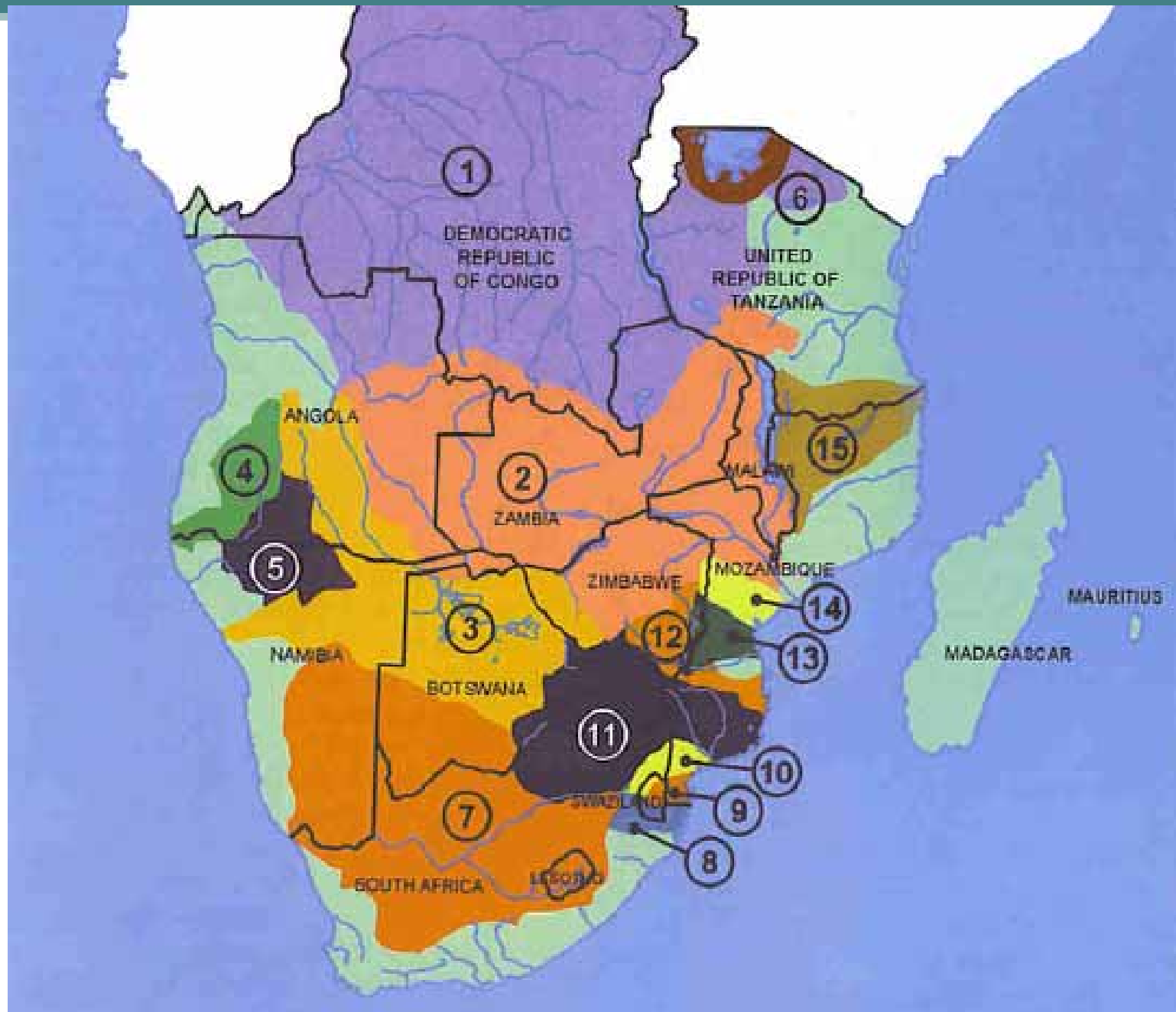
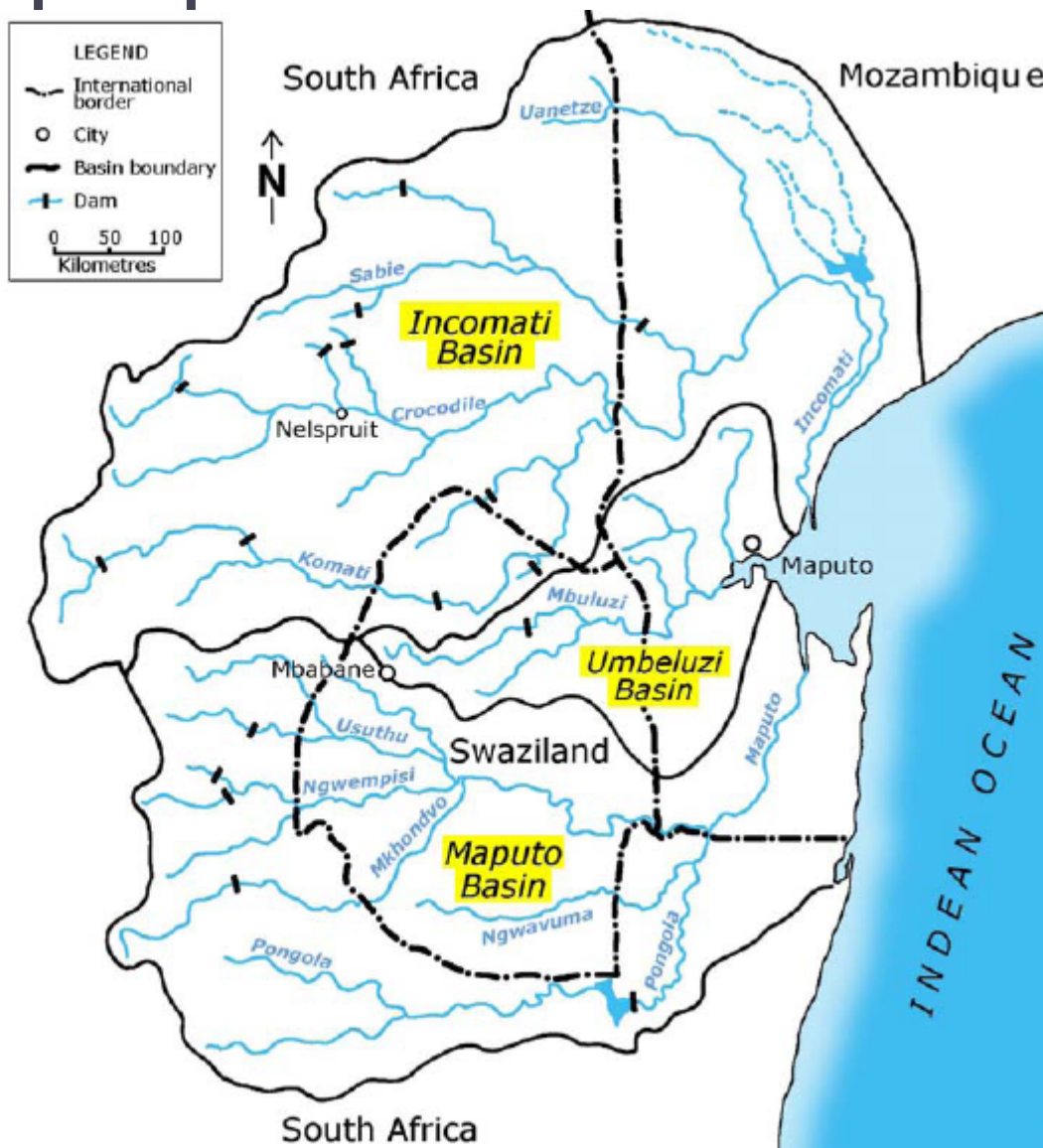


# GWSP Workshop: Global Catchment Initiative

## The Incomati River Basin

Graham Jewitt, Pieter van der Zaag, Eddie Riddel





- 47 000 Km<sup>2</sup>
- IncoMaputo Agreement
  - minimum flow of 109 million m<sup>3</sup> per year to Mozambique at Komatipoort (55% from the Komati River and 45% from Crocodile River).



# Global Change - Questions 1 - 4

- Land Use Change
- Climate Change
- Associated Impacts



# The context

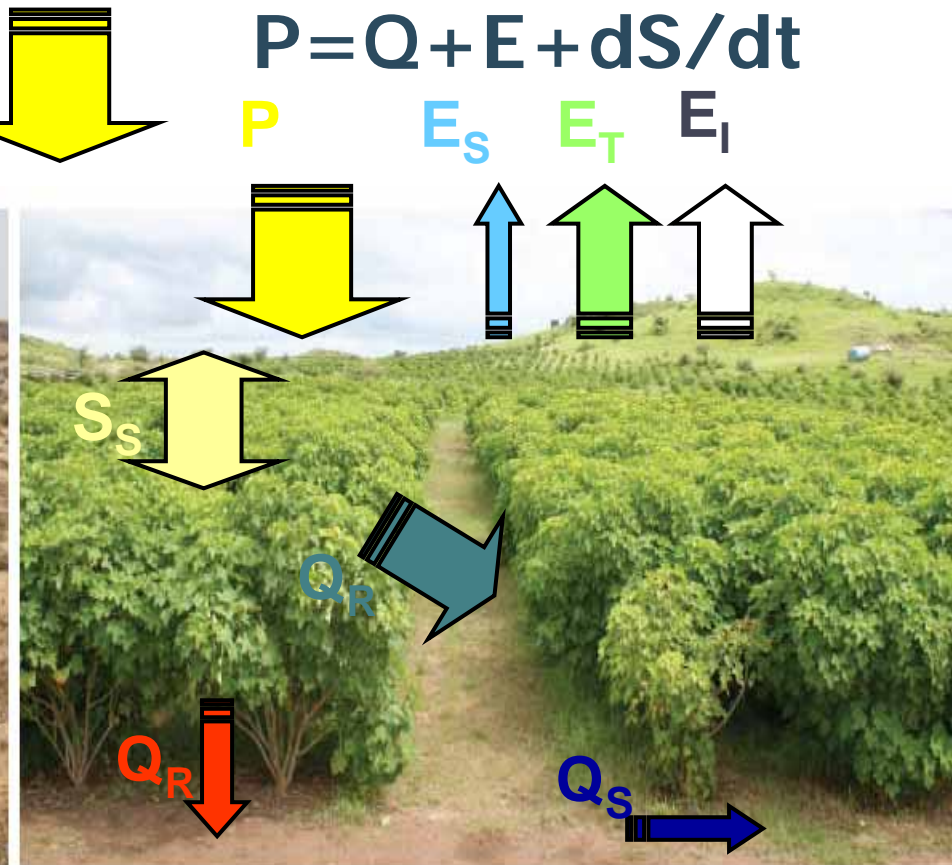
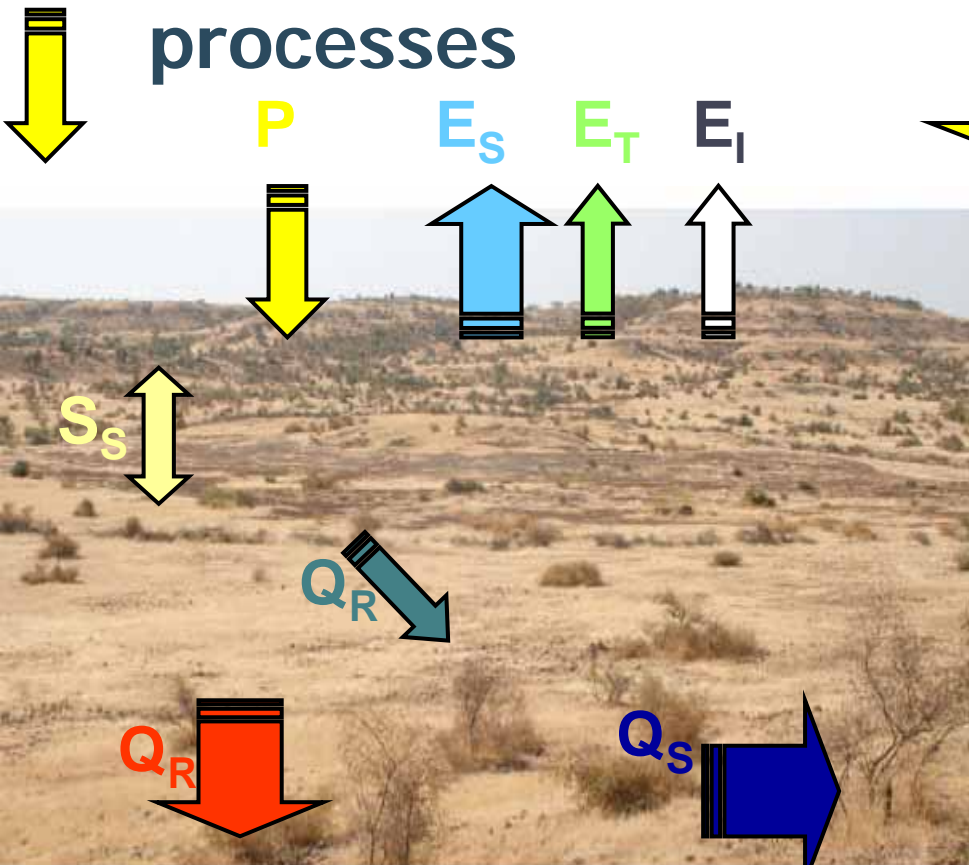
- *A massive land-grabbing scramble in Africa as foreign companies - some with foreign aid money support - rapidly establish enormous monoculture fields in tropical countries.*
  - ***Prof Seif Madoffe, SUA***



*'climate colonialism'*

***Sugar Cane – Kilombero Basin,  
Tanzania***

# Impacts of land use change on hydrological processes



Oasis in the desert: Jatropha cultivation can halt soil erosion, increase water storage in the soil and transform barren expanses into lush, productive land.

Short-term dynamics (e.g. interception, flood generation) vs. long-term dynamics (e.g. groundwater recharge, base flow)



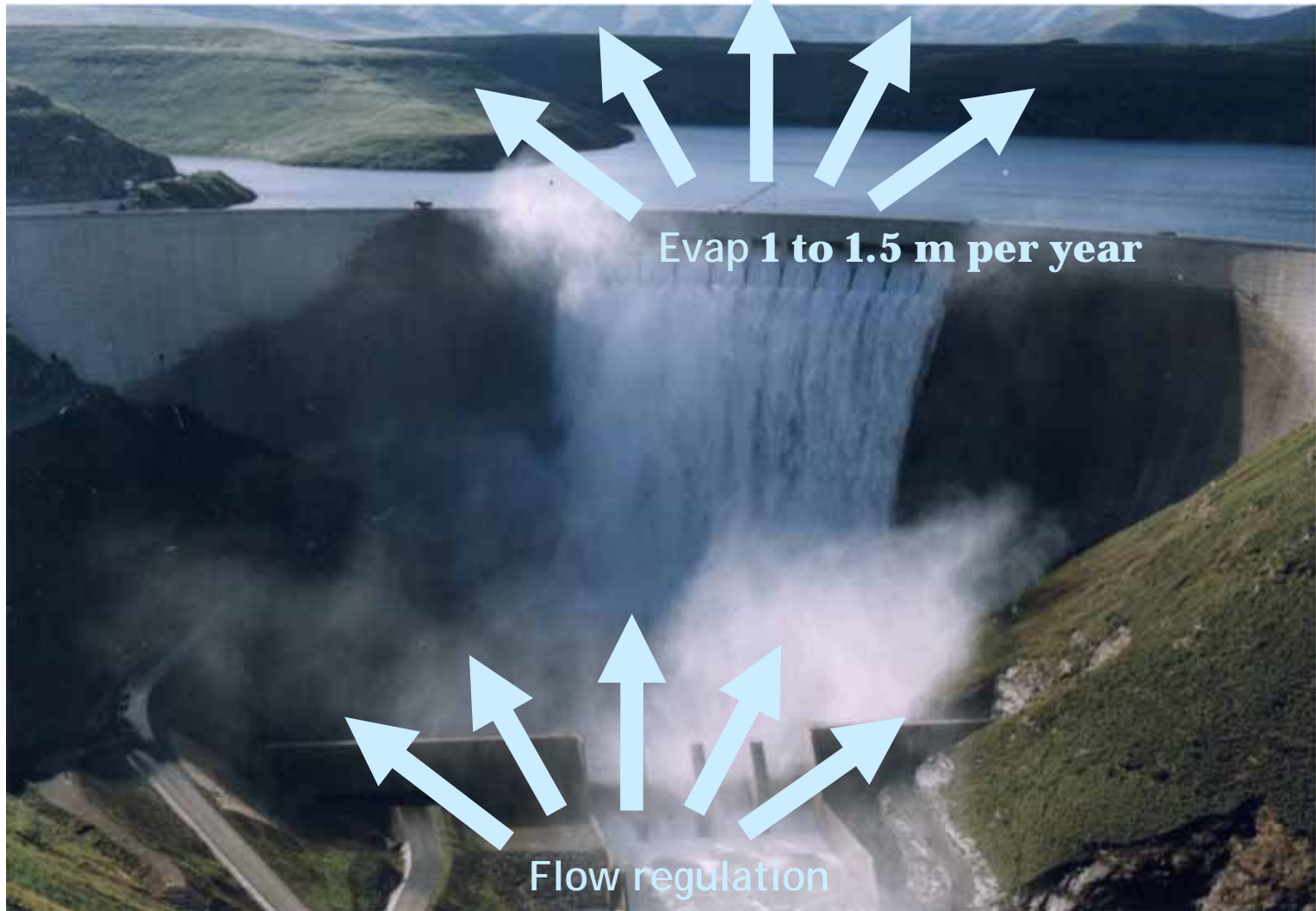
# Shifting Agriculture



Most international schemes must have a local opportunities

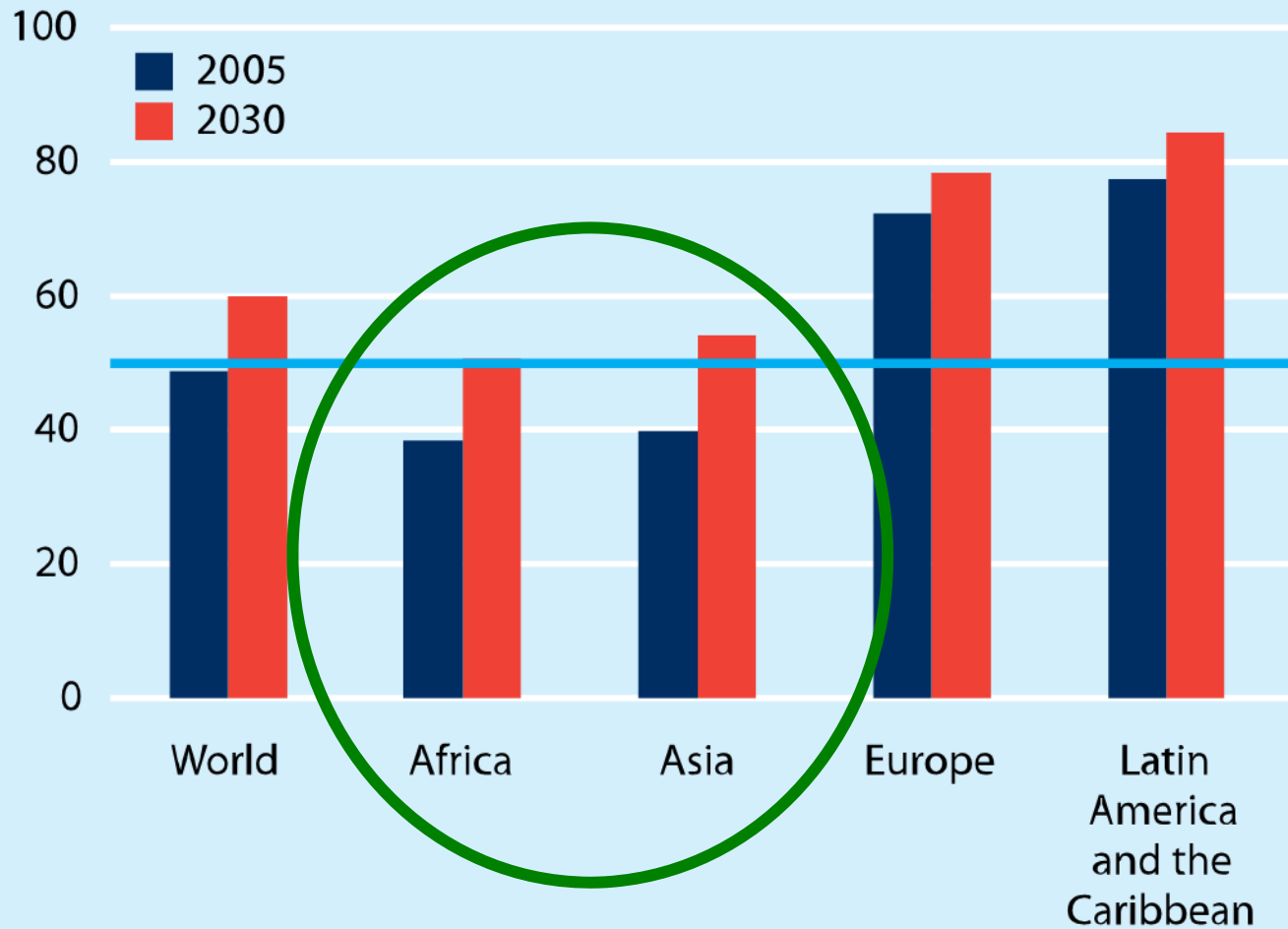


# Reservoirs



# By 2030 about 60% of the world's population is expected to live in urban areas

Share of population residing in urban areas, 2005 and 2030 (percent)



Note: Regions are official UN regions.

Source: United Nations 2006b.



Dry Deposition



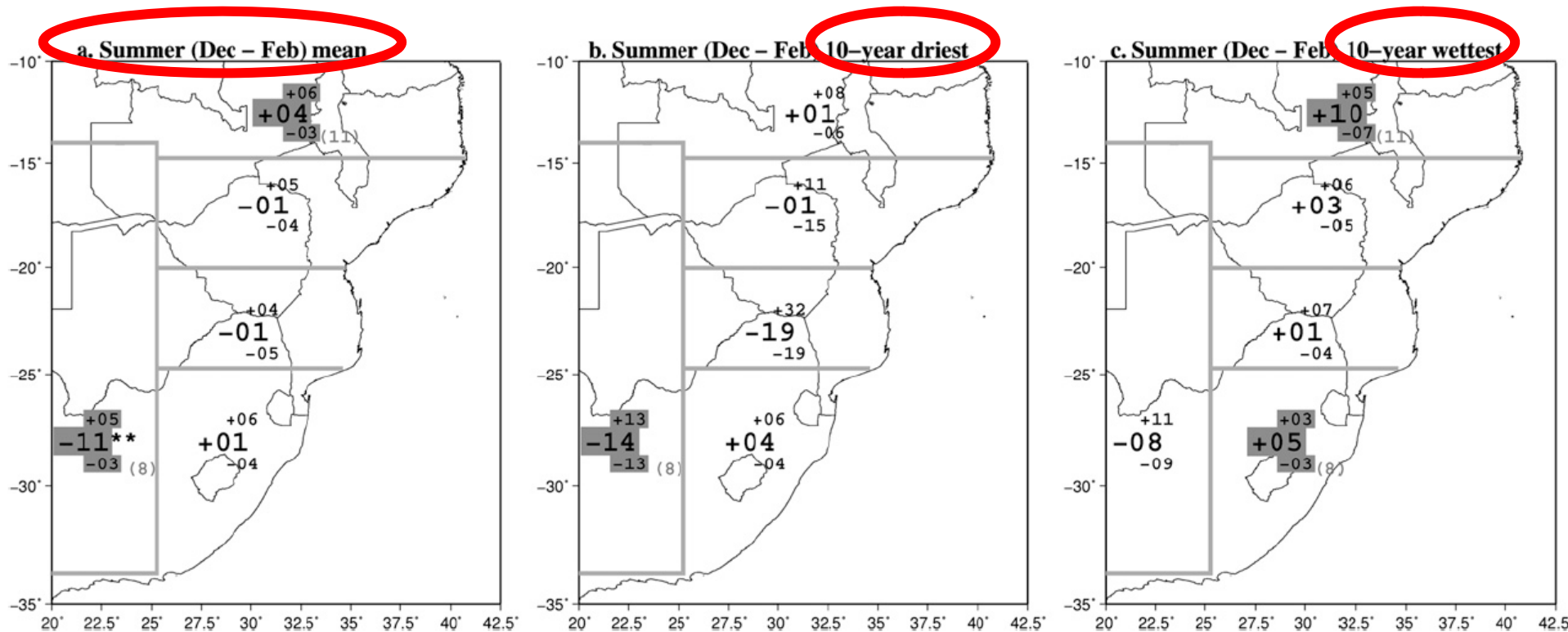
Sedimentation



Commercial Forestry

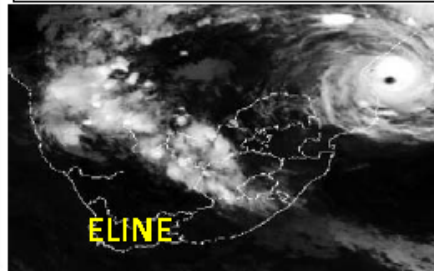
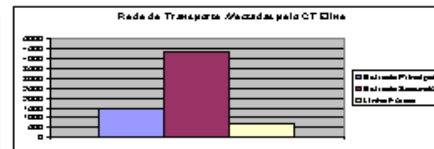
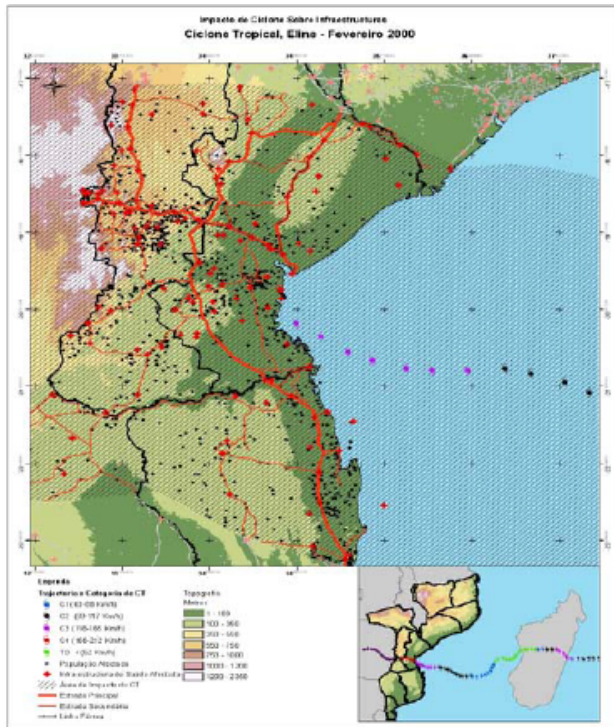
Mining

# Change in Precipitation in Southern Africa



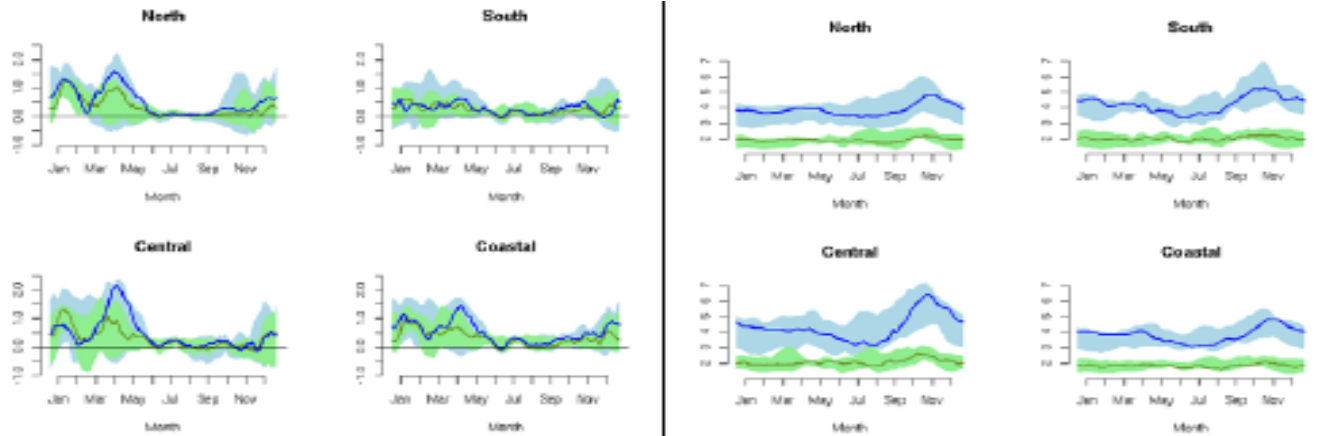


# Climate Change - Tropical Cyclones

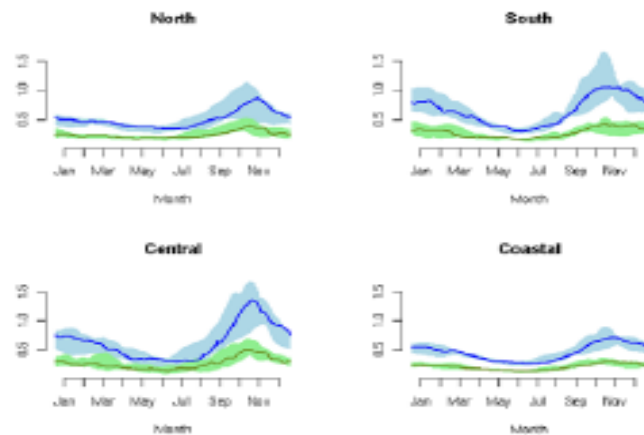


- Indian Ocean models suggest decreasing frequency of tropical cyclones but increasing cyclone intensity (Emanuel 2008)

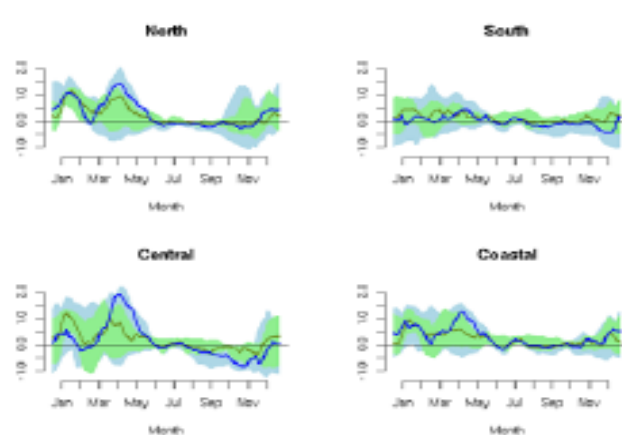
# Climate Change - PPT and Temp



PET



PMI



# Climate Change



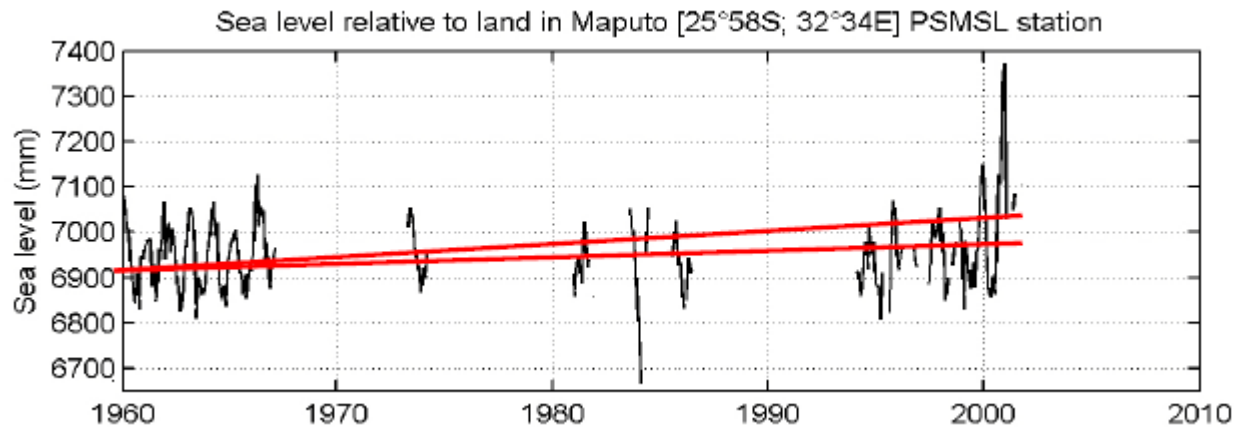
## Southern Region Rivers: Salt Water Intrusion

Deep penetration in  
Limpopo and Incomati basins

Rivers	Distance Inland	Area Impacted
Limpopo	29 km	83 km <sup>2</sup>
Incomati	28 km	9 km <sup>2</sup>
Maputo	11 km	5 km <sup>2</sup>

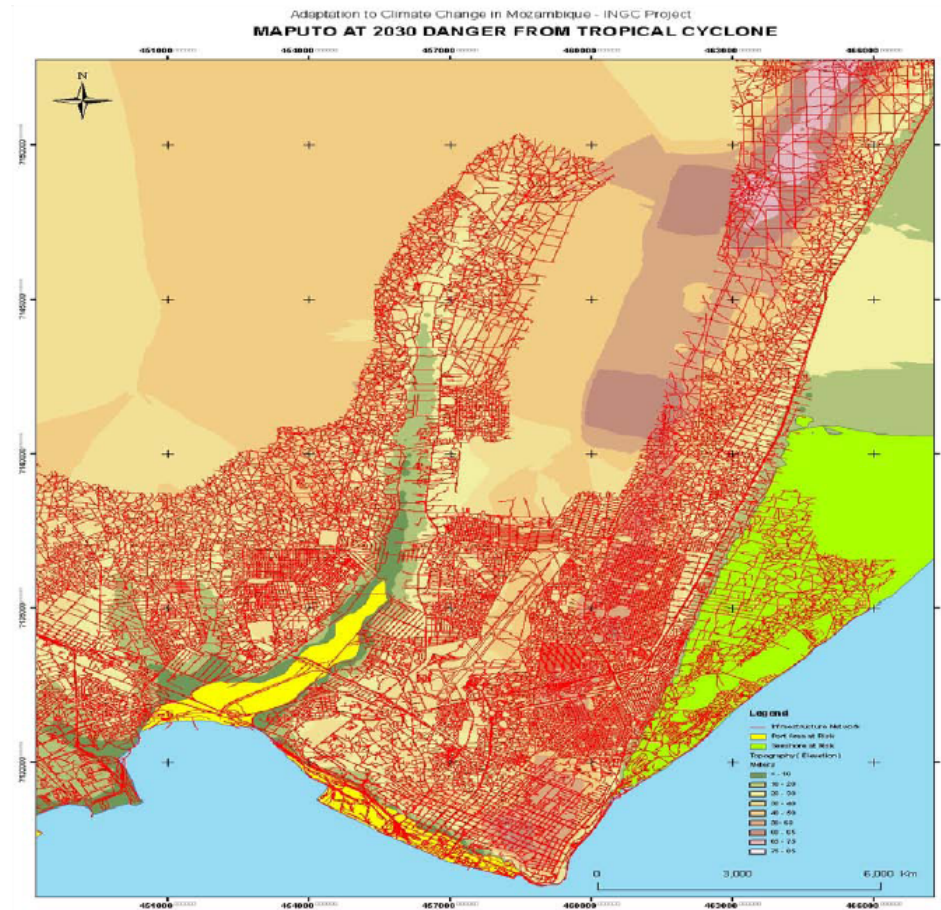


# Global Change - Sea Level Rise



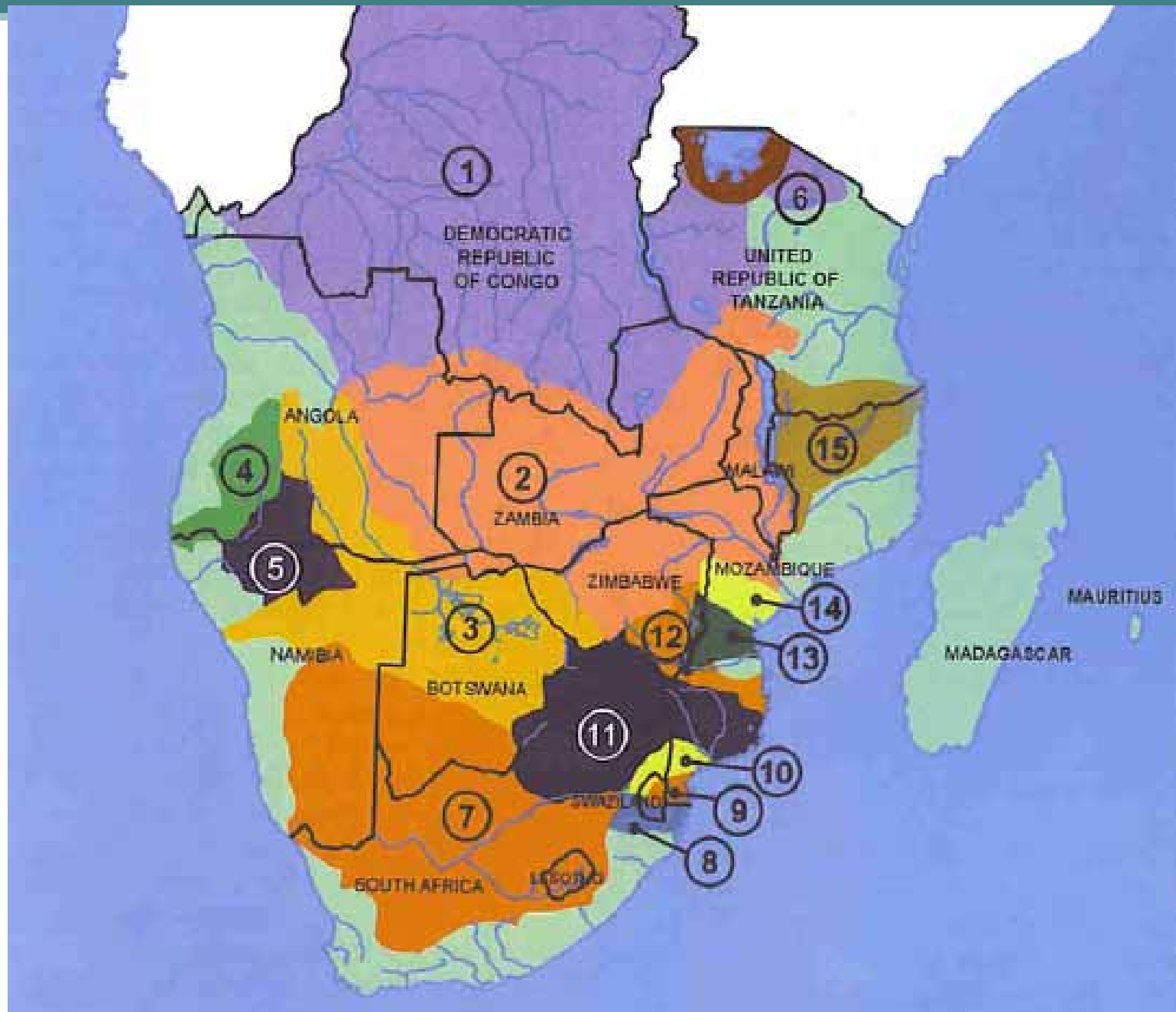


# Impact on Society



# Virtual Water Trade

- Sugar Cane as a case study



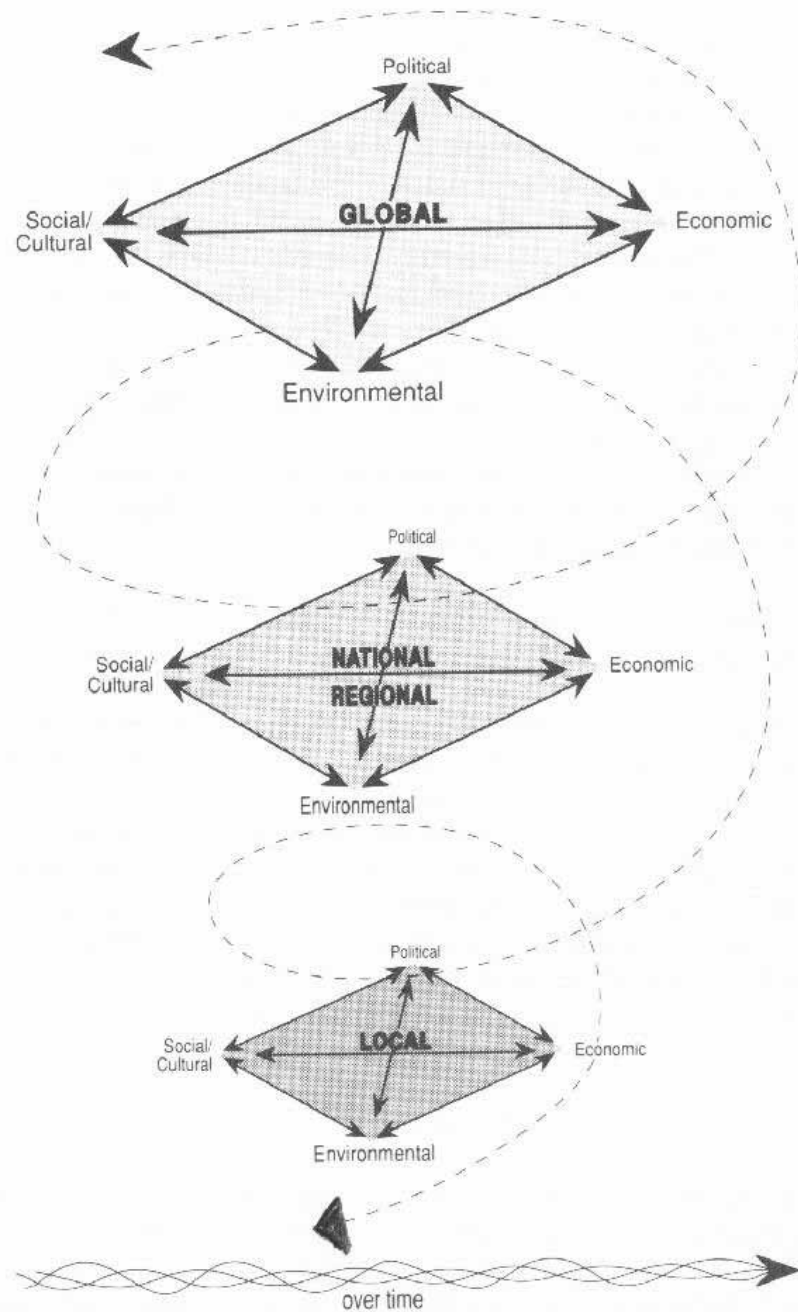
# Conventions, agreements, power relations and governance (Qs 6-9)

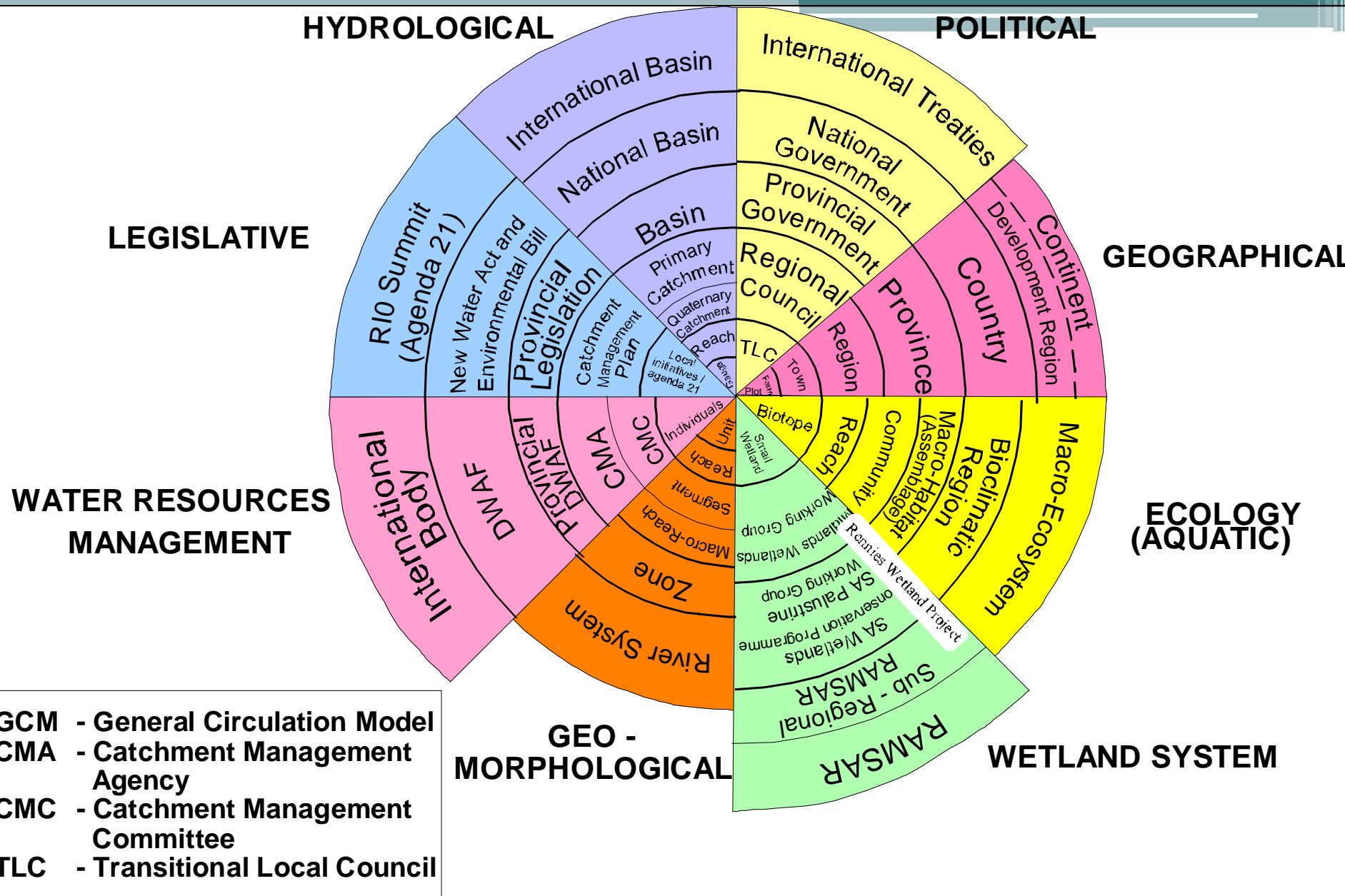
- Helsinki Rules of 1966
- UN Convention on the Law of the Non-Navigational Uses of International Watercourses
- (1997)
- SADC Protocol on Shared Watercourse Systems (in force since 1998)
- Revised as the SADC Protocol on Shared Watercourses in 2000
- World Bank
  - technical support to MZ 1989
  - declaration of “no objection” from Mozambique (Maguga).



# Key Messages

- Upstream-Downstream power relations
- Despite political tensions, ongoing dialogue on water issues (longest gap 10 years)
- “Water drives peoples and countries towards cooperation is supported by the developments in the Incomati basin”
  - (Carmo Vas and VD Zaag, 2002)





# Conclusions

- Incomati subject to global drivers
  - Biophysical
  - Socio-Politico-economic
- Sustainable Water Management?
  - Consideration in the context of development
- Strong institutional and legislative framework at all levels of water resources management particularly on Transboundary Rivers is vital as it:
  - Promotes political and economic cooperation between riparian states,
  - Promote transparency and create trust, and peace between riparian states and their users,
  - Improve strategies for managing extreme events (droughts/floods, alien invasive plants, pollution),
  - Improves possibilities of attracting funding for water projects
  - Promote capacity building and skills transfer.

(Enoch Dlamini 2005)