Impacts and Adaptation Efforts in South Africa

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Outline

Brief review of a sample of work in selected sectors (although sectoral approach not ideal!)

- Agriculture
- Livelihoods
- Water
- Health
- Urban areas/settlements

- Some key emerging lessons in adaptation

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Agriculture

- First order, e.g. change in temperature
  - (e.g. heat stress effects on maize and livestock)
- Second order, e.g. change in frost or heat units
  - (e.g. climate change implications for apple farming)
- Third order, e.g. shifts in yields, geographical production areas, pest/diseases for agricultural, horticultural, pasture, timber crops, for livestock, fisheries impacts
  - (e.g. possible shifts in rooibos cultivation suitability areas; changes in risk of tick-borne diseases – see also health)
- Fourth order, e.g.

food security, livelihoods, international trade.

Livelihoods

- **All climate sensitive sectors impact livelihoods of rural and urban poor**

- E.g. Stockholm Environment Institute study in Sekhukhune (built on FIVIMS sites)
  - How people experiencing stresses; and diffs in perceptions of stresses at household, village and municipal level
  - Village level - clear awareness of the links between climate-food-water
  - Key stressors in Tubatse – water, food security, jobs - Ga-Selala (village) vs Greater Tubatse Municipality

  - village – irrigation systems, drought resistant crop varieties;
  - municipality – increase dam capacity to capture more water – build new dam

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Water

Increased temperatures - ? evaporation and transpiration → ? catchment run-off and groundwater recharge, (even in event that rainfall remains unchanged)

Higher average water temperatures - poorer water quality due to more algal blooms (amongst other reasons)

Floods and storms

Threaten infrastructure such as dams, bridges, pump-stations and pipelines,
? usable fraction of runoff,
? soil erosion - lowers land and water quality and silts up dams
Can ? the incidence of water-borne diseases such as cholera, and
In conjunction with sea-level rise and storm-induced sea surges, inundate low-lying coastal areas, threatening life, damaging infrastructure and allowing salt intrusion into coastal aquifers.

Droughts

Reduce the amount and quality of water in rivers and dams,
Reduce the recharge of groundwater,

Greater variability of rainfall year-to-year --
Increased infrastructure costs due to the need to build large storage capacity for water and grain.

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Health

Has tended to be a somewhat neglected sector; yet range of exciting work in the science and science-policy arena

Oxfam – range of potential problems sensitive to climate change

- heat stress
- air pollution
- disasters related to climatic extremes
- vector borne diseases (e.g. malaria, dengue, schistosomiasis & tick-borne diseases)
- water borne & food-borne diseases (e.g. diarrhoeal diseases)
- food security
- water security

Environmental Health – climate change impacts & pressures

- food security and under-nourishment
- food-borne diseases due to increase in temperature
- accelerated parasite development and explosion of vector populations, thus increase in vector-borne diseases (e.g. Olwoch *et al* 2008)
- vector control, e.g. malaria
- emerging infectious diseases e.g. certain strains of cholera
- impact of temperature changes on morbidity and mortality, e.g. heat stress
- weather extremes, e.g. floods and drought, and impacts of land use, food security
- excess personal ultraviolet radiation exposure with increasing ozone depletion and associated skin cancer risk

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Urban areas & settlements

Importance of cities – urban growth

World's urban population will double in the next 22 years.

By 2030, approx 60% world's population will live in cities.

By 2020, will be 9 metacities (populations more than 20 million)

Cities as agents of global change; and as impacted by global change (several South African cities represented here at stakeholders)

The city region – strategic & political level of admin and policy making extending beyond the admin boundaries of an urban area.

Key focus –

- Can begin to model urban social-ecological systems
- simulations of development trajectories

Possibility of identifying 'preferred' scenarios

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The role of cities in climate change

(Satterthwaite & Dodman 2009)

- Debates around role of cities in GHG emissions
  - 'no inherent conflict between an increasingly urbanized world and reduced global GHG emissions' (interesting argument)
- How to manage particular structures and activities within cities associated with high GHG emissions
- Well planned & well governed cities – can provide high living standards combined with controlled GHG emissions (& a host of other benefits – 'win-win' strategies)
- Key focus in much work in South Africa now concerns reducing vulnerability of cities (and vulnerable groups within cities) and on the notion of the type of cities described above (a key focus of the Global Change Grand Challenge section on the human-environment)

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Priorities in impacts & adaptation

- The flaws of a sectoral approach … multi-sector strategies (e.g. intra-departmental coordination on water-health-livelihoods link in both causation and adaptation strategies)
- Acknowledging the challenge of complex emergencies/multiple stressors (e.g. cholera outbreak – summer 2008/9)
- Win-win strategies (e.g. corridor and landscape planning as an adaptation strategy)
- Understanding thresholds and progressive exceedances (households, institutions, management systems, ecosystems)
- Root adaptation in what is currently done to cope with climate variability (from the communal farmer to the mining house)

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Beyond communication & dissemination of climate change science to real sectoral & *multi-sectoral* impact

Thank you

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