

Application of GIS for Natural Resource Management

Introduction

- Land is fundamental resource for almost all human uses
- The use of land resources shaped by the interaction of two broad set of forces
 - Human needs (socio-economic)
 - Environmental features and processes (biophysical)
- Human action to the natural resources are the product of individual and group behaviors within the specific socio-economic and environmental settings



- ❖ Natural resource are not uniformly distributed but vary spatially and, in consequence, the social and economic development challenges also vary spatially
- ❖ In management context the spatiality of natural resources describe the development landscape as it currently exists as well as the potential pathways of change
- ❖ Spatial based Information is the base for natural resource management

To
Management
Natural
Resource

Information resources

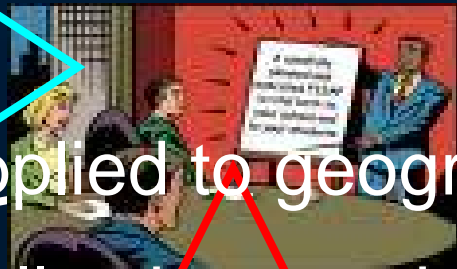
Focuses on establishing processes
and systems
to gather, organize, summarize
and package information

knowledge resources

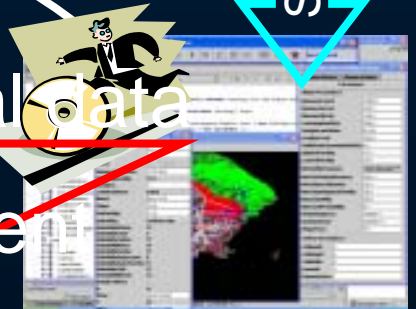
focuses on processes and people
involving in creating,
sharing and leveraging knowledge
among scientist, communities,
policy makers

GIS

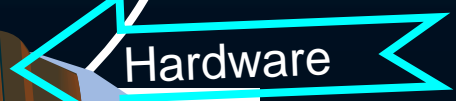
GIS



A computerized tools applied to geographical data for automation of collection, storing, retrieving, transforming and displaying spatial data for solving complex planning and management problems



GIS



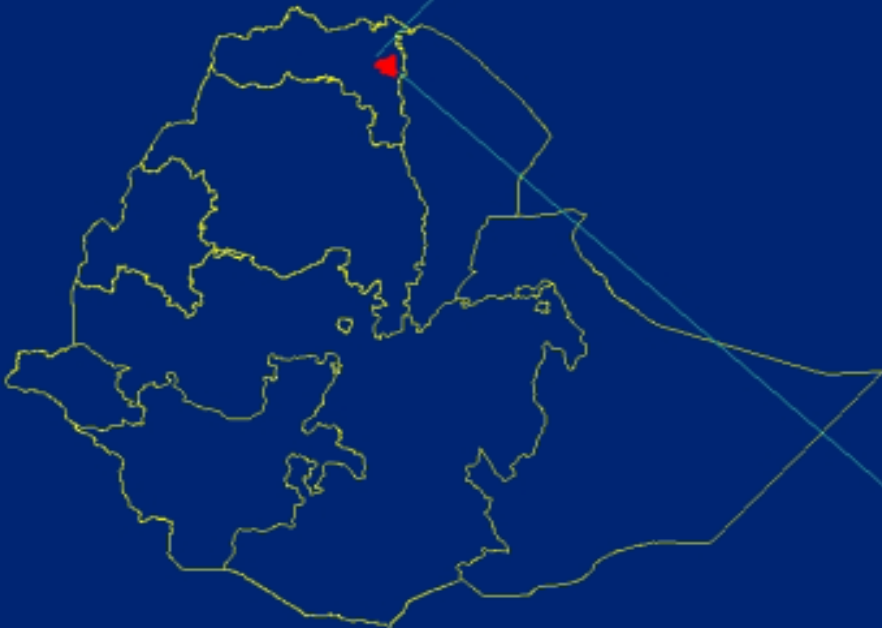
Major application of GIS in NRM

- resource assessment
- change detection
- suitability analysis
- scenario study
- impact assessment etc...

Watershed Management in Tigray (Wukro)

Major Problems

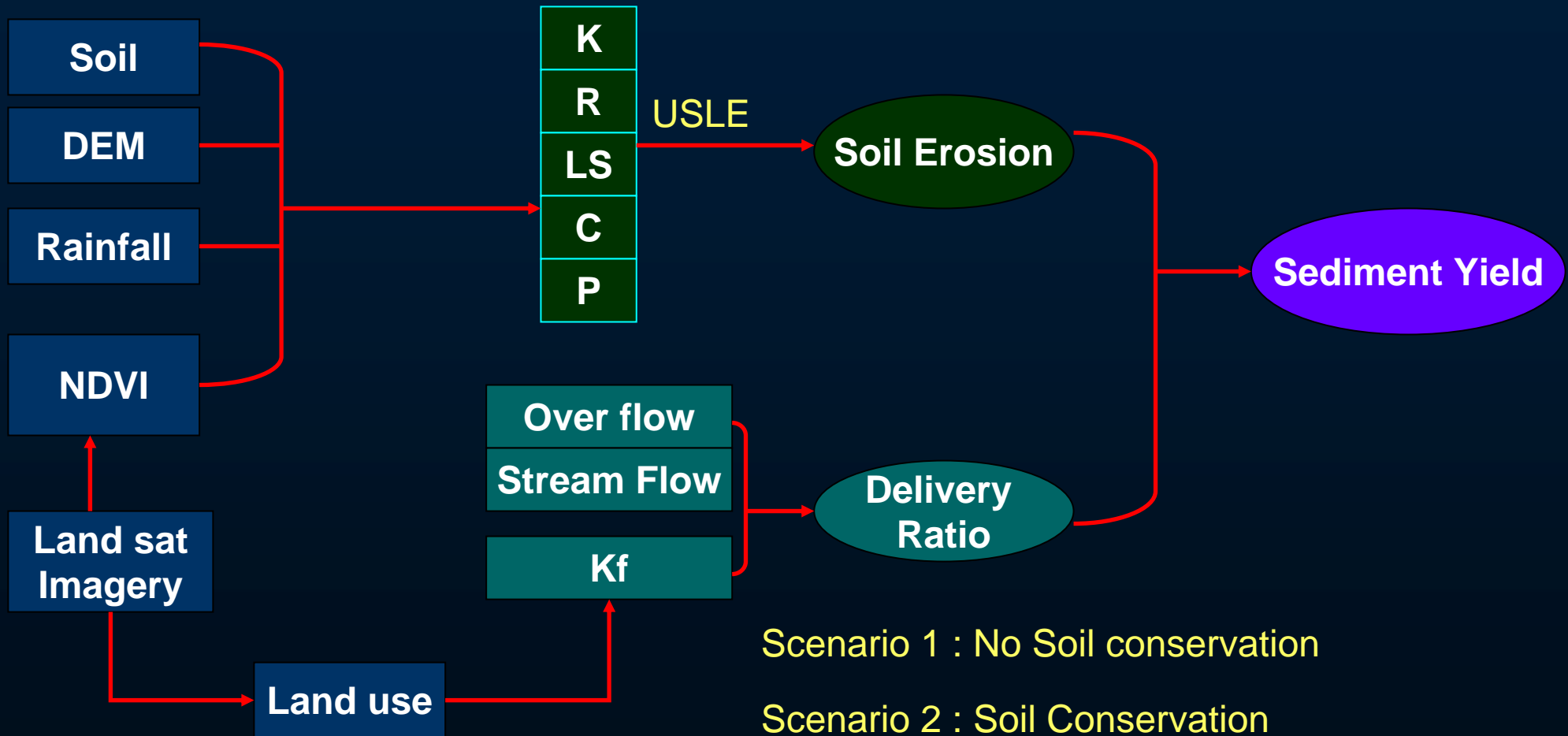
- Soil erosion
- Siltation
- Poor water harvesting
- Abandonment of water harvesting schemes due to siltation and failurity of harvesting of the designed runoff



objective

- To quantify the amount of soil loss and sediment flow from the woreda
- To locate possible surface water harvesting areas using GIS

Methodology

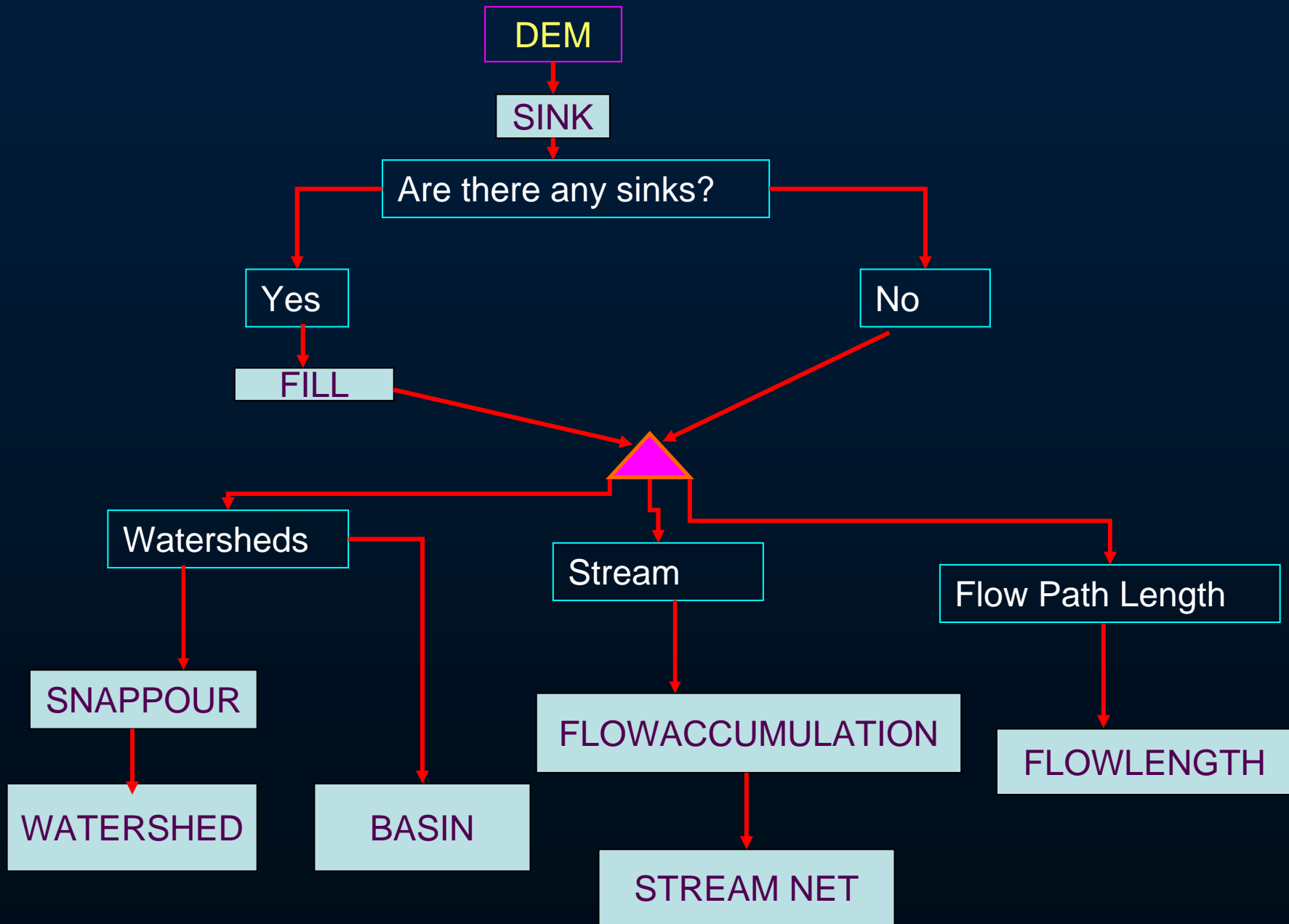


Scenario 1 : No Soil conservation

Scenario 2 : Soil Conservation

Scenario 3 : Soil Conservation + tree Planting

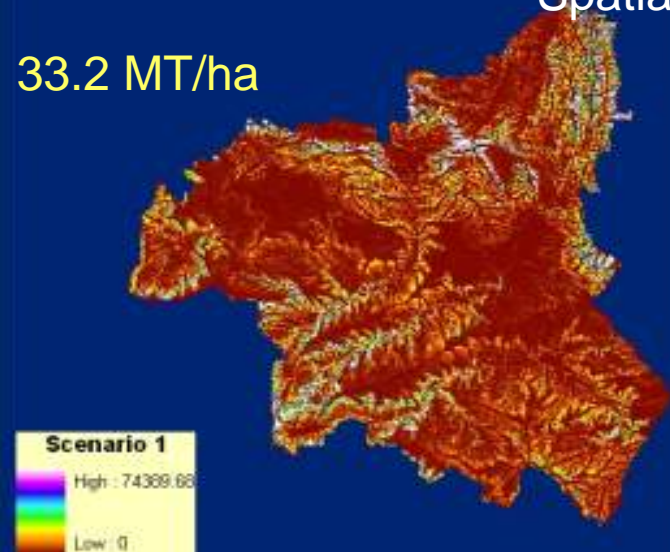
Watershed assessment Processes in GIS



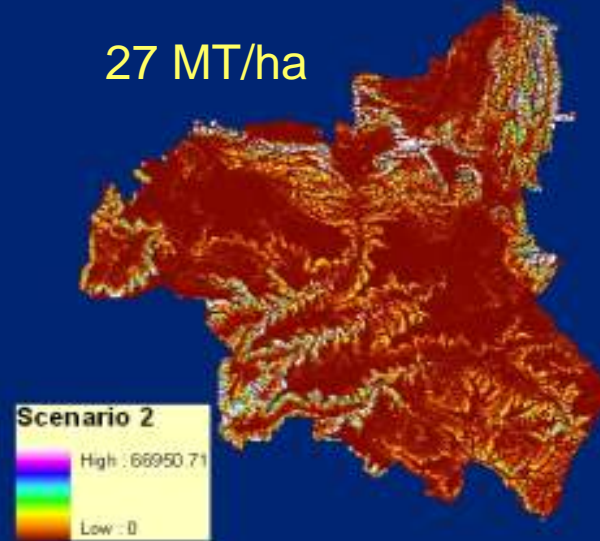
Result

Spatial Distribution of Soil Loss in Wukro

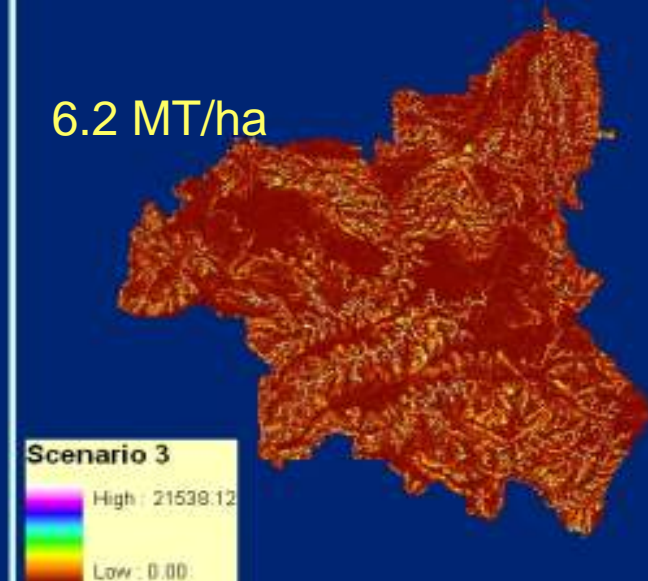
33.2 MT/ha



27 MT/ha

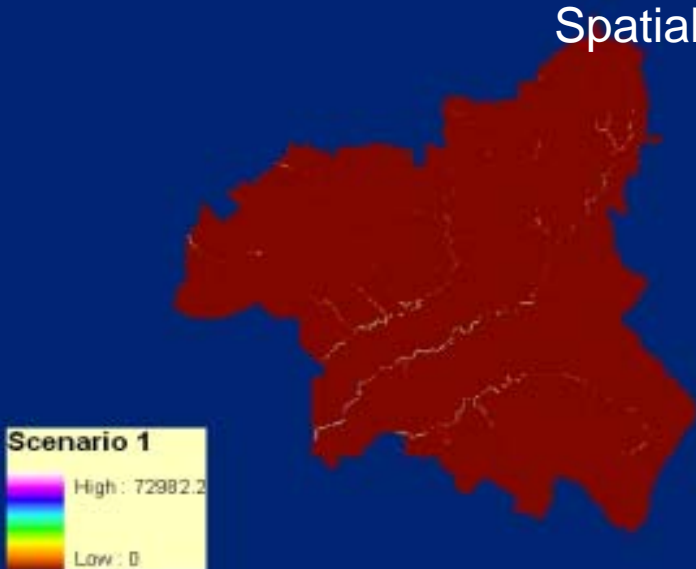


6.2 MT/ha

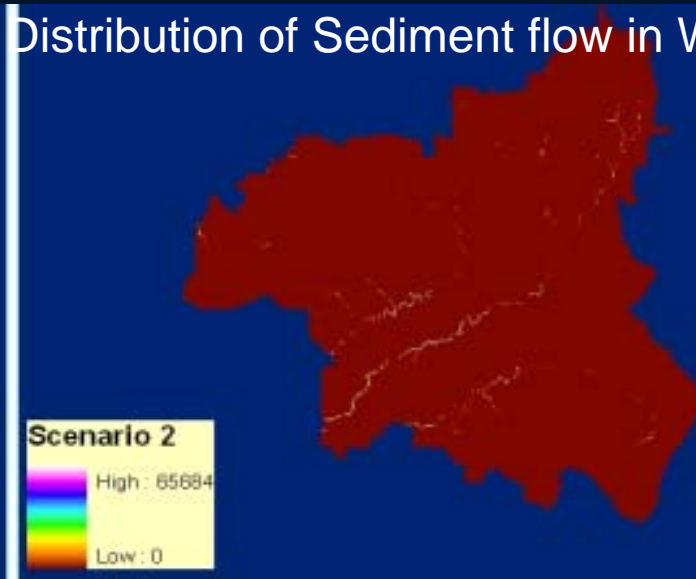


Spatial Distribution of Sediment flow in Wukro

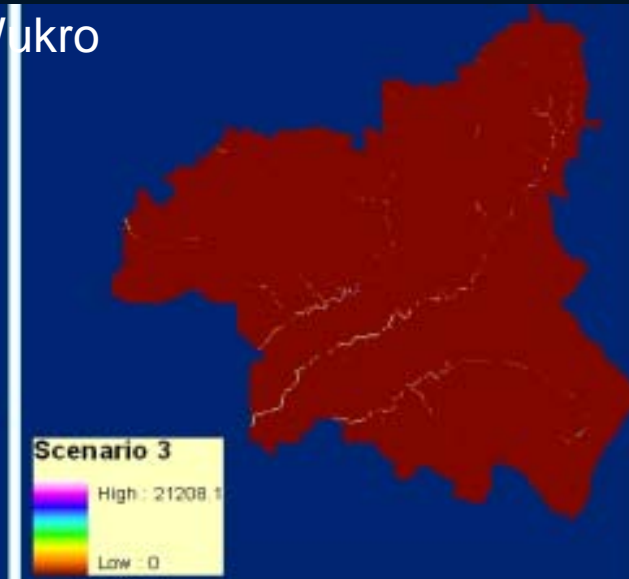
Scenario 1



Scenario 2

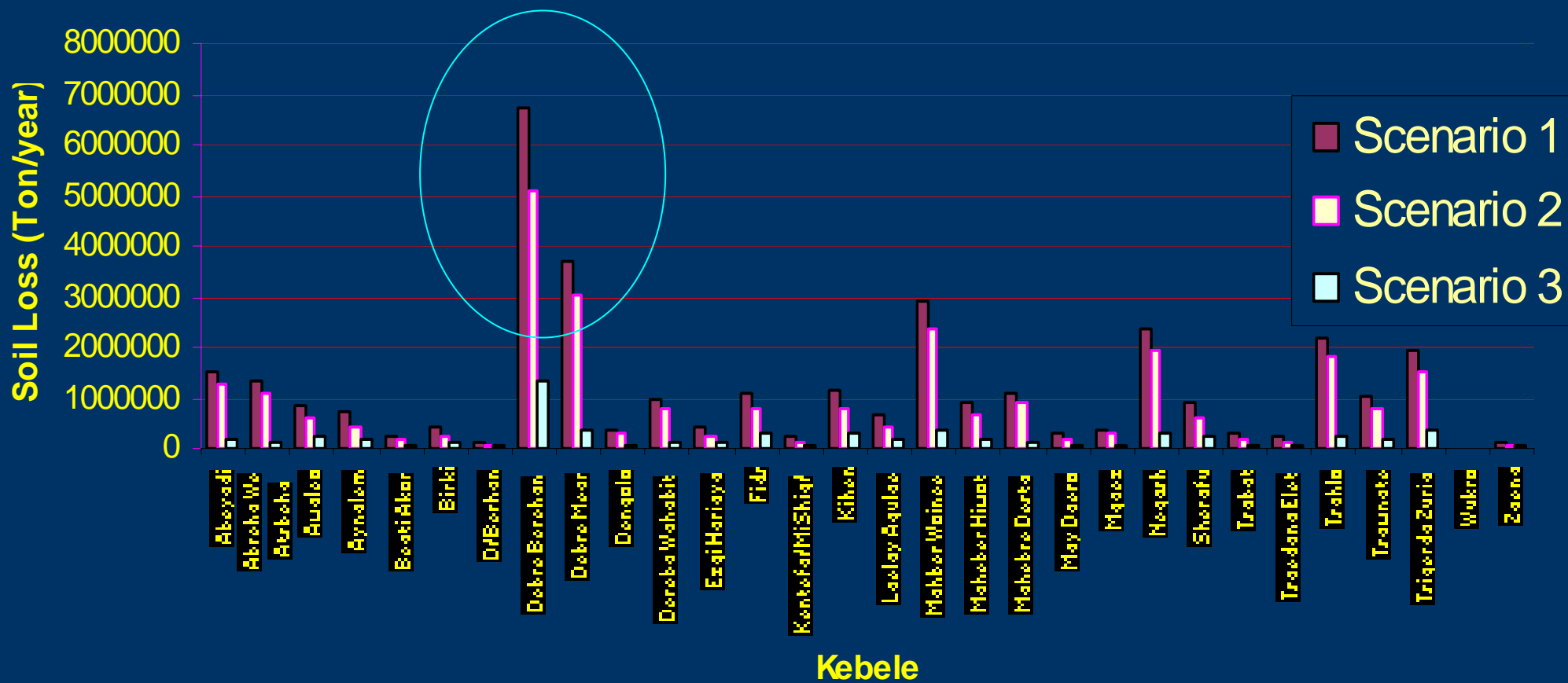


Scenario 3

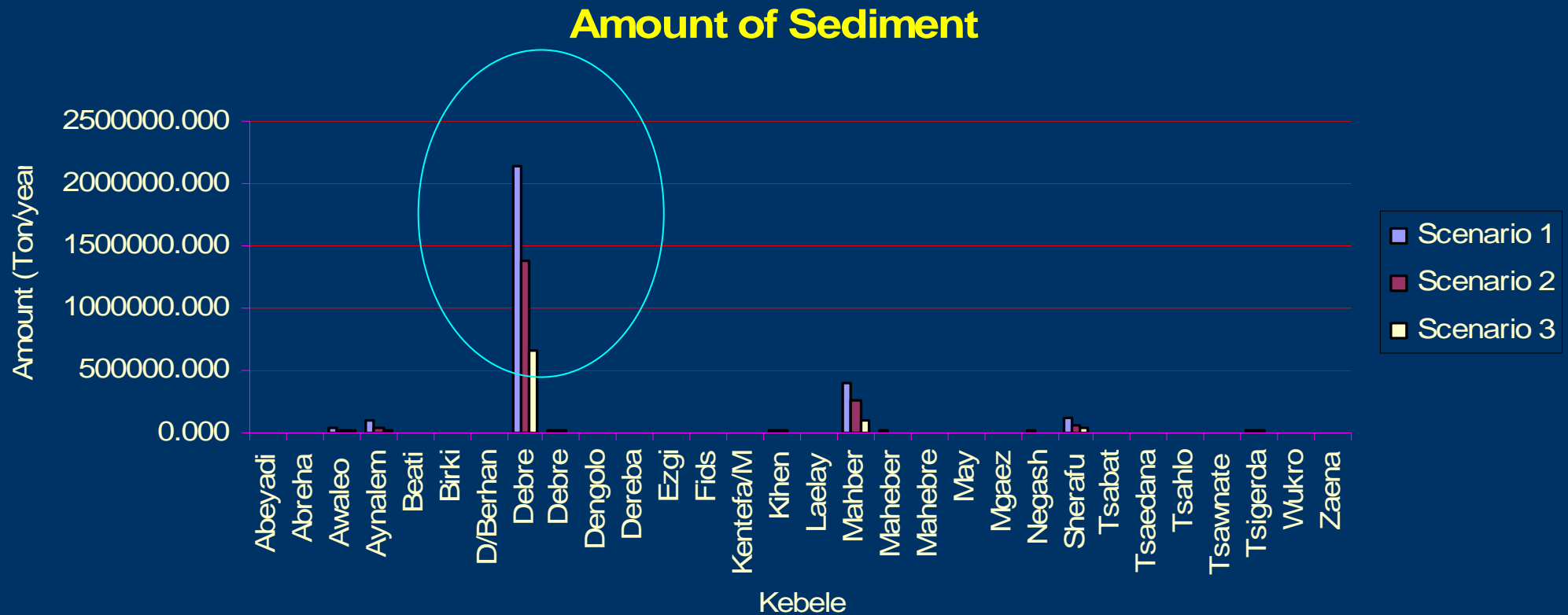


Amount of Soil Loss per Kebele

Amount of Soil Loss



Amount of Sediment flow per Kebele

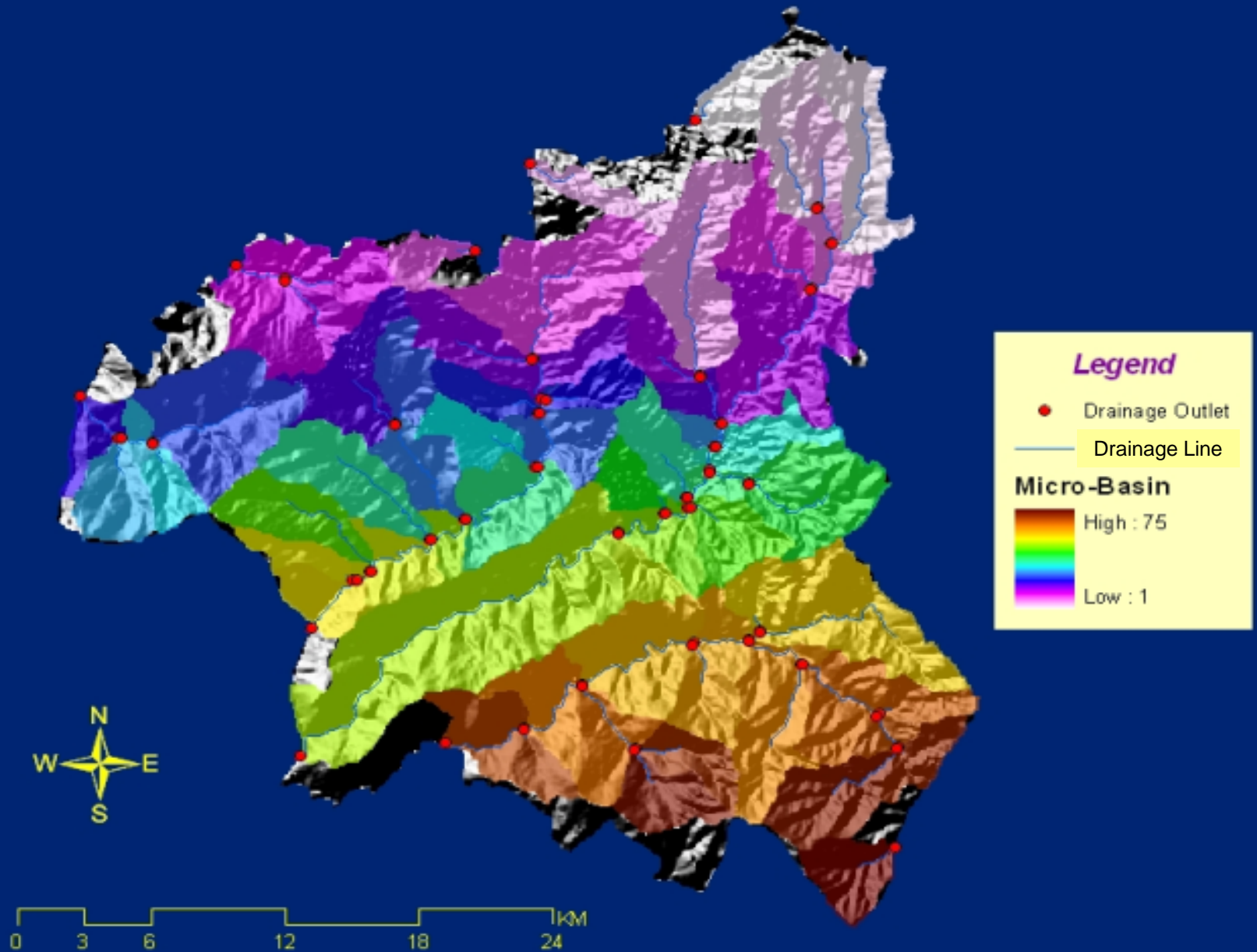


Amount of sediment fill in to dams per year (Ton/year)

	Scenario 1	Scenario 2	Scenario 3
Laelay Wukro	21953	9419	5887
Korir	1042	556	318

- The amount of sediment flows in to the dam will affect the amount of water available each year
- this will affect productivity and livelihood of the community

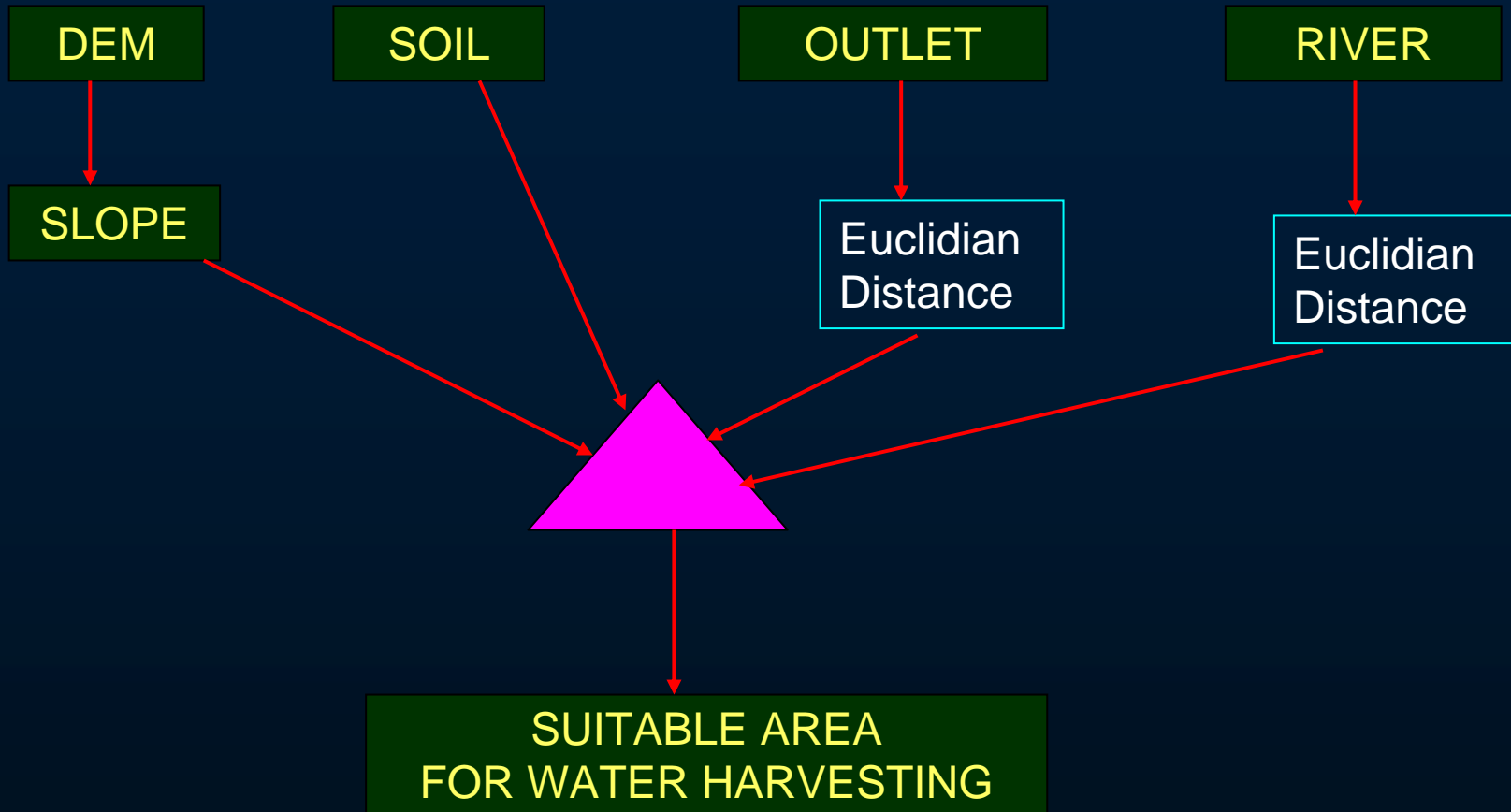
Delineation of Micro-basins



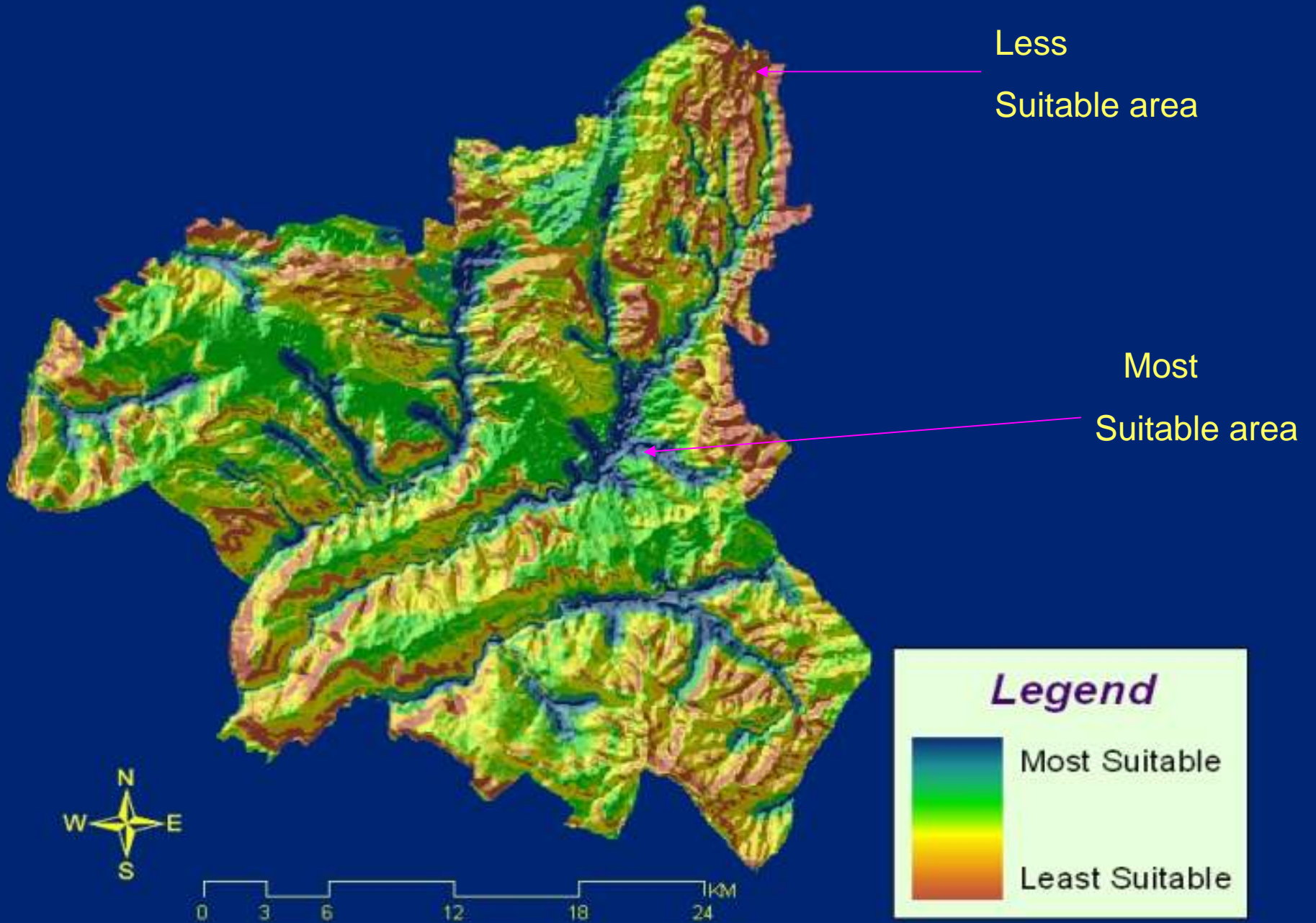
Delineation of Watersheds



Identification of Suitable area for Water Harvest



Identification of Suitable area for Water Harvest



remarks

- GIS is a powerful tool that can be used for NRM
- Prior to setting development action, information on the resource is vital
- Knowledge on the spatial dimensions could help to prioritize development actions and helps also to pursue policy makers