ASSAF Roundtable: 14 July 2022
The Human Costs of Climate Change

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GLOBAL CHANGE Institute
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AP&ES


SAMSUNG
TV of the Decade

Other contexts also matter:

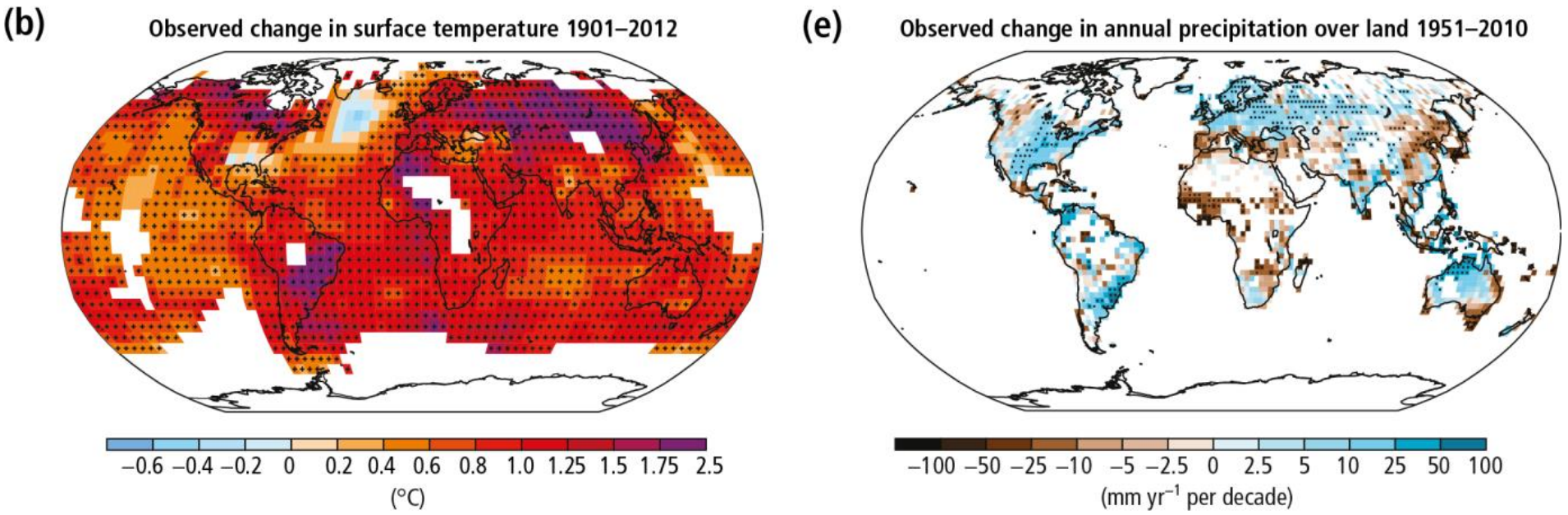
- Means of securing the necessities of life

(Source Wayne Twine)

Urban city intersectionality of risks and vulnerability assessments

Slides courtesy Tina Fatti(Wits)

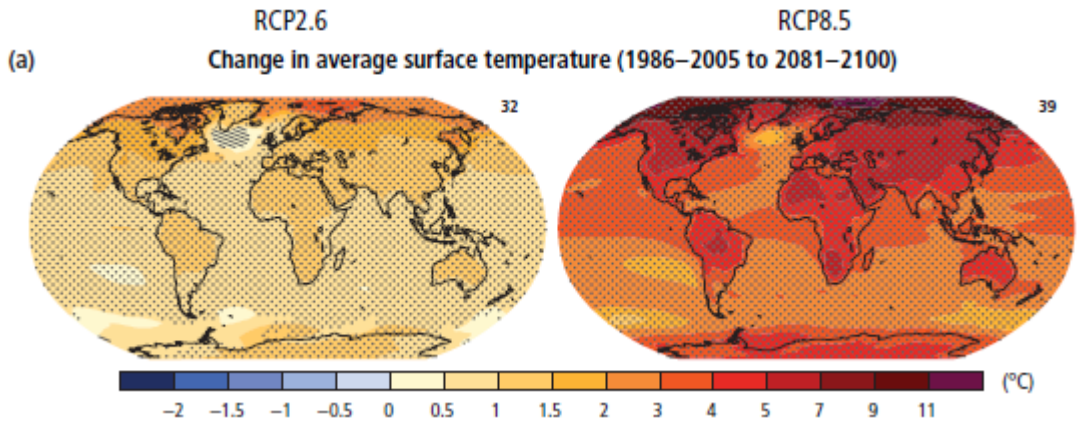
Warming has been observed nearly everywhere
Rainfall trends are weaker and less consistent



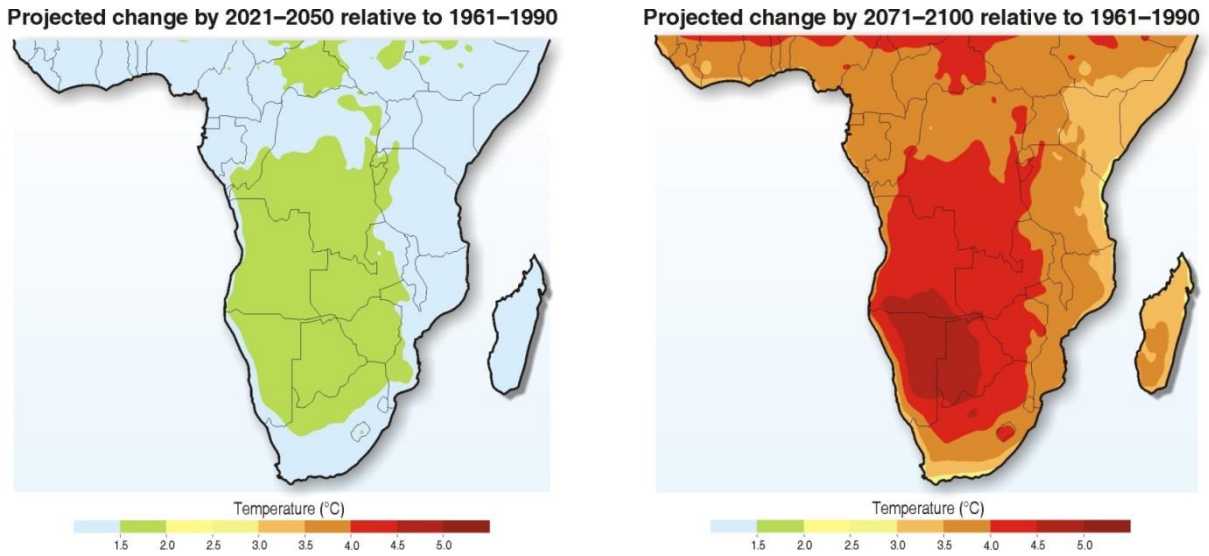
IPCC AR5 SYR 1.1 (b) and (e)

This means:
Intergovernmental Panel on Climate Change, 5th Assessment Report, Synthesis Report figure 1.1, panels (b) and (e)(e)

Climate Projections 2100

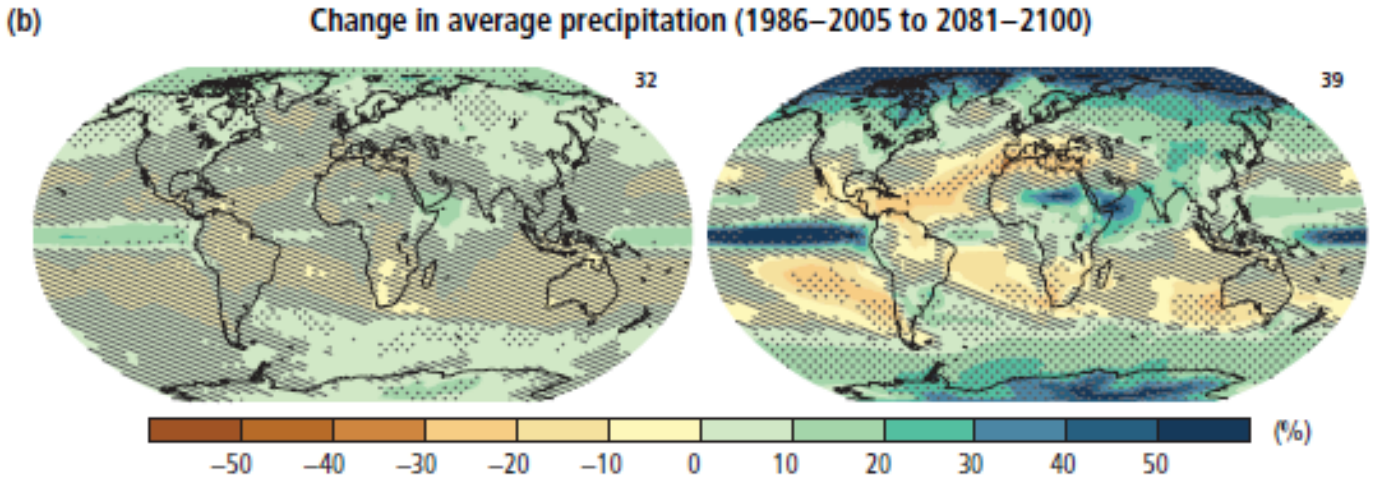


Source: IPCC 2013 AR5. Mean of 30 models, low and high scenario

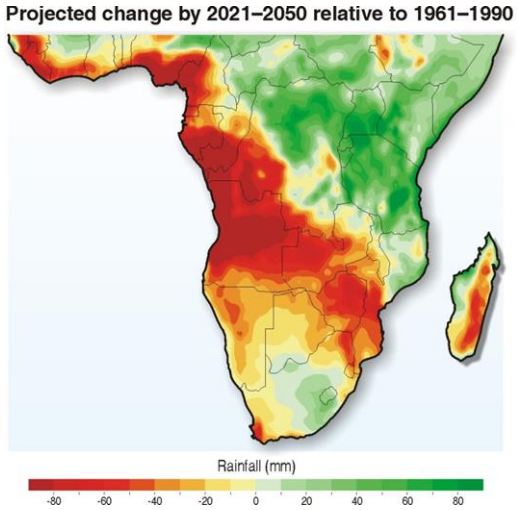


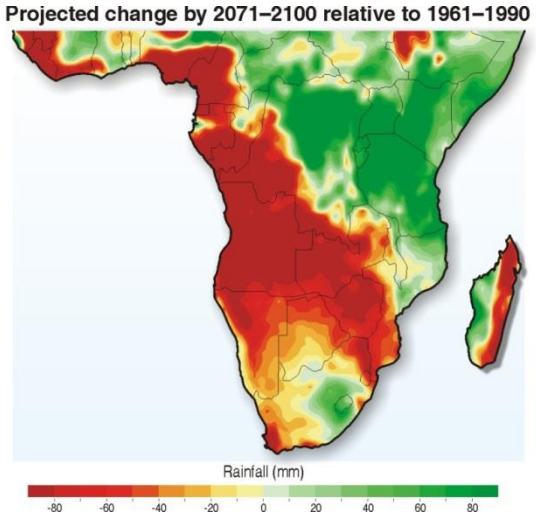
Source: Francois Engelbrecht, CSIR RCP8.5 Scenario, means of 6 global models down-scaled to ~15 km using CCAM

Rainfall change projections



Source: IPCC 2013 AR5. Mean of ~30 models. Hatched and stippled areas show model agreement



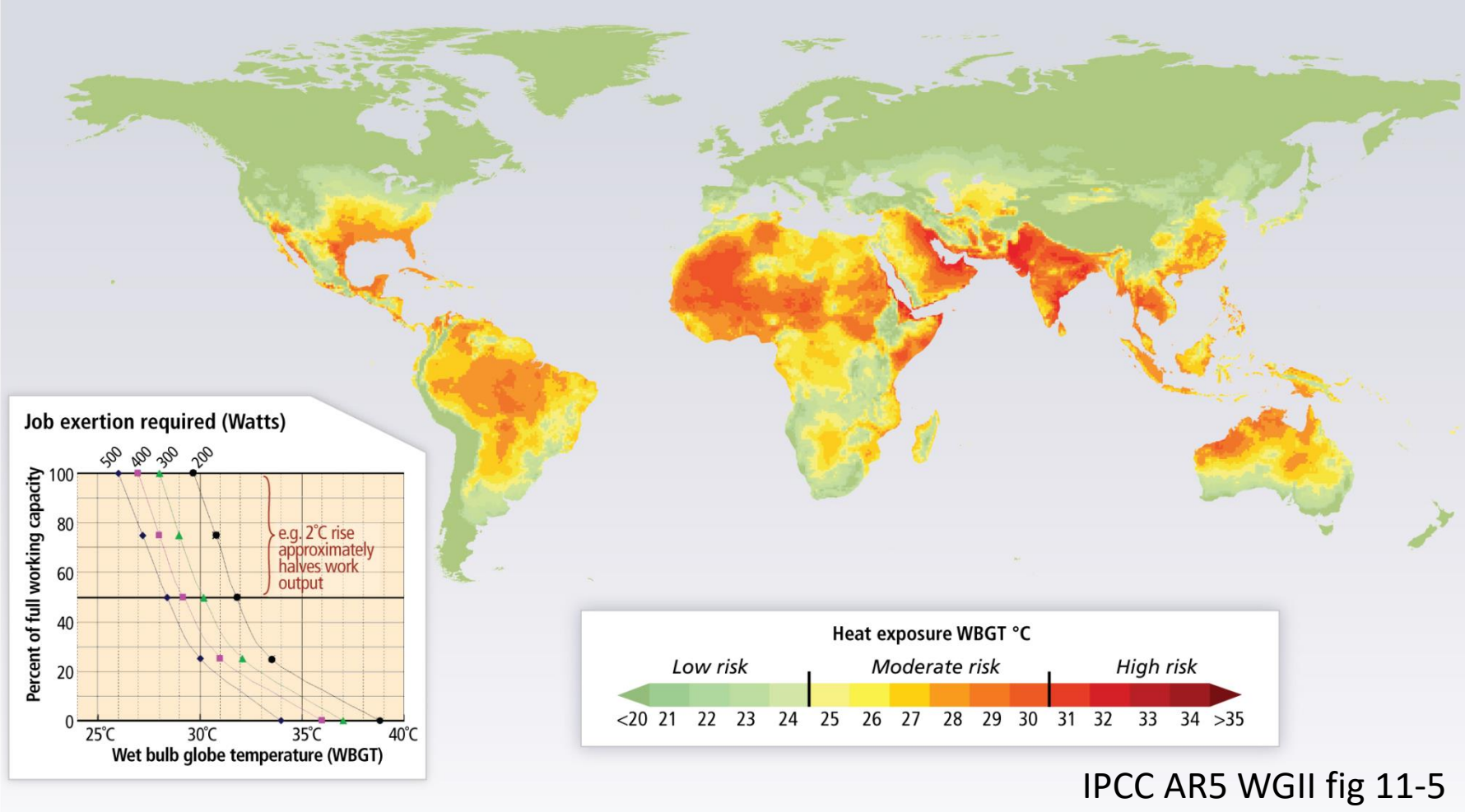


Source: Francois Engelbrecht, CSIR. RCP8.5 Scenario, Mean of 6 global models down-scaled using CCAM

Impacts on water supply and quality

- South African water resources *are already* fully allocated
  - We don't 'run out', but if one sector needs more, another gets less
- The hydrological cycle amplifies the climate signal ~3-fold
- Lower rainfall and higher evaporation is projected in the west of Southern Africa - droughts
- Higher (but more intense) rain and higher evaporation is projected in the east - flooding
- Water quality decreases everywhere

Heat stress and the reduced capacity for human work



IPCC AR5 WGII fig 11-5

Smith, K.R., A. Woodward, D. Campbell-Lendrum, D.D. Chadee, Y. Honda, Q. Liu, J.M. Olwoch, B. Revich, and R. Sauerborn, 2014: Human health: impacts, adaptation, and co-benefits. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 709-754.

Observed impacts - HEALTH & WELLBEING

Climate change is adversely affecting the physical health of people globally (very high confidence) and mental health of people in assessed regions

- **Extreme heat events human mortality and morbidity****
- **Climate-related food-borne and water-borne diseases****
- **Vector-borne diseases from range expansion and/or increased reproduction of disease vectors*****
- **Animal and human diseases, including zoonotic diseases, emerging in new areas*****
- **Water and food-borne diseases from climate-sensitive aquatic pathogens and from toxic substances from harmful freshwater****
  - **Diarrheal diseases, including cholera**** and other gastrointestinal infections****
- **Some mental health challenges*****
- **Climate-sensitive cardiovascular and respiratory distress****
- **Health services disrupted by extreme events such as floods*****

Levels of confidence: **** *Very high*; *** *High*; ** *Medium*; * *Low*

(b) Observed impacts of climate change on human systems

Human systems	Impacts on water scarcity and food production				Impacts on health and wellbeing				Impacts on cities, settlements and infrastructure			
	Water scarcity	Agriculture/ crop production	Animal and livestock health and productivity	Fisheries yields and aquaculture production	Infectious diseases	Heat, malnutrition and other	Mental health	Displacement	Inland flooding and associated damages	Flood/storm induced damages in coastal areas	Damages to infrastructure	Damages to key economic sectors
Global	±	−		−	−	−	−	−	−	−	−	−
Africa	−	−	−	−	−	−	−	−	−	−	−	−
Asia	±	±	−	−	−	−	−	−	−	−	−	−
Australasia	±	−	±	−	−	−	−	not assessed	−	−	−	−
Central and South America	±	−	±	−	−	−	not assessed	−	−	−	−	−
Europe	±	±	−	±	−	−	−	−	−	−	−	−
North America	±	±	−	±	−	−	−	−	−	−	−	−
Small Islands	−	−	−	−	−	−	−	−	−	−	−	−
Arctic	±	±	−	−	−	−	−	−	−	−	−	±
Cities by the sea				−		−	not assessed	−		−	−	−
Mediterranean region	−	−	−	−	−	−	not assessed	−	±	−		−
Mountain regions	±	±	−		−	−	−	−	−	na	−	−

Confidence in attribution to climate change

- ● High or very high
- ● Medium
- ● Low
- ○ Evidence limited, insufficient
- na Not applicable

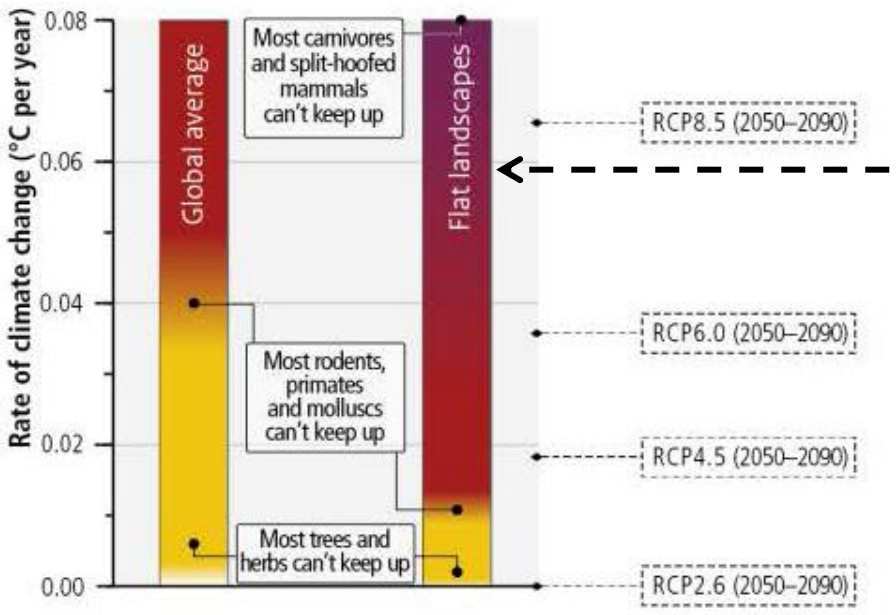
Impacts to human systems in panel (b)

- − Increasing adverse impacts
- ± Increasing adverse and positive impacts

Terrestrial biodiversity

Plants and animals have a capacity to adapt to changing climate
They mostly do so by moving their distribution to follow the preferred climate
This strategy does not work if the climate zone moves too fast for them to keep up
It also does not work if there are barriers to movement, like cities, roads, fences and fields, or if the species is already near a mountaintop

(A) Risk for terrestrial and freshwater species impacted by the rate of warming



The rate of climate change in the Karoo, for instance, will reach ~ 0.06 °C/y under a moderate mitigation scenario

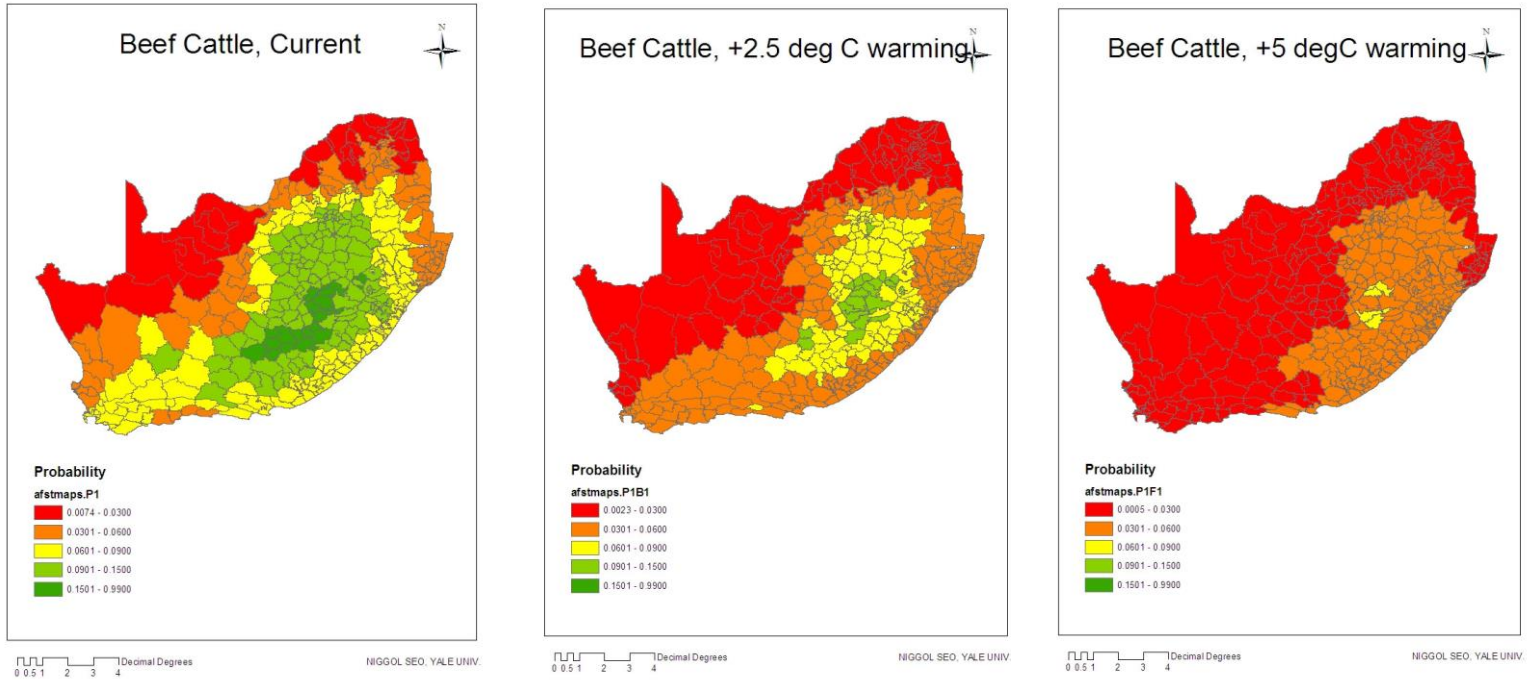
The equivalent 'climate velocity' is about 7 km/year

This is about 100 times faster than average natural climate change rates and climate velocities experienced in the past

Livestock farming

As the ambient temperature rises towards body temperature (37 °C) milk production plummets, growth rates slow, and fertility falls

Beef cattle financial viability



Seo, SN and R Mendelsohn 2006 The impact of climate change on livestock management in Africa: a structural Ricardian analysis. CEEPA paper 23

Effective adaptation options include

- Strengthening the resiliency of health systems
- Protect against exposure to climate hazards, particularly for those at highest risk
  - Heat Action Plans that include early warning and response systems
- Improve access to potable water, reducing exposure of water and sanitation systems to flooding and extreme weather and climate events, and improving early warning systems
- For mental health, improve surveillance, access to mental health care, and monitoring of psychosocial impacts from extreme weather and climate events
- Integrated adaptation approaches that mainstream health into food, livelihoods, social protection, infrastructure, water and sanitation policies

** Major constraint is limited investment

Transdisciplinary Co-learning Model

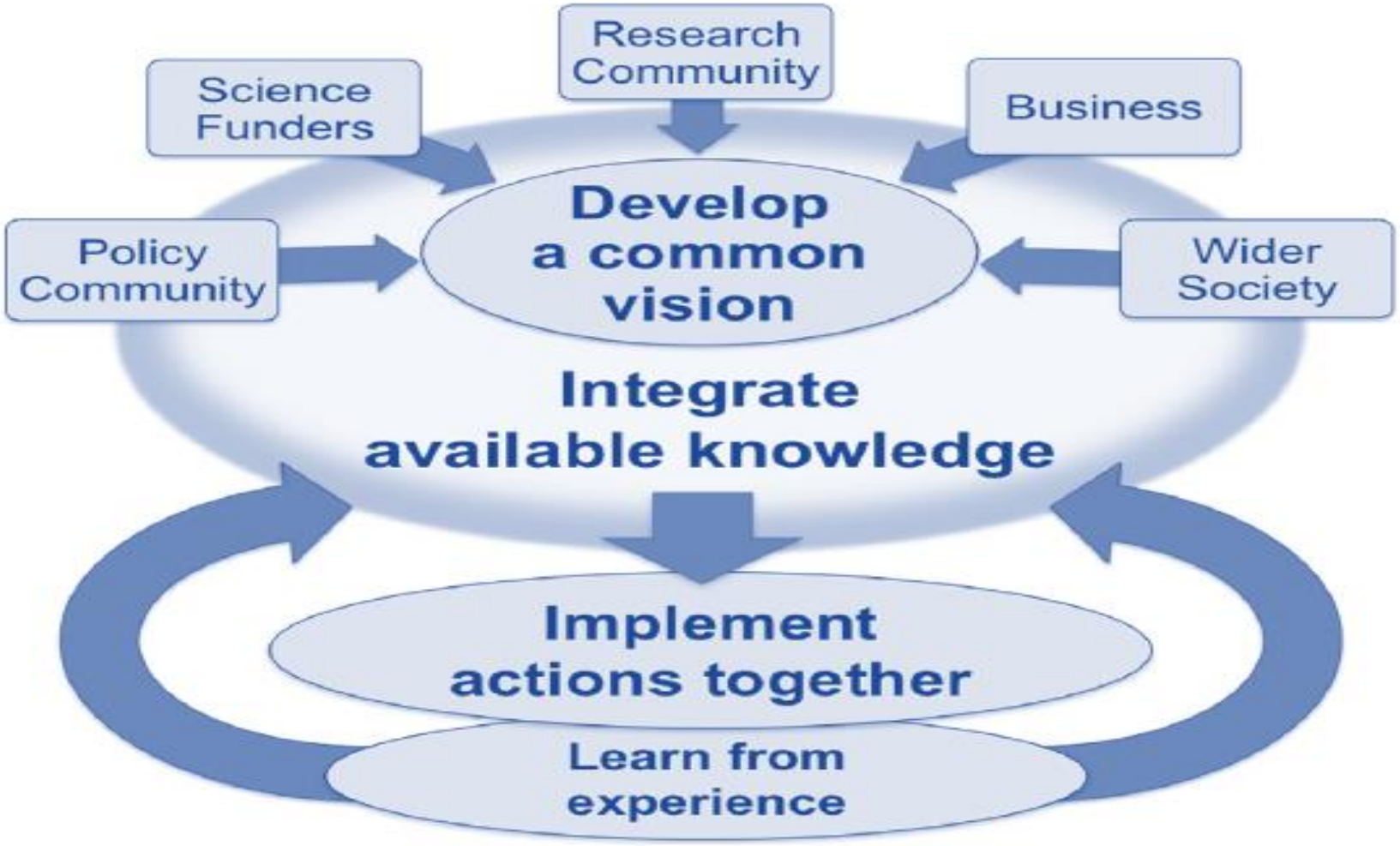


Fig. 1 – The knowledge arena: sustainability science as a collective learning process.

(After: Future Earth and Cornell et al.,2013)

What can you do?

- Governments set the rules, but civil society does the actual work of reducing our climate impact
- South Africa has pledged a 40% reduction in emissions relative to a ‘business as usual’ growth by 2030
  - You can quite easily achieve the same target, by
    - Driving a less fuel-hungry car, and driving it less
    - Adapting your home to be energy efficient and climate-resilient
    - Making climate-smart consumer choices
  - Promote climate consciousness in your workplace and networks

Off the grid

Low emission materials

Highly insulated