Lab -4 Soil and water Conservation / Practical

 3th stage Soil and Water Dep.

**Soil Erodibility Factor (K):**

The amount of soil loss from unit plot per unit energy index During a given period (Day, Month, Season, week and Year). The range of K-factor (0 - 1) metric unit.

Soil erodibility factor can be measured in the fields under natural rainfall ,and simulated conditions it can also be predicted from models.

Mean by a plot with the following specification:

1. Clean tilled ,continuos follow, plowed up and down the slope.
2. The slope percent % s = % 9 $\rightarrow 0.09$
3. Slope length L = 72.6ft ( 22.1 metric unit)
4. The soil surface should be free of plant residues.

 Then if s = 0.09 → S= 1.0

 S ≠ 0.09 → S ≠ 1.0

 Lamda **λ** = 22.1m → L= 1.0

 Lamda **λ** ≠ 22.1m → L ≠ 1.0

 Plowing up slope and down slope → P= 1.0

 Clean tilled → C = 1

**A = R K L S C P**

**A = RK \*1\*1\*1\*1**

 **K=**$ \frac{A }{R}$

**Soil erodibility factor unit**

1m = 3.28 ft

1 inch = 2.54 cm

Acer = 4047 kg

**K= m.**$\frac{cm}{hr}$ **metric unit**

**K= ft.**$\frac{inch}{hr}$ **english unit**

**K=0.277\*10-5 M1.14 (12 - O.M)+0.043(Sc - 2)+0.033(Pc - 3)**

M=(Silt% + VFS%) (100 - Clay%)

O.M = Organic matter

Sc = structure code

Pc = permeability code

VFS = Very fine sand

**Factor affecting soil erodibility :**

1. Organic matter
2. Structure
3. Texture
4. Infiltration

**Sand% + silt % + clay% = 100**

**Sand % = 100 – ( Silt + Clay ) %**

Clay < 0.002 mm

Silt ( 0.002 – 0.053 ) mm

Sand ( 0.053 – 2.0 ) mm

VFS (0.053 – 0.1 ) mm

Sand with out VFS ( 0.1 – 2.0 ) mm.

|  |  |
| --- | --- |
| Name of structure (Sc) | Code |
| Very fine granular  | 1 |
| Fine granular  | 2 |
| Medium and Coarse granular  | 3 |
| Blocky ,prismatic ,platy  | 4 |

|  |  |  |
| --- | --- | --- |
| Permeability (Pc)  | Infiltration rate (cm) | Code |
| Rapid  | > 12 | 1 |
| Moderate to rapid  | 6 – 12 | 2 |
| Moderate | 2 – 6 | 3 |
| Moderate to slow | 0.5 – 2 | 4 |
| Slow  | 0.1 – 0.5 | 5 |
| Very slow  | < 0.1 | 6 |

**Nomo graph**

Example: Calculate soil erodibility factor K-factor from the following information data:

 Silt % + % VFS = 60 %

Sand% = 5 %

O.M = 2%

Structure code: 1

Permeability cod e: 2

Example:

Calculate soil erodibility factor K-factor from the following information data:

 Clay % = 35 %

 Sand % = 15 %

 VFS % = 10 %

 O.M % = 2 %

Soil structure: Very fine granular

Soil infiltration rate= 100 mm/hr

 