Risk trajectories of South African settlements
Northern 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.
Rationale for the Green Book

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.
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.
Northern Cape’s population estimates 2050

Northern Cape’s population is projected to reach 1.3 – 1.4 million people by 2050.
Northern Cape’s population estimates

Gamagara Local Municipality in which Kathu is located is projected to grow by 270%, or around 113,000 more people by 2050.

Neighboring Tsantsabane Local Municipality is also projected to see significant growth of over 110%, with population increases of 40,000 people between 2011 and 2050.

11 of the 26 local municipalities in the Northern Cape are projected to experience population declines. These range from -2.3% (1,000 people) in the Joe Morolong Local Municipality, to massive population declines of up to 63% (56,000 people) projected for the Sol Plaatje Local Municipality.
Northern Cape’s population estimates

The 2050 provincial population is projected to increase by only 250'000 people, although the provinces overall proportion of national population will decline from 2.2% to only 1.9% by 2050.

Of the Northern Cape's settlement population growth, 83% of the provinces population increases will occur in:

- Service Towns (41%)
- Small Service Towns & Settlements (23%) &
- Regional Service Centres (19%).
Northern Cape’s population estimates

- Kathu is projected to see the most substantial growth in the province.
- Population decreases for much of the west coast projected.
- Little to no change for Kimberley projected. Surrounding small towns & service towns can become stagnant, declining or “hollowing out”.
- Growth projected to occur along the Orange River in Upington.
Northern 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)
### Northern Cape’s Local Municipalities vulnerabilities

1. High % of population have low literacy level
2. High % of households live under minimum living level

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1. Low GDP growth
2. Low GDP production & Low GDP per Capita
3. High dependency on agricultural

1. Low GDP growth
2. Low GDP production & Low GDP per Capita
3. High dependency on mining
Northern Cape’s Local Municipalities vulnerabilities

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

1. Ecological infrastructure (High amounts of conservation & protected areas)
2. Environmental health (Air quality)

1. Human influence (Urban encroachment)
2. Ecological infrastructure (High amounts of conservation & protected areas)
Northern Cape’s Local Municipalities vulnerabilities

Top 4 most vulnerable LM’s

- Joe Morolong
- Phokwane
- Dikgatlong
- Kamiesberg
2050 Projected changes in climate

**Low mitigation (RCP 8.5)**
- Temp: 1.5C – 4C increase in both min and max temp
- **Very Hot Days (vhd)**
  - More vhd projected for the north (up to 92 vhd more)
- **Extreme Rainfall Events**
  - Clear signal of increase in eastern part of the province (up to 4 extreme rainfall events more)
  - Decreases in central Northern Cape plausible

**High mitigation (RCP 4.5)**
- Temp: 1C – 3.5C increase in both min and max temp
- **Very Hot Days**
  - More vhd projected for the north (up to 70-90 vhd more)
- **Extreme Rainfall Events**
  - Signal of increase in south-eastern part of the province (up to 3 extreme rainfall events more)
  - Decreases in north-eastern Northern Cape plausible (up to 2 extreme rainfall events less)
Changes in heat stress

Increase no. Very Hot Days
Low Mitigation Scenario
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)

**Hotter and wetter but drier towards end of century**

1. **Deciduous (Table grapes)**
   - Reduction in available winter chill and increased summer heat stress.
   - Insufficient winter chilling could impact on quality of table grapes in terms of skin colour and berry composition. Increased evapotranspiration and irrigation requirements.

2. **Sheep**
   - Increased availability of forage and water resources. Warmer winters could lower cold weather associated livestock mortality but are also conducive to the survival of pests and parasites that threaten livestock.
Impact of Climate change on agriculture (RCP 8.5)

Hotter and wetter but drier towards end of century
#2 Sheep

Increased availability of forage and water resources declining towards end of century. Increased heat stress on livestock towards end of century, leading to reduced growth & reproductive efficiency.

Hotter and wetter but drier towards end of century
#2 Wheat

Potential increase in wheat yield for near future. However, yield and crop suitability decline over time as temperatures start to exceed critical crop thresholds.
Impact of Climate change on agriculture (RCP 8.5)

8.52% Loss in Agriculture GDP

11.03% Loss in Agriculture GDP

2050 Impact of CC on agriculture
Coastal flooding exposure

- 3,385 buildings are located in the coastal risk zone
- 101 buildings are located in the Very high and High risk areas
- 9,089 people are located in the coastal risk zone
- 87 people are located in the Very high and High risk classes
Implications for the Northern Cape

• High economic vulnerability in LM’s and worsening signals & high socio-economic vulnerabilities (households) will make adaptation more difficult
• The LM’s with High dependency on mining (6 LM’s) & high dependency on agricultural economic sectors (4 LM’s) should consider diversification
• Increase in drought frequency for southern part of NC
• 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)
Thank you

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