Climate Change Implications for the Southern African Development Community (SADC)

Long Term Adaptation Scenarios Workshop

22 January 2014

Hannah Baleta & Guy Pegram
Aims and Objectives

Assess how climate change impacts and adaptation responses in SADC countries may influence or affect South Africa (and vice versa)

Key outputs

- Historical examples
- Framework for analysis
- Relationships and linkages
- Development futures
- Climate futures
- Adaptation & policy responses

Impacts not adaptation responses
Conceptual framework

SADC

Physical
- Water
  - Allocation
  - Drought
  - Flood
- Fire
- Disease
  - Human
  - Livestock
  - Crop

People
- Migration

Trade
- Imports/Exports
  - Food
  - Energy

South Africa
Physical impacts of climate

- Swaziland
- Lesotho
- Mozambique
- Namibia
- Botswana
- Zimbabwe

- Water
  - Allocation
  - Drought
  - Flood

- Fire

- Disease
  - Human
  - Livestock
  - Crop
Natural disasters in SADC

- Cyclones
- Flooding
- Health
- Drought
- Food security
- Insect infestations

http://reliefweb.int/map/namibia/southern-africa-relevant-humanitarian-events-2013
Drivers:

- Tropical weather systems moving westwards in summer
- Cold fronts in winter
- Sea-level rise

Scale

- Large scale river floods
- Flash floods
1992 drought
- South Africa
  - 1.2 ZAR billion
  - 1 % GDP
- Zambia
  - 30 ZAR million
  - 2.8% GDP

Eugene Poolman; South African Weather Service; Flooding in SADC: An Overview

http://www.wri.org/our-work/project/aqueduct/aqueduct-atlas
Fire in SADC

- 7% of Africa burned in 2000
- 64% of the world total

Direct/indirect impacts
- Cross border
- Immigration/trade

% Total Area burned per SADC country from 2001-2007

Trans boundary allocation

- Physical sharing of water
- Direct neighbours
  - Lesotho
  - Mozambique
  - Namibia
  - Swaziland
  - Botswana
  - Zimbabwe
- Future Zambezi water supply options
- Energy implications

Health and climate change

**Human**
- Malaria
- Schistosomiasis
- Tickborne encephalitis
- Heat stroke
- Cholera
- Dengue

**Livestock**
- Rift Valley Fever
- African Swine Flu

**Crop**
- Stem rust
- Fruit fly

Expansion of malaria transmission time

2011 Blackleg infection in SADC

Physical summary

Direct impacts

• Flooding
  ▪ Mozambique and Swaziland affected by RSA
  ▪ RSA affected by Lesotho and Swaziland

• Health
  ▪ Cholera
  ▪ Malaria interface

• Water allocation (institutional/management)
  ▪ Orange – Senqu; Incomati; Limpopo
  ▪ Regional energy and water transfers

Indirect

• Physical climate impacts on people and trade
People

- Migration
  - Temporary residence permits per country (Africa)

Forms of migration
- forced migration
- labour migration
- livelihood seeking migration
- temporary migration
- permanent migration

Drivers
- fleeing conflict
- asylum seekers
- refugees
- traders seasonal workers
- climate
People

_migration to south africa_
- SADC (29.9%)
- Asia (25.3%)
- Europe (15%)
- West Africa (14%)

‘sending’
- Mozambique
- Malawi
- Lesotho

‘receiving’
- South Africa
- Namibia

StatSA documented immigrants in South Africa, 2011
People Summary

- Immigration
  - Concern
  - Opportunity

- Migration
  - health
  - urban infrastructure

- Resource requirements on:
  - water
  - food
  - energy

- Social dislocation (xenophobia)

- In addition to climate
Trade

- Limited intra-SADC trade (relative to potential)

**Intra-trade in SADC (US$ million, 2010)**

<table>
<thead>
<tr>
<th>Country</th>
<th>Irrigation Potential (1000 ha)</th>
<th>Actual Irrigated land (1000 ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angola</td>
<td>3700</td>
<td>35</td>
</tr>
<tr>
<td>Botswana</td>
<td>13</td>
<td>1.38</td>
</tr>
<tr>
<td>DRC</td>
<td>7000</td>
<td>7.3</td>
</tr>
<tr>
<td>Lesotho</td>
<td>12.5</td>
<td>0.067</td>
</tr>
<tr>
<td>Madagascar</td>
<td>1517</td>
<td>1081</td>
</tr>
<tr>
<td>Malawi</td>
<td>162</td>
<td>54,144</td>
</tr>
<tr>
<td>Mauritius</td>
<td>33</td>
<td>20.8</td>
</tr>
<tr>
<td>Mozambique</td>
<td>3072</td>
<td>40.1</td>
</tr>
<tr>
<td>Namibia</td>
<td>47.3</td>
<td>6.14</td>
</tr>
<tr>
<td>South Africa</td>
<td>1500</td>
<td>1498</td>
</tr>
<tr>
<td>Swaziland</td>
<td>93.2</td>
<td>44.8</td>
</tr>
<tr>
<td>Tanzania</td>
<td>2132</td>
<td>274</td>
</tr>
<tr>
<td>Zambia</td>
<td>523</td>
<td>156</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>366</td>
<td>124</td>
</tr>
<tr>
<td>SADC</td>
<td>20,171</td>
<td>3,343</td>
</tr>
</tbody>
</table>

World Bank, 2010

SADC Food Security and Climate Change Paper
Variation in trade balance
South Africa major SADC exporter, not SADC importer
RSA high value exports to EU & Asia
Increased SADC cereal production
• RSA proportional decrease

South Africa Wheat Trade Balance (1999 – 2004);
http://www.thecropsite.com/reports/?id=1817
Macroeconomic impacts

- RSA dependence on SADC
  - Vulnerable to SADC climate impacts

- SADC dependence on RSA
  - Disaster in SADC = decrease economy demand/decrease economy production
  - Dual impact for South Africa (opportunity/risk)

Zimbabwe GDP and rainfall
(SADC climate change adaptation in water)
**Future for trade in SADC?**

**Does this link with climate?**

**Cross correlation of climate with SADC and RSA?**

- All dry? All wet?
- All exacerbated, not buffered.
- Physical, human and trade level – all together
Future perspectives

- Development futures

- Climate futures
SADC development context

- Economic development
- Resource endowment
- Infrastructure for resilience

Per capita freshwater withdrawal (cubic metres)

Bar chart showing per capita freshwater withdrawal for various countries in the SADC region, categorized by use (industry, domestic, agriculture).

World Bank Data, 2012
Development futures

- Growth rates

- Nature of the economy
  - Mining
  - Agriculture
  - Tertiary

- Regional Trade
  - Resilience
  - Vulnerability
Climate in SADC

- ITCZ
- Congo Air Boundary
- Mid-latitude cyclones
- Botswana High Pressure
- Cyclones
- Temperate troughs
Climate impacts

Temperature:
- warmer or hotter

Rainfall variation

Projected changes in annual rainfall (mm) 2036 – 2065 based in 6 dynamically downscaled GCMs
Key issues

- Disaster management
  - Direct impacts

- Economic resilience
  - Migration

- Regional integration
  - Trade interdependency