Lab -5 Soil and water Conservation / Practical

3th stage Soil and water Dep.

**Topographic factor (LS):**

L= slope length factor or function of (**λ**) [L-factor]

S = slope steepness factor or function of (s)[S-factor]

Determine (LS) use: 1.Table 2.Equation

**Type of slopes according to shape:**

4

1

3

2

1. Uniform
2. Convex(steepens toward the lower end)
3. Concave(flatten toward the lower end )
4. Complex(combination of the above shapes)

**Slope length factor (L):**

Slope length factor (L): The ratio of soil loss from the field slope length (**λ**) to that from a 22.1 m on the same type soil and gradient. The slope length factor can be expressed as:

L= = = ]m

L=  **]m or L= ]m** [1]

λ= is the distance from the origin of over land flow along a given flow path to the location of concentrated flow or sediment deposition**.(slope length) meter.**

22.1 = the unit plot length in meter

m = a variable slope length exponent

**The value of (m) depends on:**

1.Soil type 2.Slope gradient 3.Vegetative cover 4.Management practices 5. Runoff 6.Soil texture.

m= 0.3 for dry soil

m= 0.5 average value

m= 0.6 steep slope

**Slope steepness factor (S):**

Is the ratio of soil loss from a given slope to that from a 9% slope when all other factors are the same.

AS = 0.43 + 0.30 s + 0.043 s2

A9% = 0.43 + 0.30 \*(9) + 0.043 \* (9)2 = 6.613 units

S = AS / A9%  =[ 0.43 + 0.30 s + 0.043 s2  ] / 6.613

**S= 0.065 + 0.045 s + 0.0065 s2  [2]**

S → unit less unit( degree, rad , %)

If s = 9% , Lamda = 22.1 m

L= 1 S=1 Then LS = 1

**Combined slope length and slope steepness factors:**

**L = ]m**

**S= 0.065 + 0.045 s + 0.0065 s2**

**LS = ] \* (0.065 + 0.045 s + 0.0065 s2 )**

**For m= 0.5 the equation for LS becomes:**

**LS = [0.0138 + 0.00965 s + 0.00138 s2 ) [3]**

Calculate of topography factor LS from irregular slope assumption:

1.No deposition occur slope abruptly(suddenly )

2.The slope is uniform for each segment.

Procedure:

1.Divide the slope to a number of equal length segments.

2.begining at the upper end ,calculate LS for each segment using a suitable equation

**LS = [0.0138 + 0.00965 s + 0.00138 s2 )**

3.Calculation of soil loss fraction for each segment

**Soil loss fraction= [4]**

i = number of segment

m = slope length exponent

N= number of segments (sum of parts)

LS \* soil loss fraction = product

LS total = Σ product

|  |  |  |  |
| --- | --- | --- | --- |
| Parts of slope | LS | Soil loss fraction | Product |
| 1 | 2.54 | 0.19 | 0.48 |
| 2 | 1.15 | 0.35 | 0.4 |
| 3 | 0.75 | 0.46 | 0.34 |
| LS total | | | 1.22 |

Example: determine the topographic factor ( LS)?

Slope =5 %

Slope = 7 %

Slope =12 %

20m

20 m

20 m