

SANSA Earth Observation Flood Decision Support Tool

**Presenter(s): Zintle Mbulawa
Morwapula Mashalane**



science & innovation

Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA



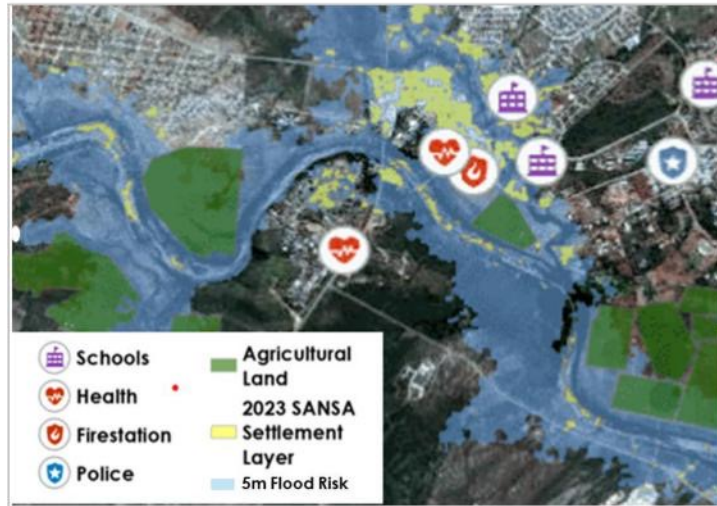
Why Monitor Water Quantity and Quality Using Remote Sensing?

- **Flooding is one of the most common and destructive natural disasters**, affecting millions of people and causing major economic losses every year.
- **This highlights the need for reliable tools** that can identify flood risk at national scale
- **Remote sensing (RS) provides a cost-effective way to simulate flooding, monitor floods** across large regions and over prolonged period.
- **Combining RS, GIS, and historical flood data** support flood mapping, early warning, emergency response, and long-term flood management.

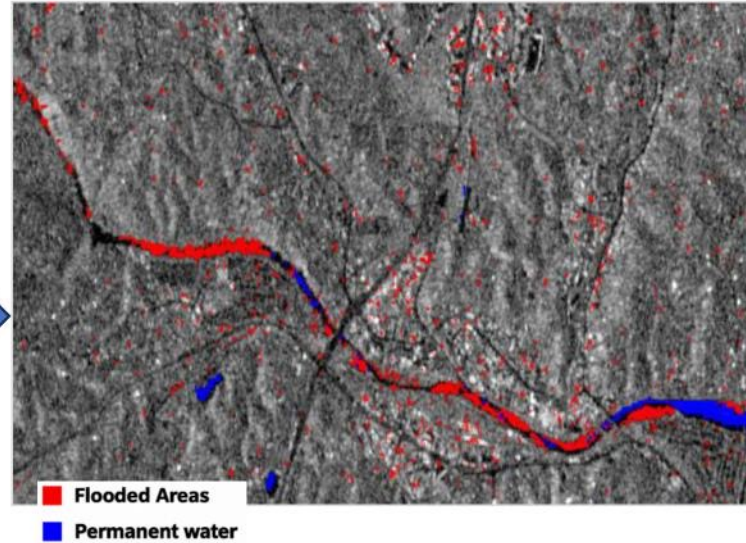


WHAT SPACE MAKES POSSIBLE: FROM FLOOD FORECAST TO ACTION

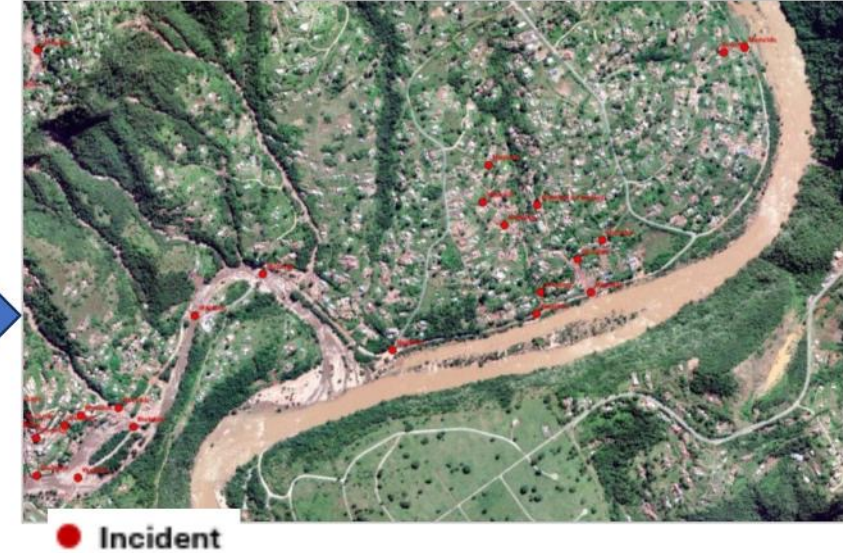
01



02



03



Flood Risk Forecast

Flood forecast and simulation to identify exposed settlements, agricultural land, and critical public infrastructure

Location: Limpopo, SA

Source :SANSA

Automated Post-Flood SAR Mapping

Detect and map flood extent using SAR data

Location: Umngeni River, KZN , 2022 floods

Source : SANSA

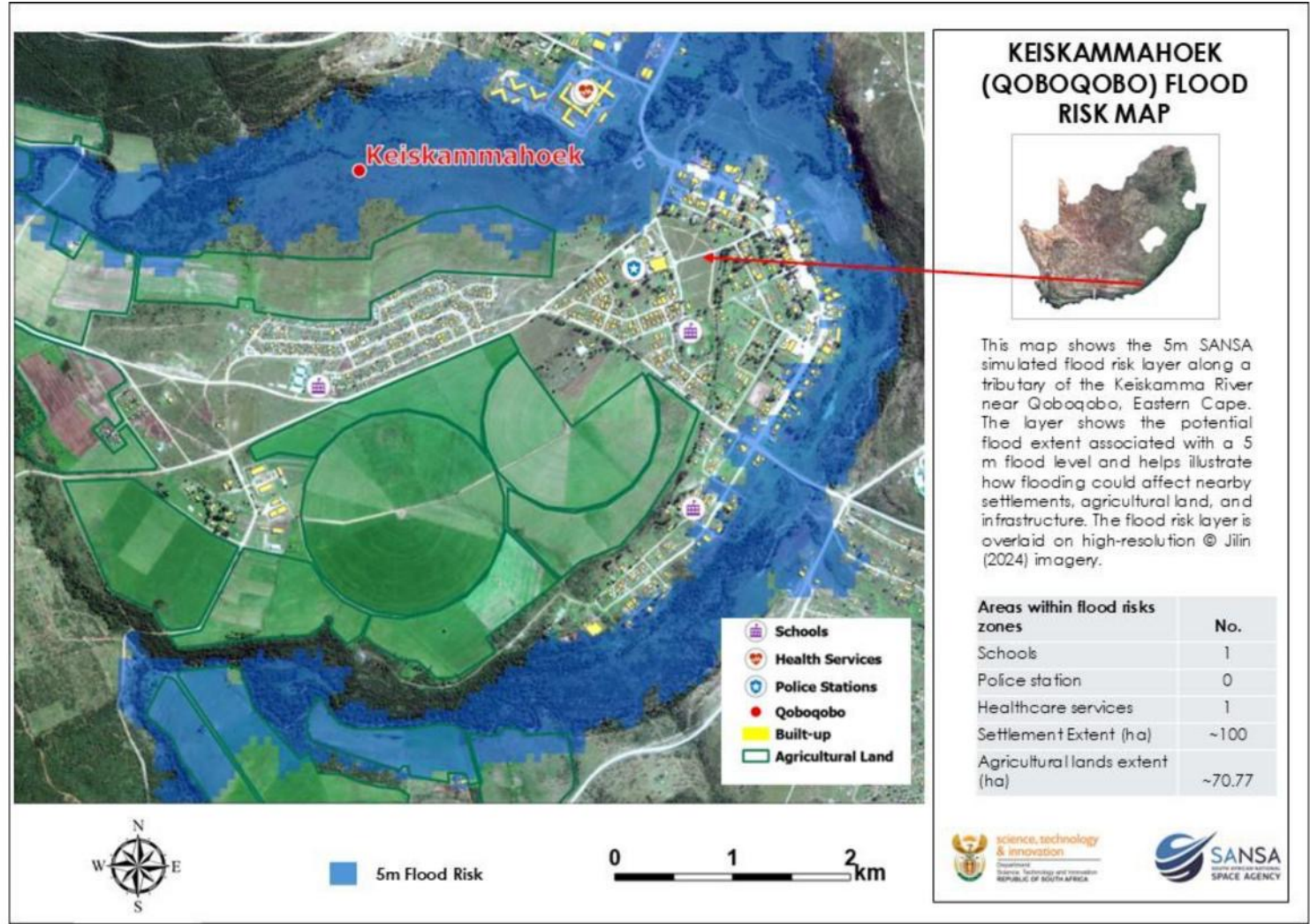
High-Resolution Damage Assessment

Assess flood impacts using high-resolution Satellite imagery

Location: Umngeni River, KZN , 2022 floods

Source : SANSA

Products derived from the Flood Decision Support Tool



Products derived from the Flood Decision Support Tool

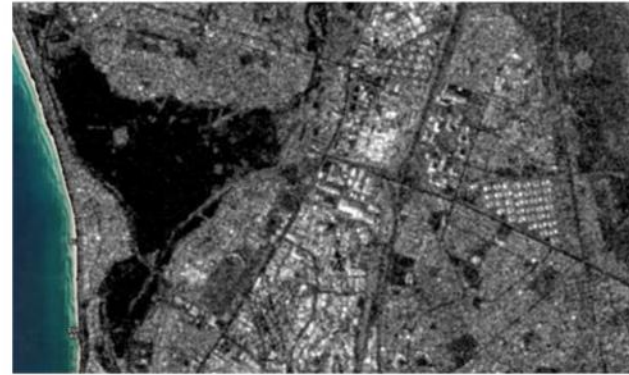
Floods in Cape Town, Reitsvlei



This compares **SANSA's 5 m simulated flood risk layers** with **Sentinel-1 SAR imagery of Reitsvlei Cape Town** to assess the impact of the **May 2026 floods**. It evaluates the model's accuracy by contrasting a **pre-flood baseline** with **post-flood conditions**

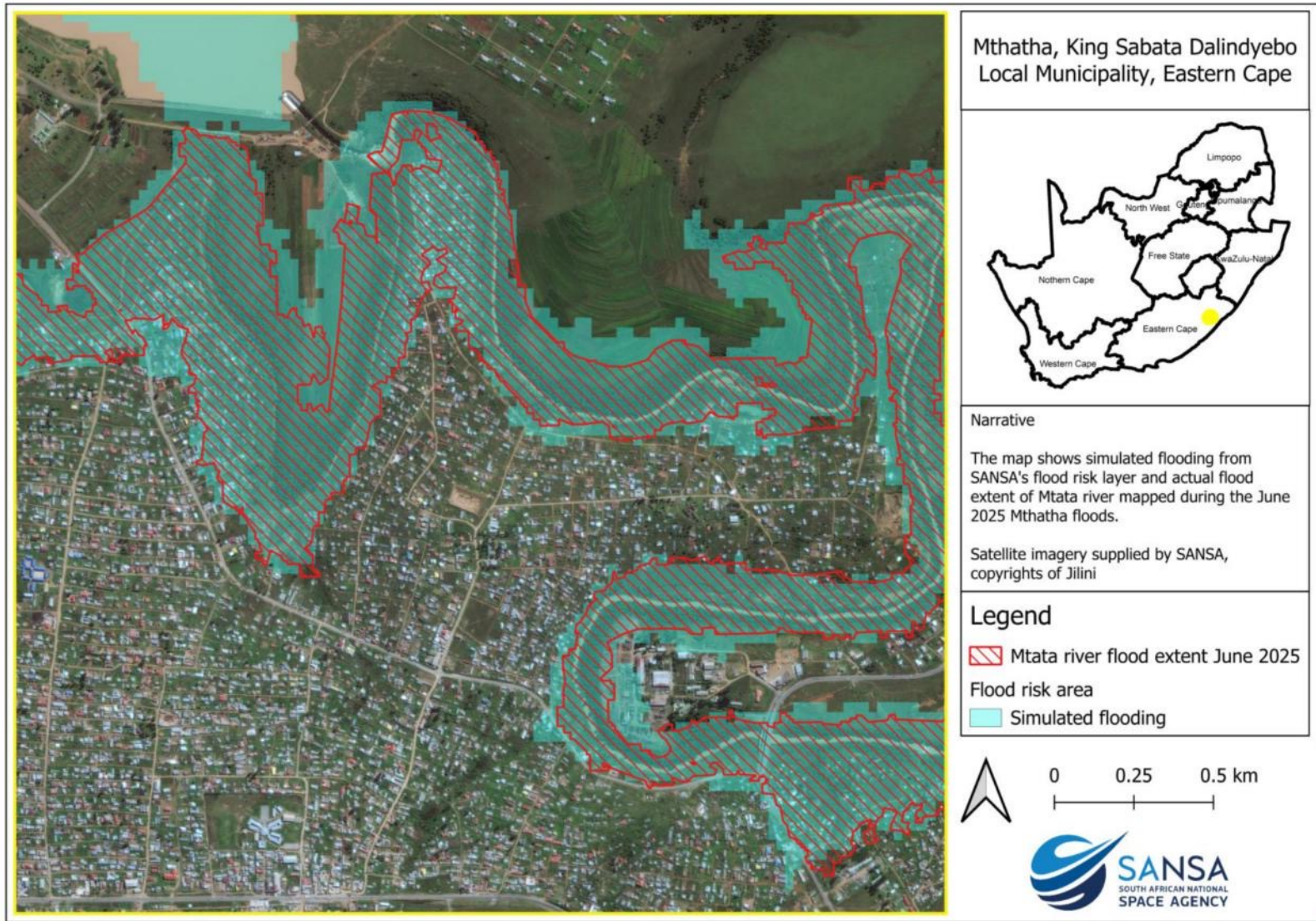


Sentinel-1 Satellite image showing before flooding (10 May 2026)



Sentinel-1 Satellite image showing after flooding (20 May 2026)

Products derived from the Flood Decision Support Tool



science & innovation

Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA



High resolution satellite imagery for floods mapping and damage assessment: Mthatha

Mthatha, Eastern Cape, South Africa



The map illustrate the area affected by flooding in Mthatha, Eastern Cape South Africa. As observed on Legion 02 Satellite imagery obtained on the 13 June 2025, several structures were damaged and swept away due the severity of the flooding. The before image Legion 02 ,image date 29 April 2025.



science & innovation

Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA



Legend

• Swept away house

0 0,03 0,06 0,12 KM



SANSA Flood prediction vs actual flooding.

The modelled and predicted flooding areas continuously experience flooding throughout the country. Examples are the KZN 2019, 2022, 2025 floods where informal settlement along Umlazi river was flooded, and Thabazimbi 2025 February floods where crop fields and roads (R510 and R511) along crocodile river were affected.

Picture frame a demonstrate predicted flooding, b indicated area before flooding and c shows after flooding.

-  Thabazimbi
-  Umlazi Mega Mart: Durban



Relevance of Flood DST For South Africa

- **Provides spatially continuous flood information** using Earth Observation, GIS and modelling.
- **Improves emergency response and damage assessment** during and after flood events.
- **Supports disaster risk planning and management** by identifying exposed communities and infrastructure.
- **Supports flood early warning and preparedness** across vulnerable areas. i.e. Help you answer the question (“1. What areas/settlements are at risk of flooding in my municipality, District, Province? 2. How many households are at risk of flooding in my municipality, District, Province?”)

How to get access to Flood Decision Support Tool

Visit: dss.sansa.org.za

Google search “sansa decision tools”

Register as a User

Permanent use for R800 000



THANK YOU,

zmbulawa@sansa.org.za



science & innovation

Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA

