

Water security: How much is enough?

Young Water Professionals
17 November 2015
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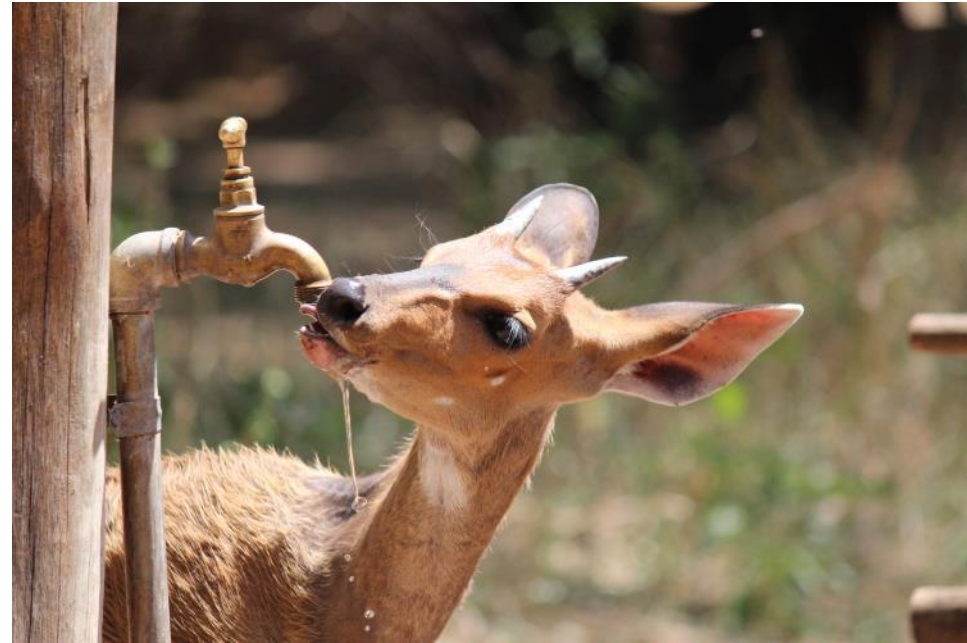
Background statistics

- 30th driest country in the world
- 60% WMA, demand > supply
- 98% of all available water resources allocated
- 37% of potable water is lost due to leakages
- 40% of wastewater treatment works is in a critical state
- Pollution renders water unfit for use and/or consumption

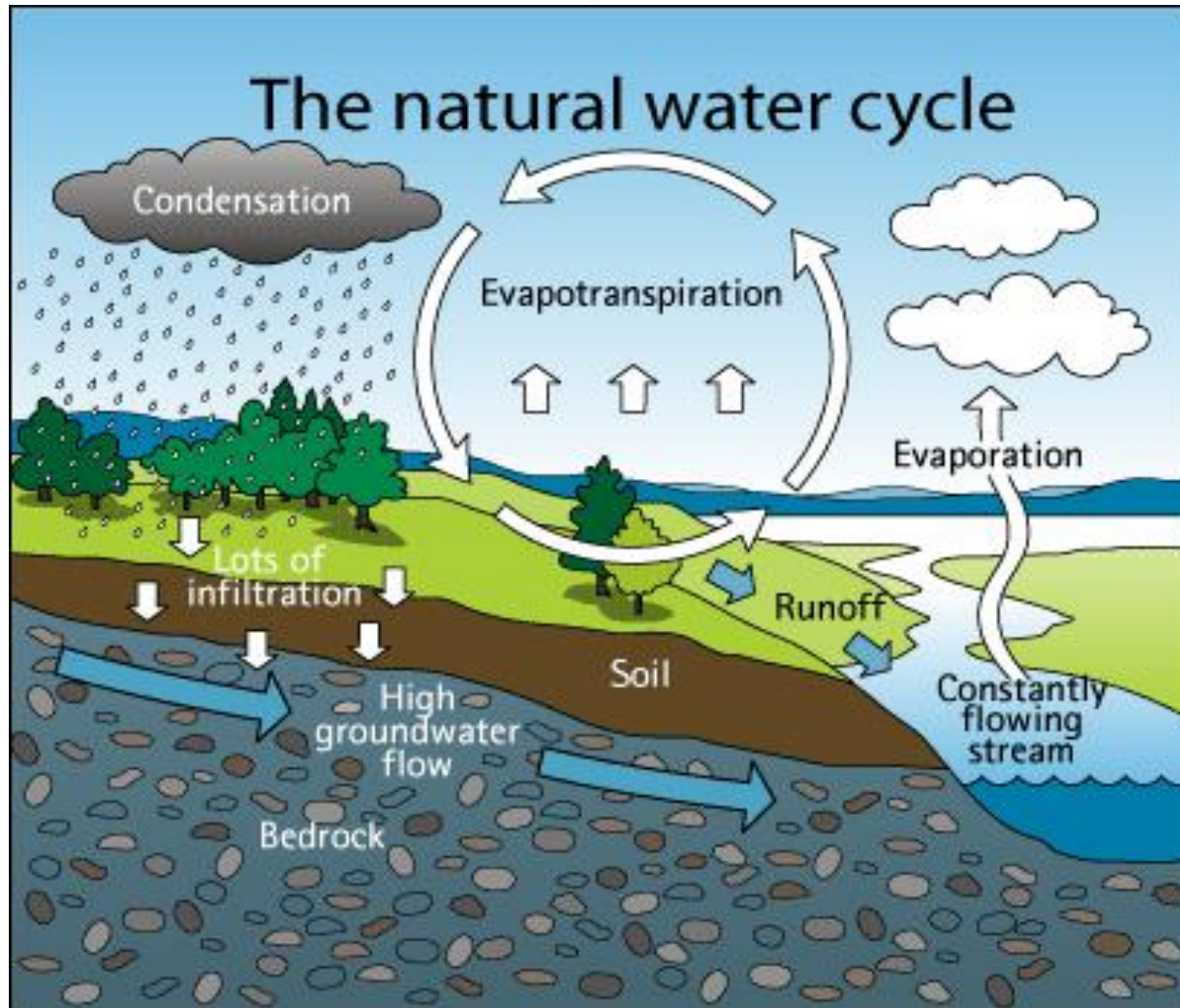
“Some, for all, forever”

Water security

- Meeting basic needs
- Securing food supply
- Protecting ecosystems
- Sharing water resources
- Managing risks
- Valuing water
- Governing water wisely



A renewable but finite resource

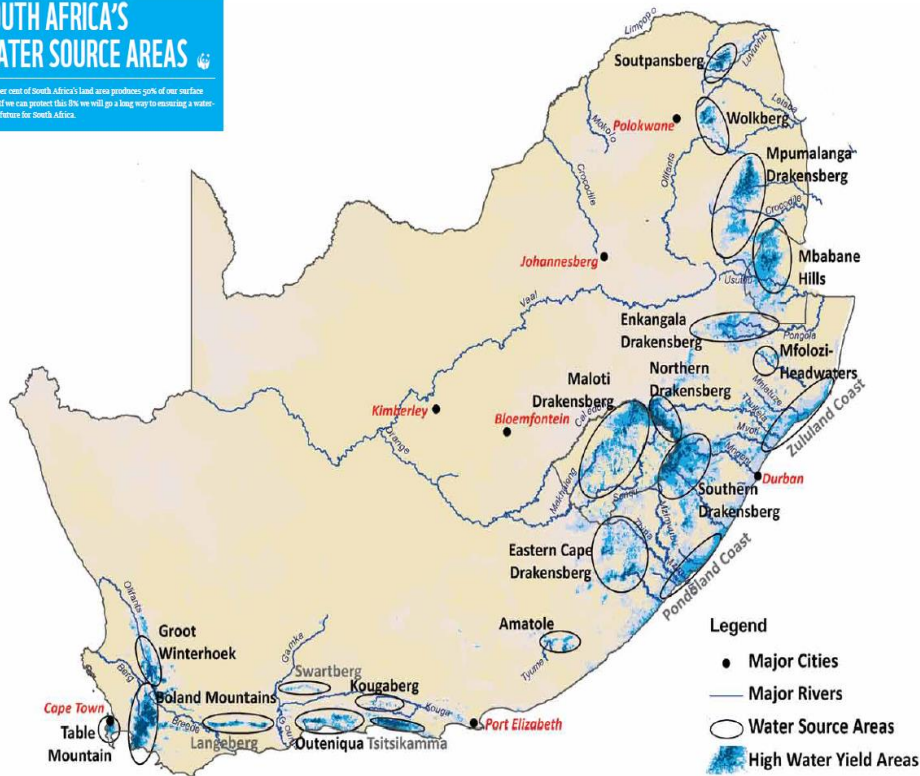


- Water can not be “used up”
- Water cannot be “made”
- Finite volume of water on earth

Uneven distribution – water vs people

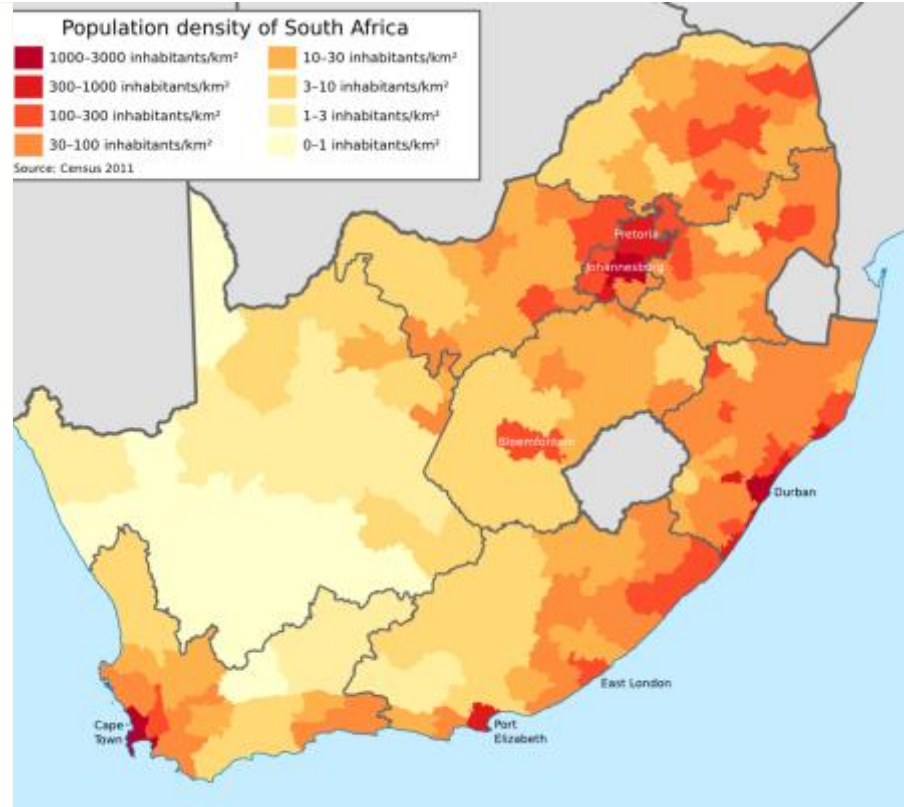
SOUTH AFRICA'S WATER SOURCE AREAS

Eight per cent of South Africa's land area produces 90% of our surface water. If we can protect this 8% we will go a long way to ensuring a water-secure future for South Africa.



- Legend**
- Major Cities
 - Major Rivers
 - Water Source Areas
 - High Water Yield Areas

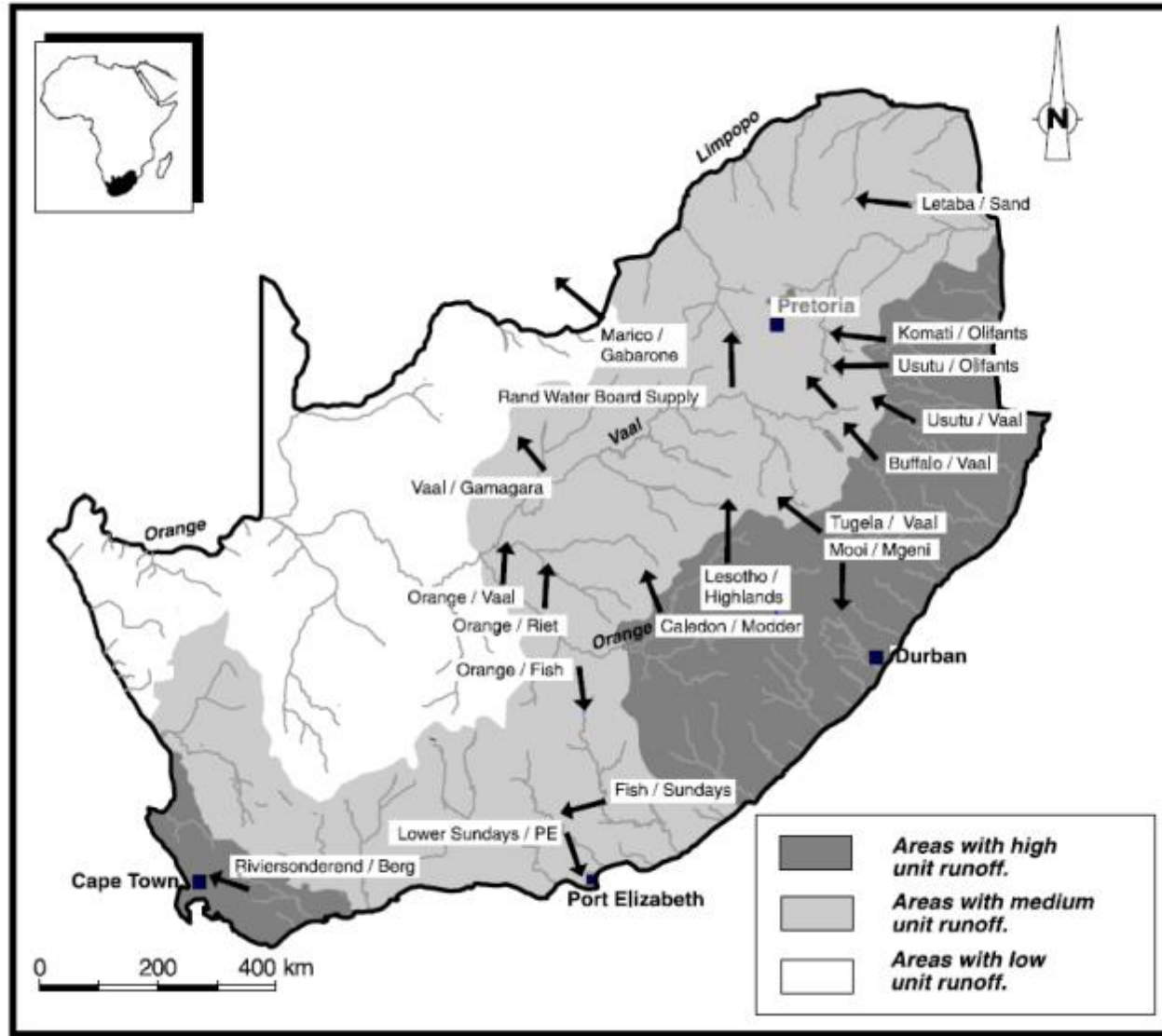
Water



- Population density of South Africa**
- 1000-3000 inhabitants/km²
 - 300-1000 inhabitants/km²
 - 100-300 inhabitants/km²
 - 30-100 inhabitants/km²
 - 10-30 inhabitants/km²
 - 3-10 inhabitants/km²
 - 1-3 inhabitants/km²
 - 0-1 inhabitants/km²
- Source: Census 2011

People

Water transfer schemes



Lesotho Highlands



- PHASE IA**
- Katshe Dam (1 950 million m³)
 - Transfer Tunnel (45km)
 - 'Muela Power-station (72MW)
 - 'Muela Dam
 - Delivery Tunnel (36km)

- PHASE IB**
- Mohale Dam (958 million m³)
 - Interconnecting Tunnel (30km)
 - Matsoku Wier and Transfer Tunnel (5,4km)

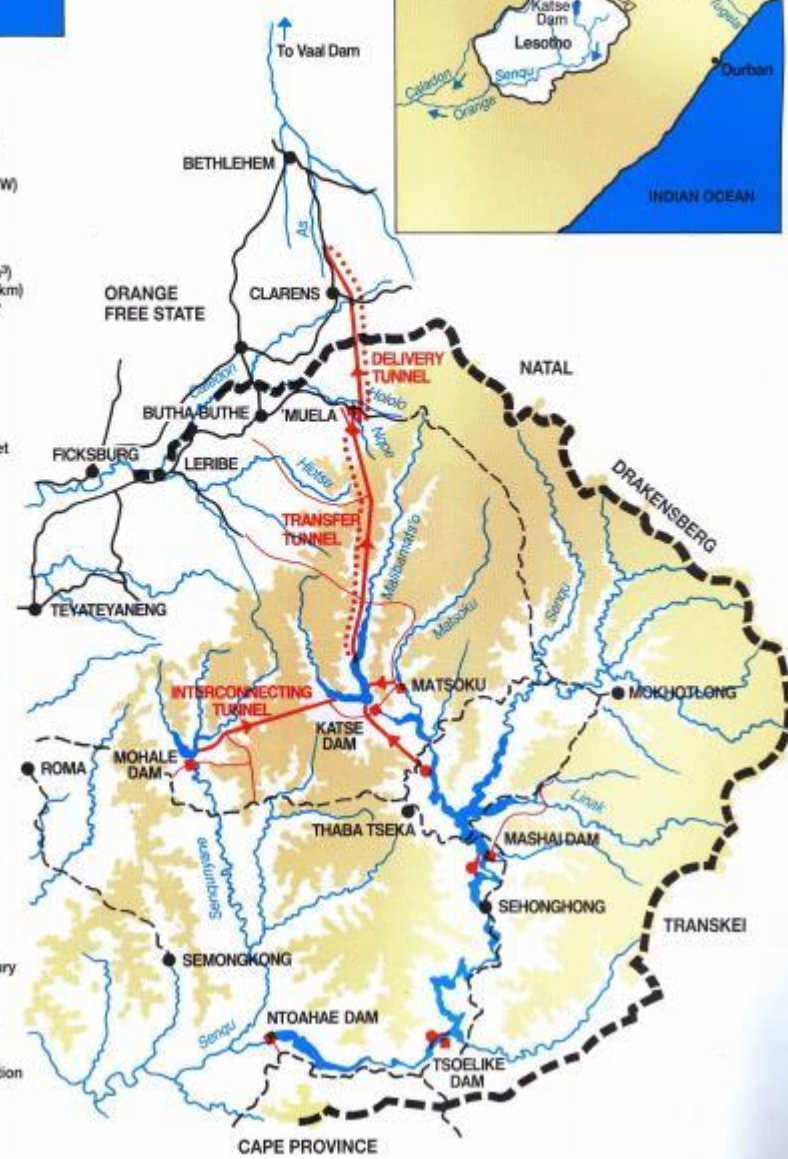
- PHASE II**
- Mashai Dam (3 306 million m³)
 - Second Transfer Delivery Tunnel from Katshe Reservoir to As River Outlet

- PHASE III**
- Tsoelike Dam (2 224 million m³) and pumping station

- PHASE IV**
- Ntoahae Dam and pumping station

LEGEND

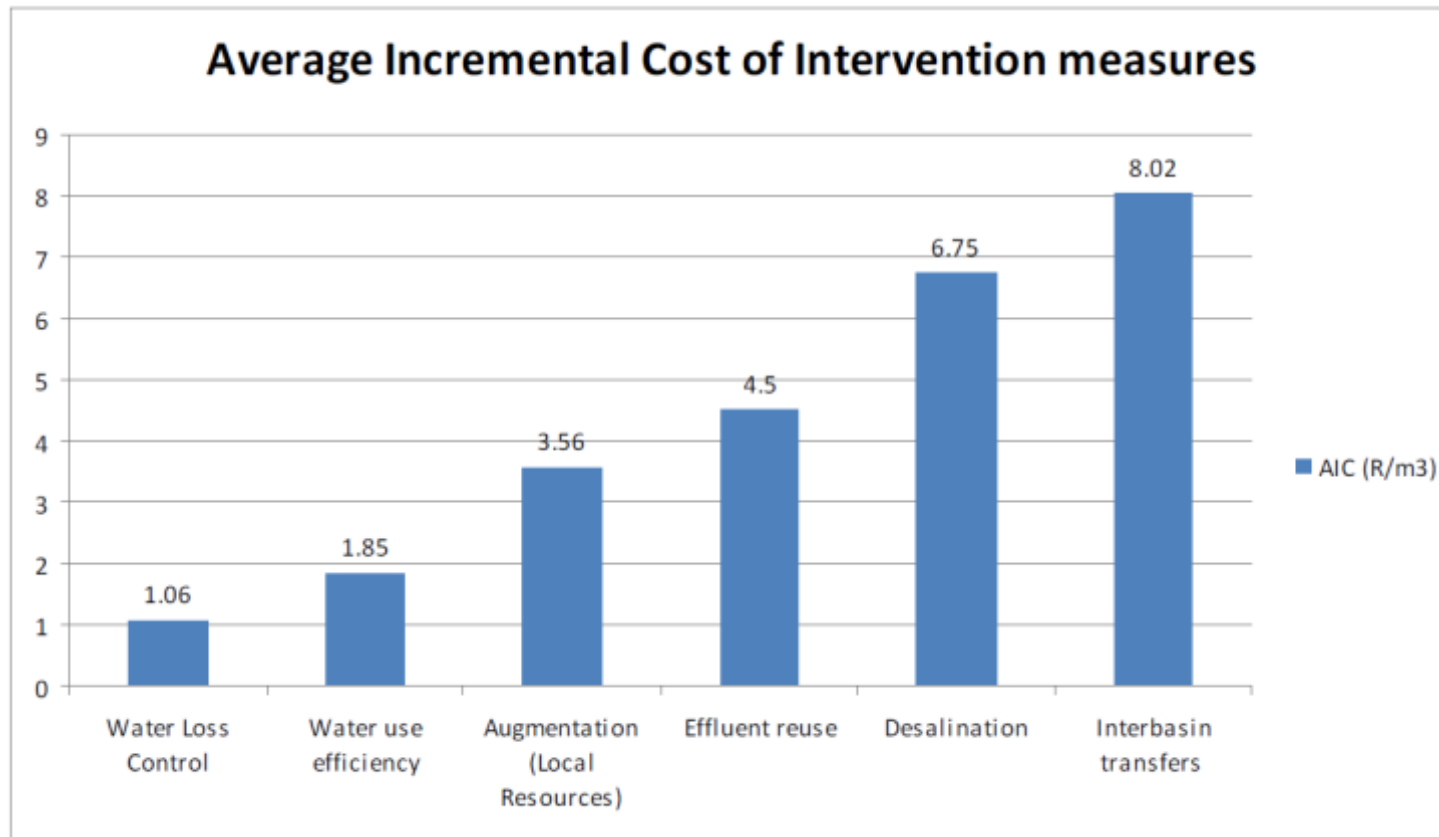
- Paved road
- - - Gravel road/Track
- International boundary
- Reservoir
- Dam
- Hydropower station
- Pumping station
- River
- 3000m-2500m elevation
- Tunnel Phase IA
- Tunnel Phase II
- Access road



Ensuring water security

- Water loss control
- Increased use efficiencies
- Effluent reuse
- Desalination of sea water
- Inter-basin transfers
- Ground water development
- Building more dams
 - More than 500 government dams in SA with total capacity = 37 000 million m³

Cost of intervention measures



Storing water as means to secure supply



Loskop Dam



Beervlei Dam

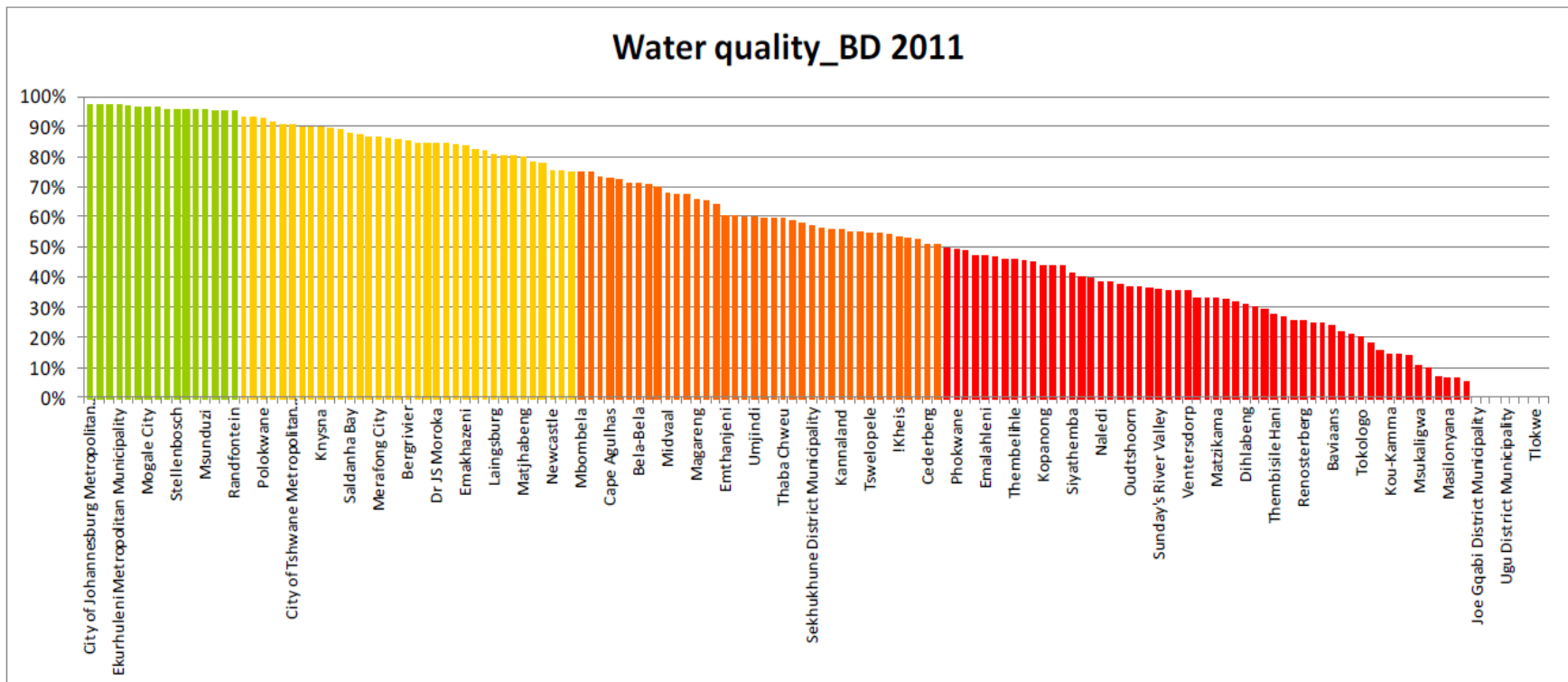
Storing means trapping of pollutants



Hartbeespoort Dam



Blue drop status – 2011



- 144 out of 152 WSA provided data
- 16 achieved Blue Drop status
- 63 scored below 50%

How much is enough?



Life expectancy = 62 year (MRC, 2014)

Basic human needs = 25 litre/person/day

= 9125 litre/person/annum

Lifetime basic water requirement

$(25 * 365 * 62) = 565\ 750$ litres



= 113 x 5000 litres

Current water demand for Basic Human Needs

- 54 million (StatsSA, 2014)
- 1 350 000 m³/day required for basic human needs



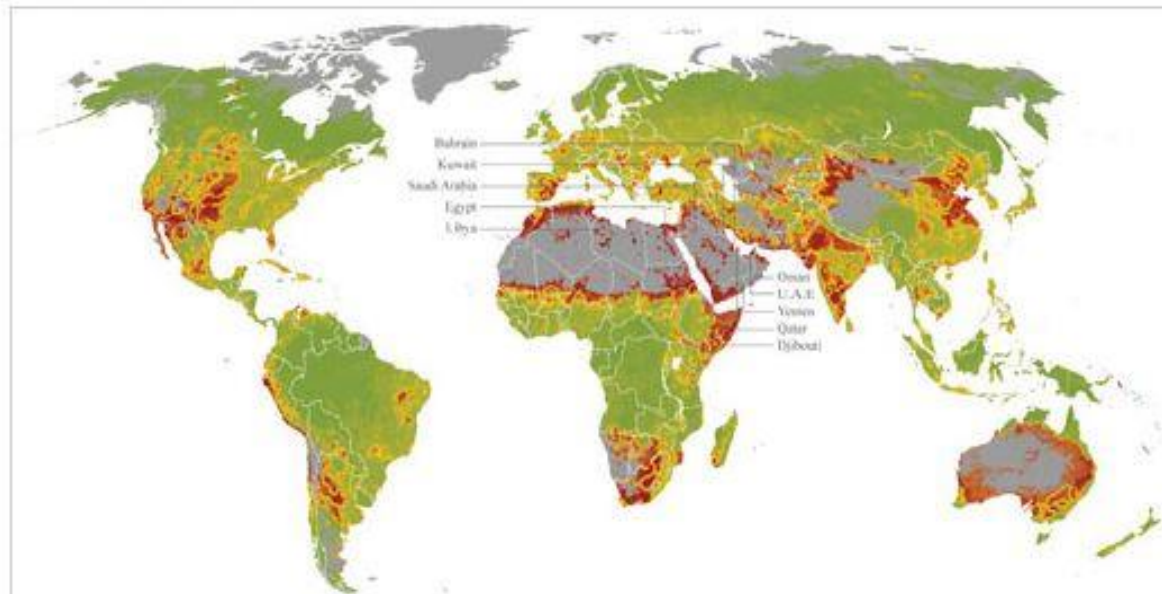
= 270 000 x 5000 Litres/day

Water scarce = < 1 000 m³/capita/annum

Water stressed = < 1700 m³/capita/annum

Water stressed

Water Stress Index 2012



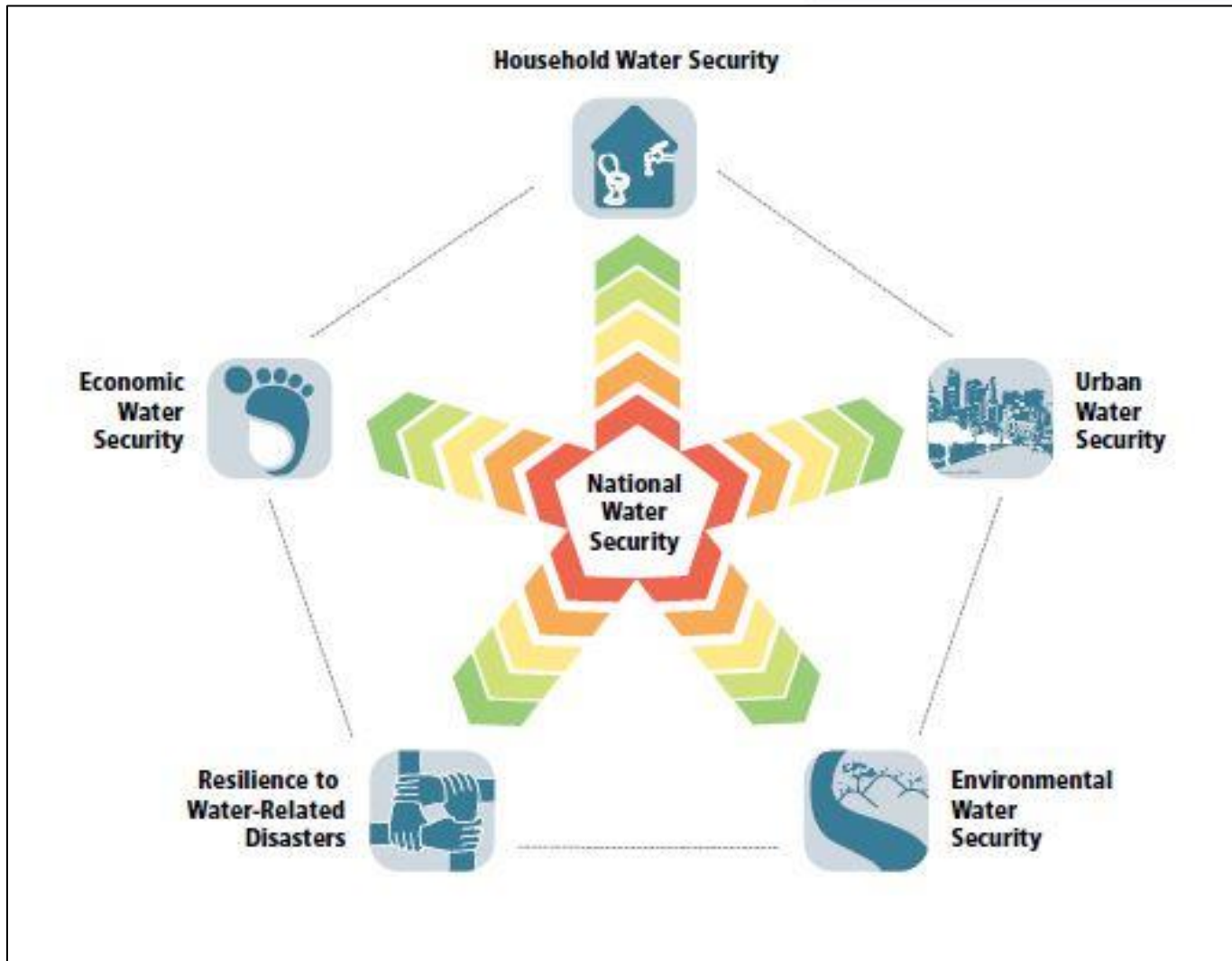
Legend
Extreme risk
High risk
Medium risk
Low risk
No Data

Rank	Country	Rating
1	Bahrain	Extreme
2	Qatar	Extreme
3	Kuwait	Extreme
4	Libya	Extreme
5	Djibouti	Extreme

Rank	Country	Rating
6	U.A.E.	Extreme
7	Yemen	Extreme
8	Saudi Arabia	Extreme
9	Oman	Extreme
10	Egypt	Extreme

© Maplecroft, 2012

Dimensions of water security



Conclusion

- Water Stress Index
 - SA is considered a “high risk”
 - Large pockets of “extreme risk”
- Not much capacity for more dams
- Variability in climate – predicted increased droughts, floods
- Water treatment is not up to standard
- Potential
 - Reduce water use and leaks
 - Ensure less pollution

“Some for all for ever”

References

- DWS, 2014. Annual National State of Water Report for the Hydrological year 2012/2013
https://www.dwa.gov.za/Groundwater/documents/Annual%20National%20State%20Water%20Report%20for%20Hydrological%20Year%202012-13_Final.pdf
- MRC, 2014 www.mrc.ac.za/bod/reports.htm

CELEBRATING
70 Years
Ideas that work

Thank You

CSIR
our future through science

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