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.
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.
The population of Mpumalanga is projected to increase by 1.9 million by 2050.
eMalahleni and Mkhondo Local Municipalities are projected to double in size between 2011 and 2050 and Steve Tshwete Local Municipality is projected to triple in size from 230,000 people in 2011 to 696,000 by 2050.

Dr JS Moroka Local Municipality is projected to decrease by as much as -35%, a projected loss of 88,000 people for the municipality.
Of Mpumalanga’s settlement population growth, 91% of this growth is projected to occur in:

- Regional Service Centres (44%)
- Cities and Large Regional Centres (31%)
- Service Towns (16%).
Mpumalanga’s population estimates

Extreme population growth projected for Witbank, Middelburg & Secunda.

Continued population declines projected around Acornhoek and Carolina.
• **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)
### Mpumalanga’s Local Municipalities vulnerabilities

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

1. Low GDP production & Low GDP per Capita
2. Low GDP growth

1. High % of unemployed and discouraged workers
2. Low GDP production & Low GDP per Capita

1. High % of households live under minimum living level
2. High child mortality rate
Mpumalanga’s Local Municipalities vulnerabilities

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

1. Environmental governance (High encroachment on protected areas and stressed catchments)
2. Environmental Health (Low Air Quality)

1. Water Resources (Groundwater, Surface Water, Wetlands)
2. Environmental governance (High encroachment on protected areas and stressed catchments)

1. Road infrastructure (Low road density)
2. High traditional population covering large area
Top 4 most vulnerable LM’s
- Mkhondo
- Bushbuckridge
- Dr Pixley Ka Isaka Seme
- Chief Albert Luthuli
2050 Projected changes in climate

Low mitigation (RCP 8.5)
Temp: 2.5C – 3.2C increase in both min and max temp

Very Hot Days (vhd)
- Up to 48 vhd more projected for the province

Extreme Rainfall Events
- Mixed signal for change in Extreme Rainfall Events (up to 3.5 extreme rainfall events more, projected for the south-west, and a decrease of 1 event annually in the central parts of the province)

High mitigation (RCP 4.5)
Temp: 1.8C – 2.9C increase in both min and max temp

Very Hot Days
- Up to 37 vhd more projected for the province

Extreme Rainfall Events
- Mixed signal for change in Extreme Rainfall Events (up to 3 extreme rainfall events more, projected for the south-west, and a decrease of 2 events annually in the central parts of the province)
Changes in heat stress

Increase no. Very Hot Days
Low Mitigation Scenario
*RCP8.5
The mean ratio of the near-future (2021-2050) and current (1961-1990) extreme daily rainfall (95th percentiles) for each quinary catchment.

*RCP8.5
Changes in drought

Drought Index (SPI) *RCP4.5
Impact of Climate change on agriculture (RCP8.5)

Hotter and wetter with more extreme rainfall events.

#1 Maize for grain

Potential increase in maize yield for near future. However, towards 2050, heat stress can negatively impact on production.
Impact of Climate change on agriculture (RCP8.5)

Hotter and wetter with more extreme rainfall events.

#2 Beef cattle

Increased water availability. Hot and moist conditions cause increased spread of disease and parasites. Reduced growth & reproduction performance due to heat stress.

Hotter and wetter with more extreme rainfall events.

#2 Maize for grain

Potential increase in maize yield for near future. However, towards 2050, heat stress can negatively impact on production. However, towards 2050, heat stress can negatively impact on production.

Hotter and wetter with more extreme rainfall events.

#2 Chickens

Increased production costs (and increased investment will be required in ventilation and cooling) to maintain optimal seasonal temperatures and reduce the risk of heat stress. Heat stress on birds can reduce body weight gain, reproduction efficiency and egg quality.
Impact of Climate change on agriculture (RCP8.5)

2050 Impact of CC on agriculture

16.94% possible Loss in Agriculture GDP due to shifts in climate

16.94% possible Loss in Agriculture GDP due to shifts in climate
Implications for Mpumalanga

- The significant population growth projected (eMalahleni, Mkhondo, Steve Tshwete) 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.
- Increase demand for critical resources.
- Very high economic vulnerability in LM’s and worsening signals for 14 out of 17 LM’s & high socio-economic vulnerabilities (households) for 8 of the LM’s will make adaptation more difficult.
- The LM’s with a high percentage employment dependency on AFF economic sectors (Mkondo, Dr. Pixley Ka Isaka Seme, Lekwa, Dipaleseng) should consider employment diversification.
- Heat stress on ecology (less severe than northern, north-western parts of the Country).
- Heat stress on human comfort (less severe than northern, north-western parts of the Country).
- Hot and moist conditions can cause increased spread of disease and parasites.
- Warmer climate projections will have relevance for energy demand (increase demand for cooling in summer due to maximum temperature increase).
Thank you

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