Fluvial Landscapes

By

Prof. SANJAY KUMAR

P.G.DEPT OF GEOGRAPHY
MAHARAJA COLLEGE, ARA
V.K.S.U., ARA, BIHAR

INTRODUCTION

You have studied about Exogenic Processes continuously active on the surface of the earth. You have also read about the five erosional agents (Running Water, Wind, Underground water, Glacier and Sea waves) are active over different geographical regions. It is worth mentioning here that running water i.e. river is active in humid regions, underground water is active in the regions where limestone, chalk, gypsum and dolomite like soluble rocks beds are found and glaciers are active in high altitudes and high latitudes regions of the world whereas wind is active over arid and semi- arid regions of the world. The landscapes develops by running water is known as fluvial landscapes. Fluvial landscapes are developed between source and mouth of the river. Therefore, such landscapes are found over vast and extensive region. All the erosional agents have their own characteristics but all of them develop peculiar cum special type of erosional and deposional landscapes.

FLUVIAL LANDSCAPES

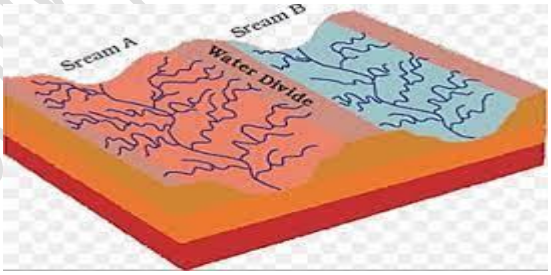
Fluvial landscapes are those which are generated by running water, mainly rivers. The term fluvial derives from the Latin word 'fluvius' that means river. Fluvial landscapes are developed between source and mouth of the river. According to W.M.Davis, River or running water is a normal agent of erosion in humid regions and he also compares the whole process of river erosion by human life cycle. Just as a human ends his life by crossing three stages, in the same way the river passes through three stages of youth, maturity and old stages and complete the cycle of erosion. Generally, the erosional work is done in the youth stage. At the beginning of the mature stage, erosion takes place while depositional work takes place at the end of this stage. In old stage, erosional works by river ceased and mainly deposional work takes place. All these stages are characterised by their work (developed landscapes) not by the time. Different type of landscapes are develops in different stages.

A : YOUNG STAGE

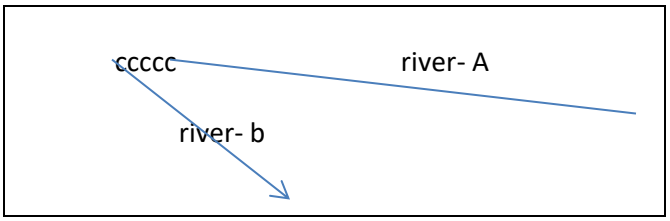
After formation of mountain, some small rills and gullies are develops. Young stage or first stage of river cycle is characterised by the formation of some landscapes. According to Davis, river remains on the mountains in the first stage. In this stage, erosional work is more and more active and there is no depositional work seen.

a) After development of small rills and gullies, **'I' shaped valley** is formed due to rapid bottom level erosion/ down cutting and slow rate of horizontal erosion. Therefore, the deep and narrow valleys are develops due to down cutting, popularly known as Gorge.

b) Due to slow rate of horizontal erosion, **water divide** remains wider in young stage. Actually, water divide, divides the path of two rivers in two different directions.



c) **River capturing** is the main feature of young stage. Due to Head ward erosion, when a river erodes towards its source, it captures the water of another river. The point where a river captures another river, it is called **Elbow of Capture**. After some time, the bed of river with steeper slope is full of water and the valley of captured river is devoid of water. The water flow here and there, that's why it is called **Misfit River** in captured river.



CAPTURING OF RIVER- A BY RIVER –B

d) In mountainous part, rapids, cascades, springs and waterfalls are formed due to different arrangement of hard and soft rocks. When hard rocks are found in the path of a river on mountain, the water flow in up and downs pattern known as **Rapids**. Sill and Dykes are responsible for the formation of rapids. If a river flows in staircase pattern, it is known as **Cascades**.

Rapid

Cascade

Pot holes

POTHOLE

When vertical and horizontal arrangement of hard and soft rocks is found in the path of a river, soft rocks are erodes easily. In such condition, water falls freely and speedily from top to the bottom is known as Waterfall. In such condition, when water falls slowly with the surface from top to the bottom is known as Spring. e) River flow through narrow and deep valleys during first stage or young stage. When river leaves the mountainous part, their debris spread is cone shape, popularly known as Alluvial Cone. When two and more than two cones are connected to each other, it takes the shape of a fan, popularly known as Alluvial Fan. Initially, the relief is less but it increases rapidly. By the end of this stage, maximum relief is developed.

B : MATURE STAGE

When river leaves mountainous part, it comes or flow in plain region. Mature stage of river can be divided into initial mature stage and lateral initial stage. The stage is characterised by Lateral corrasion tends to replace vertical corrasion (high lateral erosion and slow or less vertical erosion). Therefore, narrow and deep valley is converted into open 'V' valley as some tributaries meets with Main River.

V shaped valley

Water divides are eroded but the column of hard rocks is seen. Relief and slope becomes lower due to negligible vertical erosion. During mature stage, river flows in sine curve and creates some typical landscapes. Among them Natural levees, Ox bow lakes, Flood Plain are more popular. The speed of the running water in plain area or in second stage also becomes slow as river flow with debris or sediments. Therefore, if any hard rock comes in the path of the river, turns and changes its path. Thus, river flows in sine curve pattern in plain area is known as Meander.

Meander

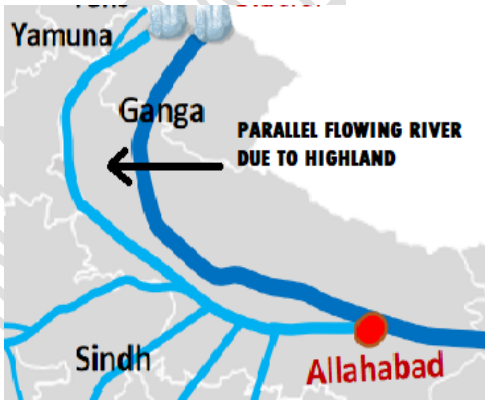
Meander is erosional cum depositional landscape. Sometimes, the erosional and depositional works separates the path of river from main path/ channel. The separated part of water body of the river looks like ox bow. Hence, it is known as Ox Bow Lake.

Ox Bow Lake

The two ends or margins of the river which is comparatively higher topography are known as Natural Levees. The river has the capacity to retain water in its bed up to the height of natural levees. The water level during rainy season reached up to this level is known as Flood. When the water from this level (natural levees) exceeds, the water of flood spread in the nearby areas, popularly known as flood water.

When water retreats, the sediments or debris spreads in the flooded regions and creates a plain, known as Flood Plain. The newer flood plain region is known as Khadar. The region where the flood water doesn't reach or older flood plain is known as Bhangar. Due to deposition, some tributaries run / flow parallel to the main river for the some distance and then meet with the main river. Tributaries which flow parallel to the main river for the some distance; is called Yazoo Rivers. Yamuna and Punpun are the example of such Yazoo rivers .

Natural bridge



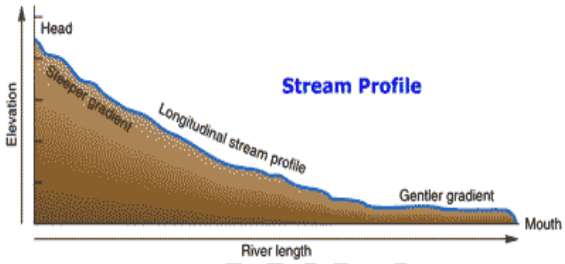
Yazoo river

C : OLD STAGE

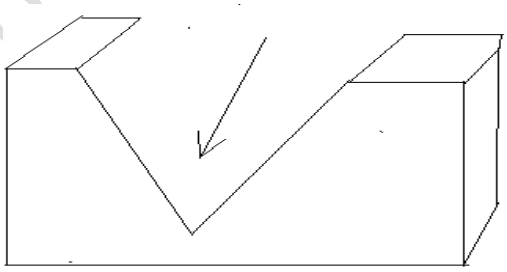
During old stage, river is at or near mouth. Here, the relief and slope becomes very low. The erosional activity completely ceased and depositional work increased. It means, the main river attains its base level. Due to lowering down of slope, some branches/channels of rivers are formed from the main river, called Distributaries.

Delta, A triangular shaped depositional topography is formed (due to deposition of sediments) at the mouth of the river. You can observe the largest delta at the mouth of River Ganges and Brahmaputra. Most of the landscape is at or slightly above sea level. Still out crop of some hard rocks are seen here and there in Peniplane, is known as Monedanock. In Bihar, Biharsarif hill and Rajgir hills etc. are the best examples of such monedanock.

Delta



LONGITUDINAL PROFILE OF A RIVER



TRANSVERSE PROFILE OF A RIVER

During young stage, vertical erosion takes place whereas in mature stage initially erosional work takes place but in later stage depositional work started and in old stage only depositional works happens. Thus, it is clear that from source to mouth river's longitudinal profile appears in concave shape whereas the transverse profile from one end to another end of a river appears and remain 'V' shaped always (whether it is open or closed).