

INTERGRATED DROUGHT RISK REDUCTION AND MANAGEMENT PLAN FOR SOUTH AFRICA.



BACKGROUND

- ▶ Prior to COVID-19 pandemic, drought was the hazard with largest impact
- ▶ Drought shaped the history of South Africa
- ▶ Climatic changes documented since 1700's
 - ▶ 1700-1750 extreme droughts
 - ▶ 1800–1806 *Mahlathule* (Nguni)(let one eat what he can and say naught)
 - ▶ 1801-1806 extreme drought also in Cape Colony
 - ▶ 1816-1817 *Mahlatule* led to *Mfekane*. Catalyst for social revolution that see the establishment of the Zulu Kingdom under Shaka. >2million ppl died - hunger and conflict
 - ▶ 1820-1830 multi-year drought in whole country
 - ▶ 20th Century droughts: 1914, 1916, 1923, 1933, 1941, 1946, 1949, 1964, 1979, 1982-84, 1991-92,
 - ▶ Recent: 2001-03, 2015-18

BACKGROUND

- ▶ Drought management remain mostly response
- ▶ Same mistakes over and over
- ▶ New plan shift focus to Drought Risk Reduction
- ▶ Drought is slow onset disaster and we need to implement contingencies as drought progress
- ▶ Drought classification is important
- ▶ **Drought monitoring is key element for drought preparedness and DRR**
 - ▶ Remotely sensed indicators
 - ▶ Site specific indicators
 - ▶ Demarcation of monitor boundaries

CLIMATE PROFILE



LONG TERM PLANNING HORIZON: AGRIC PRODUCTION POTENTIAL, WATER MANAGEMENT LIMITATIONS AND OPPORTUNITIES

PRECIPITATION

ABOVE NORMAL.

NORMAL./ AVERAGE

BELOW NORMAL

Floods
Crisis Management

**Ideal water management
and water use conditions**

**Ideal agricultural
production conditions**

PREPAREDNESS PLANNING

**TIMELY OPERATIONAL
DECISIONS**

**MITIGATION PLANNING;
PREPAREDNESS**

Drought Classification

**Implement drought
contingency plans**

D0

D1

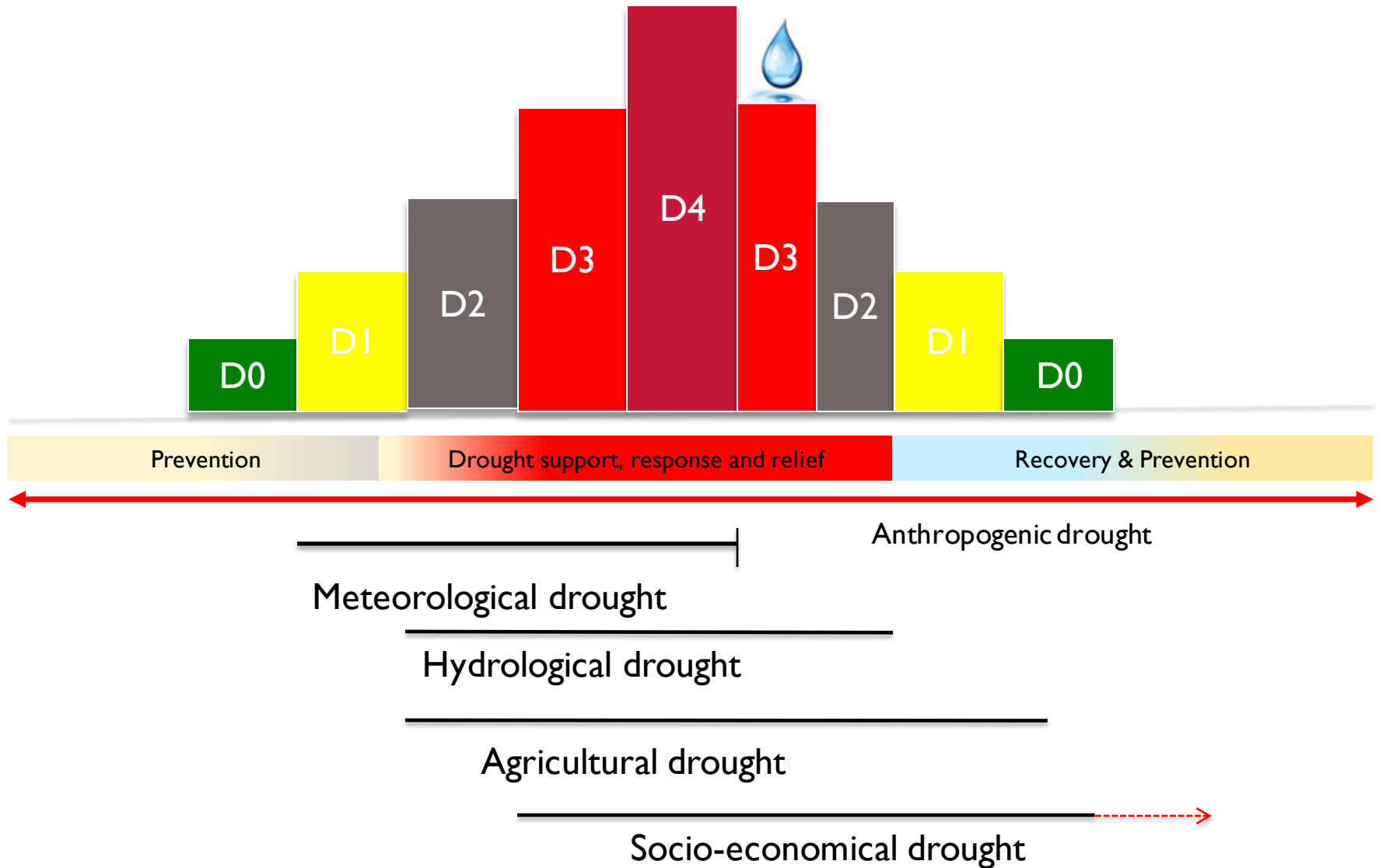
D2

D3

D4

**Implement drought
recovery plans**

DROUGHT CLASSIFICATION



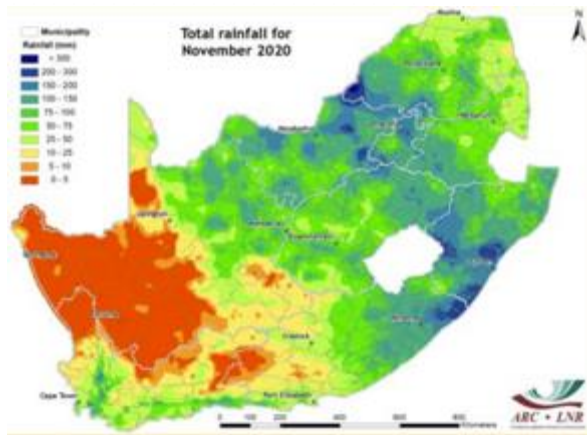
Cat	Descript.	Potential impacts	Freq.	Meteorological		Remote sensing			Hydrological				
				% Of normal preciptn.	SPI	NDVI	PASG	1-month VCI	St Veg health Index. SVHI	CPC Soil Moist. %	Dam levels zone Z score	Str. Flow Z score	Ground water level % Z score
D0	Dry	Dry period: Short term dryness slowing plant Growth of crops and pastures; fire risk above average: some lingering water deficiencies: pastures and crops not fully recovered	1/3yr	<75%for 30days	-0,5 to -0,7		3month PASG <90%	< 90%	36-45	21-30	In the moderately low zone	21-30	60- 100
D1	Moderate drought	Some damage to crops & pastures: fire risk is high: Levels of streams, reservoirs or wells are low: Some water shortages are imminent and developing: voluntary water restrictions requested: early warning	1/5yr	<70%for 30days	-0,8 to -1,2		6-month PASG <90%	<80%	26-35	11-20	In the low zone Z= -0,8 to -1,2	11-20 Z= -0,8 to -1,2	40- 60 Z= -0,8 to -1,2
D2	Severe drought	Crop and pasture losses likely: Fire risk very high: Water shortages common: Water restrictions imposed: drought warning messages: Institutions to prepare for response mechanisms.	1/10yr	<65%for 180days	-1,3 to -1,5		12-month PASG <90%	<70%	16-25	6-10	In the very low zone Z= -1,3 to -1,5	6-10 Z= -1,3 to -1,5	30- 40 Z= -1,3 to -1,5
D3	Extreme drought	Major crop and pasture losses: Extreme fire danger: Widespread water shortages and restrictions compulsory: Extended duration with critical impact: Warning messages must be adhered to: disaster drought declaration: Institutions to implement active response actions.	1/20yr	<60%for 180days	-1,6 to -1,9		12/24-month PASG <80/90%	<60%	6-15	3-5	Water below the absolute minimum Z= -1,6 to -2	3-5 Z= -1,6 to -2	15- 30 Z = -1,6 to -2
D4	Exceptional drought	Exceptional and widespread crop & pasture losses: Exceptional high fire risk: shortages of water in reservoirs, streams and wells creating water emergencies. Water restrictions compulsory: Warning messages must be adhered to: Active response mechanisms: Impacts critical	1/50yr	<65%for 360days	-2 or less		12/24-month PASG <80%	<60%	1-5	0-2	Dams dry Z<-2	0-2 Z<-2	0- 15 Z<-2

CLASSIFICATION INDEX THRESHOLDS

SYSTEM ALREADY APPROVED BY NJDCC AND NATIONAL DM FORUM (2017) BUT NOT IMPLEMENTED

GEOGRAPHIC BOUNDARIES FOR DROUGHT MONITOR / ASSESSMENT

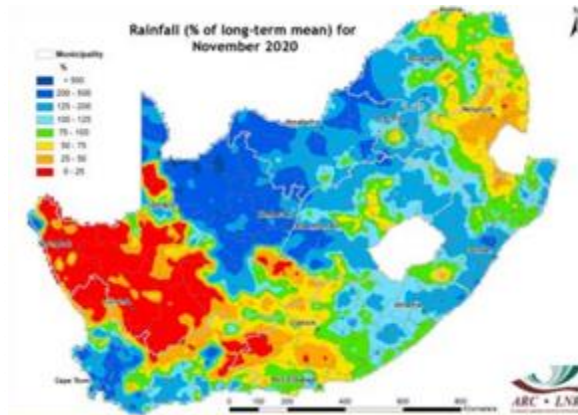
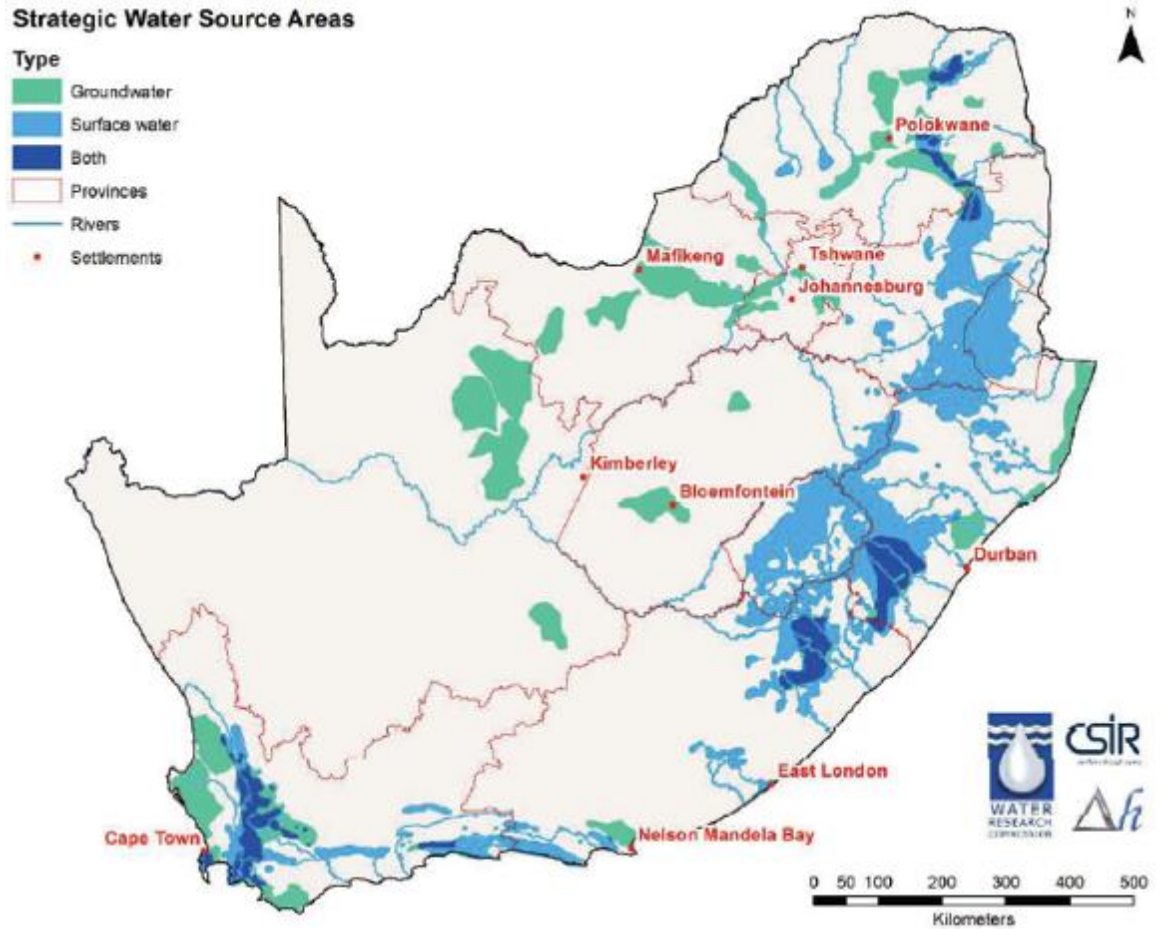
- ▶ Quaternary catchment for agricultural drought management and risk assessment
- ▶ Water catchment area for urban and industrial drought risk assessment & management
- ▶ Water catchment area for irrigation farming drought risk assessment & management
- ▶ Water users depended on groundwater should use groundwater recharge area for drought risk assessment & management



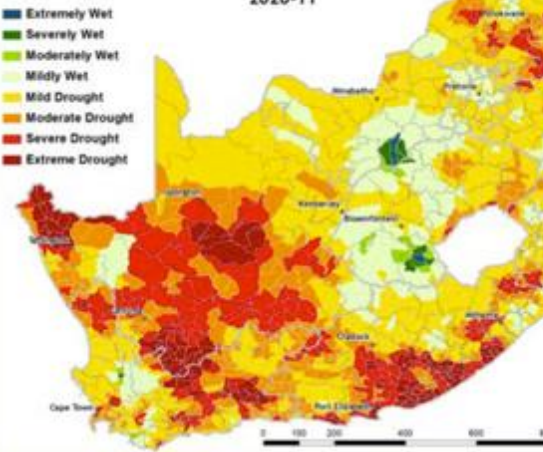
Strategic Water Source Areas

Type

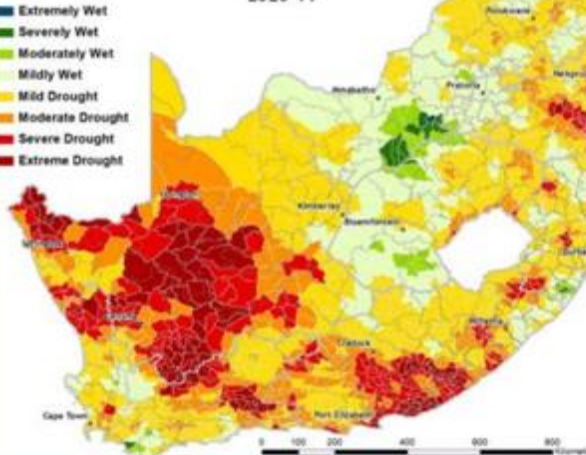
- Groundwater
- Surface water
- Both
- Provinces
- Rivers
- Settlements



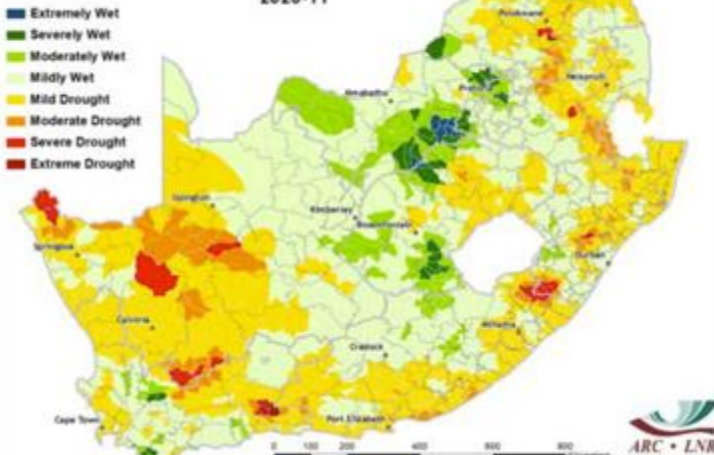
36-Month SPI category by 2020-11



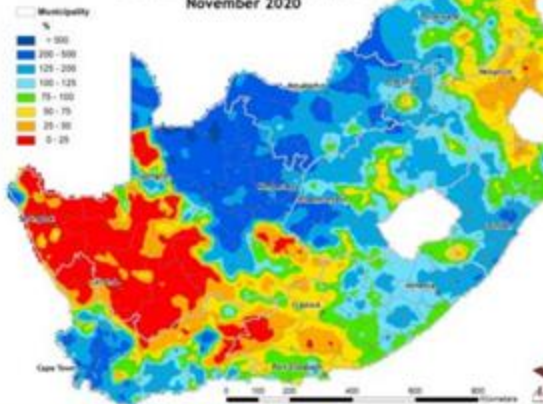
24-Month SPI category by 2020-11



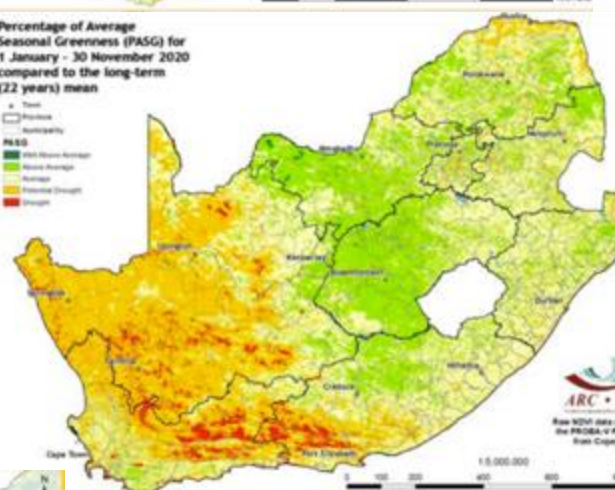
12-Month SPI category by 2020-11



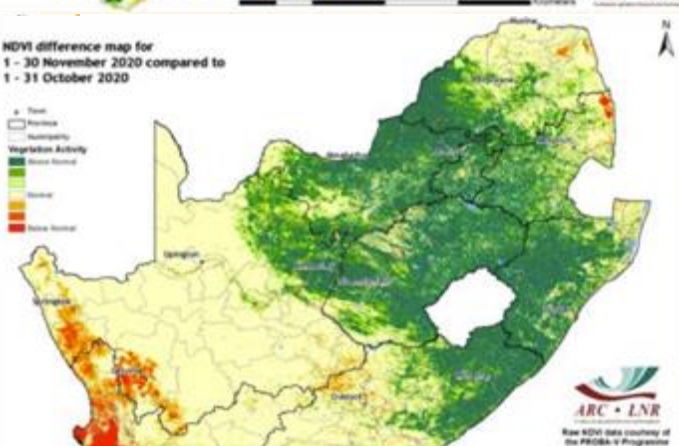
Rainfall (% of long-term mean) for November 2020



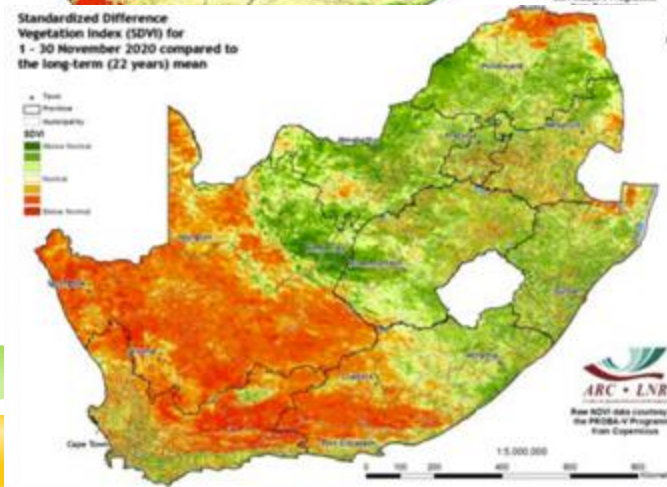
Percentage of Average Seasonal Greenness (PASG) for 1 January - 30 November 2020 compared to the long-term (22 years) mean



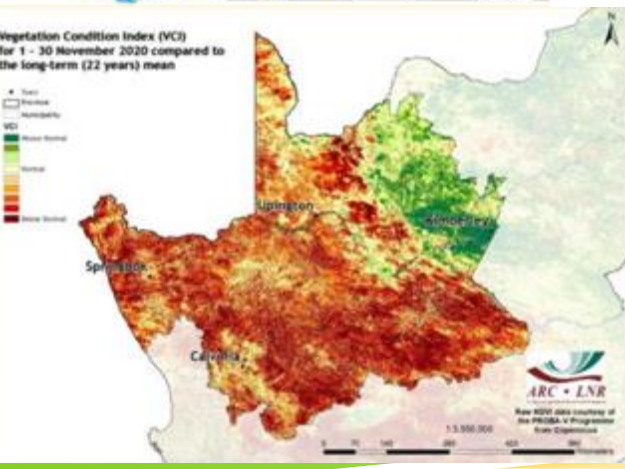
NDVI difference map for 1 - 30 November 2020 compared to 1 - 31 October 2020



Standardized Difference Vegetation Index (SDVI) for 1 - 30 November 2020 compared to the long-term (22 years) mean



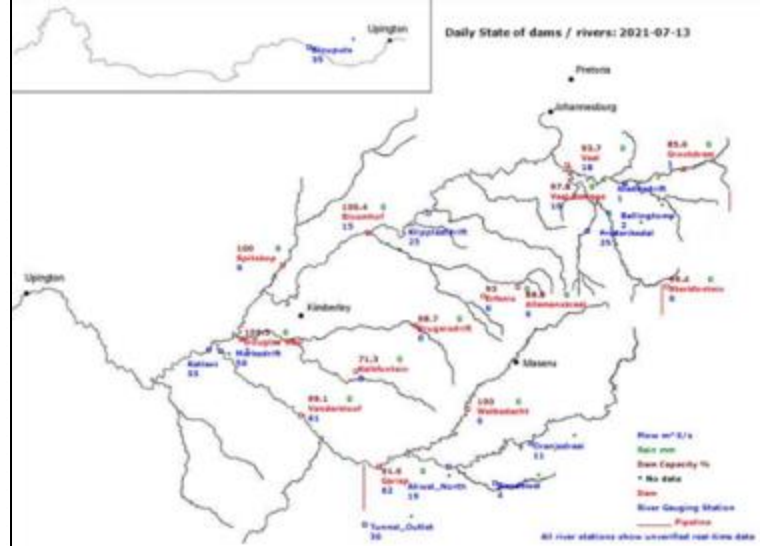
Vegetation Condition Index (VCI) for 1 - 30 November 2020 compared to the long-term (22 years) mean



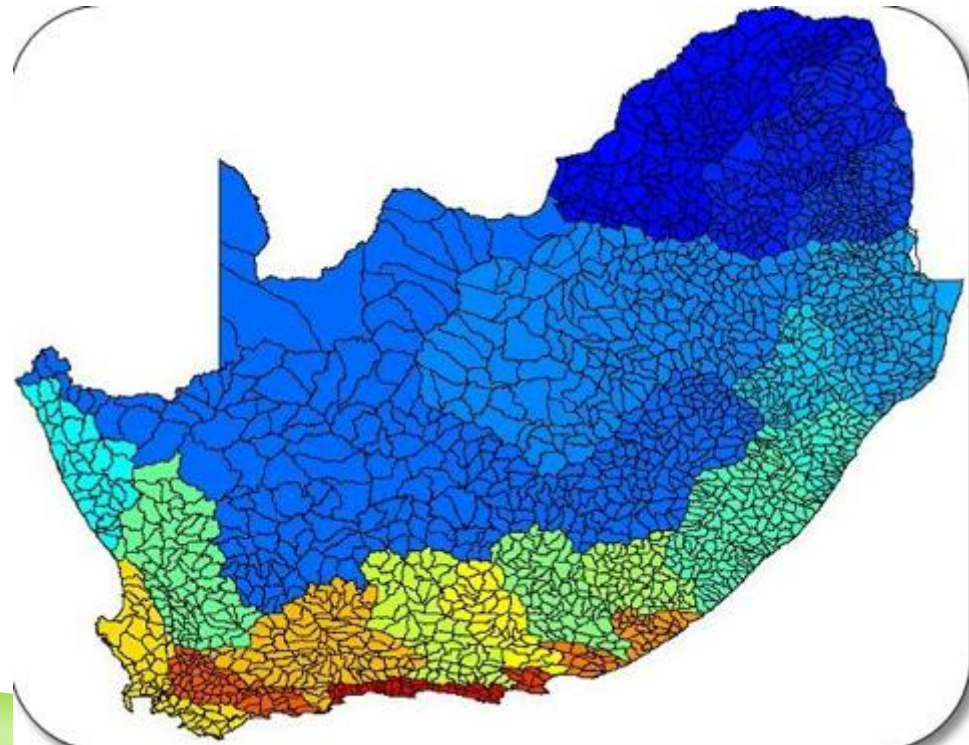
All indicators show a dry NC... but is that the reality?

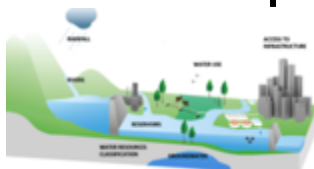
IRRIGATION FARMING IN NC



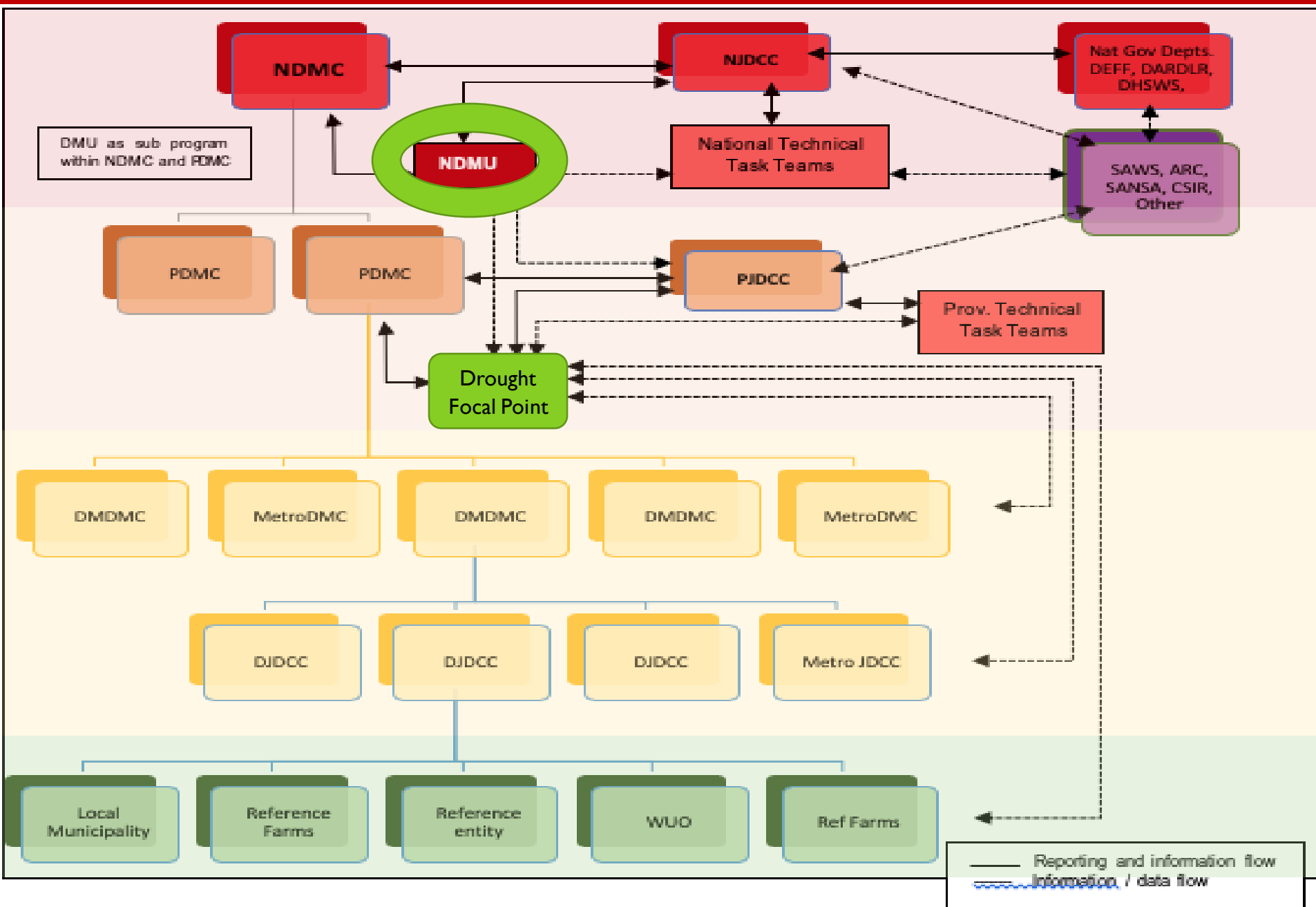


Dam	River	Photo	Indicators	FSC	This Week	Last Week	Last Year
Allemaanskraal Dam	Sand River	Photo	Indicators	174.6	90.0	90.7	53.8
Armenia Dam	Leeu River	Photo	Indicators	13.3	95.1	96.1	94.9
Bloemhof Dam	Vaal River	Photo	Indicators	1243.0	107.0	107.2	100.5
Egmont Dam	Witspruit River	Photo	Indicators	9.1	87.6	88.0	97.5
Erferis Dam	Groot-Vet River	Photo	Indicators	206.1	94.0	94.4	75.6
Fika-Patso Dam	Namahadi River	Photo	Indicators	29.5	85.5	86.8	42.0
Gariep Dam	Orange River	Photo	Indicators	4903.5	92.9	93.7	93.0
Groothoek Dam	Kgabanyane River	Photo	Indicators	12.0	89.6	90.0	65.9
Kalkfontein Dam	Riet River	Photo	Indicators	325.2	71.7	71.9	22.9
Knellpoort Dam	Rietspruit River	Photo	Indicators	130.0	81.8	81.9	69.6
Koppies Dam	Renoster River	Photo	Indicators	42.4	91.6	91.8	62.8
Krugersdrift Dam	Modder River	Photo	Indicators	71.5	99.0	99.0	100.0
Metsi-Matsho Dam	Metsi-Matsho River	Photo	Indicators	4.4	78.5	80.2	88.2
Rustfontein Dam	Modder River	Photo	Indicators	72.2	66.4	67.5	28.6
Saulspoort Dam	Liebenbergsvlei River	Photo	Indicators	15.7	99.7	99.5	100.0
Sterkfontein Dam	Nuwejaarspruit River	Photo	Indicators	2617.0	99.2	99.1	93.9
Tierpoort Dam	Tierpoort River	Photo	Indicators	34.0	85.8	86.1	60.0
Vaal Dam	Vaal River	Photo	Indicators	2603.5	94.7	95.5	45.3
Vaalrivier Barrage	Vaal River	Photo	Indicators	53.7	98.8	98.7	97.9
Vanderkloof Dam	Orange River	Photo	Indicators	3092.4	99.4	99.3	89.3
Welbedacht Dam	Caledon River	Photo	Indicators	5.5	100.0	81.8	74.6
Total				15657.4	96.0	96.4	82.3





ORGANOGRAM & INFORMATION FLOW



MAJOR RECOMMENDATIONS

- ▶ Drought Mitigation Unit with consistent monitoring and integration of monitoring tools
- ▶ Information system with integrated web platform
- ▶ Demarcation of drought boundaries – From administrative to ecosystems /watershed boundaries
- ▶ Application of drought classification system
- ▶ Contingency plans instead of State of disaster declaration

Thank you