

# Assessment of climate change induced water stress in the Nile Basin

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# Nile Basin

- 10% of Africa
- Drainage area of 3 Million sq. km
- 171 million inhabitants with various levels of dependency.
- 11 countries
- Three rainfall regime zones: Arid, tropical, and equatorial
- Annual rainfall varies from 120 mm to 2450 mm

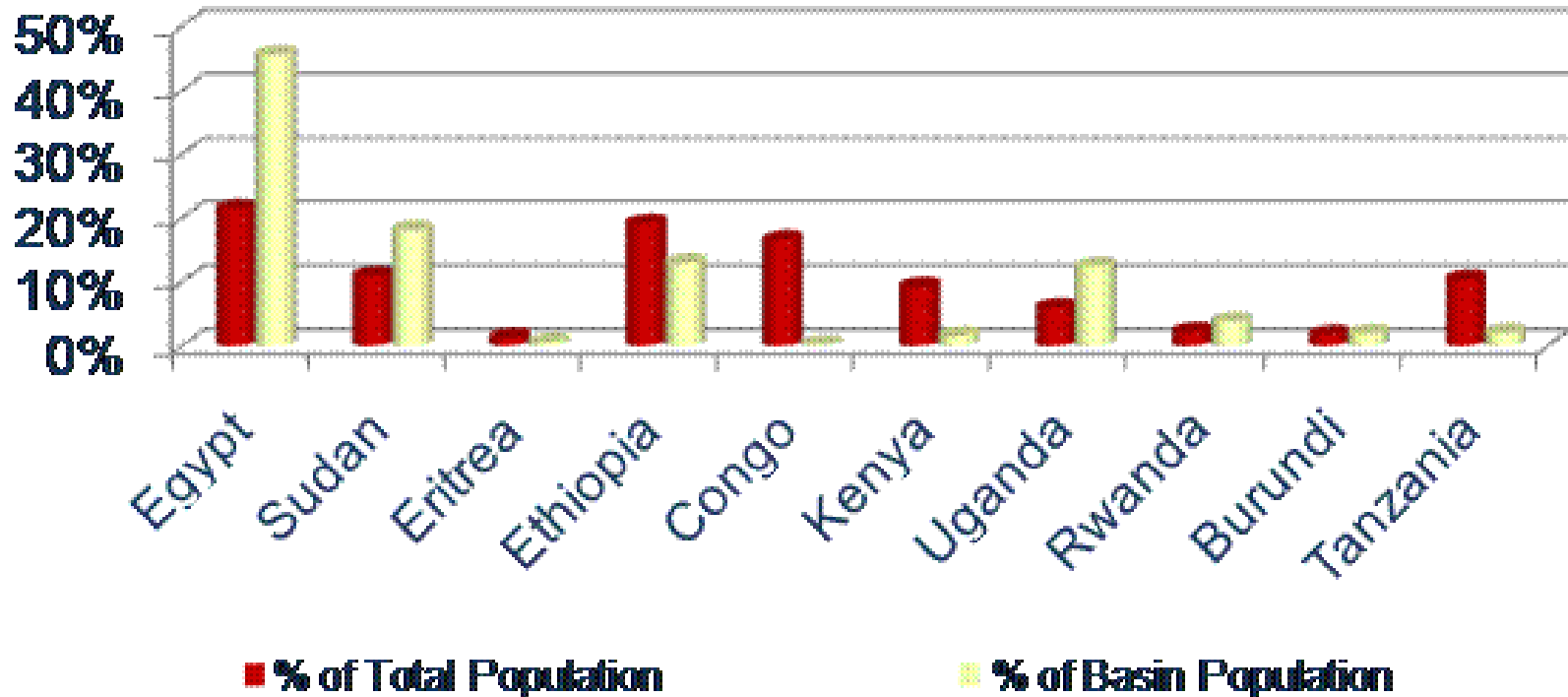


Source:  
Loucks and  
Beek, 2005

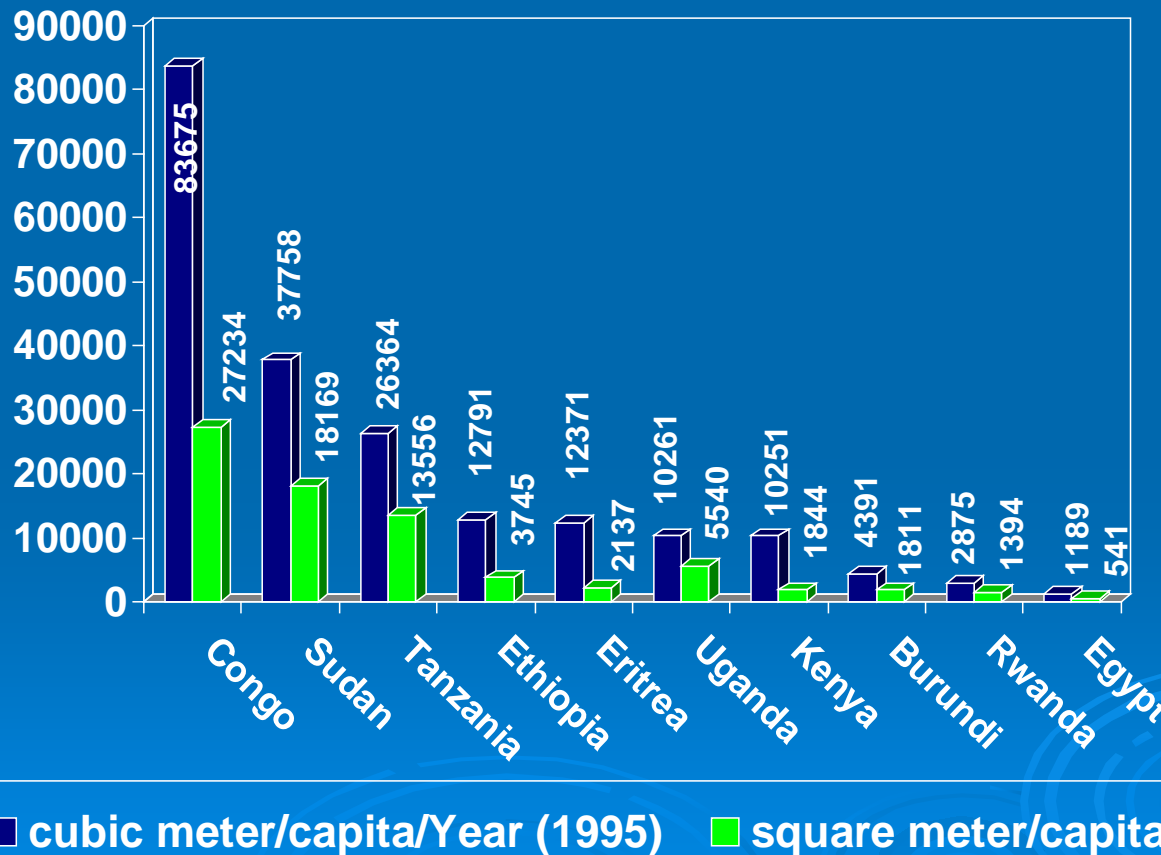
# Objectives of Assessment

- Reaching a common joint assessment on the basin's water resources.
- Reaching a common joint assessment on climate change impact on the basin's water resources.
- Formulating a hydrological model that will be capable of simulating different adaptation strategies to deal with different future scenarios.

# Innovative Approaches: Basin Population



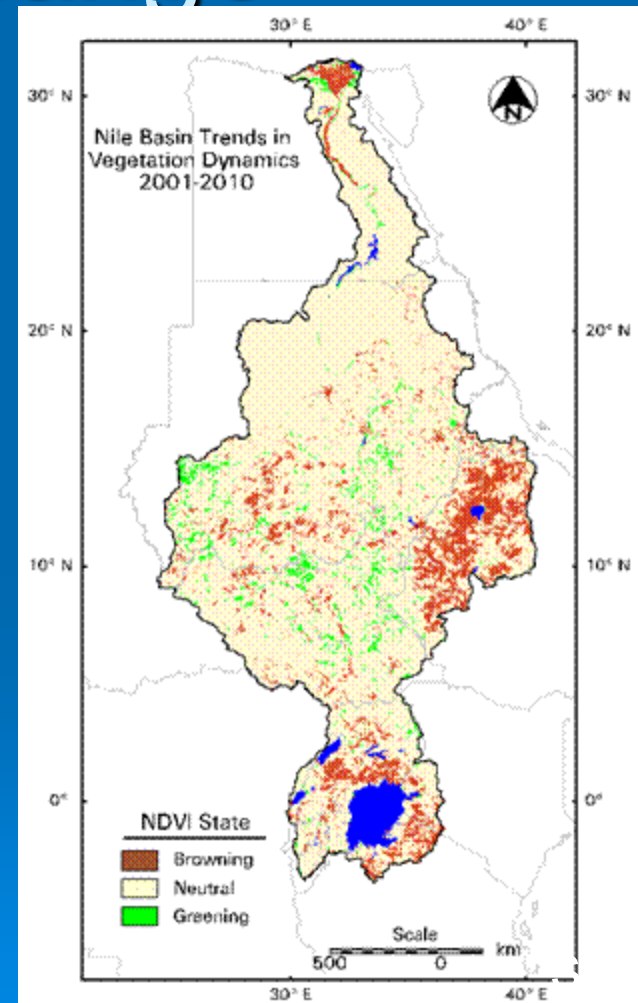
# Innovative Approaches: Blue and Green Water Assessment



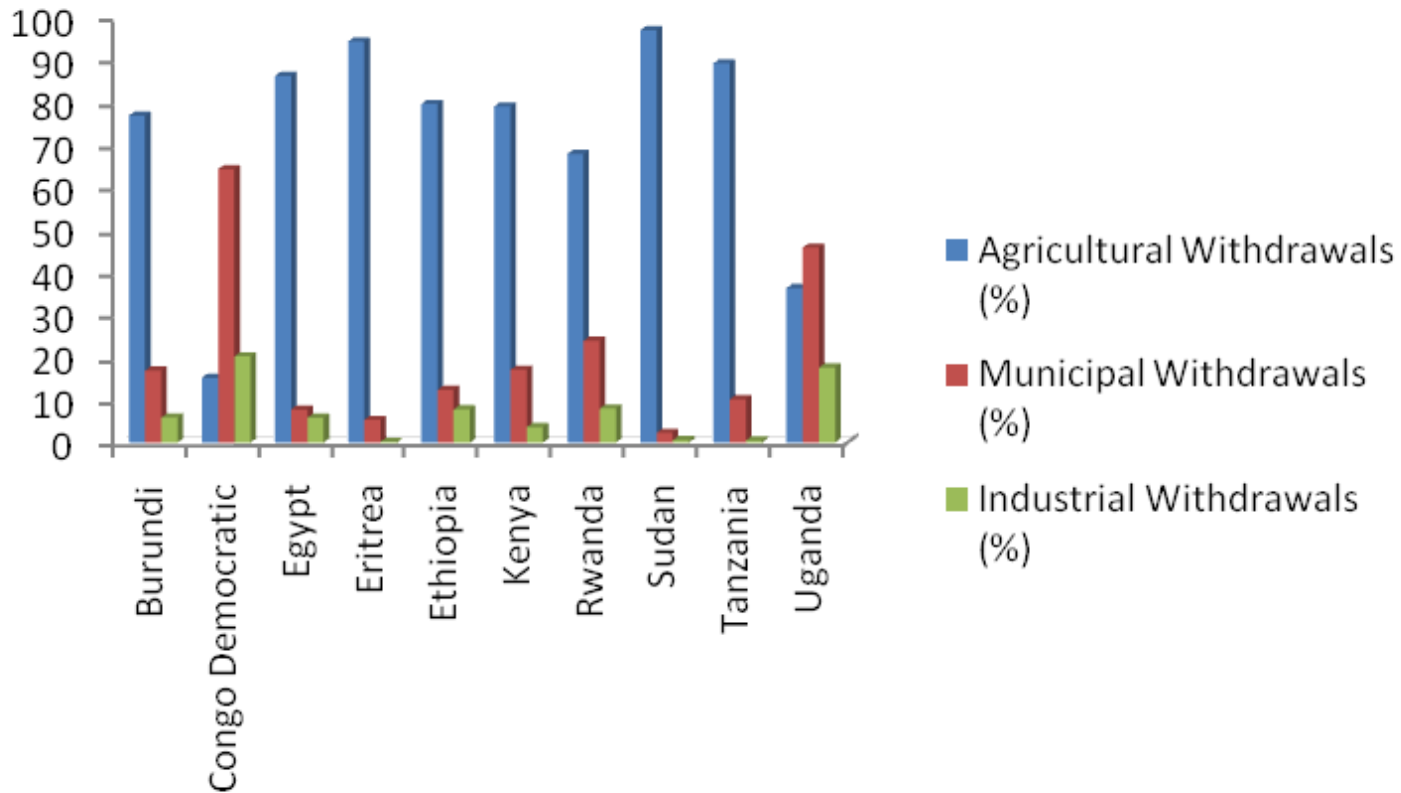
# Land Use change

- Normalized Difference Vegetation Index (NDVI) is used to indicate the spatial and temporal variation of green cover.
- Terrestrial Evapo-Transpiration (ET) dynamics in the Nile Basin is governed by climatic factors and change in land cover.

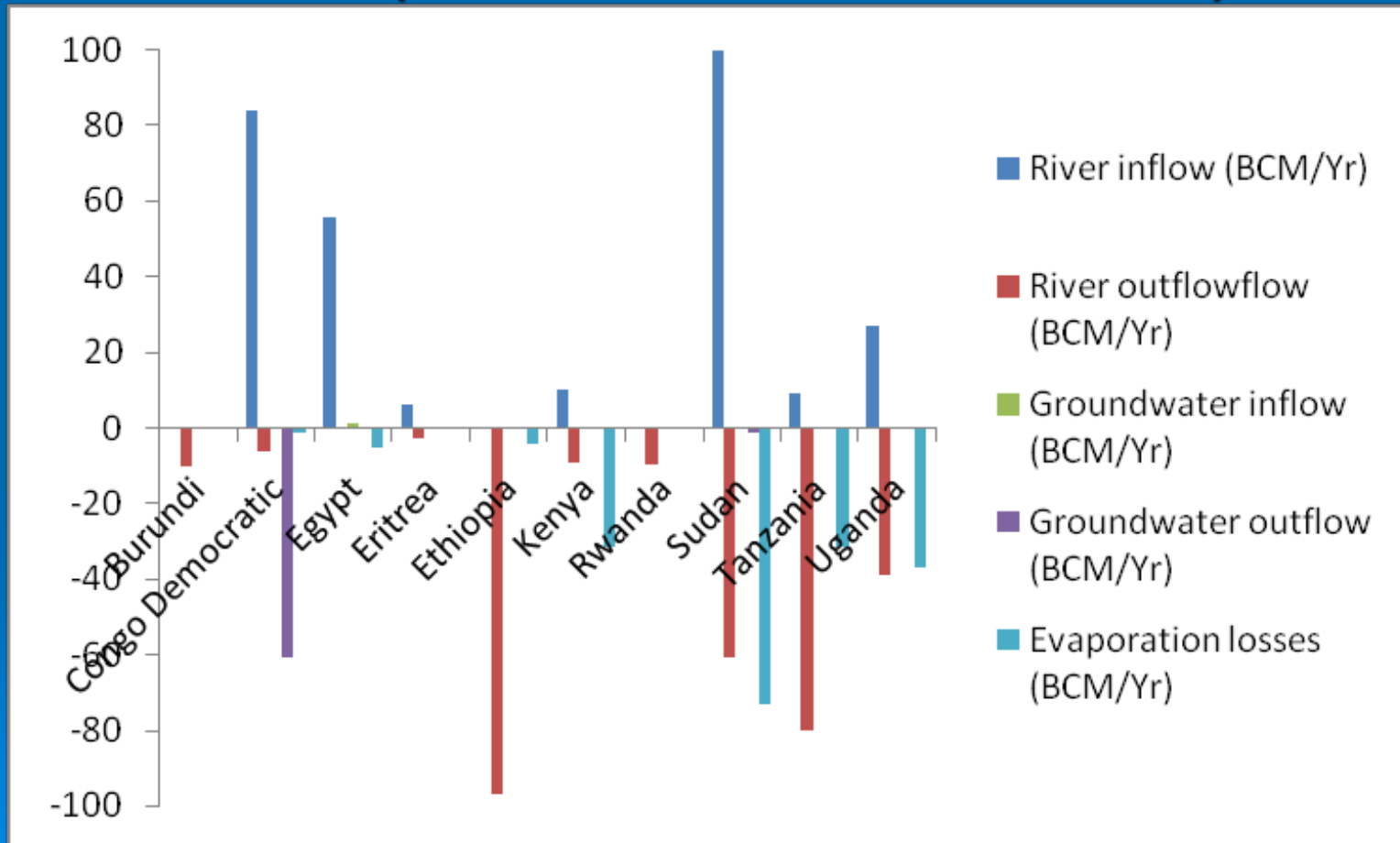
Source:  
Henok et al.  
2012



# Nile Countries Sectoral Withdrawals (% of Total)



# Transboundary Surface and Groundwater Flows (AQUASTAT&CEDARE)





# Groundwater as a strategic resource

- The groundwater availability and usage in the Nile Basin has been assessed.
- Groundwater storage in different aquifers of the Nile River basin has higher future potential than the surface water storage.
- Sustainable groundwater management practices are needed in order to preserve both the quantity and quality of groundwater in the basin in order to overcome the negative impact of climate change.

# Important Findings

- There is evidence from instrumental records that due to climate change, rainfall trends and river flow regimes have changed.
- Areas that require attention in regards to fresh water supply due to climate changes:
  - Ruwenzori Mt, Ethiopian plateau
  - Nile confluence in Sudan
  - Nile Delta and Nile valley in Egypt
- Areas with Increased green cover:
  - Toshka Depression and Aswan in Egypt
  - Wadi Halfa, Ash shalal ar Rabia, and Korti in Sudan
  - Busia in Uganda
  - Kisumu in Kenya Toshka

# Ongoing & Future Research

- Updating green and Blue water Assessment using NDVI and GIS.
- Assess the impact of current and future urbanization on water resources.
- Modeling different climate change scenarios.

# THANK YOU