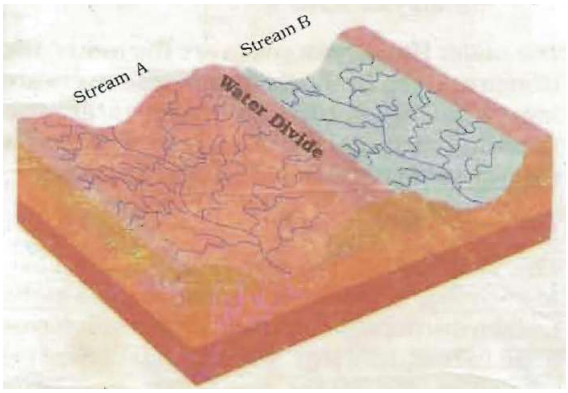
DRAINAGE

DRAINAGE OF INDIA

- **Drainage :** The term drainage is used to describe the river system or an area.
- **Drainage basin :** The area drained by a single river system is called a drainage basin.
- **Water divide :** The upland that separates the flow of two rivers or river system.

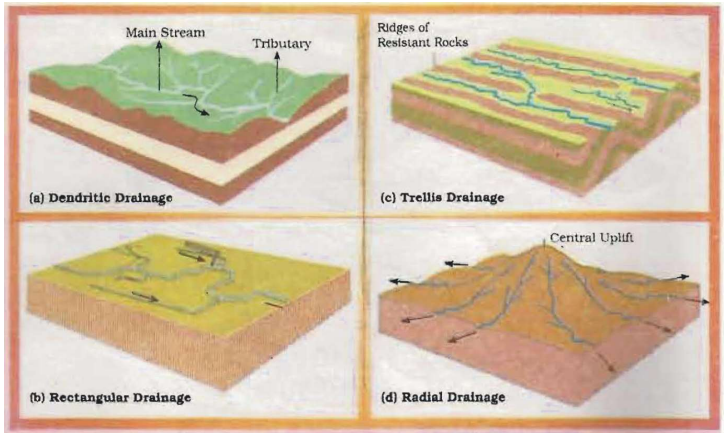


Water Divide

DRAINAGE PATTERN

A drainage system refers to the origin and development of stream through time while drainage pattern means spatial arrangement and form of drainage system in term of geometrical shapes in the area. They are different types.

1. **Trellis Pattern :** In this pattern, the tributaries can be seen meeting the main stream at right angle.
2. **Dendritic Drainage pattern :** The tributaries come from all directions to meet the main river.

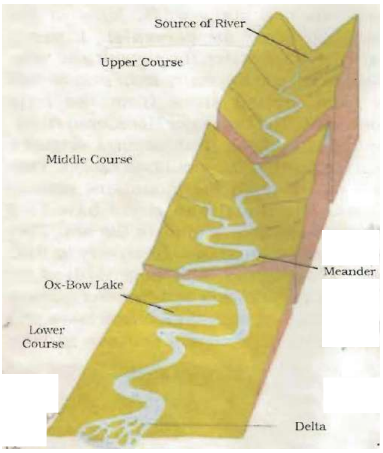


3. **Parallel Drainage Pattern :** In this pattern numerous rivers which are parallel to each other and follow the regional slope.
4. **Radial Drainage pattern :** Radial drainage pattern also known as centrifugal pattern is formed by the streams which diverge from a central higher point in all directions.

On the basis of origin, two broad drainage system of India are generally recognised.

1. The Himalayan Rivers
2. The Peninsular Rivers.

DRAINAGE



Some Features Made by Rivers

◈ **River-system :** A river alongwith its tributaries may be called a river system.

A Gorge

◈ **Difference:**

	The Himalayan rivers	The Peninsular rivers
1	These rivers originate from the glaciers	These rivers originate on the plateau
2	Their catchment area is very large	Their catchment area is very small
3	These rivers pass through gorge and carve deep valleys	These rivers form shallow valleys
4	These rivers are young	These have acquired maturity
5	These are engaged in high erosion activity	These have very little erosional activity
6	These are useful for irrigation	These are of little use for irrigation
7	These rivers are perennial, i.e., they flow throughout the year	These rivers are non-perennial
8	Indus, Ganga, Brahmaputra are the main rivers	Godavari, Krishna, Kaveri, Narmada and Tapti are major rivers

DRAINAGE

Major Rivers and Lakes

THE INDUS RIVER SYSTEM

1. The Indus originates from the glaciers of the Kailash range in Western Tibet near Mansarovar Lake.
2. It flows west and north west wards and enter Indian territory in Jammu & Kashmir. This river pierces through Kailash range and forms a spectacular george. It flows through Ladakh, Baltistan and Gilgit to finally emerge out of the hillls at Attock. Here the Indus is joined by the Kabul river from Afganisthan. The Indus flows south-west wards across Pakistan to reach the Arabian sea east of Karachi.
3. With a total length of 2,900 k.m., the Indus is considered as one of the largest rivers of the world.
4. Satluj, Chenab, Jhelum and Ravi are its main tributaries.
5. A little over a third of the Indus basin is located in India in the states of Jammu & Kashmir. Himachal Pradesh & Punjab and the rest in Pakistan.

THE GANGA DRAINAGE SYSTEM

◈ **Ganga :**

1. The head waters of the Ganga, called the Bhagirathi is fed by the 'Gangotri' Glacier and joined by the Alaknanda to Dev Prayag in Uttranchal.
2. Flowing south westwards the Ganga comes out of Himalayas near Haridwar. The total length of the Ganga is 2,525 km.
3. Beyond Farakka it flows south east ward in to Bangladesh where it is known as Padma.
4. Before falling into Bay of Bengal, the Padma joins the Brahmaputra which is known as Jamuna & Meghna here.
5. The Yamuna and the Son are the two main right bank tributries of the Ganga.

◈ **The Yamuna :**

1. It is the largest and most important tributary of the Ganga.
2. It originates from the Yamunotri Glacier on the Bandarpunch Peak in Garhwal.
3. After cutting a deep gorge across the lesser Himalayas, it flows towards the south west and enters the Ganga plain near Tajewala.

THE BRAHMAPUTRA DRAINAGE SYSTEM

1. The Brahmaputra rises in the Tibet east of Mansarowar lake very close to the source of the Indus and the Satluj.
2. It is one of the largest river in the world with a total length of 2900 km.
3. It flows eastwards parallel to the Himalayas.
4. On reaching the Namacha Barwa (7757 m), it takes a turn and enters India in Arunachal Pradesh through a gorge. Here it is called the Dihang and is joined by the Dibang, the Lohit, the Kenula and many other tributaries to form the Brahmaputra in Assam.
5. In Tibet the river carries a smaller volume of water and less silt as it is cold and dry area.
6. In India the river carries a large volume of water and considerable amount of silt.
7. In rainy season the river overflow its banks causing widespread devastation due to the flood in Assam & Bangladesh.
8. The river also shifts its channel frequently.
9. The Brahmaputra has a braided channel in its entire length in Assam and forms many riverine islands. Majuli, in the Brahmaputra river is the largest inhabited riverine island in the world.

THE PENINSULAR RIVERS

◈ **Major features of Peninsular rivers :**

1. Almost all the rivers of the Peninsula are in the mature stage.
2. They flow through wide valleys.
3. Except the Narmada and Tapi which drain west wards into the Arabian Sea, the other major stream discharge their water into the Bay of Bengal.

◈ **The East flowing rivers :**

(A) The Mahanadi :

1. The river rises in the highland of Dandakaranya in Chhattisgarh.
2. It flows through Orissa to reach Bay of Bengal.
3. The total length of the river is about 860 km.
4. Its drainage basin is shared by Maharastra, Chhatisgarh, Jharkhand and Orissa.

(B) Godawari Basin :

1. It is the largest river of the Peninsula.
2. It originates from the Trimabak Plateau of the north Sahyadri near Nasik.

3. The Godavari is often referred as Vridha Ganga or Dakshina Ganga because of its large size and extent.
4. Its principal tributaries include the Pravara, Purna, Manjra, Penganga, Wainganga, Wardha Pranhita, Indravati, Maner and the Sabari.
5. Its length is about 1500 km.

(C) Krishna Basin :

1. Rising from a spring near Mahabaleshwar, the Krishna flows for about 1400 km and reaches the Bay of Bengal.
2. Its tributaries are the Tungabhadra, the Koyana, the Ghatprabha, the Musi and the Bhima. Its drainage basin is shared by Maharastra, Karnataka and Andhra Pradesh.

(D) The Kaveri Basin :

1. It rises in the Brahmagri range of the western ghats and it reaches the Bay of Bengal in south of Cuddalore in Tamil Nadu.
2. Total length of the river is about 760 km.
3. Its main tributaries are Amravati, Bhavani, Hemavati and Kabini.
4. Its basin drains parts of Karnataka, Kerala and Tamil Nadu.

◈ **Other East-flowing rivers :**

The Subarnarekha, the Brahmani, the Penneru, the Pannaiyar and Vaigai are Some of the other east flowing rivers of the Peninsula.

THE WEST FLOWING RIVERS

(A) The Narmada Basin :

1. This river originates from Amarkantak hills in Madhya Pradesh.
2. It flows towards the west in a rift valley formed due to faulting.
3. On its way to the sea the Narmada creates many pitctures que locations. The marble rocks near Jabalpur where the Narmada flows through a deep gorge and the 'Dhuadhar falls' where the river plunges over steep rocks are some of the notable ones.
4. All the tributaries of the Narmada are very short and most of these join the main stream at right angles.
5. The Narmada basin covers parts of Madhya Pradesh and Gujarat.

(B) The Tapi :

1. This river originates from the sacred tank of Multai on Satpura Plateau.
2. It is the second largest west flowing river of the Peninsular India.
3. It also flows in a rift valley parallel to the Narmada but it is much shorter in length.
4. Its basin covers parts of Madhya Pradesh, Gujarat and Maharashtra.

The coastal plains between Western Ghat and the Arabian sea are very narrow. Hence the coastal rivers are short. The main west flowing river are Sabarmati, Mahi, Bharathpuzha and Periyar.

◈ **Difference:**

	East flowing Rivers of Peninsular	West flowing Rivers of Peninsular
1	Rivers – Mahanadi, Godavari, Krishna and Keveri flow from west to east into the Bay of Bengal	Rivers – Narmada and Tapi flow from East to west into the Arabian Sea
2	These rivers form fertile deltas along the eastern coast	These form estuaries on the western coast
3	These rivers are longer and drain bigger areas. Their main course is flat area	These two rivers are shorter as compared to east flowing rivers. They flow through trough and form gorges
4	They are rain-fed and depend on rainfall and are seasonal	They are also rain-fed and are seasonal rivers

INLAND DRAINAGE AND LAKES

- **The Gaghar :** It is the most important river of inland drainage. It is a seasonal stream which rises on the lower slopes of Himalayas and form the boundary between Haryana and Punjab. The Tangri, Markanda, Saraswati and Chaitanya are the most important tributaries of the river.
- **Lakes :** A lake is a body of water lying on a hollow on the earth's surface and being surrounded by land.

Following are the major types of lakes found in India.

1. Fresh water lakes : Most of the fresh water lakes are in the Himalayan region. They are of glacial origin. The Dal lake, Bhimatal, Nainital, Lutak and Barapani are some of the fresh water lakes of India.
2. Lakes of Tectonic origin : Folding and faulting produce hollows in the earth's crust. These hollows may contain either salt or fresh water lake. The Wular lake in Jammu & Kashmir is the result of tectonic activity.
3. Salt water lake : Any lake that has no natural drainage outlet, either as a surface of stream or as a sustained subsurface flow, will become saline. The Sambhar in the desert region of Rajasthan is a salt water lake. Its water is used for producing salt.

Laktak Lake

4. Man made lakes : In order to harness water for generation of hydel power, to provide irrigation water to crops and to provide drinking water to urban places, a number of lakes have been constructed. e.g. Govind Sagar and Govind Ballabh Pant Sagar.
5. Lunar Lake situated in Maharashtra is a crater lake.
6. Chilka Lake situated in Puri district of Orissa & south of the Mahanadi delta is the biggest lake of the country.
7. Kolleru Lake is deltaic Lake of Andhra Pradesh situated between the Krishna & Godavari delta.
8. Pulicat Lake situated in the north of Chennai is a shallow lagoon. It has been barred by a long sandpit which is actually Sri Harikota Island.
9. Loktak Lake situated in Manipur is the largest fresh water lake in the North East India. Keibul lamjao, the only floating National Park of the country is situated here.
10. Vembanad Lake is a lagoon in Kerala and is an important tourist spot. Coconut islands are located in it.
11. Gohna Lake situated near Devprayag in Garhwal has been formed by a huge landslide across a tributary of the Gange.

ROLE OF RIVERS IN THE ECONOMY

1. **Development of Civilization :** Rivers have played role in the development of civilisation most of the ancient civilisation like Indus, Aztec etc developed around the river.
2. **Development for Agriculture :** Rivers and their associated alluvial soils provide the most productive agricultural lands of the country.
3. **Settlement :** Most of the large cities are located on the banks of a river. Not only do river provide water supplies but also they provide transportation.
4. **Industrial development :** It has flourished along rivers in many industrial as a coolant and for the generation of hydro electricity.
5. **Means of transportation :** Rivers provide primary channel of inland transportation.

RIVER POLLUTION

1. The growing domestic and industrial demand for water from rivers naturally affects the quality of water. As a result more and more water is being drained out of the rivers reducing their volume.
2. A heavy load of untreated sewage and industrial effluents are emptied into the rivers. This effects not only the quality of water but also the self cleaning capacity of rivers.
3. The increasing urbanisation and industrialization is also responsible for increasing pollution level of many rivers.

NATIONAL RIVER CONSERVATION PLAN (NRCP)

1. The activities of Ganga Action Plan (GAP) Phase-I were started in1985 and they declared closed on 31st March, 2000.
2. The steering Committee of the National River Conservation Authority reviewed the progress of the GAP and necessary corrections were made on the basis of lessons learned and experiences gained from GAP Phase-I.
3. They have been applied to the major polluted rivers of their country under the NRCP.
4. The Ganga Action Plant (GAP) Phase-II has been merged with the NRCP. The expanded NRCP now covers 152 towns located along 27 interstate rivers in 16 states. Under this action plan, pollution abatement works are being taken up in 57 towns. A total of 215 schemes of pollution abatement have been sanctioned. So far, 69 schemes have been completed under this action plan. A million litre of sewage is targeted to be intercepted, diverted and treated.

GLOSSARY

1. **Perennial Rivers :** These are the rivers which flow through out the year as they get water from the rainfall as well as melting of ice.
2. **Lagoon :** A part of the sea near the land which has been cut off from the open sea at low tide.
3. **River basin :** The area drained by a single river system is called a river basin.
4. **Drainage :** A system of flowing water from the higher level to the lower level.
5. **Water shed :** The upland or a mountain which separates two adjoining drainage basin is known as water shed or water divide.
6. **Gorge :** A deep narrow opening formed by the river in the upper course.
7. **Lake :** A body of water lying on a hollow on the earth's surface and being entirely surrounded by land is known as a lake.
8. **Inland drainage :** A drainage system in which rivers do not reach on ocean but empty their water into a lake is called inland drainage.
9. **Tributary :** A tributary is that river which joins the main river and increases the volume of water.
10. **Distributary :** A distributary is that river which originates from a main river. It is formed near the mouth of river before it falls into the sea. It is found in the lower course of the river.