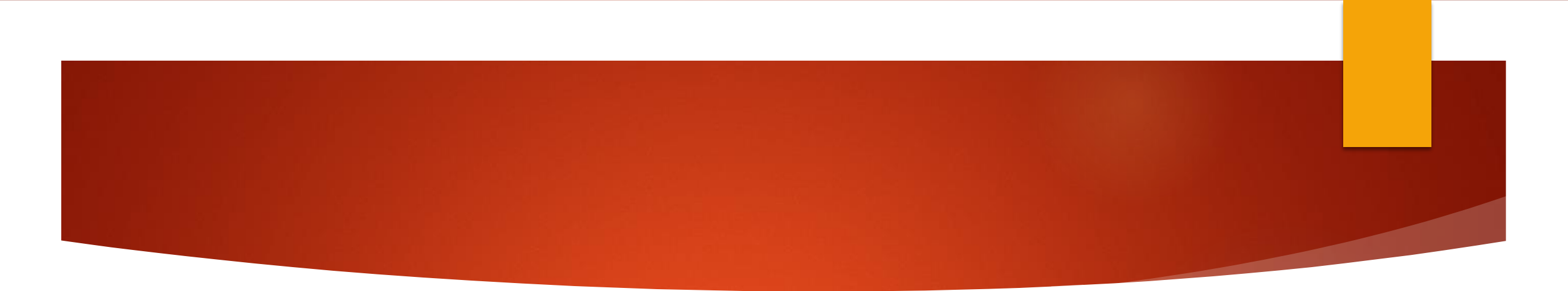


CHAPTER 3

DRAINAGE

- 
- ▶ **STUDENTS WILL BE ABLE TO UNDERSTAND ABOUT:**
 - ▶ **HIMALAYAN AND PENINSULAR RIVERS OF INDIA**
 - ▶ **IMPORTANCE OF RIVERS AND LAKES .**

TOPICS

- 
- DRAINAGE BASIN
 - DRAINAGE SYSTEM IN INDIA

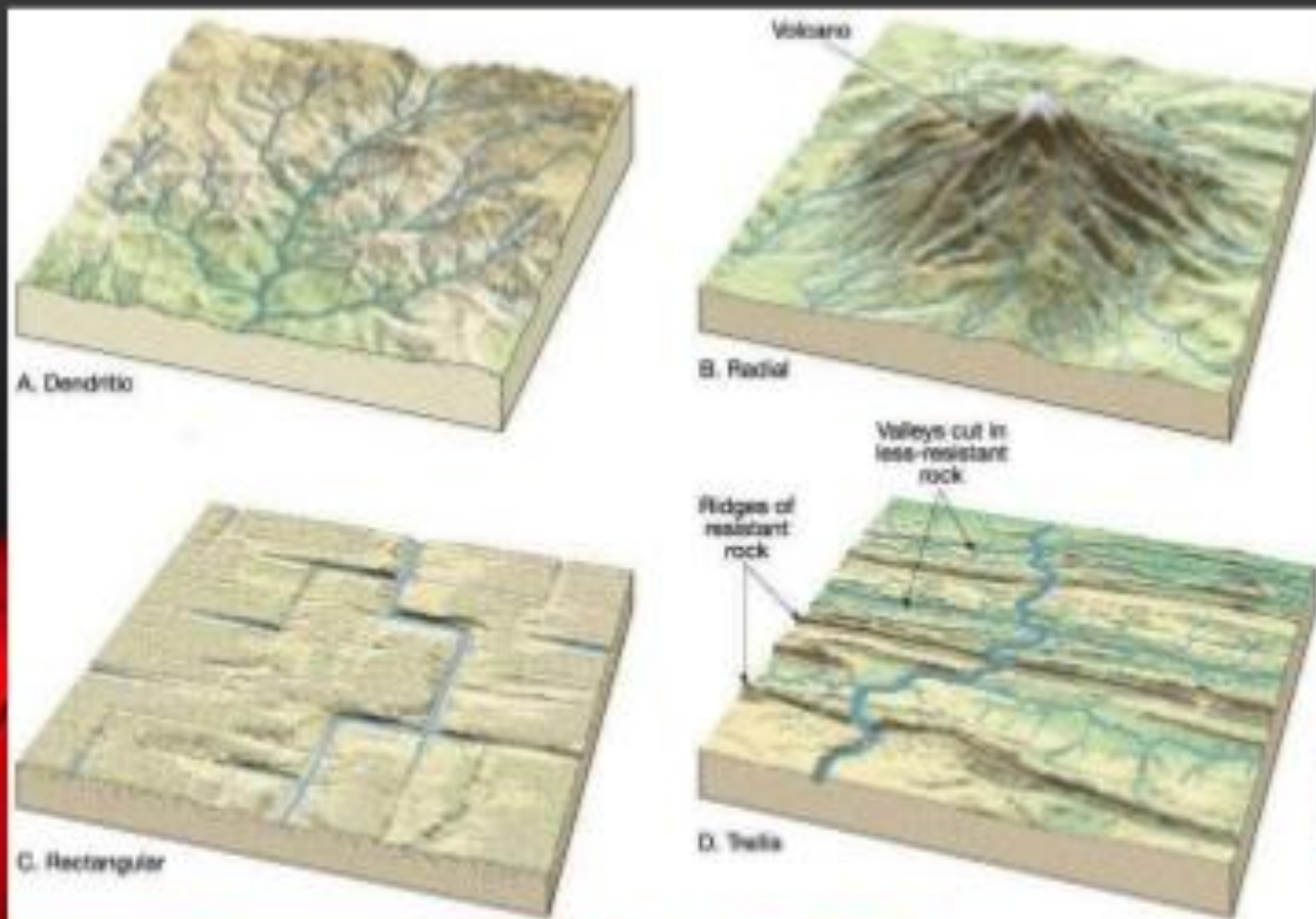
- 
- HIMALAYAN RIVERS
 - PENINSULAR RIVERS

*The term drainage describes the
river system of an area.*

*The area drained by a single river system is
called a drainage basin.*

THE DRAINAGE PATTERNS MADE BY RIVERS

The streams within a drainage basin form certain patterns, depending on the slope of land as well as underlying rock structure and climatic conditions. These are dendritic, trellis, rectangular, and radial.



DRAINAGE PATTERNS MADE BY RIVERS

DRAINAGE SYSTEMS IN INDIA

The drainage systems of India are mainly controlled by the broad relief features of the subcontinent.

Accordingly, the Indian rivers are divided in to two major groups:

- *The Himalayan rivers.*
- *The Peninsular rivers.*

Comparison between the Himalayan & Peninsular Rivers

Himalayan Rivers

- I. These rivers originate from the glaciers.*
- II. Catchment area is very large.*
- III. Engaged in high erosion activity.*
- IV. Useful in irrigation*
- V. Perennial.*
- VI. Eg.:- Indus, Ganga.*

Peninsular Rivers

- I. These rivers originate from the plateaus.*
- II. Catchment area is very small.*
- III. Engaged in low erosion activity.*
- IV. Not very useful in irrigation*
- V. Non-perennial.*

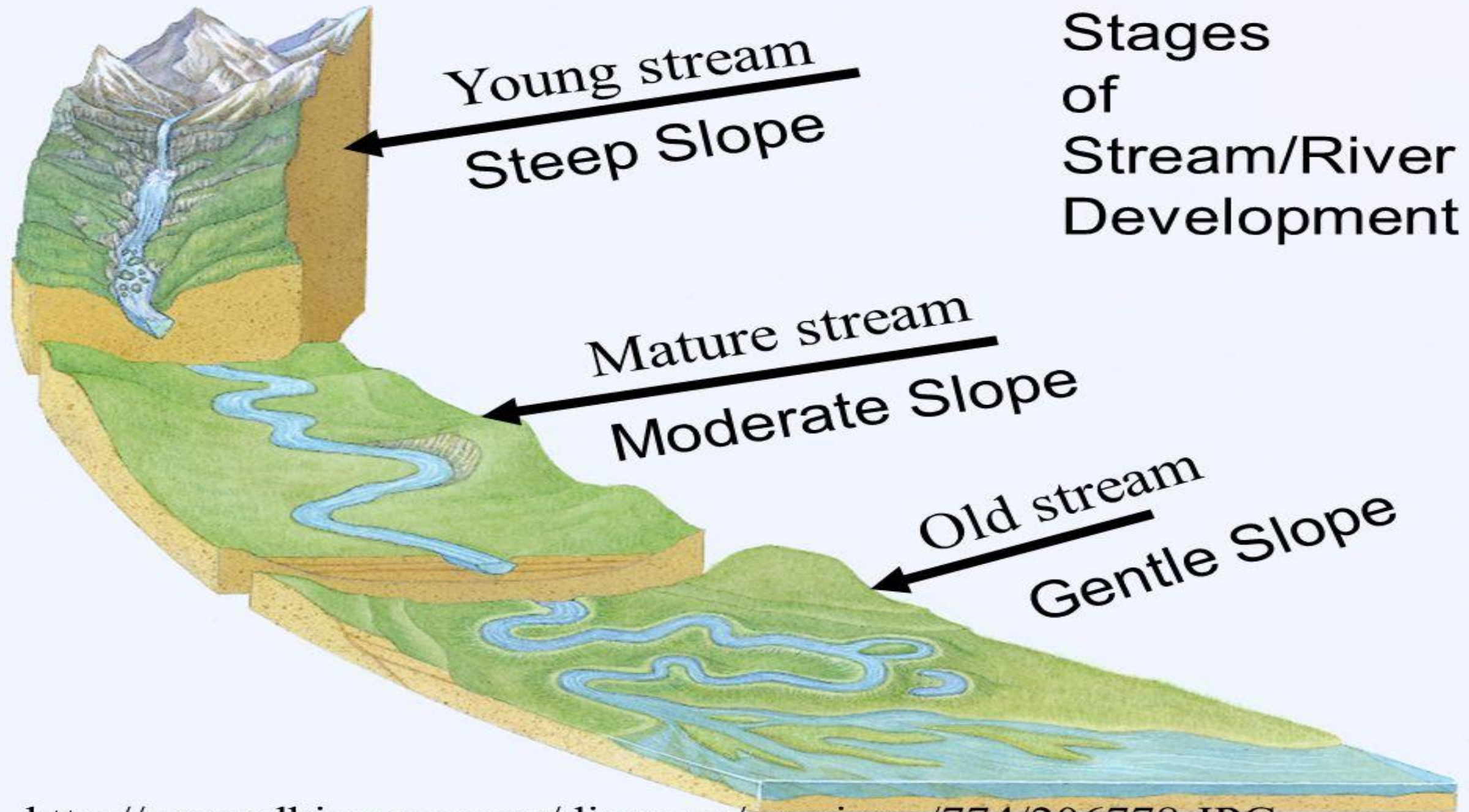
Main Courses of a River

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graph TD; A[Main Courses of a River] --> B[Upper Course]; A --> C[Middle Course]; A --> D[Lower Course]
```

Upper Course

Middle Course

Lower Course

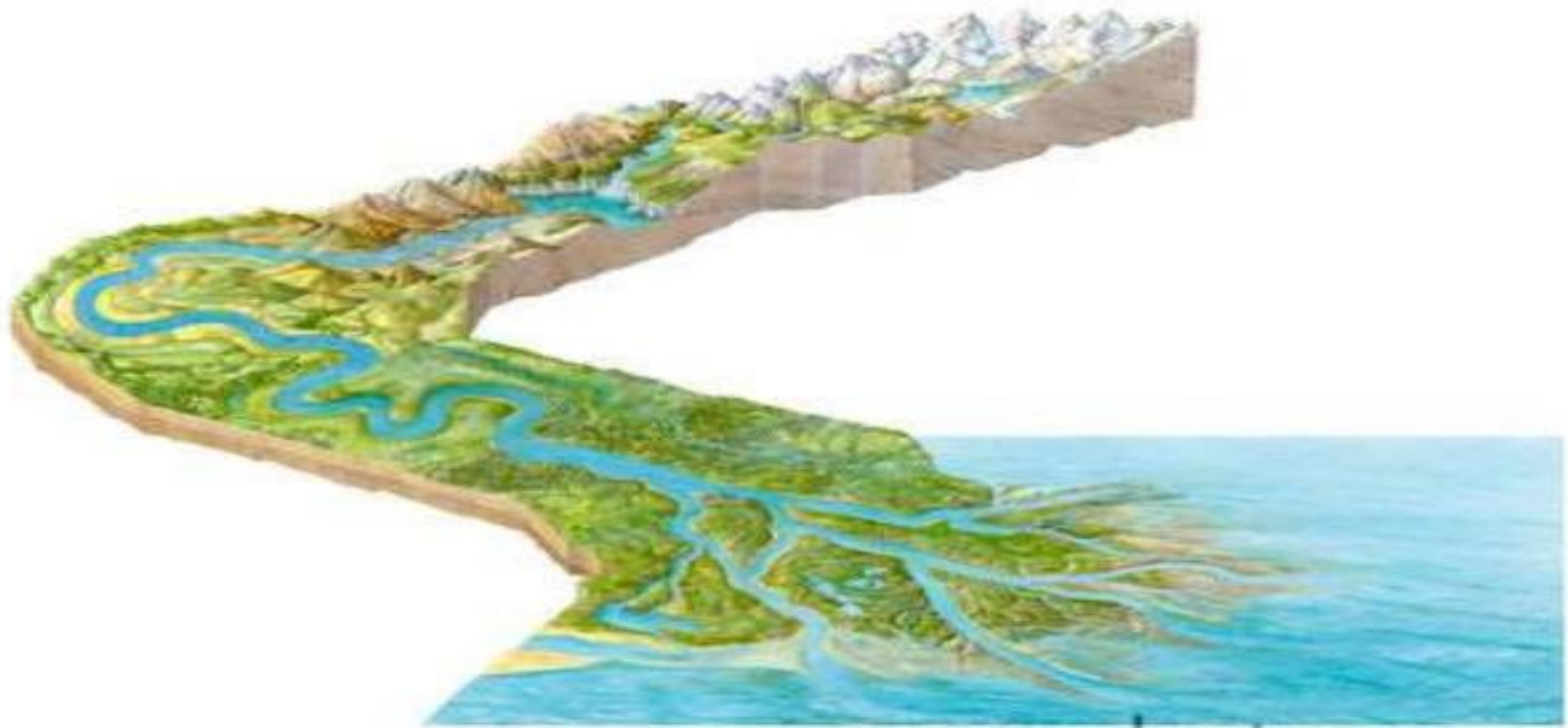


Stages of Stream/River Development

Young stream
Steep Slope

Mature stream
Moderate Slope

Old stream
Gentle Slope





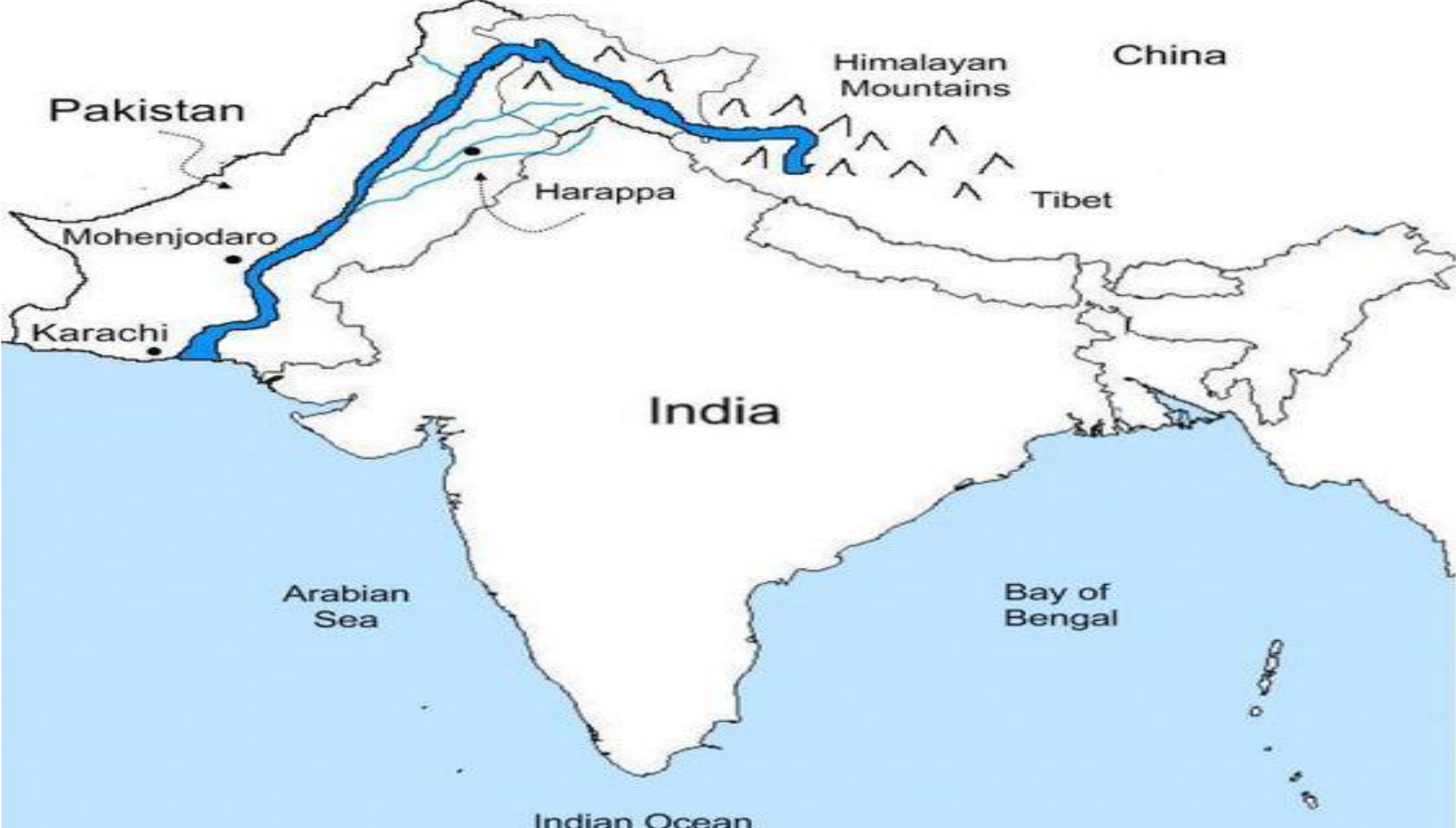
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Himalayan Rivers



The Ganges, the Brahmaputra and the Indus together are known as the Himalayan Rivers.



Pakistan

China

Himalayan
Mountains

Harappa

Tibet

Mohenjodaro

Karachi

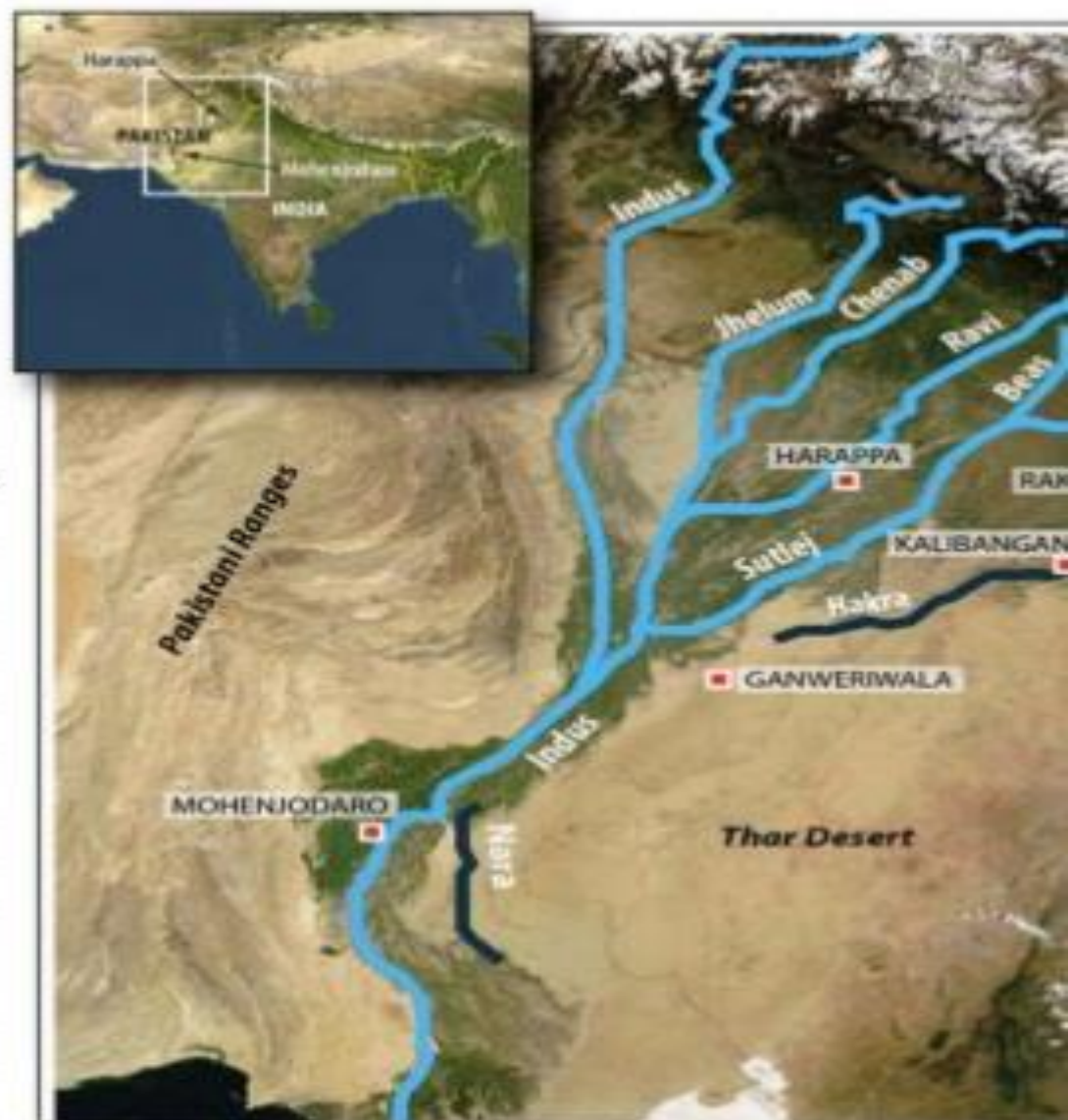
India

Arabian
Sea

Bay of
Bengal

Indian Ocean

- **INDUS RIVER**
- *Source: Rises in Tibet*
- *Near lake Manasarovar.*
- *Tributaries: Chenab, Sutlej, Jhelum, Ravi*
- *Beas.*
- *Length: 2900km.*
- *Indus Water Treaty 1960.*

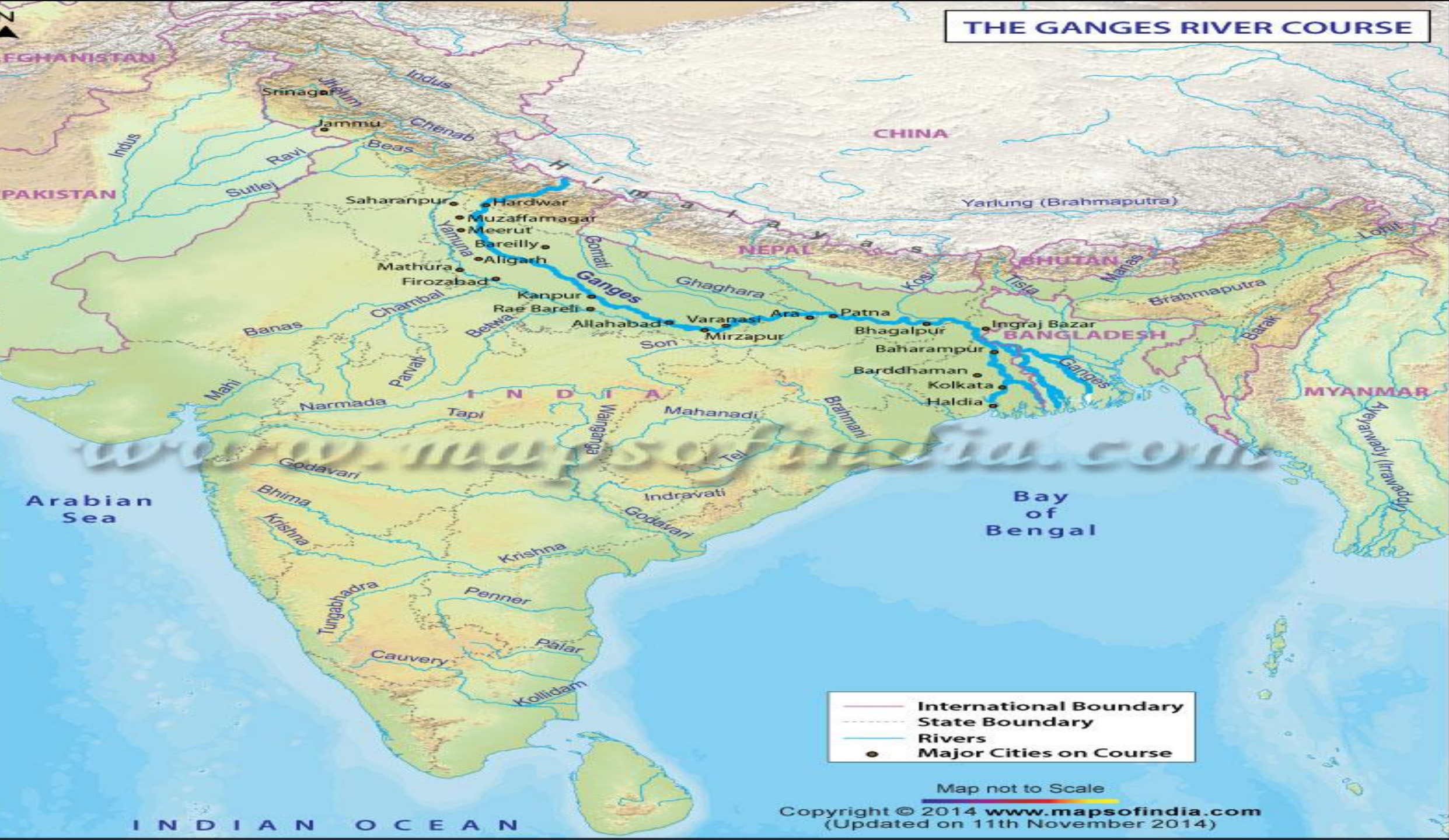


The Ganges River System

*The **Ganges**, is the largest river of the Indian subcontinent, flowing east through the Gangetic Plain of northern India into Bangladesh. The 2,500 km river rises in the Gangotri Glacier.*



THE GANGES RIVER COURSE



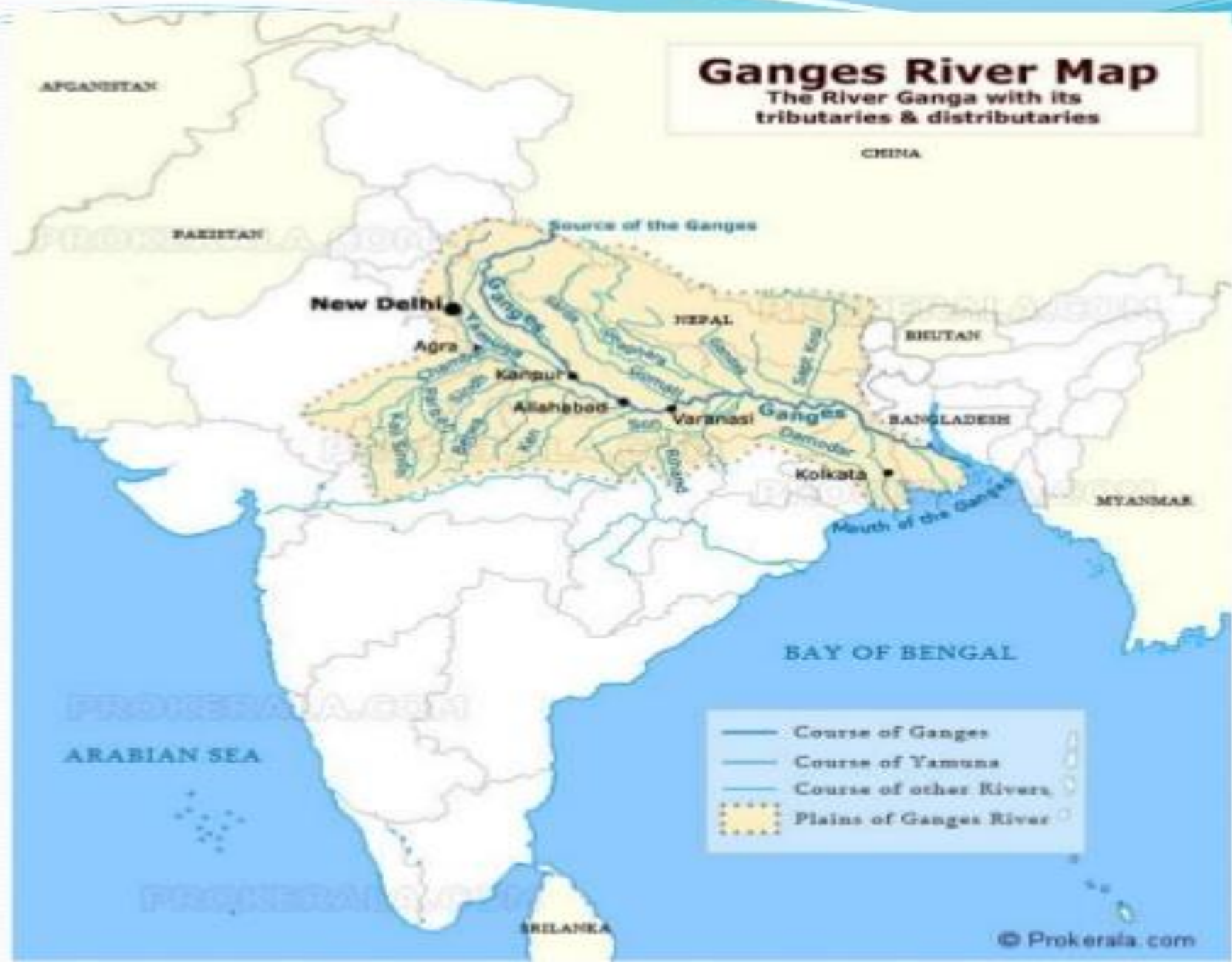
- International Boundary
- - - State Boundary
- Rivers
- Major Cities on Course

Map not to Scale



Ganges River Map

The River Ganga with its
tributaries & distributaries



Main Features Of The Ganga System

- *The length of the Ganga is over 2500 kms.*
- *It has the largest basin.*
- *From the Himalayas the Ganga enters the plains at Haridwar.*
- *It is joined by a number of tributaries i.e. Yamuna, Son, Kosi & Gandak.*
- *The Ganga enters Bangladesh as Padma.*
- *The river is called Meghna when Brahmaputra joins it.*
- *It creates the largest delta, Sunderban with the help of Brahmaputra .*

BRAHMAPUTRA RIVER



Brahmaputra River

National Waterway No. II



Map not to Scale

 National Waterway No. II



BRAHMAPUTRA RIVER

- *Source: Rises in Tibet east of Manasarovar lake*
- *Flow eastward parallel to the Himalayas. On reaching the Namcha Barwa it takes a 'U' turn and enters India in Arunachal Pradesh through a gorge.*
- *Tributaries: Dibang, Lohit.*
- *Form riverine island.*



PENINSULAR RIVER



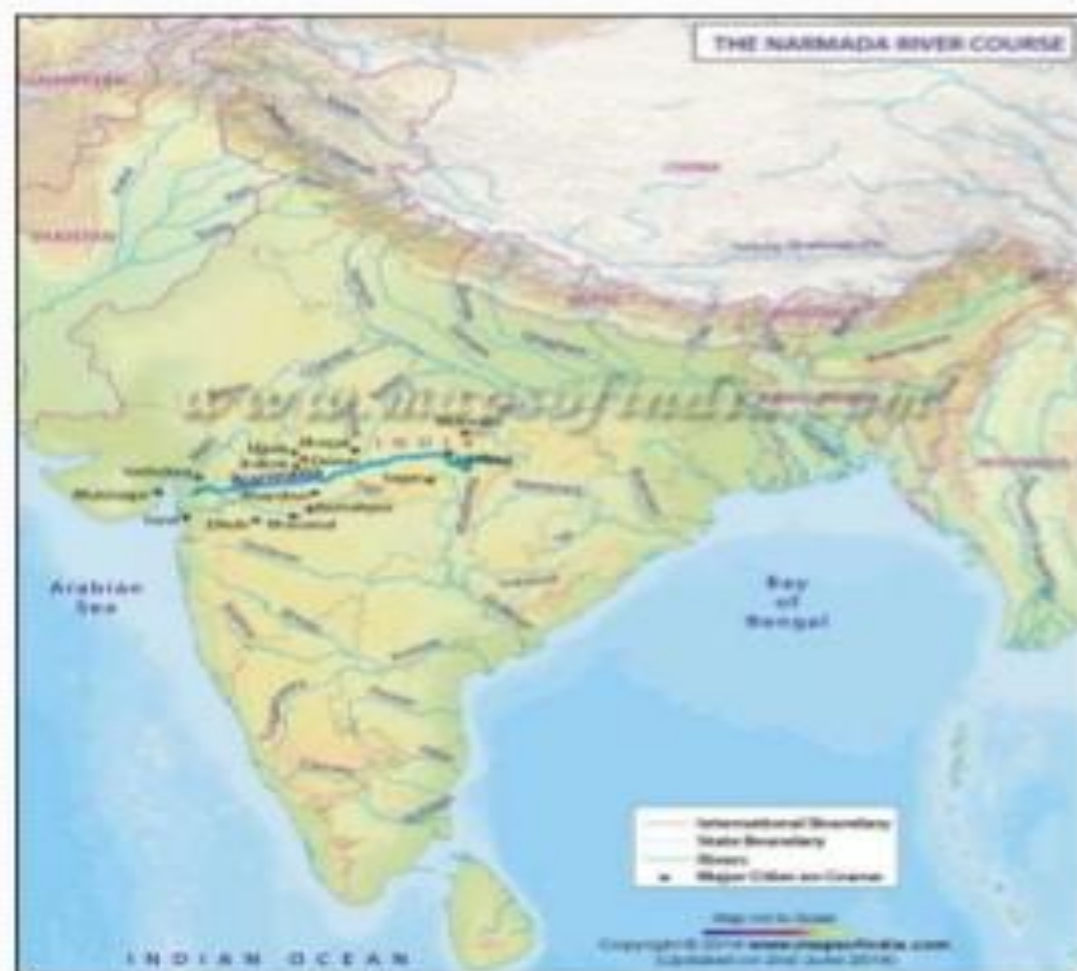
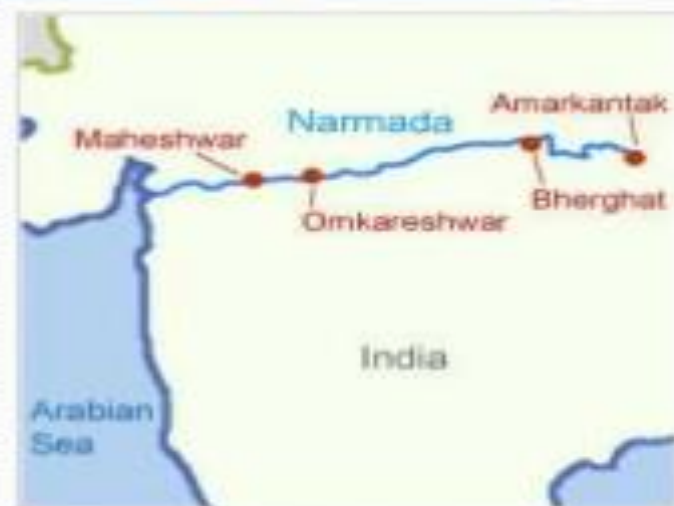




- 
- ▶ **PENINSULAR RIVERS ARE DIVIDED INTO TWO**
 - ▶ **1 . EAST FLOWING RIVERS**
 - ▶ **2. WEST FLOWING RIVERS**

- 
- ▶ **WEST FLOWING RIVERS ARE NARMADA AND TAPI.**
 - ▶ **EAST FLOWING RIVERS ARE MAHANADI, KRISHNA, GODAVARI, KAVERI.**

NARMADA RIVER



Dhuadhar falls



THE TAPI BASIN

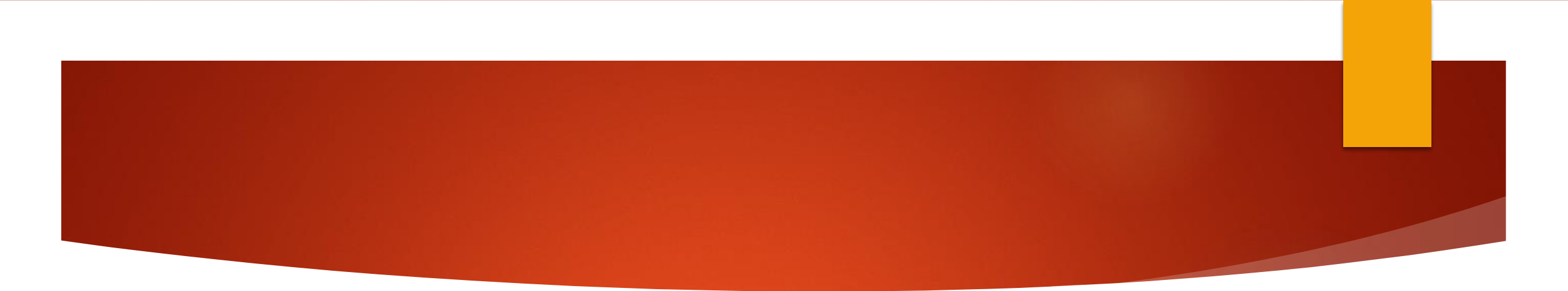


Tapti River

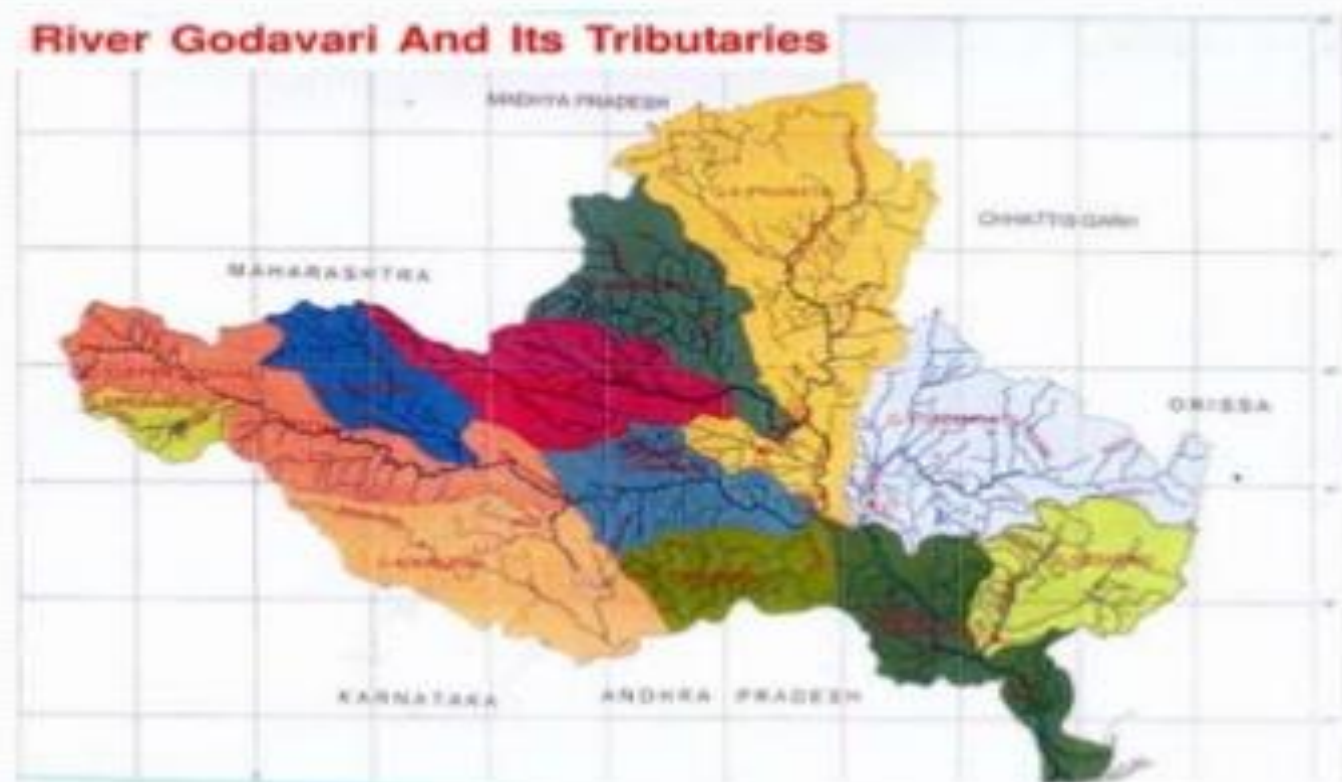
- River in India
- The Tapti River ancient original name Tapi River, is a river in central India.
- **Length**: 724 km
- **Basin area**: 65,145 km²
- **Source**: Satpura Range
- **Mouth**: Gulf of Khambhat
- **Country**: India
- **Cities**: Surat, Burhanpur, Bhusawal, Jalgaon, Dhule, Nashik, more
-

DAKSHINA GANGA



- 
- ▶ **TOTAL LENGTH OF RIVER GODAVARI IS 1500 KM**
 - ▶ **IT HAS MANY TRIBUTARIES**
 - ▶ **ORIGINATES FROM NASIK DISTRICT OF MAHARASTRA**
 - ▶ **BECAUSE OF LARGE TRIBUTARIES AND LENGTH GODAVARI RIVER IS KNOWN AS DAKSHIN GANGA.**

River Godavari And Its Tributaries



Tributaries of Godavari River-

Pravara-
Penganga-
Indravathi-
Purna-
Wardha-
Sabari-
Manjira-
Vine Ganga -
Manair-
Pranahitha



Mahanadi
Originate : highlands
of chattisgarh
total length : 860km
river mouth : Bay of
Bengal

KRISHNA BASIN



- 
- ▶ **KRISHNA RIVER ORIGINATES FROM SPRING NEAR MAHABALESHBAR IN MAHARASTRA**
 - ▶ **TOTAL LENGTH OF RIVER KRISHNA IS 1400 KM**
 - ▶ **DRAINAGE BASIN : MAHARASTRA, KARNATAKA,,ANDHRA PRADESH.**

KAVERI BASIN



- The Kaveri, also spelled Cauvery in English, is a large
- Indian river. The origin of the river is traditionally placed
- at Talakaveri, Kodagu in the Western Ghats in Karnataka.
- **Length**: 765 km
- **Basin area**: 72,000 km²
- **Source elevation**: 1,276 m
- **Source**: Western Ghats
- **Country**: India
- **Cities**: Tiruchirappalli, Thanjavur, Talakaveri, Srirangapatna, more
-

River kaveri makes second biggest water fall in India: Sivasamudram



Benefits of a River

- a) *The rivers contain fresh water which is most necessary for man as well as animals for survival.*
- b) *They provide water for irrigation and cultivation available in abundance.*
- c) *They make the soil rich in Alluvial.*
- d) *These serve as arteries of commerce.*
- e) *They are good for navigation.*
- f) *Estuaries, near the shores, where the sweet water mixes freely with the salt water of the oceans, have proved to be the most biologically productive areas of the world. All type of fishes survive over here.*
- g) *Rivers are harnessed for generation of hydro-electricity.*

THE ROLE OF RIVERS IN THE ECONOMY

- Rivers have been of fundamental importance to humans.
- Using rivers for irrigation, navigation, hydro-power generation, fishing is of special significance.



HYDRO-POWER ON RIVER KAVERI



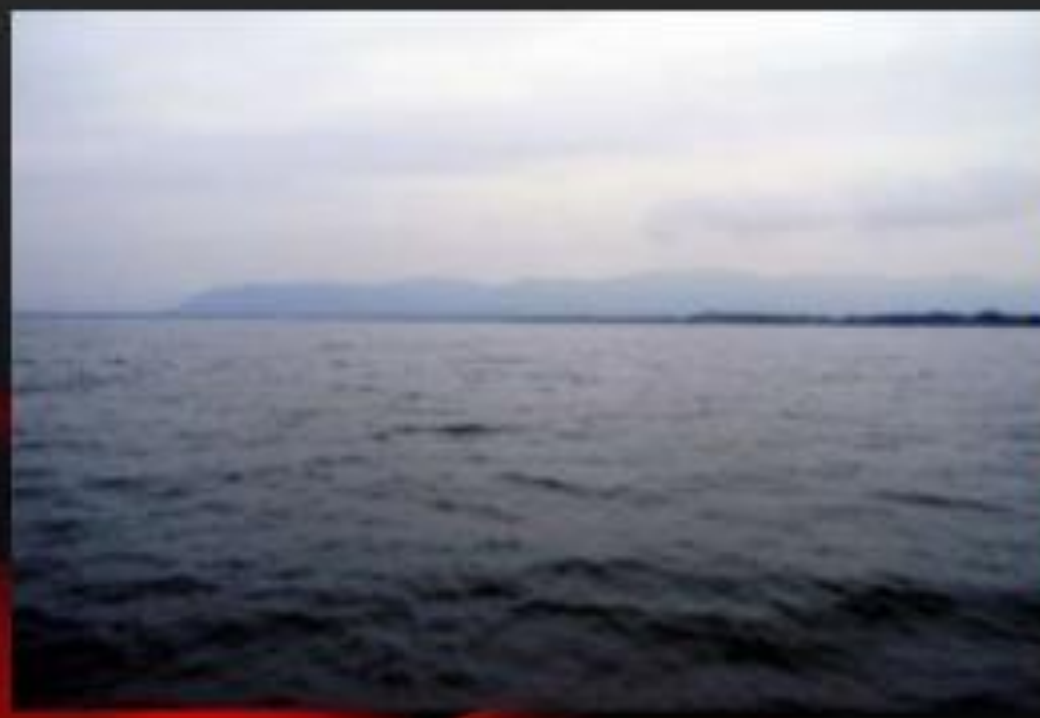
FISHING DONE IN RIVERS



INDIA'S LAKES

THE INDIAN LAKES

- India has many lakes. They differ in size, and other factors.
- Most lakes are permanent; some contain water only during rainy season.
- A meandering river across a flood plain forms cut-offs that later develop into ox-bow lakes. Ex.: Chilika Lake, Pulicat Lake
- Lakes in a region are sometimes seasonal. Ex.: Sambhar Lake



A VIEW FROM THE SHORES OF CHILIKA LAKE

THE INDIAN LAKES

- Most freshwater lakes are in the Himalayan region. They mostly form by glacier snowmelt. Ex.: Dal Lake, Wular Lake
- Apart from natural lakes, the damming of rivers for hydro power generation has also led to the formation of Lakes. Ex.: Guru Gobind Sagar (Bhakra Nangal Dam)



A VIEW FROM THE SHORES OF DAL LAKE



● **Wular Lake**

● **Sambhar Lake**

● **Chilika Lake**

● **Kolleru Lake**

● **Pulicat Lake**

THE ROLE OF LAKES

- A lake helps to regulate the flow of a river.
- During heavy rainfall, it prevents flooding.
- During dry season, it helps to maintain even flow of water.
- They can be used for hydro power generation.
- They moderate the climate of a surroundings.
- They also maintain aquatic ecosystem, enhance natural beauty, help develop tourism and provide recreation.



RIVERS POLLUTION

RIVER POLLUTION

- The growing domestic, industrial and agricultural demand for water from rivers affect the quality if water.
- More and more water is being drained out of them reducing their volume.



**RIVER YAMUNA
BEING POLLUTED FROM INDUSTRIAL WASTE**

RIVER POLLUTION

- On the other hand, a heavy load of untreated sewage water is being drained into the rivers.
- This affects both quality and reduces the self-cleansing capacity of rivers.
- Programmes initiated to control river pollution include Ganga Action Plan or GAP, Narmada Bachao Abhiyaan etc.



**RIVER CHAMBAL
BEING POLLUTED FROM SEWAGE**