



# FRACTAL

FUTURE RESILIENCE FOR AFRICAN CITIES AND LANDS



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# *How can we plan for*

# CLIMATE

## KNOWLEDGE + DECISION CONTEXT

FRACTAL aims to fully understand the decision context and the climate science required to contribute to climate resilient development in nine southern African cities.

Academic knowledge is important but only provides a partial picture, so FRACTAL works to uncover the complementary societal knowledge as well. The project engages with scientists, engineers, government representatives and other stakeholders.

Working together, the researchers and stakeholders are co-producing knowledge that supports resilient development pathways and enables decision-makers to better integrate pertinent climate knowledge in their resource management and urban development planning decisions.

FRACTAL creates spaces for bringing stakeholders and different knowledge types together in order to understand and co-define each city's



# SMART CITIES *in Africa* ?

“The FRACTAL process is likely to create new working spaces where decision-makers and climate scientists pay more attention to each other’s voices than before.”

*Gilbert Siame  
Local PI, Lusaka*

unique **burning issues** and explore how the risks created by climate change might affect these.

**Learning Labs** have been held in each city. They are driven by co-discovery of city needs, providing a neutral setting for stakeholders to meet and co-produce climate-relevant knowledge that can point to potential solutions. Questions from decision-makers focus around possible climatic changes within a 20-30

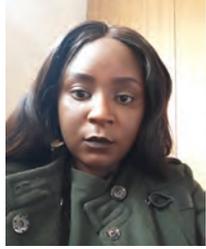
year time frame.

An **Embedded Researcher** (ER) approach has been implemented, enabling an academic researcher to sit within the municipality, contributing to FRACTAL’s understanding of the local context. The ER framework has been well received and encourages good working partnerships. Small Opportunity Grants have funded **city exchanges** to help develop regional networks and shared knowledge.

# 9 SOUTHERN AFRICAN CITIES

## LUSAKA | Zambia

**BRENDA MWALUKANGA** *Institutional partners have been engaged at the first Learning Lab resulting in joint planning and implementation for water security and resilience. We expect to see more learning and collaboration amongst stakeholders in the water and energy sectors.*



## WINDHOEK | Namibia

**KORNELIA IPIINGE** *FRACTAL has enabled learning exchanges between Windhoek, Harare and Lusaka. Through city learning processes in Windhoek we have also explored what climate information is needed for resilient infrastructure design.*



## GABARONE | Botswana

**LAPOLOGANG MAGOLE** *Researchers from the University of Botswana, together with key individuals from the water sector and city management, have developed climate narratives for Gaborone.*



## CAPE TOWN | South Africa



**AMY DAVISON** *Through FRACTAL, there has been interest shown in developing learning workshops that bring together City of Cape Town officials and academics in open discussion around climate and climate change.*

## JOHANNESBURG





## BLANTYRE | Malawi

**BURNET O'BRIEN MKANDAWIRE** *FRACTAL* has held an engagement workshop with multiple stakeholders and been part of an innovative discussion paper on a proposal to turn solid waste into energy. Climate narratives have also been developed.



## HARARE | Zimbabwe

**MZIME NDEBELE-MURISA** *GEC* funding has enabled research into climate risks, the nexus between climate, water and energy, and decision-making. A successful ER model was implemented. Exchange visits to Lusaka and Windhoek highlighted common water scarcity.



## MAPUTO | Mozambique

**GENITO MAURE** *The Maputo Water Dialogue* was the first event to bring multiple stakeholders at the city level to the same platform to discuss water issues. It shed light on where the gaps are likely located between producers and users of climate information.

## JOHANNESBURG | South Africa

**GIVEN MBARA, LEBO MOLEFE AND MZUKISI GWATA** *The Climate Change Adaptation Framework* reports have been presented to section 79 and mayoral committees and a green light has been given to engage further stakeholders.

## DURBAN | South Africa



**LULU VAN ROOYEN** *FRACTAL* has investigated ways to integrate climate change information into biodiversity planning. This has sparked interest in a series of workshops to mobilize climate change knowledge within various departments in the city.



*How can excellent research*

# CLIMATE

## ACTIONABLE CLIMATE KNOWLEDGE

Climate research has the potential to contribute to decisions for resilient development in southern African cities. However, there is a growing acknowledgement that climate knowledge is only really actionable if it is contextual.

The African cities where FRACTAL operates are complex, characterised by emergent properties and dynamism, and historically reactive decision-making. FRACTAL works to meet the

challenge of these fast developing cities and produce climate knowledge that is credible (academically), relevant (to the regional context) and significant (for the pressing needs of each city).

The FRACTAL team undertakes research across disciplines and knowledge types, including experiential knowledge from decision-makers and organisations working in each city, climate science, governance

each support

SMART

in

CITIES

Africa ?



“One of FRACTAL’s major aims is to distill defensible scale-relevant climate information that is informed by and tailored to urban decision-making and risk management.”

*Bruce Hewitson*  
CSAG

research, and impacts modelling. Ongoing **fundamental climate science** is being carried out to improve understanding of the physical climate processes that govern the regional system (observed and simulated).

Researchers and stakeholders unpack the unique socio-economic, governance and physical characteristics of each city in order to **understand climate sensitivities**, and enable decision-makers and planners

to consider these sensitivities.

Different knowledge types are brought together through social learning processes, exploring methods to undertake **transdisciplinary co-production** and identifying opportunities for context-specific capacity building. FRACTAL aims to foster an iterative learning process that moves beyond measurements of targets towards adjustment.

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