Impact of climate scenarios on vulnerability and coping

or

"How does the climate modeler fit in the picture"

Bruce Hewitson
University of Cape Town, South Africa
http://www.csag.uct.ac.za

Climate change projections and seasonal forecasting span the time scales for adaptation strategies.

Adaptation is inherently dependant in understanding and the system, and credible projections to inform / determine action

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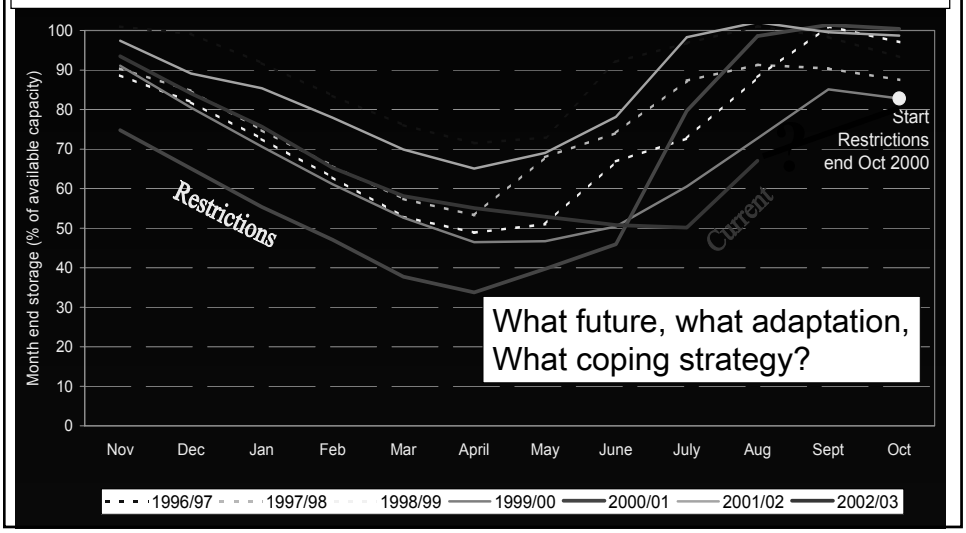
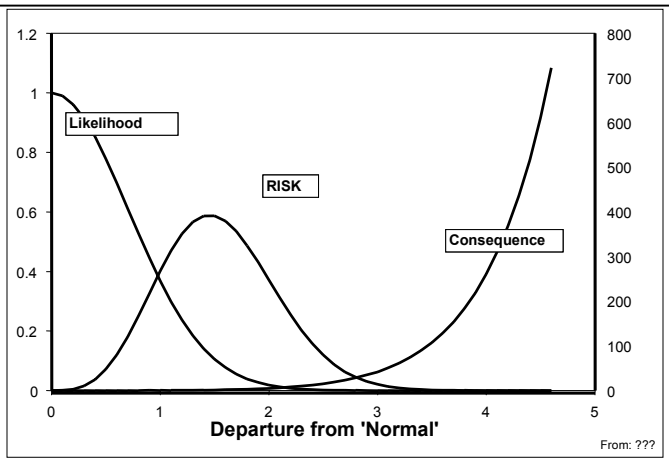


Coping strategies and adaptation predicated on:

a) Appropriate projections / forecasts of climate impact
b) Quantifiable skill / probability of the forecast
c) Effective communication

No usable forecast / projection → No effective adaptation
Non-effective forecast projection → dangerous strategies



Coping strategies and adaptation predicated on:

a) Appropriate projections / forecasts of climate impact
- Appropriate to impact sector
- Relevant variables
- Applicable spatial / temporal resolutions

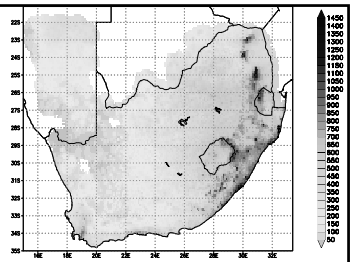
b) Quantifiable skill / probability of the forecast
- Error bars / statistical significance
- Probability (conditional)
- Hit rates / skill scores

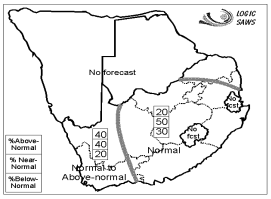
c) Effective communication
- Language / terminology barriers
- Accessibility and visibility
- Guidelines / caveats / limitations

A Real-time development environment:

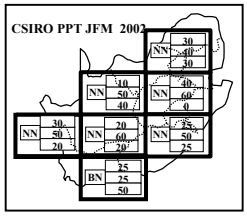
Seasonal forecasting

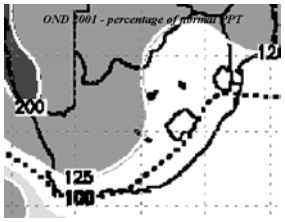
Appropriate projections?

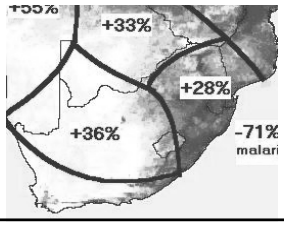


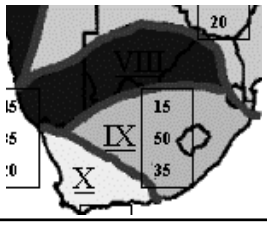


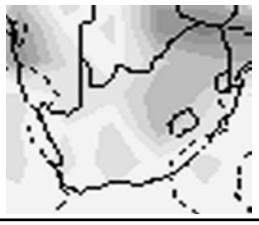
Expected total rainfall for February + March + April 2002



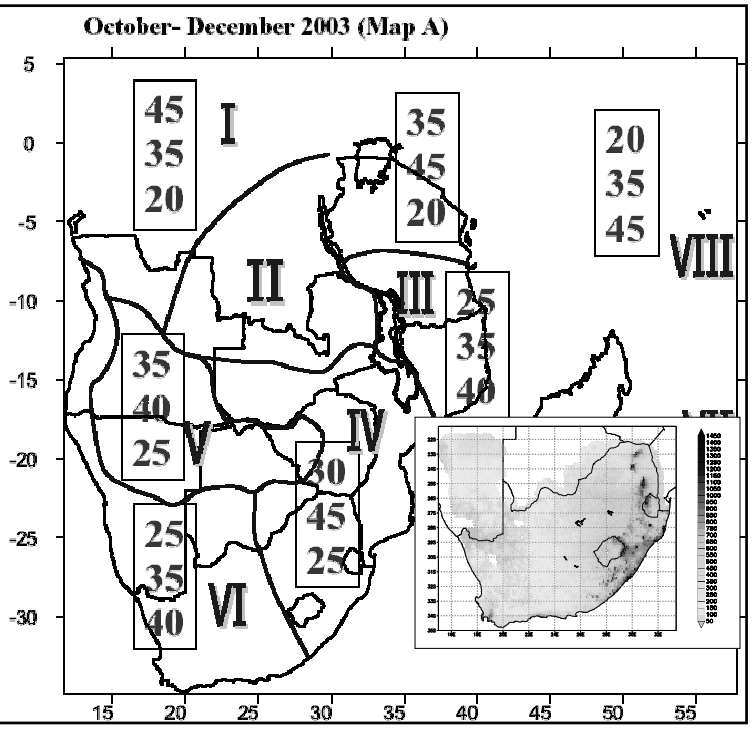




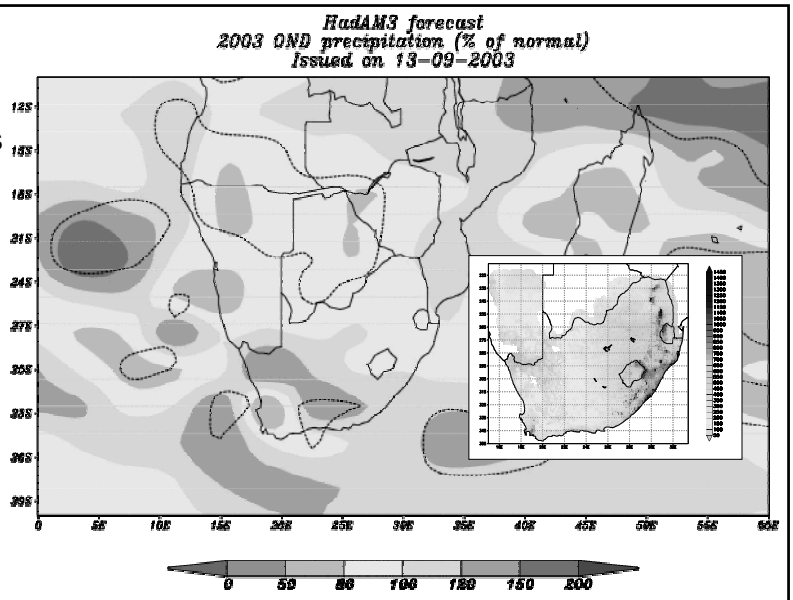




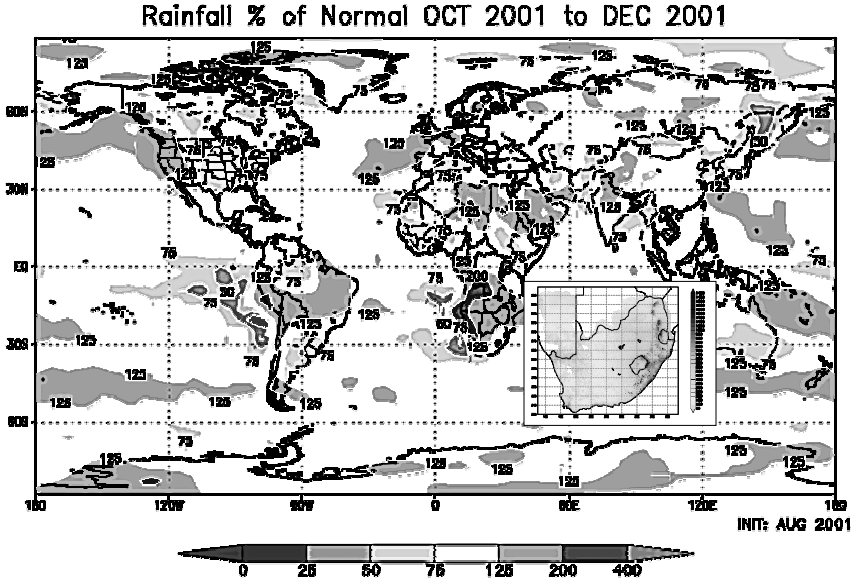
Current projections (SARCOF)



Current projections (UM)



10 simulation ensemble mean from simulations at University of Cape Town. Dashed lines enclose regions where the projected anomaly is statistically different at 90% significance



Current projections (South African Weather Service)

Adoption examples:

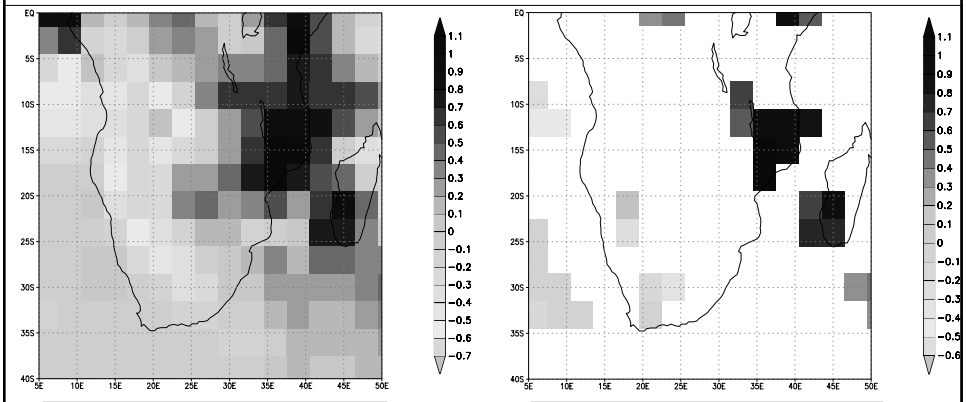
Commercial farmers general view “not useful”
- Lack of spatial detail (large area average)
- Inappropriate temporal resolution (3-month average)
- Difficult to interpret

Subsistence farmers show variable adoption
- Problem of sustaining trust
- Difficult access / communicate
- Difficult to interpret

Other sectors – variable adoption
- eg: Water resource managers dangerous adoption
  - Naïve acceptance of seasonal forecasts to deep skepticism of climate change projections

Climate change: the situation worsens

Annual mean change in daily precipitation
(2070-2099) – (1970-1999)



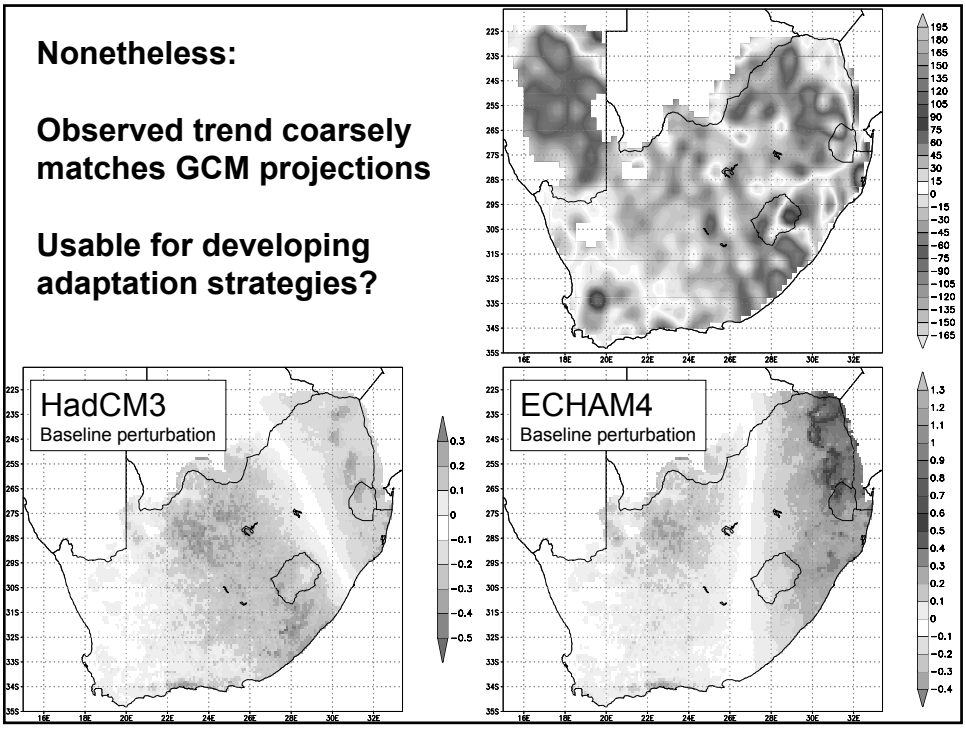
Climate change projection: Multi-model mean Δ precipitation

4 of 6 agreement on sign
… but which models are correct …

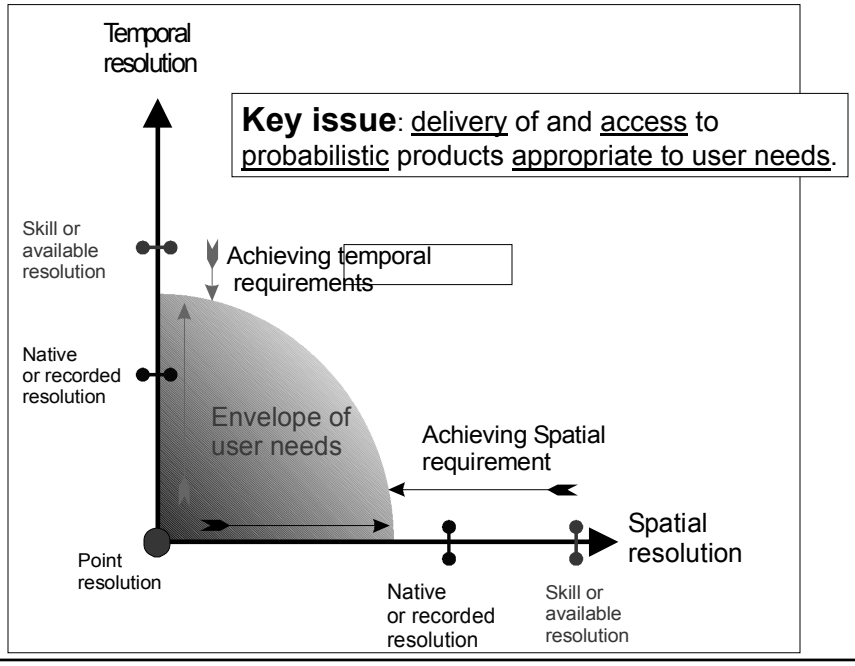
Nonetheless:

Observed trend coarsely matches GCM projections

Usable for developing adaptation strategies?



Downscaling and tailoring: a necessary post-processing



Concluding statements

Appropriate coping strategies for effective adaptation are, in part, conditional on tailored probabilistic projections

and

Understanding by climate community of user community needs

Understanding by user community of climate projection limitations

Within-country capacity (local knowledge) to generate tailored products

Effective communication / language