Earth Observation Data & Services in support of the WEF Nexus


Dr Clement Adjorlolo
SANSA in Perspective

SANSA Corporate Office

Corporate Support Programme

SANSA Earth Observation Directorate
SANSA Space Operations Directorate
SANSA Space Science Directorate

Earth Observation Programme
Space Operations Programme
Space Science Programme

Space Programme

Goal 1: Address South Africa’s challenges through space services and products
Goal 2: Lead high-impact collaborative R&D on a national scale
Goal 3: Develop national human capacity and ensure transformation
Goal 4: Enhance the competitiveness of the South African space industry
Goal 5: Develop active global partnerships
Goal 6: Ensure the growth and sustainability of SANSA
Goal 7: Transform SANSA into a high performance Agency
SANSA Earth Observation Programme

Earth Observation

- Image acquisition
- Image distribution
- Value-added services

Data Base Processing & Distribution

Data Acquisition

Decision Support Tools
Direct reception sensors

Data received by SANSA Space Operations demodulators ....
Ingested, archived and catalogued by SANSA Earth Observation ground segments

- SPOT 6 & 7.
- SPOT 5.
- Landsat 8
- Landsat 7
- MODIS (Aqua and Terra)
- NOAA AVHRR
- CBERS 4
- NOAA AVHRR
Distributor of other commercial data

- RADARSAT-1
- GeoEye
- Ikonos
- QuickBird
- World View (1,2,3..)
- PLEIADES
- TerraSAR- X
- RAPIDEYE
- ALOS-2
Transforming Terabytes of EO-Data into Information
Problem: Status Quo
Uncertainty in monitoring and risk assessment using traditional technologies and methods

Solution: Enhancing existing methods & techniques

Outcomes: move projections beyond current capacity

State of the Art Monitoring Services

Satellite data converted into actionable information can assist optimise production management operations

WEF Production Monitoring & Prediction
Risk Assessment & Reporting
Partnerships & Collaborations
Mining applications

- Acid Mine Drainage/ Effluent Monitoring
- Mining Impact Assessment
- Monitoring Mining Activities
Fire Disaster Management Applications

- Fire detection
- Fire risk mapping
- Post fire assessment

Advance Fire Mapping System (AFIS) – Fire detection http://www.afis.co.za/
Application examples

Long-term time Series of Satellite-derived Vegetation Indices

9 January 2015

Legend

NDVI
High
Low

0 150 300 600 Km
Application examples

Growing Season ET relative to Long-Term Average

claim

No claim
Air quality applications

- Emission inventory
- Aerosol concentration
Spatial planning applications

- Community development
- Infrastructure planning
- Service delivery
- Monitoring
- Policy formulation and implementation
- Urbanisation
Change detection – Human settlements, vegetation, mining
Agriculture/vegetation applications

- Vegetation condition
- Land capability
- Yield estimation
- Deforestation
- Vegetation management
Monitoring using satellite-derived parameters

FAPAR; Fraction of Vegetation Cover; Fraction of Soil; Leaf Area Index (LAI); Leaf Chlorophyll Content (CHL); Leaf Water Content
Summary

The two crop fields assessed above displayed symptoms of vegetation stress due to low relative canopy leaf chlorophyll (CChl) and relative canopy leaf water (CW) values. These two fields were analyzed using retrieved biophysical parameters from sentinel 2 image. The CChl and CW were modelled with the Leaf Area Index (LAI) values to assess whether the low values were, in fact, a cause of stress or a result of a sparse vegetation cover/density.
Application examples

Field verification & Validation

[Images of field conditions, including healthy maize and stressed maize, along with a chart showing crop evolution with stages of emergence, growth, steady growth, and stressed conditions.]
Application examples

Actual ET calculated from Landsat-8 data acquired over center-pivots irrigated corn field near Harrismith.

Image date: 25-09-2015
Users & Partnership: National and Regional Stakeholders

Service to National Government Departments

Geo-AfriGEOSS

SADC-Zambia

FUNDISA Resources to MESA University Network
Earth Observation Users

- Eskom
- Water Research Commission
- South African National Parks
- ATNS
- DENEL
- Statistics South Africa
- National Disaster Management
- South African Weather Service
- Development Bank of Southern Africa
- NRF
- Council for Geosciences
- The South African National Roads Agency
- Armscor
- Technology Innovation Agency
- South African Police Service
- ARC-LNR
- CSIR
- Rural Development and Land Reform
- NGI
- SENTECH
Thank You

Email: cadjorlolo@sansa.org.za