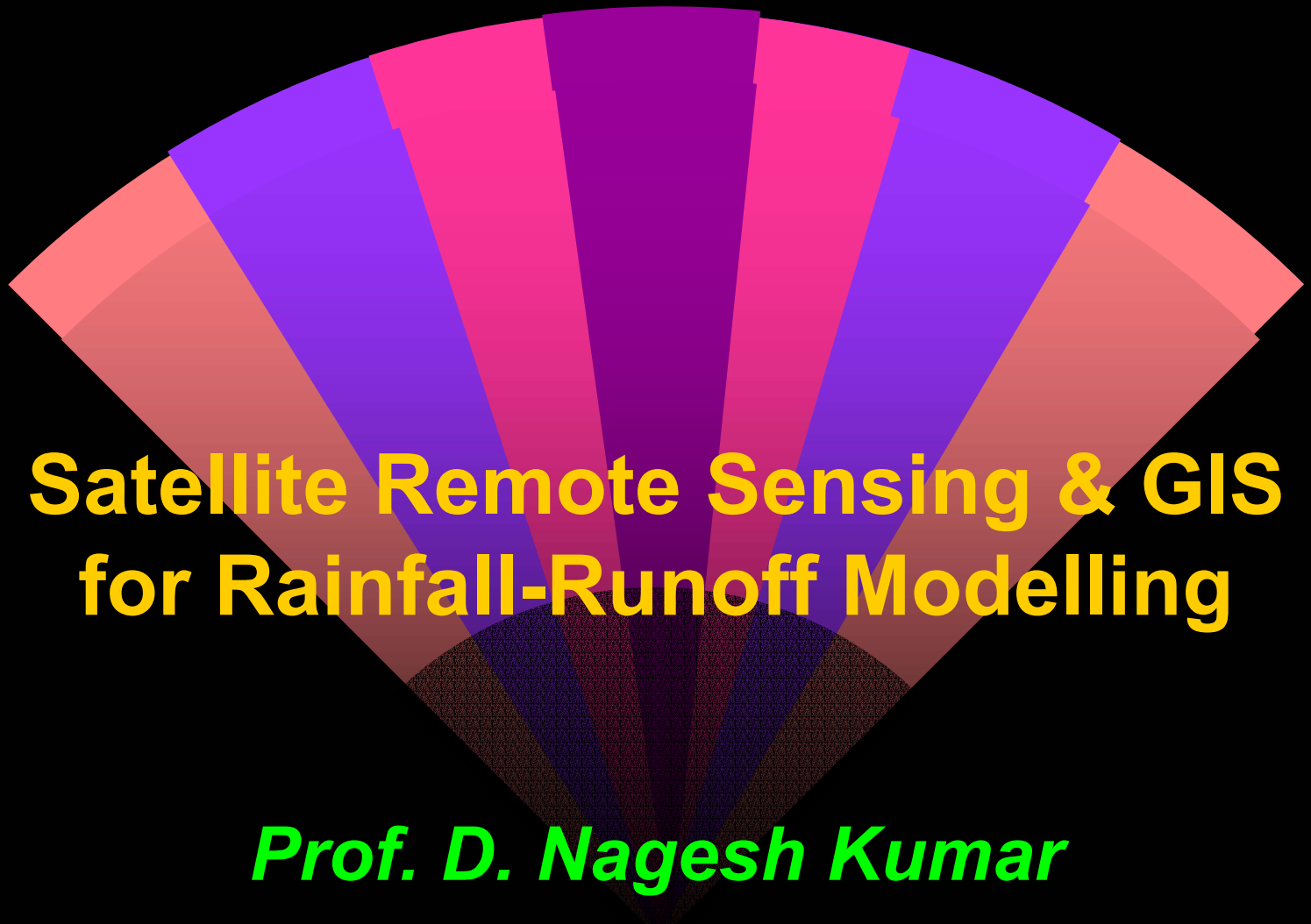

Satellite Remote Sensing & GIS for Rainfall-Runoff Modelling

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Case Study

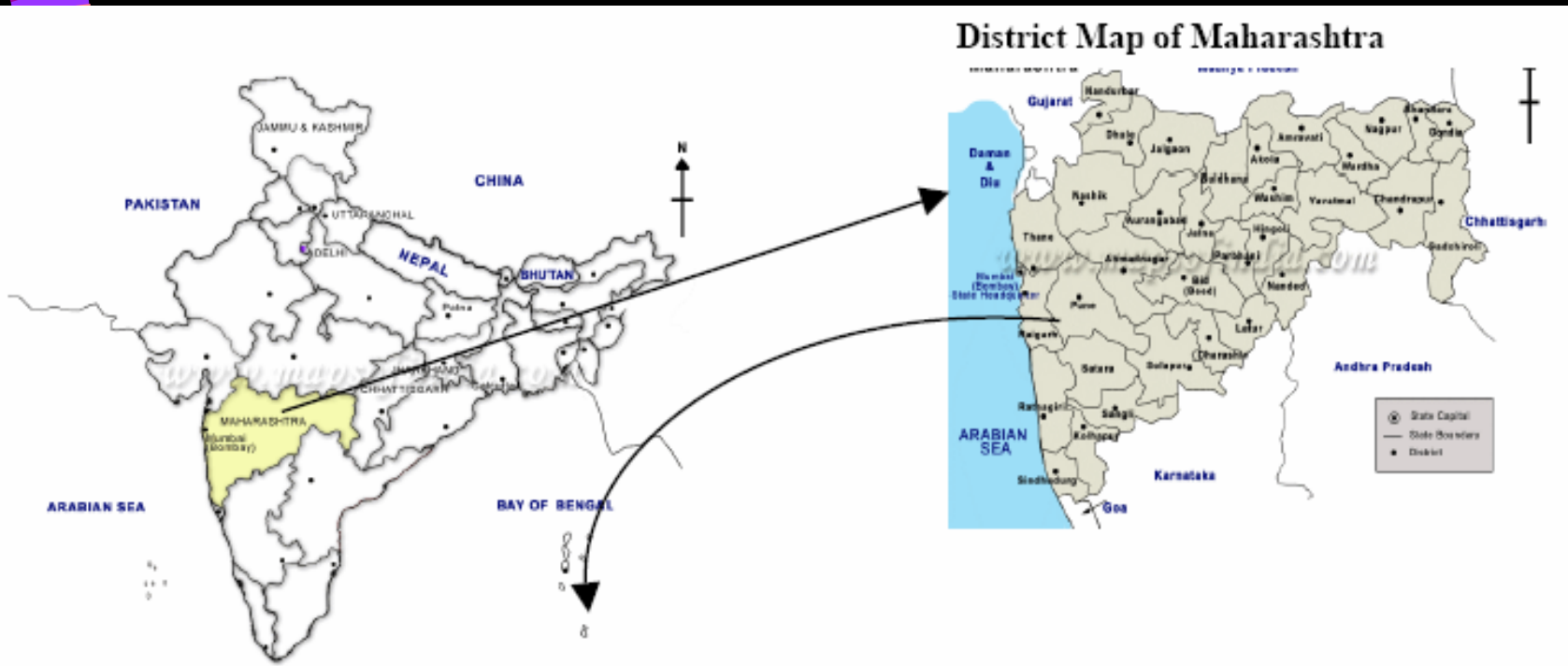
Estimation of Surface Runoff for Warasgaon Dam Catchment

Mose river (near Pune)

Source

Estimation of Surface Runoff using Rainfall – Runoff Modeling of Warasgaon Dam Catchment
A. A. Kulkarni, S.P. Aggarwal and K.K.Das
Map India Conference 2004, GIS Development, New Delhi

Location Map



Warasgaon Dam Catchment

Village Boundaries

Materials and Methods

- Satellite images of IRS – IC LISS III (4th February 2002) & IRS – IC PAN (30th January 2002) were used for land use/land cover mapping
- Digital Elevation Model (DEM) was created using contour map for deriving slope map of Mose river catchment in GIS domain.

Modified Soil Conservation Services (SCS) Model

- The **runoff** is estimated with help of following equation

$$Q = \frac{(P - I_a)^2}{(P - I_a + S)}$$

Where,

Q = Accumulated storm runoff, mm.

P = Accumulated storm rainfall, mm.

I_a = Initial abstraction, (=~0.2S)

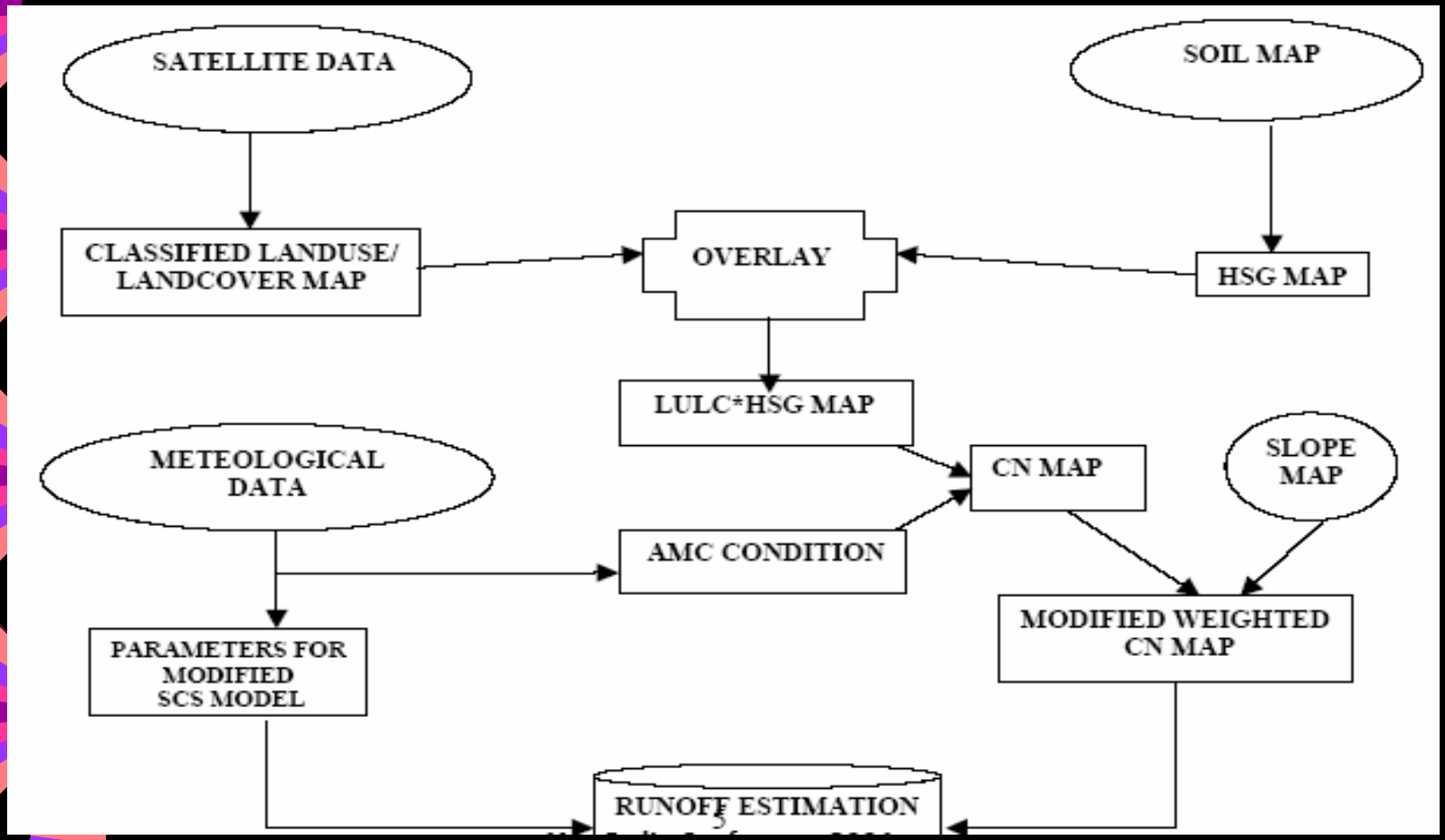
S = Maximum Potential retention by the soil.

- For daily rainfall, S values are derived from the CN values using the following formula as

$$S = 25.4\left(\frac{1000}{CN} - 10\right)$$

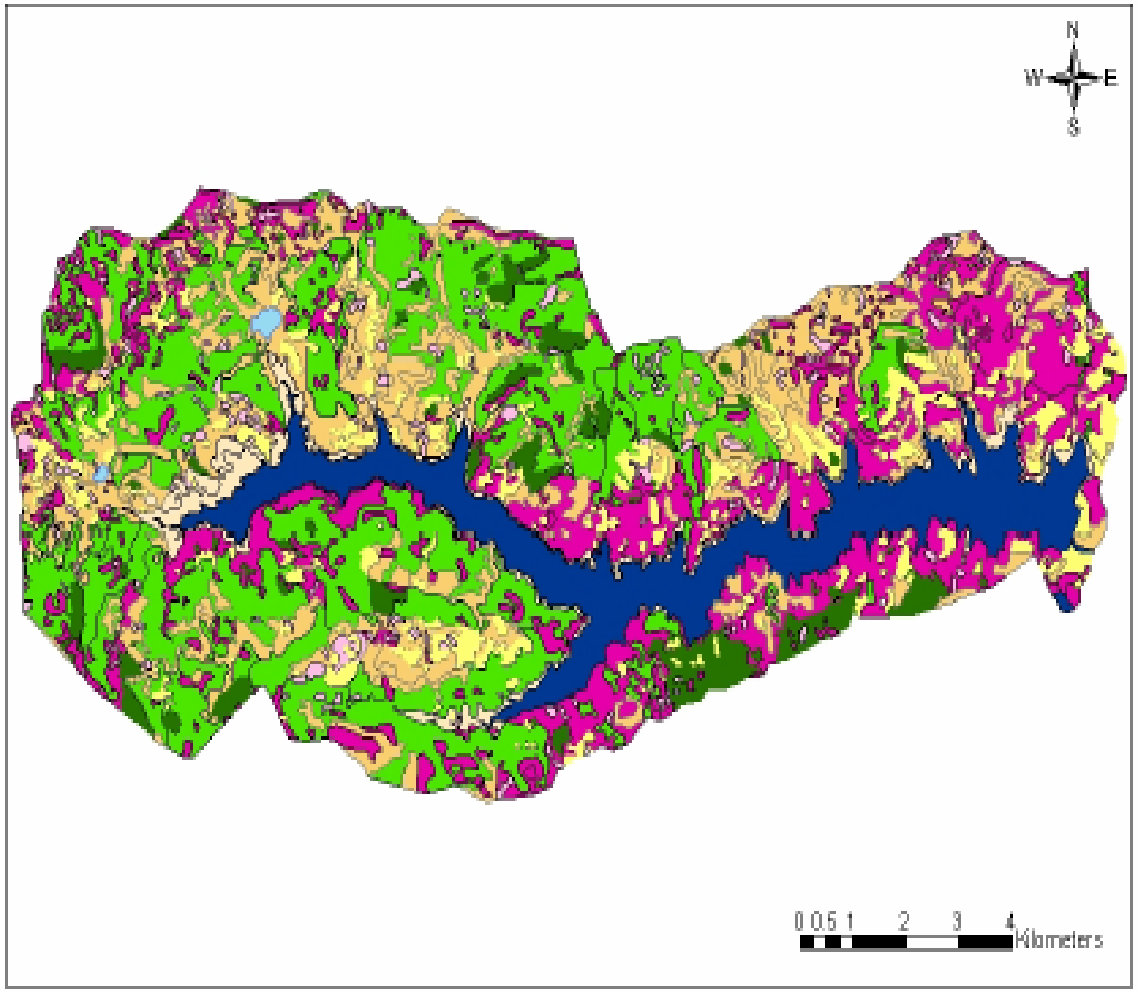
Where, CN is function of watershed hydrologic land use/land cover units, hydrologic soil groups and antecedent moisture conditions

Methodology for Rainfall – Runoff Modeling

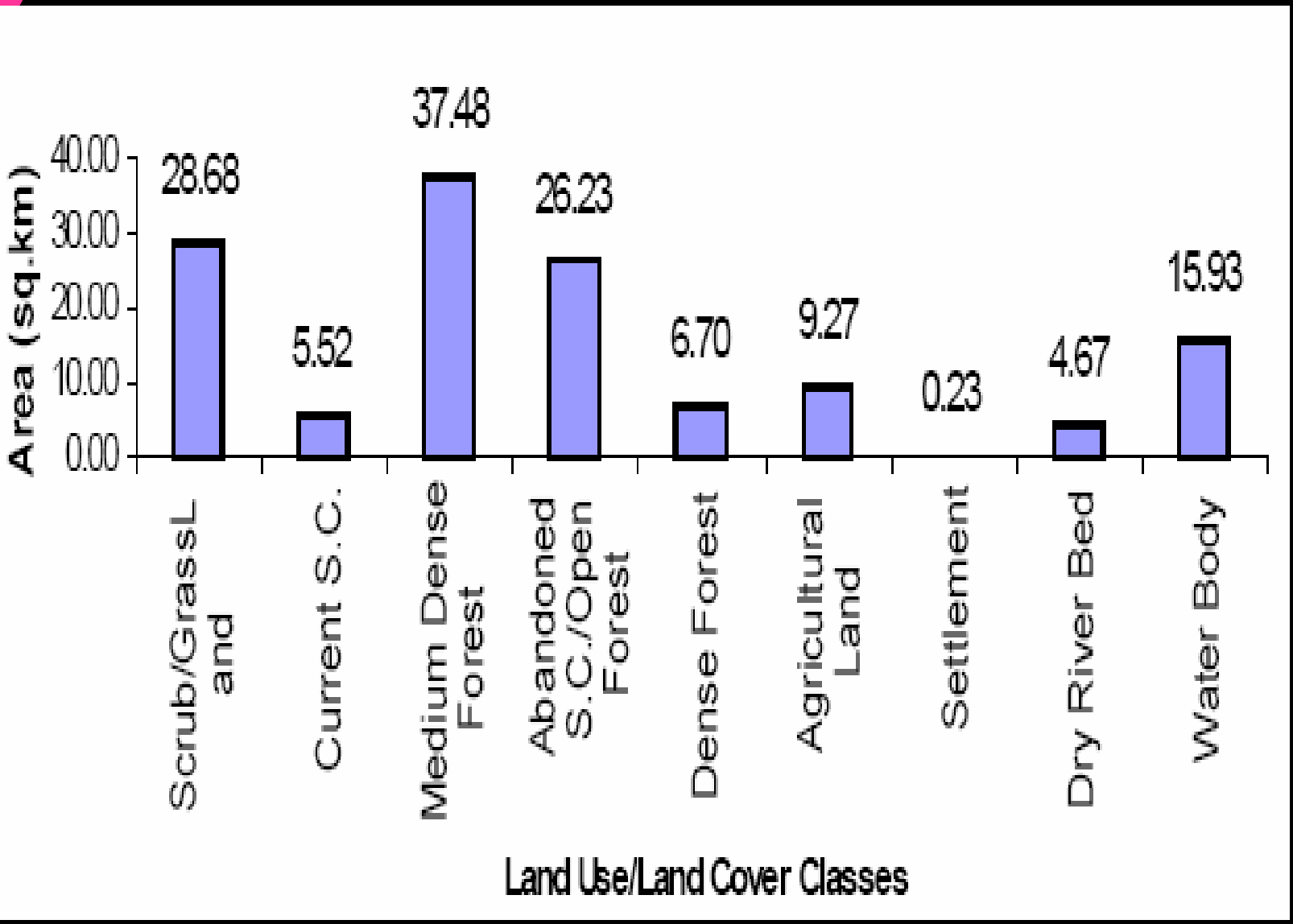


Rainfall (mm) for each Theissen Polygon

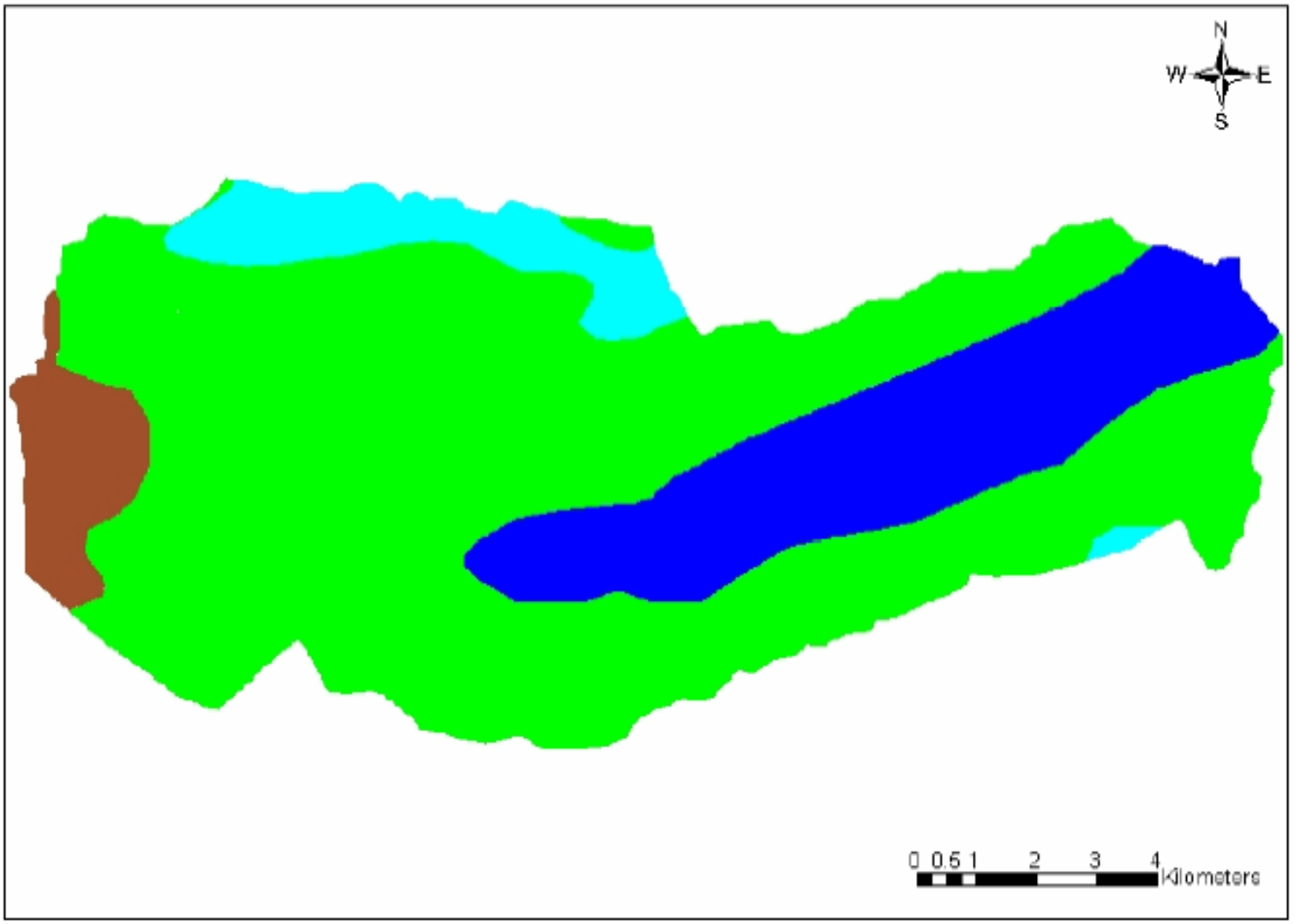
Land use/Land cover Map



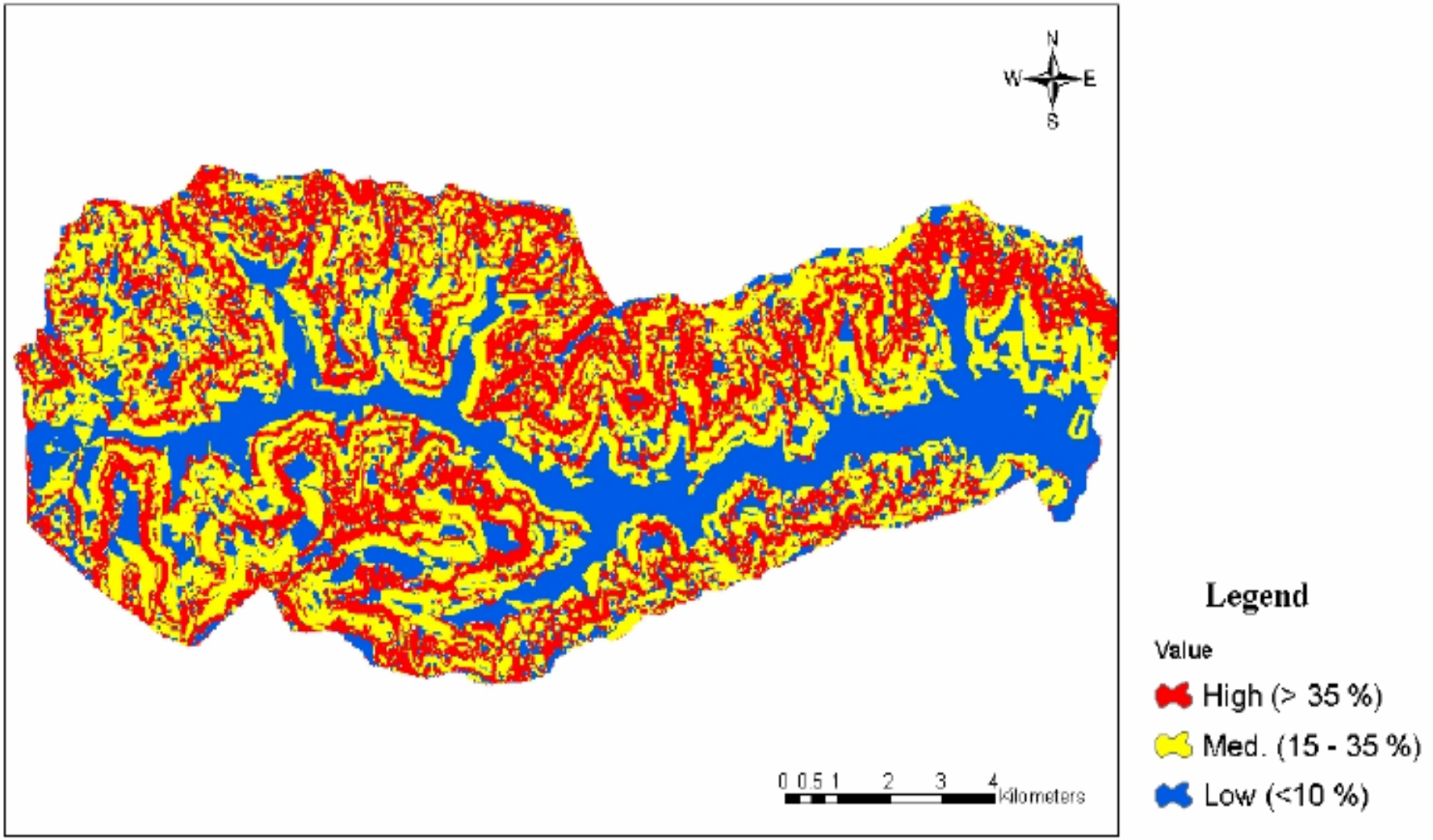
Land Use/ Land cover Classes



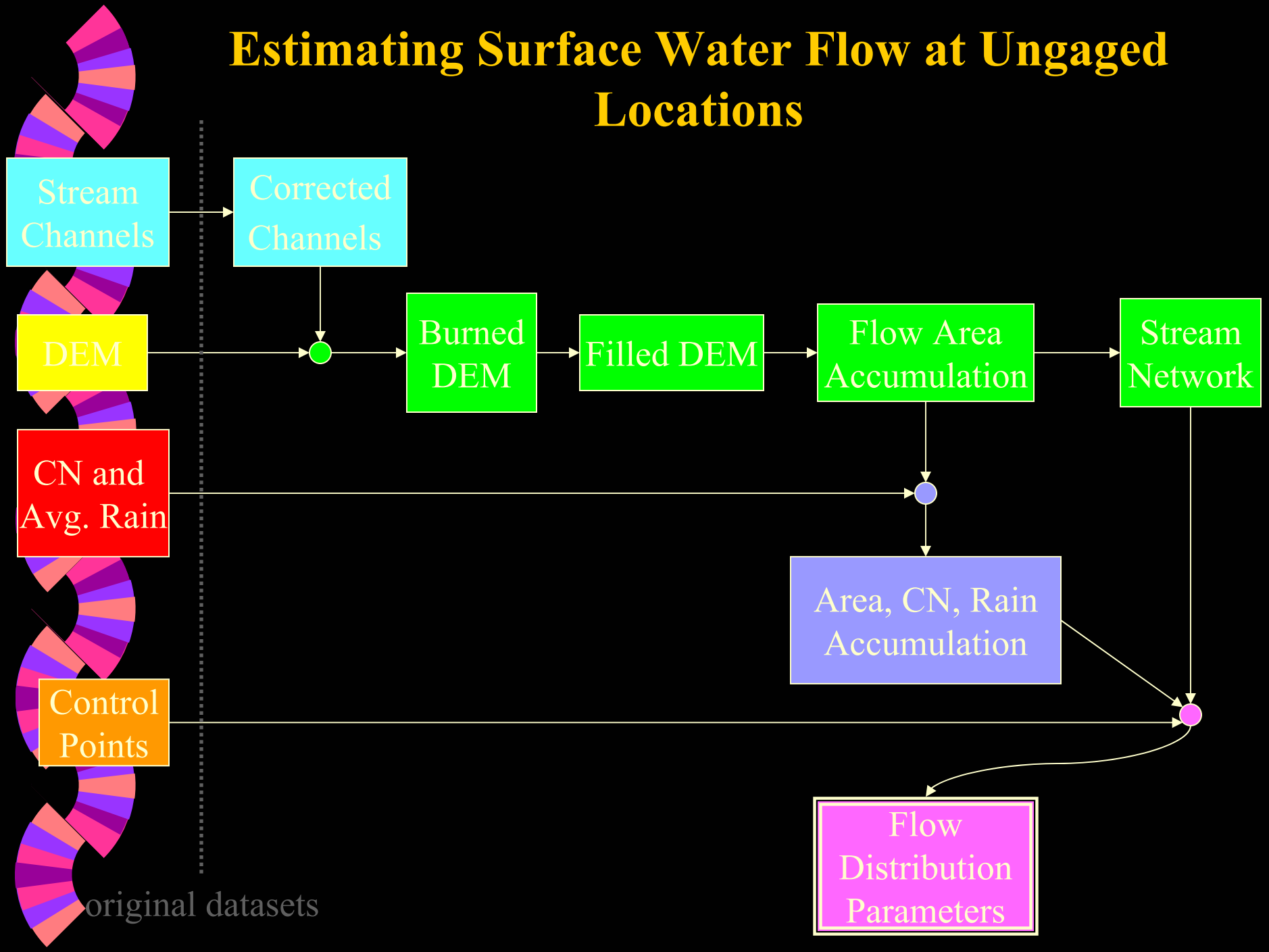
Soil Texture Map



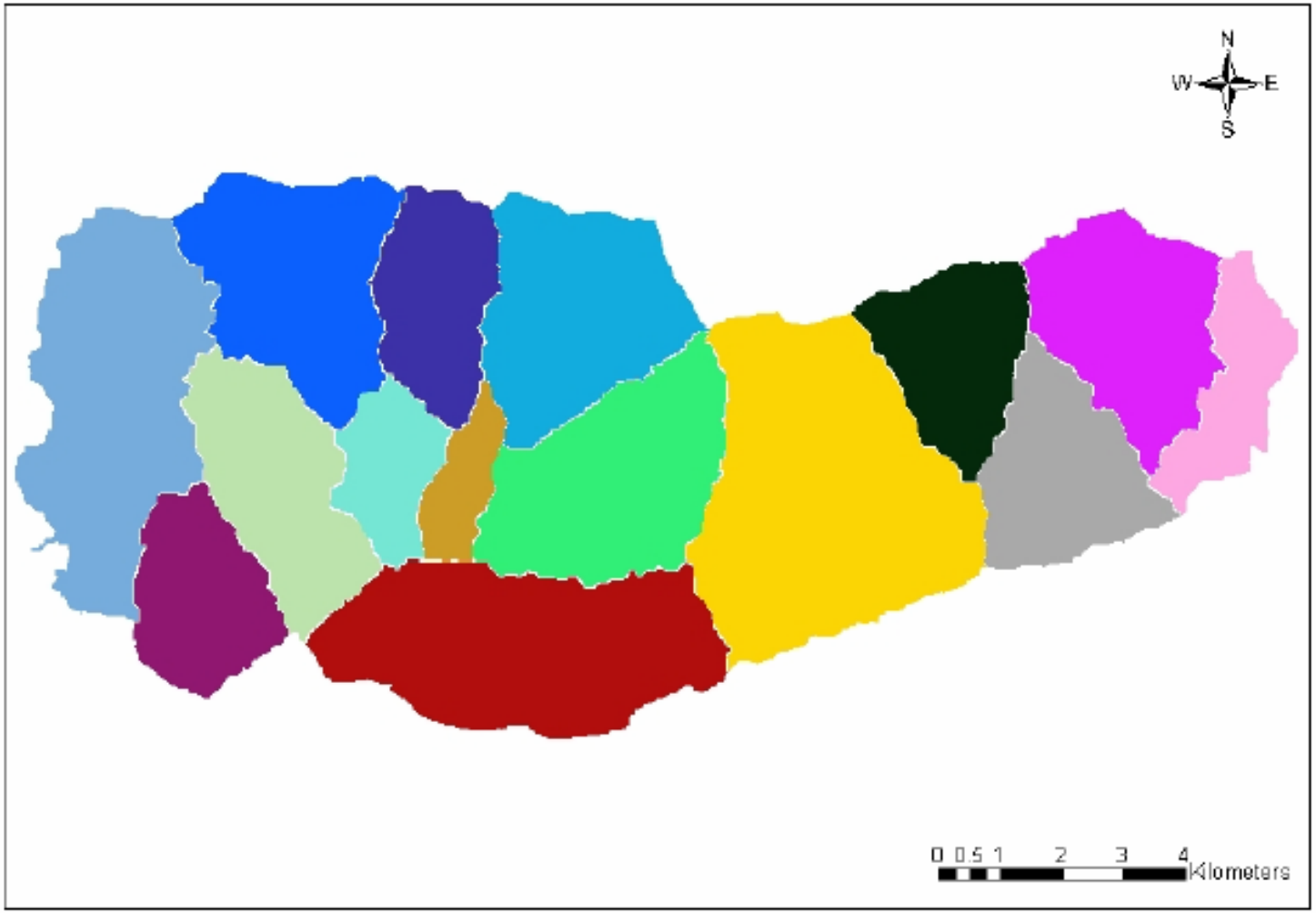
Classified Slope Map



Estimating Surface Water Flow at Ungaged Locations



Estimated Surface Runoff for each Sub watershed



Legend

Runoff (mm)

- 320.93
- 460.70
- 930.90
- 995.85
- 1,213.82
- 1,215.74
- 1,350.15
- 1,382.18
- 1,467.64
- 1,489.52
- 1,565.56
- 1,837.16
- 2,315.20
- 2,551.14
- 3,914.76

Surface Runoff for Each Sub watershed