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Soil-Water Conservation Engineering and Structures

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EROSIVITY

- ▶ **Potential ability of rain to cause erosion**
- ▶ **Depends on physical characteristics of rainfall**
- ▶ **Energy required to break soil aggregates, splash them and carry them with runoff**



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FACTORS AFFECTING EROSIVITY

- 1. Rainfall intensity**
- 2. Drop size distribution**
- 3. Terminal velocity**
- 4. Wind velocity, and**
- 5. Direction of slope**



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Rainfall Intensity

The rainfall intensity acts as the force, by which an individual water droplet strikes over the soil surface. K.E and intensity of rainfall are related as

$$E_K = 210.3 + 89 \log_{10} I \quad (\text{Wischmeir \& Smith, 1958})$$

Where,

E_K = Kinetic energy of rainfall (metric tonnes per ha per cm of rain)

I = Rainfall intensity (cm/hr)



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Terminal Velocity

It is a function of drop size and counted in terms of K.E of respective raindrops at the time of their impact over the soil surface.

$$E_k = (I.V^2)/2$$

Where, E_k = Rainfall energy (watt / m²)

I = Intensity of rainfall (mm/s)

**V = Terminal velocity before impact
(m/sec)**

ERODIBILITY

- **Vulnerability or susceptibility of the soil to erosion**
- **Depends on *physical characteristics* of soil, texture, aggregate stability, shear strength, infiltration capacity, organic matter, land and crop management practices**
- **Bouyouces (1935)- erodibility depends on mechanical composition and proportional to**
$$\frac{\% sand + \% silt}{\% clay}$$



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ERODIBILITY

Range of particle's diameter

Clay - below 0.002mm

Sand - from 0.06 to 2 mm

Silt - from 0.002 to 0.006mm