Chapter 3: Drainage

1. Introduction to Drainage

Drainage refers to the river system of an area. A river system consists of a main river and all its tributaries.

Drainage Basin: The area drained by a single river system is called its basin.

Watershed: A ridge or elevated area that separates two drainage basins.

---

3. Major River Systems in India

India has two major river systems:

Himalayan Rivers

Peninsular Rivers

3.1 Himalayan Rivers

These rivers are perennial, meaning they have water throughout the year as they are fed by both rainfall and glacial melt.

These rivers flow in long courses from the mountains in the north to the plains in the south.

Major Himalayan rivers include:

The Indus River System: Originates in Tibet (China) and enters India in Jammu and Kashmir.

The Ganga River System: Originates in the Gangotri Glacier (Uttarakhand). It has several tributaries, including the Yamuna, Ghaghara, Gandak, and Kosi.

The Brahmaputra River System: Originates in Tibet and enters India in Arunachal Pradesh.

3.2 Peninsular Rivers

These rivers are seasonal and are dependent on monsoon rains. They have shorter courses and flow from higher elevations in the Western Ghats to the Bay of Bengal or Arabian Sea.

Major Peninsular rivers include:

The Narmada River: Flows westward and drains into the Arabian Sea.

The Tapi River: Also flows westward into the Arabian Sea.

The Godavari River: Known as the Dakshin Ganga, it flows into the Bay of Bengal.

The Krishna River: Flows into the Bay of Bengal.

The Mahanadi River: Flows into the Bay of Bengal.

The Kaveri River: Flows into the Bay of Bengal.

---

4. The Ganga River System

The Ganga originates in the Gangotri Glacier in Uttarakhand.

It is joined by several tributaries, such as the Yamuna, Ghaghara, Gandak, and Kosi.

The Yamuna joins the Ganga at Allahabad (Prayagraj).

The river flows southeast through Uttar Pradesh, Bihar, and West Bengal before entering Bangladesh.

In Bangladesh, it is known as the Padma before it empties into the Bay of Bengal.

---

5. The Brahmaputra River System

The Brahmaputra originates in Tibet, where it is known as the Tsangpo.

It flows through Arunachal Pradesh and Assam, joining the Ganga in Bangladesh before entering the Bay of Bengal.

The Brahmaputra carries large amounts of silt and causes frequent floods in Assam during the monsoon season.

---

6. Peninsular River Systems

The Narmada and Tapi rivers flow westward and drain into the Arabian Sea.

The Godavari, Krishna, Mahanadi, and Kaveri rivers flow eastward and drain into the Bay of Bengal.

These rivers are seasonal, dependent on rainfall and have shorter, steeper courses compared to the Himalayan rivers.

---

7. Lakes

India is home to several lakes, both freshwater and saline.

Freshwater Lakes: Examples include Wular Lake (Jammu and Kashmir) and Dal Lake.

Saltwater Lakes: Examples include Chilika Lake (Odisha) and Sambhar Lake (Rajasthan).

Lakes help in maintaining the ecosystem by regulating the flow of rivers, providing water for irrigation, and supporting biodiversity.

---

8. Importance of Rivers and Lakes

Rivers:

They are the lifelines for agriculture, transport, and power generation.

Rivers provide water for domestic use, irrigation, and industrial purposes.

Lakes:

They help maintain the water table, support fishing, and are important tourist destinations.

---

9. River Pollution

Rivers in India are facing pollution due to domestic waste, industrial effluents, and agricultural runoff.

Government initiatives like the Ganga Action Plan and Namami Gange Programme have been launched to clean rivers.

NCERT Textbook Exercise Questions and Answers

Q1. Choose the right answer from the four alternatives given below:

i. Which one of the following describes the drainage patterns resembling the branches of a tree?

a. Radial

b. Dendritic

c. Centrifugal

d. Trellis

Answer: b. Dendritic

---

ii. In which of the following states is the Wular Lake located?

a. Rajasthan

b. Uttar Pradesh

c. Punjab

d. Jammu and Kashmir

Answer: d. Jammu and Kashmir

---

iii. The river Narmada flows to the west and forms estuaries. Which of the following rivers flows to the east and forms a delta?

a. Tapi

b. Godavari

c. Narmada

d. Mahanadi

Answer: b. Godavari

Q2. Answer the following questions briefly:

i. What is meant by a water divide? Give an example.

Answer:

A water divide is a geographical feature, such as a ridge or elevated area, that separates two drainage basins. For example, the Western Ghats form a water divide between rivers flowing into the Bay of Bengal and those flowing into the Arabian Sea.

---

ii. Which is the largest river basin in India?

Answer:

The Ganga River Basin is the largest river basin in India.

---

iii. Where do the rivers Indus and Ganga have their origin?

Answer:

The Indus originates near the Mansarovar Lake in Tibet.

The Ganga originates from the Gangotri Glacier in the Himalayas.

---

iv. Name the two headstreams of the Ganga. Where do they meet to form the Ganga?

Answer:

The two headstreams of the Ganga are the Bhagirathi and the Alaknanda. They meet at Devprayag in Uttarakhand to form the Ganga.

---

v. Why does the Brahmaputra in its Tibetan part have less silt, despite a longer course?

Answer:

The Brahmaputra carries less silt in its Tibetan part because it flows through a cold and dry region with low erosion. However, as it enters India, it passes through humid regions with higher rainfall and sediment load, increasing its silt content.

---

vi. Which two Peninsular rivers flow through troughs?

Answer:

The Narmada and Tapi rivers flow through troughs and drain into the Arabian Sea.

---

vii. State some economic benefits of rivers and lakes.

Answer:

Rivers provide water for irrigation, domestic use, and industrial purposes.

They are used for hydroelectric power generation and inland navigation.

Lakes help in maintaining the water table, provide water for agriculture, support fishing, and are tourist destinations.

Q3. Discuss the significant difference between the Himalayan and the Peninsular rivers.

Answer:

Himalayan Rivers:

These rivers are perennial, fed by glaciers and rainfall.

They have a longer course and flow through young fold mountains.

They form large deltas (e.g., Ganga, Brahmaputra).

Peninsular Rivers:

These rivers are seasonal, dependent on monsoon rains.

They have shorter courses and flow through older, hard rock terrain.

Most form estuaries (e.g., Narmada, Tapi) or small deltas (e.g., godavari delta in AP)

Q4. Compare the east-flowing and the west-flowing rivers of the Peninsular Plateau.

Answer:

East-Flowing Rivers:

Major east-flowing rivers include the Godavari, Krishna, Mahanadi, and Kaveri.

They drain into the Bay of Bengal.

These rivers form large deltas at their mouths.

West-Flowing Rivers:

Major west-flowing rivers include the Narmada and Tapi.

They drain into the Arabian Sea.

These rivers form estuaries rather than deltas.

Q5. Why are rivers important for the country’s economy?

Answer:

Rivers are crucial for the country's economy due to the following reasons:

1. Irrigation: Rivers provide water for agricultural activities, which is the backbone of India’s economy.

2. Hydroelectricity: Rivers help generate hydroelectric power, which is a renewable source of energy.

3. Inland Transport: Rivers provide an important means of inland navigation and transportation.

4. Fishing: They support the fishing industry, providing a livelihood for many communities.

5. Tourism: Many rivers and lakes are attractive tourist destinations, contributing to the economy.

Important Extra Questions and Answers

Q1. Explain the significance of the Narmada and Tapi rivers.

Answer:

The Narmada and Tapi rivers are important because they are among the few rivers in the Peninsular Plateau that flow westward and drain into the Arabian Sea.

They form estuaries instead of deltas, which makes them unique in comparison to most rivers that flow into the Bay of Bengal.

These rivers flow through rift valleys, formed due to faulting.

Q2. What are the problems faced by rivers in India today?

Answer:

Rivers in India face several problems:

1. Pollution: Industrial waste, sewage, and agricultural runoff are major causes of river pollution.

2. Overuse of Water: Excessive extraction of river water for irrigation and industrial use has reduced the water flow in many rivers.

3. Encroachment: Urbanization has led to the encroachment of riverbanks, leading to flooding and the degradation of river ecosystems.

4. Flooding: Many rivers, especially in northern India, experience seasonal

flooding, which affects human settlements and agriculture.

Q3. What is the importance of lakes in maintaining the ecosystem?

Answer:

Lakes are vital in maintaining the ecosystem because:

1. They help regulate the water cycle by storing and releasing water during dry periods.

2. Lakes help in groundwater recharge, raising the water table.

3. They act as natural buffers during floods by absorbing excess water.

4. Lakes support a wide range of biodiversity, including aquatic plants and animals.

5. They also provide water for domestic, agricultural, and industrial uses.