

GEOGRAPHY



Drainage

An area drained by the streams or tributaries of a single river is known as a **drainage basin**. A river along with its tributary is known as a **river system**. When a mountain or an upland separates two drainage basins, it is known as a **water divide**.

Drainage System in India

Relief features play an important part in controlling the drainage system in India. Indian rivers are divided into two major groups—the Himalayan rivers and the Peninsular rivers.

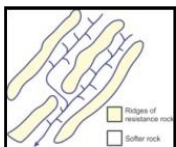
Differences between the Himalayan rivers and the Peninsular rivers are

The Himalayan Rivers	The Peninsular Rivers
Most of the Himalayan rivers are perennial such as the Ganga and the Brahmaputra.	Most of the Peninsular Rivers are not perennial.
The rivers are deep and have large courses.	The rivers have shorter and shallower courses as compared to the Himalayan rivers.
Most of the Himalayan rivers originate in the snow-capped Himalayan mountains.	Most of the Peninsular rivers originate in the Western Ghats.
The Himalayan rivers are long.	The Peninsular rivers are comparatively smaller.

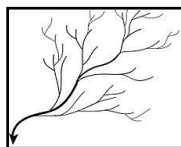
Drainage Patterns Formed by Rivers

The main drainage patterns formed by rivers are

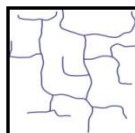
- Dendritic:** This drainage system is formed when the river channel follows the slope of the terrain. Because many tributaries join the main river, this drainage system appears like the branches of trees.
- Trellis:** The trellis pattern is developed when many tributaries join the main river at right angles and the hard and the soft rock exist parallel to each other.
- Rectangular:** It develops on the strongly jointed rocky terrain which are resistant to erosion. Such rocks have joints at right angles which can be eroded. The joints are cracked opened by erosion, and hence, the streams of rivers develop along these joints.
- Radial:** When the streams of a river flow in different directions from a central peak or a dome-like structure, the radial drainage pattern is developed.



Trellis pattern



Dendritic pattern



Rectangular pattern



Radial pattern

The Himalayan Rivers

The main Himalayan Rivers are the Indus, Ganga and Brahmaputra.

The Indus River System

- The River Indus originates near Lake Mansarovar in Tibet. It enters India in the Ladakh district of Jammu and Kashmir.
- With a total length of about 2900 km, the River Indus is one of the longest rivers in the world.
- It has many tributaries such as Zaskar, Nubra, Shyok and Hunza which join it in the Kashmir region.
- The Satluj, Beas, Ravi, Chenab and Jhelum join and flow into the River Indus in Pakistan.
- About one-third of the River Indus flows through Kashmir, Himachal Pradesh and Punjab. The rest of the river flows through Pakistan.
- The Indus then flows southwards and drains into the Arabian Sea.

The Ganga River System

- The River Ganga originates from the Gangotri Glacier in the Himalayas. It is joined by Alaknanda at Devprayag in Uttarakhand. It is at Haridwar that the River Ganga emerges from the mountains on to the plains.
- Some tributaries of the River Ganga are the Yamuna, Ghaghara, Gandak and Kosi.
- Yamuna is a major tributary of Ganga. It originates from the Yamunotri Glacier in the Himalayas and meets the River Ganga at Allahabad.
- Rivers such as the Kosi, Gandak and Ghagra rise in the Himalayas in Nepal. They cause floods in the northern plains almost every year. They enrich the soil and make the region agriculturally very productive during the process.
- Chambal, Betwa and Son are some tributaries of the River Ganga which rise in the peninsular uplands.
- The River Ganga flows till Farakka in West Bengal and divides here. Its distributary Bhagirathi–Hooghly flows through the deltaic plains into the Bay of Bengal.
- The main River Ganga flows into Bangladesh where it joins the River Brahmaputra. It is also known as Meghna further downstream. These rivers form the Sundarban delta, home to the royal Bengal tiger.

The Brahmaputra River System

- The River Brahmaputra rises east of the Mansarovar Lake in Tibet. Most of its course lies outside India.
- The River Brahmaputra at Namcha Barwa takes a 'U' turn and enters Arunachal Pradesh through a gorge. It is joined by many tributaries such as the Dibang and Lohit to form the River Brahmaputra in Assam, where it is also known as Dihang.
- In India, the river passes through a region of high rainfall, and thus, the volume of water and silt increases.
- The River Brahmaputra makes many riverine islands in Assam. Majuli is the largest riverine island formed by the Brahmaputra. The river shifts its channel frequently.
- During the rainy season every year, the River Brahmaputra floods its bank and causes huge loss of lives and property.

The Peninsular Rivers

The Western Ghats acts as a main water divide in Peninsular India. Some important peninsular rivers are the Godavari, Mahanadi, Krishna and Kaveri. These rivers make deltas at their mouths. While most rivers drain into the Bay of Bengal, the Narmada and the Tapti drain into the Arabian Sea forming estuaries.

The Narmada Basin

- The River Narmada originates in the Amarkantak Hills in Madhya Pradesh.
- The river creates many scenic locations on its way into the Arabian Sea. The 'Marble Rock' and the Dhuandhar Falls are some picturesque locations.
- The Narmada basin covers parts of Gujarat and Madhya Pradesh.
- The tributaries of Narmada are very short.

The Tapti Basin

- It originates in the Satpura ranges in the Betul district of Madhya Pradesh.
- It is much shorter in length compared to River Narmada. It flows through Madhya Pradesh, Gujarat and Maharashtra.

The Godavari Basin

- The River Godavari is the largest of all peninsular rivers. It originates from the slopes of the Western Ghats in the Nasik district of Maharashtra.
- Its length is about 1500 km, and it drains into the Bay of Bengal. Because of its length, it is also known as Dakshin Ganga.
- About half of the river's basin lies in Maharashtra. The river also flows through Madhya Pradesh, Odisha and Andhra Pradesh. Some of its tributaries are the Purna, Wardha, Manjra and Penganga.

The Mahanadi Basin

- It originates in the highlands of Chhattisgarh. The river drains into the Bay of Bengal.
- The river mainly drains Odisha, Chhattisgarh, Maharashtra and Jharkhand.

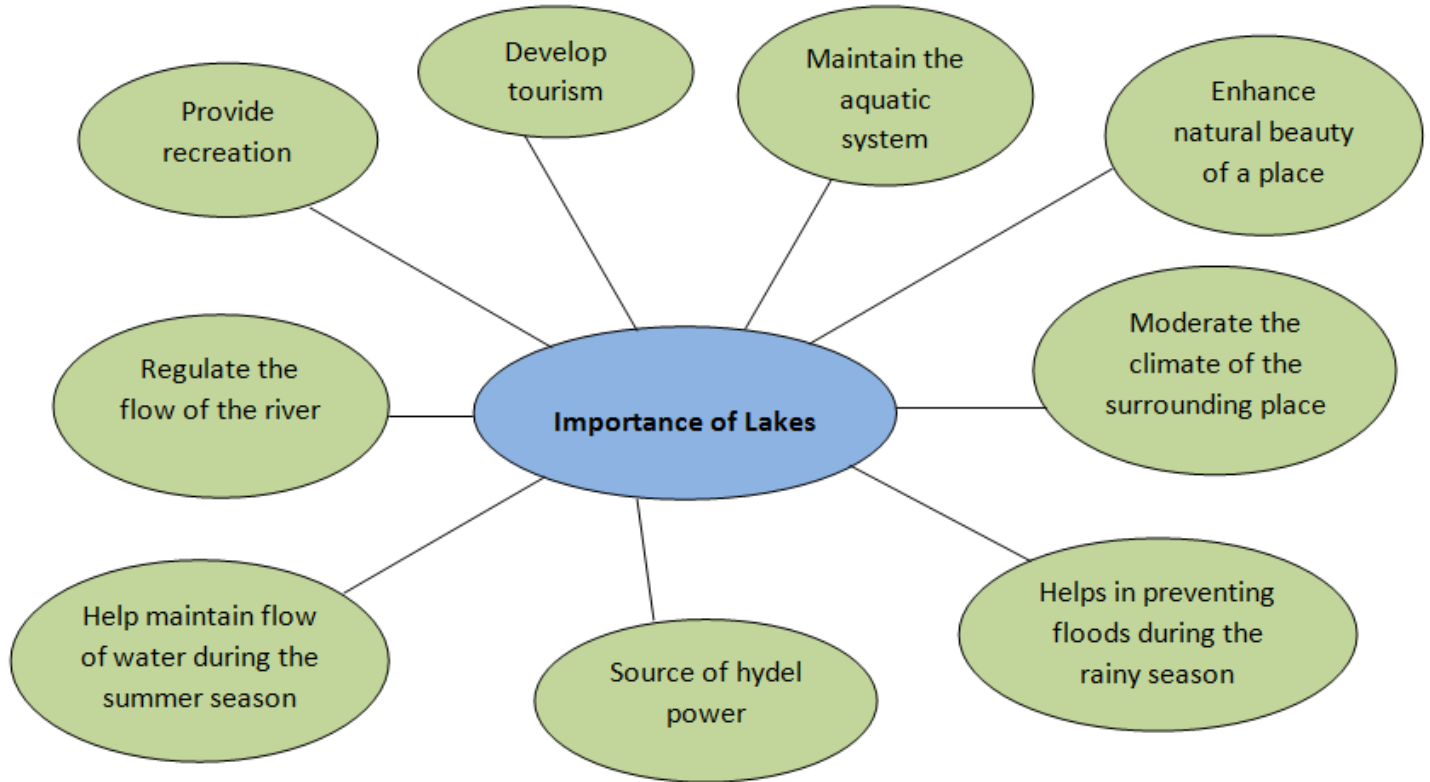
The Krishna Basin

- It rises from a spring near Mahabaleshwar and drains into the Bay of Bengal.
- Some of its tributaries are the Musi, Koyana, Bhima and Ghatprabha.
- It drains Maharashtra, Karnataka and Andhra Pradesh.

Lakes

- The Dal Lake is a famous lake in Kashmir.
- Lakes originate
- During the rainy season
- As a result of the action of glaciers and ice sheets
- As a result of the action of winds and rivers, and human activities
- An oxbow lake is produced when water forms a large meander from the main stream creating a free-standing body of water.

- Lake Sambhar in Rajasthan is a saltwater lake. Its waters are used to manufacture salt.
- Many freshwater lakes found in the Himalayan region are of glacial origin.
- The Wular Lake in Jammu and Kashmir is the largest freshwater lake in India. The Dal, Bhimtal, Nainital and Loktak are some important freshwater lakes in India.
- Guru Gobind Sagar Lake in Punjab has been formed as a result of the damming of a river.



Role of Rivers in the Economy

- Rivers have been of extreme importance throughout human history. Many civilisations developed on the banks of rivers.
- River water is used for domestic and industrial consumption.
- River water is used for irrigation and navigation.
- River water is used for the generation of electricity.

River Pollution

- Domestic, municipal and industrial wastes pollute river waters.
- Untreated sewage wastes and industrial effluents also pollute river water. This not only reduces the quality of water but also the self-cleansing mechanism of river water.
- Increasing urbanisation has also polluted river water.

Map of Major Rivers in India

