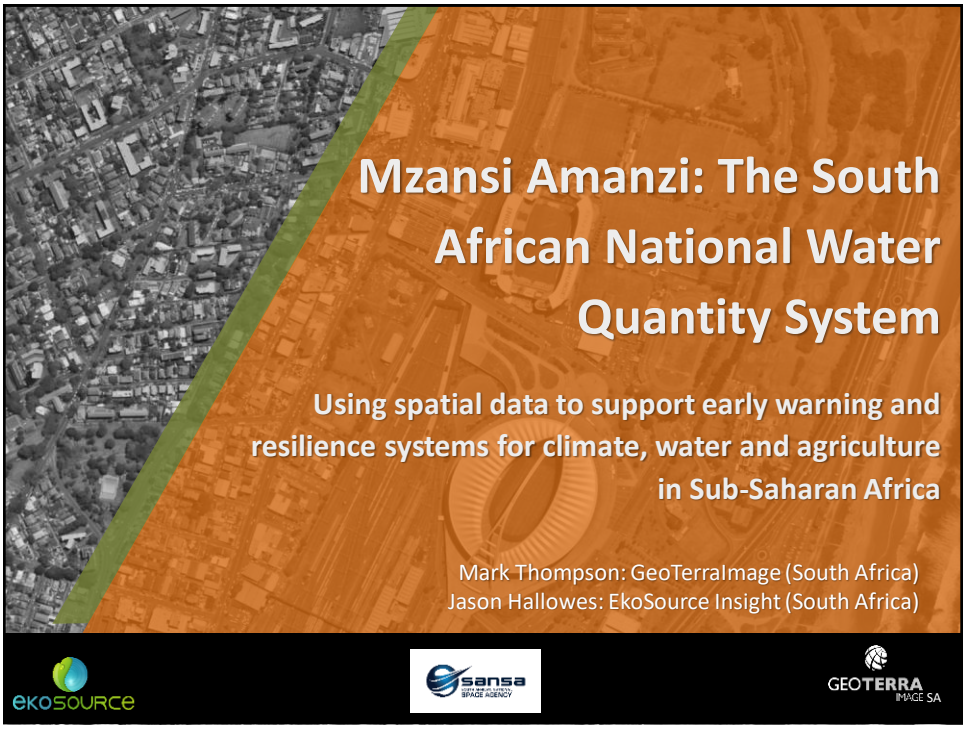


The Need for Water Resource Monitoring

- Water is a critical resource and underpins economic development, energy generation, food security, population health and ecosystem services capabilities.
- Access to accurate, reliable and timeous water resource information underpins a wide range of strategic planning and management, from basic water access to industrial expansion.

The Need for Water Resource Monitoring

- Wide-area coverage, detailed water resource monitoring and inventory is now an operational capability, and can be integrated with many other types of data in order to support a wide range of water-critical, actionable intelligence generation and reporting.

The South African National Water Quantity System

- The South African National Water Quantity Service ("Mzansi Amanzi") is a joint initiative between the South African National Space Agency (SANSA) and the GeoTerraImage / EkoSource partnership.
- Detailed, national coverage, monthly information on the status of surface water resources across South Africa.
- Water existence and extent (*where is it?)* and importantly, dam volume (*how much is available?)* information.

How the Water System Works

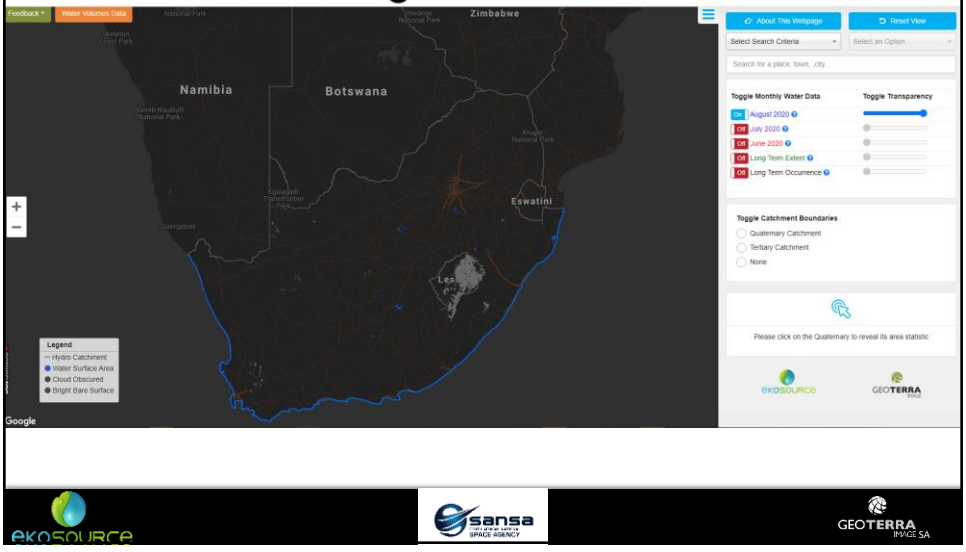
- The water service uses cloud-based technologies and satellite imagery to identify and map surface water features; followed by automated modelling procedures to determine water volume in individual dams / reservoirs.

- No in-situ ancillary observations nor field data collation is required for the water service to compute and complete: it is fully automated using data only sourced from satellite imagery and digital terrain models.

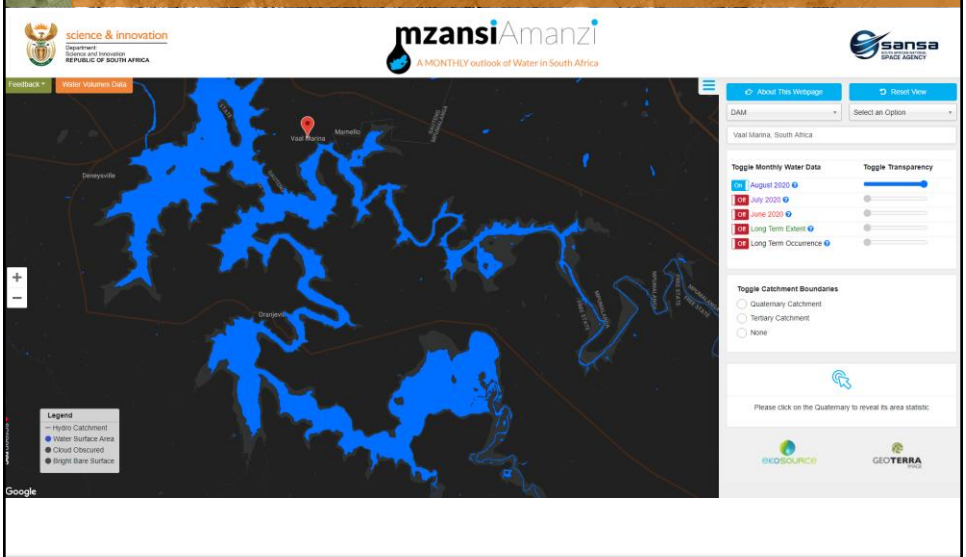
What the Water System Generates

- The South African Water Quantity Service generates user-ready information every month:
  - National coverage, total surface water feature inventory
  - Smallest detectable surface water feature (± 0.1 ha)
  - Individual water volume reporting for < 30,000 dams
  - Catchment summarised small dam volumes (± 250,000 dams, volumes less than 25,000m^3)
  - Digital maps (GIS compatible)
  - Data spreadsheets & public-access websites viewing portals
  - Near-real time information: ± 5 days from end of each month

https://www.water-southafrica.co.za



https://www.water-southafrica.co.za



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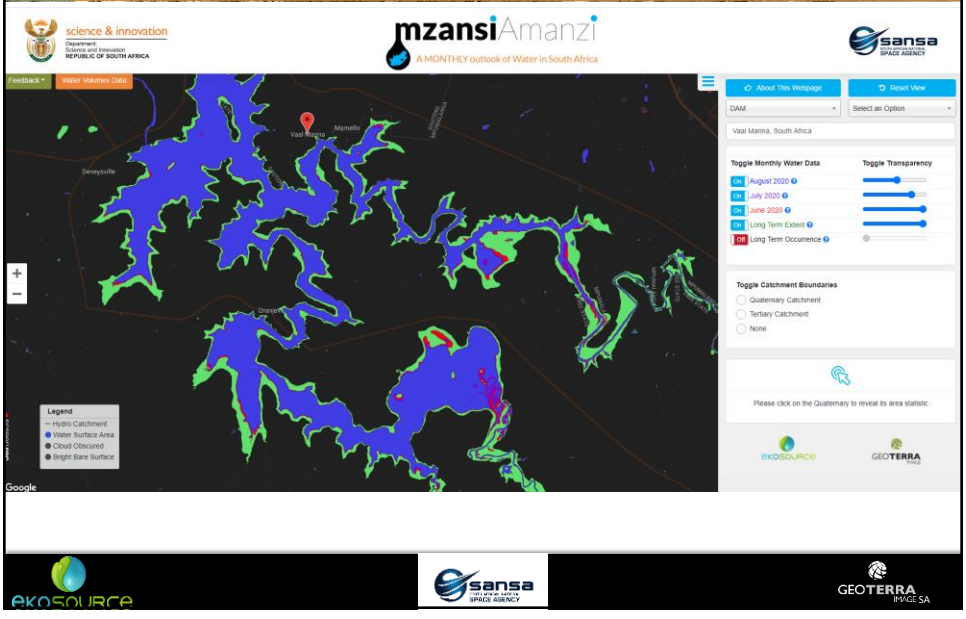
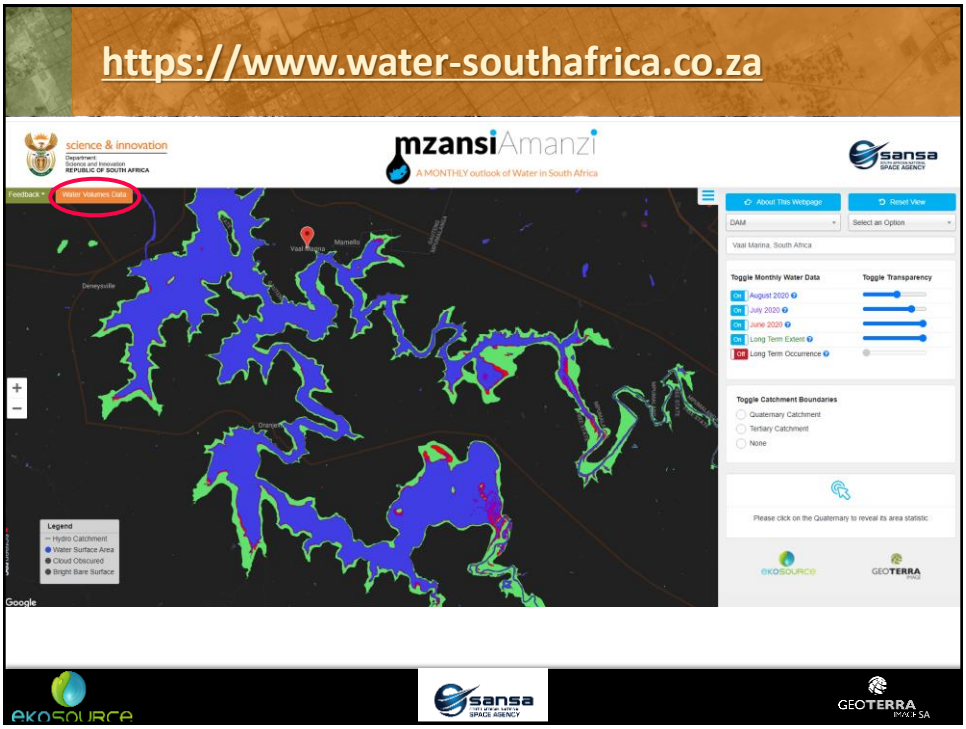
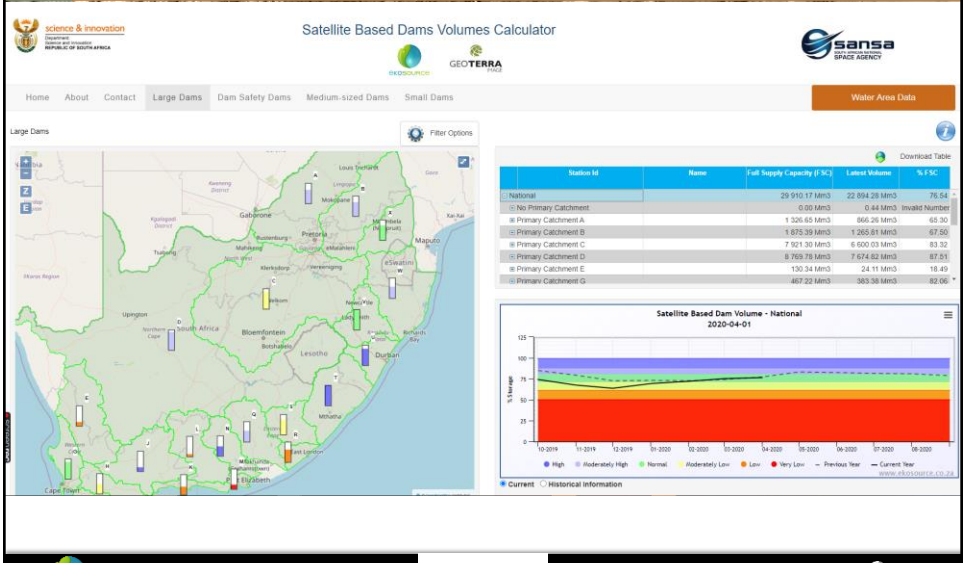


https://www.water-southafrica.co.za

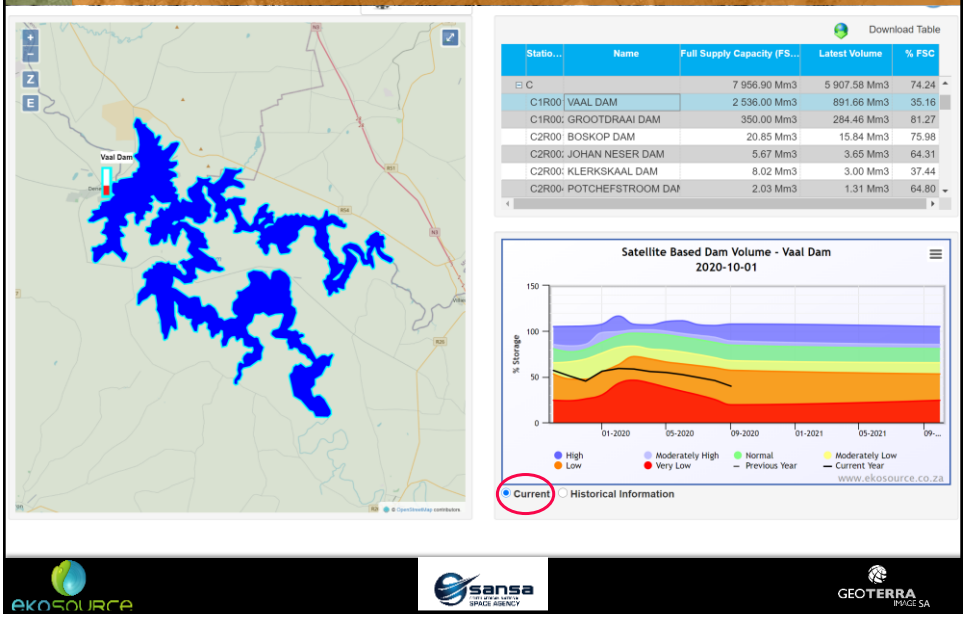


http://sbdvc.ekodata.co.za/ (dam volumes)



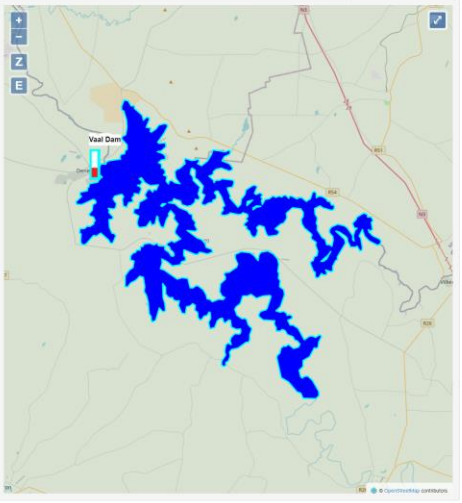
http://sbdvc.ekodata.co.za

Current Dam Water Volumes



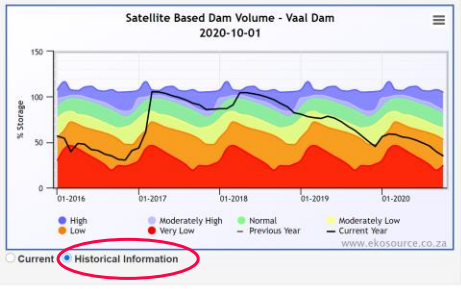
http://sbdvc.ekodata.co.za

Historical Dam Water Volumes

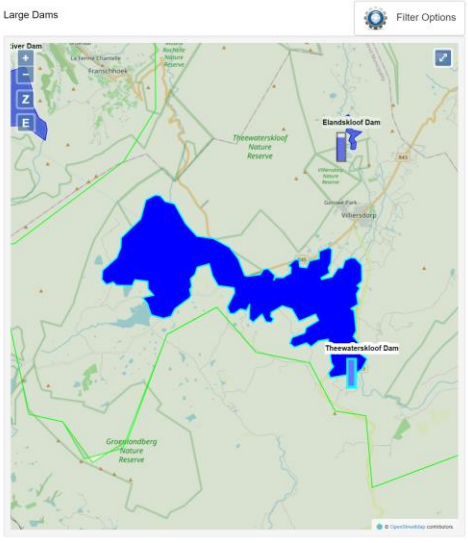


Download Table

Statio...	Name	Full Supply Capacity (FS...	Latest Volume	% FSC
C		7 956.90 Mm3	5 907.58 Mm3	74.24
C1R00	VAAL DAM	2 536.00 Mm3	891.66 Mm3	35.16
C1R00	GROOTDRAAI DAM	350.00 Mm3	284.46 Mm3	81.27
C2R00	BOSKOP DAM	20.85 Mm3	15.84 Mm3	75.98
C2R00	JOHAN NESER DAM	5.67 Mm3	3.65 Mm3	64.31
C2R00	KLERKSKAAL DAM	8.02 Mm3	3.00 Mm3	37.44
C2R00	POTCHEFSTROOM DAI	2.03 Mm3	1.31 Mm3	64.80

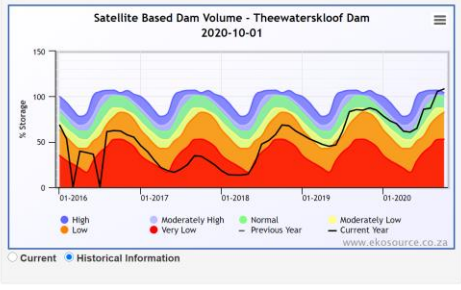


Monitoring Dam Volumes

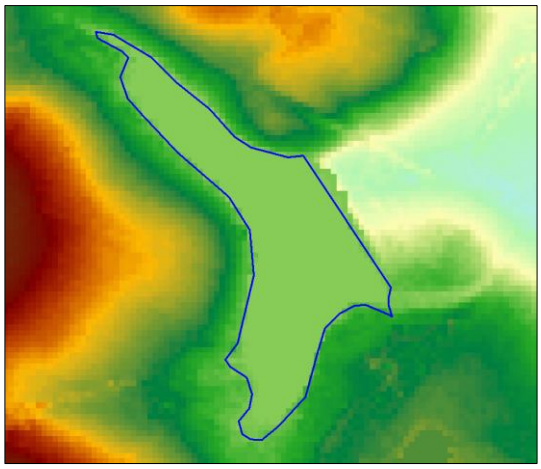


Download Table

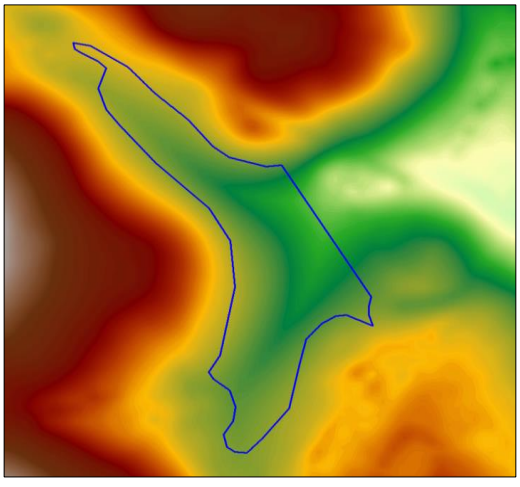
Statio...	Name	Full Supply Capacity (FS...	Latest Volume	% FSC
H3R00	POORTJIESKLOOF DAM	9.68 Mm3	0.02 Mm3	0.21
H3R00	PIETERSFONTEIN DAM	2.03 Mm3	0.74 Mm3	36.29
H4R00	KEEROM DAM	9.11 Mm3	6.75 Mm3	74.09
H4R00	KLIPBERG DAM	1.99 Mm3	1.03 Mm3	51.87
H4R00	KWAGGASKLOOF DAM	0.00 Mm3	158.30 Mm3	0.00
H6R00	THEEWATERSKLOOF D	480.41 Mm3	520.41 Mm3	108.33
H6R00	ELANDSKLOOF DAM	11.50 Mm3	9.32 Mm3	81.07



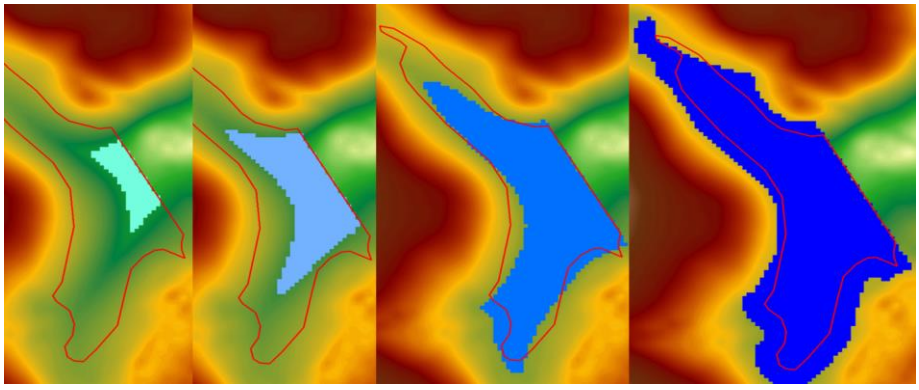
Calculating Dam Volumes (Topography)



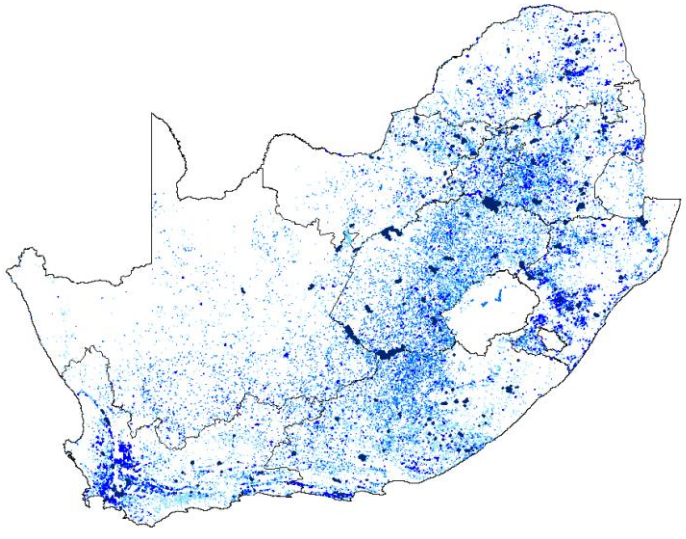
Calculating Dam Volumes (Topography)



Calculating Dam Volumes (Topography)

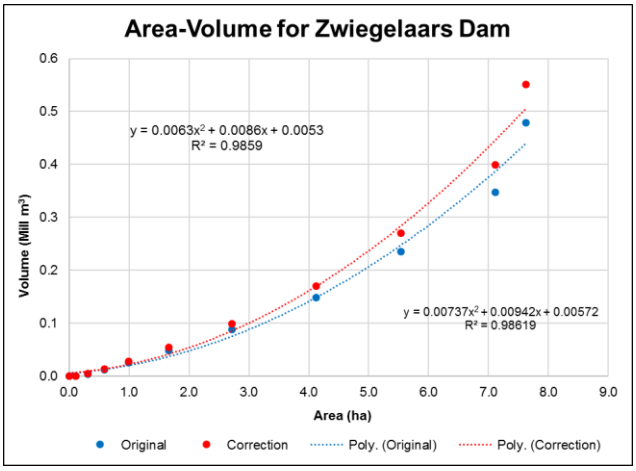


South Africa: Dam Volume Data Monthly



Accuracy (Area & Volume)

Category 2 Dams – Zwiegelaars Dam

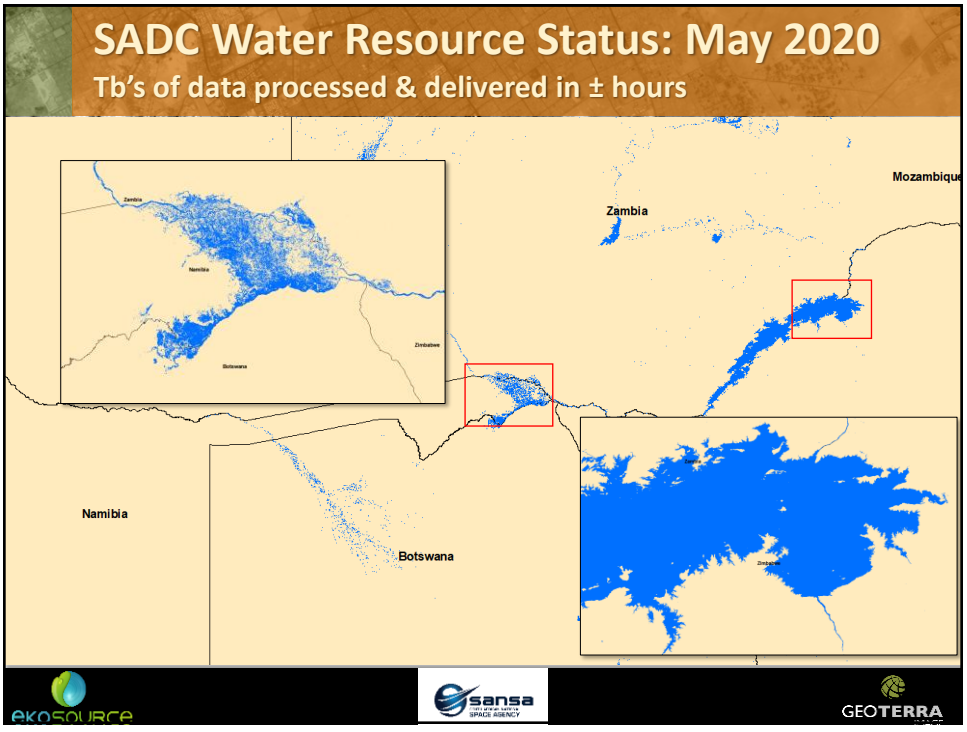


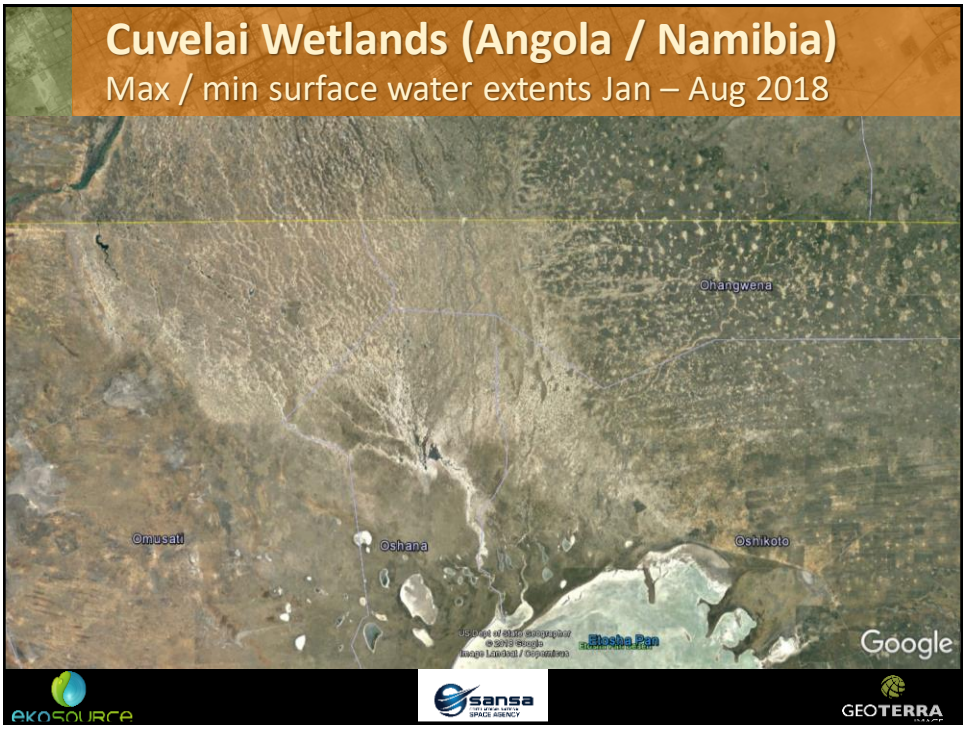
Regional & International Water Monitoring

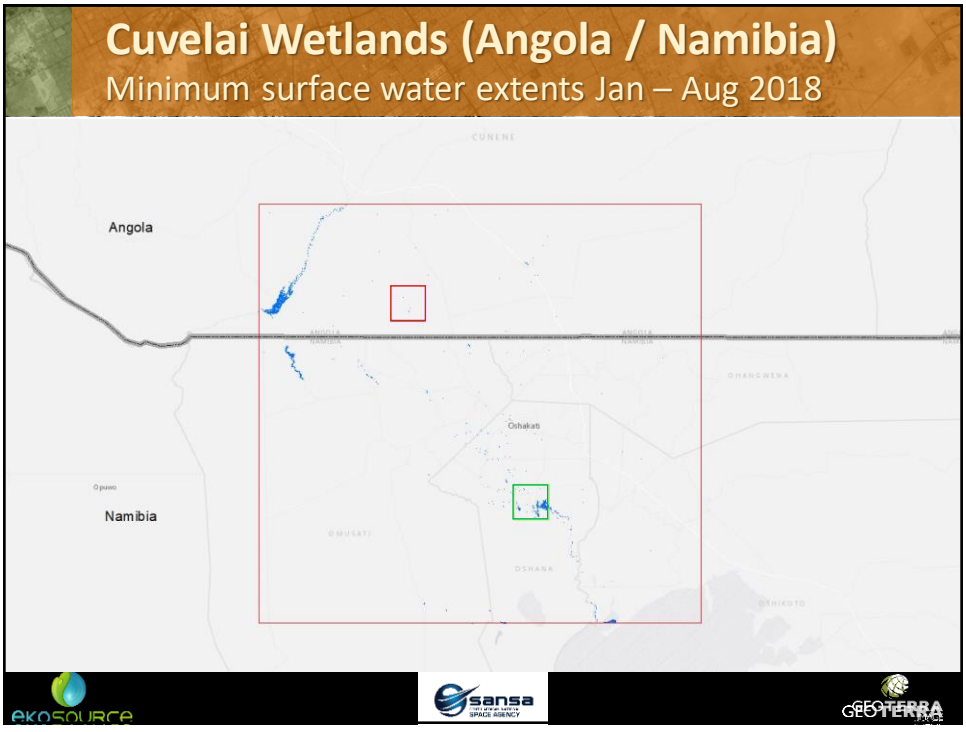
The South African National Water Quantity System is the South African version of an operational capability that is geographically transportable to other areas, both regionally and internationally.

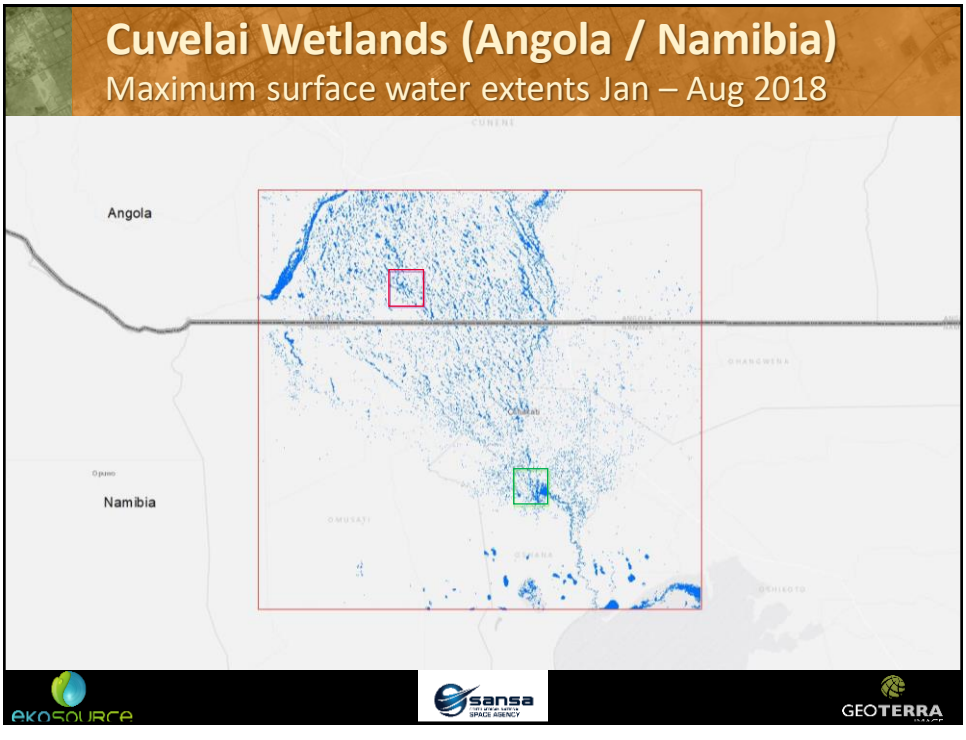
Other areas of service application include:

- OKACOM: all hydrological catchments upstream of the Okavango Swamps, extending across Botswana, Namibia, Zambia, Angola (*operational*)
- ZAMCOM: all hydrological sub-catchments making up the full Zambesi River Basin, extending across Angola Botswana, Mozambique, Malawi, Namibia, Zambia, Zimbabwe, Mozambique (*pre-operational*)


SADC Water Resource Status: May 2020
Tb's of data processed & delivered in ± hours
Mozambique
Zambia
Namibia
Botswana
ekoSOURCE
sansa
GEOTERRA


Cuvelai Wetlands (Angola / Namibia)
Max / min surface water extents Jan – Aug 2018
Ohangwena
Omusati
Oshana
Oshikoto
Etosha Pan
Google
ekoSOURCE
sansa
GEOTERRA


Cuvelai Wetlands (Angola / Namibia)
Minimum surface water extents Jan – Aug 2018
Angola
Namibia
Oshakati
ekosource
sansa
GEOTERRA

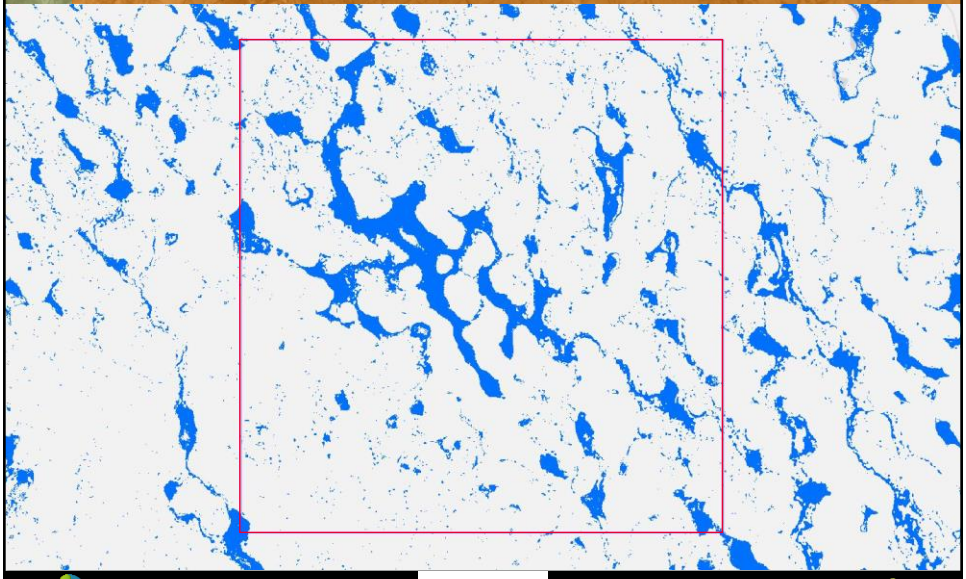

Cuvelai Wetlands (Angola / Namibia)
Maximum surface water extents Jan – Aug 2018
Angola
Namibia
ekosource
sansa
GEOTERRA

Cuvelai Wetlands (Angola / Namibia)

Close-up: Minimum surface water extents Jan – Aug

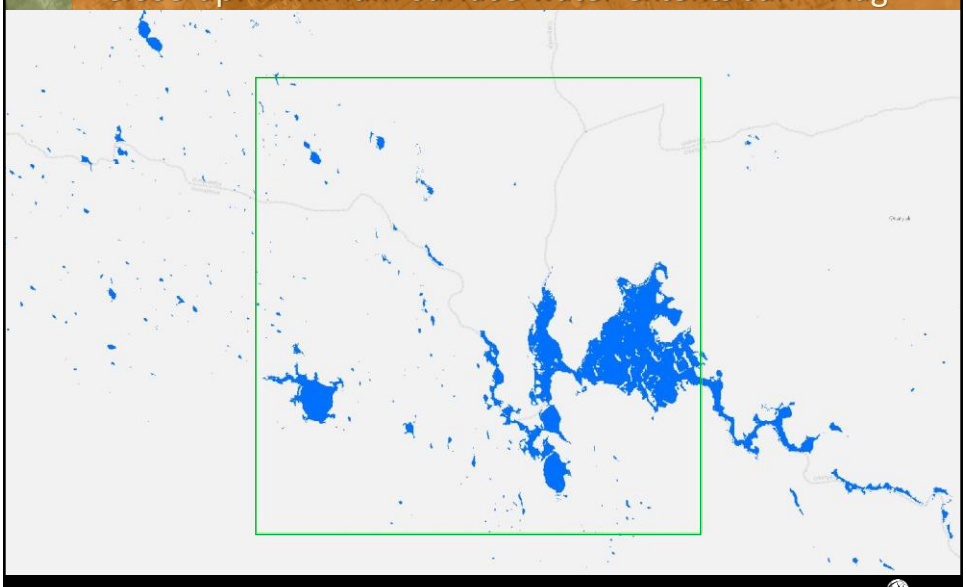
Cuvelai Wetlands (Angola / Namibia)

Close-up: Maximum surface water extents Jan – Aug



Cuvelai Wetlands (Angola / Namibia)

Close-up: Minimum surface water extents Jan – Aug

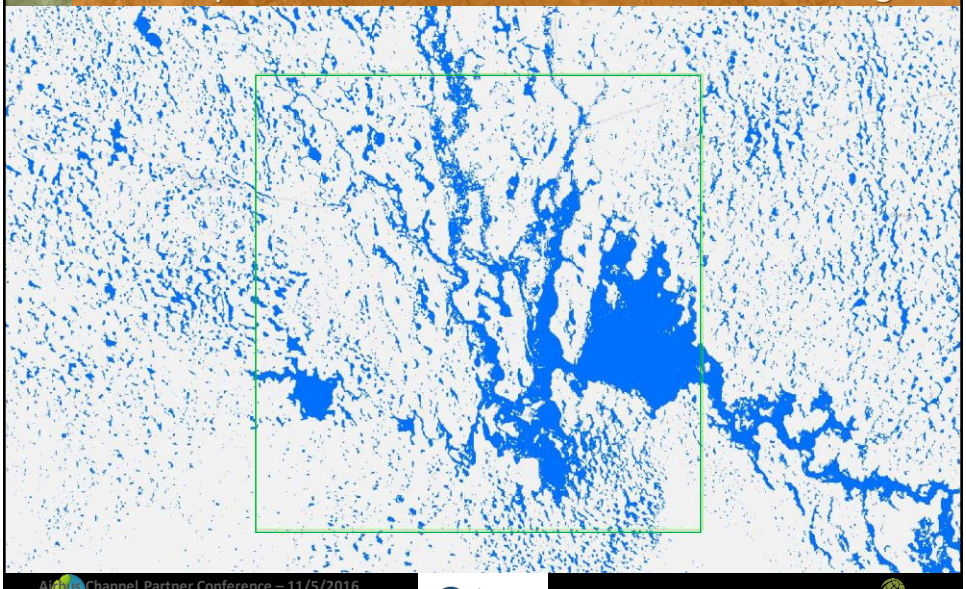


Close-up: Minimum surface water extent 01 – 08 2018

GEOTERRA IMAGE

Cuvelai Wetlands (Angola / Namibia)

Close-up: Maximum surface water extents Jan – Aug

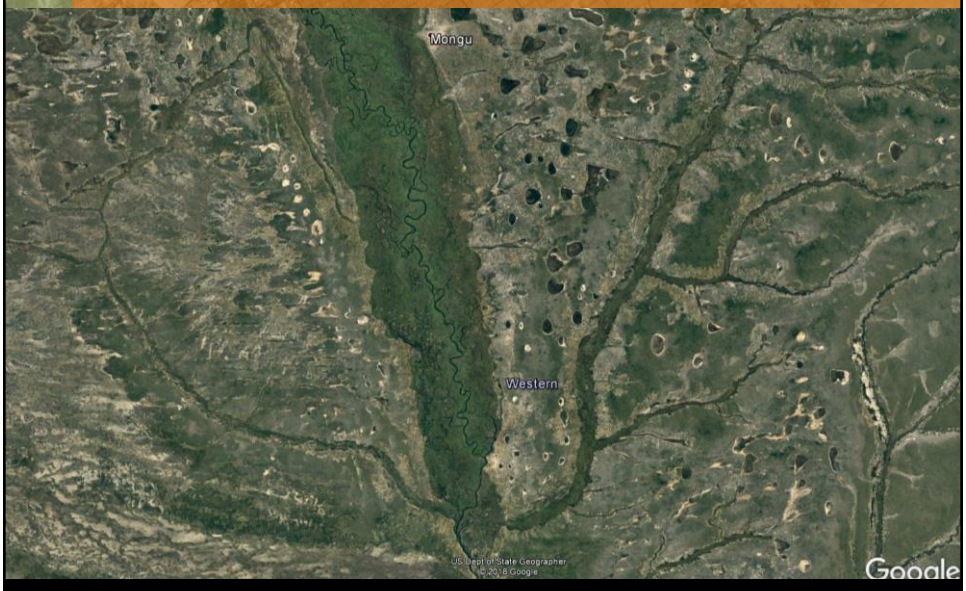


EKOSOURCE

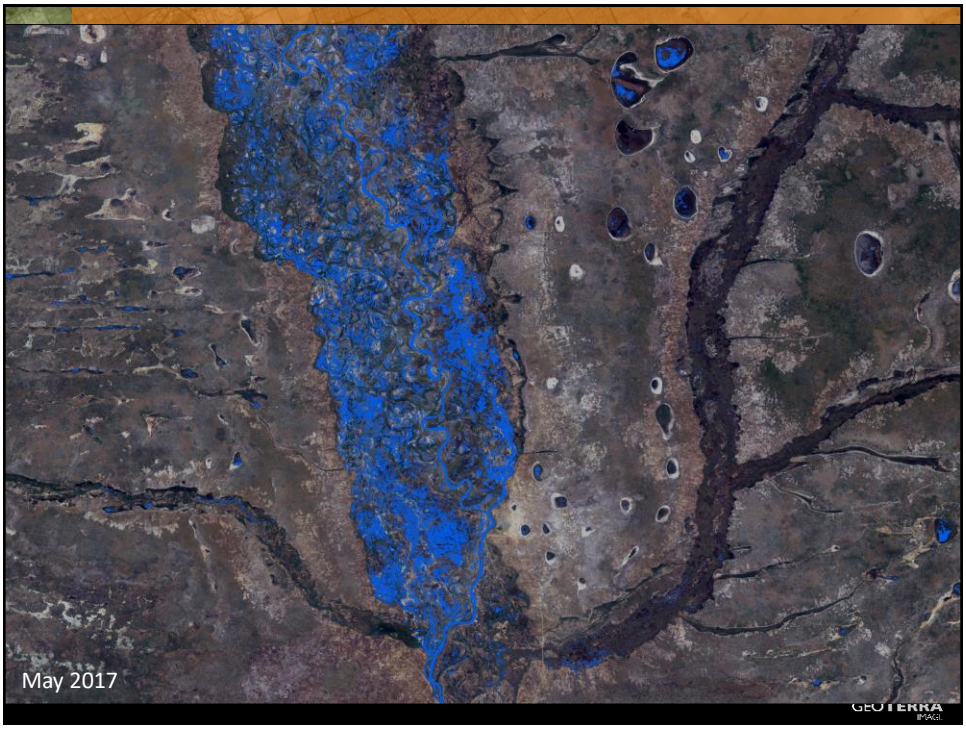
sansa SOUTH AFRICAN NATIONAL SPACE AGENCY

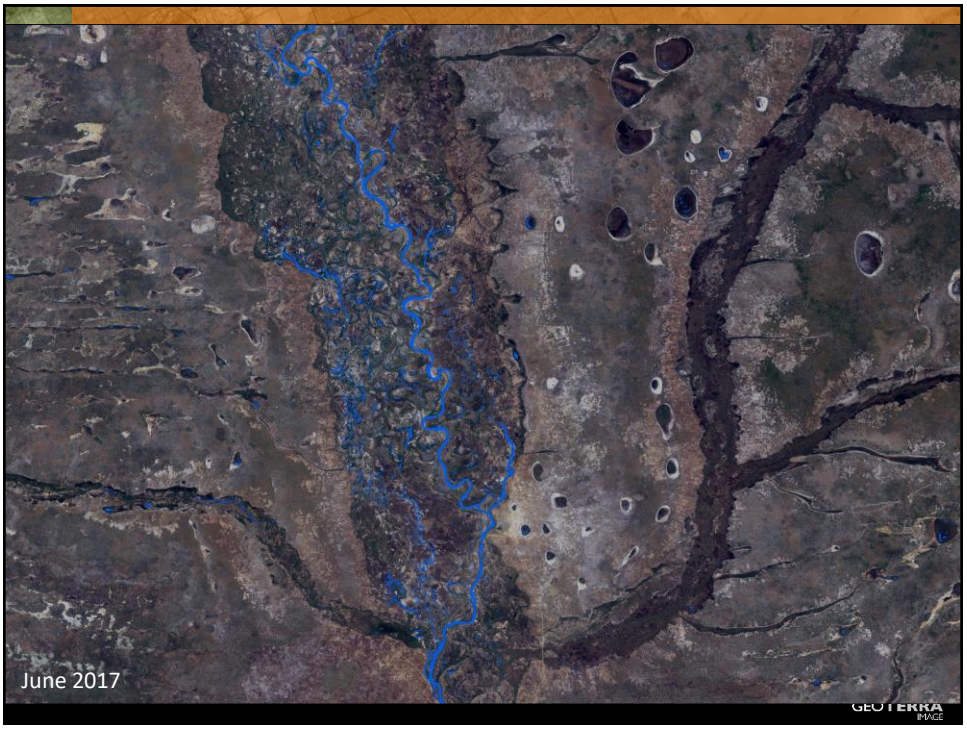
GEOTERRA IMAGE

Liuwa Plains (Zambia): Seasonal Flooding

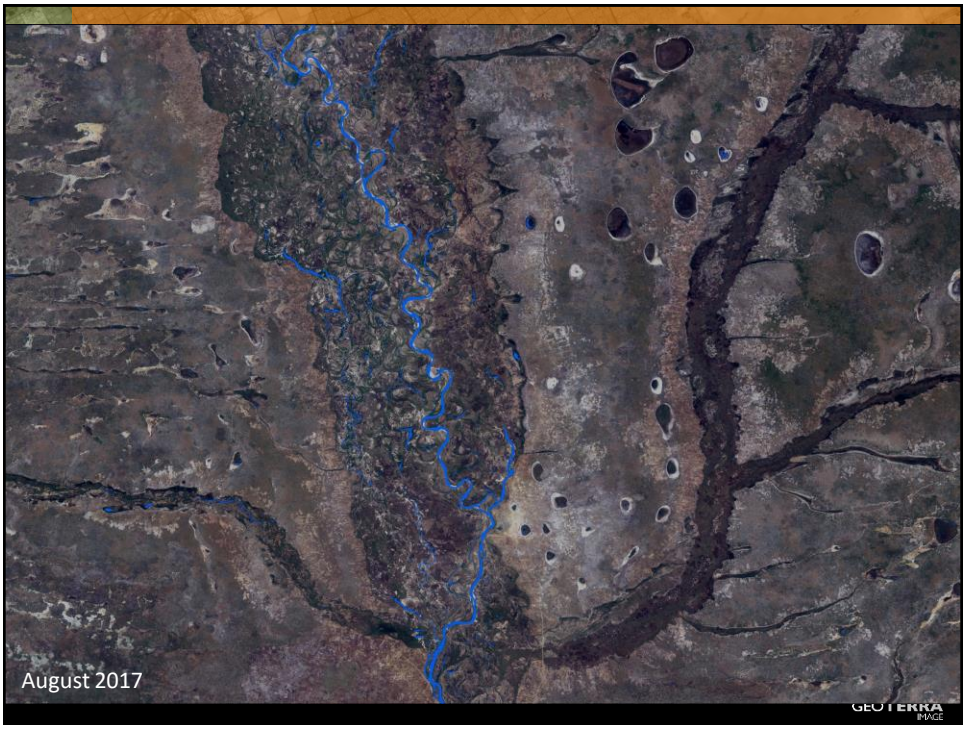


May 2017 – April 2018 monthly surface water




June 2017
GEOTERRA
IMAGE


July 2017
GEOTERRA
IMAGE


August 2017
GEOTERRA
IMAGE


September 2017
GEOTERRA
IMAGE


October 2017

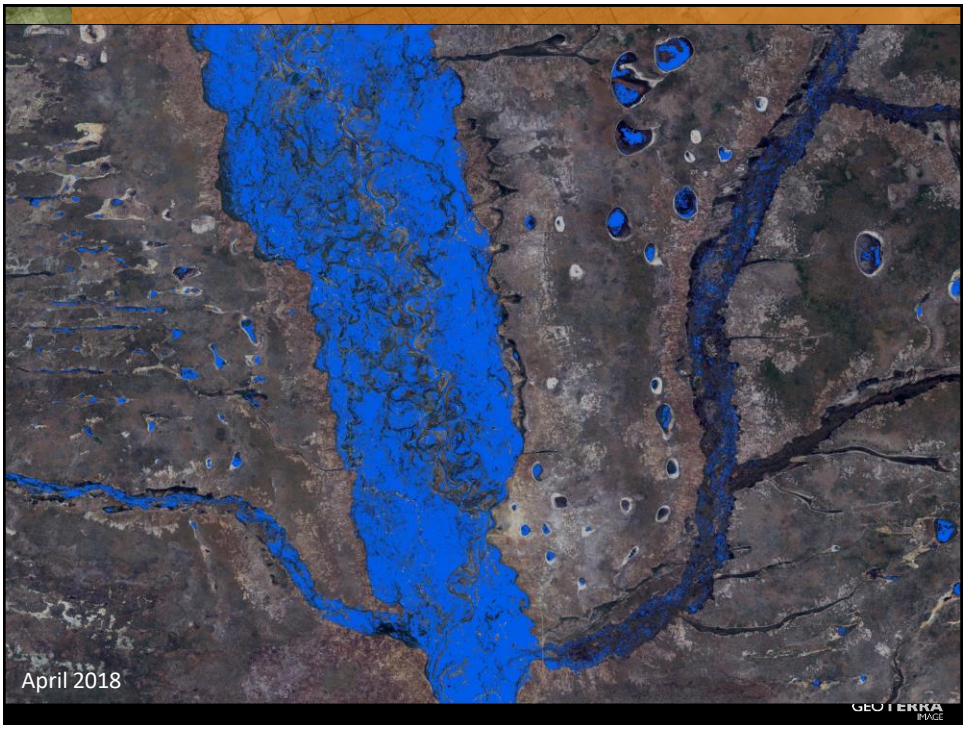

November 2017

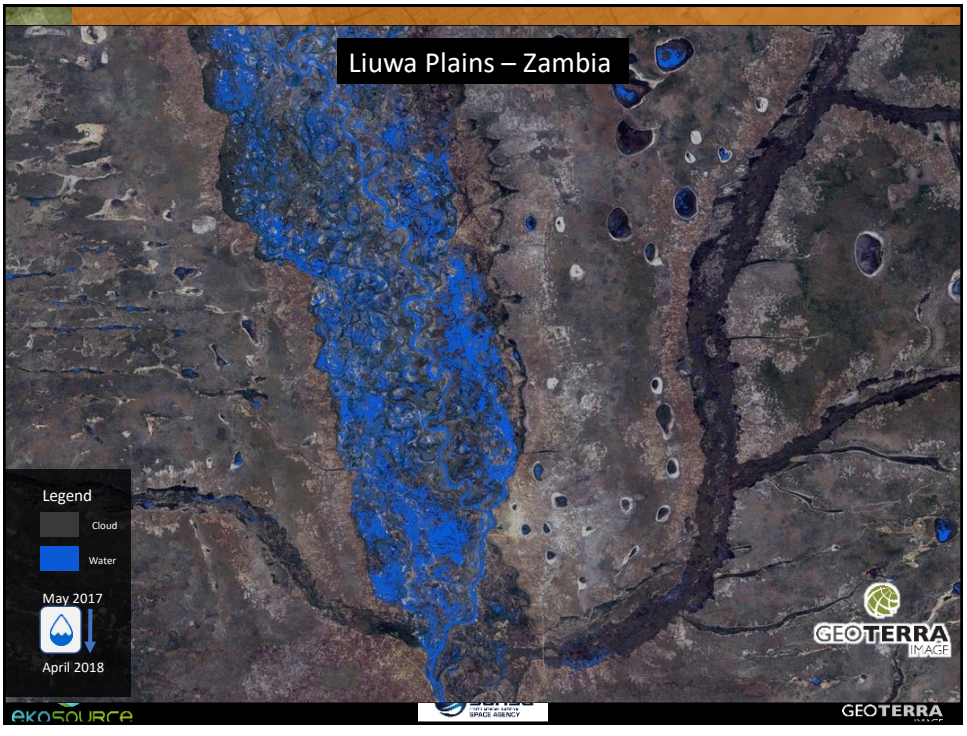

December 2017
GEOTERRA
IMAGE

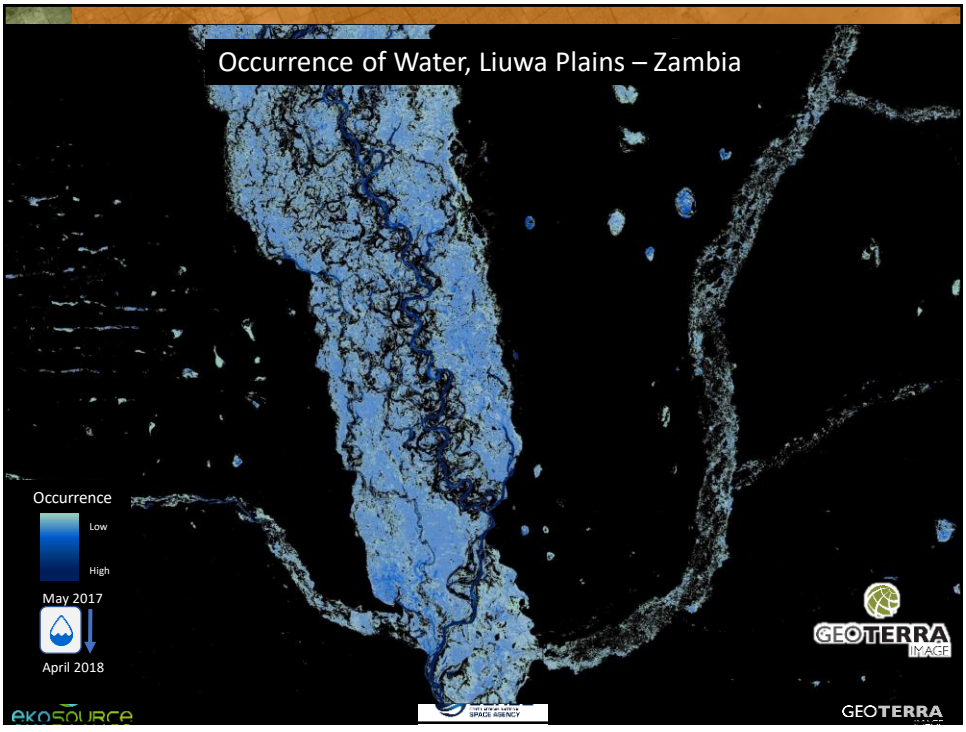

January 2018
GEOTERRA
IMAGE


February 2017
GEOTERRA
IMAGE


March 2018
GEOTERRA
IMAGE


April 2018


Liuwa Plains – Zambia
Legend
Cloud
Water
May 2017
April 2018
GEOTERRA
IMAGE

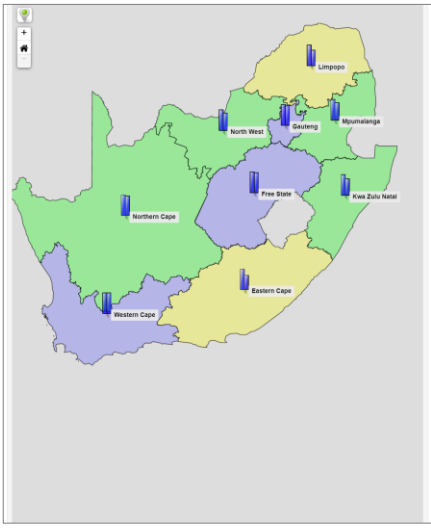


Turning Water Resource Information into Actionable Intelligence for Operational Planning & Decision Support

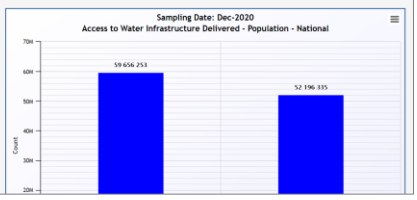
Dashboards can be generated to integrate water information with other key information sets to generate focussed and actionable intelligence ….

These are examples of information monitoring dashboards developed within the South African Department of Water and Sanitation (DWS) to support improved water resources management and assist with assessing progress towards the SDGs within the DWS.

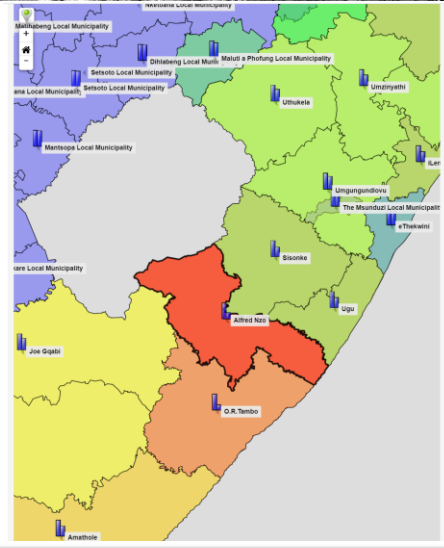
Dashboard Example: Access to Water Services



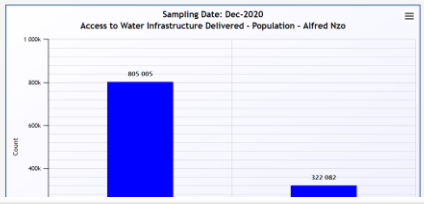
WSA	Population	Population with access	%Population with access
National Total(9 Provinces)			
Eastern Cape(14 WSAs)			
Eastern Cape	6 484 186	4 491 435	6
Free State(19 WSAs)			
Free State	3 043 072	2 968 504	9
Gauteng(7 WSAs)			
Gauteng	15 668 446	15 467 592	9
Kwa Zulu Natal(14 WSAs)			
Kwa Zulu Natal	11 657 986	9 362 747	8
Limpopo(9 WSAs)			
Limpopo	5 717 653	4 268 610	7
Mpumalanga(16 WSAs)			
Mpumalanga	4 744 406	4 074 797	8
North West(10 WSAs)			
North West	4 165 588	3 493 212	8
Northern Cape(25 WSAs)			
Northern Cape	1 245 933	1 171 658	9
Western Cape(25 WSAs)			
Western Cape	6 928 983	6 897 780	10
National	59 656 253	52 196 335	8



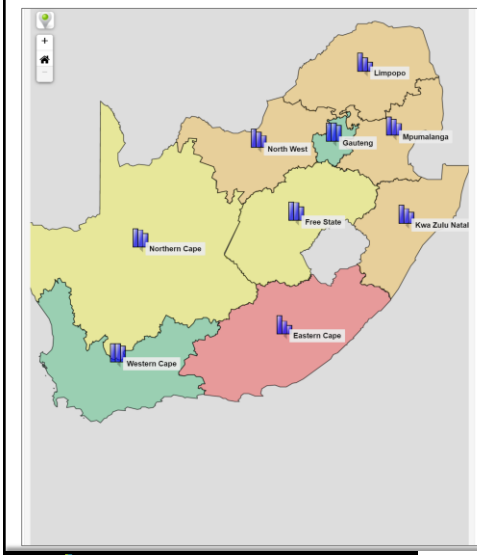
Dashboard Example: Access to Water Services



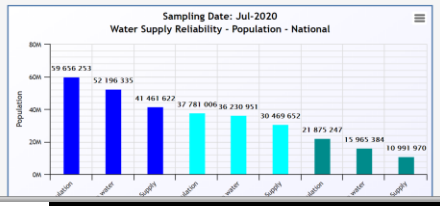
WSA	Population	Population with access	%Population with access
National Total(9 Provinces)			
Eastern Cape(14 WSAs)			
Buffalo City	773 601	773 601	100%
Amathole	814 377	506 266	62%
Chris Hani	777 416	593 273	76%
Joe Gqabi	345 629	253 090	73%
O.R.Tambo	1 350 803	450 746	33%
Alfred Nzo	805 005	322 082	40%
Dr Beyers Naudé Local Municipality	76 037	72 723	96%
Blue Crane Route Local Municipality	33 295	32 455	97%
Makana Local Municipality	75 832	72 841	96%
Ndlambe Local Municipality	58 436	54 886	94%
Sundays River Valley Local Municipality	55 513	47 512	86%
Kouga Local Municipality	105 139	101 103	96%
Kou-Kamma Local Municipality	40 511	38 265	94%
Nelson Mandela Bay	1 172 592	1 172 592	100%
Eastern Cape	6 484 186	4 491 435	69%
Free State(19 WSAs)			
Free State	3 043 072	2 968 504	98%
Gauteng(7 WSAs)			



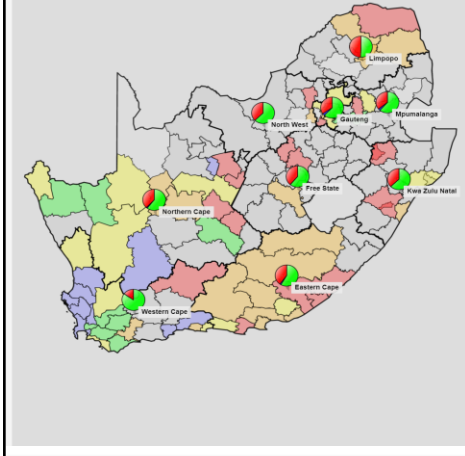
Dashboard Example: Reliability of Water Supply



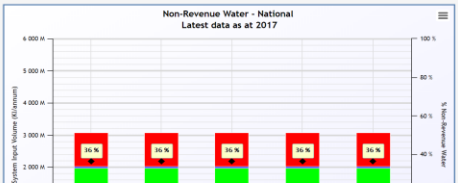
WSA Name	Population	Population with access to water	Population Reliable Supply	% Population Reliable	Urban Population	Urban Population with access
National Total(9 Provinces)						
Eastern Cape(14 WSAs)						
Eastern Cape	6 484 186	4 491 435	3 000 752	46%	2 695 282	2 482 387
Free State(19 WSAs)						
Free State	3 043 072	2 968 504	2 239 812	74%	2 764 638	2 706 146
Gauteng(9 WSAs)						
Gauteng	15 668 446	15 467 592	13 563 105	87%	14 161 924	13 988 787
Kwa Zulu Natal(14 WSAs)						
Kwa Zulu Natal	11 657 986	9 362 747	7 083 095	61%	5 578 664	5 177 963
Limpopo(10 WSAs)						
Limpopo	5 717 653	4 268 610	2 941 658	51%	1 073 005	868 418
Mpumalanga(17 WSAs)						
Mpumalanga	4 744 406	4 074 797	3 042 371	64%	2 267 021	2 010 338
North West(10 WSAs)						
North West	4 165 588	3 493 212	2 594 811	62%	1 920 375	1 736 079
Northern Cape(26 WSAs)						
Northern Cape	1 245 933	1 171 658	895 179	72%	967 718	929 806
Western Cape(25 WSAs)						



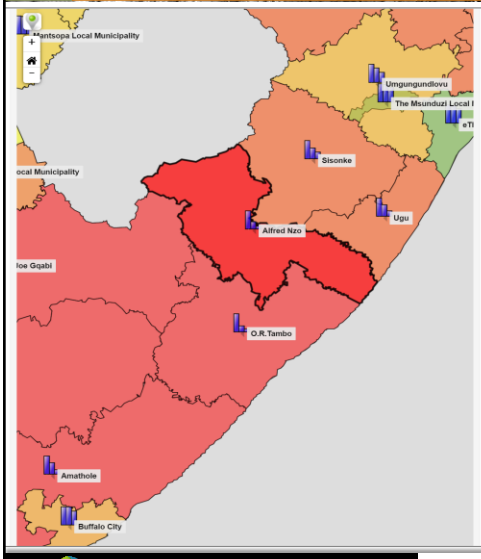
Dashboard Example: Non-Revenue Water



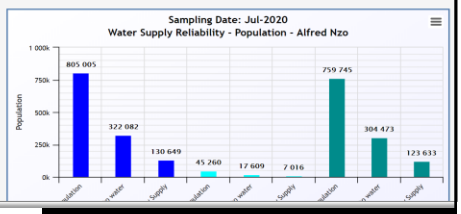
WSA	Year	Non Revenue Water	% NRW
National Total(9 Provinces)			
Eastern Cape(16 WSAs)			
Eastern Cape	2017	Area of Concern	
Free State(20 WSAs)			
Free State	2017	Area of Concern	
Gauteng(10 WSAs)			
Gauteng	2017	Acceptable	
Kwa Zulu Natal(14 WSAs)			
Kwa Zulu Natal	2017	Area of Concern	
Limpopo(11 WSAs)			
Limpopo	2017	Crisis	
Mpumalanga(18 WSAs)			
Mpumalanga	2017	Area of Concern	
North West(11 WSAs)			
North West	2017	Area of Concern	
Northern Cape(27 WSAs)			
Northern Cape	2017	Area of Concern	
Western Cape(25 WSAs)			
Western Cape	2017	Good	
National	2017	Area of Concern	



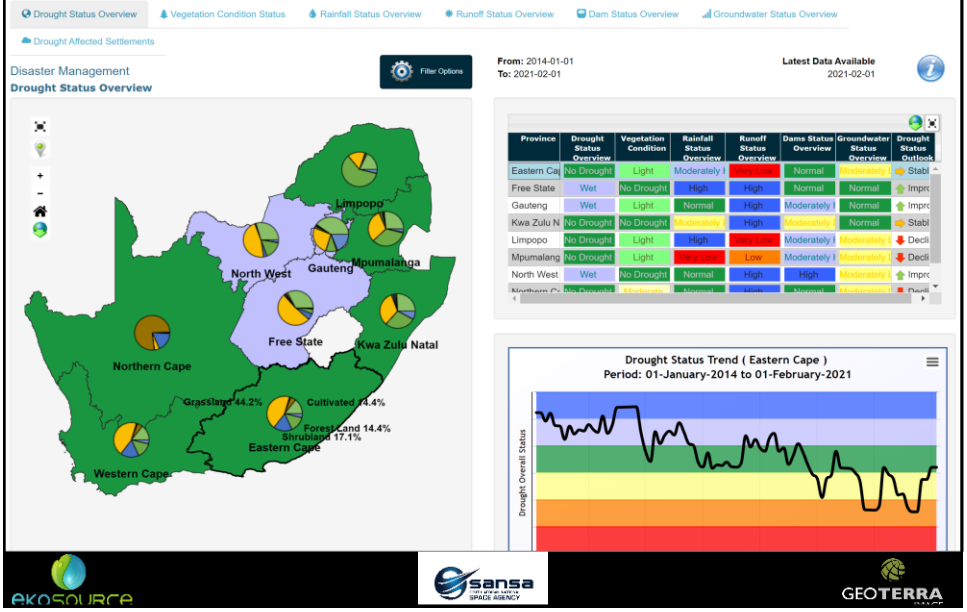
Dashboard Example: Reliability of Water Supply



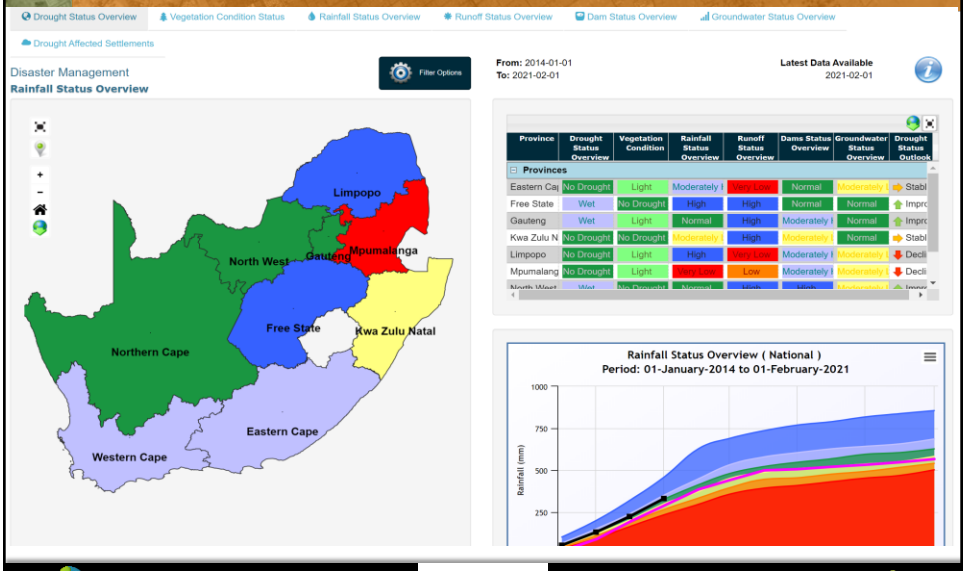
WSA Name	Population	Population with access to water	Population Reliable Supply	% Population Reliable	Urban Population	Urban Population with access
National Total(9 Provinces)						
Eastern Cape(14 WSAs)						
Alfred Nzo	805 005	322 082	130 649	16%	45 260	17 609
Amathole	814 377	506 266	194 139	24%	143 723	105 879
Blue Crane Route	33 295	32 455	29 798	89%	26 013	25 346
Buffalo City Metropolitan Mu	773 601	773 601	584 550	76%	451 620	451 620
Chris Hani	777 416	593 273	324 906	42%	166 179	156 805
Dr Beyers Naudé	76 037	72 723	65 124	86%	75 119	71 805
Joe Gqabi	345 629	253 090	155 181	45%	135 928	112 411
Kouga	105 139	101 103	86 290	82%	101 376	97 411
Koukamma	40 511	38 265	26 701	66%	39 774	37 528
Makana	75 832	72 841	61 170	81%	75 676	72 685
Ndlambe	58 436	54 886	49 184	84%	57 914	54 364
Nelson Mandela Bay Metro	1 172 592	1 172 592	1 036 553	88%	1 167 587	1 167 587
OR Tambo	1 350 803	450 746	223 870	17%	153 821	64 046
Sundays River Valley	55 513	47 512	32 637	59%	55 292	47 291
Eastern Cape	6 484 186	4 491 435	3 000 752	46%	2 695 282	2 482 387
Free State(19 WSAs)						



Dashboard Example: Drought status overview



Dashboard Example: Drought Status Rainfall



Thank you

emails to add