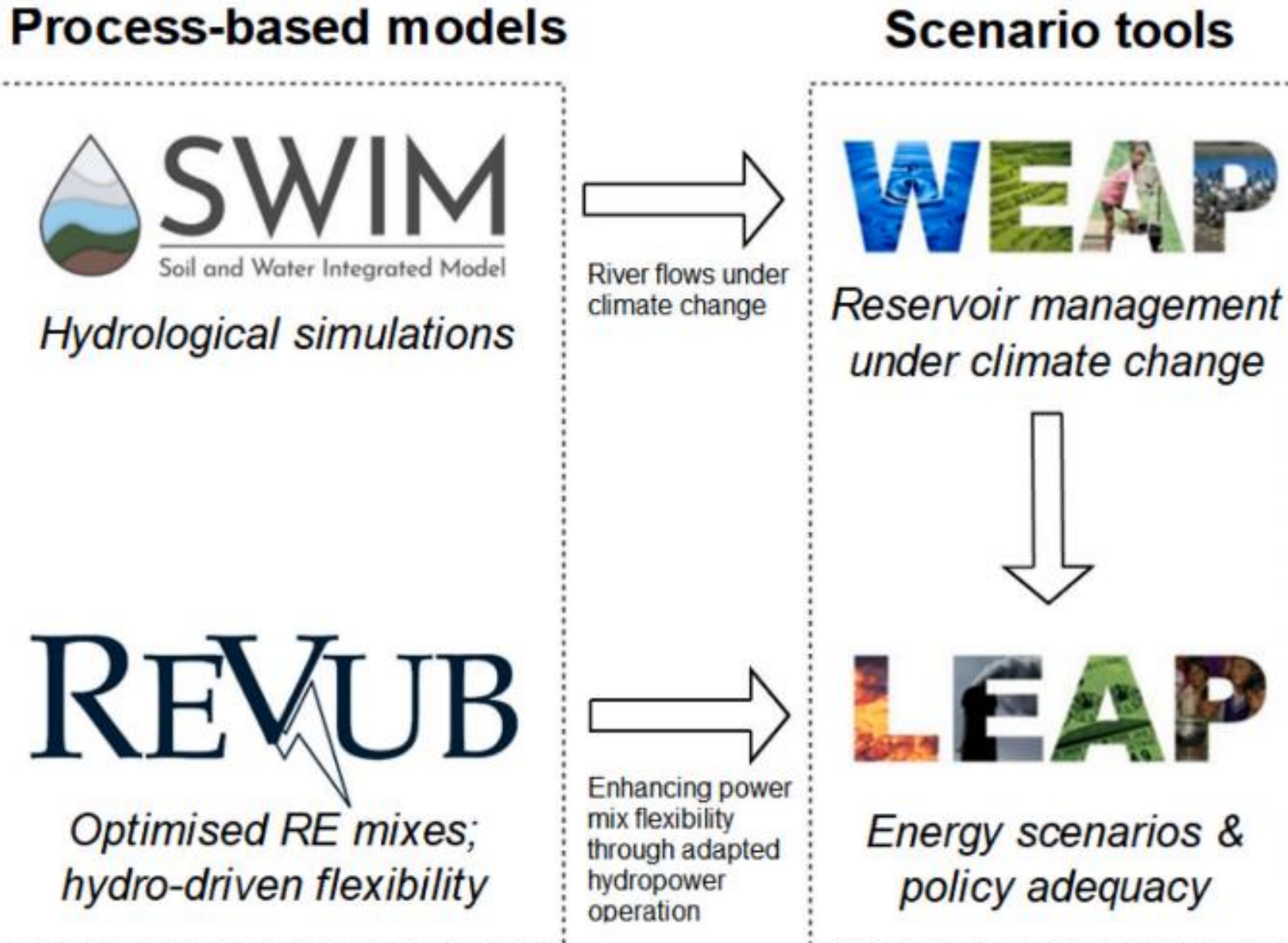


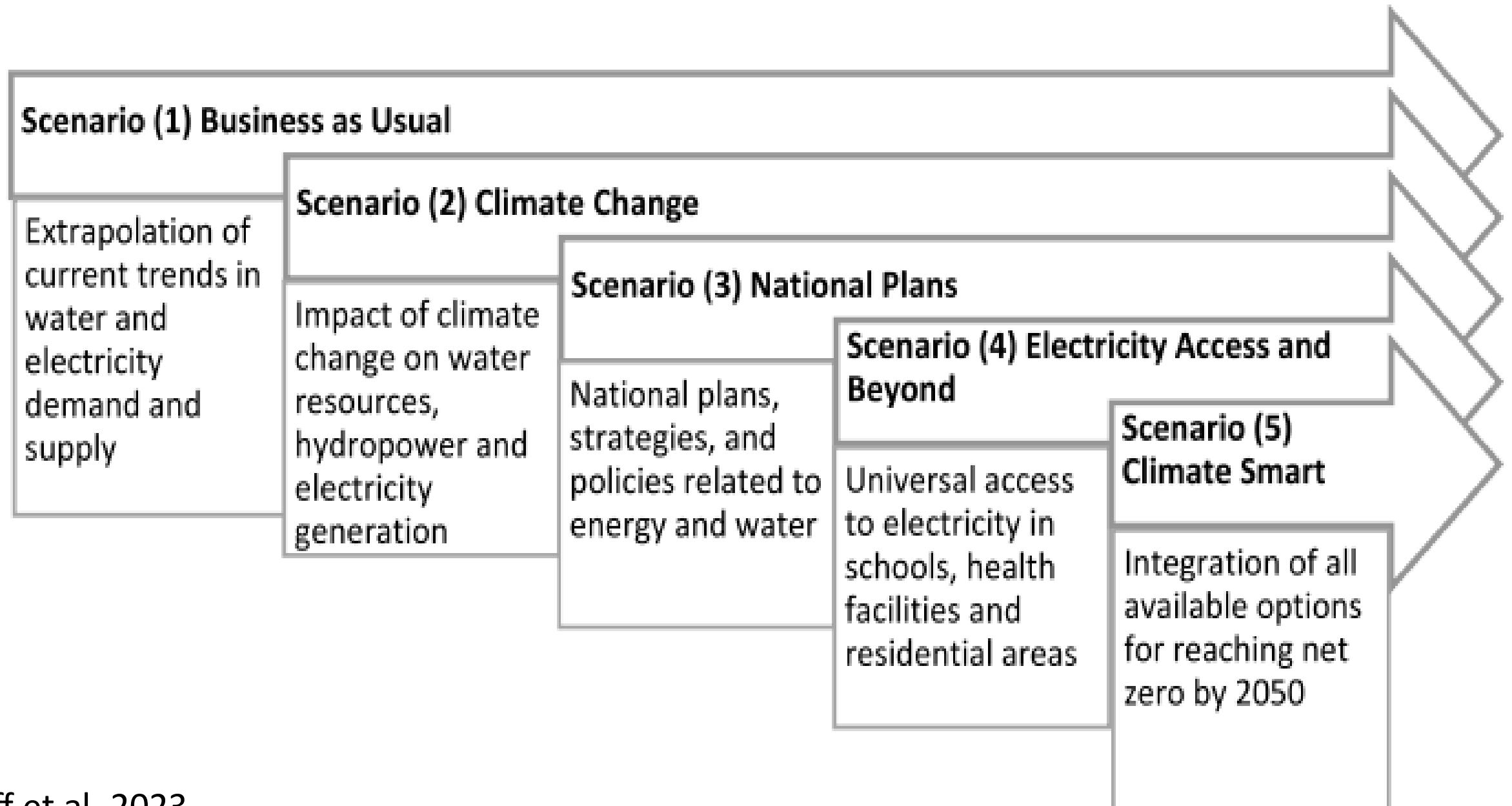
# **Modelling Frameworks for Integrated Planning and Management of the Water-Energy-Food (WEF) Security Nexus**

**Anderson Kehbila (PhD; MBA)**

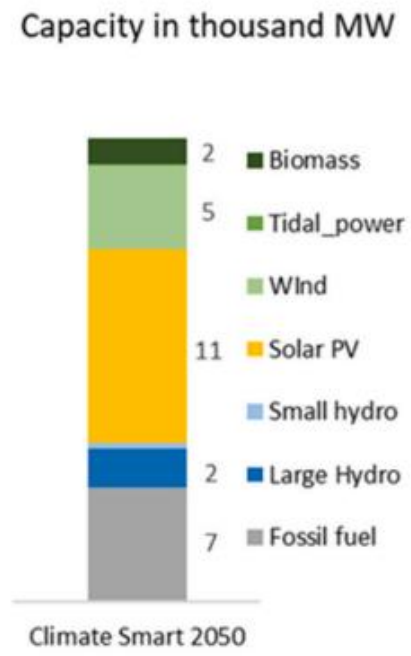
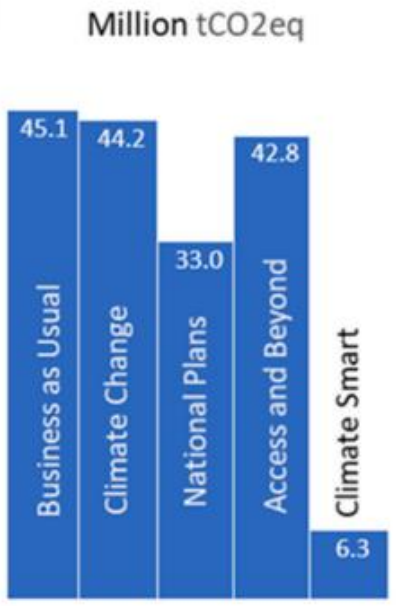
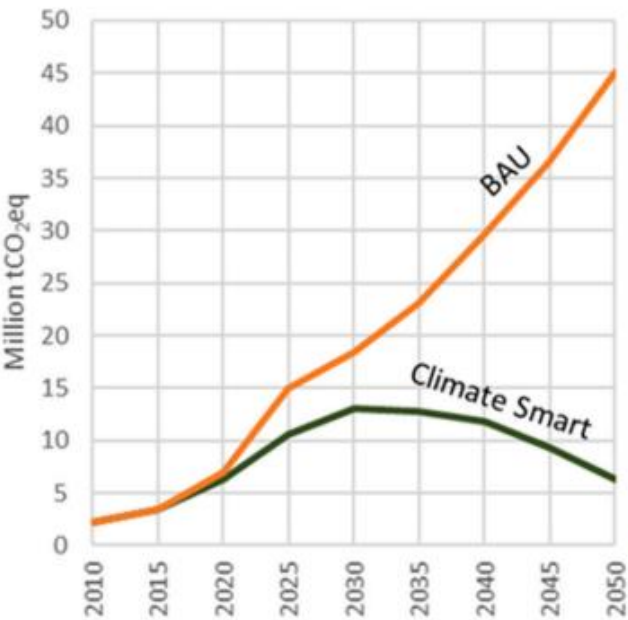
# Case Study 1: Climate-water-smart electricity transition in Ghana and Burkina Faso



# Scenario Hierarchy as co-developed by Stakeholders and Scientists

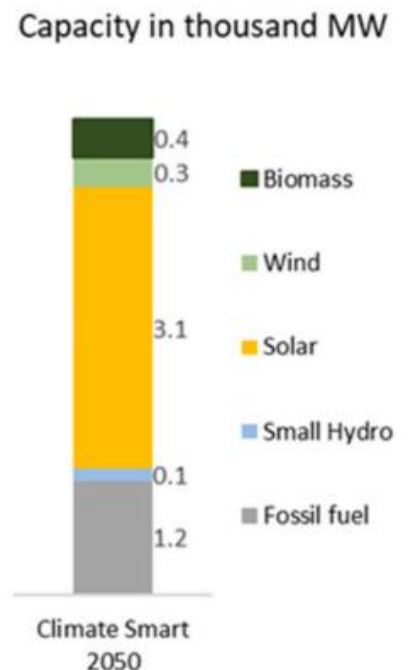
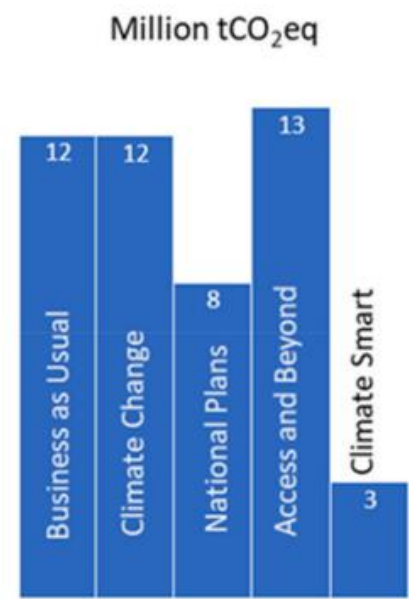
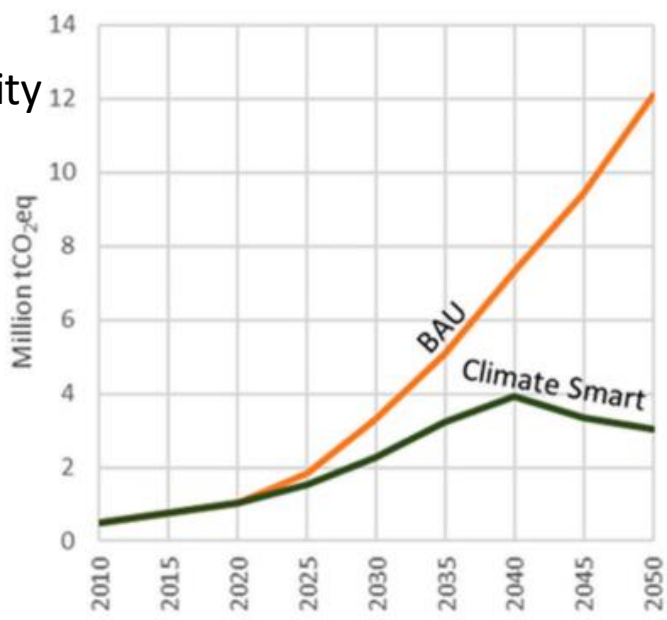


# Emission Pathways and Electricity Generation in Ghana and Burkina Faso



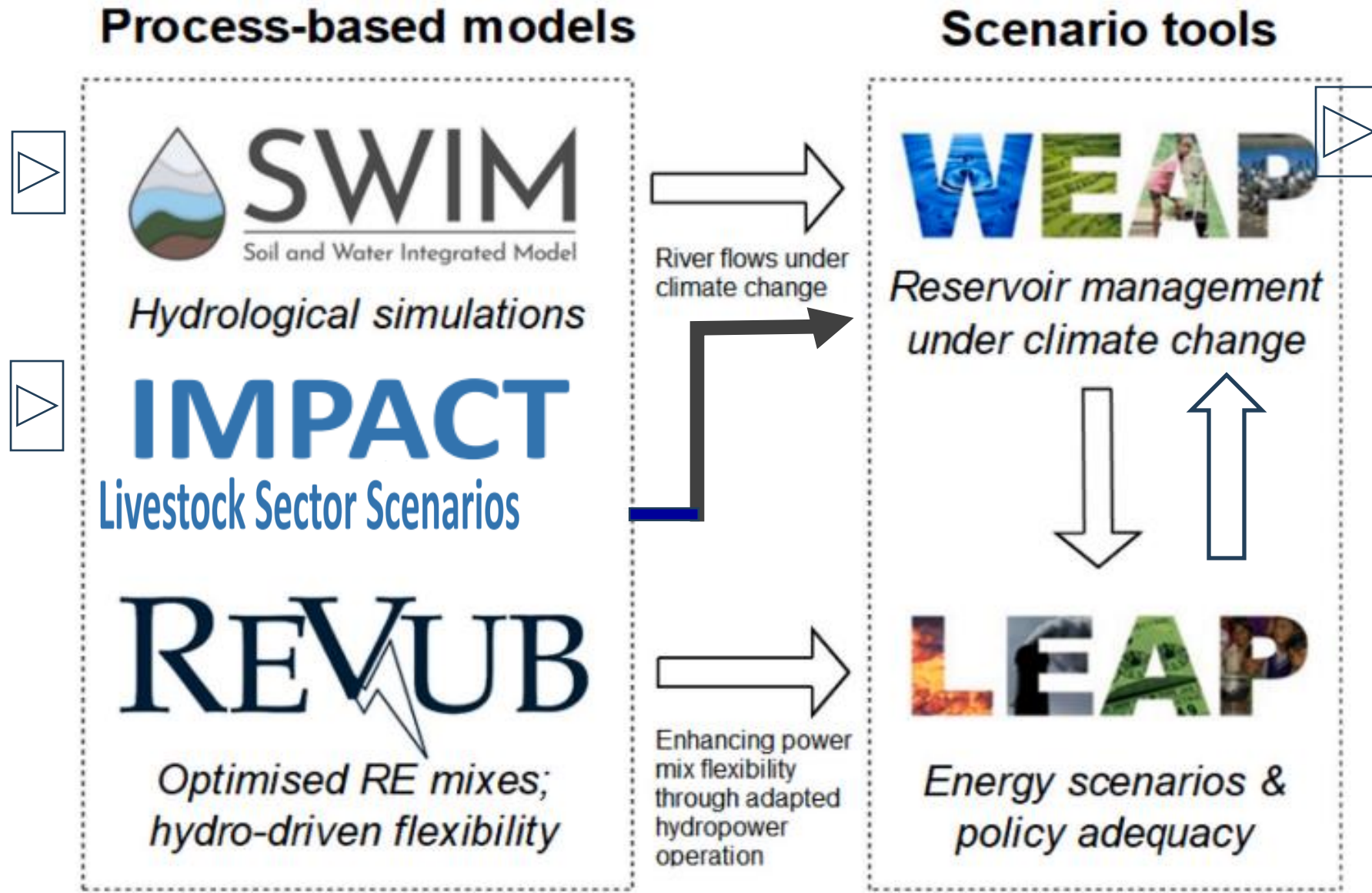
Emission pathways towards a zero-carbon electricity system for Ghana and electricity generation capacities for the Climate Smart scenario in 2050

Emission pathways towards a zero-carbon electricity system for Burkina Faso and electricity generation capacities for the Climate Smart scenario in 2050

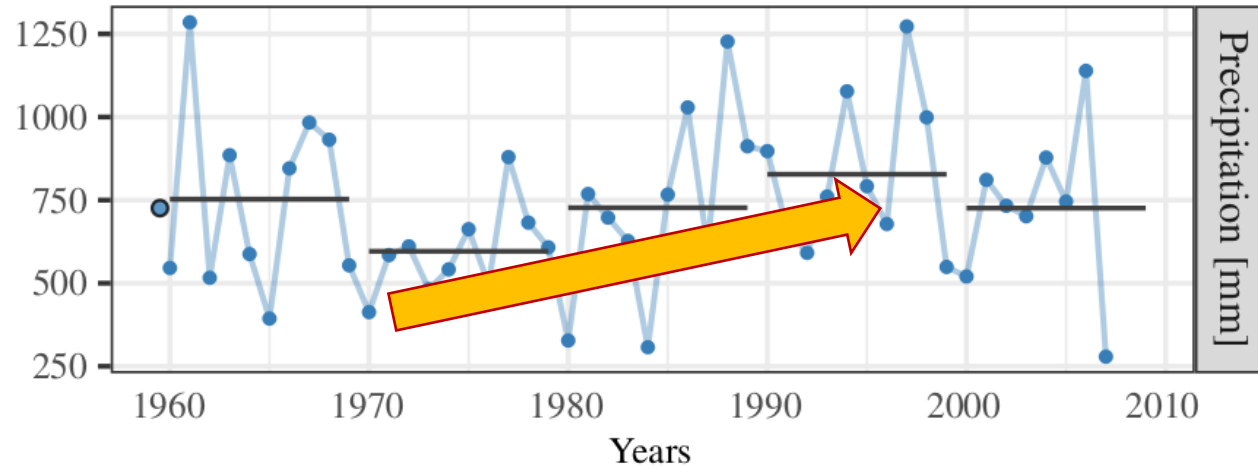


## Case Study 2:

# Applying the Water-Energy-Food Nexus to promote Ecosystem Based Adaptation in the Ewaso Ng'iro North River Catchment, Kenya

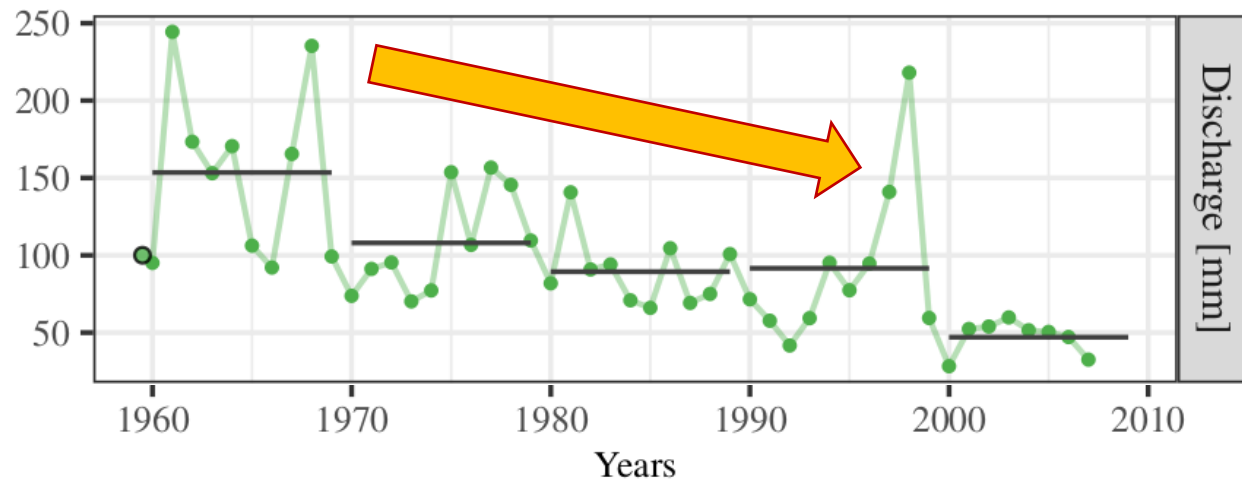


# Precipitation and discharge observations at Mount Kenya



**Increased withdrawals starting in ~1990s**

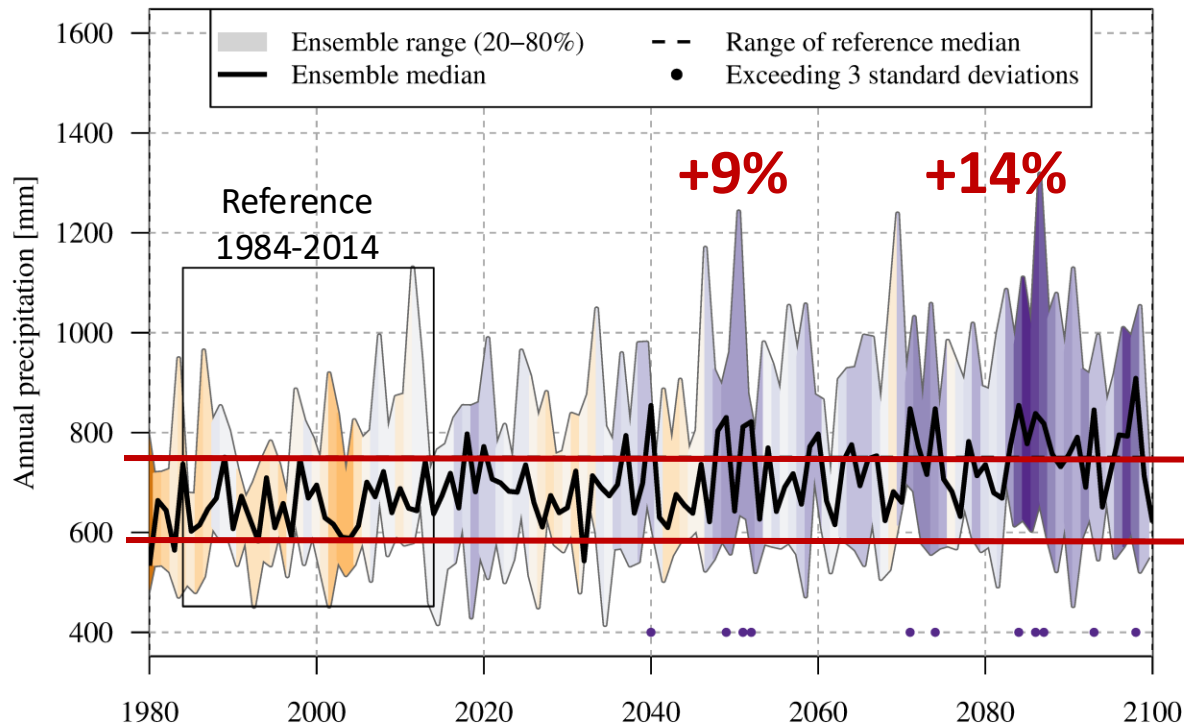
Visible in several tributaries



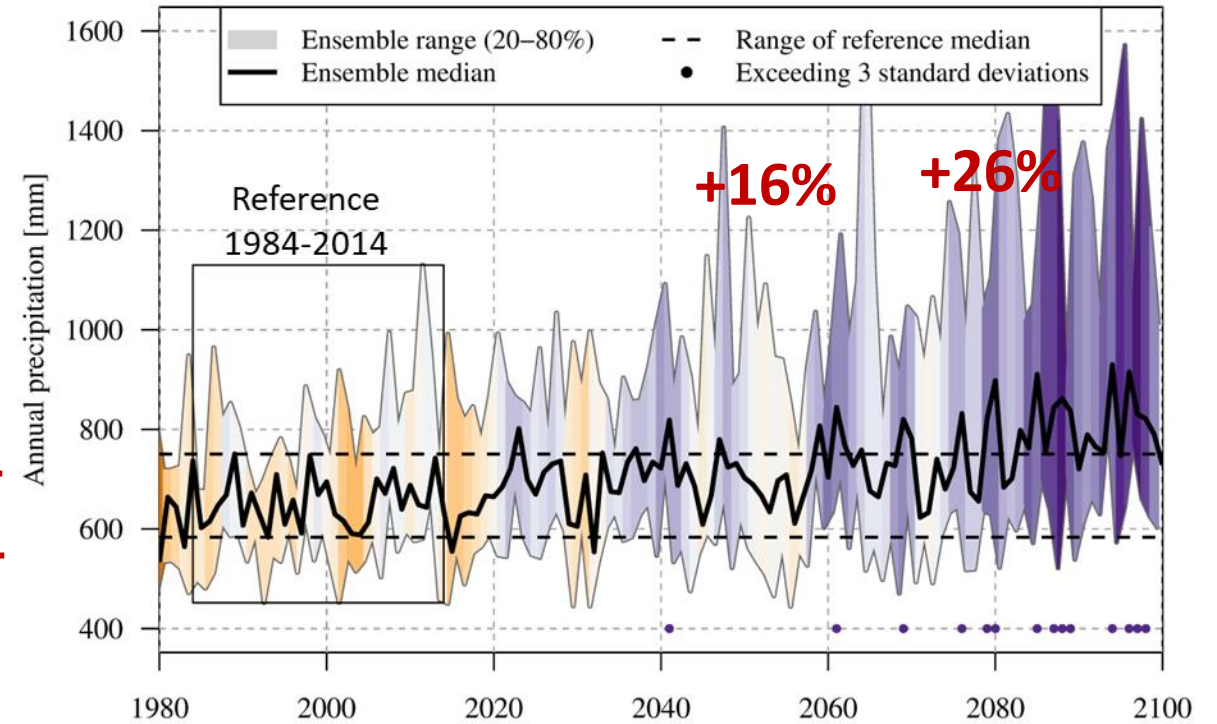
# Precipitation Projections

## Ewaso Ng'iro Catchment (average)

### Moderate scenario SSP1-2.6



### Medium-high-end scenario SSP3-7.0

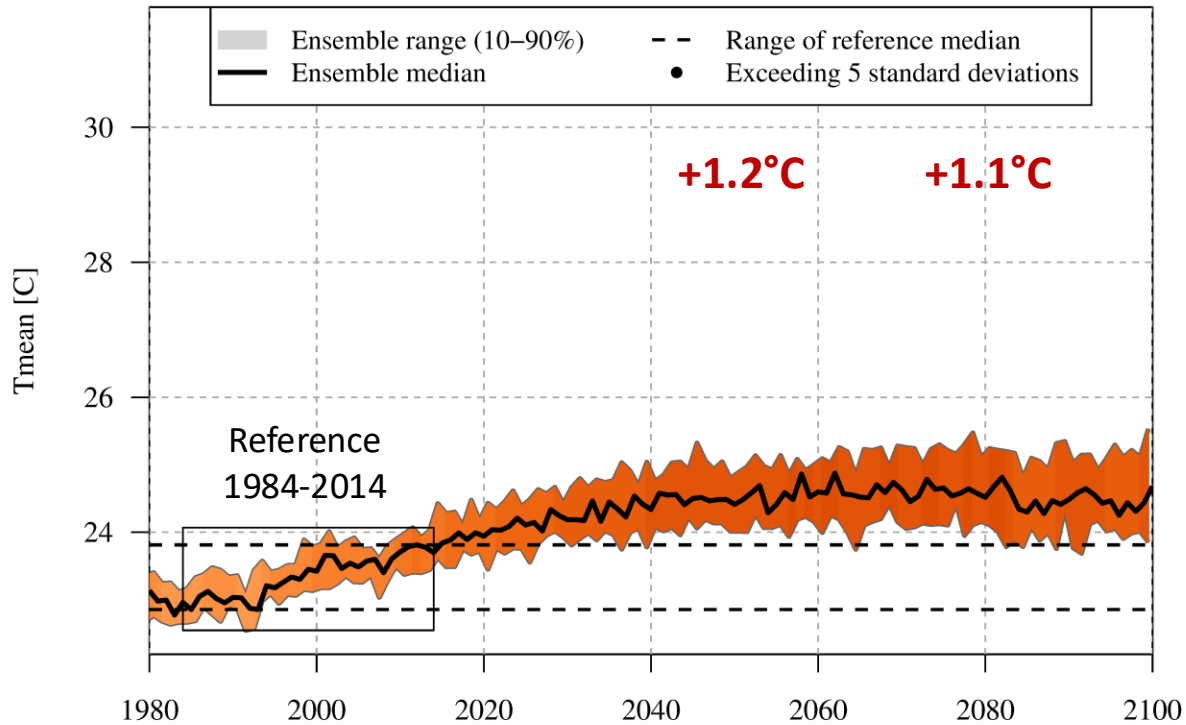


Range of reference period

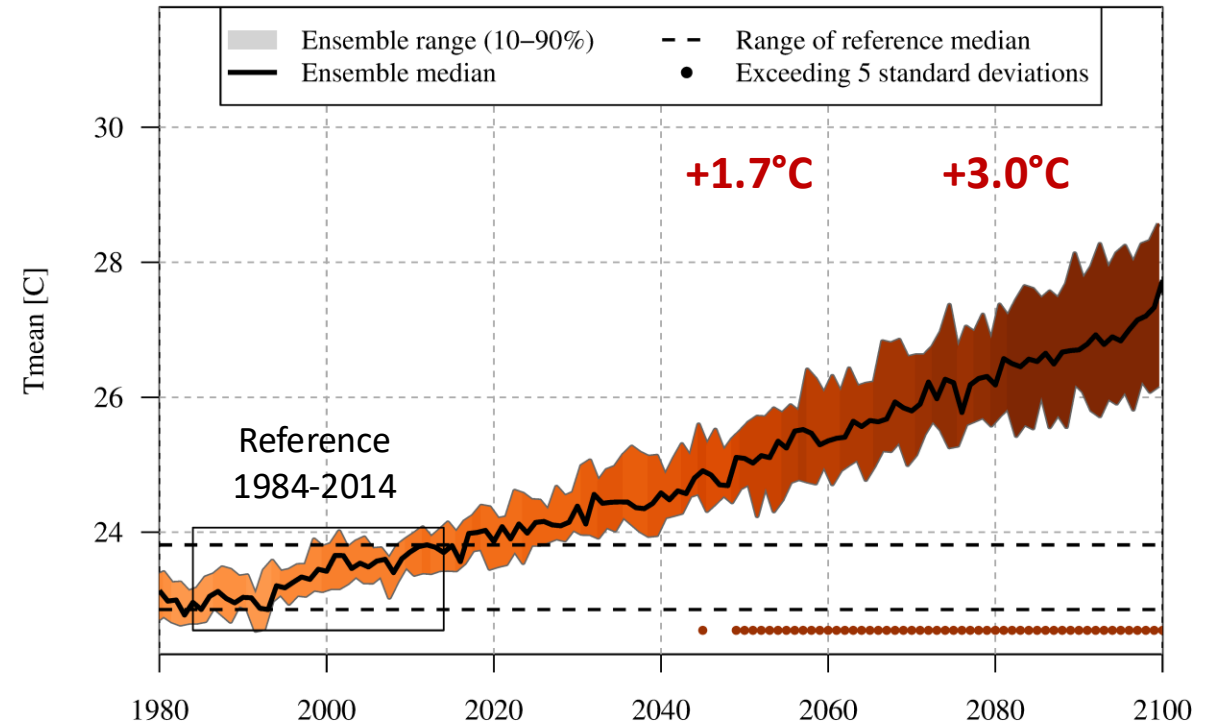
# Air Temperature Projections

## Depending on climate scenario

Moderate scenario (SSP1-2.6)



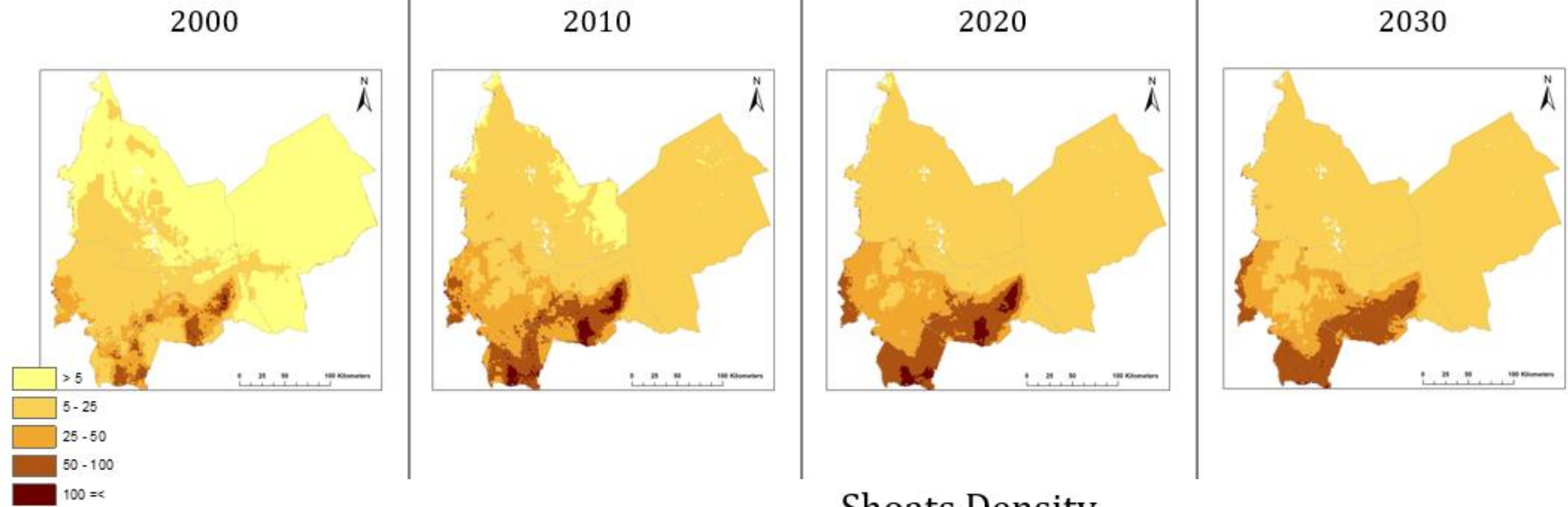
Medium-high-end scenario (SSP3-7.0)



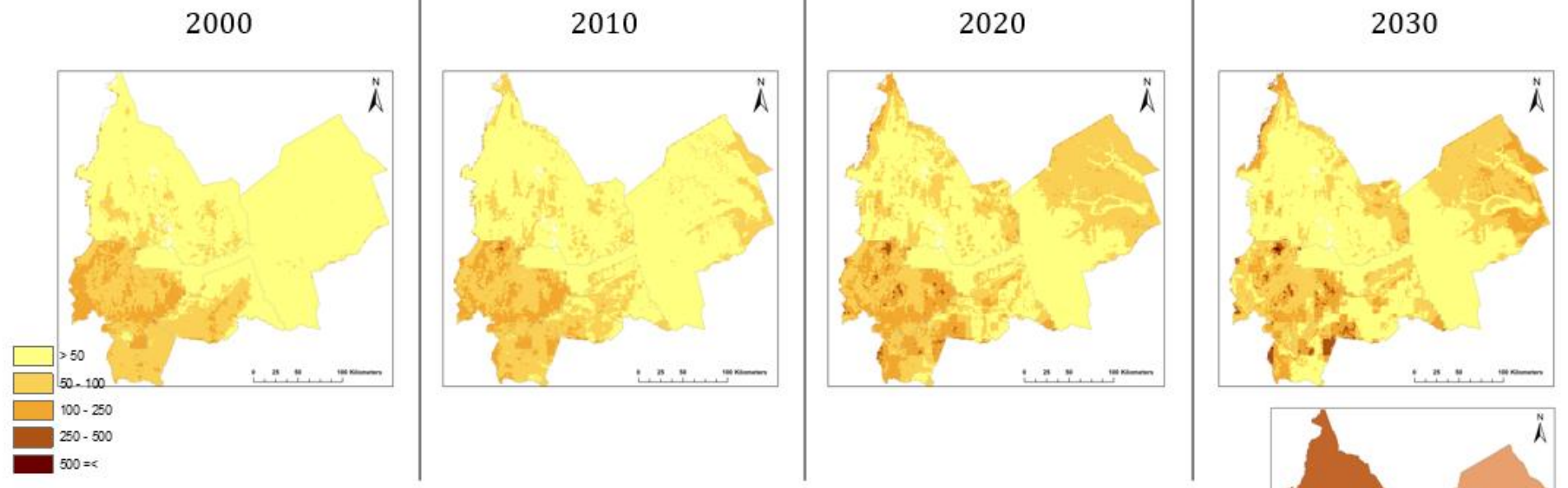
In terms of global warming levels: Add  $\sim 1^\circ\text{C}$  (pre-industrial era)



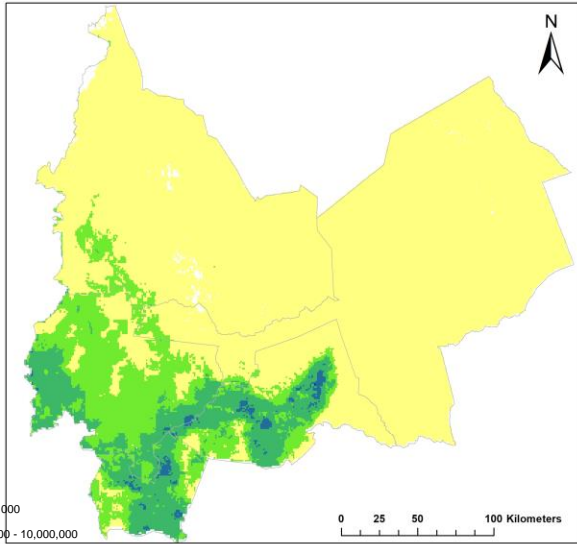
# Cattle Density



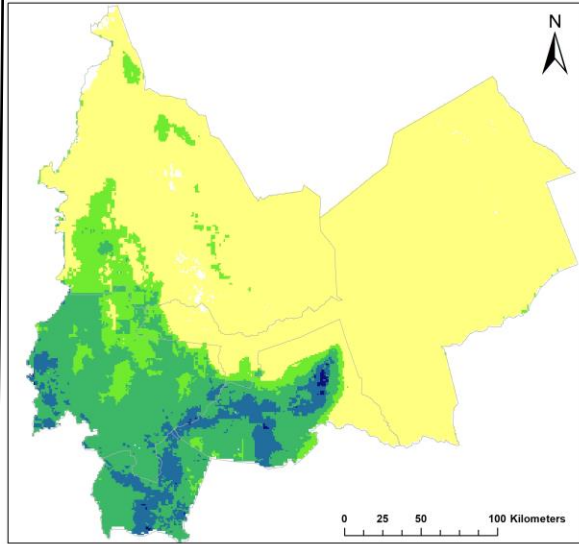
# Shoats Density



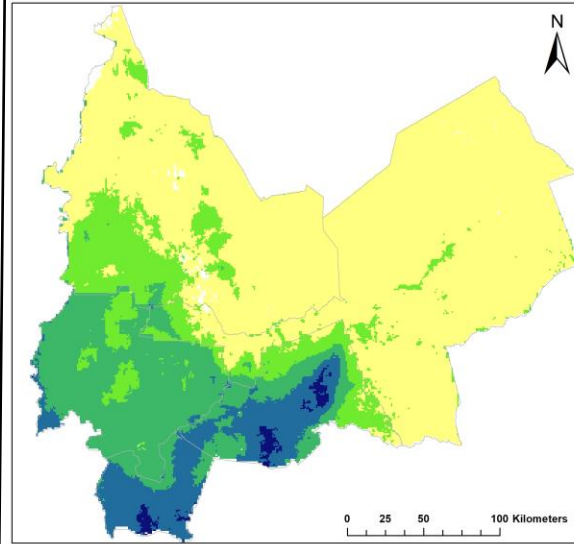
2000  
**Beef water requirement**



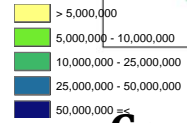
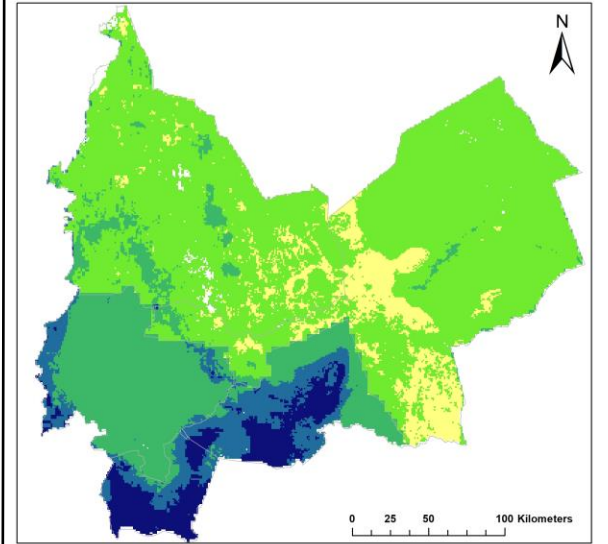
2010



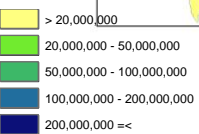
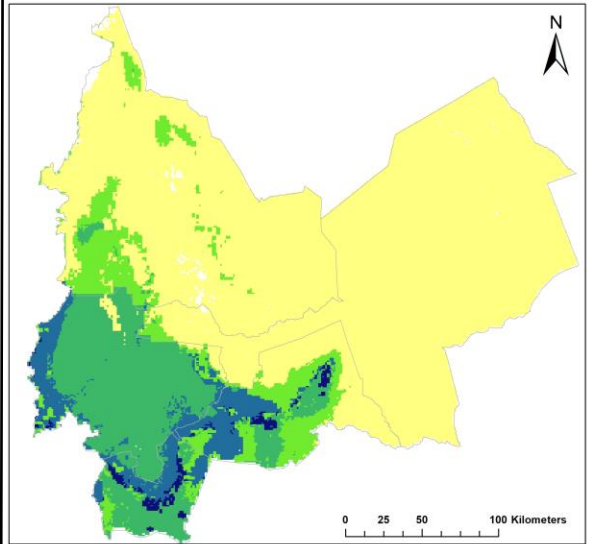
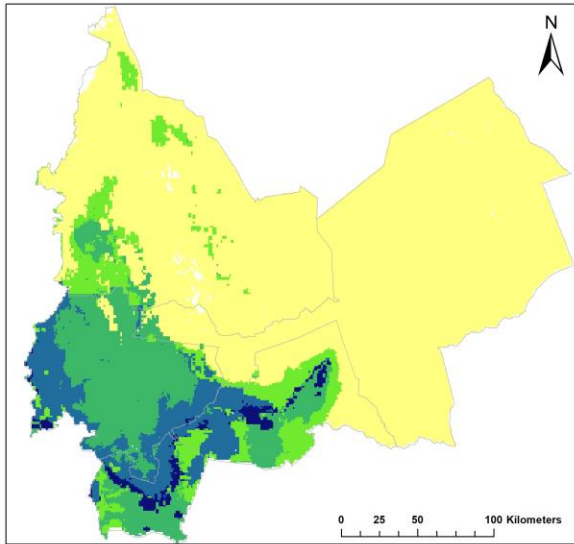
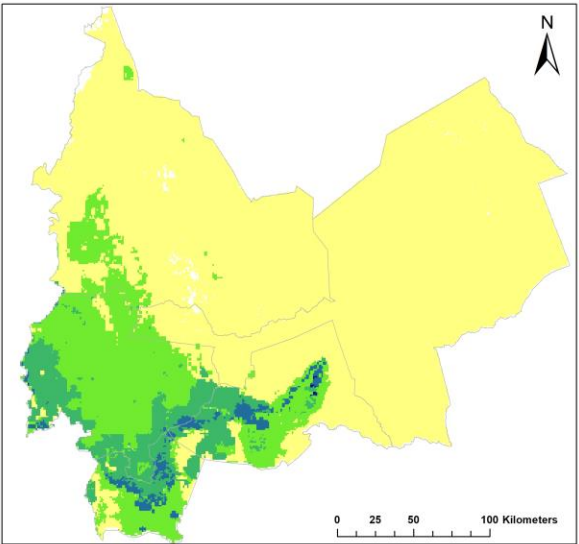
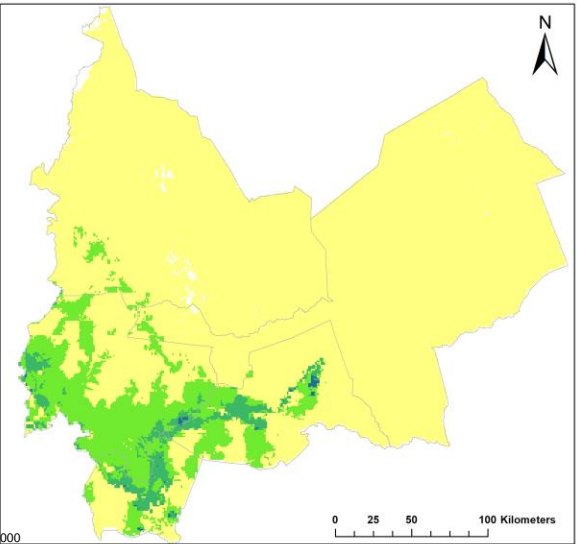
2020



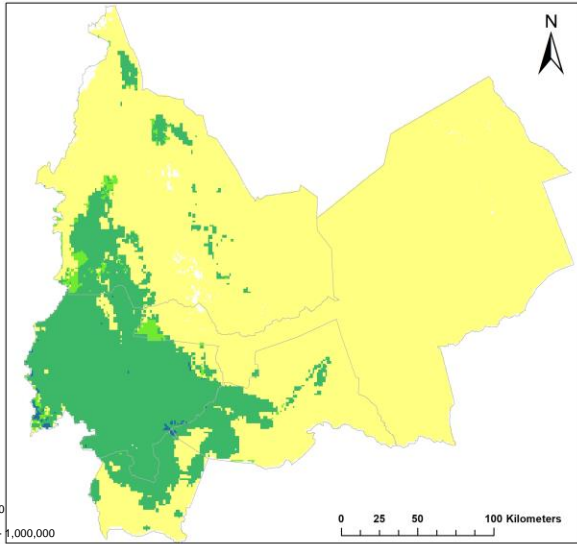
2030



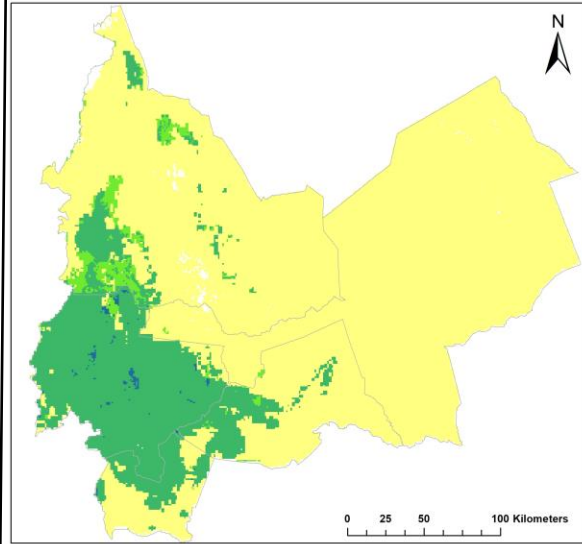
**Cow milk water requirement**



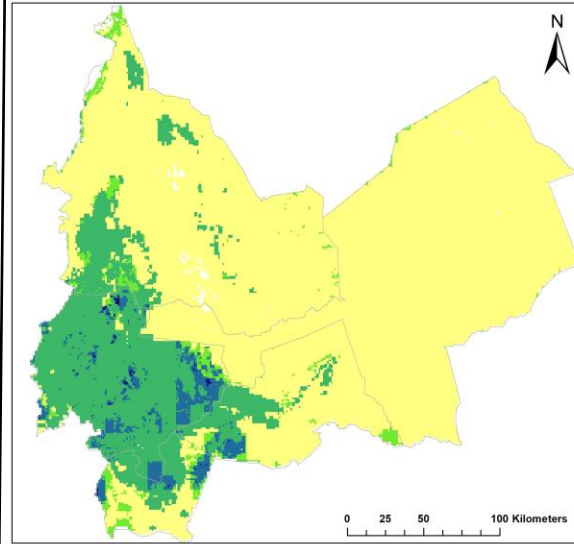
# 2000 Shoats meat water requirement



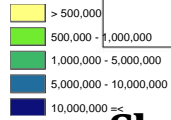
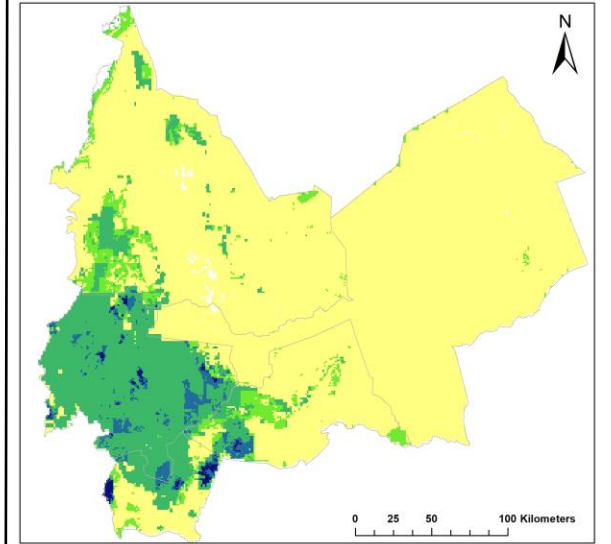
2010



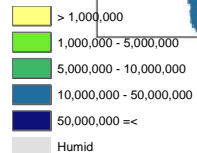
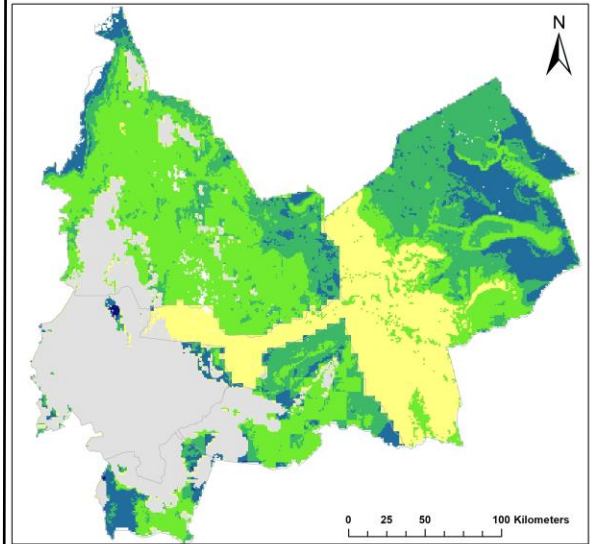
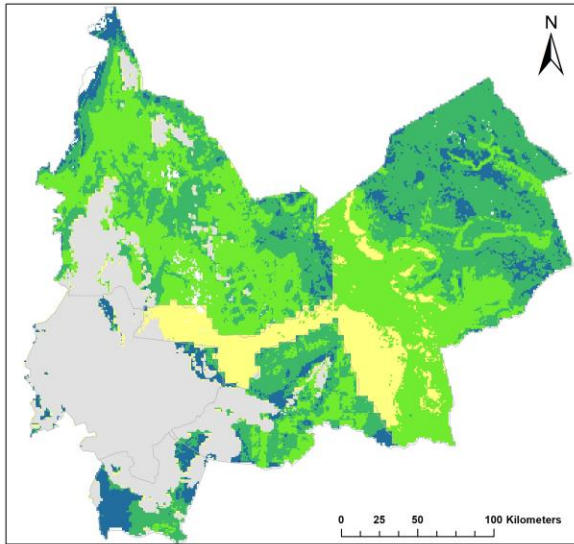
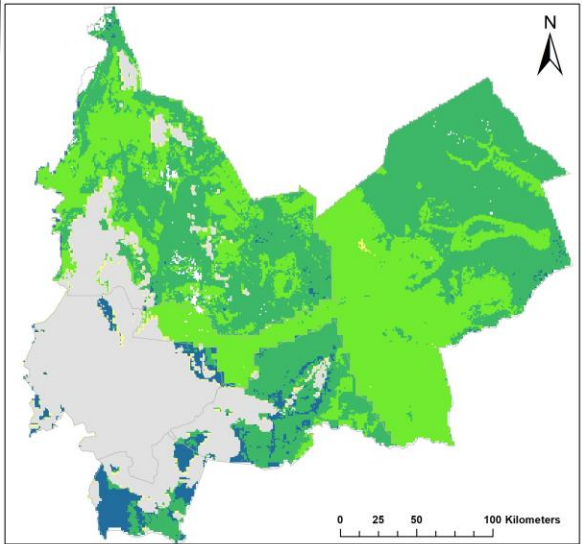
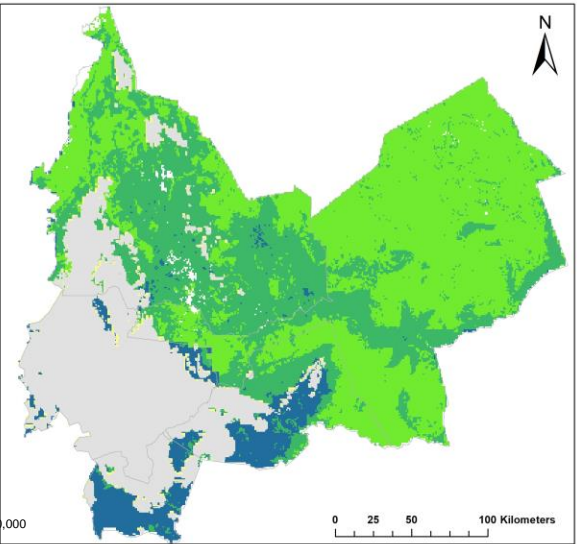
2020



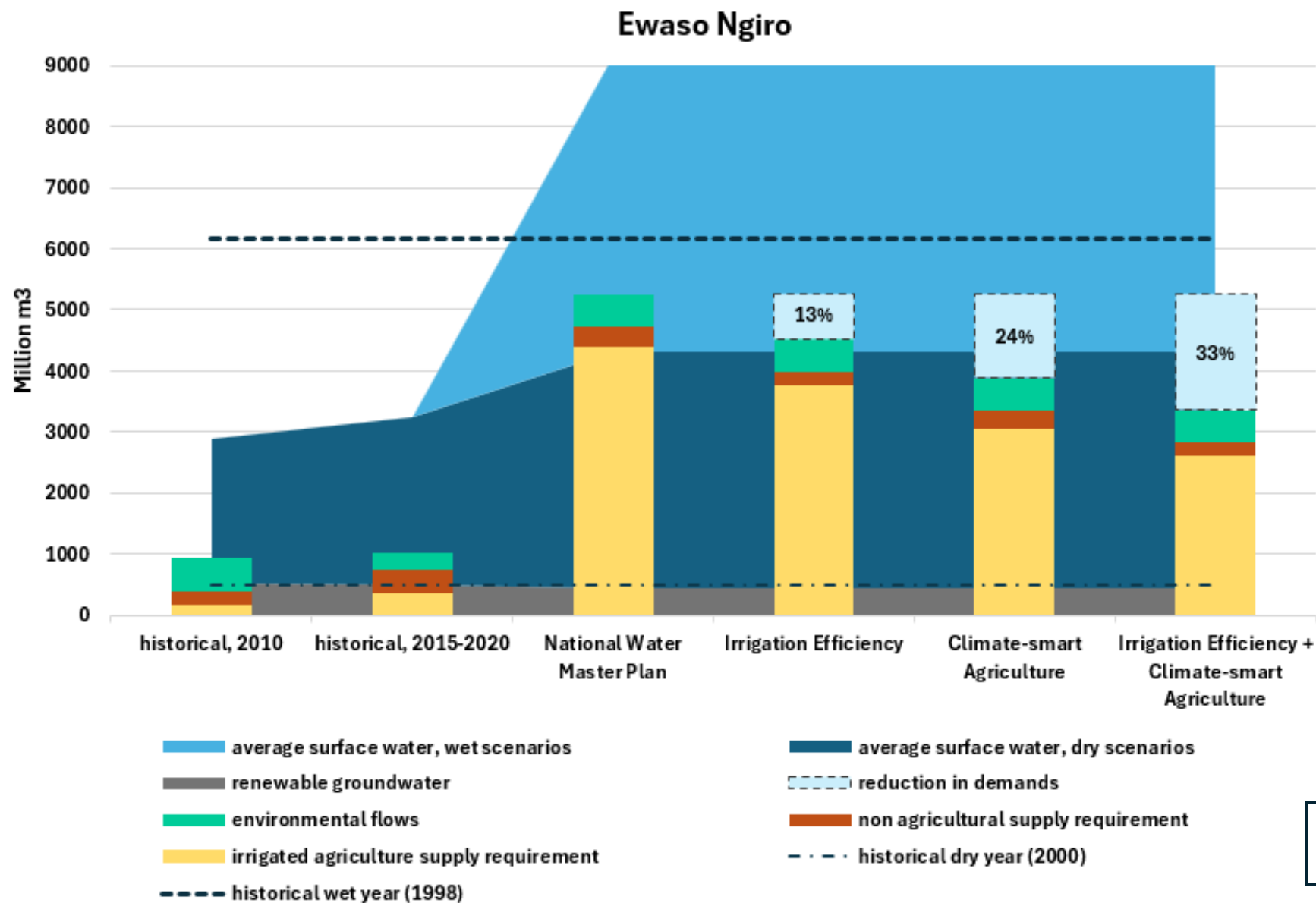
2030



# Shoats milk water requirement



# Irrigation Water Supply and Demand Trends (2010 -2030)



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Thank you for your Attention