Risk trajectories of South African settlements
Western Cape initial findings

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Background

- Strong evidence that extreme weather events are becoming more frequent and intense with climate change expected to amplify these trends, particularly heat waves, floods, droughts, wildfires and storm surges.
- Strong evidence to support that Urbanisation will continue & that this will place even more pressure on infrastructure and service delivery.
- More frequent and intense events combined with a growing and urbanising population, poor land use practices, growing informal sector = likely exacerbate the vulnerabilities of communities and place more people at risk of climate induced disasters.
- Growth can be a catalyst for economic growth but effective planning and policy interventions are needed.
- Spatial planning will be vital to planning for peoples sustainable livelihoods.
Knowing **what** change to adapt for and **how** to adapt for this change is of critical importance to **decision makers** involved in the **planning** and **design** of human settlements.

The Green Book was commissioned with the aim of supporting municipal planning on the development of climate-resilient cities and settlements through research in climate adaptation.
South Africa’s urban future

SA is expected to follow the worldwide trend - experiencing high population growth and urbanisation. Current projections indicate and additional 19-24 million people to be added to the country in the next three decades. Vast majority of growth to be confined to cities and towns.
Western Cape’s population estimates 2050

By 2050, the population of the Western Cape is projected to increase by 2.7 million people.

Western Cape’s population is projected to reach 8.5 – 9 million people by 2050.
The fastest growing district municipality is the West Coast District Municipality, projected to increase by 65% (620,000 people) by 2050.
Western Cape’s population estimates

The fastest growing local municipalities are Bitou, Overstrand and Swartland, all projected to grow by over 100% by 2050.

Hessequa, Kannaland and Oudtshoorn local municipalities are projected to experience net population decreases by 2050.
Western Cape’s population estimates

Of the Western Cape's settlement population growth, 96% of this growth is projected to occur in:
- City Regions (72%)
- Regional Service Centres (10%)
- Service Towns (14%).
Western Cape’s population estimates

Western Cape Provincial Growth

Significant population growth projected for Malmsbury, Hermanus, Plettenberg Bay and Stellenbosch.

Declining population in settlements around Oudtshoorn.
Western Cape’s LM vulnerabilities

- **Socio-economic**: Households vulnerabilities (household composition, income composition, education, health, access to basic services, safety & security)

- **Economic vulnerability**: Economy of the LM (diversification, size of economy, labour force, GDP growth/decline pressure, inequality)

- **Physical vulnerability**: Access & infrastructure (road infrastructure, housing types, density, accessibility within the LM)

- **Environmental vulnerability**: Air quality, environmental governance, competition between ecology & urban encroachment)
Western Cape’s Local Municipalities vulnerabilities

1. High % of population have no secondary education
2. High % of population is not working age

1. High inequality
2. Low GDP production & Low GDP per Capita

1. Low GDP production & Low GDP per Capita
2. High % of unemployed and discouraged female workers
## Western Cape’s Local Municipalities vulnerabilities

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1. Road infrastructure (Low road density)
2. Low accessibility within municipality

1. Water Resources (Groundwater, Surface Water, Wetlands)
2. Environmental Health (Low Air Quality)

1. Road infrastructure (Low road density)
2. Housing Type (High % of informal & government subsidised housing)

1. Water Resources (Groundwater, Surface Water, Wetlands)
2. Ecological infrastructure (High amounts of conservation & protected areas)
Western Cape’s Local Municipalities vulnerabilities

Top 4 most vulnerable LM’s
- Bitou
- Knysna
- Prince Albert
- Beaufort West
2050 Projected changes in climate

Low mitigation (RCP 8.5)
Temp: 1C – 3C increase in both min and max temp
Very Hot Days (vhd)
• Up to 45 vhd more projected for the province
Extreme Rainfall Events
• Clear signal of decrease over most of the province, but specifically around the Cape Town peninsula and up along the Cape Fold mountains on the west coast, from the Hottentots Hollands to the Cederberg (up to 4 extreme rainfall events less).

High mitigation (RCP 4.5)
Temp: 1C – 3C increase in both min and max temp
Very Hot Days
• Up to 41 vhd more projected for the province
Extreme Rainfall Events
• Clear signal of decrease over most of the province, but specifically around the Cape Town peninsula and up along the Cape Fold mountains on the west coast, from the Hottentots Hollands to the Cederberg (up to 3.5 extreme rainfall events less annually).
Changes in heat stress
Flooding

The mean ratio of the near-future (2021-2050) and current (1961-1990) extreme daily rainfall (95th percentiles) for each quinary catchment.
Changes in drought

Drought Index (SPI)
Impact of Climate change on agriculture (RCP8.5)

2050
Impact of CC on agriculture

Hotter and drier
#1 Deciduous (Apples and pears)

Reduction in available winter chill and increased summer heat stress. High temperatures cause sunburn damage and reduce fruit quality. Increased evapotranspiration and irrigation requirements. Reduced suitability for apple production in the distant future.

Hotter and drier
#1 Citrus

Increased evapotranspiration and irrigation requirements. An increase in temperature will benefit a more heat-tolerant disease vector.
Impact of Climate change on agriculture (RCP8.5)

- Hotter and drier
  - Wheat
    - Increasing yield variability in the near future, declining over time as rainfall decrease. Areas suitable for wheat production shift south east wards.

- Hotter and drier
  - Rooibos tea
    - Reduced suitability in marginal, low rainfall areas. High altitude areas remains viable in near future. Increased yield variability.
Impact of Climate change on agriculture (RCP8.5)

- 2050 Impact of CC on agriculture

- 3.41% Gain in Agriculture GDP

- 0.29% Gain in Agriculture GDP
Coastal flooding exposure

790,763 buildings are located in the coastal risk zone.

1,035 buildings are located in the Very high and High risk areas.

2,712,322 people are located in the coastal risk zone.

2,250 people are located in the Very high and High risk classes.
Implications for Western Cape

- The significant population growth projected if not managed and planned for effectively, will place an enormous amount of pressure on bulk infrastructure delivery and will have critical implications for peoples exposure to natural hazards and resource availability (e.g. water)
- Increase demand for critical resources
- Heat stress on ecology
- Severe heat stress on livestock & availability of forage and water
- Heat stress on human comfort
- Warmer climate projections will have significant relevance for energy demand (increase demand for cooling in summer due to maximum temperature increase)
- Good socio-economic vulnerabilities resulting in more resilient households, clear improvement in past 15 years
- Good economic vulnerability resulting in more resilient local governments, clear signal of improvement in past 15 years (exemption of couple of LM’s e.g. Bitou)
- High environmental vulnerabilities due to competition between accommodating the urban growth and environmental protection of water sensitive and ecological sensitive areas. Ecological infrastructure needs protection
- Coastal flooding
- Increase in drought frequency (shifting climate)
Thank you