



From Earth Observation to Natural Capital Intelligence: Using EO-Derived Decision Support Tools to Inform Environmental Decision-Making

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Outline of Presentation

- SANSA Mandate and Overview
- From Earth Observation to Natural Capital Intelligence
- Why does Earth Observation Matter?
- From EO Data to Decision Support
- Air Quality Decision Support Tool
- Water Decision Support Tool
- Disaster (Flood) Decision Support Tool
- Roadmap: Expanding SANSA's Decision Support Portfolio
- The Link to Natural Capital Accounting
- Decision-Ready Evidence
- Conclusion



OUR MANDATE

“...Provide for the promotion and use of space and cooperation in space-related activities, foster research in space science, advance scientific engineering through human capital and support the creation of an environment conducive to industrial development in space technologies within the framework of national government policy...”.

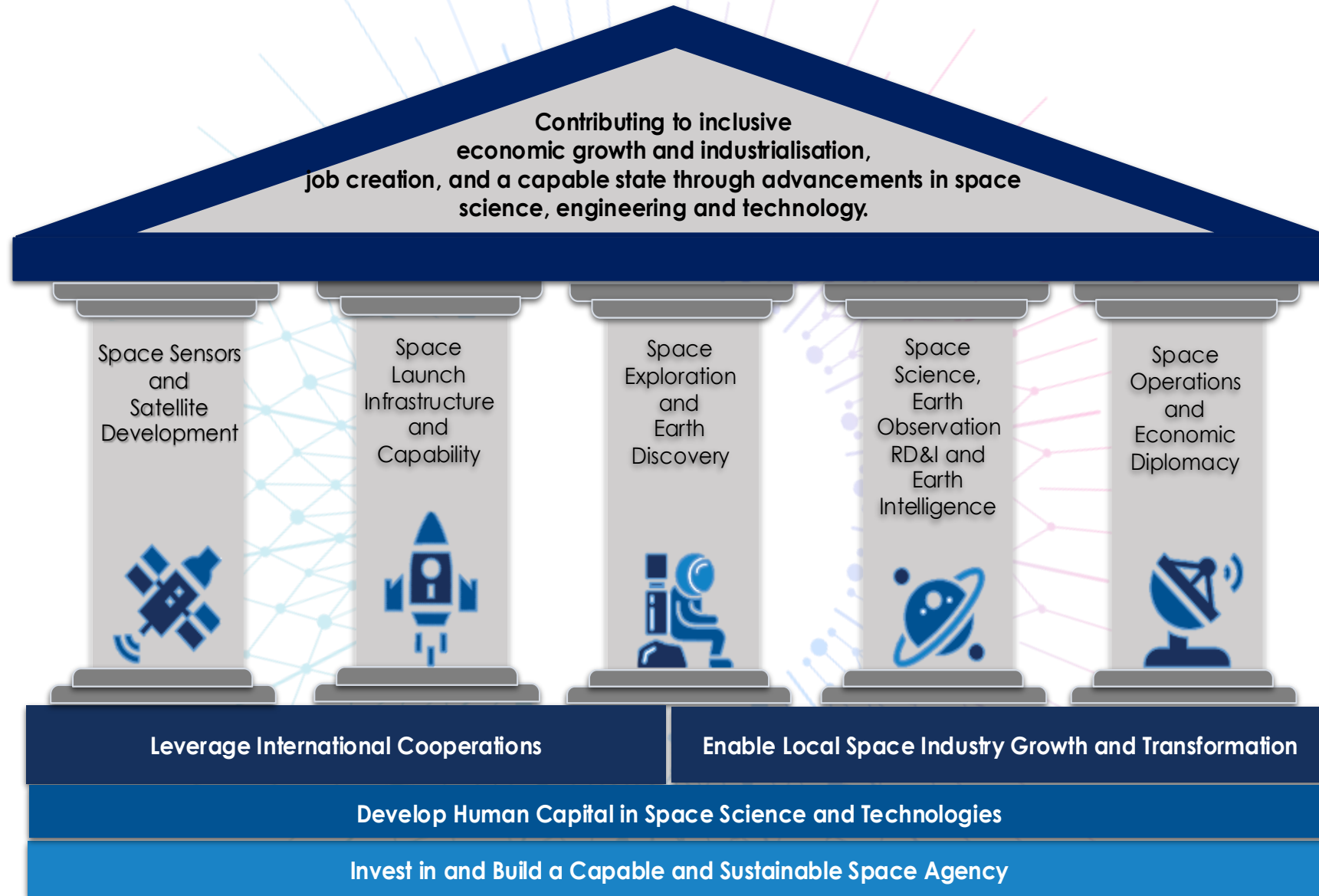


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SANSA STRATEGIC PILLARS 2025-2030

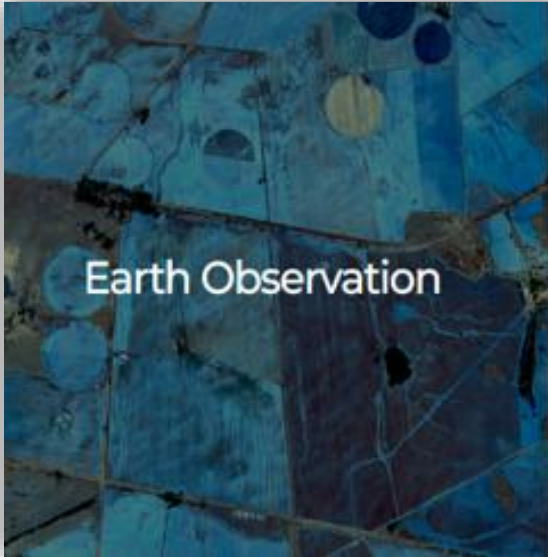


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KEY PROGRAMMES



Earth Observation



Space Engineering



Space Operations



Space Science



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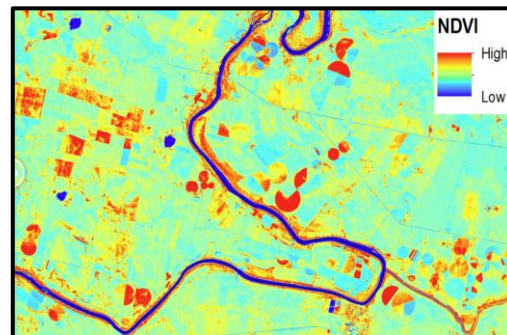
From Earth Observation to Natural Capital Intelligence

- Natural Capital Accounting: we are trying to understand the **extent, condition and changes** in the natural **assets** on which our economy and society depend.
- Earth Observation gives us something very powerful in this context: the ability to **observe those assets consistently, repeatedly** and **spatially** across the country.
- How best can we **convert EO observations into indicators and evidence** that government can actually use.
- Focus: to explore how **Earth Observation-derived** information can **contribute** to the broader **Natural Capital Accounting** agenda by providing evidence on the **state, change and pressures** affecting our natural resources.

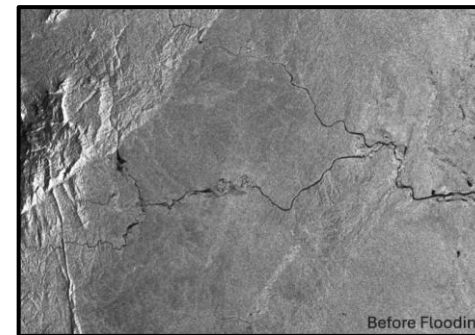
Water



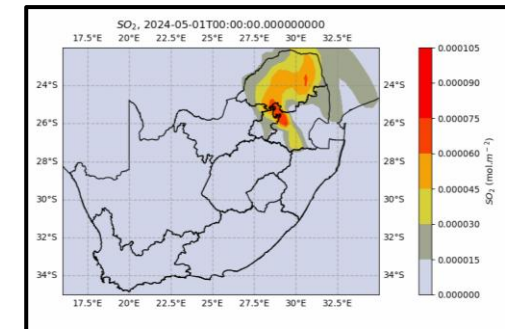
Vegetation



Flood



Air and Climate



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Why does Earth Observation Matter?

Our **environment is changing** and Government needs to understand:

- Where **environmental resources** are located?
- What **condition** they are in?
- How they are **changing over time**?
- What **pressures are driving those changes**?
- Where **risks and impacts** are occurring?
- What **interventions** are required?
- Whether **interventions are working**?
- This is where **Earth Observation** becomes particularly **valuable**.
- **Satellites provide** repeated observations of the same areas over time. This allows us to move from isolated observations towards **systematic monitoring of environmental change**.

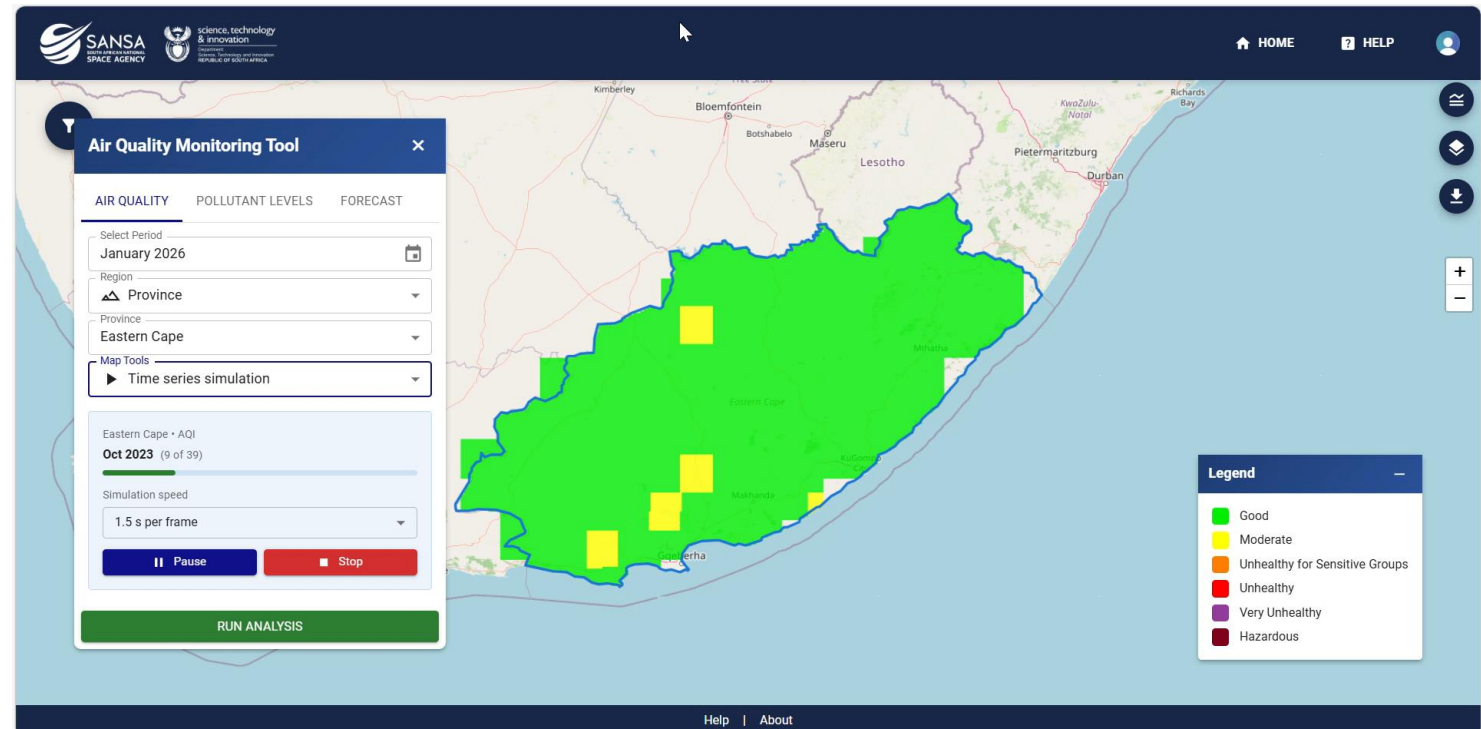
From EO Data to Decision Support

- There are enormous amount of Earth Observation data available. One of the [key challenges](#) we identified at SANSA is that simply making [satellite data available does not necessarily result in better decisions](#).
- Decision Support Tools [translate complex EO datasets into information](#) that can be consumed by government departments, municipalities, researchers and other stakeholders.
- Our approach is to [build a value chain from satellite observation](#) all the way to [decision support](#). The tools bring together Earth Observation products, environmental indicators and other government and scientific datasets.
- The objective is to move from simply asking "[What does the satellite show?](#)" to asking "[What does this mean for government?](#)"
- We currently have three operationalised Decision Support Tools focusing on [Air Quality, Water and Disaster Risk](#). We are expanding this capability into areas such as [agriculture, natural resources and the built environment](#).
- This is particularly [relevant to Natural Capital Accounting](#) because these domains correspond to different components of our natural and environmental assets.

Air Quality Decision Support Tool

The Air Quality Decision Support Tool is developed to provide [real-time, satellite-derived forecasts](#) of key [pollutants](#) across South Africa. The tool delivers users with near real-time data on the [National Air Quality Index](#) (NAQI), integrating satellite-derived data to present a comprehensive overview of ambient air quality conditions. [Key atmospheric pollutants](#) monitored include:

- Sulphur Dioxide (SO₂),
- Nitrogen Dioxide (NO₂),
- Carbon Monoxide (CO),
- PM 2.5,
- PM10.



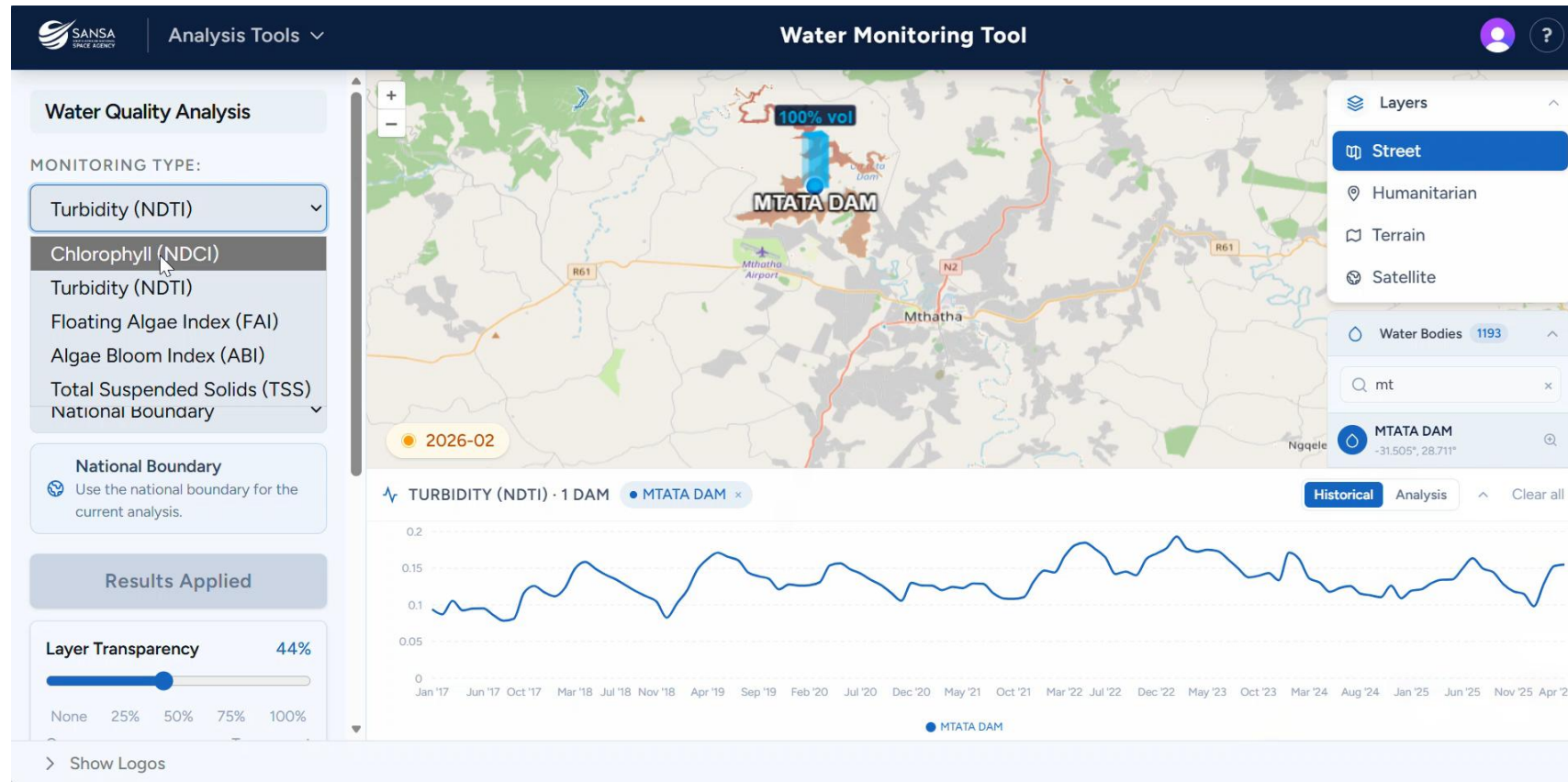
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Water Decision Support Tool

The Water Monitoring Decision Support Tool aims to provide **near-real-time monitoring** of water resources, including **quantity** and **quality**. It will support sustainable water resource management, compliance monitoring, and risk assessment in the context of **droughts, pollution events, and climate change impacts**.



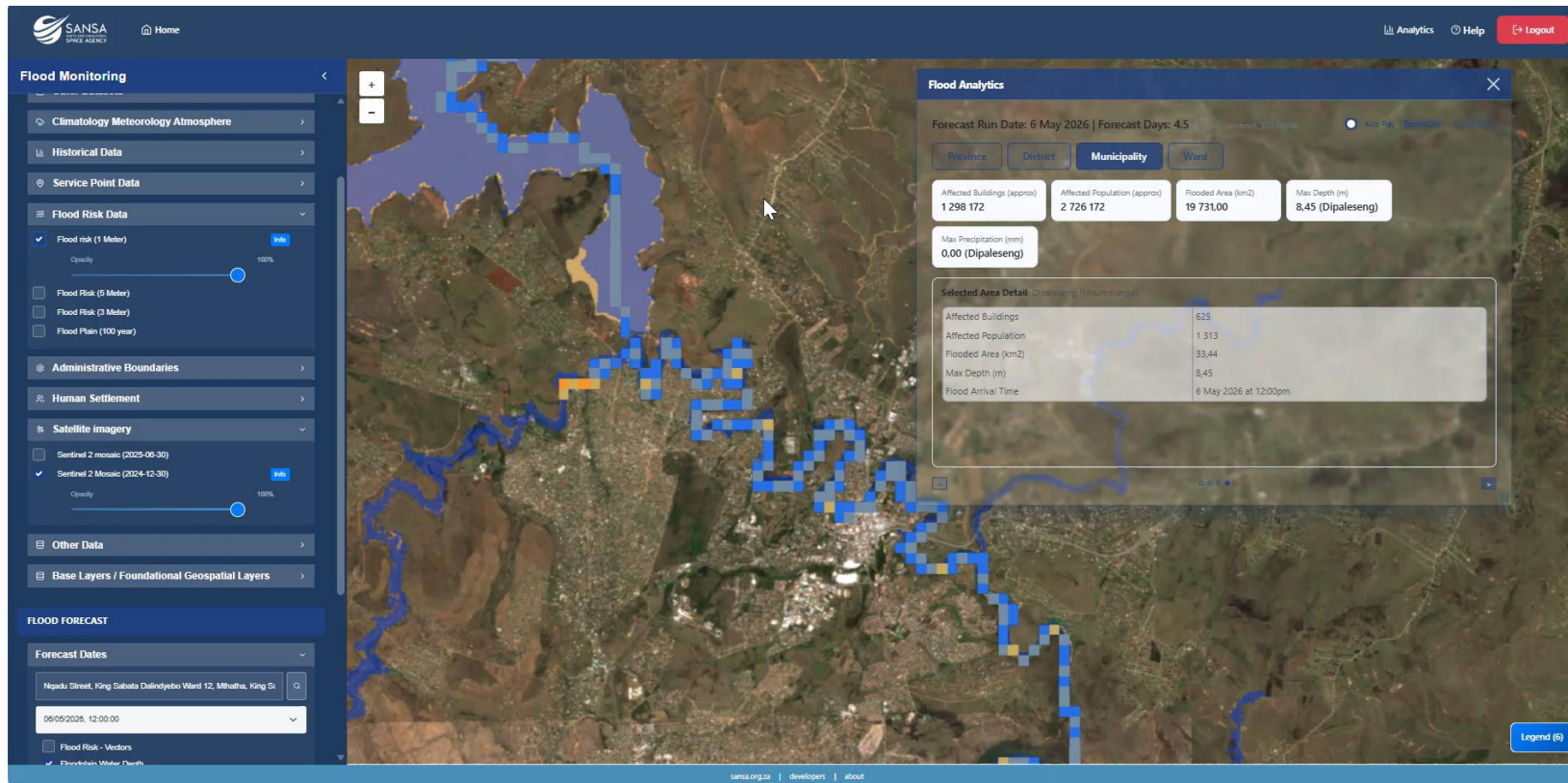
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Disaster (Flood) Decision Support Tool

The Flood Decision Support Tool is designed to enhance disaster preparedness, response, and recovery through Earth observation and predictive analytics. It will support decision-makers with near-real-time situational awareness, risk mapping, and early warning systems for floods.



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Roadmap: Expanding SANSA's Decision Support Portfolio

26/27 Financial Year

- **Agriculture/Rangeland** (orchard monitoring, land degradation)
- **Built Environment** (urban growth, informal settlements, infrastructure risk)
- **Forestry** (Forest change, species distribution, forest health)

27/28 Financial Year

- **Marine and Maritime** (coastal change, harmful algal blooms, vessel monitoring)
- **Mining** (land degradation, environmental compliance, rehabilitation)

This [phased approach](#) will broaden the application of Earth Observation services across key sectors of the South African economy.

The Link to Natural Capital Accounting

EO Can Support Multiple Components of the NCA Framework

- Earth Observation should not be viewed as a replacement for Natural Capital Accounting.
- Rather, it provides an important **evidence layer that can strengthen** the accounting process.
- It can support **measurements of extent and condition**, provide information on **change and pressures**, and help **spatially locate areas** where ecosystem services and risks are concentrated.
- Integrated Natural Capital Intelligence: examine how **changes in land condition affect water resources**, how **disasters affect ecosystems and agriculture**, or how **environmental pressures** are distributed across **municipalities**.
- This begins to create an **integrated natural capital intelligence** capability.

Decision-Ready Evidence

Earth Observation is one component of the evidence ecosystem

- The strongest decision-support systems are created when EO is [integrated with government datasets, ground observations, statistics, models](#) and scientific knowledge.
- This is also important for Natural Capital Accounting because accounting frameworks require [multiple sources of information](#).

Building a National EO Evidence Infrastructure

- SANSA's role is therefore [broader than providing satellite imagery](#). We have an opportunity to contribute to a national evidence infrastructure that [supports environmental monitoring and decision-making](#). Our Decision Support Tools are one practical manifestation of this capability.
- Key Message From: "[What natural resources do we have?](#) "Towards: "[Where are they, what condition are they in, how are they changing, what services do they provide, and where should we intervene?](#)" That is the opportunity for [EO-enabled Natural Capital Intelligence](#).

Conclusion

Earth Observation can make Natural Capital Accounting **more spatial, dynamic and decision-oriented**. Earth Observation gives us the ability to continuously observe our natural environment. Natural Capital Accounting gives us a **framework to understand the value and condition** of that environment. Together, they can provide government with a **stronger evidence base for sustainable development**.

Together, we continue to make a meaningful impact through research, innovation, and service excellence.

THANK YOU

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