AMESD SADC THEMA OVERVIEW, Drought Monitoring Service

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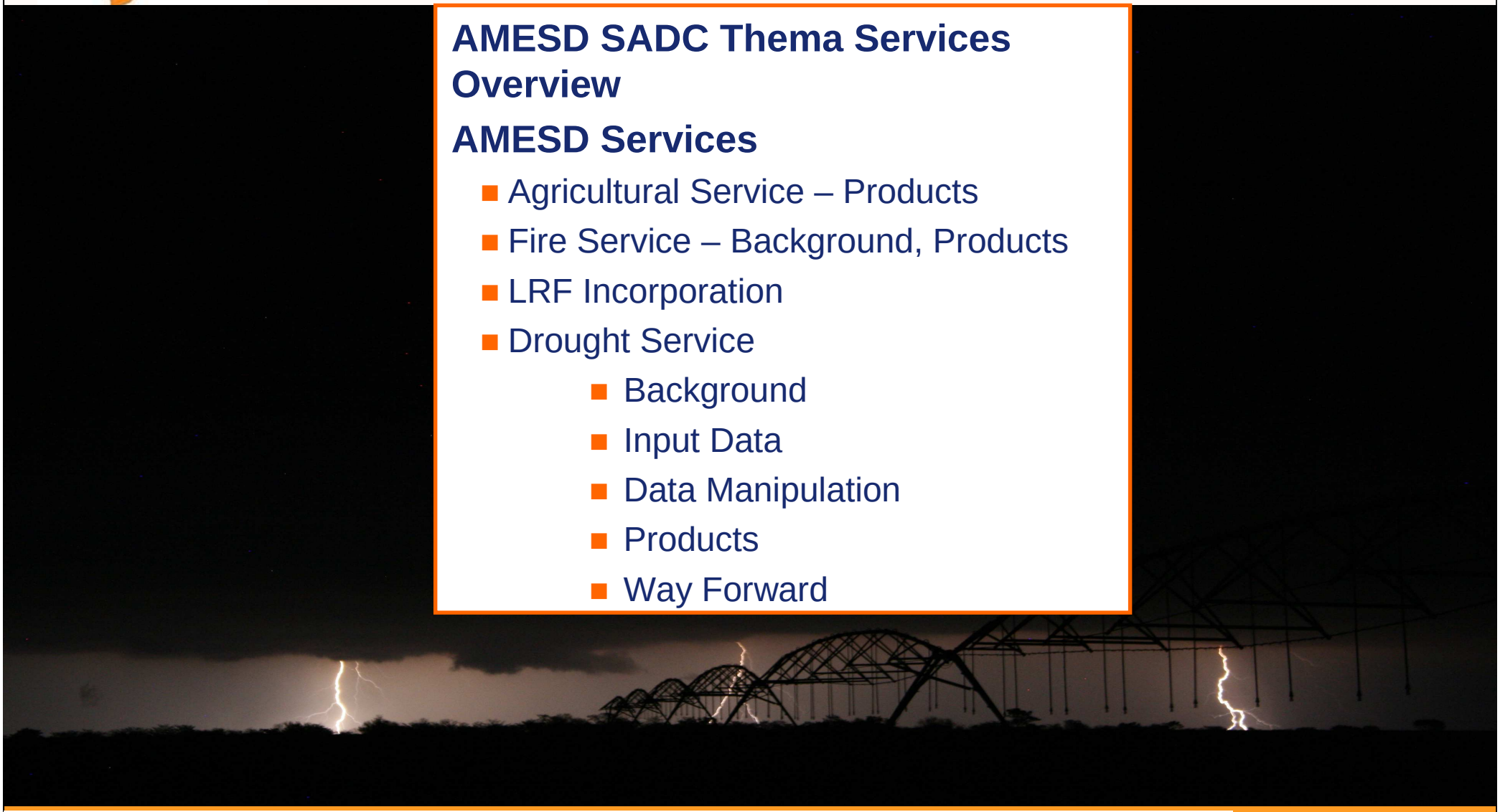
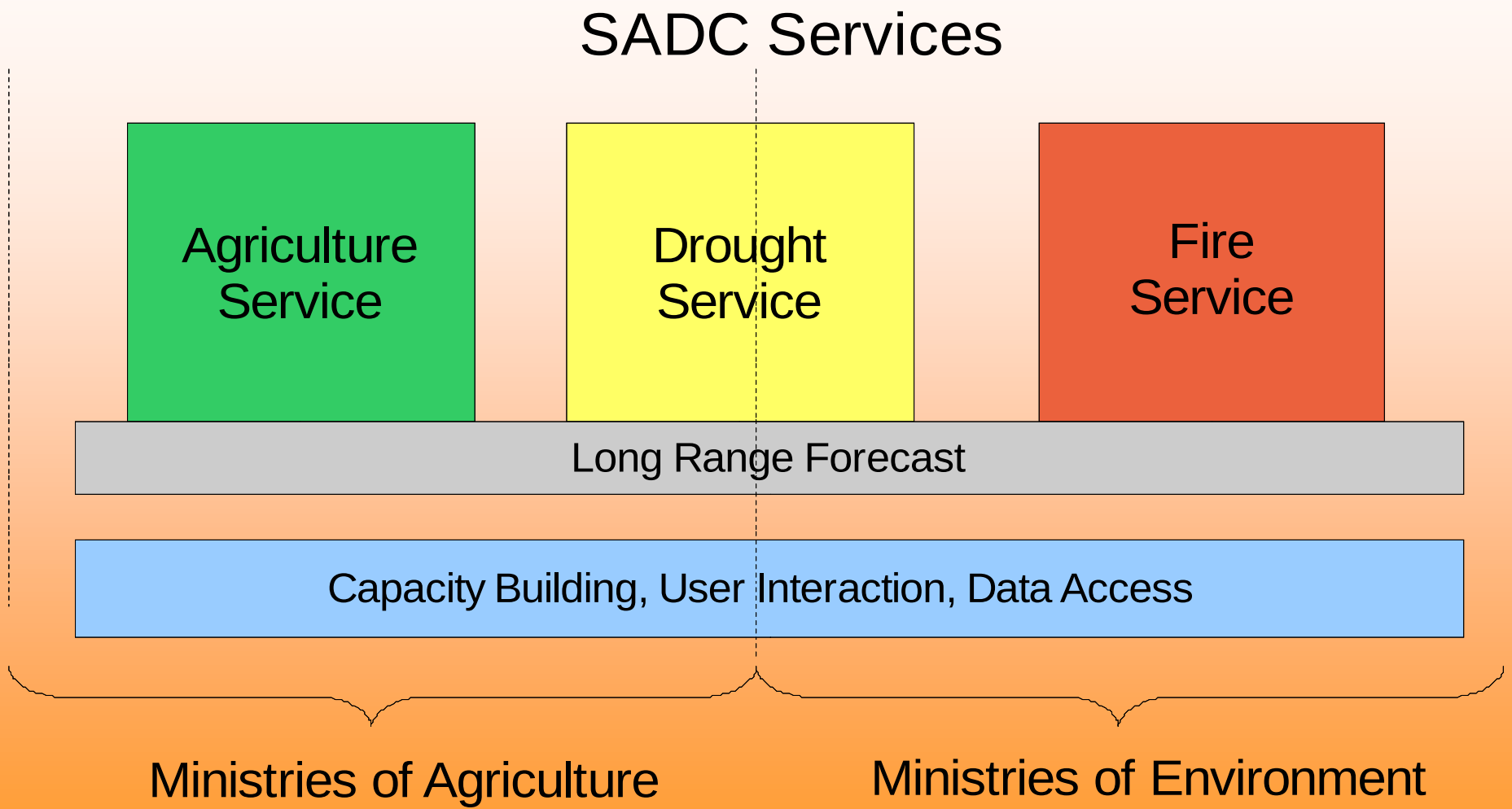


AMESD SADC Thema Services Overview

AMESD Services

- Agricultural Service – Products
- Fire Service – Background, Products
- LRF Incorporation
- Drought Service
  - Background
  - Input Data
  - Data Manipulation
  - Products
  - Way Forward

SADC THEMA Services: Overview



SADC THEMA Services: Overview

Key-Users

- National Level:Ministries of Agriculture (MoA), Ministries of Environment
  - Department of Water Affairs, Dept. Forestry and Rangeland, Department of Tourism and Wildlife, etc)
- Regional Level : SADC FANR **(Food, Agriculture and Natural Resource)**

Secondary Users

- Regional and National Food Security Services
- Farmer Associations
- Farming Communities
- National Statistic Offices
- Agrometeorological Departments
- Agricultural Research Counsils
- Disaster management Offices
- District Counsils
- Ministries of Transport
- Weather Services (National Television)

Agricultural Service: Products

Product	Comments
CNDVI	Crop Specific NDVI
WRSI	Water Requirements Satisfaction Index
WRSI-Anom	WRSI Anomaly map
SOS	Start of Season (Onset of Rains)
SOS-Anom	SOS Anomaly map
Phenology	Estimates of phenology based on planting and crop cycle length
SWI	Soil Water Index Estimates

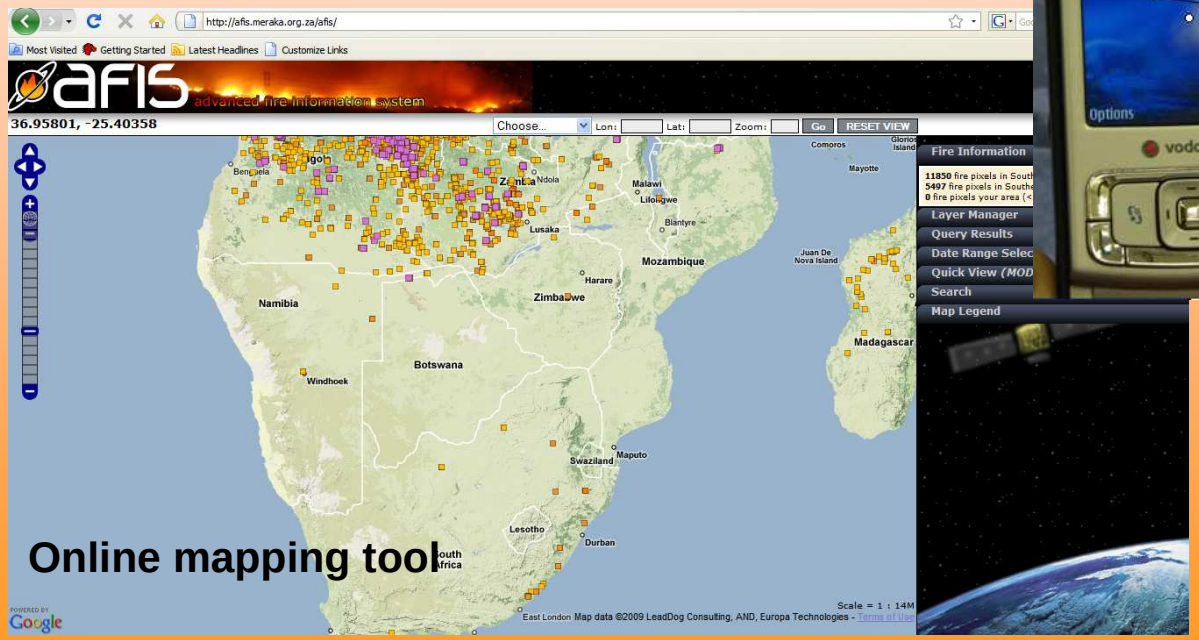
Potential collaboration – id similar products

Land SAF?

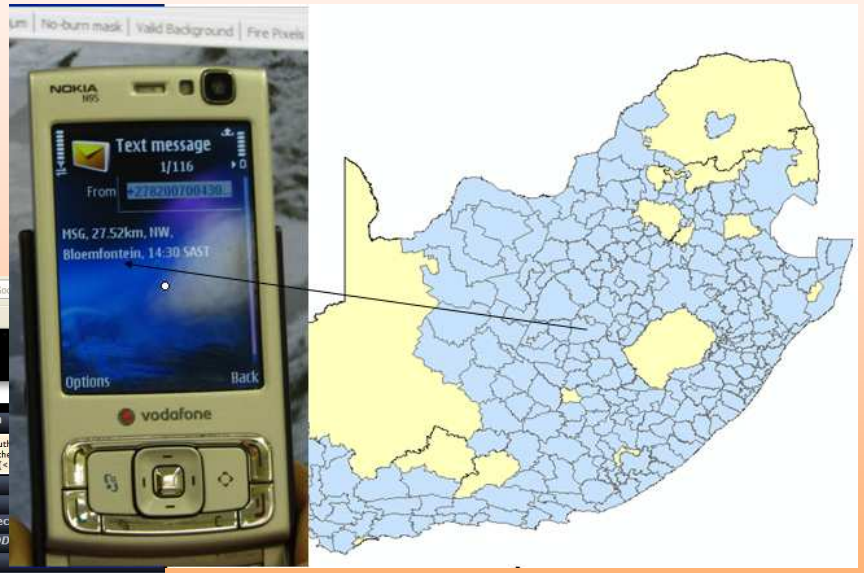
Fire Service: Existing Capacity

AFIS: Advanced Fire Information System (AFIS) of CSIR (°2004)

1. Early detection of active fires
2. Monitoring of existing fires
3. Fire Danger prediction
4. Burned area assessment



Online mapping tool



Cell phone alert service

Fire Service : AMESD Work Plan

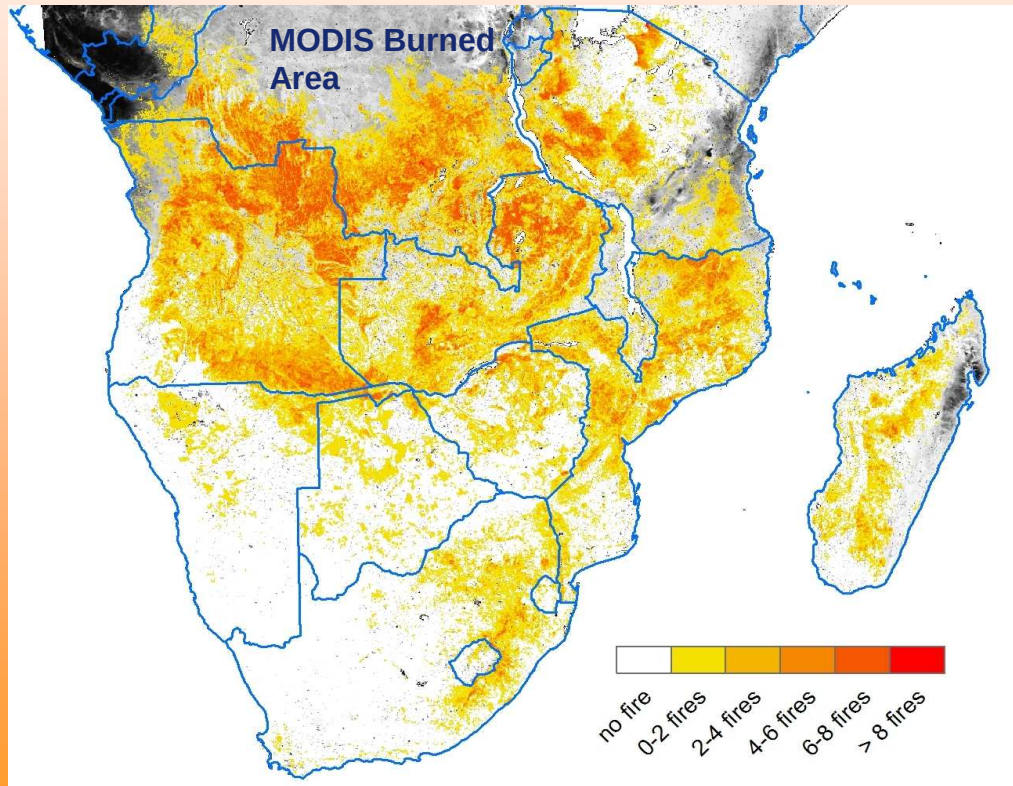
- Improve and geographically expand the current AFIS system of CSIR
- Integrate GLOBCOVER (and other) Landcover map
- Integrate Google terrain map
- Integrate LRF in reporting
- Use EUMETCast/GEONetCast

Fire Service : Products

Product	Comments
Active Fires	MODIS + MSG Active Fires
FDI	Fire Danger Indexes (2x)
MODIS-BAE	Burnt Area Estimates
MODIS-721	MODIS 721 Band Combination

Potential collaboration – id similar products

Land SAF?



Produced by Sally Archibald

LRF: AMESD Work Plan

Intro

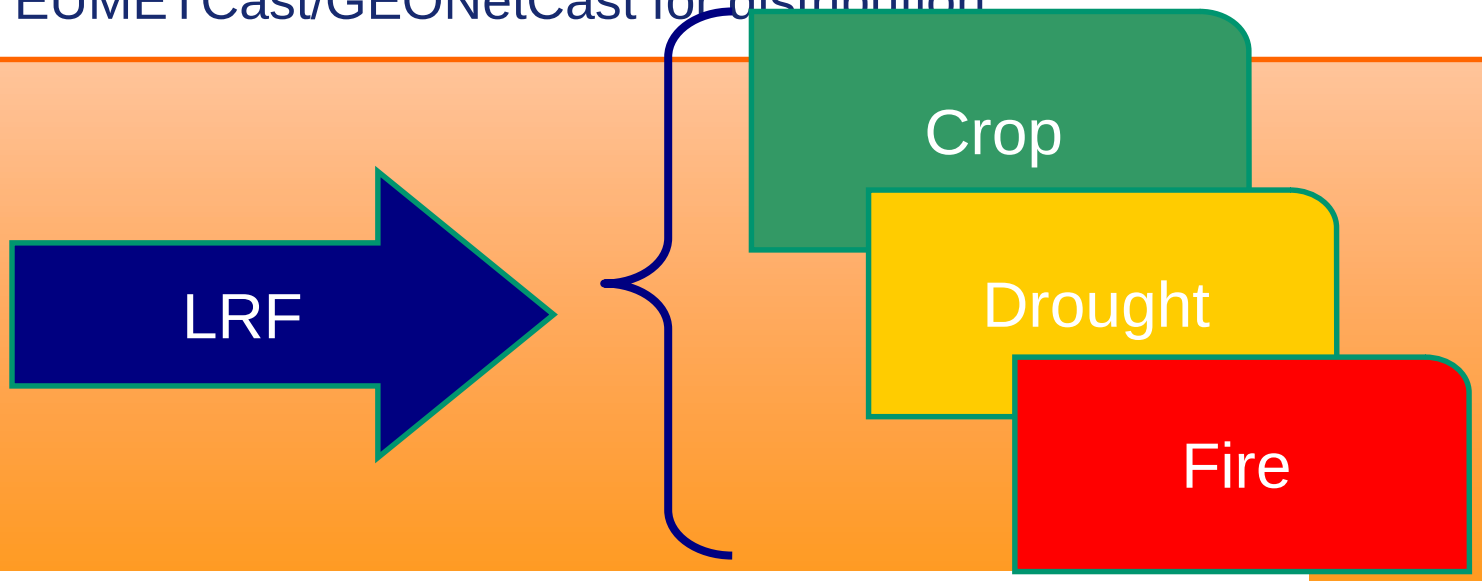
- LRF has become mature
- Not used in agricultural and environmental sector yet

Principle:

- Use existing LRF and integrate into 3 core-services

Dissemination Side:

- Use EUMETCast/GEONetCast for distribution



AMESD
Drought Monitoring Service
(More Detail)

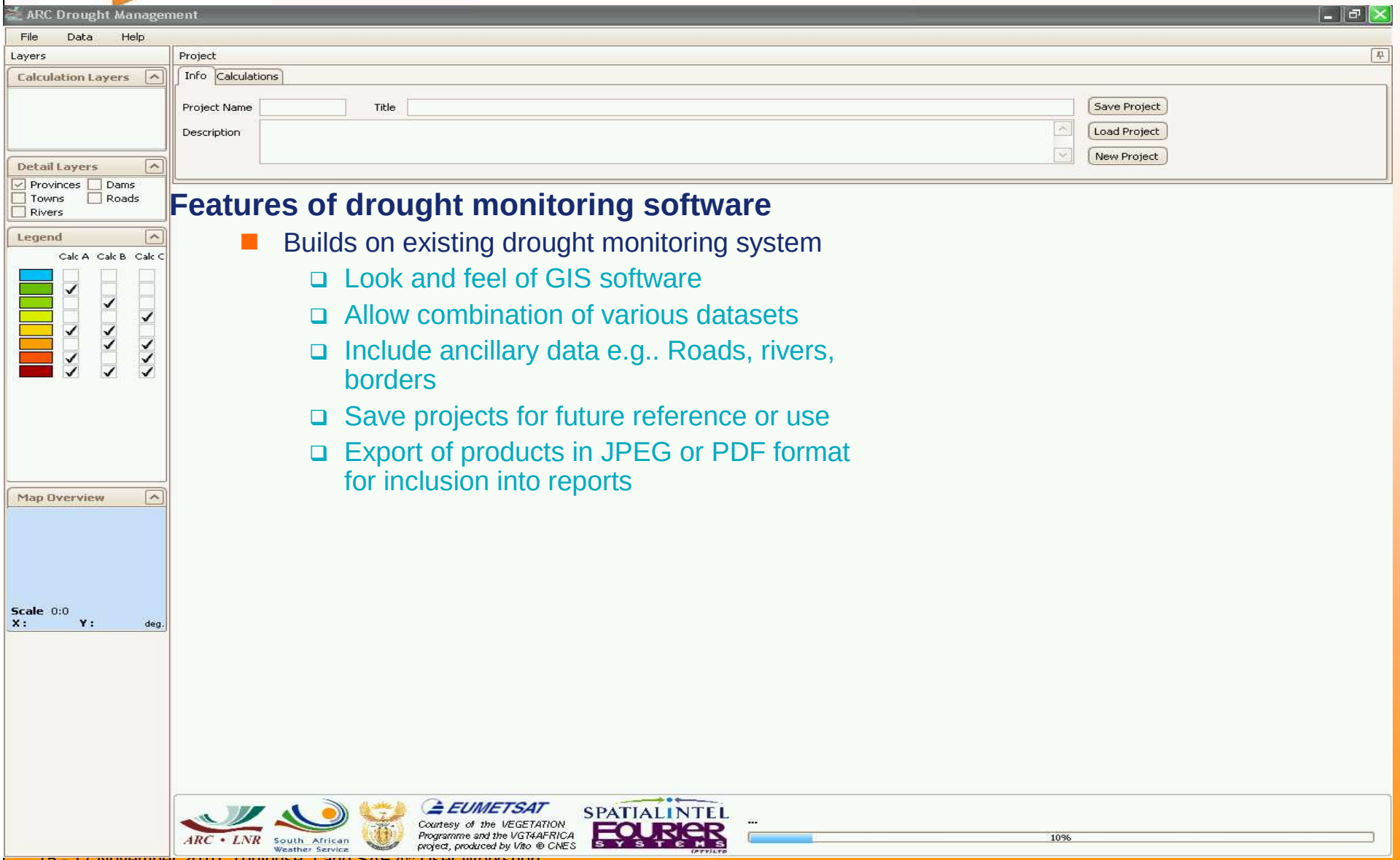
Drought Service: Background

Drought Service relies on development of drought monitoring software

Features of drought monitoring software

- Developed in open source, builds on existing drought monitoring software developed previously by ARC-ISCW – during PUMA
- System that receives all operational data from EUMETCast / GEONetcast
- Automatic data ingestion
- Data include
  - Rainfall and NDVI data
    - Summations, combinations and other calculations happen with user interaction
    - Historical datasets provided once off
    - Real time data through EUMETCast / GEONetCast
  - Seasonal (3-month) rainfall forecast adapted for inclusion
- Guides user in existing drought monitoring techniques by the correct combination of data
- Provides user with opportunity to define own combination of data
- Output products are graphs, maps and statistics that can be copied into *a word document template made available with the system* for reports, advisories, newsletters

Drought Service: Background



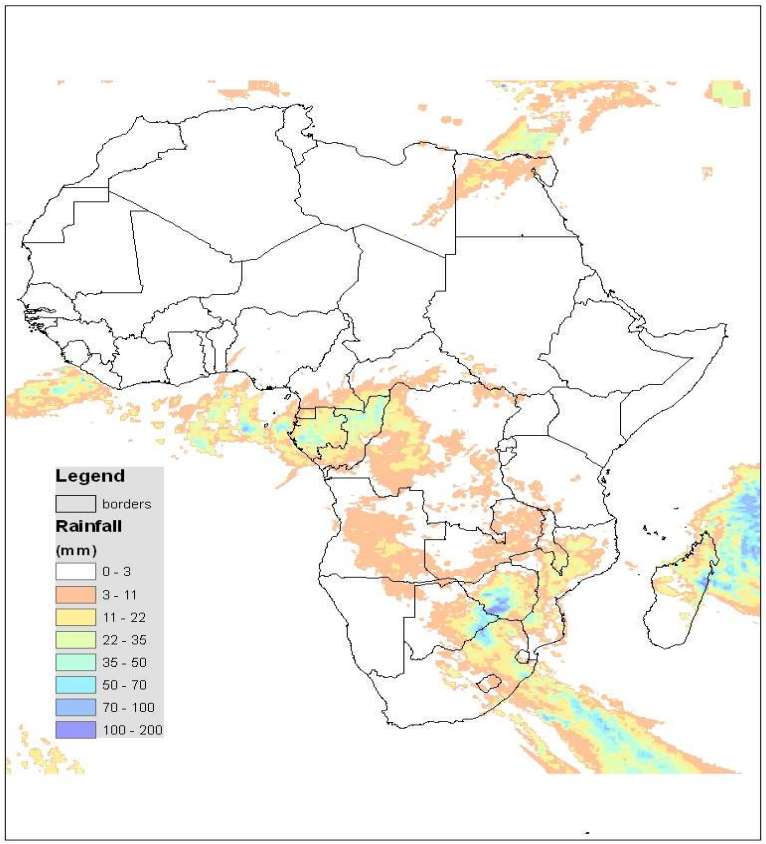
Features of drought monitoring software

- Builds on existing drought monitoring system
  - Look and feel of GIS software
  - Allow combination of various datasets
  - Include ancillary data e.g.. Roads, rivers, borders
  - Save projects for future reference or use
  - Export of products in JPEG or PDF format for inclusion into reports

Drought Service: Input data

Meteorological data

- Rainfall data
  - ADDS RFE
    - 10-daily, daily
    - Historical data set since 1995
    - Real time -through GEONETCast/ EUMETCast



Any Other ?

Historical dataset,
Real time update

Drought Service: Input data

Meteorological data

- Seasonal rainfall outlook
  - *Adapted to be a GIS input layer*
  - *Single layer*
  - *Percentage chance of receiving less than he 33rd percentile of the rainfall during the coming three months*
    - *Continuation of drought conditions*
  - *Updated monthly*

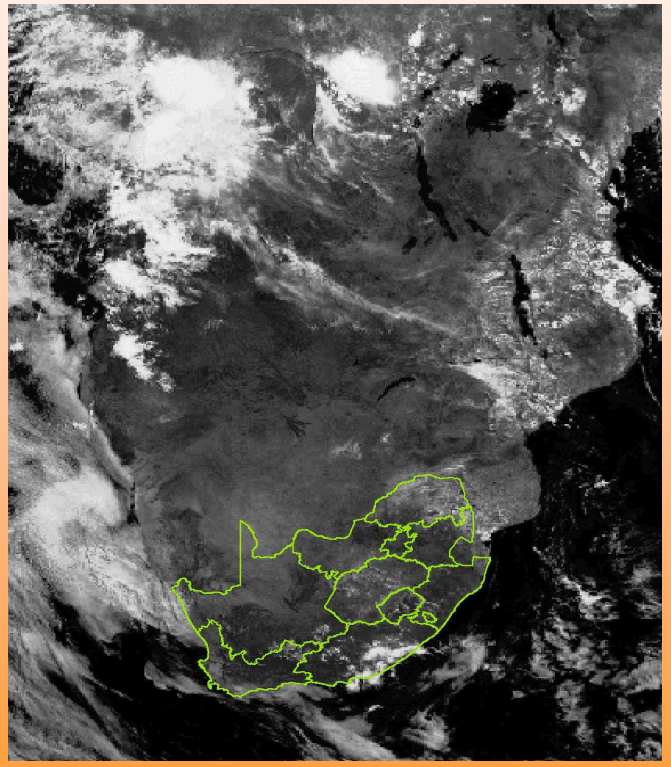
Drought Service: Input data

Satellite land surface input data

- NDVI
  - Ten-daily SPOT VEGETATION NDVI
  - *Ten-daily MSG SEVIRI NDVI – updated daily*
- *SPOT NDVI has historical dataset, real time updates through GEONETCast*

Satellite land surface output products

- All RS products derived from NDVI within Drought Monitoring software – historical dataset for NDVI
- Historical dataset of NDVI provided once-off

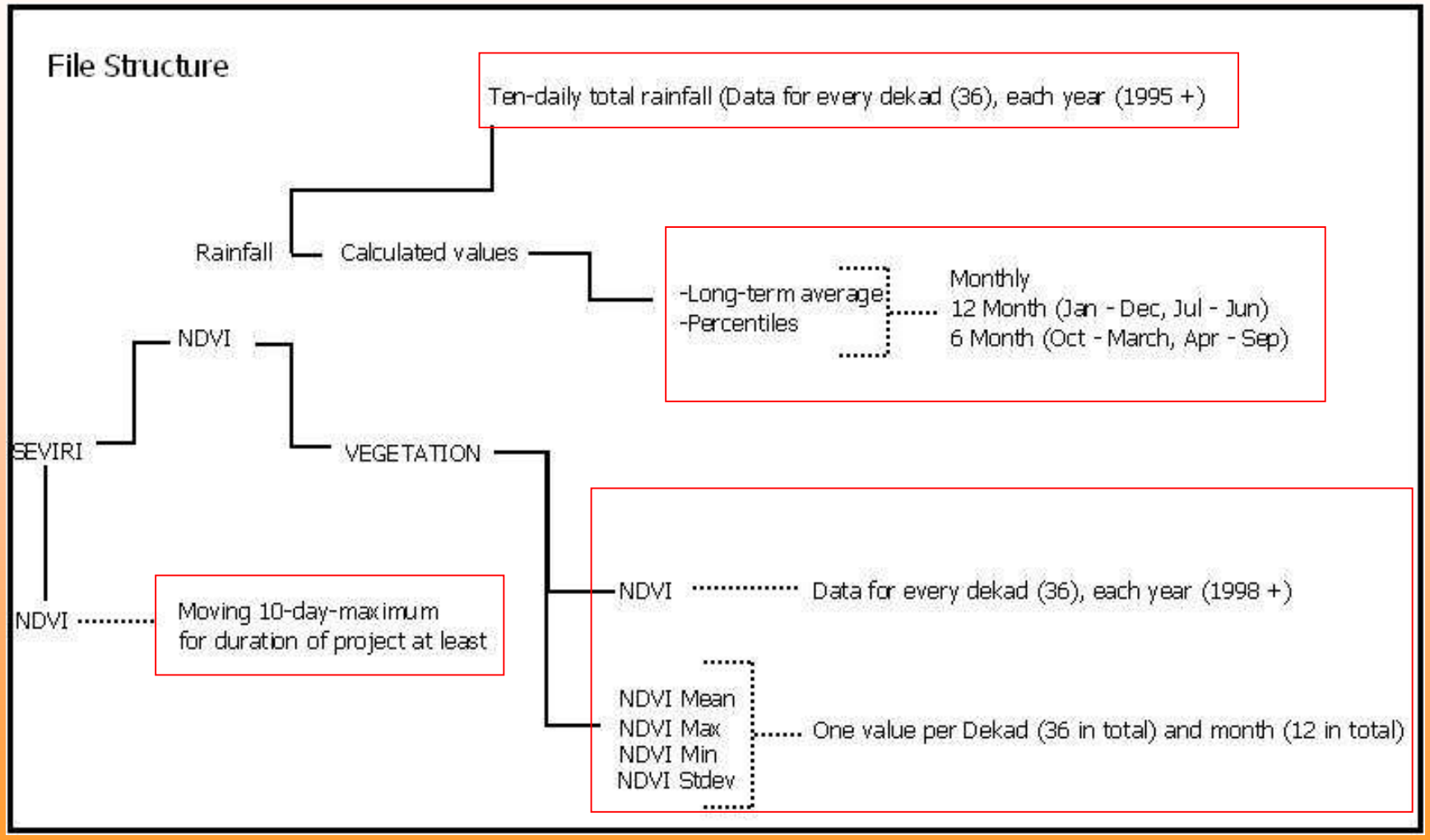


Any Other ?

Historical data set

Real time update

Drought Service: Input data



Drought Service: Data manipulation

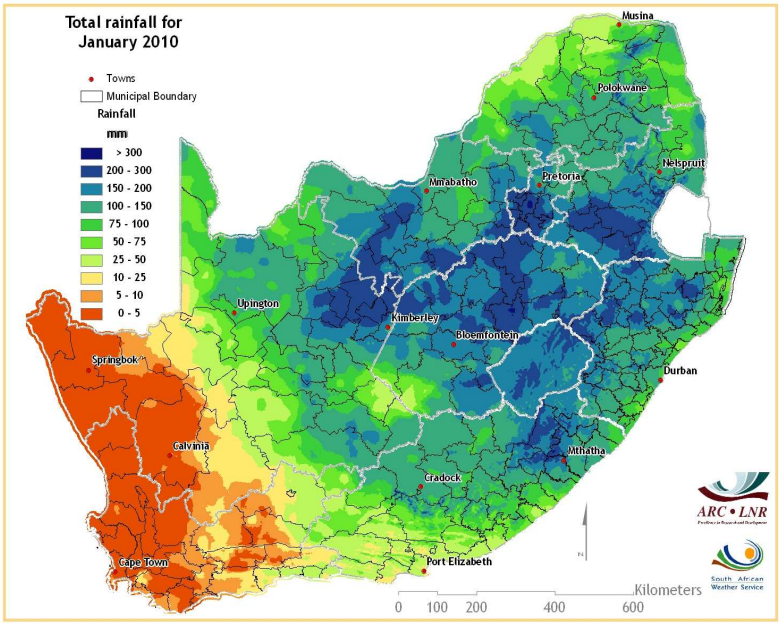
Capabilities of drought monitoring software

- Facilitates use and combination of various datasets
  - NDVI
  - Rainfall
- Allows user to combine one rainfall and one NDVI dataset
  - Eg.PASG, % of average rainfall
  - Result:
    - Boolean (discreet)
    - Continuous
- Allows user to create existing pre-defined products
- Allows user to choose relevant periods
- Allows user use of own calculations
- Allows user to apply a filter to create a Boolean-type map

Drought Service: Data manipulation, Products

Rainfall

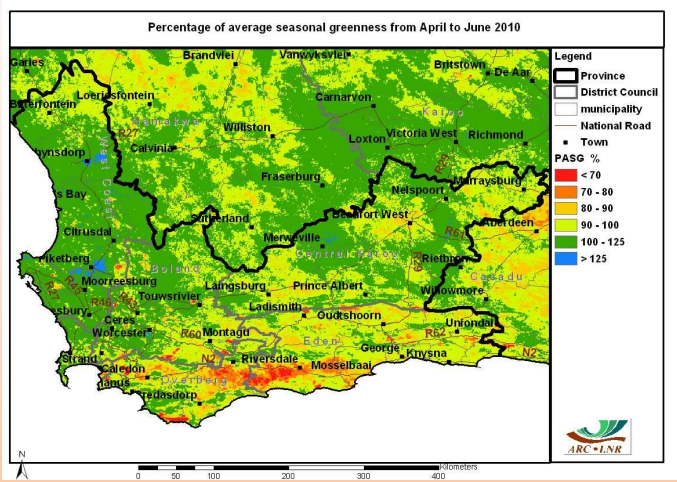
- Cumulative rainfall (mm)
  - Since beginning of season
  - For any period within current season
- Rainfall expressed relative to long-term dataset
  - Rainfall (% of average for any given period)
  - Rainfall Decile
- Rainfall for any given period compared to another period (differencing)
- Number of days since rainfall



Drought Service: Data manipulation

NDVI products – Derived from NDVI data

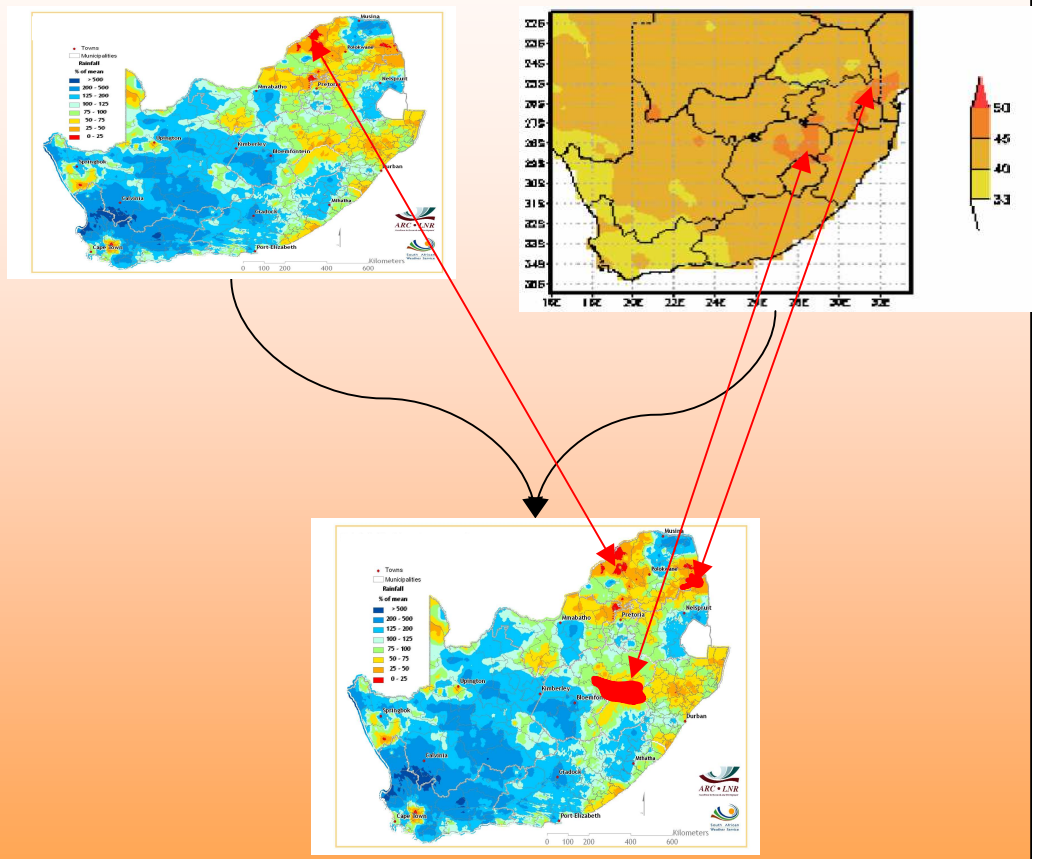
- Pre-defined indices
  - NDVI Difference
  - SDVI
    - **Calculated for latest 10-day period**
    - **SDVI =(NDVI – LT NDVI)/(STDEV$_{\text{NDVI for that period over time}}$)**
  - VCI
    - **Calculated for latest 10-day period**
    - **VCI = [(NDVI$_{\text{Current}}$ - NDVI$_{\text{min})}$/(NDVI$_{\text{max}}$ - NDVI$_{\text{min}}$)]*100**
    - **places the current NDVI value into the context of the historical NDVI timeseries**
    - **compares the current NDVI to the historical maximum and minimum NDVI value for the pixel**
  - PASG
    - **(Cumulative NDVI$_{\text{period}}$)/ (Average Cumulative NDVI$_{\text{period}}$)**
    - **used to evaluate the NDVI response over an extended period like an entire rainfall season**
- User-defined
  - ??



Drought Service: Data manipulation, Products

Inclusion of seasonal rainfall forecast

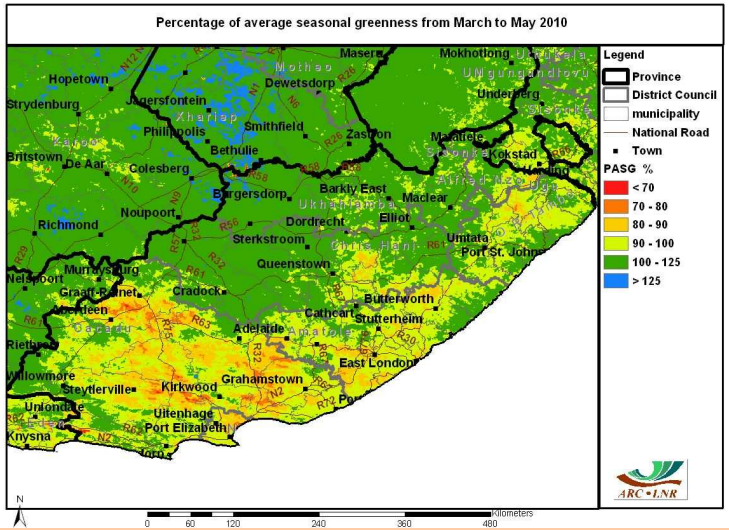
- Show areas where current deviations in cumulative NDVI or rainfall overlaps areas with a high probability of below-average rainfall over the next three months
  - E.g.. Where seasonal rainfall so far < 50% or where seasonal rainfall so far < 75% of average and probability for rainfall during the following 3 months not exceeding the 33rd percentile > 45%

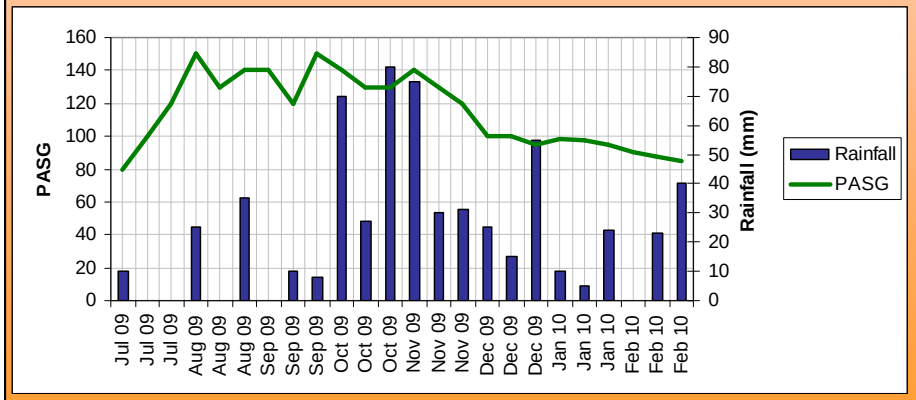


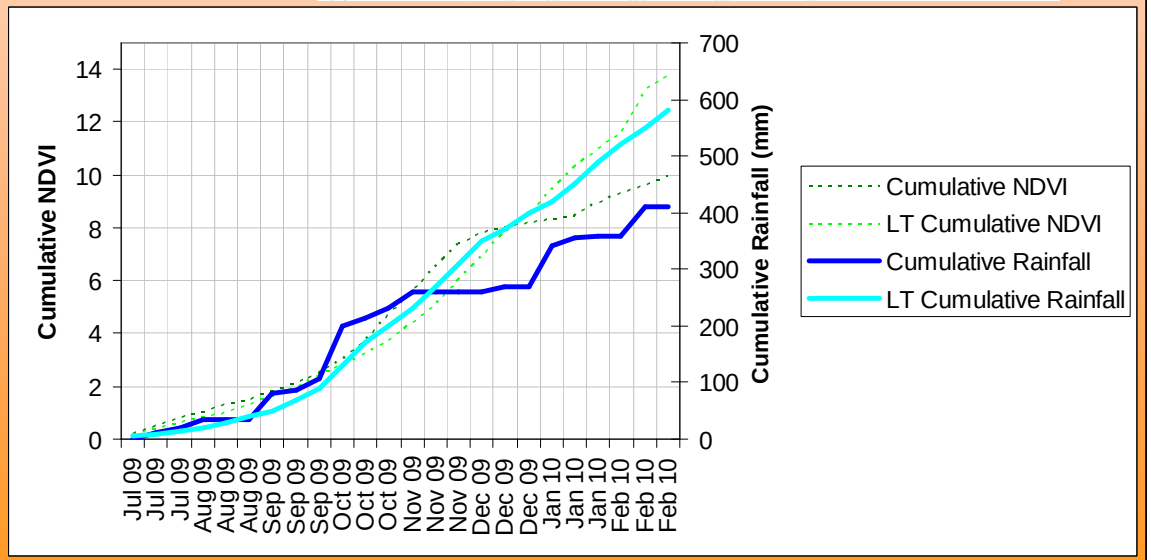
Drought Monitoring Service: Products

Output products

- Images
- Temporal- and spatial statistics
  - Graphs per polygon (province, district) showing time series data (total, actual, average, deviations, cumulative etc.)





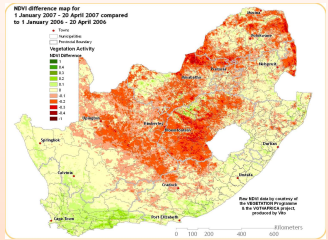


Drought Monitoring Service: Products

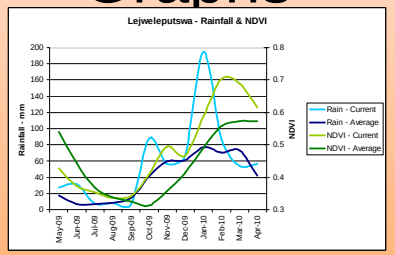
Output products

- Ultimately, a (drought) report / newsletter advisory is envisaged
- Graphs, statistics and images copied and pasted into a template with space for user comments
  - This is also a facet that will receive attention during training

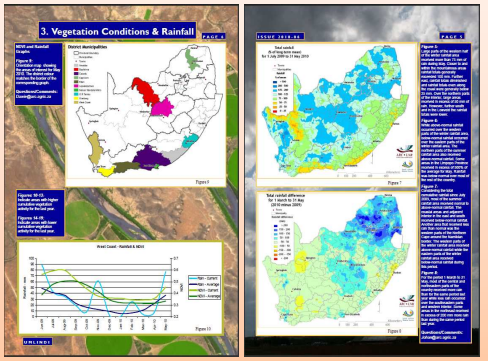
Images



Graphs



Report



Advisories
News Letters

Drought Monitoring software

Spatial statistics
E.g.. 25% of province under drought stress

Drought Monitoring Service: Way Forward

INPUT PRODUCTS

- Liaise with Land SAF

SYSTEM TRANSLATION (OS)

- TOR being finalised

OPERATIONAL BY mid 2011

TRAINING & SUPPORT

- UZ
- ARC-ISCW

CONTINUAL IMPROVEMENT (FEED BACK)

THANK YOU