



science
& technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

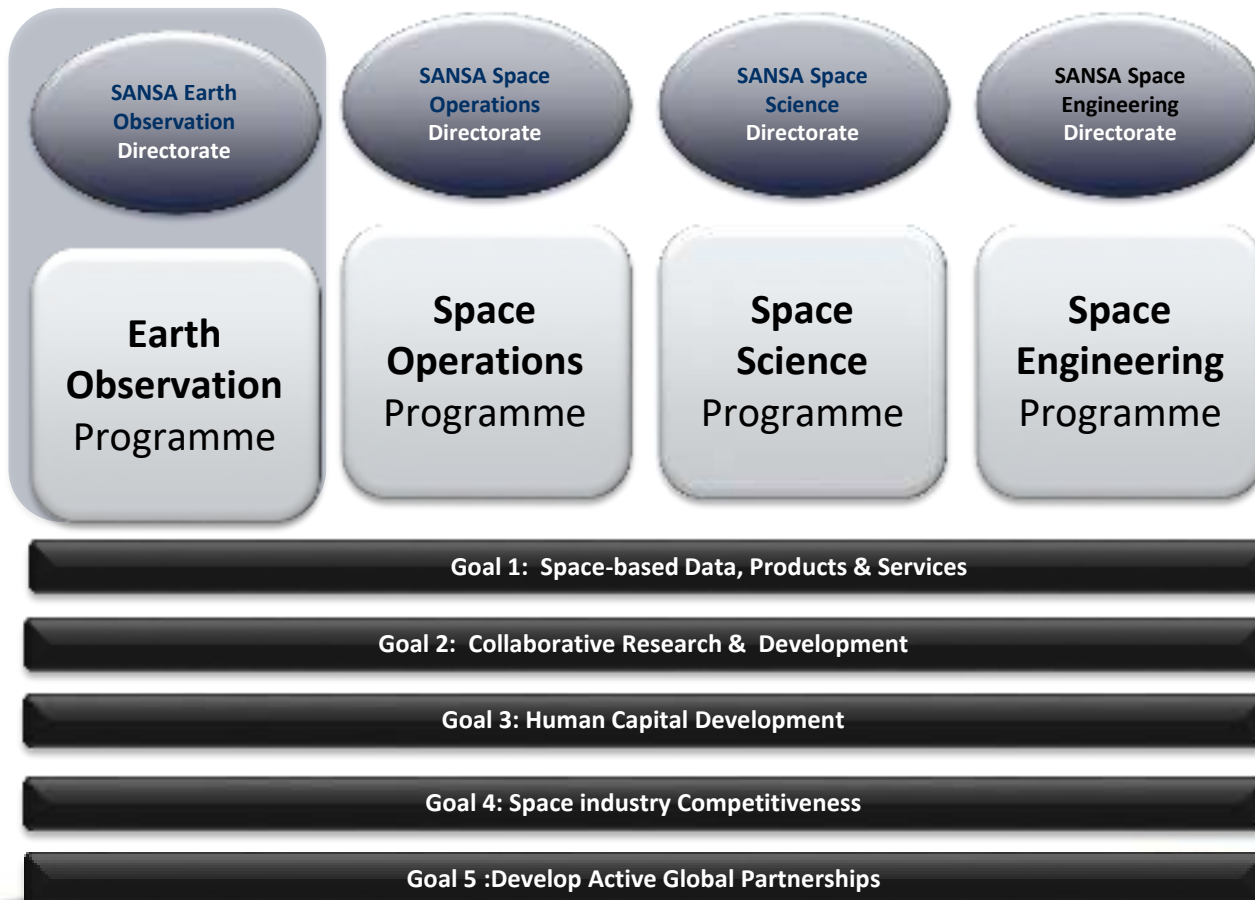


Remote Sensing in Disaster Management

Spatial products for early warning and disaster management

DISASTER MANAGEMENT CAPACITY WORKSHOP: DIMTEC-UFS / UN-SPIDER Workshop

To position “South Africa as an international hub for space solutions for the world of the future”



Our core business

- Sensor Portfolio Management & Data reception
- Data Archiving, Processing & Dissemination
- Geo-information Products & Applications

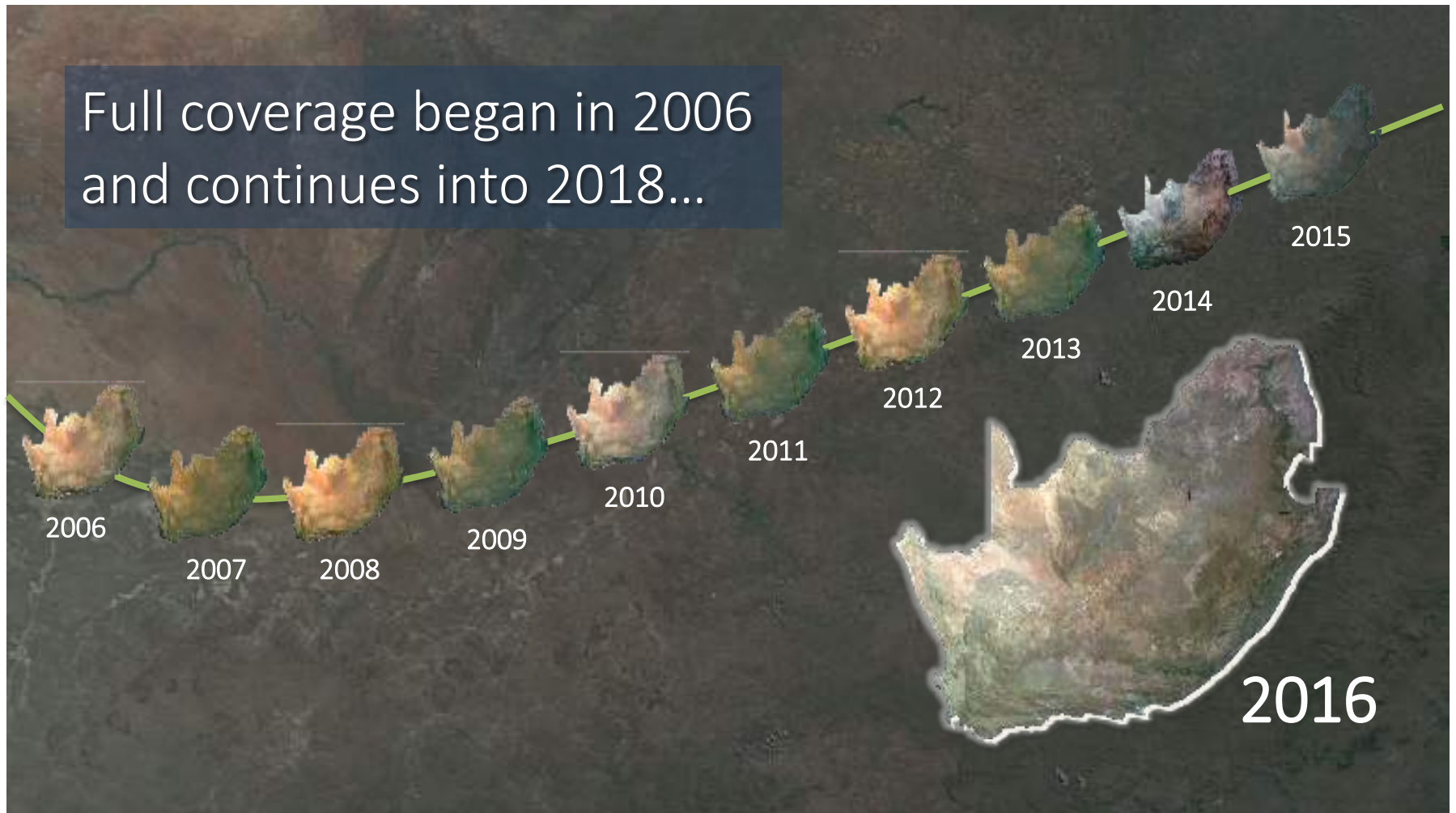


- Data reception
- Archive
- Data processing
- Data dissemination
- Geo-information Products & Applications

Contribute to

- greater utilisation of earth observation in addressing day-to-day societal problems & needs
- better planning & decision making; performance monitoring; environmental & resource management; disaster management; national security & health

Satellite image mosaic



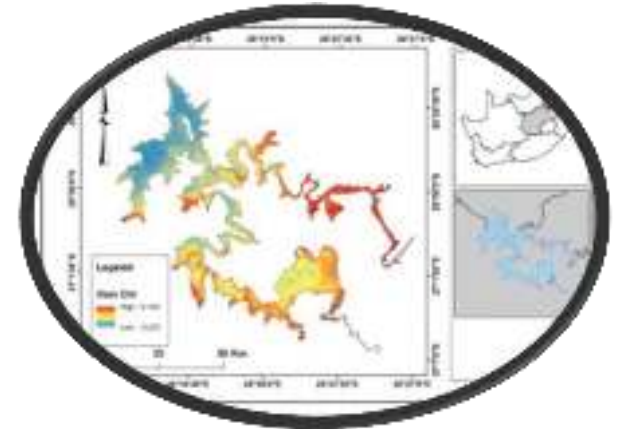
For access : <http://catalogue.sansa.org.za/>

Earth Observation thematic areas

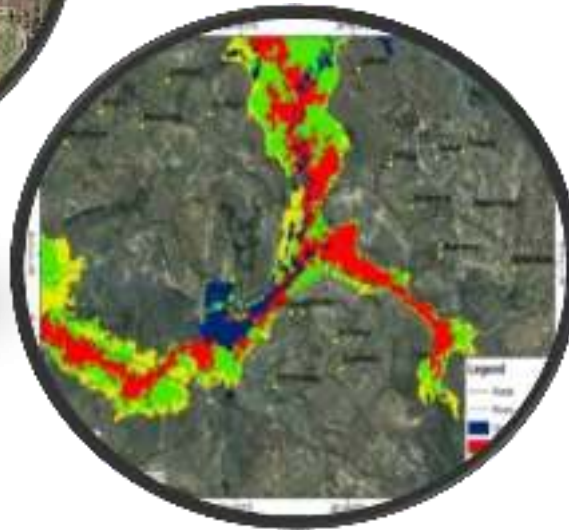
Human settlements mapping
and monitoring



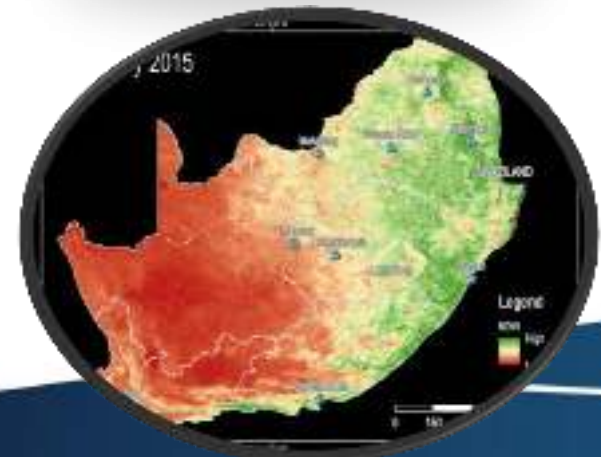
Water resources mapping
and monitoring



Disaster management



Vegetation mapping
and monitoring

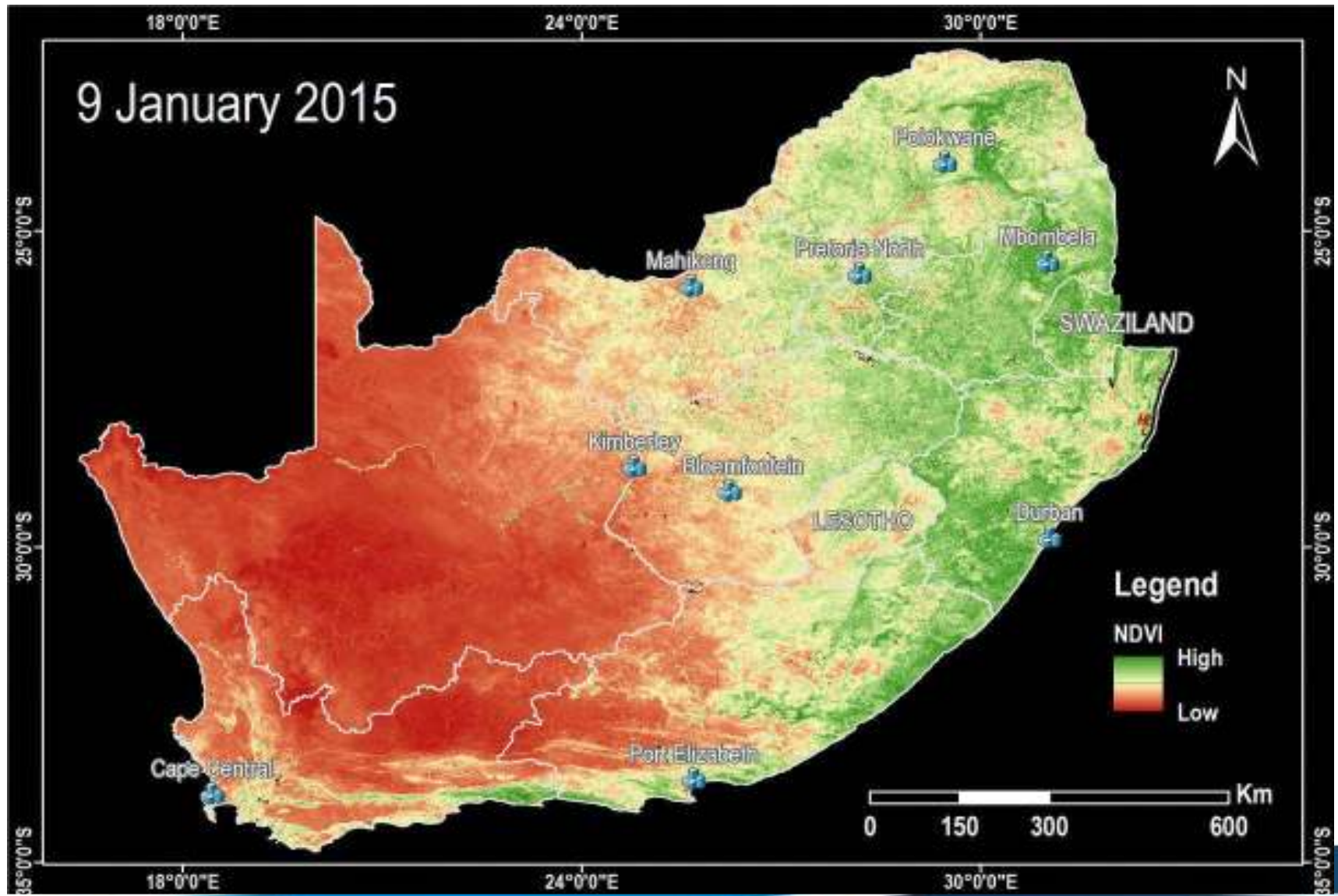


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Remote Sensing uses in Disaster Life-Cycle

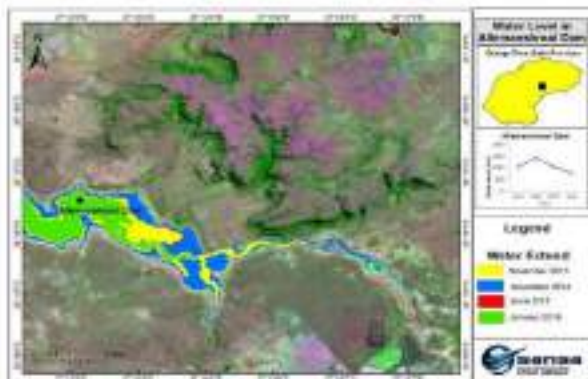
Disaster	Mitigation	Preparedness	Response	Recovery
Drought	Risk modelling	Weather forecasting	damage assessment	Informing drought mitigation
	vulnerability analysis	vegetation monitoring		
	land and water management planning	crop water requirement mapping		
		early warning		
Fire	Mapping fire-prone areas	Fire detection	Coordinating fire fighting efforts	Damage assessment
	monitoring fuel load	predicting spread/direction of fire		
	risk modelling	early warning		
Flood	Mapping flood-prone areas	Flood detection	Flood mapping	Damage assessment
	delineating flood-plains	early warning	evacuation planning	spatial planning
	land-use mapping.	rainfall mapping	damage assessment	

Example of drought prediction: Vegetation greenness

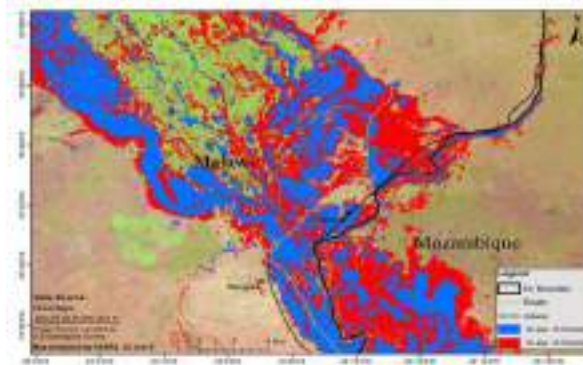


SANSA EARTH OBSERVATION SERVICES

Water resource management



Disaster management



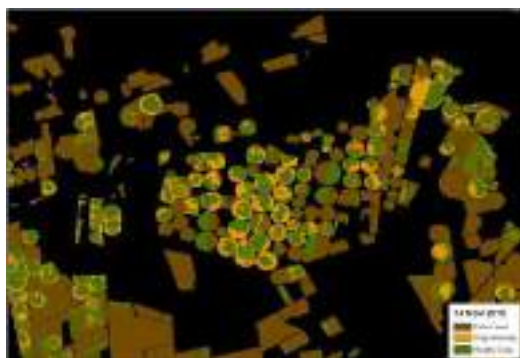
Human settlements mapping



Human Capital Development & Science Advancement

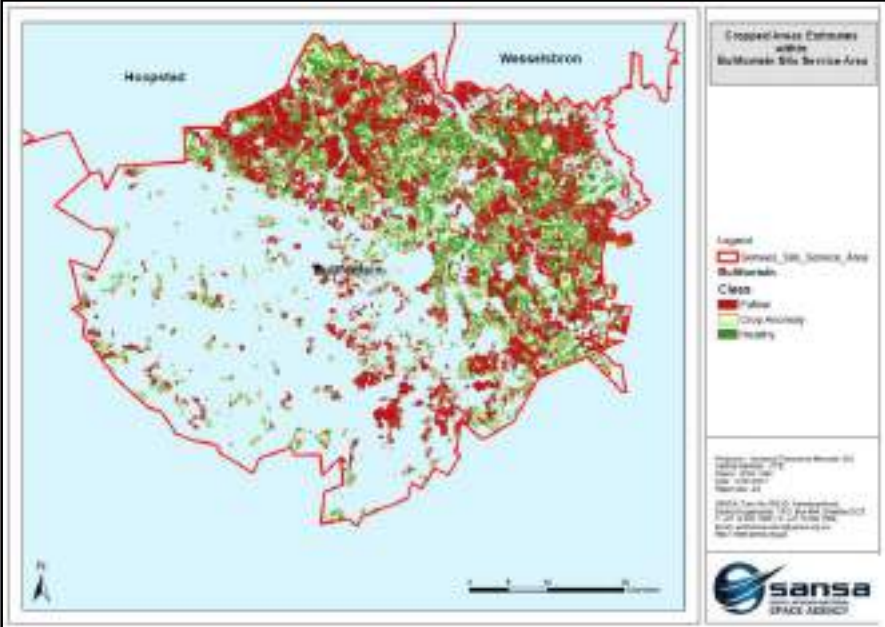
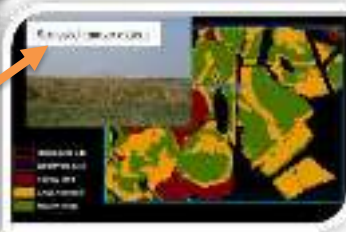


Agriculture & Forestry

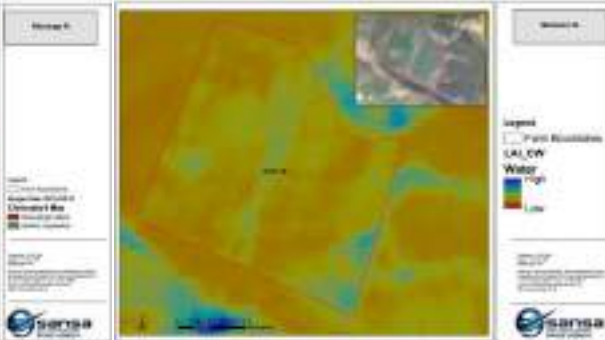


Data dissemination & WMS

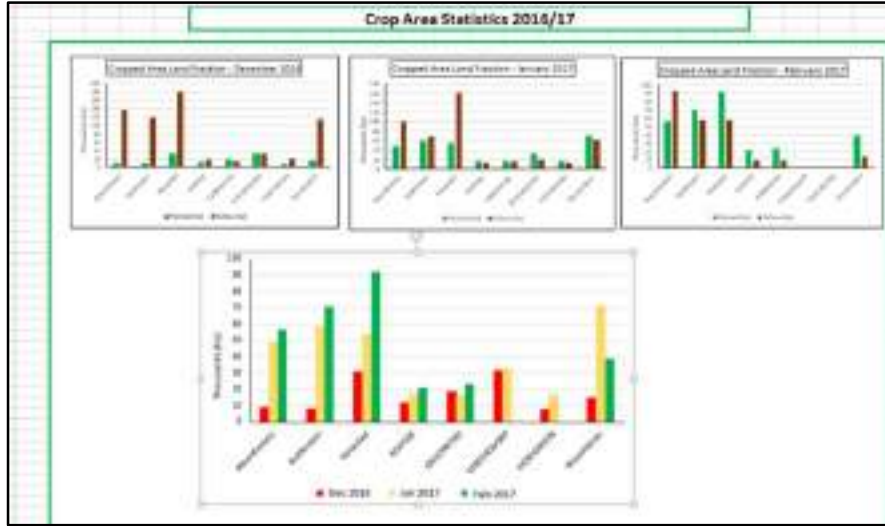




Nutrient Deficiency



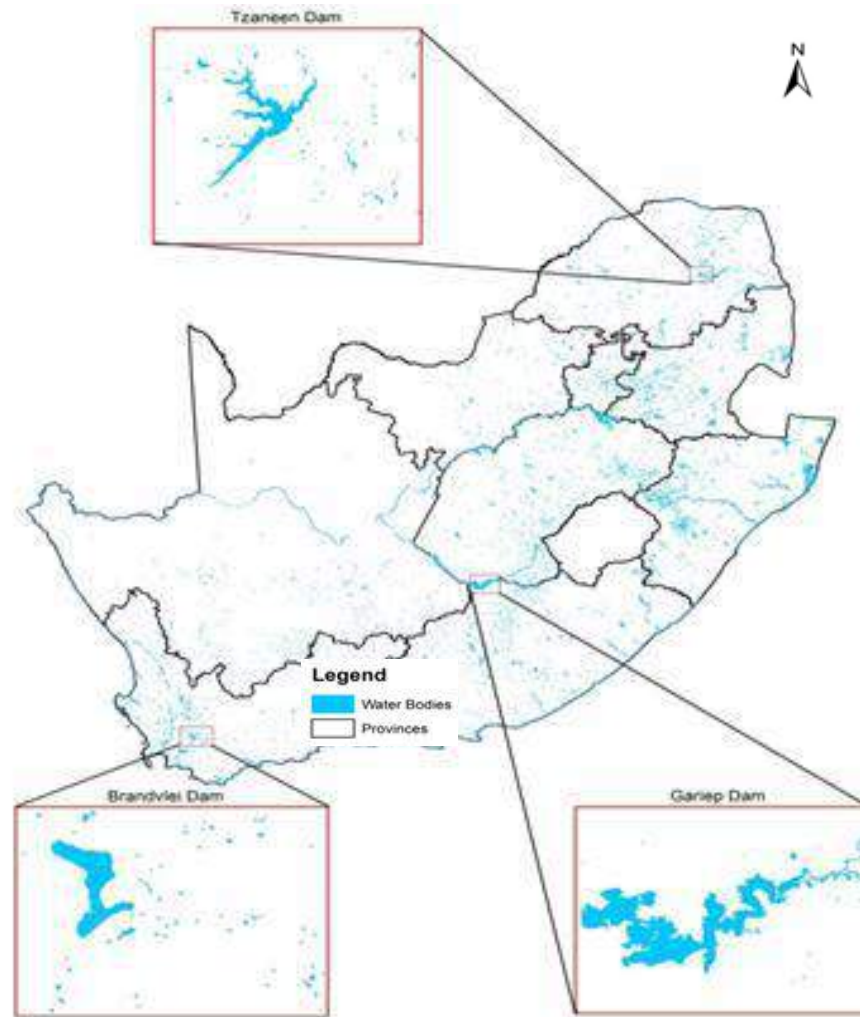
Water Logging



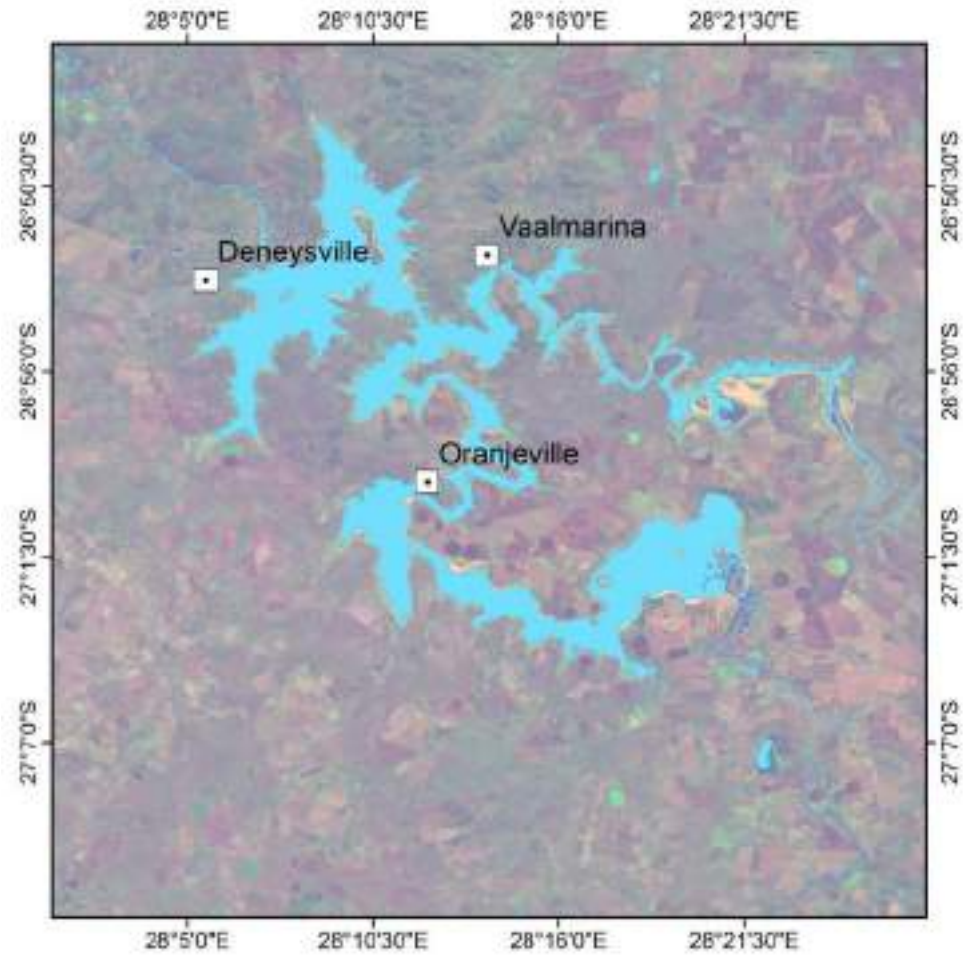
Actionable information for decision making

Water body mapping

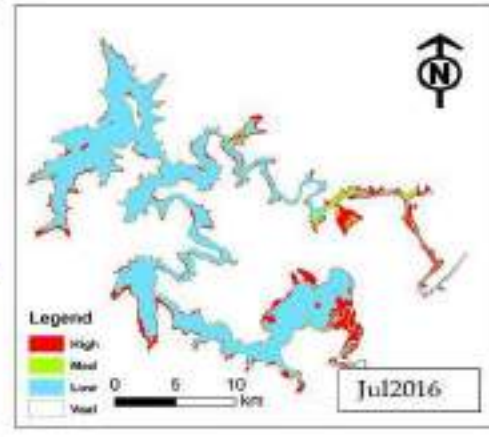
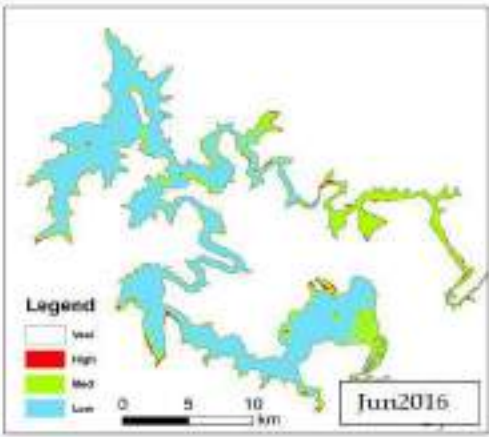
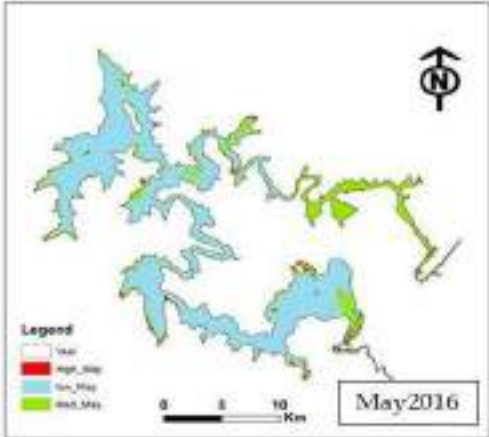
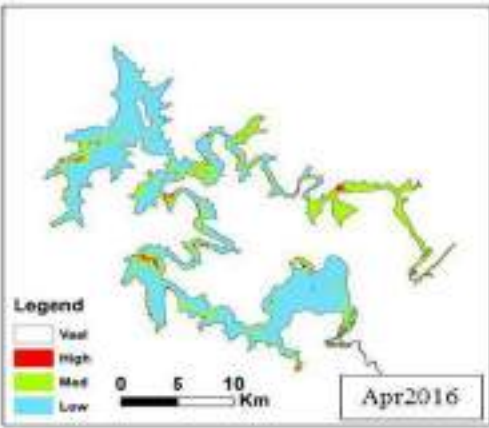
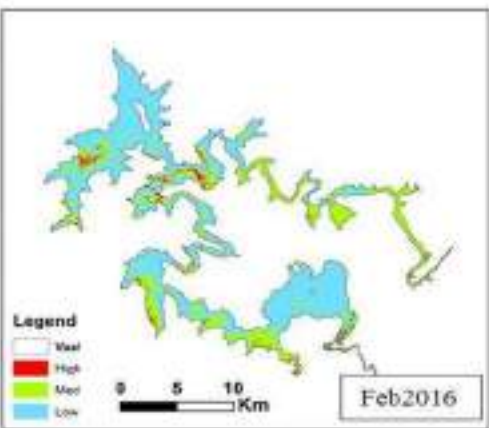
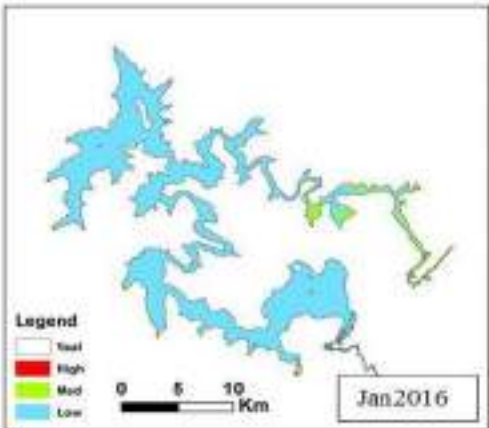
- Easier water audits
- Water licensing & water use management
- Improve catchment management
 - ✓ promote livelihoods and ecosystem sustainability



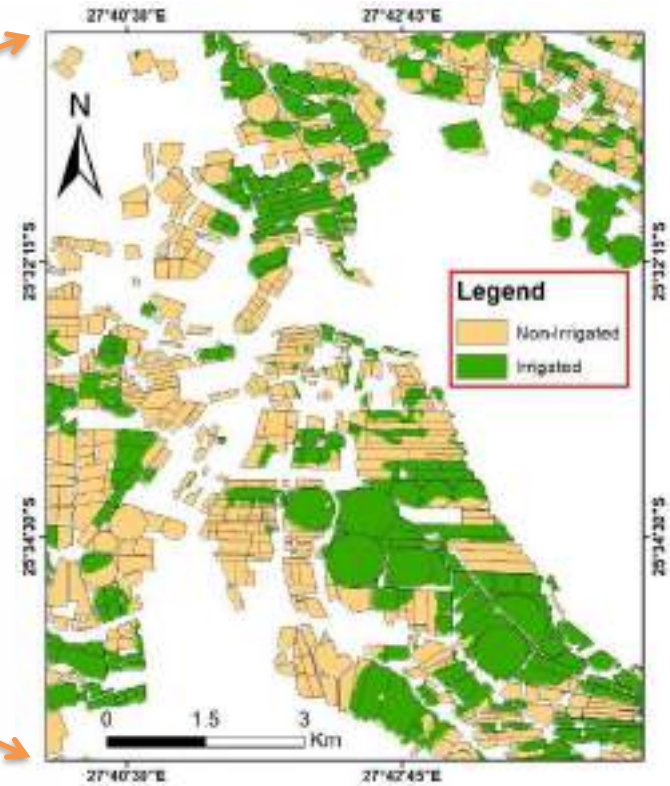
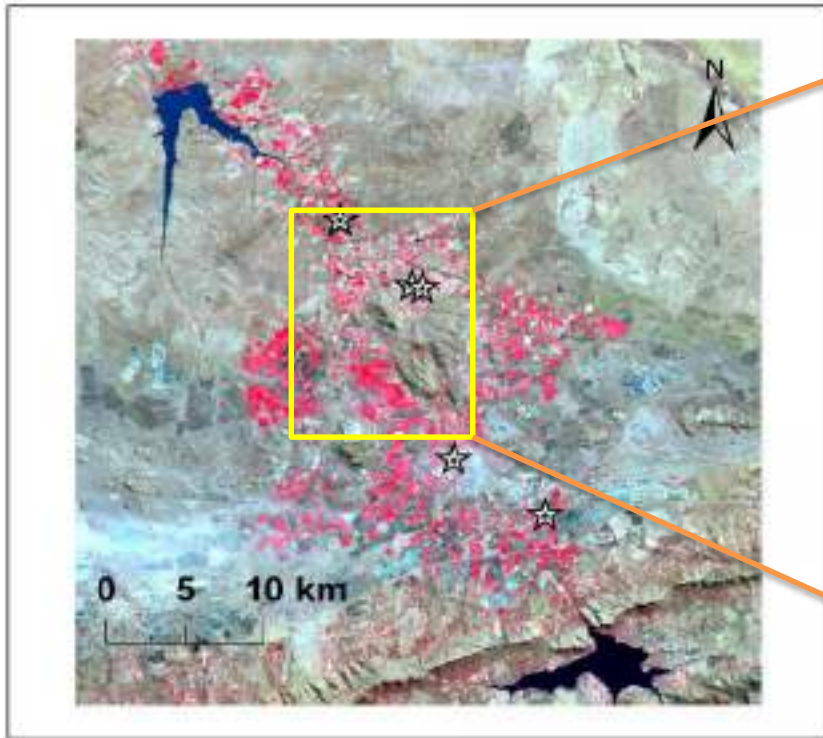
2016 Water Bodies Extracted at Vaal area



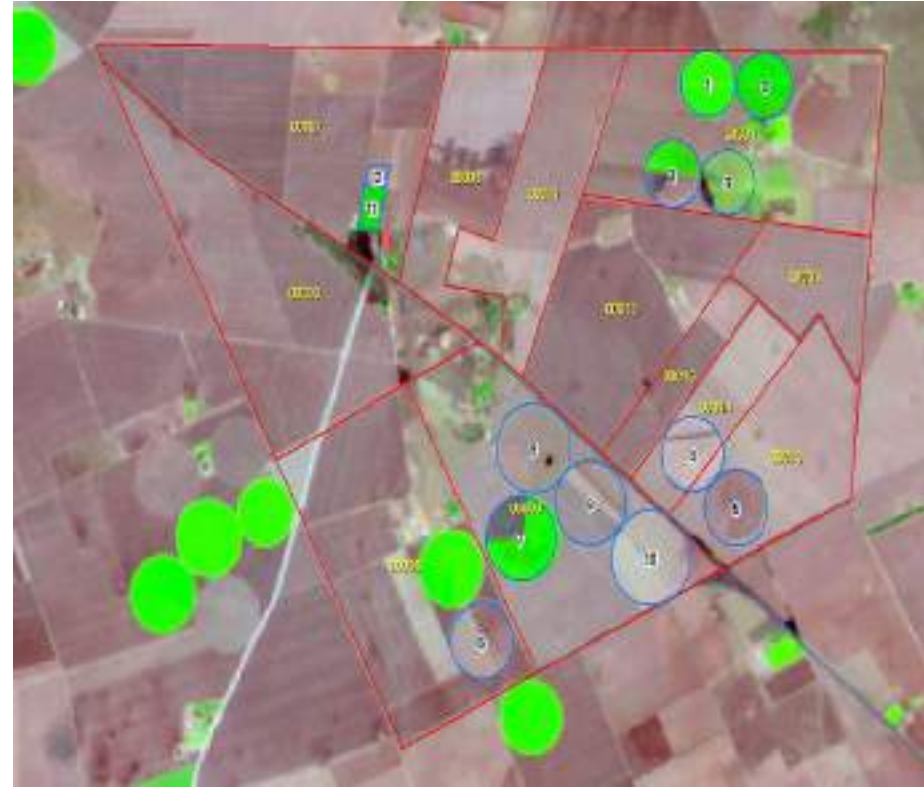
Algal bloom mapping: maps



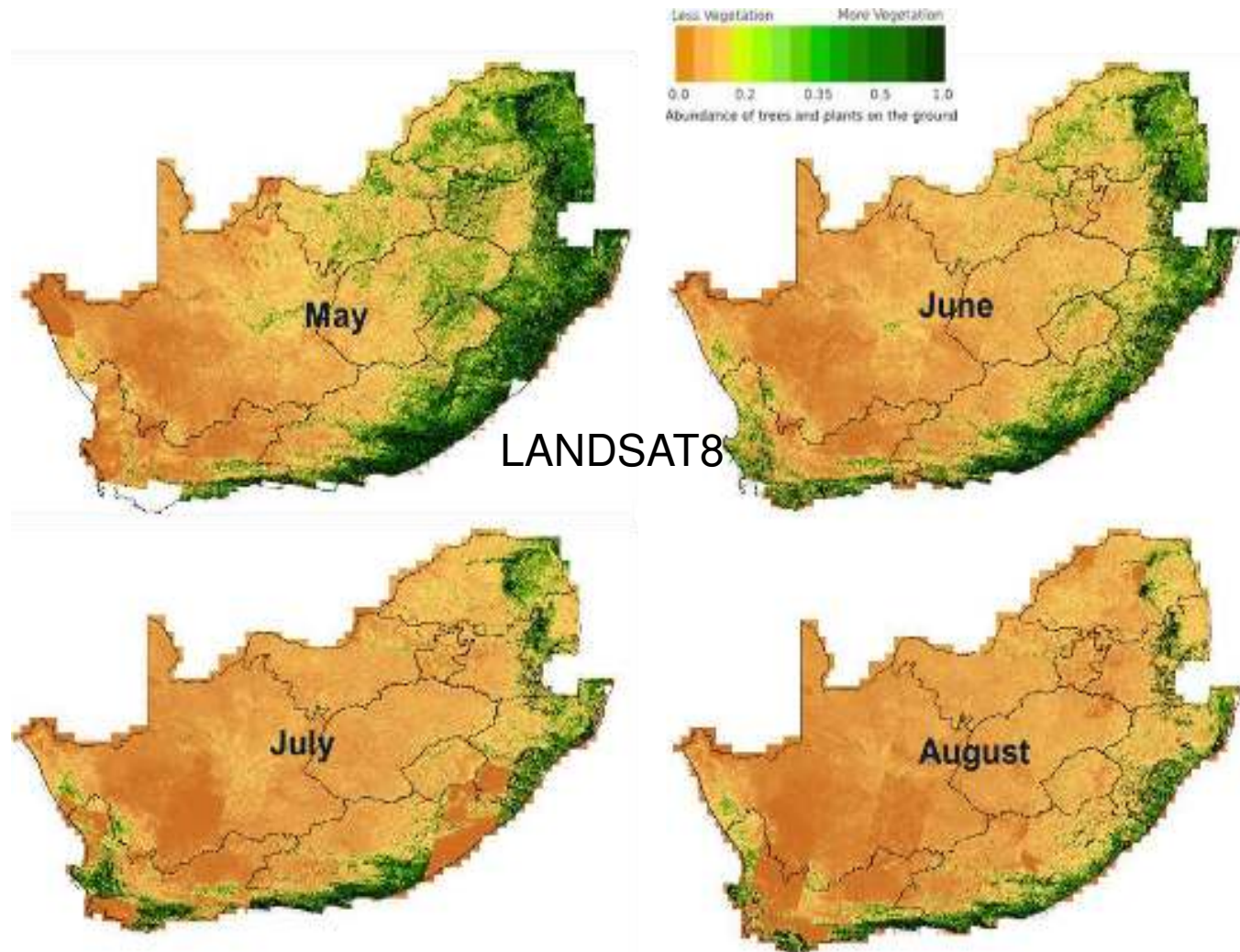
MONITORING IRRIGATION



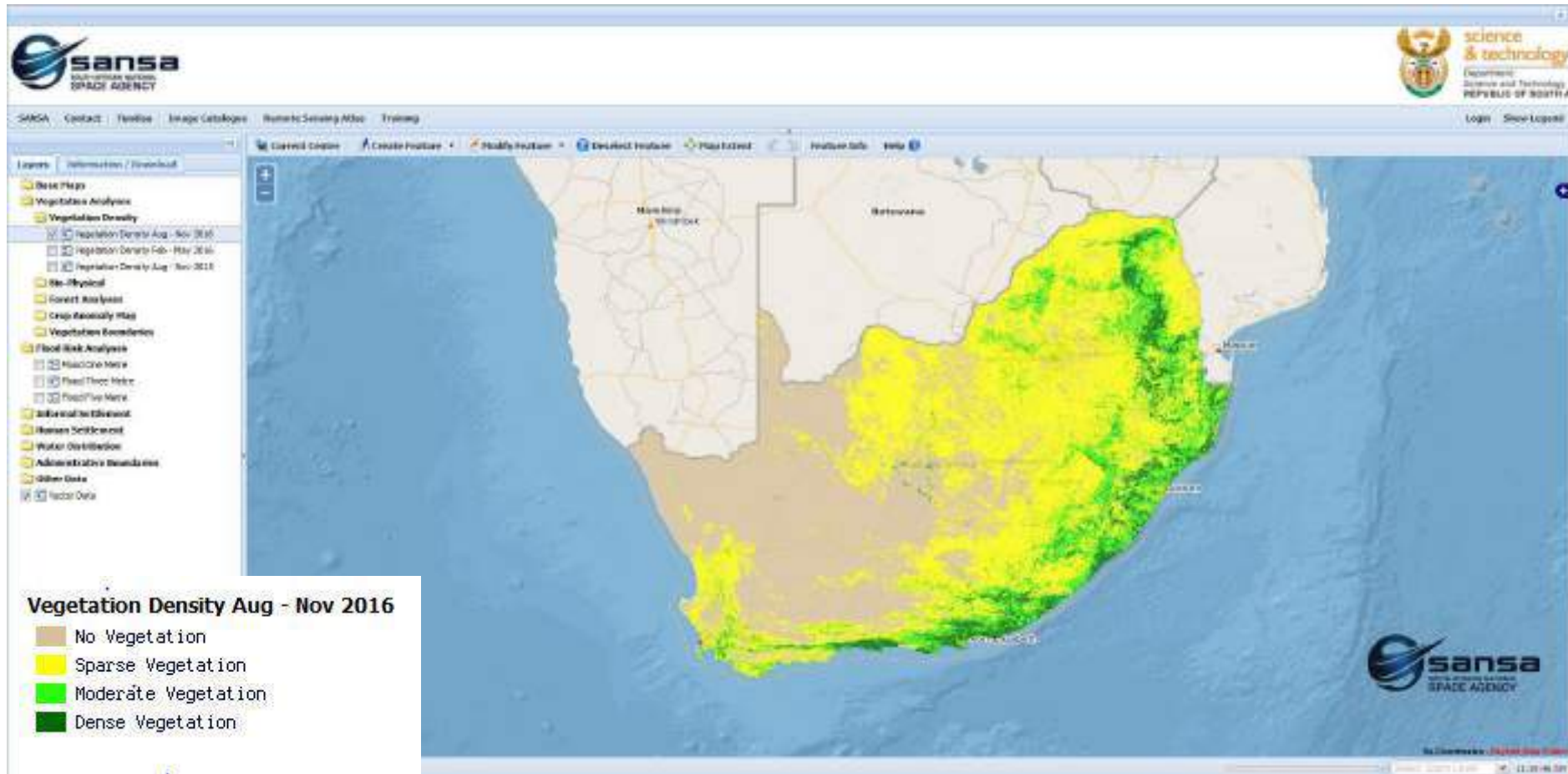
20 May 1990 / 25 Sep 1990 | L5 Irrigation Detection



Vegetation monitoring



Landsat-derived parameters



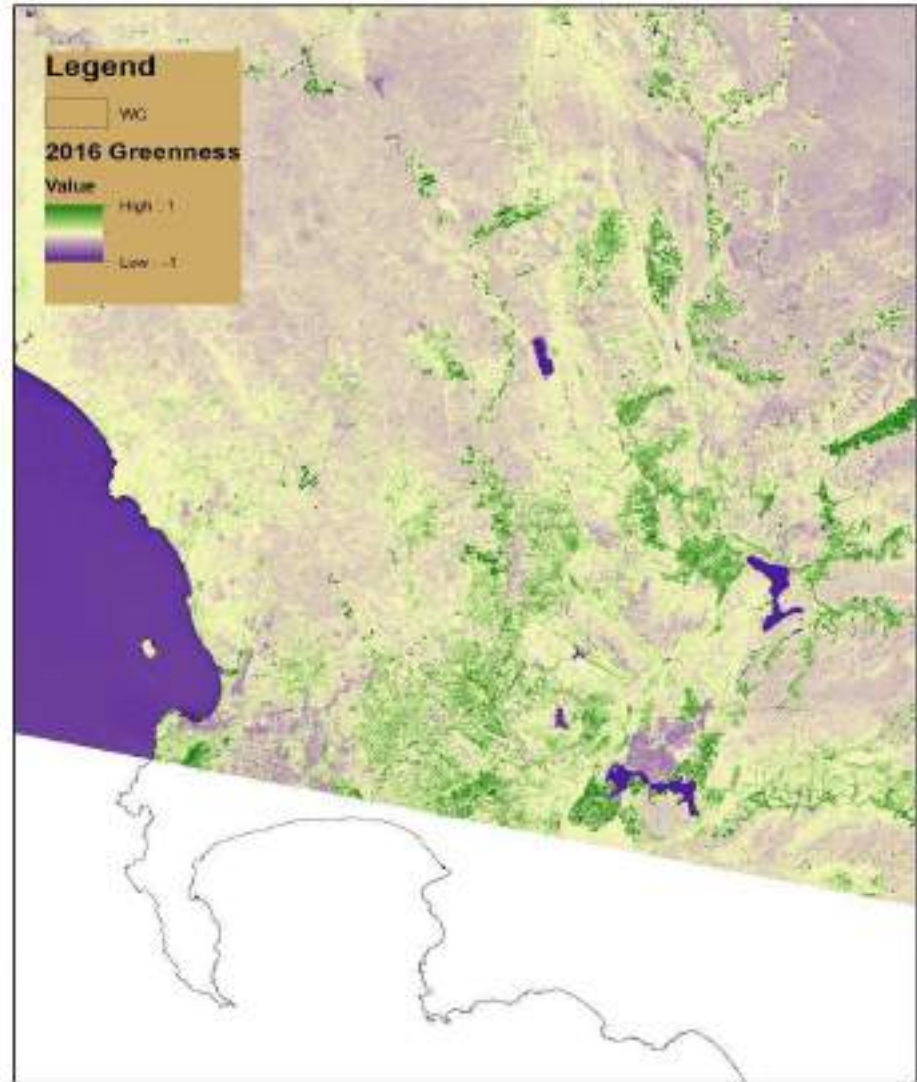
Monitoring using satellite-derived parameters

- ❖ Canopy Shadow Factor
- ❖ Fraction of Absorbed Photosynthetically Active Radiation (FAPAR)
- ❖ Fraction of Brown Vegetation Cover
- ❖ Fraction of Vegetation Cover
- ❖ Fraction of Soil
- ❖ Leaf Area Index (LAI)
- ❖ Green Leaf Area Index
- ❖ Leaf Chlorophyll Content (CHL)
- ❖ Leaf Water Content
- ❖ Soil Brightness
- ❖ Soil Fraction
- ❖ Soil Surface Humidity
- ❖ Soil Water Content

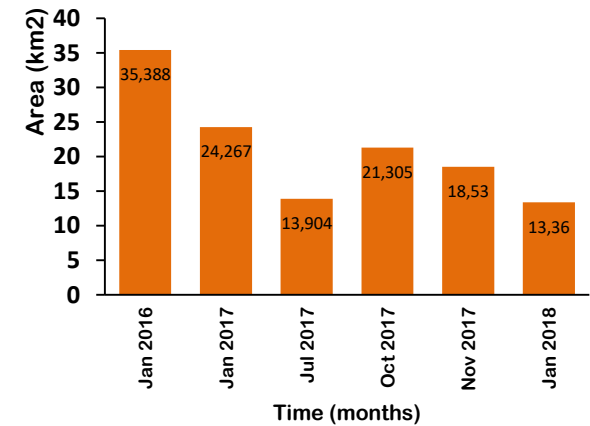
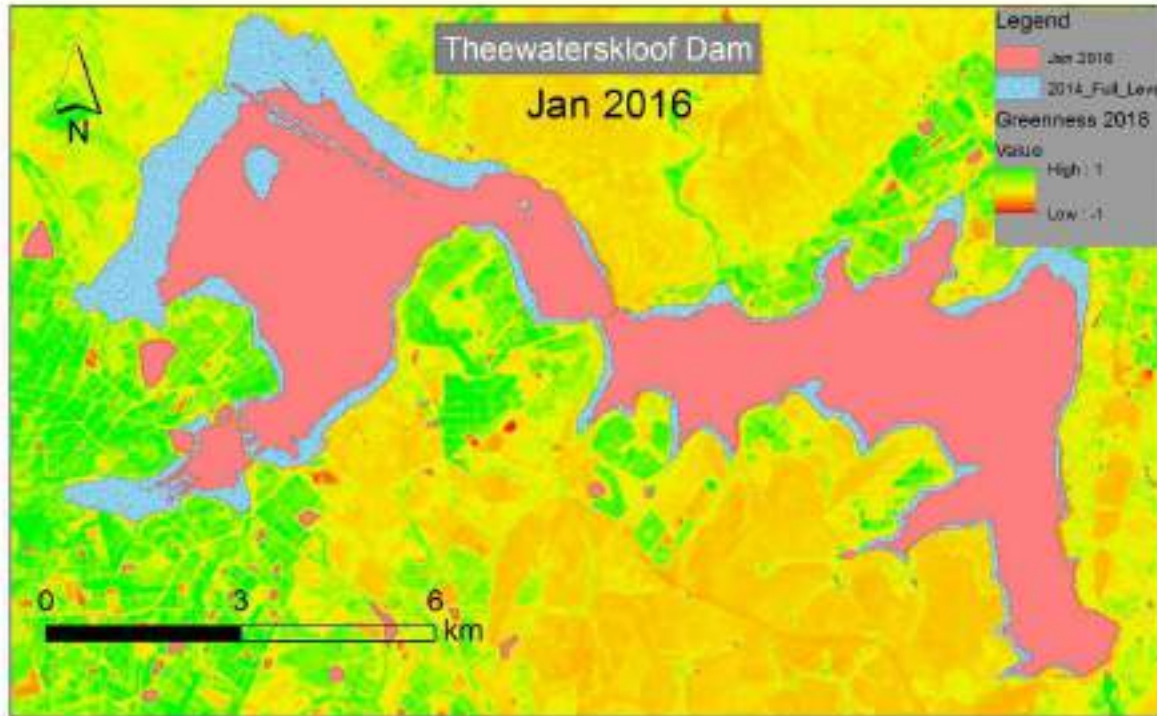


Vegetation greenness monitoring

Cape Town 2018
drought



Water body geographical extent monitoring



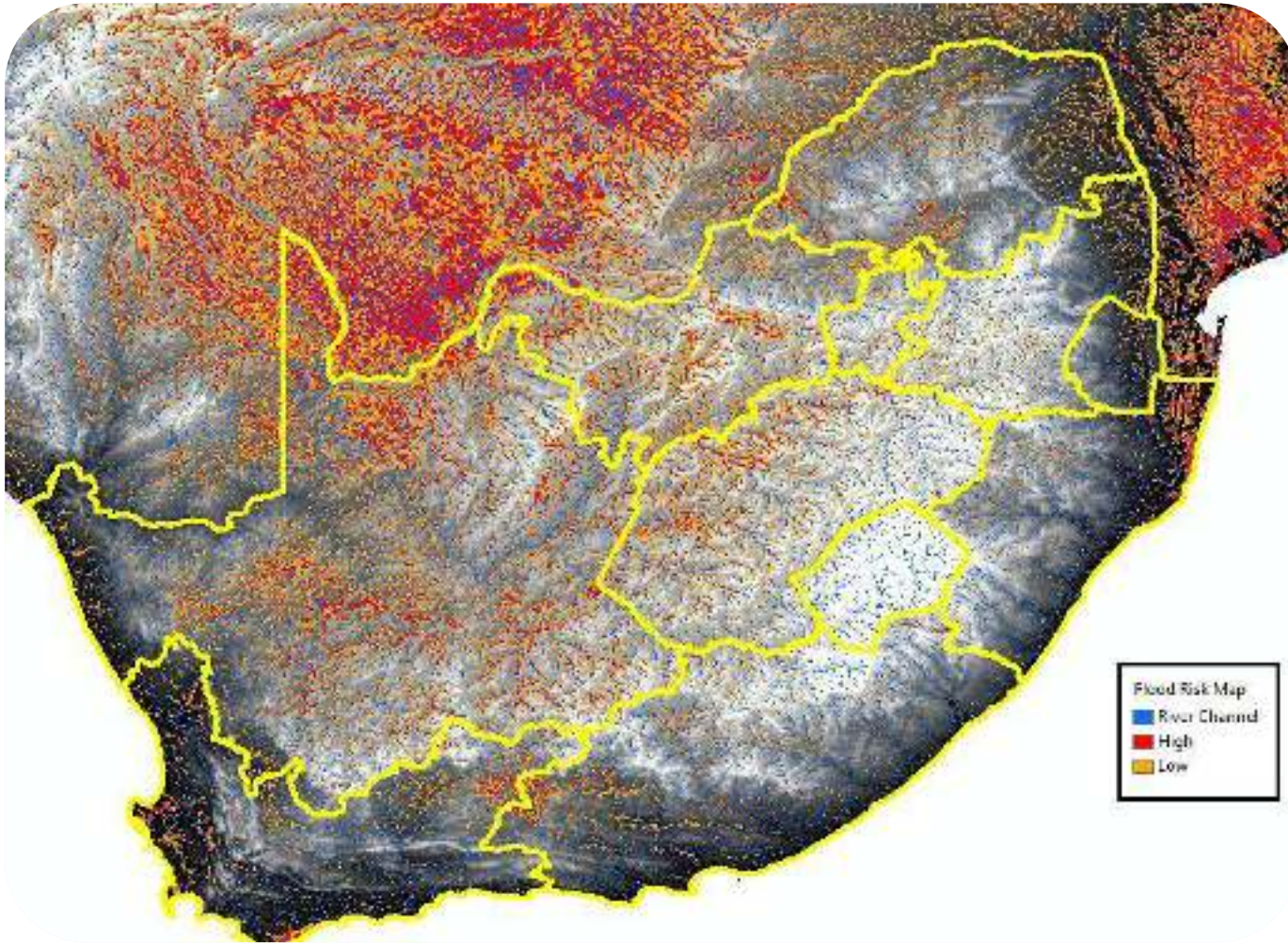
Flooding Early Warning: Height Above Nearest Drainage

The Hand Above Nearest Drainage product is a hydrologically relevant terrain model calculated by normalizing conventional digital elevation model.

It can be used to:

- Understand, predict and calculated water movement
- Predicting water storage
- Identifying drainage networks
- Calculating water table potential
- Water management and irrigation planning
- Developing hydrological and disaster risk reduction models for early warning
 - Identifying flood lines and flood plains

Early warning tool: National Flood Risk Map



Provide information on areas most likely to be flooded during heavy rain storms.
Generated from 2014 SRTM DEM

Water detection

Sentinel image date: 2018/02/16



Water detection and flood prediction



Projection: Azim. Equal Area
Standard Parallels: -16°S, -32°S
Central meridian: 24°E
Datum: WGS 1984
Units: Metres
Paper size: A4

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Flood Risk Map: Matatiele Local Municipality example



Khoapa



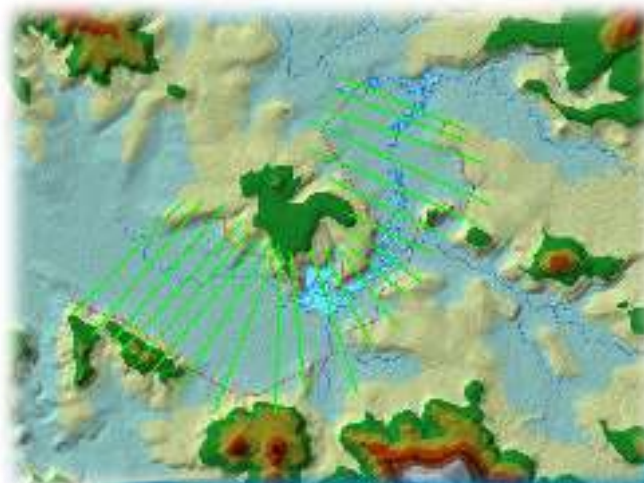
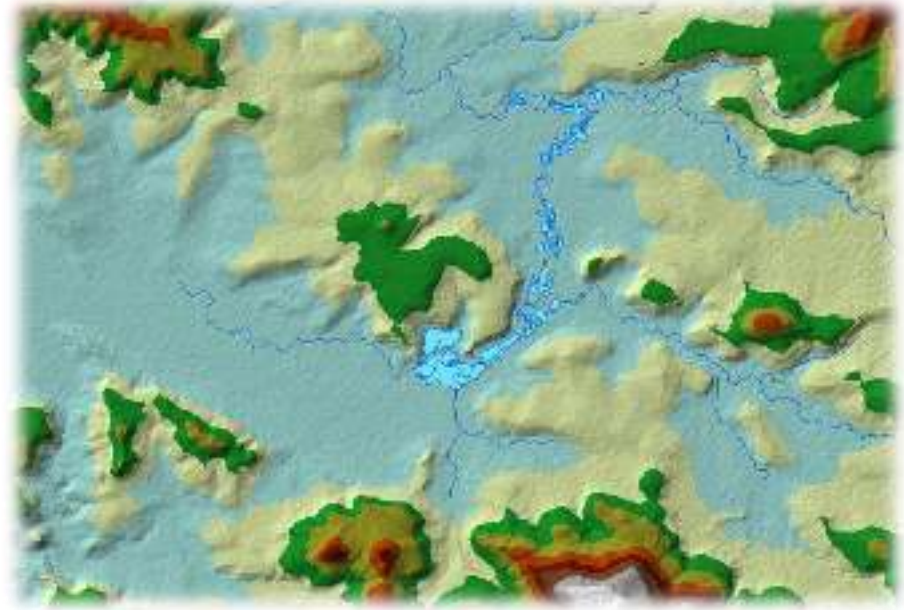
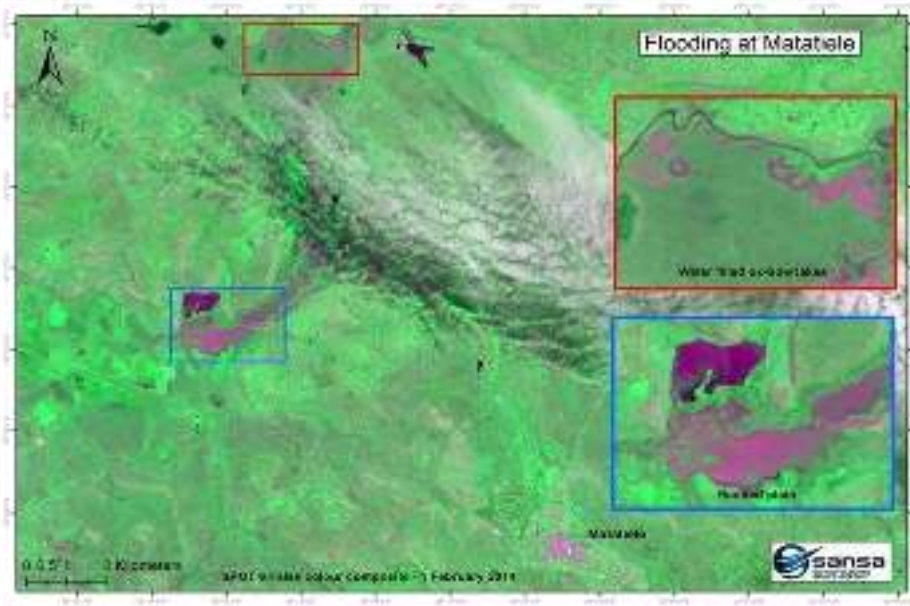
Legend

-  Household at risk of flood
-  Potential Flood Area

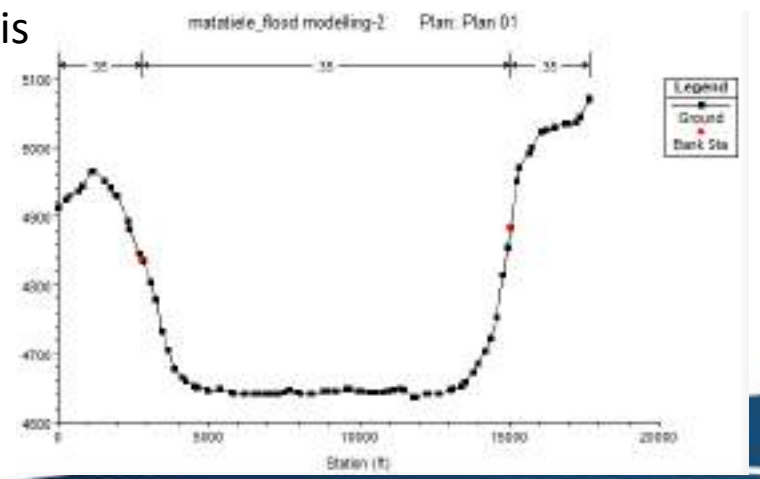
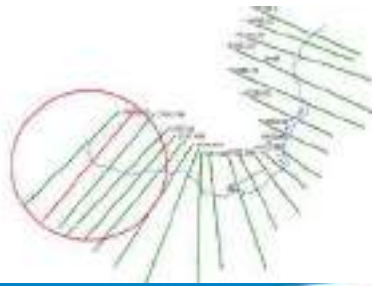
Projection: Albers Equal Area
Standard Parallels: -18°S, -32°S
Central meridian: 28°E
Datum: WGS-1984
Data:
Paper size: A4
SANSIA, Farm No 50222, Hartebeesthoek,
District Kogelberg | P.O. Box 484, Silverton, 6127,
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Email: earthobservations@sansa.org.za,
Web: www.sansa.org.za



Flood detection



River channel analysis

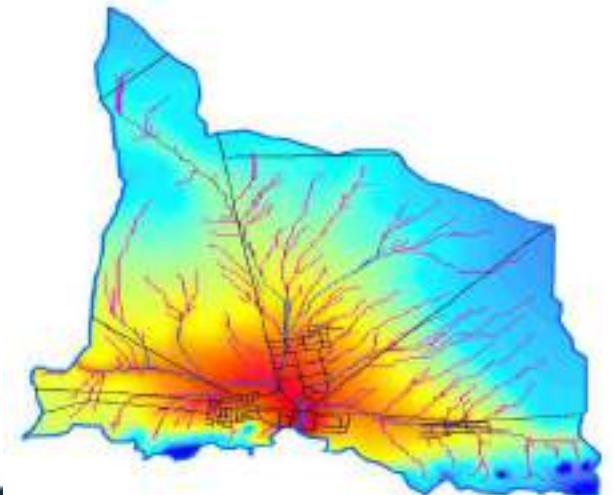
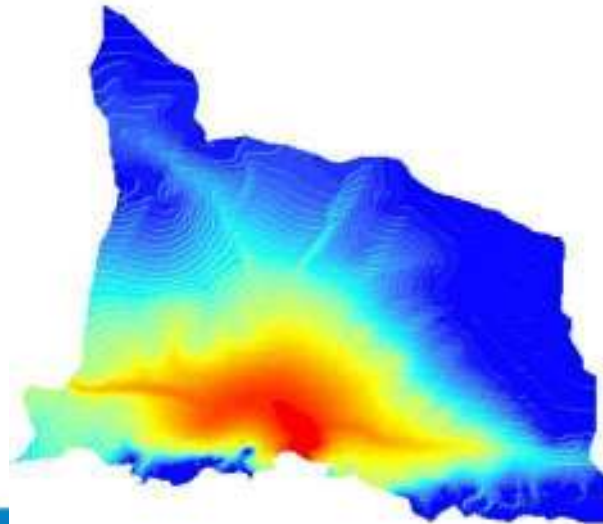


Flooding disaster damage assessment

Before



After





science
& technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA



Re a leboga
Thank you

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