NCERT Class 11 Geography Part 1 Chapter 7: Landforms and Their Evolution YouTube Lecture Handouts

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NCERT Class 11 Geography Part 1 Chapter 7: Landforms and their Evolution [https://www.youtube.com/watch?v=i0PAv55vkh4]

- Landforms: Small to Medium tract or parcel of earth surface
- Each landform has its own shape, size & is result of geomorphic processes
- Landforms change due to action of **geomorphic agents**
- Landform has history of development and changes through time – passes stages of youth, mature and old age
- Geomorphology: History of earth surface through study of its forms, material and process (erosion or destruction & deposition or construction)
- Geomorphic agents depends on folds, faults, joints, fractures, hardness and softness, permeability and impermeability, etc.
- Independent controls include stability of sea level, tectonic stability and climate

Running Water

- In humid areas having heavy rainfall
- Running water as overland flow on general land surface as sheet or as linear flow in streams – with time steep gradient turns gentler, lose velocity and facilitate active deposition. Gentler channels have higher deposition, lateral erosion of banks increases and hills turns to plains
- Overland flow causes sheet erosion – because of friction of water column, material are removed in direction of flow and rills are formed. Rills → Gullies → Network of valleys

Life Cycle of River: Life Cycle of a River - Stream Orders, Erosion, Transportation and Deposition [https://www.youtube.com/watch?v=o1uY2mqYVMM]

- Youth: V-Shaped valley, stream divides are broad and flat, meanders, waterfalls and rapids
- Mature: Deep valleys with wider flood plains – waterfall disappear

- Old Age: Few tributaries with gentle gradient – oxbow lake, levees – landscape at or above sea level

Erosional Features

- Valley: rills that deepen to form V-Shaped valley, gorge (top & bottom at equal width & form in hard rocks) or canyon (broad top and narrow bottom & form in horizontally bedded sedimentary rocks)
- Pot Holes and Plunge Pools: Circular depression by stream erosion with abrasion of rock fragments – gets bigger with rotation of rock fragments – series join and get deepen to form plunge pools (deep hole at base of waterfall)
- Incised or Entrenched Meanders: Deep and wide meanders found cut in hard rocks. Occur on steep gradient, erosion is mainly over bottom channel.
- Paired & unpaired terraces: Vertical erosion. Unpaired terraces in case of slow land uplift due to receding water after a peak flow; change in hydrological regime due to climatic changes; tectonic uplift of land; sea level changes when rivers are closer to the sea
- Erosional Landforms: Tenacious Rivers - 5 Major Fluvial Erosional Landforms [https://www.youtube.com/watch?v=HMdAJ6WoBaY]

Depositional Features

- Alluvial Fans & Cones: Streams from higher level break into lower level – load is carried over mountain slopes. In Humid areas show low cone with gentle slope while in arid areas show high cone with steep slope
- Delta: Accumulates as low cone, coarsest settle first and finest carried closest to sea
- Floodplains: fine grained material carried by slow moving water. Floodplain above the bank is inactive (flood deposit & channel deposit) . In case of delta known as delta plains
- Natural Levees: Found along river banks – low, linear parallel ridge of coarse deposit along river banks
- Point Bars: Known as meander bars – found on convex side of large river
- Meanders: Loop like channel because of propensity of water, unconsolidated nature of deposits and Coriolis force (deposition on convex or slip off bank & undercut on concave or cutoff bank) – cut at inflection points as ox-bow lakes
- Braided channels: material deposited as islands and lateral bars, when discharge is less and load is more – channel bars develop on floor as multiple threads
- Depositional Landforms: 7 Major Fluvial Depositional Landforms - Carving the Face of The Earth [https://www.youtube.com/watch?v=rlq_n6KlqWY]

Groundwater

Surface water percolates when rocks are permeable, thinly bedded and jointed – mechanical removal of material like limestone or dolomites rich in $CaCO_3$ – Karst topography in

Balkans (Adriatic Sea)

Details: Karst Topography (By Underground Water) - Formation, 8 Erosional and 9 Depositional Landforms [https://www.youtube.com/watch?v=8_Ec6PgjzGw]

Erosional Features

Swallow holes → Sink holes (circular at top with funnel shaped at bottom) – if formed by solution action it is known as solution sink & are more common, if by roof collapse it is called collapse sink (dolines)

Sinkholes or dolines join together due to roof collapse: uvalas

Irregular ridges or grooves are formed – due to differential solution along parallel to sub-parallel joints – lapies form limestone pavements

Caves: When limestone is dense and massive with thick beds – cave formation is prominent – have opening on both ends and is called tunnels

Depositional Landforms

$CaCO_3$ is soluble in carbonated water (CO_2 absorbed rainwater) Stalactites, Stalagmites, Pillars or Columns

Glaciers

Mass of ice moving as sheets over land (continental glacier or piedmont glacier) or as linear down the slope

Movement is due to force of gravity

Alkapuri glacier: Feeds Alakananda River

Gangotri Glacier: Feeds Ganga River

Details: Glacial Landforms: 25 Erosional & 3 Depositional Features [https://www.youtube.com/watch?v=xBUtXMR2BmY]

Erosional Features

- Cirque: At head of glacial valley, ice cuts it while moving down – lake could be seen as cirque or Tarn Lake – can be stepped
- Horns: headward erosion of cirque walls – 3 or more glaciers cut headward and meet
- Arete – sharp crest with zig zag outline – saw toothed ridge
- Glacial valley – U-Shaped valley
- Fjords: deep glacial trough filled with sea water and makes up shoreline

Depositional Landforms

- Glacial till: unassorted coarse and fine debris – angular and subangular
- Outwash deposits: glacio-fluvial deposits which are stratified and assorted
- Moraines: Terminal, Lateral and Medial

- Eskers: in summer when glacier melts it runs as streams below glacier – rock debris is carried and has sinuous ridge
- Outwash Plains: Lies at foot of glacial mountains or beyond limits of continental ice sheets
- Drumlins: Oval ridge like deposits – stoss (blunted due to pushing of ice and gives indication of glacier movement direction) and tail (steeper)

Waves and Currents

- When waves break on shore – lot of force – churning of sea sediments
- It depends on configuration of land and sea floor, advancing or retreating coastline
- High, rocky coasts (submerged coasts) – river disappears to have been drowned with irregular coastline – erosion feature dominates – waves break with force to form wave-cut platform. Bars are submerged, bars above water are barrier bars, gets keyed to form spits and further to form lagoons
- Low, smooth and gently sloping sedimentary coasts (emerged coasts) – forms lagoons and tidal creeks, marshes and swamps abound and depositional features dominate, lagoons turn into swamps and finally to coastal plains

Details: Coastal Landforms (By Waves & Currents) : 18 Erosional & 18 Depositional Features [https://www.youtube.com/watch?v=nd72XVWGaYE]

Erosional Features

- Cliffs: Steep sides
- Wave-cut terrace: Platform occurring at elevation above average height of waves
- Sea caves: waves creates hollows
- Sea Stack: resistant mass of rock that remains – temporary and disappear

Depositional Features

- Beaches: Shoreline dominated by deposition, temporary features, made of sand-sized material
- Sand dunes forming long ridges parallel to the coastline are common
- Off-shore bar – ridge formed parallel to coast - offer 1st buffer or defense against storm or tsunami by absorbing most of their destructive force, so if sediment budget is disturbed or mangroves removed – coast will be eroded
- Formation of Spits & later lagoons

Winds

- Desert floor gets heated up leading to upward movement in hot air with turbulence
- Deflation: Lifting and removal of dust and smaller particles from the surface of rocks

- Wind moves fine materials and general mass erosion is accomplished by sheet floods or sheet wash
- Erosional Features
- Pediments: Gently inclined rocky floors close to the mountains at their foot with or without a thin cover of debris
- Pediplains: Low featureless plains
- Playas: shallow lakes – with salt deposits these are called alkali flats
- Deflation hollows: shallow depressions with small pits – blowouts are created which gets deeper to form caves
- Mushroom rocks: Rock outcrops with resistant rocks that remains as pedestal rock

Depositional Features

- Sand Dunes: Dry hot desert with obstacle to initiate dune formation
- Barchans: crescent shaped dunes with wings away from wind, sand is uniformly moving
- Parabolic Dunes: Sandy surface covered with vegetation – are reversed barchans with wind direction being same
- Seif: Longitudinal dunes when supply of sand is poor and wind direction is constant – long ridge of low height
- Transverse dunes: aligned perpendicular to wind direction, wind direction is constant and sand is elongated at right angles

Details: Aeolian Landforms (By Wind) - 13 Erosional & 3 Depositional Landforms [https://www.youtube.com/watch?v=Z5rdYMaQ1hs]

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