

Fluvial Landforms

Fluvial landforms are created by **running water (rivers)**. Rivers drain nearly **68% of Earth's land surface** and act as major agents of erosion, transportation, and deposition.

I. BASIC CONCEPTS

Drainage Basin

- Area drained by a trunk river and its tributaries.
- Also called a **catchment/watershed**.
- Acts like a funnel collecting runoff.

Drainage Divide

- Ridge separating adjacent drainage basins.
- Prominent in youthful topography (e.g., Himalayas).

Consequent Stream

- The initial stream flows down the original slope.

II. FLUVIAL EROSION

Types of River Erosion

- **Hydraulic Action** – Mechanical loosening of rocks by water pressure.
- **Abrasion/Corrasion** – Rock fragments strike and wear the bed & banks.
- **Attrition** – Rock fragments collide and reduce in size.
- **Solution/Corrosion** – Chemical dissolution of soluble rocks.
- **Downcutting** – Vertical erosion (valley deepening).
- **Lateral Erosion** – Sideward erosion (valley widening).
- **Headward Erosion** – Upstream extension of the valley.

III. STAGES OF RIVER COURSE

Youth Stage

- Dominant vertical erosion.
- Deep, narrow **V-shaped valleys**.
- Features: Gorges, Canyons, Waterfalls, Rapids.

- Poorly developed floodplains.

Mature Stage

- Lateral erosion dominates.
- Wider valleys.
- Meanders develop.
- Floodplains begin forming.

Old Stage

- Deposition dominant.
- Extensive floodplains.
- Oxbow lakes, levees, deltas.
- Low gradient & heavy sediment load.

IV. FLUVIAL EROSIONAL LANDFORMS

1. Valleys

V-Shaped Valley

- Formed by vertical erosion.
- Narrow & deep.

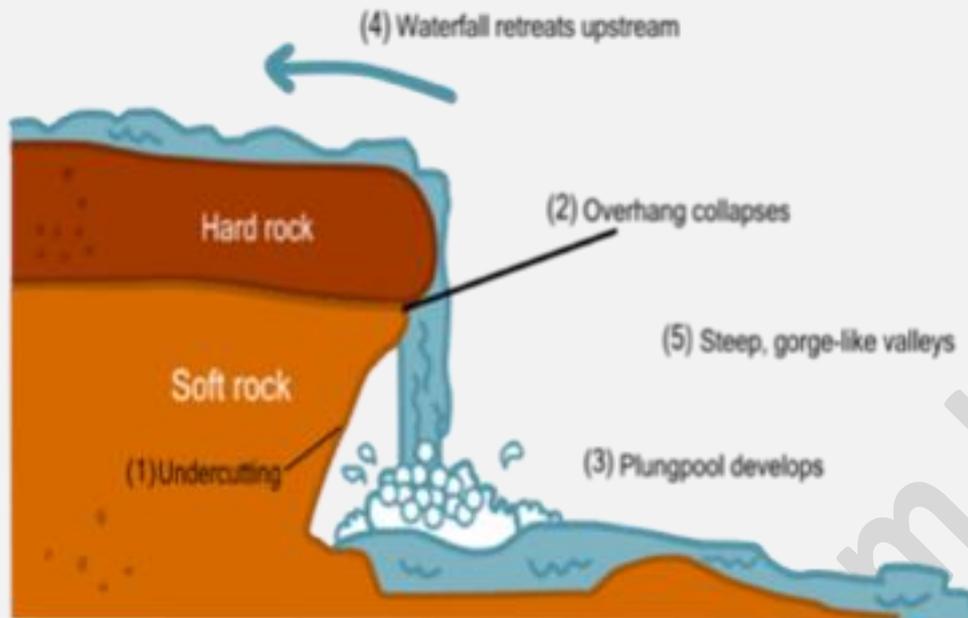
Gorge (I-shaped Valley)

- Deep, narrow valley with steep sides.
- Example: Indus Gorge (Kashmir).

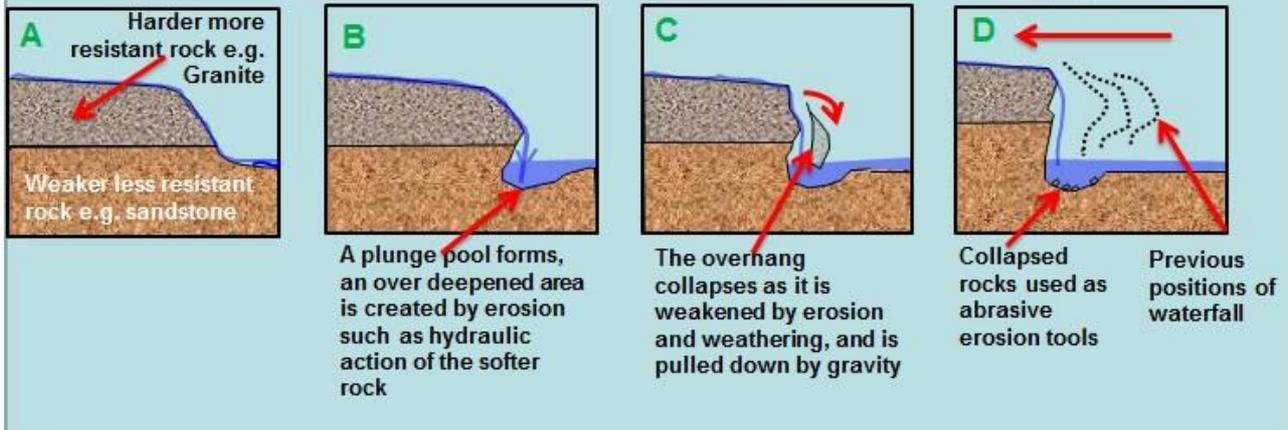
Canyon

- Wider at the top, step-like slopes.
- Common in horizontal sedimentary rocks.
- Example: Grand Canyon (USA).

2. Waterfalls & Rapids



The formation of a waterfall



- Formed due to differential erosion.
- Create plunge pools.
- Recede upstream over time.
- Large waterfalls on major rivers are called **Cataracts**.

3. Potholes & Plunge Pools

- Circular depressions in rocky river beds.
- Formed by rotating pebbles.
- Large ones at the waterfall base = plunge pools.

4. Interlocking Spurs

- Alternating projections of high land in V-shaped valleys.

5. River Terraces

- Old floodplain levels.
- Indicate rejuvenation.
- Paired terraces occur at the same level on both sides.

6. Incised/Entrenched Meanders

- Deeply cut meanders in hard rocks.
- Result of rejuvenation or uplift.

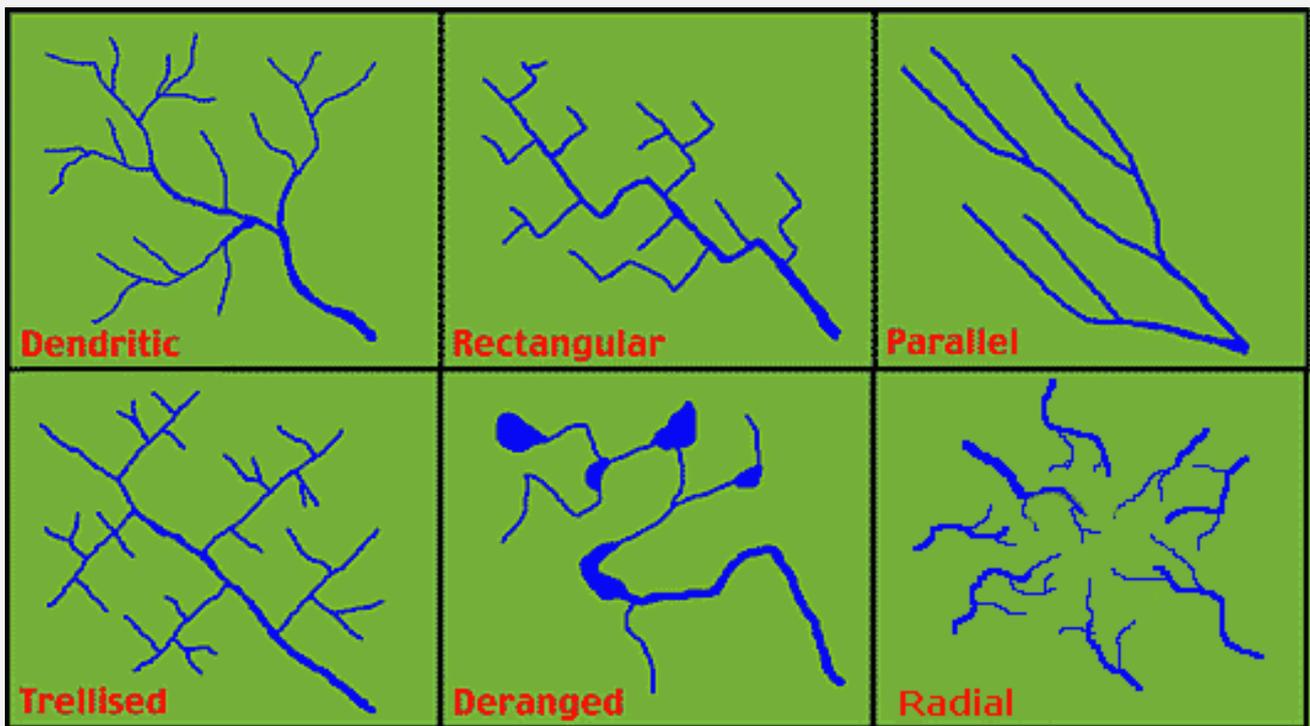
7. Structural Benches

- Step-like valleys.
- Due to the differential erosion of hard & soft rocks.

8. Peneplain

- Almost level surface.
- Represents near-final stage of fluvial erosion.

V. DRAINAGE PATTERNS



Dendritic

- Tree-like pattern.
- Example: Northern Plains rivers.

Trellis

- Right-angle tributaries.
- Found in folded mountains.

Radial

- Streams flow outward from the central high.
- Example: Amarkantak.

Centripetal

- Streams flow inward to the depression.
- Example: Loktak Lake.

Rectangular

- Right-angle bends due to jointed rocks.

Parallel

- On steep slopes.

Annular

- Circular pattern around domes.

VI. FLUVIAL DEPOSITION

Occurs when river velocity decreases (lower course).

VII. FLUVIAL DEPOSITIONAL LANDFORMS

1. Alluvial Fans



- Cone-shaped deposits at mountain foothills.
- Coarse sediments were deposited first.
- Steeper in arid regions.

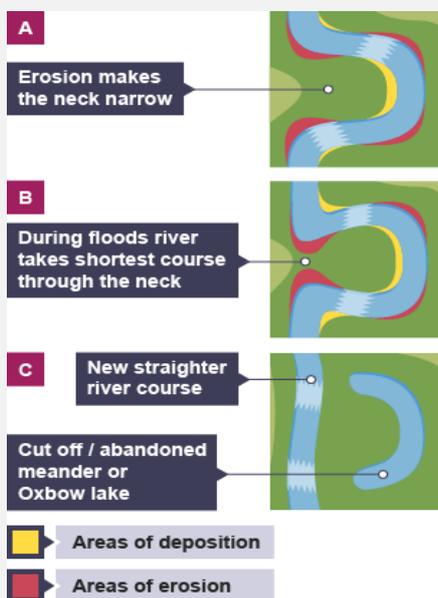
2. Floodplains

- Formed by repeated flooding.
- Built by layers of silt & clay.
- Active & Inactive floodplains.

3. Natural Levees

- Raised embankments along river banks.
- Formed by coarse sediments during floods.
- Example: Yellow River (China's Sorrow).

4. Meanders & Oxbow Lakes



- Erosion on the concave side → Cut bank.
- Deposition on convex side → Point bar.
- Cut-off meander forms **Oxbow Lake**.

5. Braided Channels

- Multiple channels separated by bars (eyots).
- Occur with high sediment load & low velocity.

6. Delta

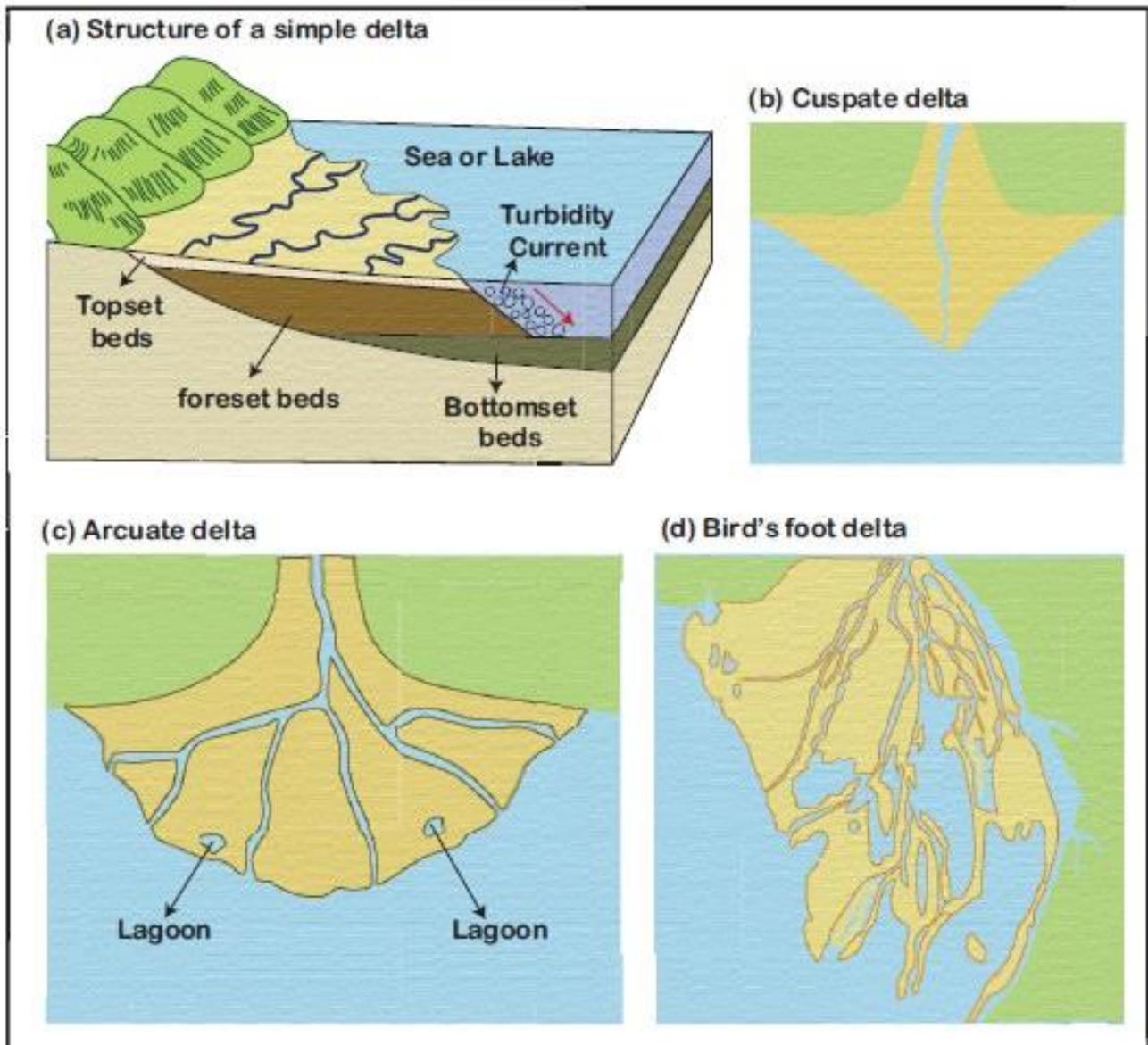


Figure 4.15 Types of Delta

Definition

Fan-shaped deposit at the river mouth.

Conditions

- High sediment supply.
- Shallow sea.
- Weak tides & currents.
- No large lakes upstream.

Types

- **Bird's Foot Delta** – Example: Mississippi River

- **Arcuate Delta** – Example: Nile River
- **Cuspate Delta** – Example: Ebro River
- **Estuarine Delta** – Example: Amazon River

VIII. DOAB

- Land between two rivers.
- A common term in the Indo-Gangetic plains.

Aspire with Ram IAS