

## Geography-3

### Drainage

- what is Drainage?
- The system of flow of water through rivers and their tributaries.
  
- What is Drainage Basin?
- The area drained by a river and its tributaries.
  
- India has two main types of drainage system-
- 1) The Himalayan Rivers-
  - ↳ Perennial (flows throughout the year).
  - ↳ Fed by glaciers and rainfall.
  - ↳ Rivers are long and have large basins.
  - ↳ Example- Ganga, Brahmaputra, Indus.
- 2) The Indus Drainage System-
  - ↳ It originates in Tibet, flows through India, and mainly runs through Pakistan.
  - ↳ Also known as Sindhu River System.
  - ↳ Originates near Lake Mansarovar, in the Tibetan Plateau.
  - ↳ Enters India in Ladakh.
  - ↳ Enters Pakistan near Chashma, flows into the Arabian Sea near Karachi.
  - ↳ Main Tributaries: Sutlej, Beas, Ravi, Chenab, Jhelum.

### → Drainage Basin:

- The total length: ~2900 km.
- $\frac{1}{3}$ rd of the Indus basin lies in India in states like Punjab, Himachal Pradesh, and Jammu and Kashmir.
- $\frac{2}{3}$ rd of the Indus basin lies in Pakistan.

### → Indus Water Treaty - (1960):

- Signed between India and Pakistan, with help from World Bank.
- According to the treaty:
  - India can use water of Eastern Rivers: Ravi, Beas, Sutlej.
  - Pakistan gets Western Rivers: Indus, Jhelum, Chenab.

### → Importance of Indus System:

- Fertile alluvial plains.
- Supports irrigation canals.
- Used for hydropower generation.
- Carries huge volume of water, especially in monsoon.

### by The Ganga drainage System:

- largest river system in India.
- It originates from the Himalayas and drains into the Bay of Bengal.
- The river forms a large basin covering Uttarakhand, Uttar Pradesh, Bihar, Jharkhand, and West Bengal.

### → Origin and course:

- Origin: Gangotri glacier in Uttarakhand.
- Main stream called Bhagirathi.

- Joins Alaknanda at Deprayag to become the Ganga.

Means Ganga = Bhagirathi + Alaknanda (at Deprayag)

- Flows through Haridwar, Kanpur, Allahabad (Prayagraj), Varanasi, Patna, and Kolkata.
- Divides into Hooghly (India) and Padma (Bangladesh) in West Bengal.
- Ends in Bay of Bengal, forming the Sundarbans delta.

↳ Main Tributaries: Ghaghra, Gandak, Kosi, Yamuna, Son.

↳ Delta formation:

- Ganga joins with Brahmaputra in Bangladesh and forms the world's largest delta: Sundarbans delta (known for mangrove forests and Royal Bengal Tiger).

### C) The Brahmaputra River System:

↳ It is a perennial river, flowing through Tibet, India, and Bangladesh.

↳ Known for carrying enormous water volume and high sediment load.

↳ It causes devastating floods during monsoons.

↳ Origin and course:

- Origin: Tibet, near Lake Mansarovar.
- Name in Tibet: Tsangpo
- Enters India: Through Arunachal Pradesh
- Name in India: Brahmaputra after entering Assam
- Enters Bangladesh: As Jamuna
- Joins Ganga: In Bangladesh (Becomes Padma)

- Ends in: Bay of Bengal, forming part of the Sundarbans Delta.

↳ Characteristics:

- Flows through high rainfall areas (especially in Assam).
- Carries more water and silt than Ganga during monsoons.
- Tributaries: Sibang, Lohit, Subansiri (Assam); Tista (Bangladesh).
- Known for flooding and erosion in its course.
- Unlike other rivers, it deposits more silt in floodplains than in delta.

## 2) The Peninsular Rivers:

- ↳ Mostly seasonal (depend on monsoon); Rain fed rivers.
- ↳ Flow through shallow and narrow valleys (Georges).
- ↳ Shorter in length compared to Himalayan rivers.
- ↳ Most rivers flow eastward into the Bay of Bengal.
- ↳ A few rivers flow westward into the Arabian sea.

## 3) Major Peninsular River System:

### 1) Godavari River (Sakristin Ganga):

- Source: Nasik (Maharashtra)
- Length: ~ 1465 km (longest Peninsular River).

- Tributaries: Purna, Wardha, Wainganga, Pranhita, Manjira, Indravati, Sabari.
- Drainage: Bay of Bengal.

### 2) Mahandi River:

- Source: Chhattisgarh
- Length: ~860 km
- Tributaries: Seonath, Hasdeo, Mand
- Drainage: Bay of Bengal.

### 3) Krishna River:

- Source: Mahabaleshwar (Maharashtra)
- Length: ~1,400 km
- Tributaries: Bhima, Tungabhadra, Koyna, Ghatprabha
- Drainage: Bay of Bengal.

### 4) Kaveri River:

- Source - Talakaveri (Karnataka)
- Length - ~760 km
- Major Tributaries - Amsavati, Hemavati, Kabini
- Drainage - Bay of Bengal.
- Famous for waterfalls like Shivasamudra.

### 5) Narmada River (West-Flowing) -

- Source - Amarkantak Plateau (Madhya Pradesh).
- Length - ~1,312 km
- Flows into - Arabian Sea
- Forms deltas and estuaries.
- Creates the Marble Rocks at Bhedaghat

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Tapi (Tapti) River (west flowing):

- Source: Satpura range (Madhya Pradesh).
- Length: ~724 km
- Flows into: Arabian Sea
- Short and swift river.

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Lakes - A lake is a large water body surrounded by land. Lakes can be natural or man-made, and they serve important roles in irrigation, water supply, fishing, hydroelectricity, and tourism.

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Types of Lakes -

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Oxbow lakes -

- ↳ Formed when a river creates a meander gets cut off from the main river.
- ↳ The cut-off water body becomes an oxbow lake.
- ↳ commonly found in the Ganga-Brahmaputra plains.

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Inland drainage lakes -

- ↳ These lakes are formed in areas where rivers do not reach the sea or ocean.
- ↳ Water collects in depressions and has no outlet to drain out.
- ↳ Often salty due to evaporation.
- ↳ Common in arid and semi-arid regions.

### 3) Freshwater Lakes -

- ↳ Naturally formed lakes that contain freshwater (not salty).
- ↳ Usually fed by rain, rivers, or glaciers.
- ↳ Found mostly in hilly areas or river basins.
- ↳ Provide drinking water, irrigation, fishery etc.

### 4) Man-made (Artificial) Lakes -

- ↳ Built by humans by constructing dams across rivers.
- ↳ Created to store water for irrigation, power or supply.
- ↳ USES: Hydroelectric power, irrigation, drinking water, flood control.

### ► Importance of Lakes -

- 1) Source of freshwater.
- 2) Irrigation for agriculture.
- 3) Hydroelectric power generation.
- 4) Supports aquatic life and biodiversity.
- 5) Groundwater recharge.
- 6) Tourism and recreation.
- 7) Moderates local climate.
- 8) Used for fishing and navigation.
- 9) Industrial use.
- 10) Prevents floods by storing excess rainwater.

## 0 Role of River in the ECONOMY -

- 1) Irrigation
- 2) Drinking Water
- 3) Hydroelectric power
- 4) Inland transport
- 5) Fisheries
- 6) Industrial Use
- 7) Recreation and Tourism
- 8) Religious and Cultural Significance
- 9) Supports Agriculture-based Economy
- 10) Employment generation
- 11) Settlement
- 12) Multipurpose projects

## 0 River Pollution:

### → Main Causes:

- Industrial waste
- Untreated sewage
- Agricultural runoff (pesticides, fertilizers)
- Religious practices (idol, immersion, flowers, ash)
- Plastic and garbage dumping
- Washing clothes and bathing animals in rivers.

### → Harmfull Effects:

- Kills fish and aquatic life.
- Spreads water-borne diseases.
- Makes water unfit for drinking and irrigation.
- Destroys river ecosystems
- Affects human health and economy.