Reducing soil loss through effective soil and water conservation practices using hydrologic considerations and farmers' participation in the Blue Nile Basin

Seifu A Tilahun, Bahir Dar University`

- Soil losses varying from 1 to over 400 tons $ha^{-1}year^{-1}$
- Blue Nile contributes 60% of the Nile flow and sediment

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Photo Title: Erosion and sediment transport
People in photo: Blue Nile Fall

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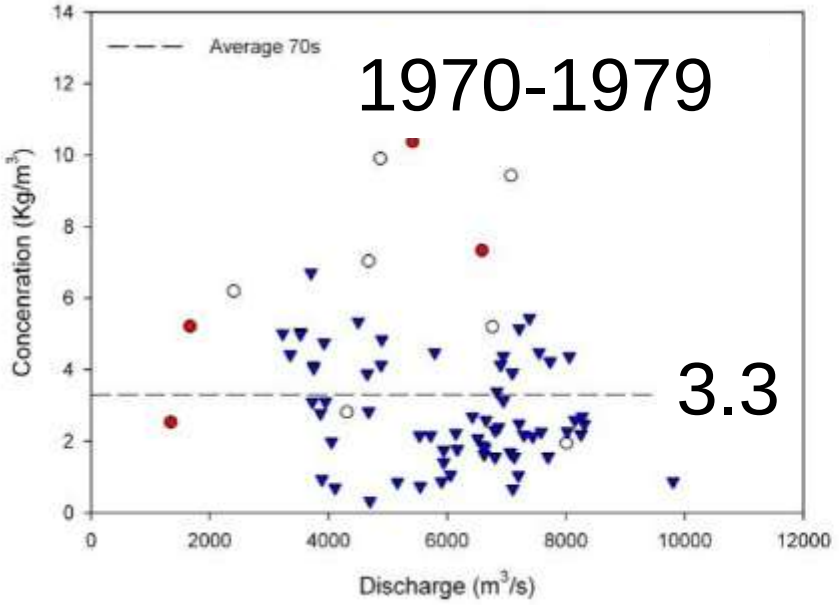
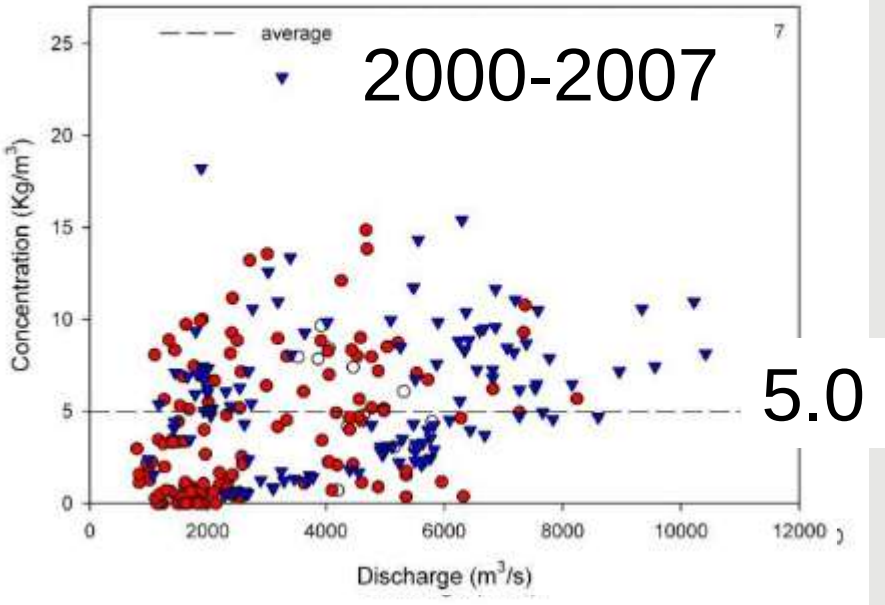
Land Interventions

- Over a quarter billion dollars has been spent on SWC practices targeting the steep slopes to combat erosion since 1980's





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Research Approach: Farmers participation, establishing 3 experimental watersheds, collecting primary & Secondary data in 2013, 2014 and 2015

Rain gauge

Infiltration tests

Piezometer wells

Grab sediment samples

Gulley Erosion

Erosion pins

Focus group discussion

Transect walks

Composite soil sampling: N, P, K from soil and sediment

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Key results of your research/project so far:

- Landscape is changing under increased population pressure: Cultivated land replaced forest and shrub lands
- Changing landscape results in loss of organic matter and other binding agents
- Particle size became much finer after loss of organic matter
- After forest clearing flow paths become shallower due to land degradation forming hardpans at shallow depth by clay illumination causing shorter travel times and more saturation
- To drain the excess water more gullies created in the landscape after 1970's
- However gullies viewed as punishment by God for their sin

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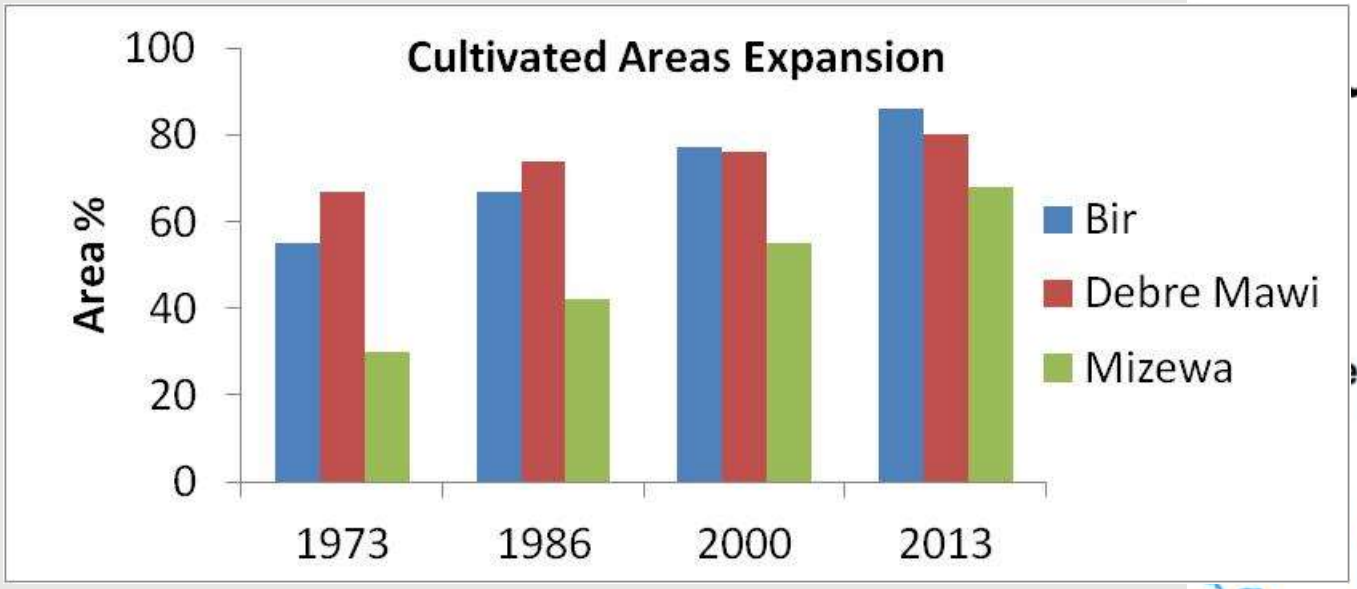
Landscape is changing
under increased population pressure

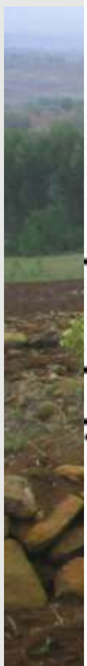
1973-2013

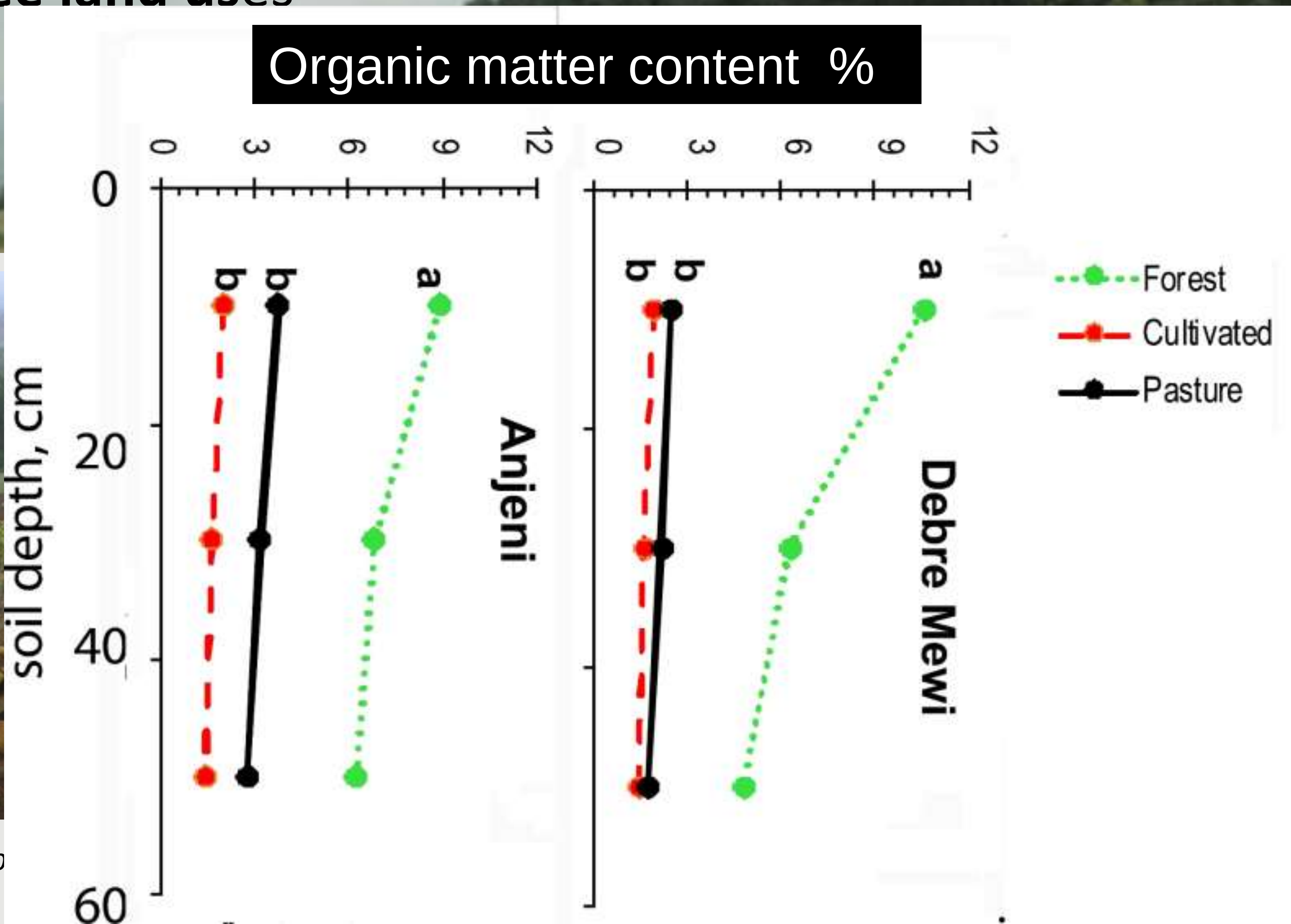
Cultivated land is replacing forests and shrubs.

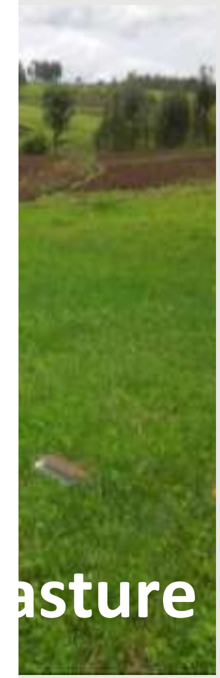


Changing landscape results in loss of organic matter and other binding agents

Three land uses

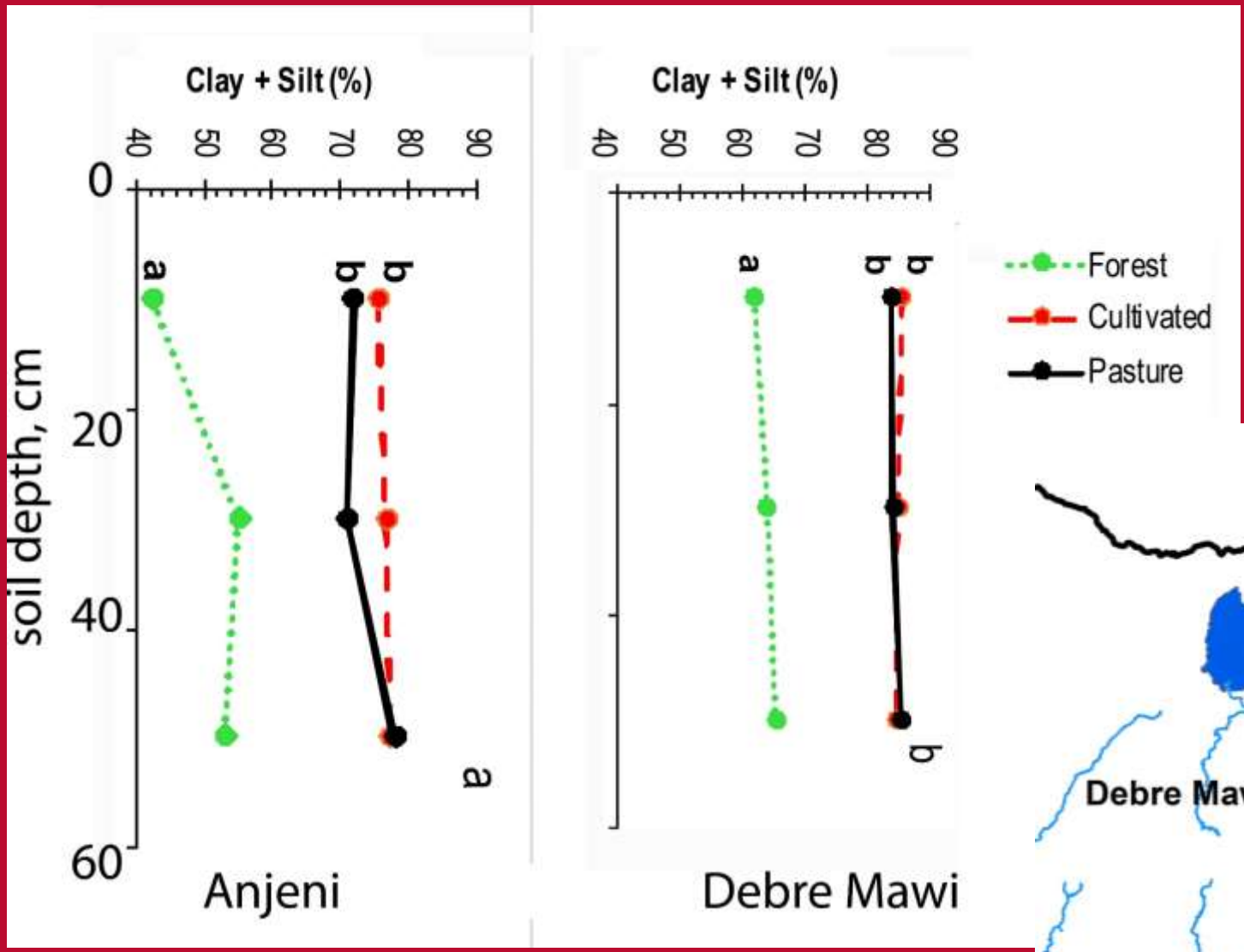


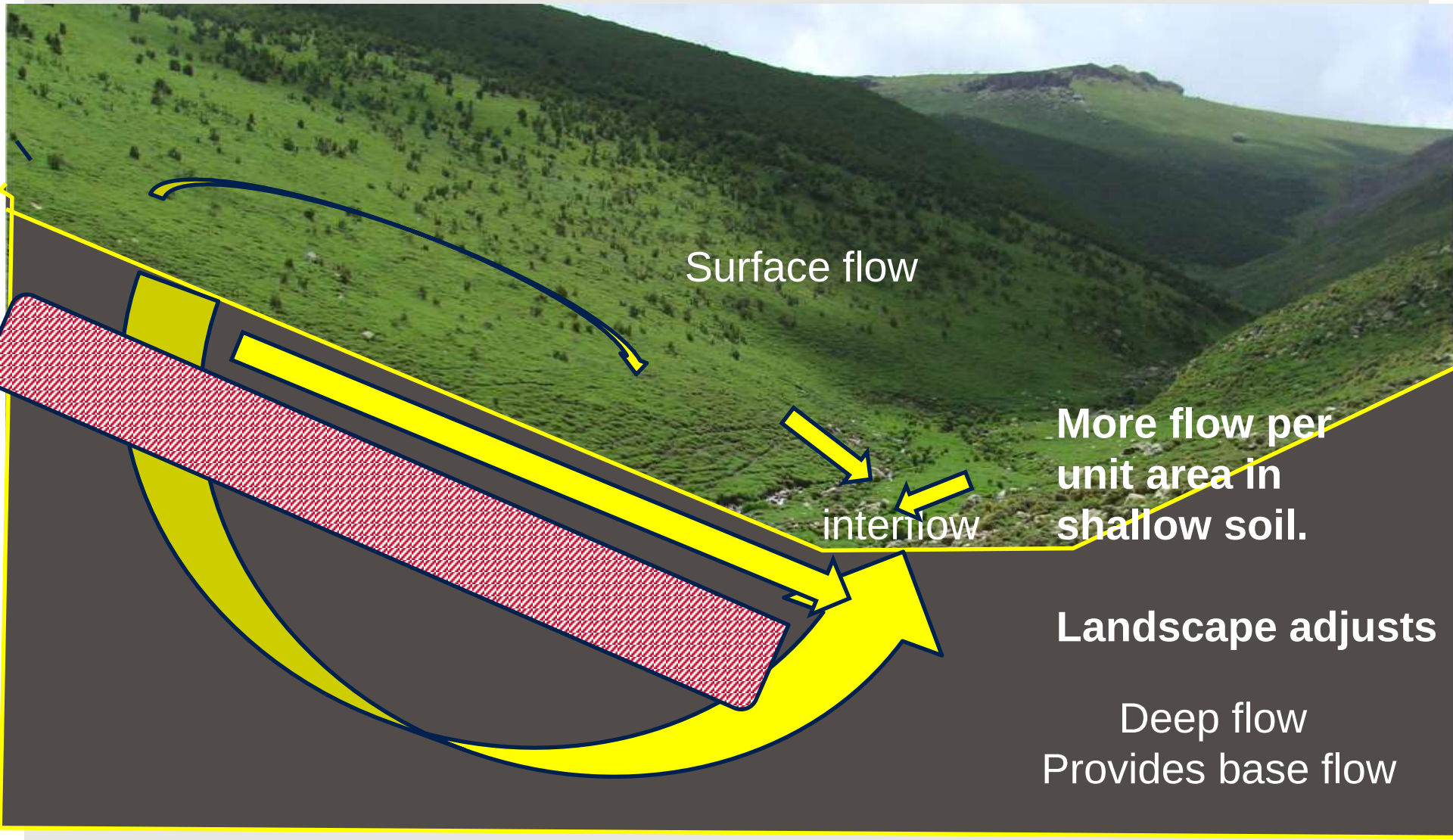




Teb

Particle size became MUCH FINER after loss of Organic matter




Surface flow
interflow
More flow per unit area in shallow soil.
Landscape adjusts
Deep flow
Provides base flow

Gullies at the Valley bottoms with depths upto 10 to 15 m are hotspot areas in the landscape

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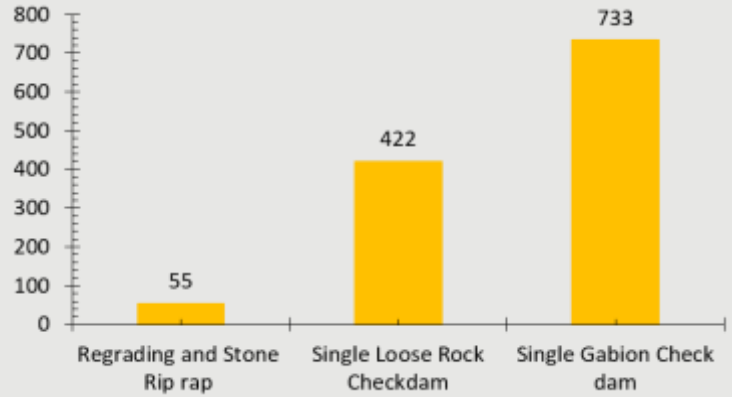
Marginal Rate of Return was 10 based on the value of increased forage production and trapped soil nutrient values.







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Treating shallow gullies is more cost effective than waiting until the gully is fully developed.

Field visit and consultation with farmers and agricultural development agents on “Controlling severe soil erosion through gully rehabilitation”

Field practice on gully head treatments

From 4 zones and 11 districts , 33 farmeres, 11 development agents and 10 researchers and journalists were participated.

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Top next steps for your project: More research is needed on how best to make break the hardpan, reverse land degradation and improve water availability during the dry phase to grow high value crops so that water productivity increased

Challenges you have faced in collecting meaningful data: failure of instruments, lab equipment with their reagents and data management

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