashmir.
- **Ravi** – originate: Rohtang pass in the Kulu hills of Himachal Pradesh – chamba valley – elevation: 4000m above mean sea level.
- Flow – north westerly course – perennial river – length: 720km.
- Water are allocated to India under the Indus Waters Treaty.
- Ranjit Sagar Dam – multipurpose project – their village.
- Ur river, Chamba town,
- Ujh Multipurpose Project
  
- **Beas** – originate: Rohtang Pass in Himachal Pradesh - enters into Punjab plain – meet with Satluj near Harike.
- Manali situated in the right banks of this river.
  
- **Satluj** – Langchen Khambab: Tibet – originate: Rakas Lake near Man Sarovar – altitude 1555m – passes through Shipki La – enters into Punjab Plain – feeds the canal of the Bhankra Nangal project. Gopin Sagar Project.

LEFT BANK TRIBUTARIES	RIGHT BANK TRIBUTARIES
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Zaskar, Suru, Soan, Jhelum Chenab, Ravi, Beas, Satluj, Panjnad	Shyok, Gilgit, Hunza, Swat, Kunnar, Kurram, Gomal, Kabul
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(Chudak – Suru)

### Shylok River

- Rise from – Karakoram range – flows through Northern Ladakh, Jammu and Kashmir – length 550 km – originate: Rimo Glaciers – widened when confluence with Nubra river – south eastern range of karakoram – form V shape bend around.

### Nubra River

- Main tributary of Shylok river.
- Originate: Nubra Glaciers – east of Saltoro Kangri Peak – meanders towards south east – join Shylok river downstream of Shylock valley – base of Ladakh range – altitude: 3048m.
- Catchment area – devoid of vegetation and human habitation – due to high elevation and lack of rainfall.

### Shigar River

- Rises from – Hispar Glaciers
- Joins Indus at – Skardu.
- Descends down a very steep gradient.
- Catchment is influenced by – action of glaciers.
- Course – Ladakh region.

### Gilgit River

- Course through – Ladakh region.
- Originates: glaciers at the northwest boundary of Himalayas.
- Entire catchment area – bleak and desolate.
- Bunji – main human settlement – along with Ghizar and Hunza related place.

### Hunza River

- Tributary of Gilgit river.
- Rises from: glacier north of the karakoram range in the northwest part of JK.
- Flows southeast – cut across the karakoram range – through spectacular gorge.

## ENTRI

- Downstream – hunza river follow – south westerly direction.
- Then cut across karakoram range and change course o southeast – lower course – merge with Gilgit – upstream iof Bunji – latter river empties itself into the Indus.

### Zaskar River

- Human settlements are sparse.

### Kishanganga River

- Originates: Drass in Kargil district of Jammu and Kashmir.
- Neelum river enters Pakistan from India – near Line of Control – runs west – meet Jhelum River.
- Another name – Neelum River – due to sky cold water or due to the precious stone: ruby or Neelum.
- Famous for – ice cold water and trout fish.

### Ganga River

- The ganga originates from the Gangothri glacier near gaumukh (3900m) in the Uttarkashi district of Uttarakhand.
- The river when it originates from the Gangotri glacier is known as Bhagirathi.
- At Devaprayag, the Bhagirathi merges with another river, i.e., the Alakananda and from here, it is known as the Ganga.
- The Alakananda originates from the Satopanth glacier above Badrinath.
  
- The major tributaries of the Alakananda are the **Dhuli** and the **Vishnuganga** these two rivers meet Joshimath / vishnuprayag.
- Some other tributaries of the Alaganandha are the pindar (joins at karna prayag and the Mandagini or kali Ganga joins at Rudra prayag)
- The total length of ganga in India is 2510 km which is shared by Uttarakhand (110km), Uttar Pradesh (1450 km), Bihar (445km), and west Bengal (520km)
- The Ganga River system is the largest river system in India.
  
- The Son is major right bank tributary of the Ganga; however, major left bank tributaries are the Ramganga, the Gomathi, the Ghaghara, the Gandak, The kosi, and the Mahananda.
  
- Originating from the Yamhnotri glacier on the western slopes of Bander punch range (6316 km), the Yamuna is the longest tributary of the ganga.
- The Yamuna joins the Ganga at Allahabad (prayag) Uttar Pradesh.

## E ▶ ENTRI

- The **Chambal**, the **Sind**, the **Batwa**, and the **Kenon** are the right bank tributaries of the **Yamuna** and the **Hindan**, the **Rind**, the **Sengar**, the **Varuna**, etc. are the left bank tributaries.
- The **Chambal** rises near **Mhow** in the **Malwa plateau** of **Madhya Pradesh**.
- The **Chambal** is famous for its band land topography, known as the **Chambal ravines**.
- Originating from the **Nepal Himalayas** between the **Dhaulagiri** and **Mount Everest**, the **Gandak** consists of two streams, namely **Kaligandak** and **Trishulganga**.
- The **Gandak** joins the **Ganga** at **Sonpur** near **Patna, Bihar**.
- The **Ghaghara** originates from the **Mapchachungo Glaciers** and joins the **Ganga** at **Chhapra, Bihar**.
- The **Kosi** originates from the north of **Mount Everest** in **Tibet** where it is known as the **Arun**.
- Originating from the **Garhwal hills** near **Gaisain**, the **Ramganga** joins the **Ganga** near **Kanauj**.
- The **Damodar** drains the eastern margins of the **Chotanagpur plateau**, where it flows through a **rift valley** and finally joins the **Hugli**.
- The **Barakar** is the main tributary of the **Damodar**.
- The **Sarada** or **Sarayu Rivers** rises from the **Milam glacier** in the **Nepal Himalayas** where it is known as **Goriganga**. However, along the **Indo-Nepal border**, it is called as **Kali or Chauk**, where it joins the **Ghaghara**.
- Originating from the **Darjeeling hills**, the **Mahananda** joins the **Ganga** as its last left bank tributary in **West Bengal**.
- Originating from the **Amarkantak plateau** the **Son** is a large south bank tributary of **Ganga** it joins the **Ganga** at **Arrah, Bihar**.

### The concept of Panch Prayag

Vishnuprayag: where the river **Alakananda** meets river **Dhauli Ganga**

Nandhaprayag: where river **Alakananda** meets river **Nadakini**

Karnaprayag: where river **Alakananda** meets river **Pindar**

Rudraprayag: where river **Alakananda** meets river **Mandakini**

Devaprayag: where river **Alakananda** meets river **Bhagirathi**

## GANGA RIVER

The principle tributaries of the Ganga are Yamuna, Damodhar, Sapta kosi, Ramganga, Gomati, Ghaghara, and Son. The river after travelling a distance of 2525 km from its source meets the Bay of Bengal.

### YAMUNA RIVER SYSTEM

- The Yamuna River is the largest tributary of the Ganga River.
- It originates from the Yamunotri glacier, at the Bandarpoonch peak in Uttarakhand.
- The main tributaries joining the river include the Son, Hindon, Betwa, Ken, and Chambal.
- The Tons is the largest tributary of the Yamuna.
- It originates from the Yamunotri Glacier on the south western slopes of the Bandarpoonch peak in the Mussoorie range of the lower Himalayas.
- Flows along of Uttarakhand, Himachal Pradesh, Haryana enters Delhi and merges with the Ganga near Triveni Sangam, Allahabad (Prayagraj).
- The largest tributary of the Ganga in the northern plains.
- Its main affluent in the upper reaches is the Tons which also rises from the Bandarpunch glacier.
- It joins the Yamuna below Kalsi before the latter leaves the hills.
- At this site, the water carried by the Tons is twice the water carried by the Yamuna.
- The total length of the Yamuna from its origin till Allahabad is 1376 km.
- It creates the highly fertile alluvial, Yamuna-Ganga Doab region between itself and the Ganges in the Indo-Gangetic plain.
- The cities of Bhagpat, Delhi, Noida, Mathura, Agra, Firozabad, Etawah, Hamirpur, and Allahabad lie on its banks.

Major Tributaries of Yamuna River
Tons Giri Hindon Chambal Banas Kali Sindh Parbati Sind Betwa Dadhan Ken



## Tons River

- The **Tons** is the longest tributary of the Yamuna River and its flows through Garhwal, the western part of the Himalayan state of Uttaranchal.

## Chambal River

- Chambal river is also known as **Charmanwati** or **Charmawati**.
- The 960 km long Chambal River originates from Janapao hills of the Vindhya range.
- 15 km west- south - west Mhow in Indore district in Madhya Pradesh.
- Utilized for hydropower generation of Gandhi Sagar dam, Rana Pratap Sagar dam, Jawahar Sagar Dam and the Kota Barrage.
- The river flows much below its banks due to severe erosion because of poor rainfall and numerous deep ravines have been formed in the Chambal valley, giving rise to band land topography (Arid Landforms).

## Dams on the Chambal

- The Gandhi Sagar dam is the first of the four dams built on the river.
- Chambal river, located on the Rajasthan- Madhya Pradesh border.
- The Rana Pratap Sagar dam is dam located 52 km down stream of Gandhi Sagar dam on across the Chambal River in Chittorgarh district in Rajasthan.
- The Jawahar aagar dam is the third dam in the series of Chambal valley projects, located 29 km upstream of kota city and 26 km downstream of Rana Pratap Sagar dam.

## Brahmaputra River System

- The Brahmaputra (meaning the son of Brahma).
- The Brahmaputra' s source is the Chemayugdung glacier in south western Tibet.
- Its source is very close to the courses of Indus and Sutlej.
- Mariam La separates the source of the Brahmaputra from the Manasasarovar Lake.
- In Tibet, it passes through the depression formed by the Indus -Tsangpo structure zone between the Great Himalayas in the south and the Kailas Range in the north.
- In spite of the exceptionally high attitude, the Tsangpo has a gentle slope. The river sluggish and has a wide navigable channel for about 640 km.
- It receives a large number of tributaries in Tibet.
- The **first major tributary is the Raga Tsangpo** meeting the Tsangpo near Lhatse Dzong.

## E ▶ ENTRI

- It flows as the Yarlung Tsangpo River across southern Tibet to break through the Himalayas in great gorges and into Arunachal Pradesh where it is known as Dihang.
- Just west of the town of Sadiya, the Dihang turns to the southwest and is joined by two mountain streams, the Lohit and Dibang.
- Below the confluence, the river is known as the Brahmaputra.
- It flows through Bangladesh as the Jamuna where it merges with the Ganga to form vast delta, the Sundarbans.
- **The biggest and the smallest river islands in the world, Majuki, and Umananda** respectively, are in the river in the state of Assam.
- Dibrugarh, Pasighat, Neamati, Tezpur and Guwahati are the important urban - centres on the river.

Region	Name
Tibet	Tsangpo (meaning the purifier)
China	Yarlung Zangbo Jiangin
Assam valley	Dihang or Siong, south of Sadiya: Brahmaputra
Bangladesh	Jamuna river
Bangladesh	Padma river: combined water of Ganga and Brahmaputra
Bangladesh	Meghana: From the confluence of Padma and Meghana

### Major Tributaries of the Brahmaputra River

Left bank	Dhansiri, Lohit, Dibang
Right Bank	Subansiri, Kameng, Manas, Sankosh

### Tributaries

Left-Lhasa River, Nyang River, Parlung Zangbo, Lohit River, Dhansiri River, Kolong River

Right - Kameng River, Manas River, Beki River, Raidak River, Jaldhaka river, Teesta River, and subansiri river.

### **Subansiri River**

- Subansiri River is also called as **gold river** as it is famous for its **gold dust**.
- It flows through the Lower Subansiri District in Arunachal Pradesh.
- Subansiri, a swift river offers excellent kayaking opportunities.

### Tributaries of Brahmaputra

#### **Kameng River**

- Flows through west kameng district of Arunachal Pradesh.
- **Pakhui wildlife Sanctuary** and the **Kaziranga National Park** are located near the Kameng river.

#### **Manas**

- Transboundary river in the Himalayas foothills between south Bhutan and India.

#### **Teesta**

- Rangeet is the major tributary of Teesta River.

#### **Dibang River**

- Mishmi hills are found along the upper courses of the Dibang river.