



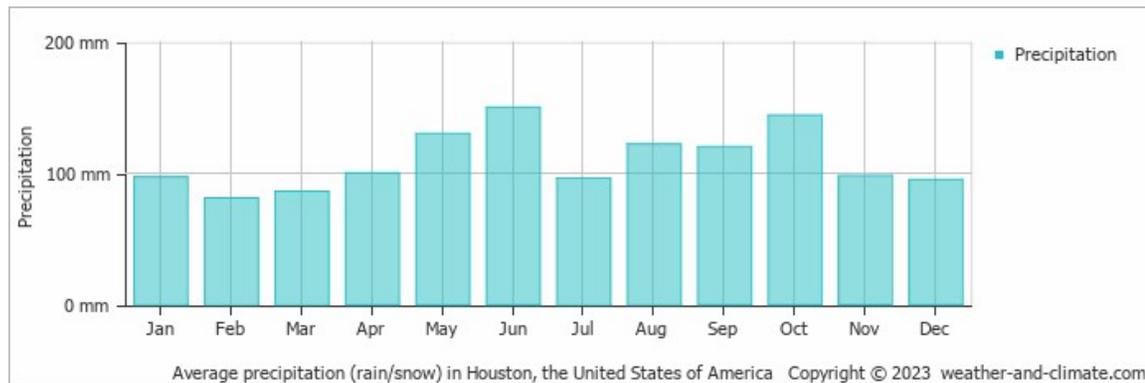
*Conference on Water, Climate and Food
Security for Students and Early Career
Scientists*

Priorities and opportunities in international agricultural and climate research

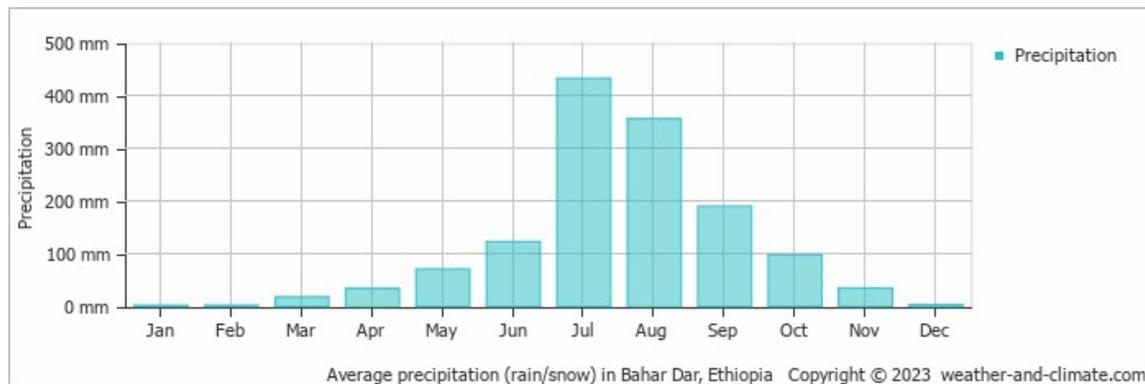
Seifu A Tilahun
International Water Management Institute,
Accra, Ghana

Bahir Dar University, Bahir Dar, Ethiopia

Rainfall in USA and Ethiopia



Huston, USA

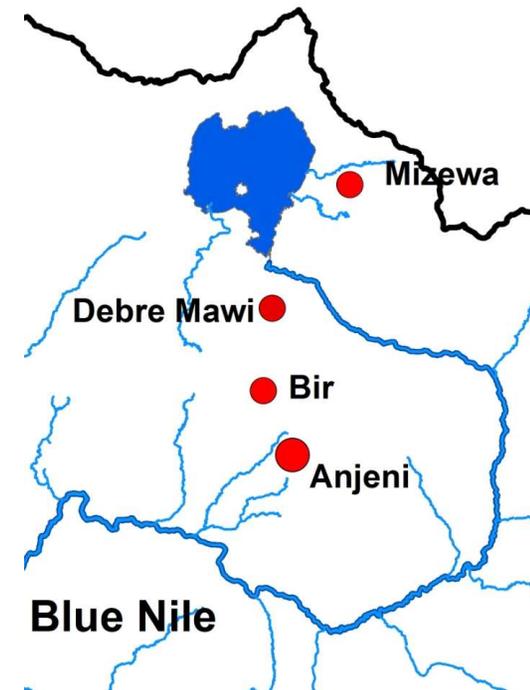
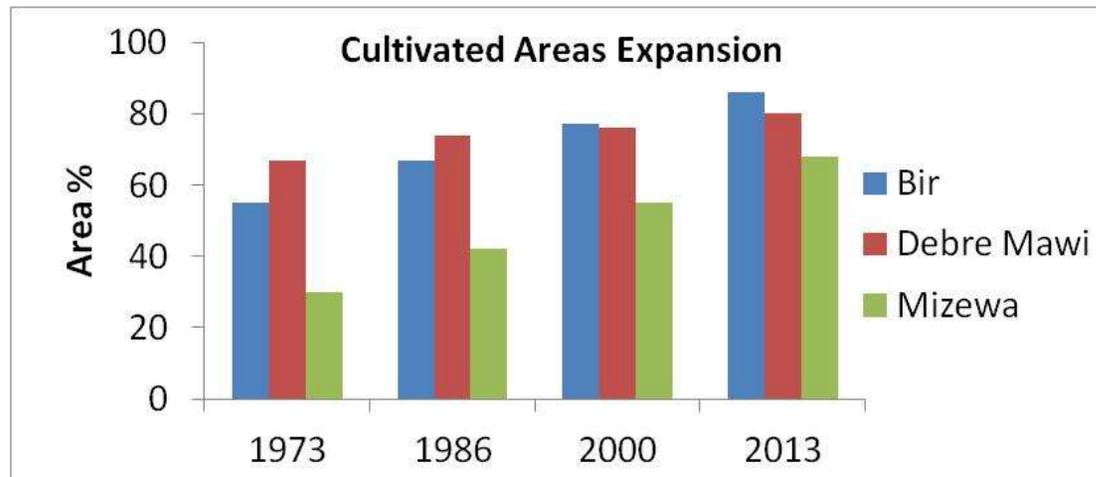


Bahir Dar, Ethiopia

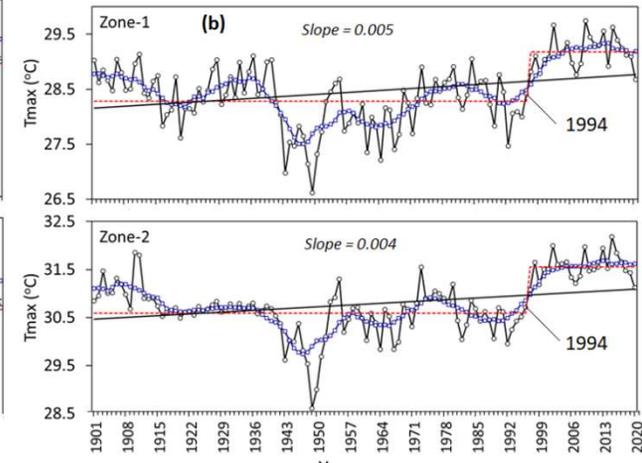
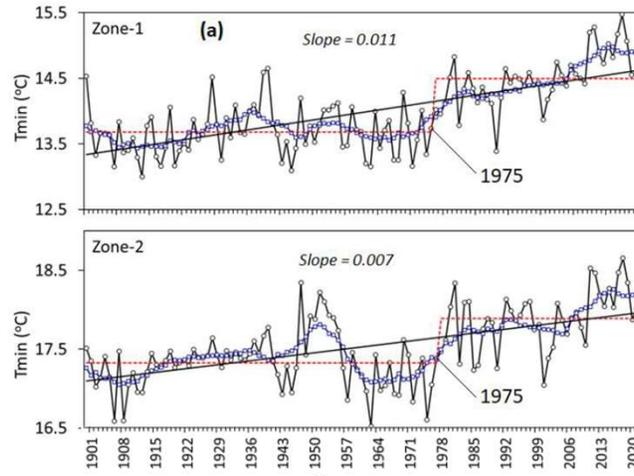
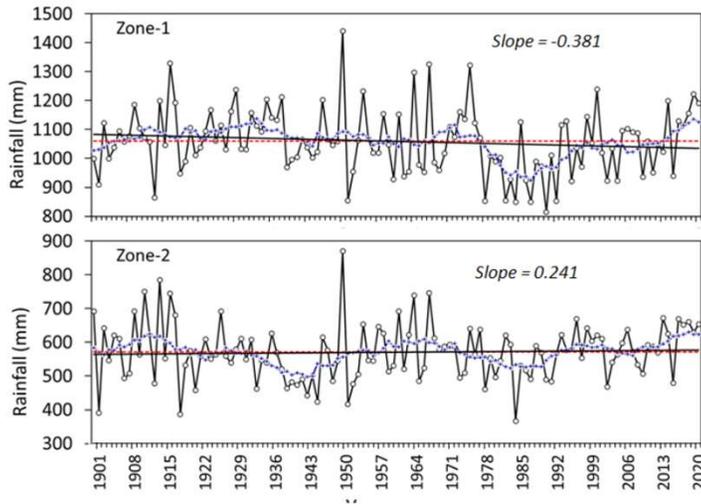
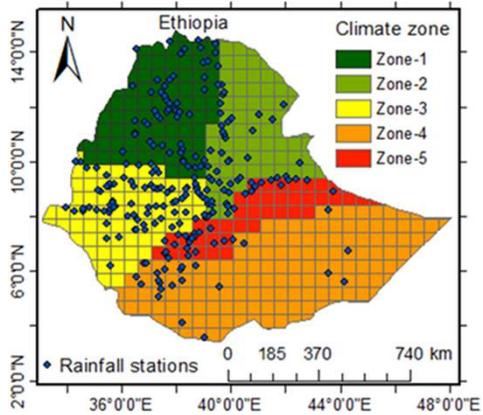
Landscape is changing under increased population pressure

1973-2013

- Cultivated land is replacing forests and shrubs.

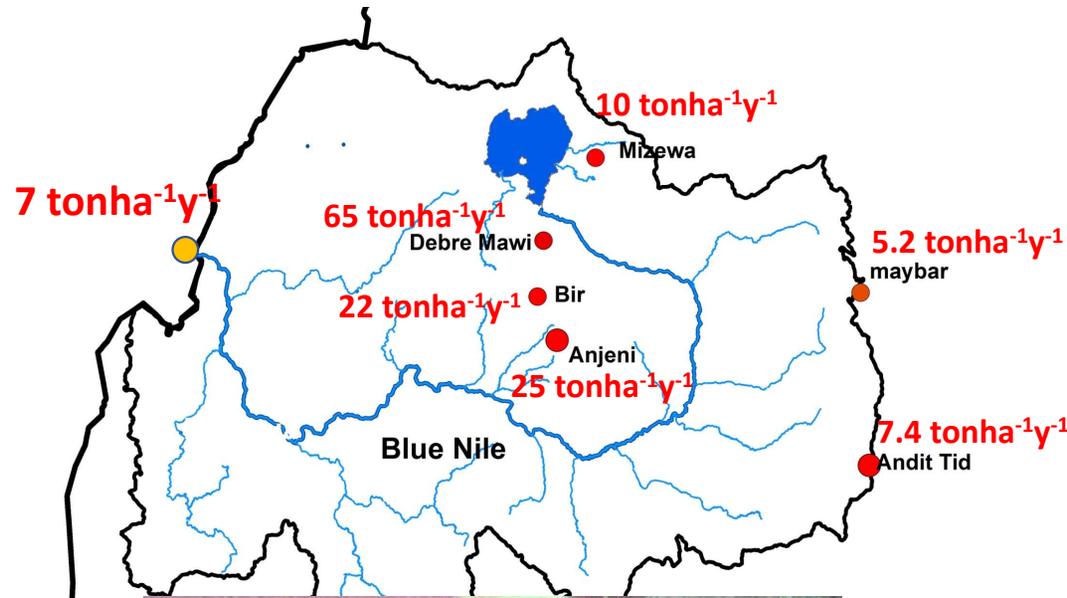


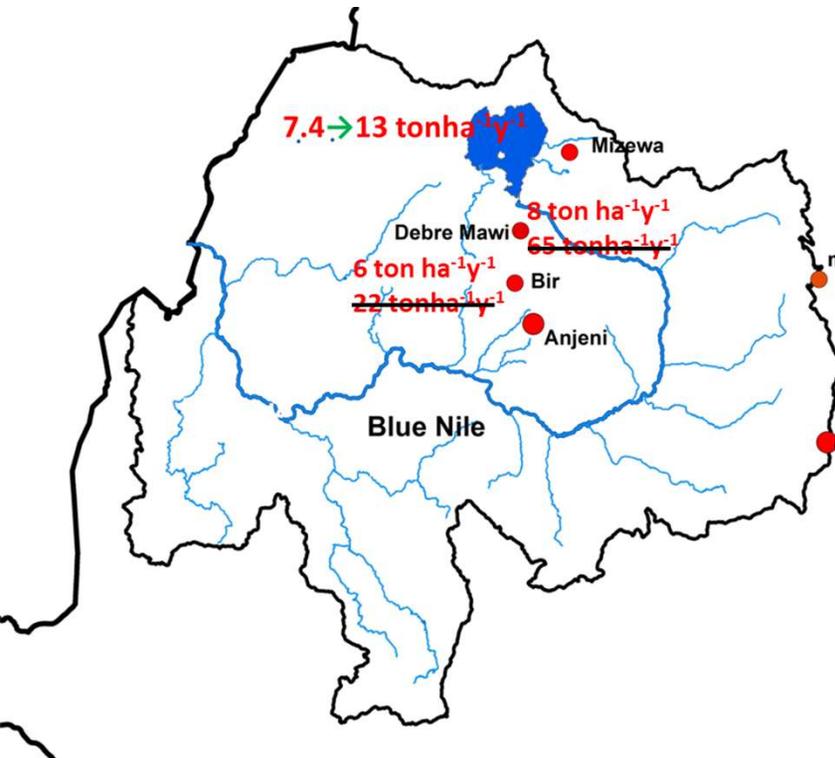
Climate changes



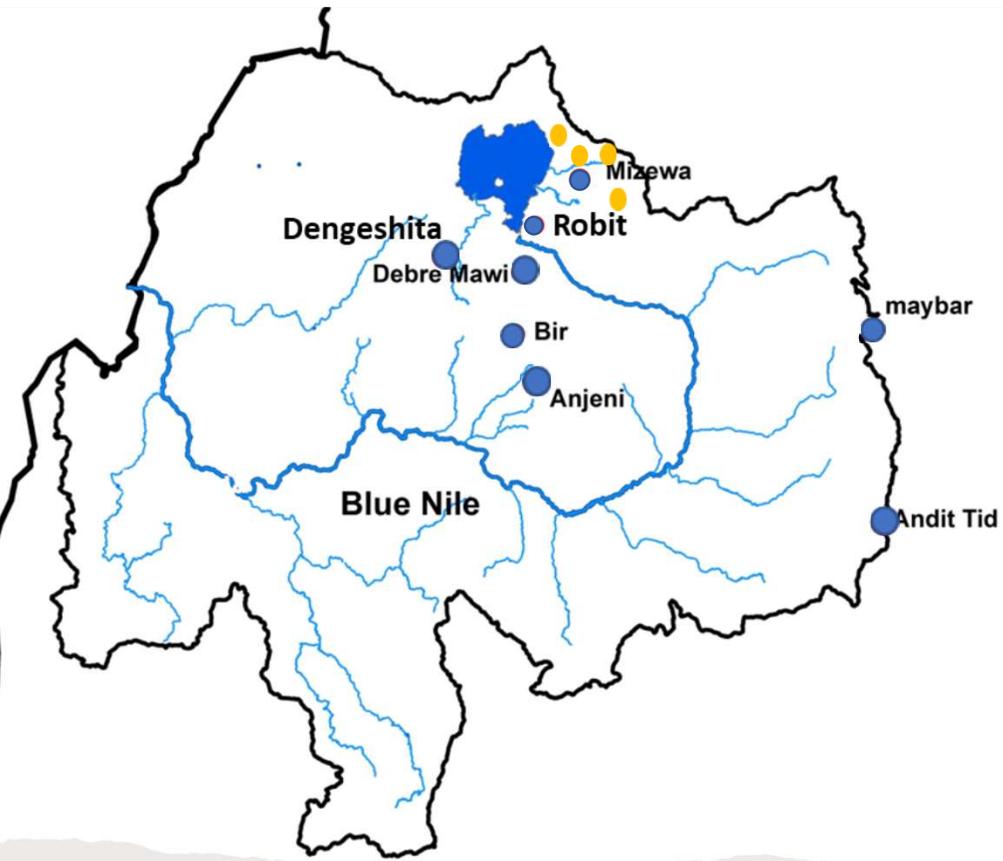
Watershed management

- Over a billion dollars has been spent on SWC practices targeting the steep slopes to combat erosion

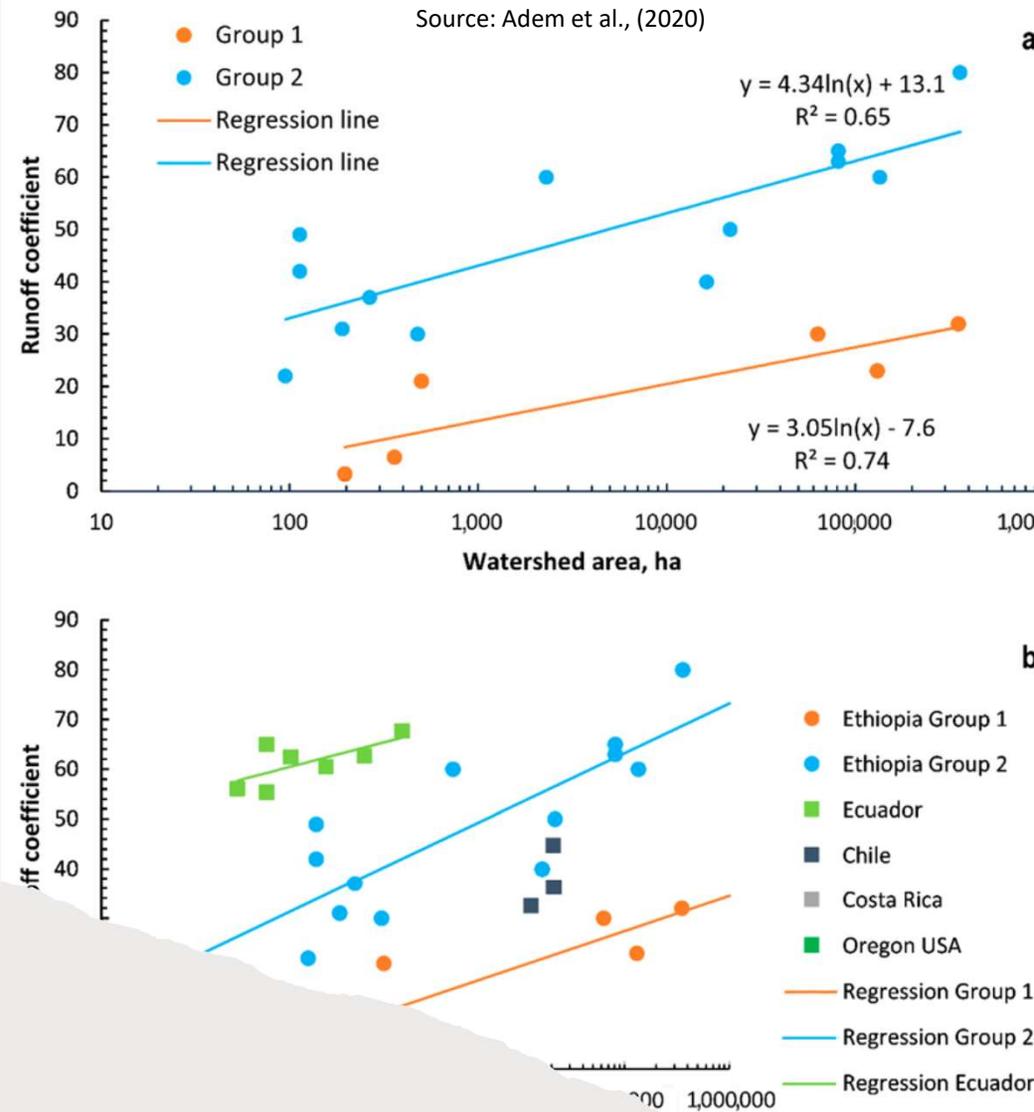




Remediation of uplands erosion in watersheds in the greatest reductions in soil loss but still not enough.



Streamflow responses



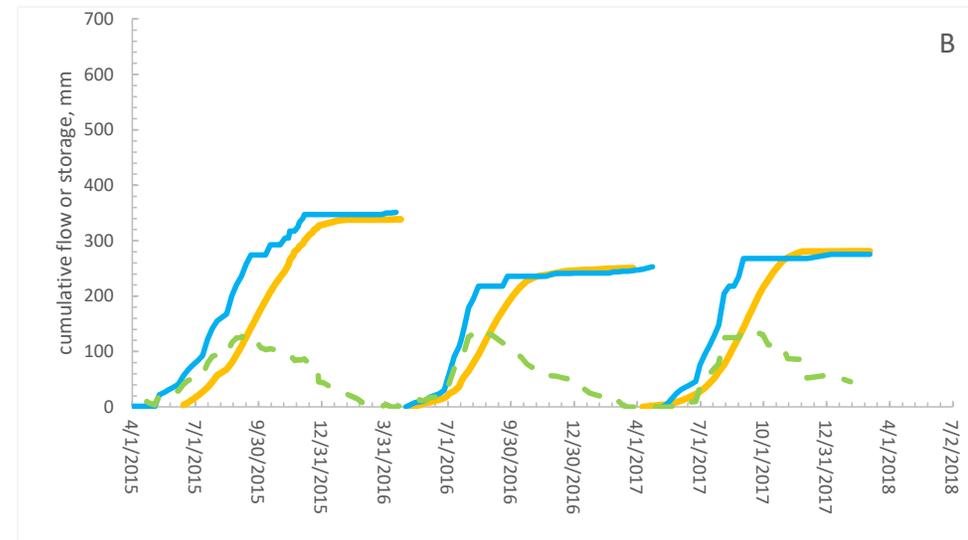
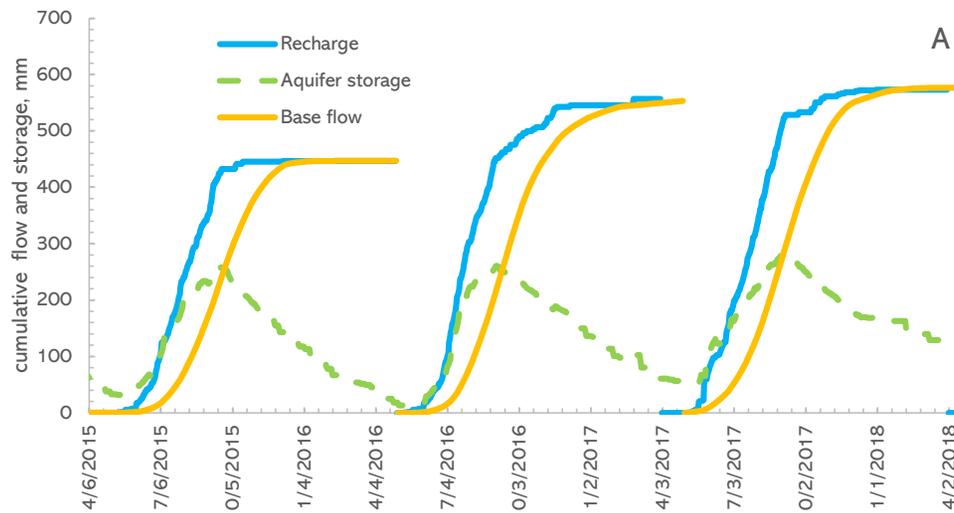
Agricultural Water Management

- Applicability of deficit irrigation
- Conservation agriculture
- Water lifting technologies
- Irrigation scheduling
- Potential of Shallow ground water for SSI



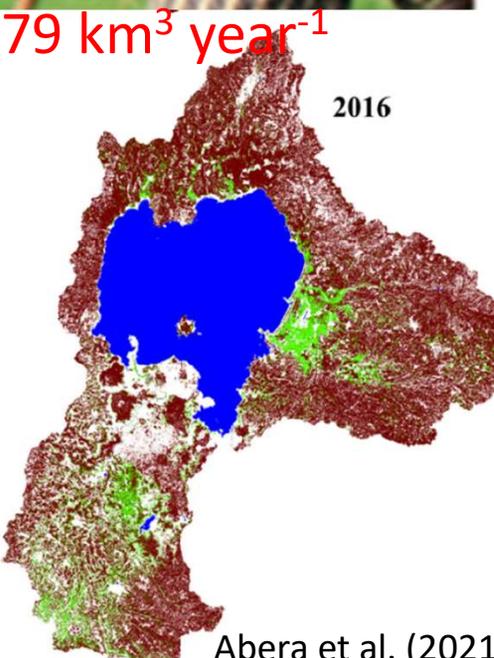
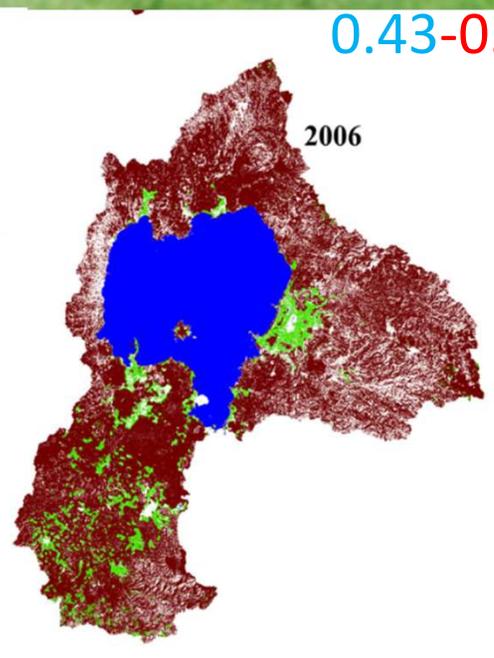
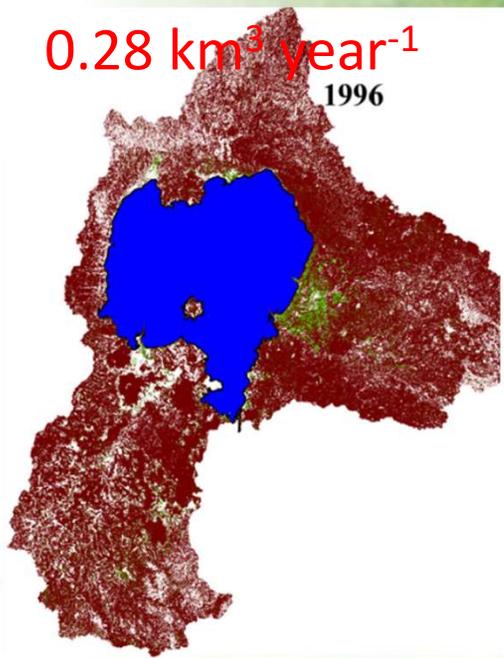
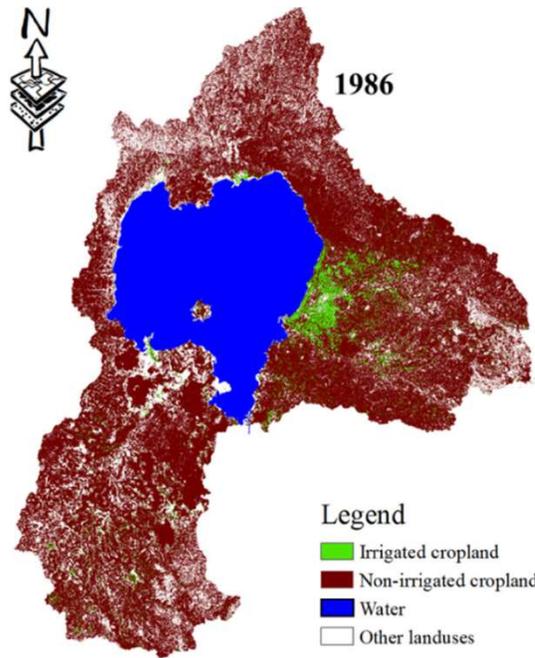
Prediction of cumulative recharge (Blue), cumulative baseflow (orange), and groundwater storage (green)

Following the approach of the modified WTF method for sloping aquifers



(A) Dengeshita watershed and (B) Robit Bata Watershed.

Water uses as Irrigation expands



Abera et al. (2021)

543 km²
8693 km²

426 km²
8810 km²

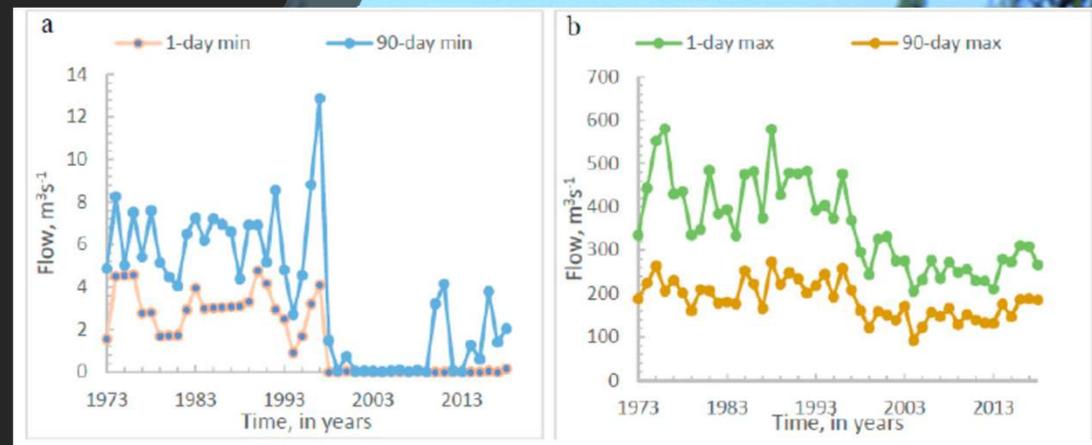
849 km²
8304 km²

1214 km²
6776 km²

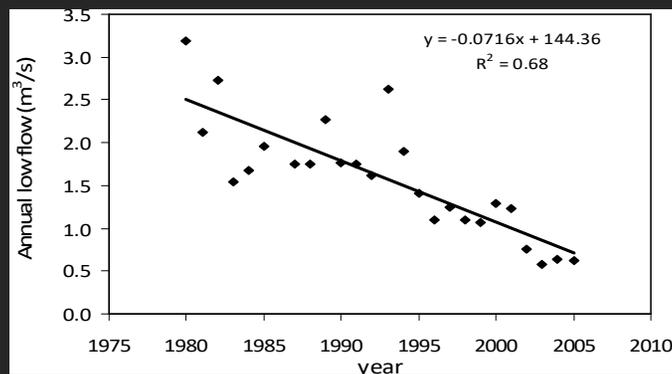


Environmental sustainability

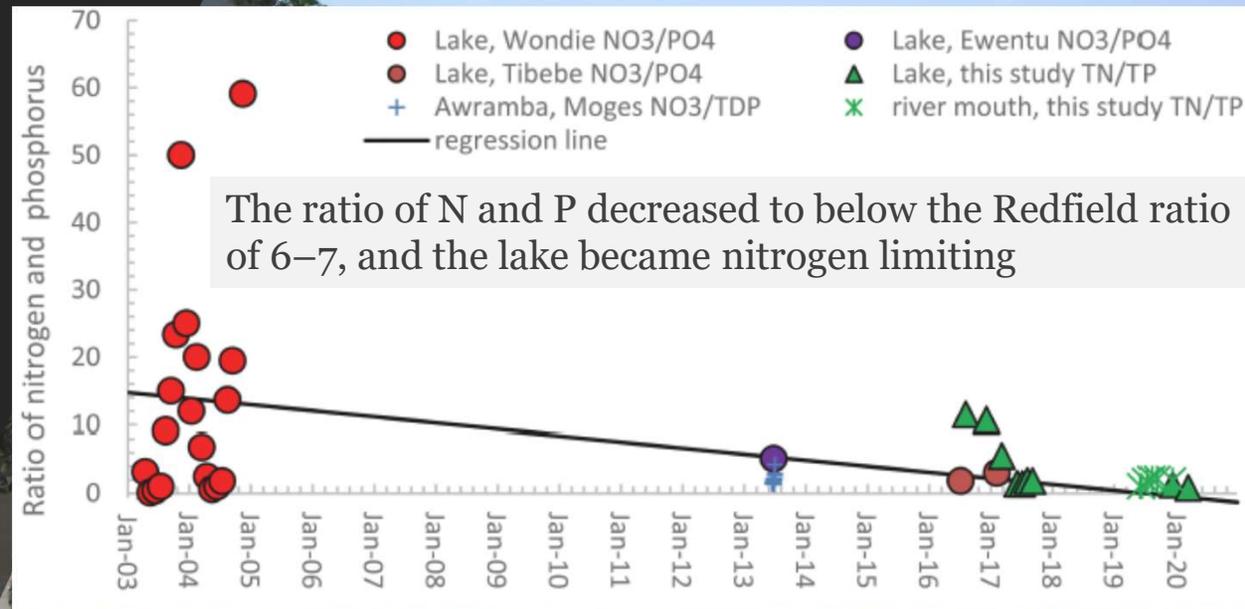
- low flow decrease is getting serious
- high-flow regimes of Rivers have decreased such as in Gumera
- phosphorus concentration increased exponentially from 0.01 mg P/l in 2003 to near 1.8 mg P/l in 2020
- Nitrogen concentrations increased from near zero to 2 mg total N/l after 2016



Gumera, Abebe et al., (2020)



Gilgel Abbay, Enku et al., (2014)



Dersgeh et al., (2022)

Conclusions

- More research is needed on adapting practices to a monsoon climate where a large portion of the watershed saturates and gullies develop.
- Consideration of local processes helps to adapt existing approaches and estimate resources to provide appropriate decision
- With the expansion of irrigation to increase productivity, environmental sustainability needs attention
- Application of fertilizers should be managed to increase crop uptake, not to be pollutant
- Watershed best management practices such as crop rotation, nutrient management, and livestock management.