

Overland Erosion: From Raindrops to Watershed Sediment Yield



Splash Erosion & Detachment

Raindrop kinetic energy detaches soil grains when it exceeds soil cohesion and adhesion.



R =

K =

L =

S =

C =

P

Rainfall Erosivity
(Intensity + Frequency)

Soil Erodibility
(Physical susceptibility)

Topographic Effect
(Slope length and steepness)

Land Management
(Vegetation cover and conservation practices)

The USLE Framework (E = RKLSCP)

An empirical model predicting soil loss based on climate, soil, topography, and management.



Sheet & Rill Formation

Overland flow selectively removes fine grains, leaving behind a coarse "armor layer."

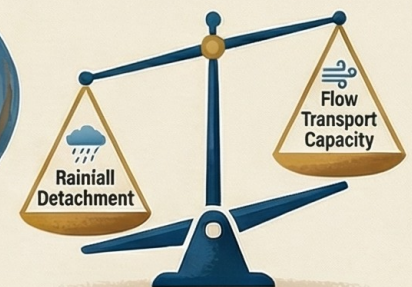
Gully Degradation

Severe erosion occurs when small rills deepen beyond 300mm into steep-sided channels.



Sediment Delivery Ratio (SDR)

Not all eroded soil reaches the outlet, larger watersheds typically have lower delivery ratios.



The Detachment-Transport Limit

Erosion rate is controlled by whichever is smaller: rainfall detachment or flow transport capacity.