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Soil and water Conservation Engineering

Presented By-

Shubham Kumar Sarangi

Asst Professor

**DEPARTMENT OF AGRICULTURAL ENGINEERING, SoABE
CENTURION UNIVERSITY OF TECHNOLOGY AND
MANAGEMENT PARALAKHEMUNDI, ODISHA**



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WATER EROSION TYPES

Water erosion

Splash erosion

Sheet erosion

Rill erosion

Gully erosion

Stream bank
erosion



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SPLASH EROSION

95% of soil is splashed by falling raindrops and runoff water erodes < 5% of soil surface being eroded-

- a) Raindrop size (1 – 8mm, 2.5mm is erosion producing rains)
- b) Drop size distribution (high intensity- large drop size, drop size increases from 1 to 5 mm infiltration rate decreases by 70%)
- c) Terminal velocity (7.8 to 9 m/s)
- d) Kinetic energy
- e) Soil characteristics



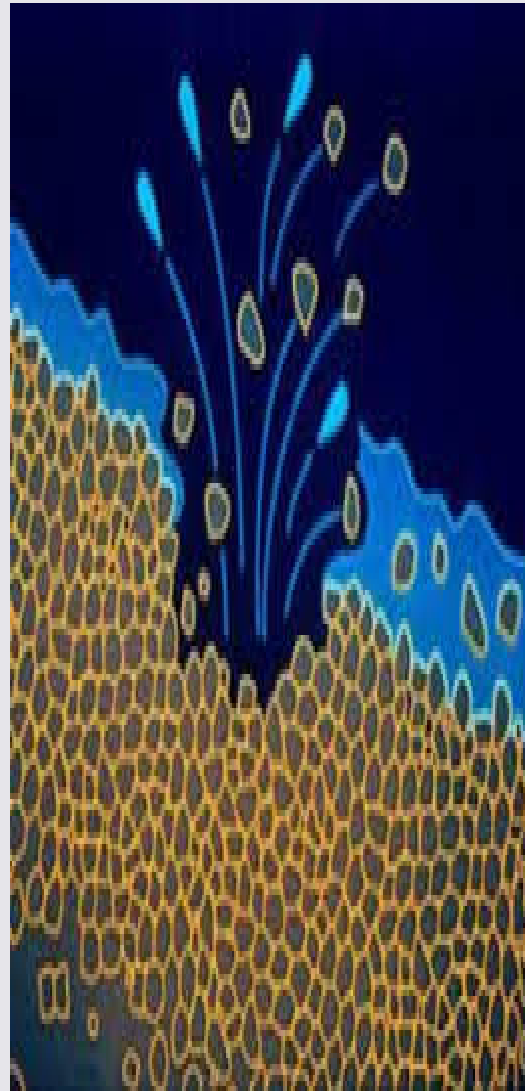
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Mean droplet size ranges from 2.0 to 2.5mm for rainfall intensities ranging from 1.25 to 5.0cm/hr. Falling raindrops at avg. speed of 75cm/hr creates a force of 14 times its own weight. Soil characteristics

- a) Roughness
- b) Surface slope
- c) Hydraulic conductivity
- d) Moisture content
- e) Particle size
- f) Elasticity

Splash is richer in sand, gravel and aggregates of dia. 0.105mm Runoff material contains 95% silt+clay and size $<0.105\text{mm}$



SPLASH EROSION



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SHEET EROSION

- Moderately uniform removal of surface soil in thin sheet by action of rainfall and runoff is called sheet erosion.
 - Most damaging form of soil erosion by water.
 - Repeated occurrences of sheet erosion exposes sub-soil.
 - Depth of soil vary from 20 to 100cm
 - Annual loss of top soil – 11 to 43 tonnes/ha along with 10 – 30% runoff loss.



Geography



Sheet Erosion





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RILL EROSION

- Loss of soil on sloping land where small channels are formed by running water.





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GULLY EROSION

Removal of soil to form relatively narrow and deep trenches known as gullies.





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RAVINE

It is the final step of soil erosion. When gully enlarges it forms ravines. Severe stage of soil erosion.





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Stream bank erosion

- Stream bank erosion consists of soil removal from stream banks.
- Scouring of soil material from the bed and cutting of stream bank by force of running water.
- Bending of path
- The eroded materials are deposited over the stream bed after decreasing of flow velocity and thus clogging the stream and causes flood.



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Depends on

- ➡ Velocity of flow
- ➡ Direction of flow
- ➡ Depth and width of stream
- ➡ Soil texture
- ➡ Alignment of stream
- ➡ Removal of vegetation
- ➡ Over grazing
- ➡ Tillage near banks



Stream bank erosion

