

The background image is an aerial photograph of a river system. The river flows from the bottom left towards the top right, creating several sharp bends or meanders. The surrounding land is covered in dense green vegetation, likely a mix of forests and fields. In the far distance, a range of mountains is visible under a clear blue sky.

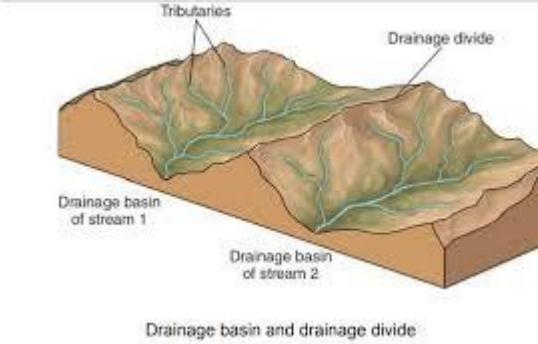
DRAINAGE

CHAPTER - 3

INTRODUCTION

Introduction:

- **Drainage ----- River system of an area.**



Drainage Basin -----

- **They are drained by a river along with its tributaries and distributaries is known as Drainage Basin.**

Water Divide : When any elevated area, such as a mountain or an upland separates two drainage basins it is known as Water Divide.



INTRODUCTION

What we are going to study in this chapter

- **Drainage systems in India**
 - The Himalayan Rivers**
 - The Peninsular Rivers**
- **Drainage patterns**
- **The Himalayas Rivers: [The Indus, the Ganga, and the Brahmaputra]**
- **The Peninsular Rivers: [The Narmada, the Tapi, the Godavari, the Mahanadi, the Krishna and the Kaveri]**
- **Lakes**
- **Role of Rivers in the Economy**
- **River Pollution**

Drainage systems in India

Influenced by the Physical features of the subcontinent. Indian rivers are divided into two major groups:

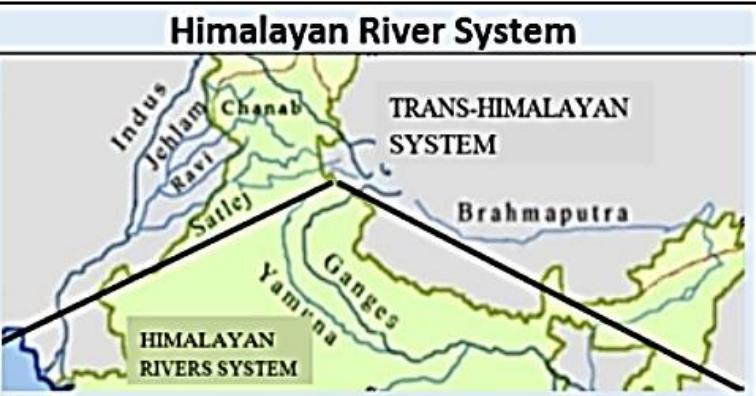
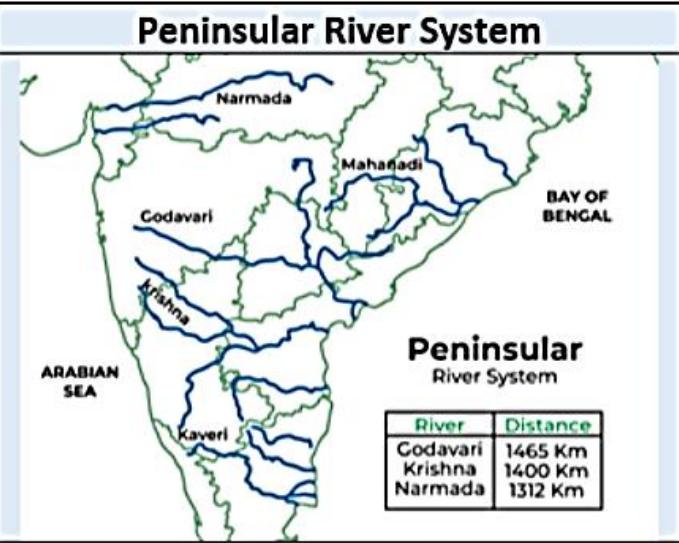
- **Himalayan Rivers- Rivers originating from Himalayas**
- **Peninsular Rivers - Rivers originating from Peninsular Plateau**

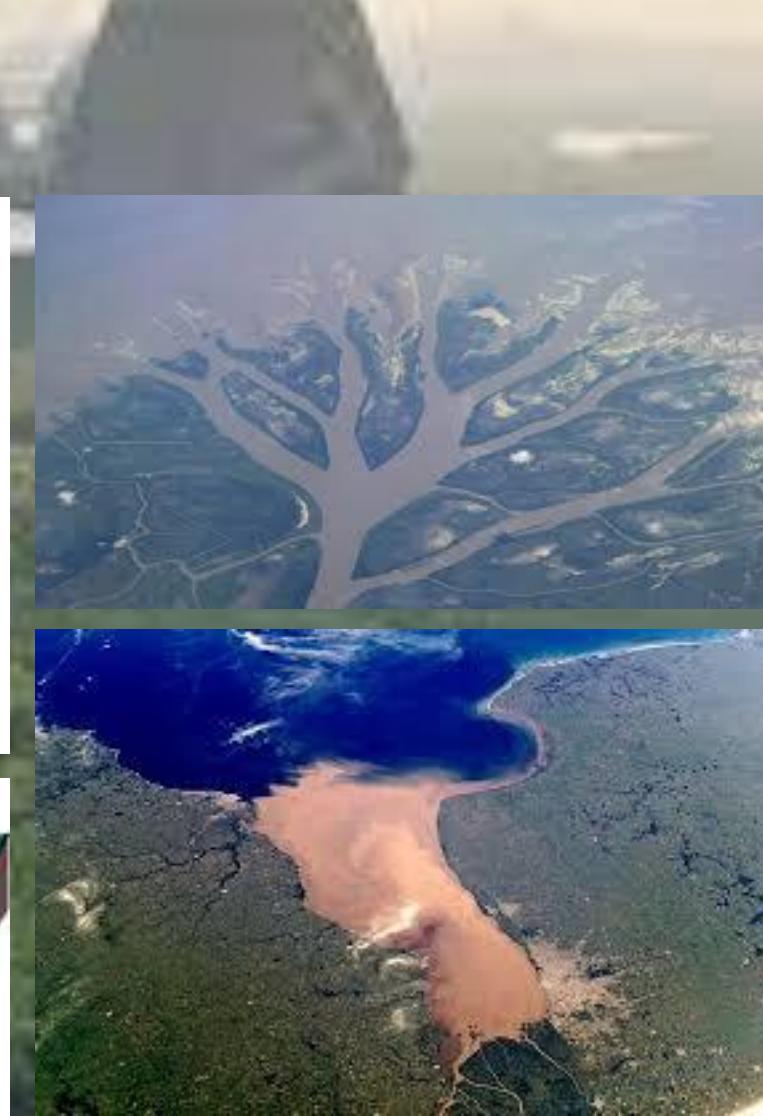
Apart from the originating point, Himalayan and Peninsular rivers also have various other differences.

Drainage systems in India

BASIC	HIMALAYAN RIVERS	PENINSULAR RIVERS
Point of origin	Himalayas & Glaciers	Western Ghats and Central Highland
Nature	Perennial	Seasonal
Source of Water	Rainfall and glaciers	Rainfall
Course	Long course, Performs erosional activity and carry huge loads of silt and sand	Short and shallower courses
Drains in?	Most Of the rivers now towards east and drains in Bay of Bengal. Indus is an exception	Most of the overs flows towards east and drains in Bay of Bengal. Narmada and Tapi are some major rivers which flows in west and drains in Arabian sea
Other features	Forms flood plains. oxbow lakes. meanders and delta	Forms estuaries unlike Himalayan rivers
Examples	Ganga, Brahmaputra, Indus, Yamuna etc	Narmada, Godavari, Krishna, Kaveri etc

Drainage systems in India

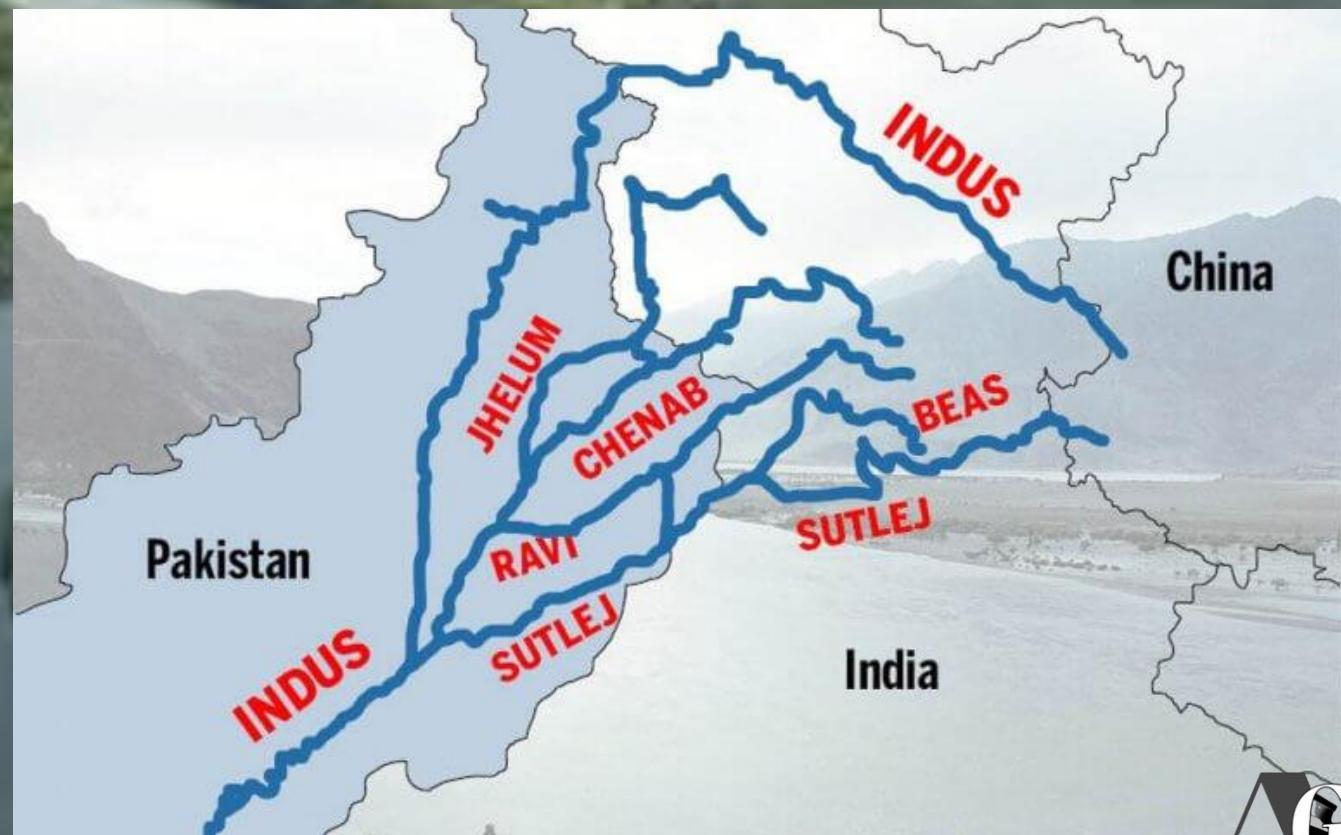
Feature	Himalayan River System	Peninsular River System								
		 <p>Peninsular River System</p> <table border="1"><thead><tr><th>River</th><th>Distance</th></tr></thead><tbody><tr><td>Godavari</td><td>1465 Km</td></tr><tr><td>Krishna</td><td>1400 Km</td></tr><tr><td>Narmada</td><td>1312 Km</td></tr></tbody></table>	River	Distance	Godavari	1465 Km	Krishna	1400 Km	Narmada	1312 Km
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The Indus River System:

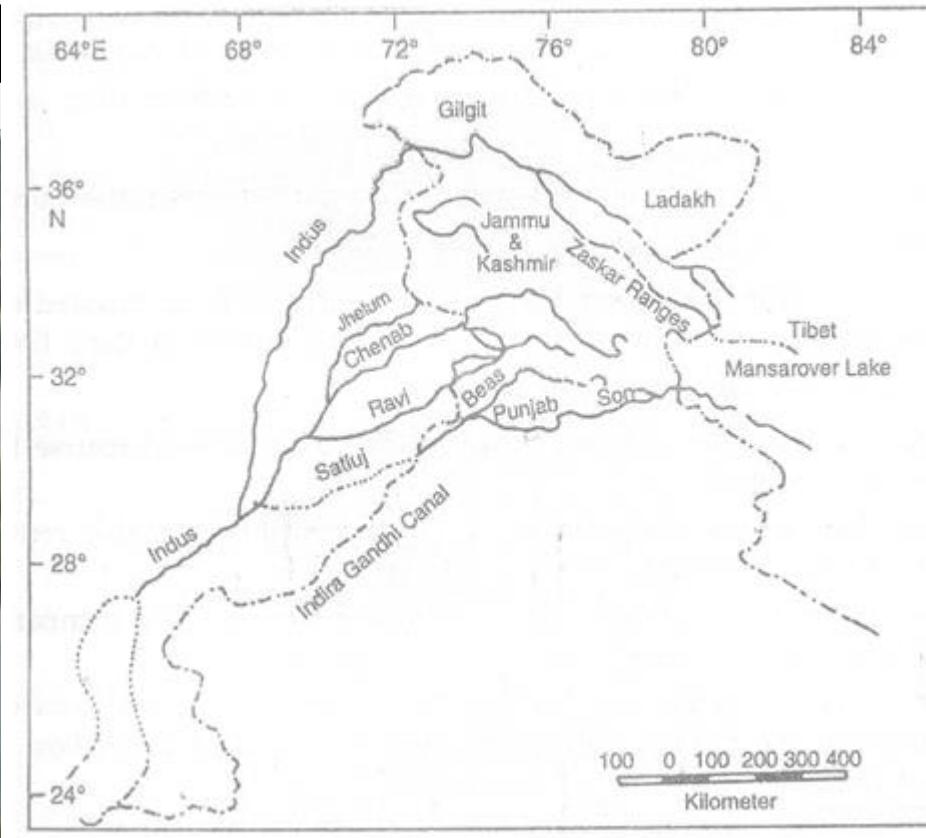


What is river system: The river along with its tributaries may be called as a river system.



THE INDUS RIVER SYSTEM

- Rises in Tibet. Near lake Mansarovar.
- Enters India from Ladakh
- It is joined by the tributaries such as the Zaskar, the Nurba, the Shyok and the Hunza.
- Further flowing from the Baltistan and Gilgit, Indus is joined by other tributaries such as the Satluj, the Ravi, the Chenab and the Jhelum at Mithankot in Pakistan.
- Flowing Southwards Indus finally drains into Arabian sea.



Total length of 2900 km.
Title over a third of Indus basin is located in India.
Major part flows from Pakistan
Do you know? = Indus water treaty (1960)

THE GANGA RIVER SYSTEM

Devprayag (U.K)

At Haridwar, Ganga emerges from mountains to plains.

- Further coming on the plains River Ganga is joined by many tributaries.



THE GANGA RIVER SYSTEM

Left Bank tributaries of Ganga

The Ghaghara

The Gandak

Kosi

[Rises from the glaciers in Himalayas]

These Rivers floods parts of the Northern plains every year.

Causing damage to life and property but at same time they enrich the soil for agricultural use.

Right bank tributaries of Ganga

The Chambal

The Betwa

The Son

[Rises from Semi-arid part of Peninsular]

They have a shorter courses and do not carry much water. Why?

Do you know? The Namami Gange Programme

THE GANGA RIVER SYSTEM

Further carrying water from its left and right bank tributaries. The ganga flows towards east.

Farakka is the easternmost point of Ganga in West Bengal

Bhagirathi – Hooghly

- A distributary of Ganga
- Flows into Bay of Bengal

Padma

- Ganga entering into Bangladesh
- Mainstream further flow south and join Brahmaputra

- The mighty river with the water of Ganga and Brahmaputra = Meghna

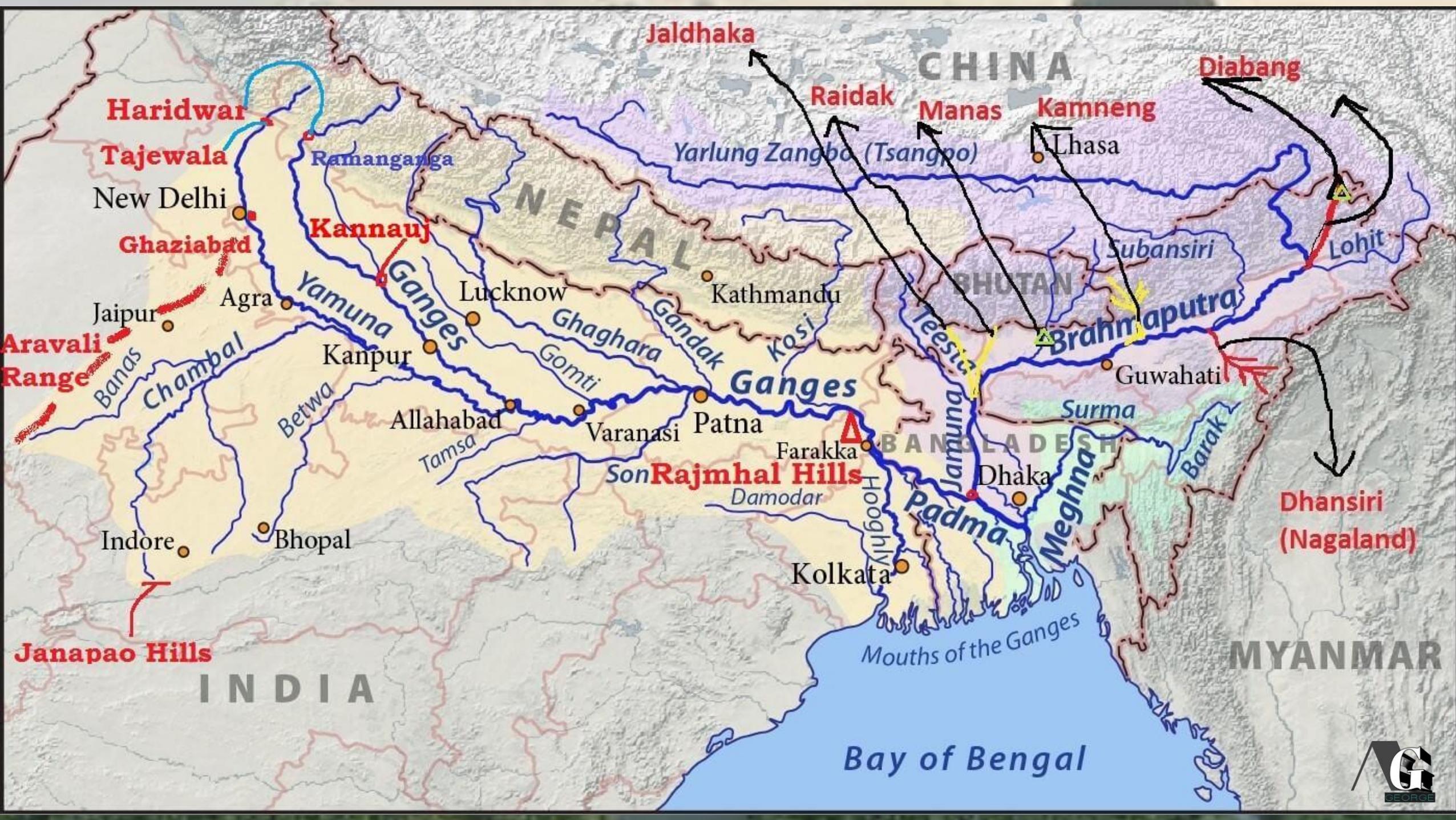


THE GANGA RIVER SYSTEM

These rivers forms the Sundarban Delta

- **Name derived from Sundari Tree**
- **Length 2500 km**
- **Ambala water divide between Indus and Ganga river system**
- **Ambala to Sundarban = fall in sleep 300 meter-----forms MEANDERS**

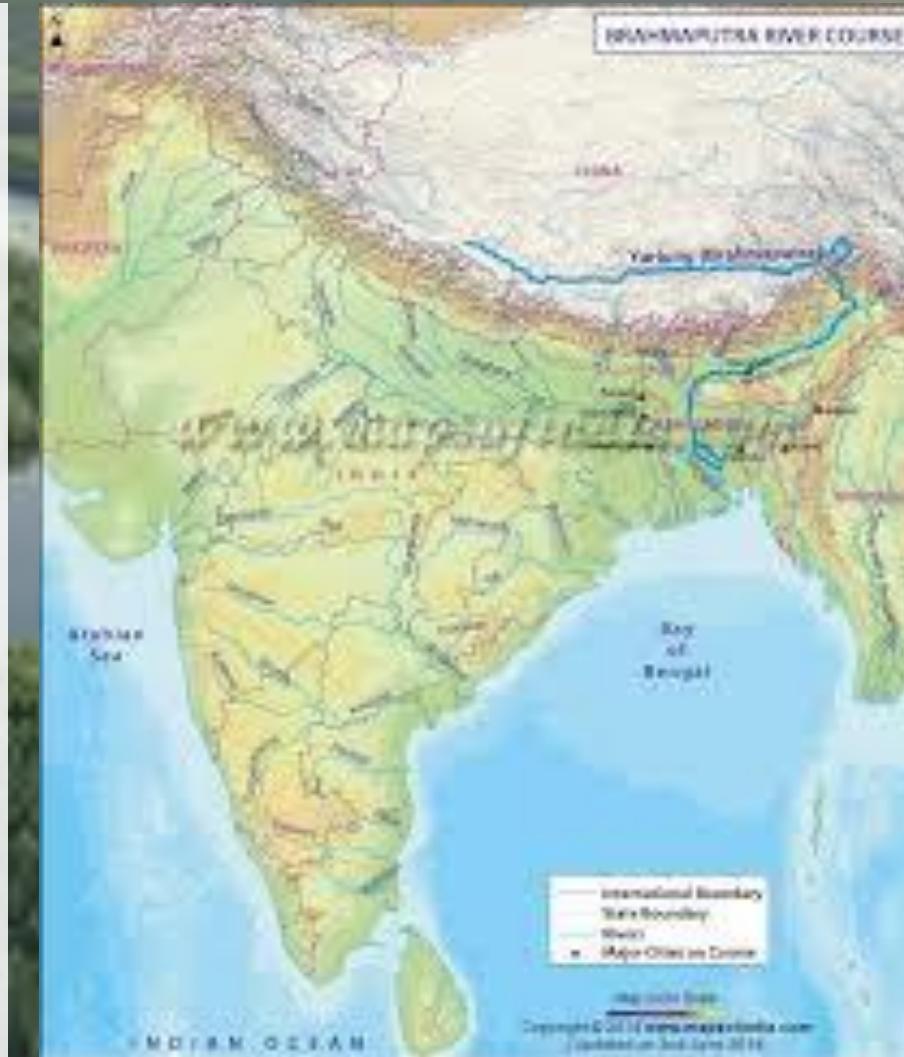




THE BRAHMAPUTRA RIVER SYSTEM

**Rises in Tibet; East of Mansarovar lake
(Mansarovar lake = Water divide)**

- Slightly longer than the Indus and most of its course lies outside India. :**
- From Namcha Barwa, it takes 'U' turn and enters into India in Arunachal Pradesh.**
- Here, it is known as Dihang, joined by other tributaries such as Dibang, the Lohit etc.**
- Volume of water in river varies in Tibet and India.**



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THE BRAHMAPUTRA RIVER SYSTEM

Entering in India Brahmaputra carries a large amount of water & **Silt**

Forms Riverine Island

- **World's largest riverine Island?**
- The river **overflows its banks, causing widespread devastation due to floods in Assam and Bangladesh.**
- The Brahmaputra is marked by **huge deposits of silt on its bed causing the riverbed to rise.**

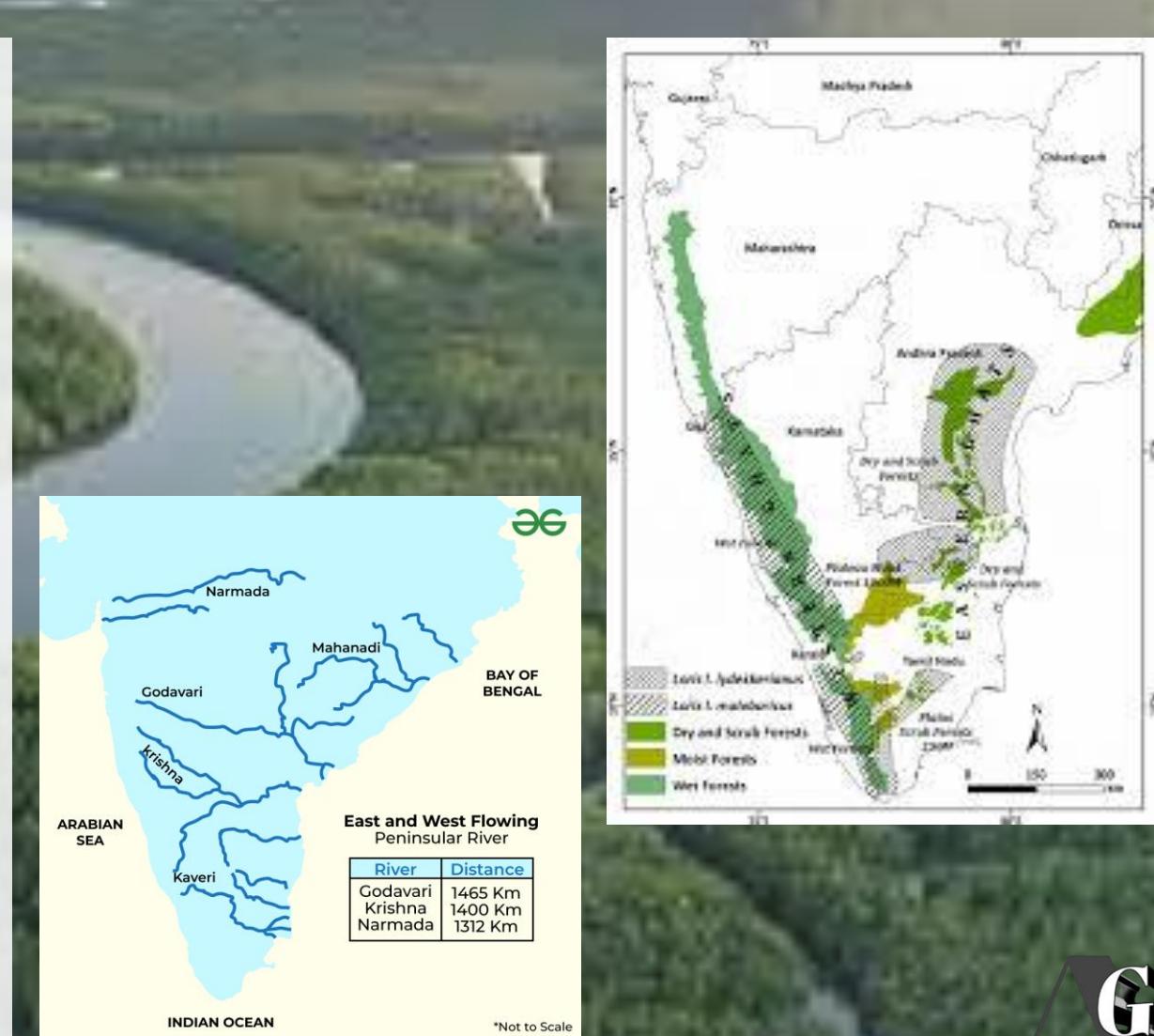
Dhola Sadiya Bridge

Majuli



The Peninsular Rivers:

- ***Most of the peninsular rivers originates from Western Ghats***
- **Western Ghats as water divide in the peninsular India**
- **All the major river originating from Western Ghat flows towards East.**
- **Forms delta.**
- **The Narmada and Tapi are only long rivers, which flows West and make estuaries.**
- **Peninsular Rivers include: The Narmada, the Tapi, the Godavari, the Mahanadi, the Krishna, The kaveri**



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The Narmada Basin

Rises in the Amarkantak hills

- **Flows west in Rift valley due to faulting**
- **River Narmada flows through deep gorge, forming picturesque location. [Dhuandhar falls]**
- **Most of the tributaries of Narmada are short and joins at right angle [Rectangular Pattern]**
- **River flows in the parts of M.P and Gujarat.**



The Narmada Basin



The Tapi Basin

- Rises in Satpura range in Betul district of Madhya Pradesh.
- It also flows in Rift valley parallel to Narmada but shorter in length.
- Flows through three states [M.P, Gujarat and Maharashtra]
- Drains in Arabian sea.

Are there only two west flowing rivers? – No there are west flowing coastal rivers but their length is short.

Eg. Sabarmati , Mahi, Bharatpuzha, Periyar



The Godavari Basin

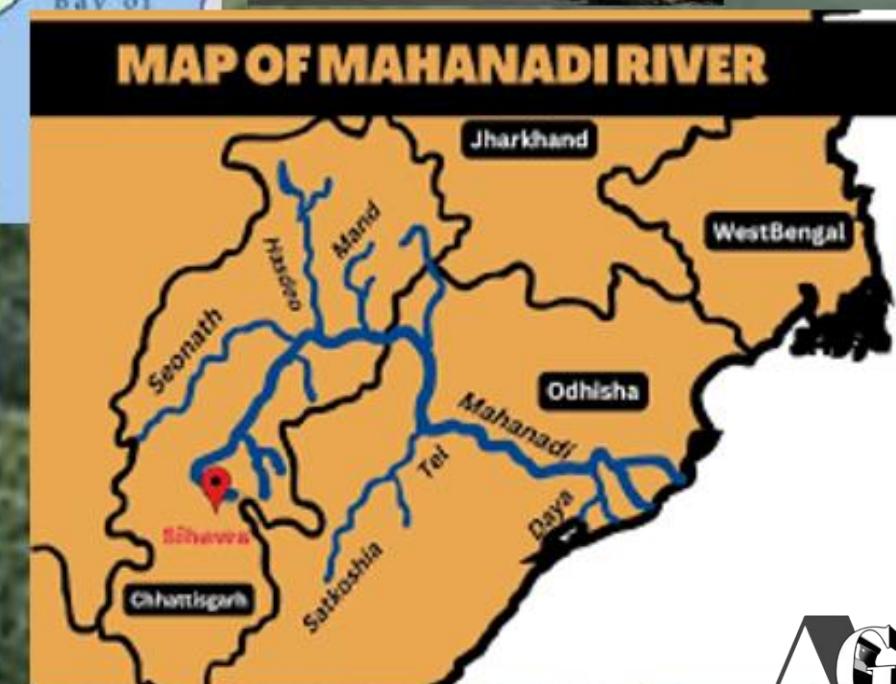
- • Largest Peninsular River.
- • Covers a large area along with its tributaries.
- Also known as **Dakshin Ganga**
- Rises from slope of the western ghats in the Nasik district of Maharashtra.
- Length = 1500 km
- About 50% of drainage basin covers Maharashtra. Also extends to M.P, Odisha and Andhra Pradesh.
- Tributaries such as the Purna, the Wardha, the Pranhita, the Manjra, the Wainganga and Penganga.



The Mahanadi Basin

- Rises in the Highlands of Chhattisgarh.
- **Total length of Mahanadi = 860 km**
- It flows mainly in Odisha
- Joined by the tributaries such as **Seonath, Jonk, Hasdo, Mand, Lb** etc.
- Its drainage basin is shared by
- **Maharashtra, Chhattisgarh, Jharkhand and Odisha.**

Is the source water for peninsular river is rainfall only?



The Krishna Basin

- **Rises from the springs near Mahabaleshwar, flows Eastwards.**
- **Its drainage is shared by Maharashtra, Karnataka and Andhra Pradesh.**
- **The tributaries of river Krishna are the Tungabhadra, the Konyana, the Ghatprabha, the Musi and the Bhima etc.**
- **It flows over the distance of 1400 km and drains into Bay of Bengal.**



The Kaveri Basin

- **Rises in the Brahmagiri range of Western Ghats [Karnataka]**
- **Flows East and drains in Bay of Bengal in South of Cuddalore in Tamil Nadu**
- **The total length of river is about 760 km.**
- **Its main tributaries are Amravati, Bhavani, Hemavati and Kabini covering the parts of Karnataka, Kerala and Tamil Nadu.**



-

Do you Know?

- 71 per cent of the world's surface is covered with water, but 97 per cent of that is salt water.**
- Of the 3 per cent that is available as freshwater, three quarters of it is trapped as ice.**

Do you Know?

- The river Kaveri makes the second biggest waterfall in India, known as Shivasamudram Falls. The hydroelectric power generated from the falls is supplied to Mysuru, Bengaluru and the Kolar Gold Field**
- There are some smaller rivers which flows towards East such as:**
- The Damodar The Brahmani The Baitarani The Subarnarekha**

LAKES

- Lakes and We

Imagine a situation of various tourist places as Nainital and Srinagar without lakes?

Lakes plays a very Important role in our life

- Tourist centres and enhances natural beauty.

- Habitat for aquatic life.

- Helps to regulate the flow of a river.

- Prevents flooding and supplies water during dry season. •

- Used for developing hydel power.

- They moderate the climate of the surrounding

Why do lakes of large extent are called seas.
Eg. The Caspian Sea, The dead sea



Types of LAKES

India has many lakes -----They differ from each other in variety of ways.

- **Some are permanent**
- **Some contain water only during rainy season**
- **Salt water lakes**
- **Fresh water lake**

Depending on the formation lakes are

Glacier Lakes



Oxbow



Lagoons



Inland drainage lakes



LAKES

Glacier Lakes

- These lakes are formed due to the action of Glaciers and ice sheets.
- **Freshwater Lakes**
- E.g The Dal lake, Bhimtal, Nainital, Loktak etc
- **Wular Lake** is the largest Freshwater lake in India is a tectonic lake.
- Similarly there are **Meteoroid lakes** also. E.g Lonar Lake



LAKES

OXBOW LAKE

Due to turns and twists----

Erosion and deposition along the sides of the meander. ----- In due course of time the meander loop cuts off from the river forms a cut-off lake



LAGOONS

- Another important type of lakes.

Mostly lagoons are salt water lakes [connected with seal]

- Lagoons are a shallow body of water separated from a larger Body of water by barrier islands or reefs.

- Example of lagoon lakes are Chilika lake, the Pulicat lake and Kolleru lake



LAKES

INLAND DRAINAGE LAKES

They are formed due to the drainage of river water. E.g Sambhar lake

They are sometimes seasonal.

Most of the time they are salt water lake

Apart from these natural lakes there are lake which are constructed by humans known as human made or Artificial lakes.



Role of Rivers in the Economy

- Rivers have been of fundamental importance throughout the human history.
- Humans have settled near river banks since ancient times
- These settlements have now become big cities
- Rivers are used for irrigation, navigation, hydropower generation



River Pollution

- **We and our dependence on water causes ..**
- **Water is required for variety of need**

Domestic

Municipal

Industrial

Agricultural

- **Due to all this rivers are being drained out.**
- **Polluted by the heavy load of untreated sewage and industrial effluents**
- **This affects the quality of water as well as the self - cleansing capacity.**
- **Concern over rising pollution in our rivers led to the launching of various action plans to clean the rivers. National River Conservation Plan (NRCP) 1985 ---1995**

