





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

Long Term Adaptation Scenarios Workshop

22 January 2014

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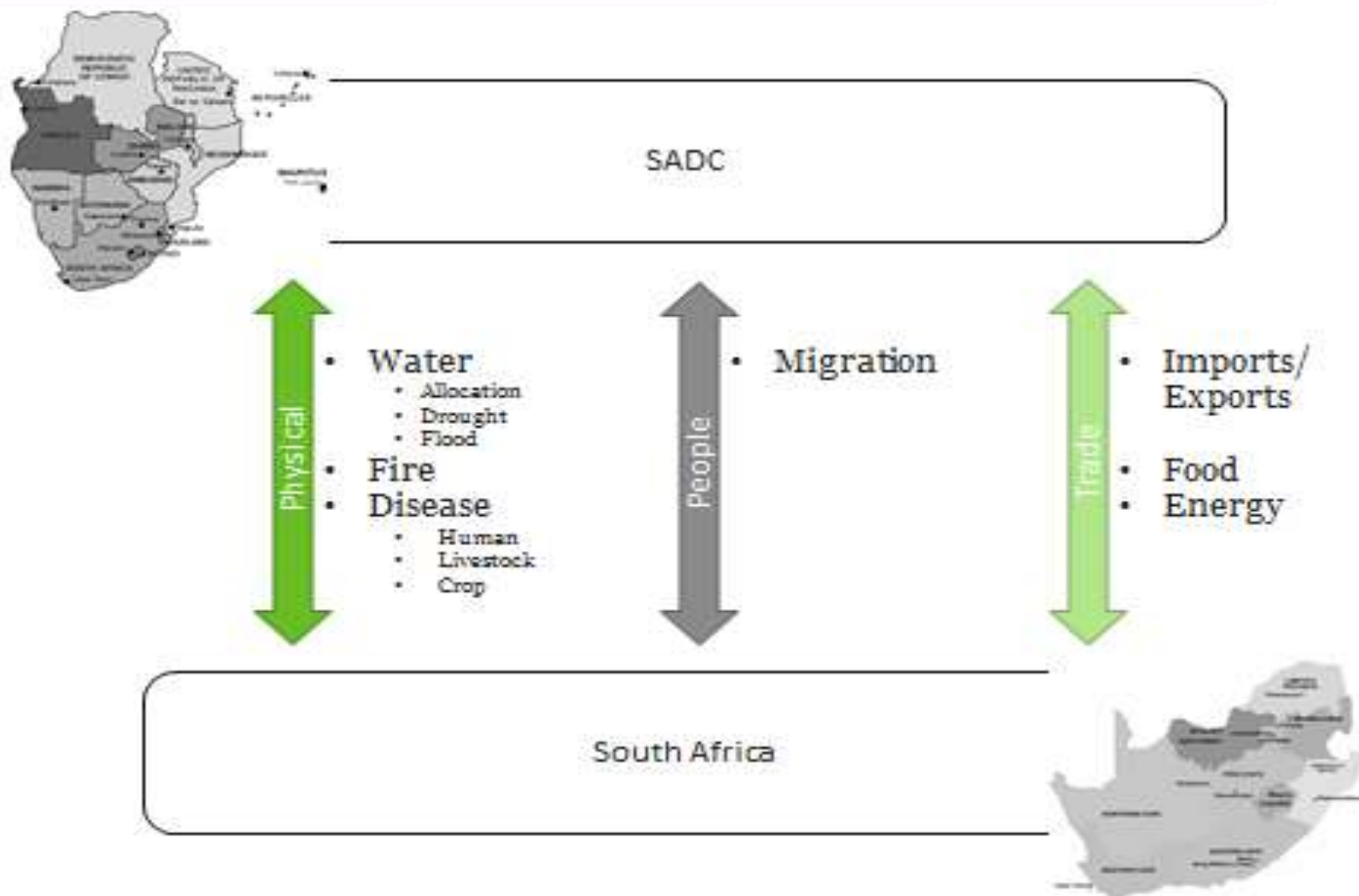
Aims and Objectives



- 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



Physical impacts of climate



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

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

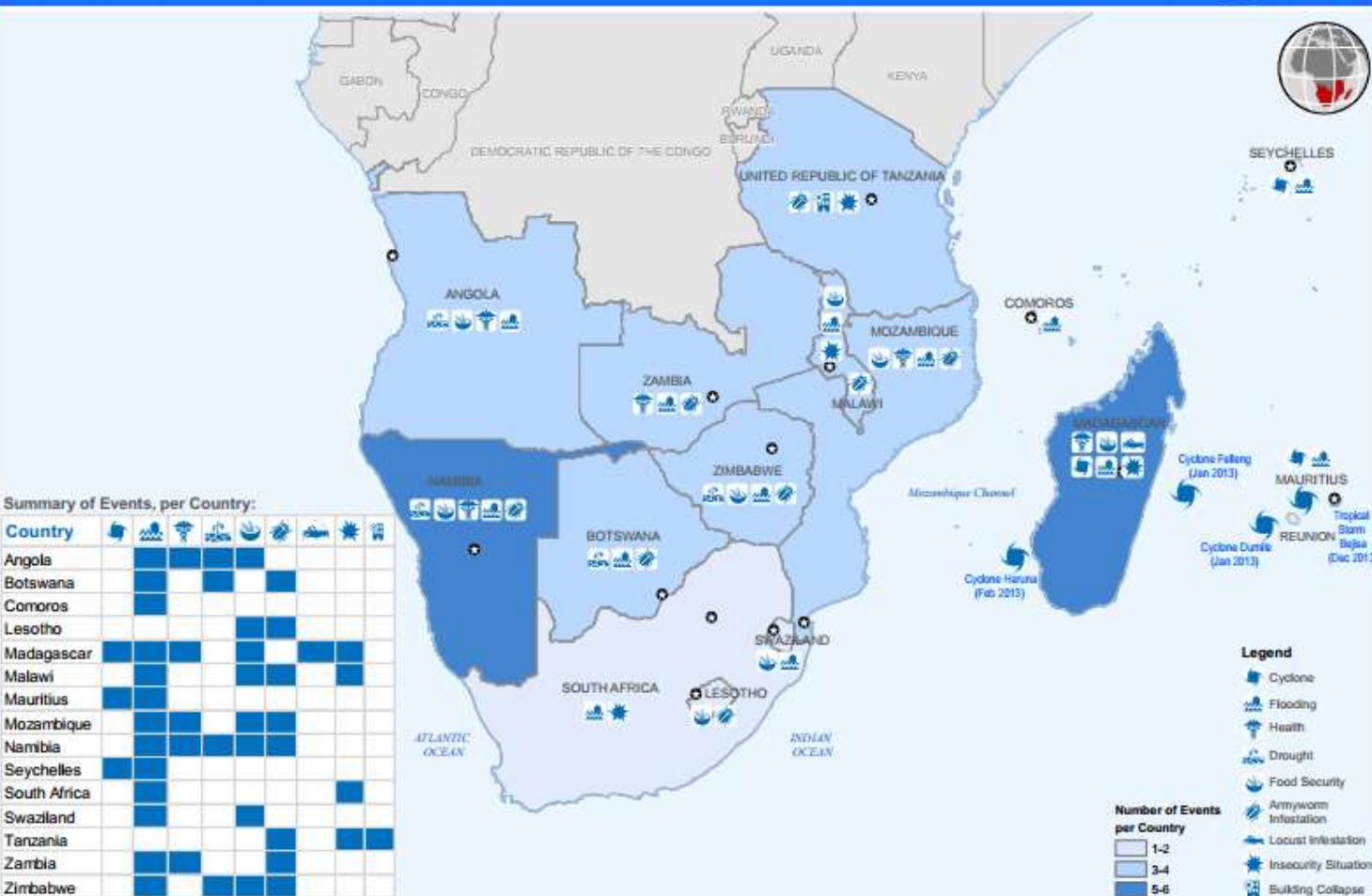


Natural disasters in SADC



SOUTHERN AFRICA: Relevant Humanitarian Events (2013)

OCHA



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

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

Flood in SADC

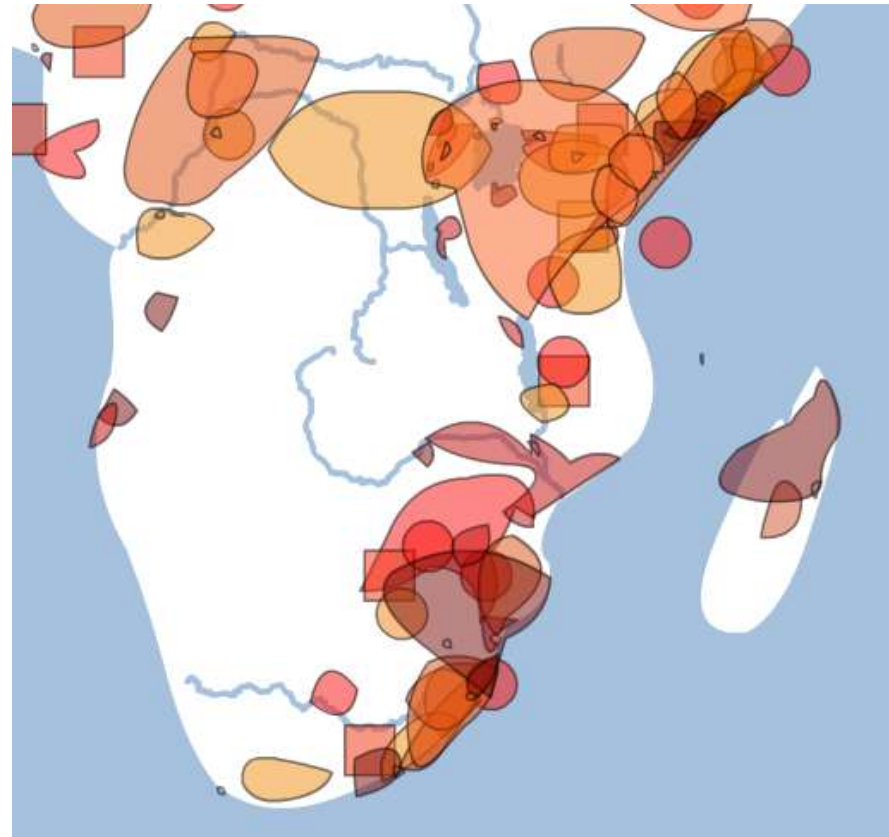


↳ Drivers:

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

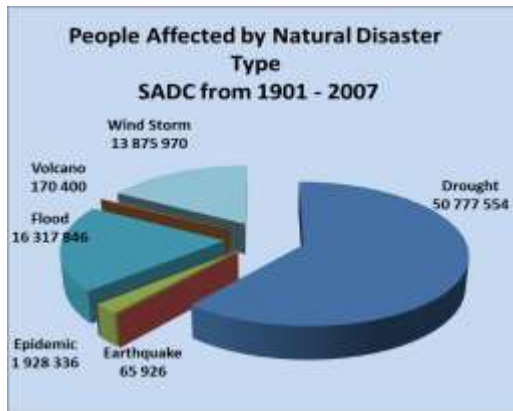
↳ Scale

- Large scale river floods
- Flash floods



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

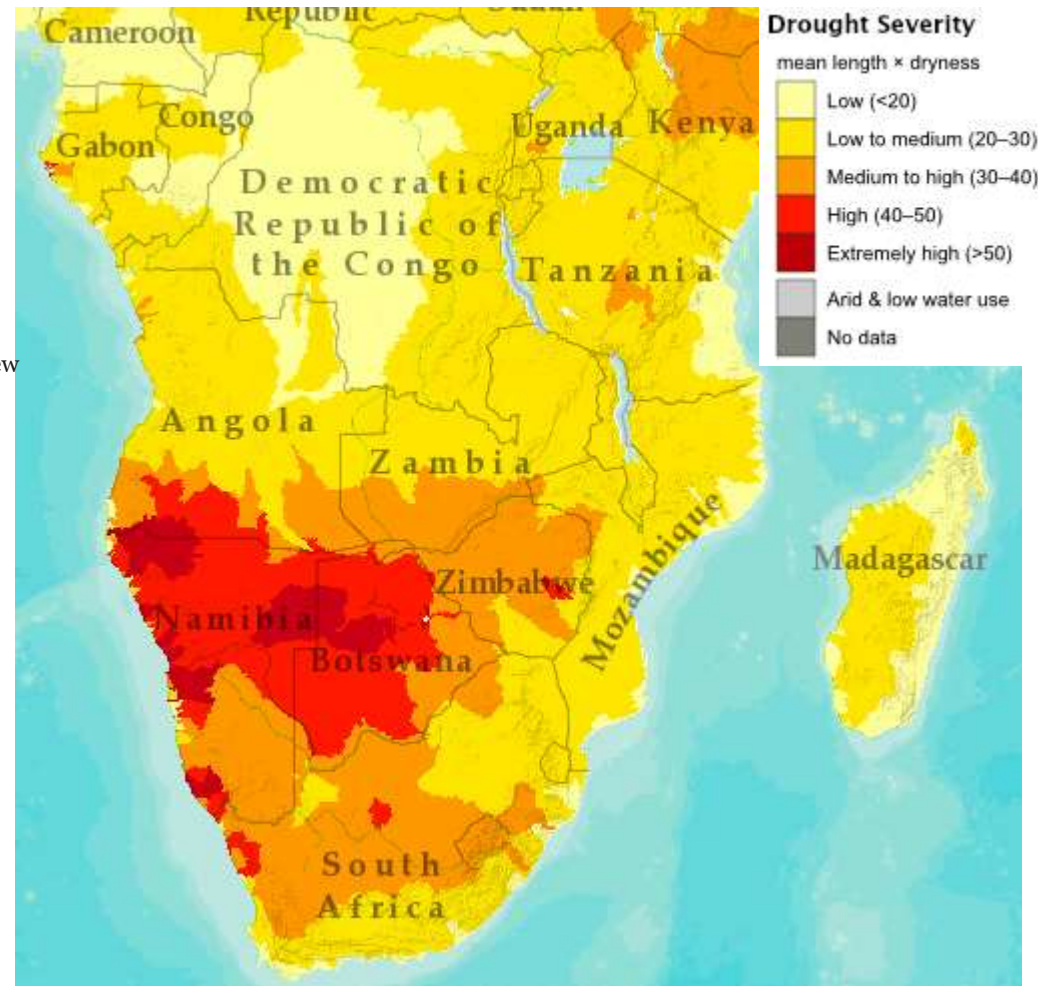
Drought in SADC



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

✦ 1992 drought

- South Africa
 - 1.2 ZAR billion
 - 1 % GDP
- Zambia
 - 30 ZAR million
 - 2.8% GDP



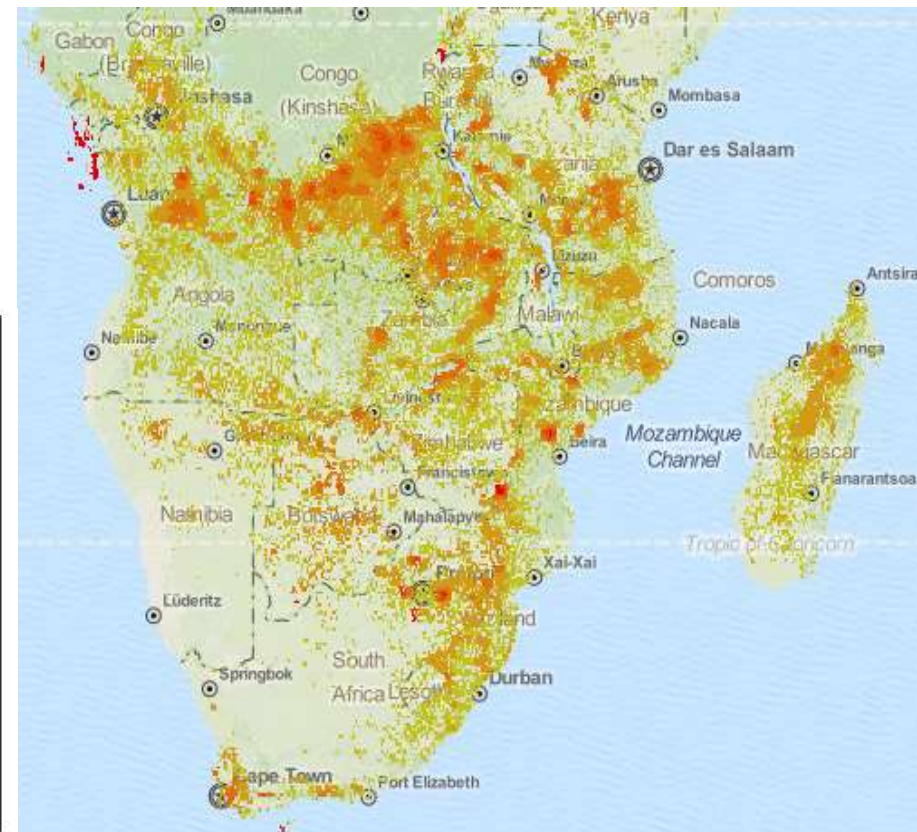
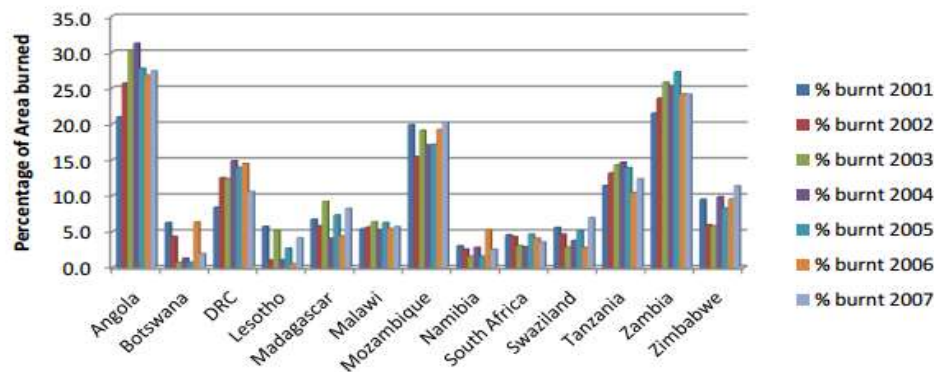
<http://www.wri.org/our-work/project/aqueduct/aqueduct-atlas>

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



<http://www.fire.uni-freiburg.de/GlobalNetworks/Africa/SADC%20Regional%20Fire%20Management%20Programme%20Document-Final-6.pdf>

Trans boundary allocation



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



<http://www.limpoporak.com/en/river/geography/basins+of+southern+africa.aspx>

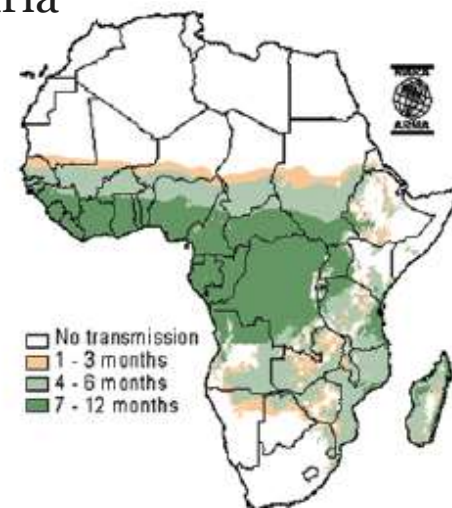
Health and climate change



Human

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

Expansion of malaria transmission time



Livestock

- Rift Valley Fever
- African Swine Flu

Crop

- Stem rust
- Fruit fly



2011 Blackleg infection in SADC

http://www.sadc.int/files/9313/5548/2461/SADC_ANIMAL_HEALTH_YEARBOOK_2011.pdf

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

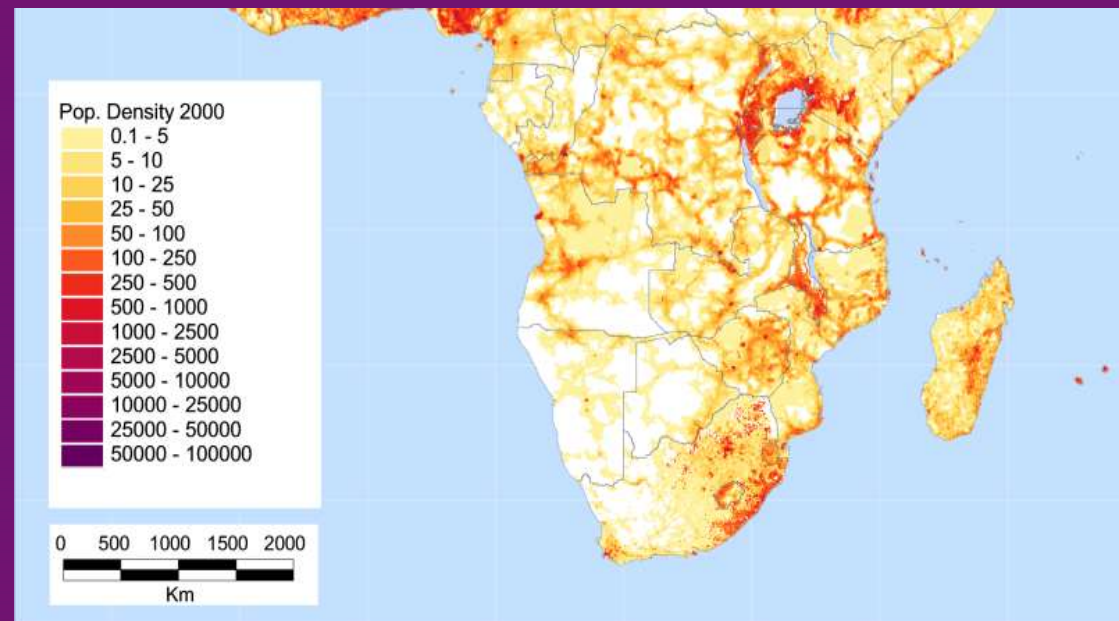
- Temporary residence permits per country (Africa)

✓ 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

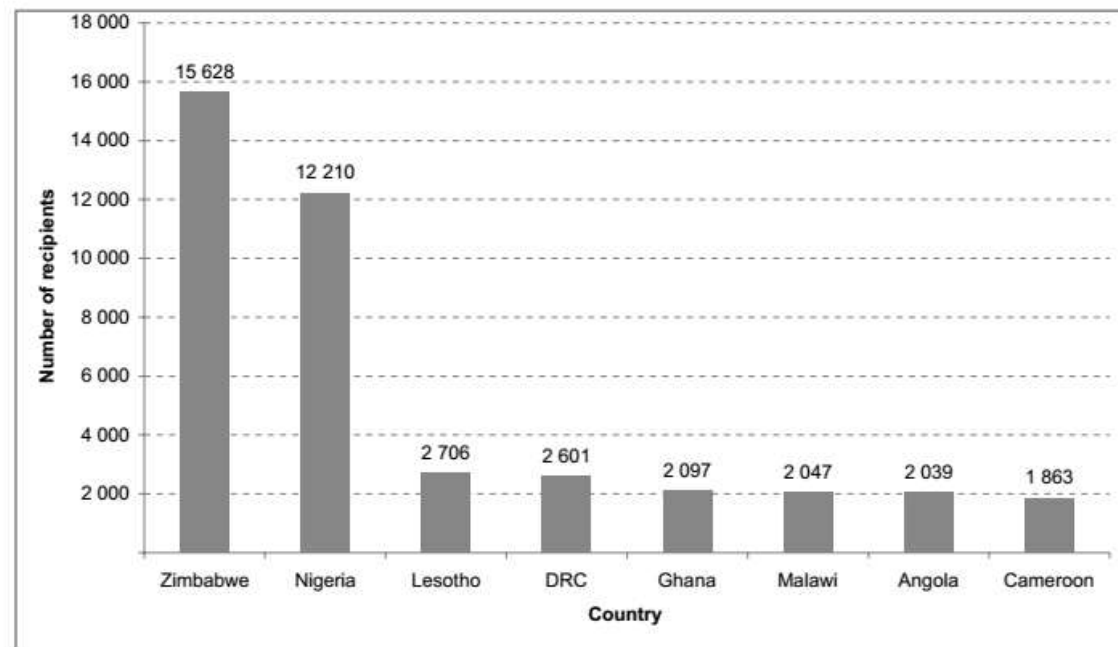
- SADC (29.9%)
- Asia (25.3%)
- Europe (15%)
- West Africa (14%)

✦ 'Sending'

- Mozambique
- Malawi
- Lesotho

✦ 'Receiving'

- South Africa
- Namibia



StatSA Documented immigrants in South Africa, 2011

South Africa Temporary Residence Permits

People Summary



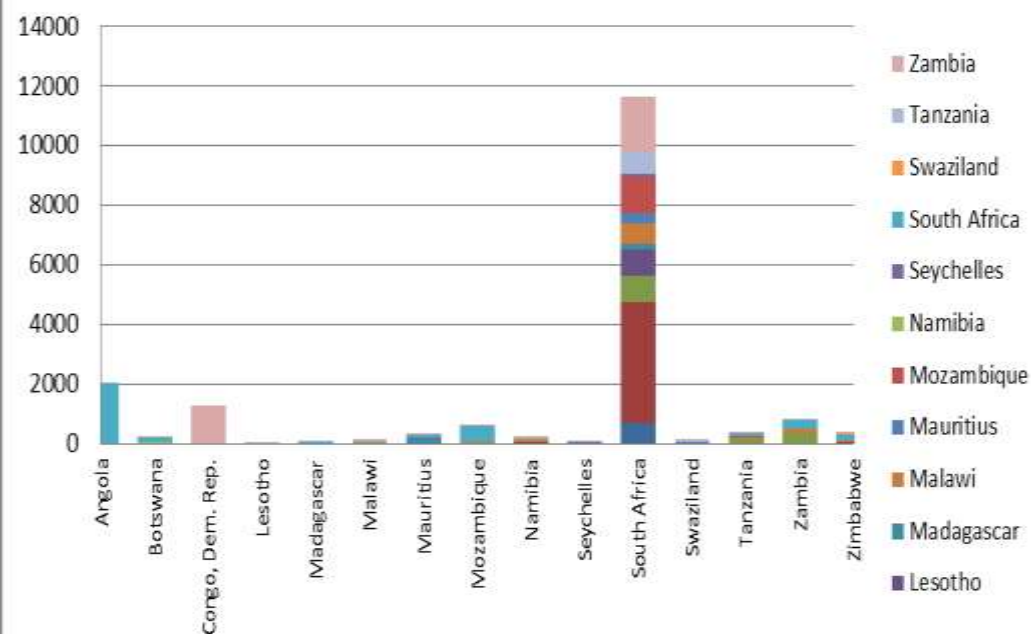
- ✦ Immigration
 - Concern
 - Opportunity
- ✦ Migration
 - health
 - urban infrastructure
- ✦ Resource requirements on:
 - water
 - food
 - energy
- ✦ Social dislocation (xenophobia)
- ✦ In addition to climate

Trade



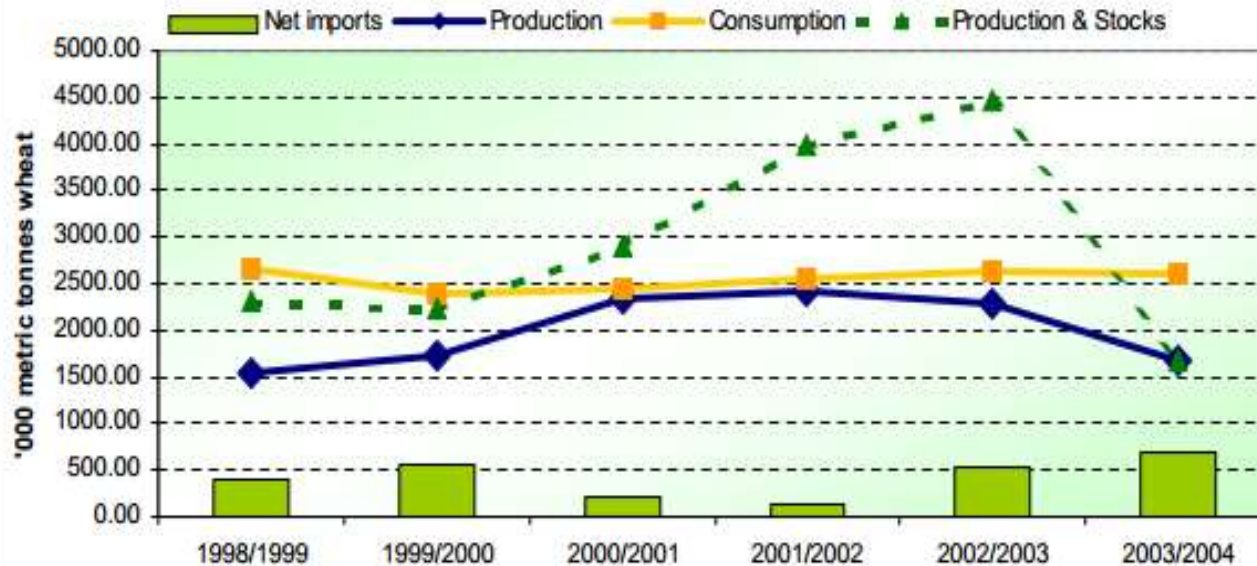
- Limited intra-SADC trade (relative to potential)

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



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

Trade



South Africa Wheat
Trade Balance
(1999 – 2004);

<http://www.thecropsite.com/reports/?id=1817>

- 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

Macroeconomic impacts



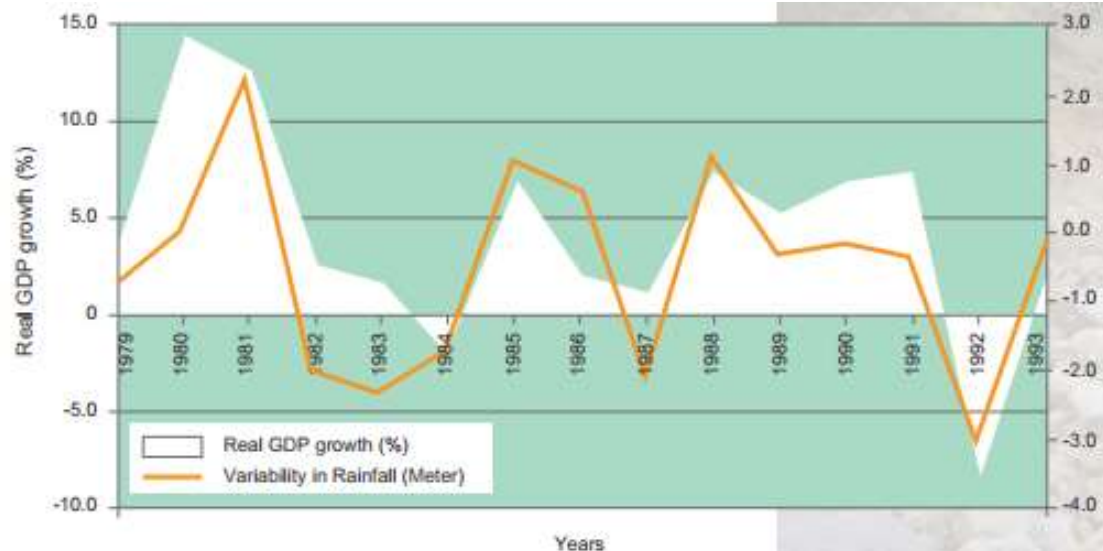
✦ RSA dependence on SADC

- 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)



Trade summary & key questions



- ✚ 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

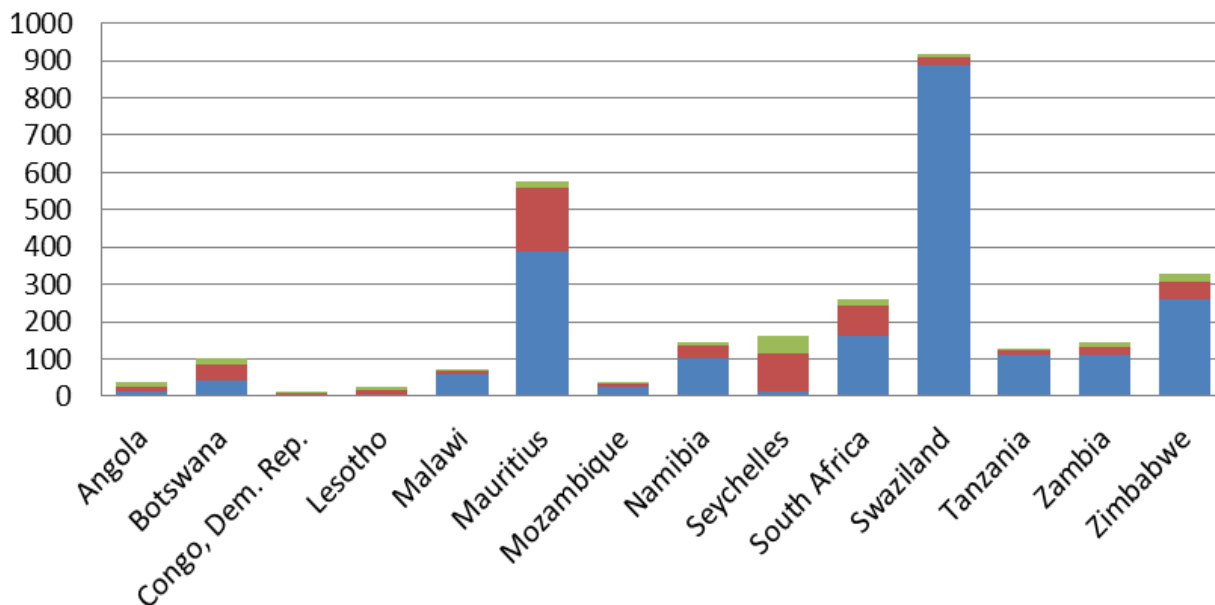
✓ Climate futures

SADC development context



- ✦ Economic development
- ✦ Resource endowment
- ✦ Infrastructure for resilience

Per capita freshwater withdrawal (cubic metres)



Per capita freshwater withdrawal (m³/inhab)
Domestic
Industry
Agriculture

World Bank Data, 2012

Development futures

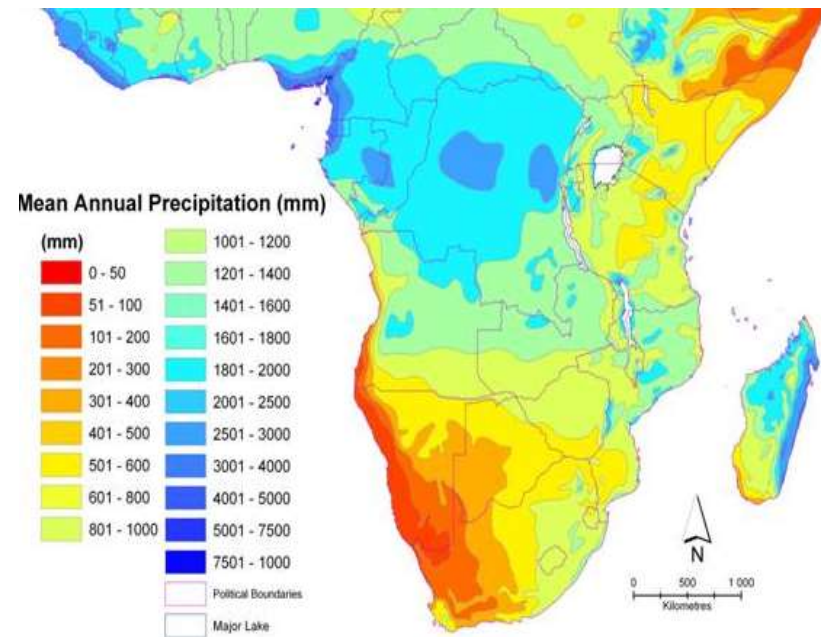


- ✚ Growth rates
- ✚ Nature of the economy
 - Mining
 - Agriculture
 - Tertiary
- ✚ Regional Trade
 - Resilience
 - Vulnerability

Climate in SADC



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



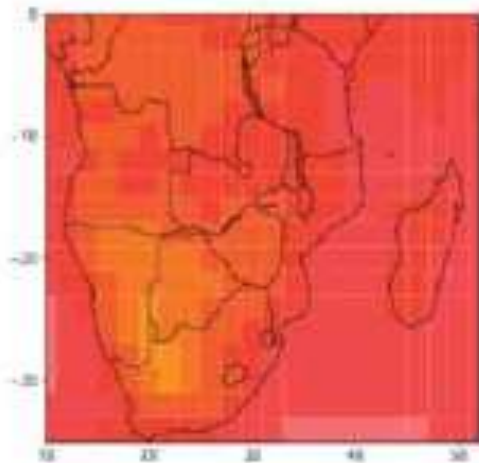
Climate impacts



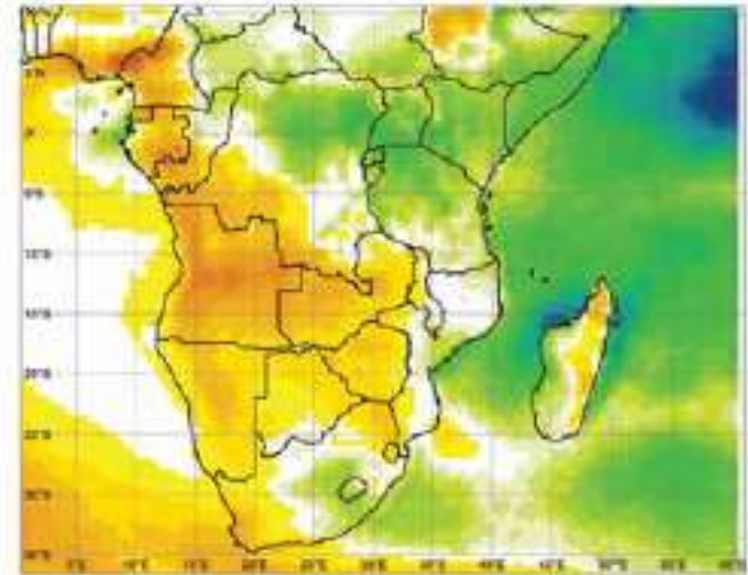
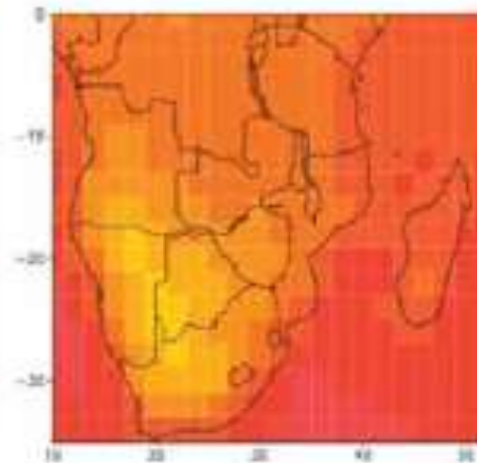
- Temperature:
 - warmer or hotter
- Rainfall variation

Projected change in annual temperatures based on GCMs

BI 50th percentile



A2 50th percentile



CSIR

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

