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no drop
CERTIFICATION
water use efficiency
REGULATION

WCWDM-A CONCEPT OF ADDRESSING WATER RESURITY RISK WITHIN SOUTH AFRICAN MUNICIPALITIES

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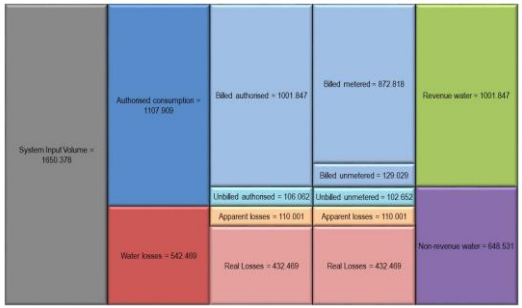
Department of Water and Sanitation
Directorate: Water Use Efficiency

Northern Provinces Branch Seminar and AGM

27 August 2021

Presentation Outline

- Background
- WCWDM strategic documents
- Water resource planning processes and outputs
- Status of water losses and NRW in South Africa
- Managing the water security risk
- Conclusions



BACKGROUND

What is Water Conservation and Water Demand Management (WC/WDM)

"**Water Demand Management**" is the adoption and implementation of a strategy or a programme by a water institution or consumer to influence the water demand and usage of water in order to meet any of the following objectives-

- *economic efficiency*,
- *social development, social equity*,
- *environmental protection*,
- *sustainability of water supply and services; and*
- *political acceptability.*

Water Conservation – minimization of loss or waste, … and effective and efficient use of water, … and effective and efficient use of water.

National Water Act (Act 36 of 1998)

Water Services Act (Act 108 of 1997)

- Duty on all spheres of Government to ensure water services are provided -
  - in an efficient, equitable and sustainable manner;
  - sufficient for subsistence and sustainable economic activity;
  - must observe and adhere to the principles of co-operative government;
  - must be undertaken in a manner consistent with the broader goals of water resource management;
  - confirming the National Government's role as custodian of the nation's water resources;

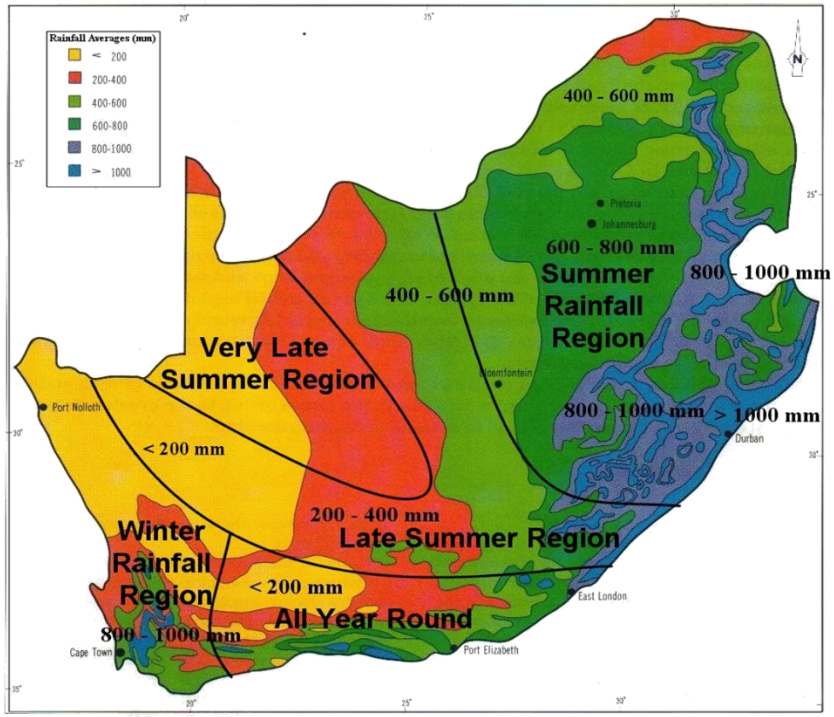
What's the problem?

- The population is growing rapidly, putting more pressure on our water supply (demand is increasing)

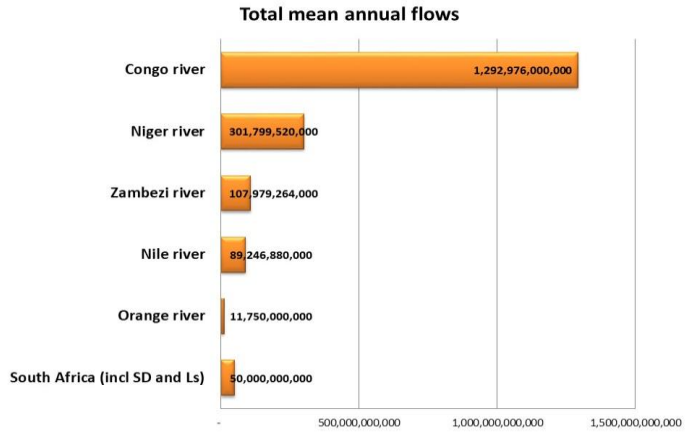
- The amount of water is effectively reduced by pollution and contamination (supply is decreasing)

TAKING STOCK

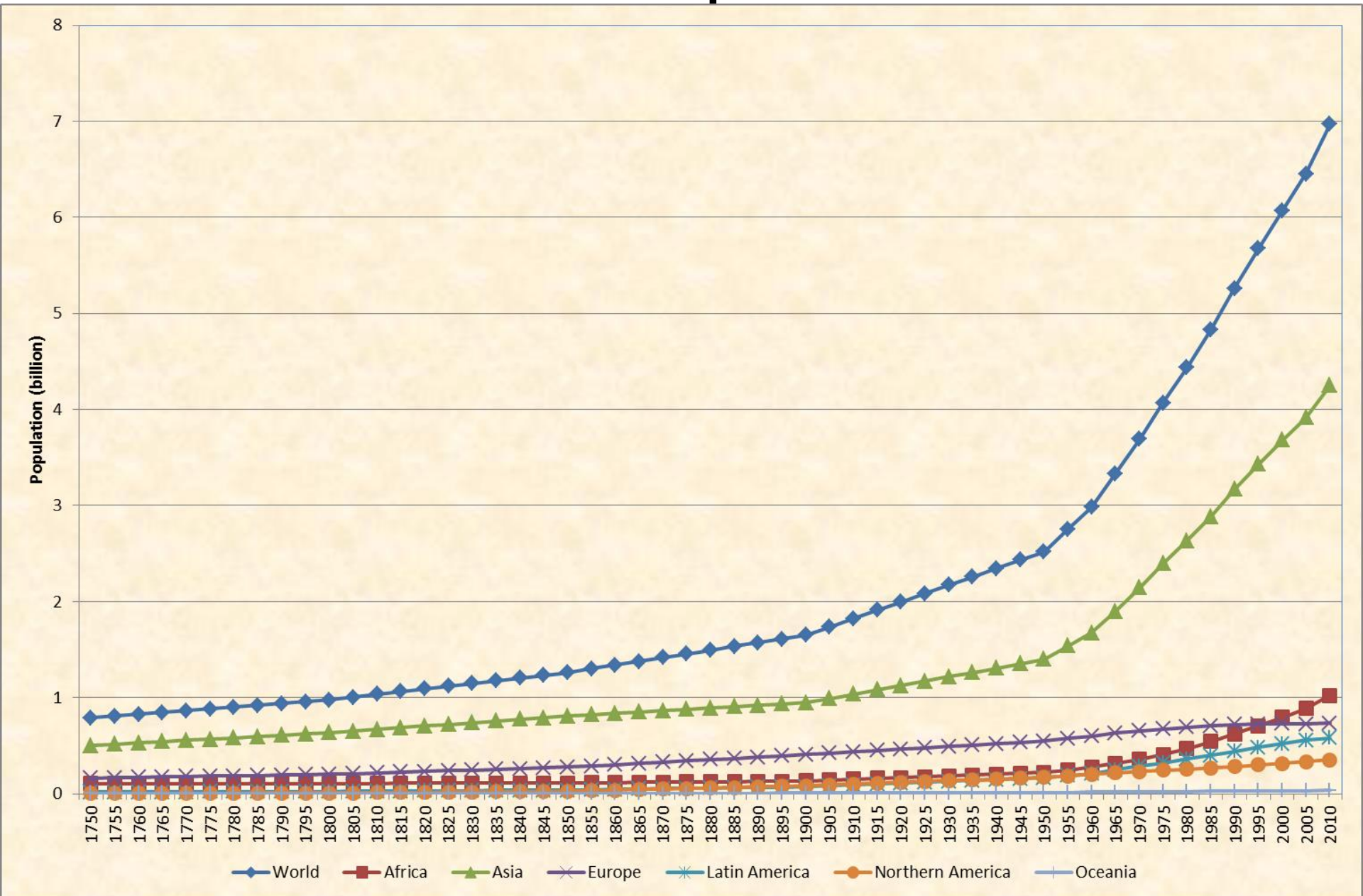
South Africa's Surface Water Resources



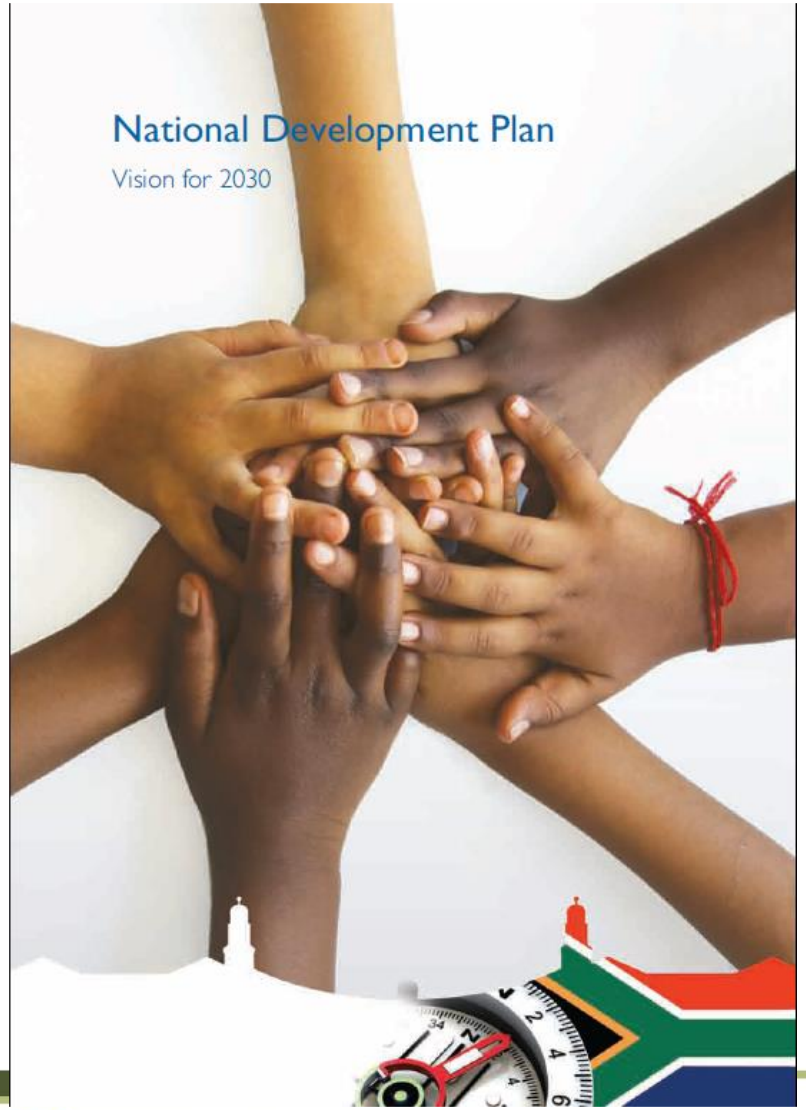
- **Mean annual rainfall**
  - South Africa is 500mm ***vs*** world average of 860mm
  - 65% of SA receives <500mm
  - 21% of SA receives <200mm
- **Severe and prolonged droughts**
  - 25% - drained by perennial rivers
  - 75% - drained by seasonal to episodic rivers (event related).

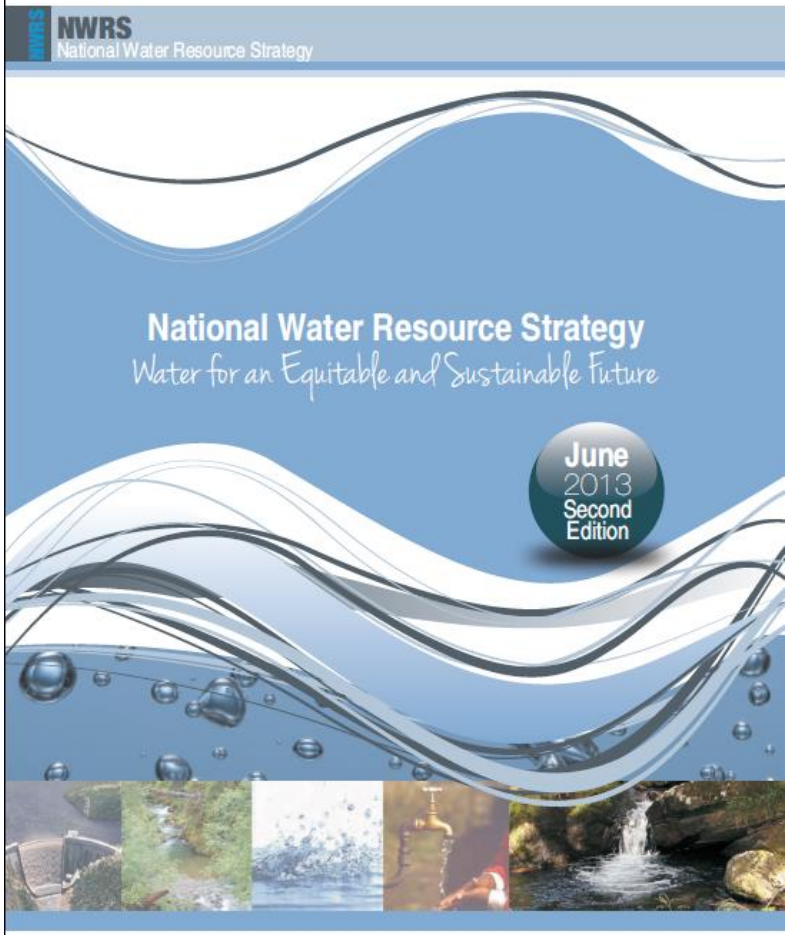


World Population



Key Strategy Documents





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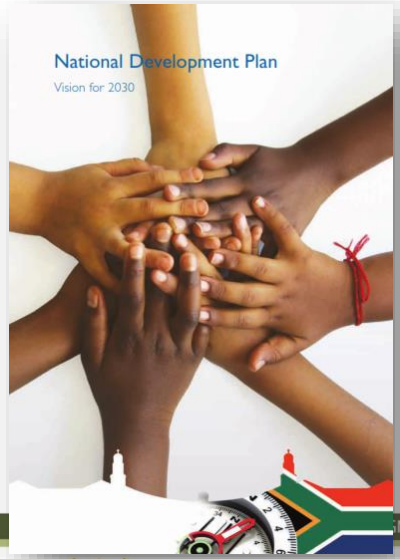
2030 NDP
NATIONAL DEVELOPMENT PLAN
Our Future - make it work

National Development Plan – South Africa's Vision

- Recognises that reducing growth in water demand is as important as increasing supply and estimates that it will be possible to reduce water demand levels in urban areas to 15% below the 2012 business-as-usual levels.

- Achievement of reductions of this scale will require focussed programmes which will reduce leakage in distribution systems and will yield more efficient use in domestic and commercial applications.

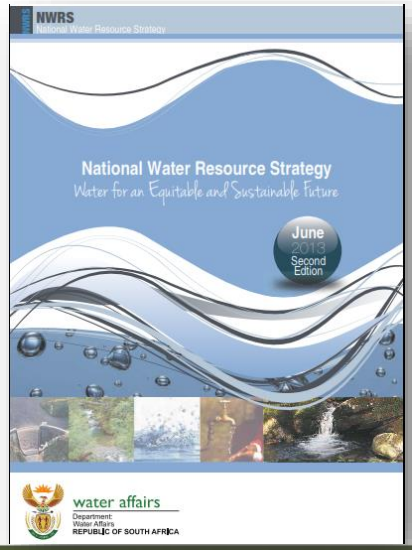


- Proposes a national WCWDM Programme with clear national and local targets for 2017 and 2022, and sub-programmes focussed on municipalities, industry and agriculture

National Water Resource Strategy (2)

- Spells out “Implementing water use efficiency, conservation and water demand management” is a non-negotiable principle.
  - Resource development and expansion cannot be substantiated unless WC/WDM fully implemented

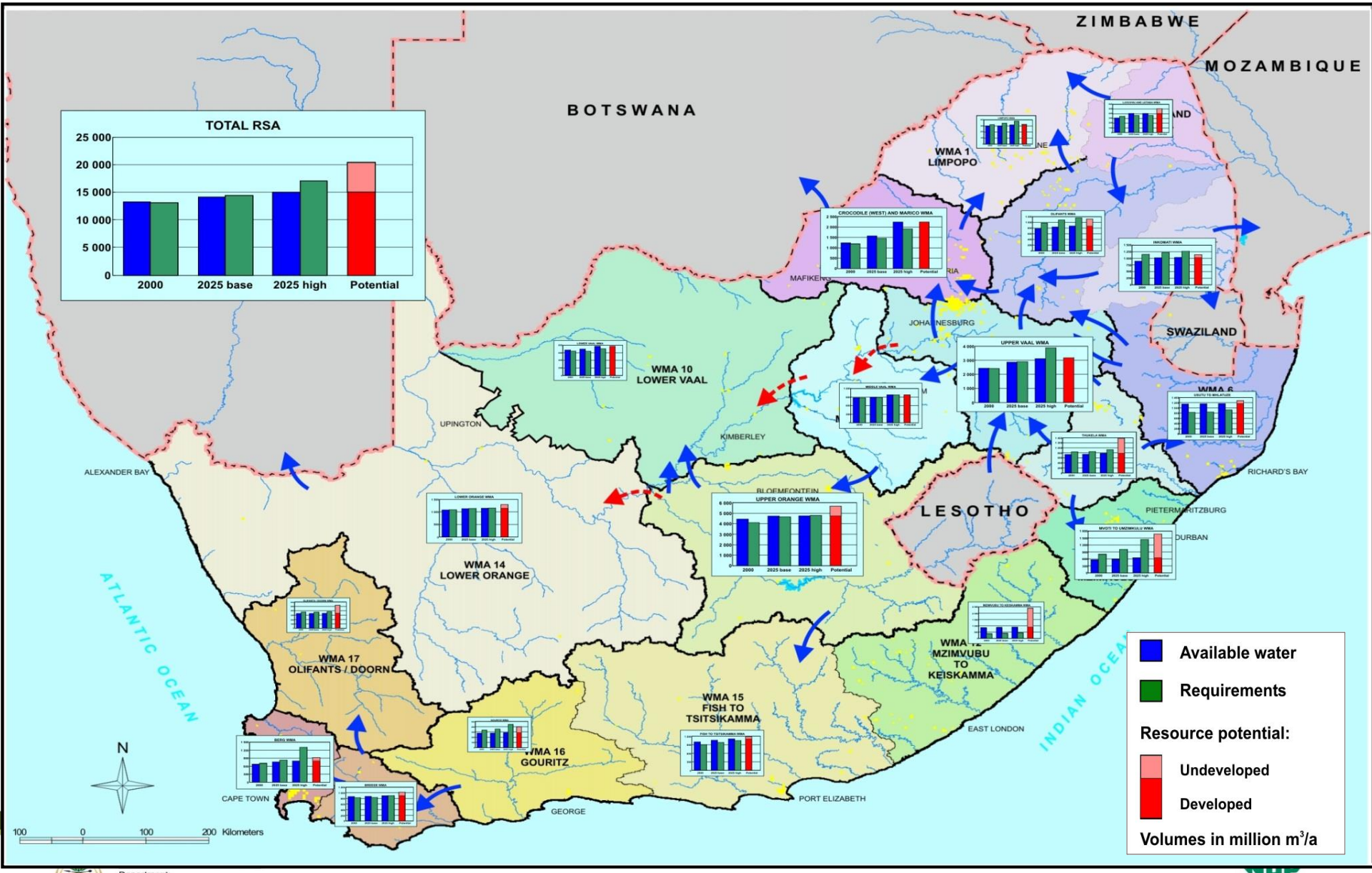
- The strategy highlights the need to:
  - reduce water losses and increase water use efficiency;
  - promote water saving through incentive-based programmes incl smart technology, rebate - water savings;
  - fast-track the implementation of WCWDM in consideration of the elevated status in the National Gov’s Plan of Action (Outcome 10) = set a target of 15% in 2014 for reduction of water losses in distribution systems.
    - Note: Reconciliation Strategies = context- and catchment specific targets.



Trying to balance supply and demand….

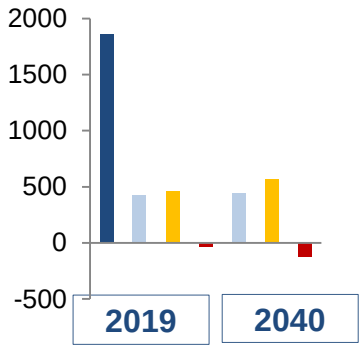
"Integrated Water Resources Management"

Future water reconciliation scenarios

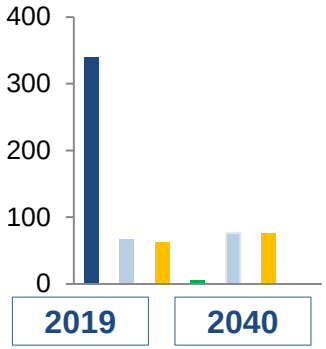


CURRENT AND PROJECTED FUTURE WATER AVAILABILITY AND DEMAND PER WATER RESOURCE SYSTEM (Million M^3/YEAR)

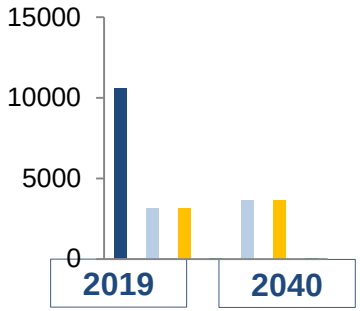
Olifants



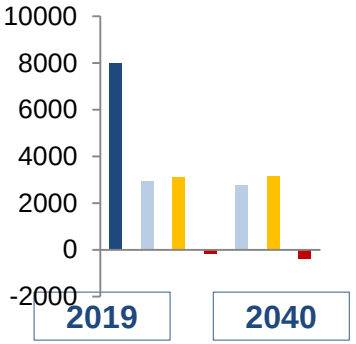
Crocodile East



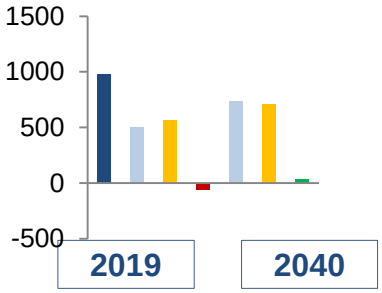
Integrated Vaal River System



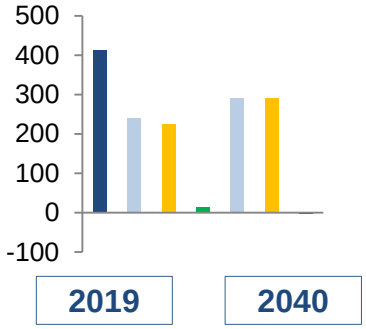
Orange



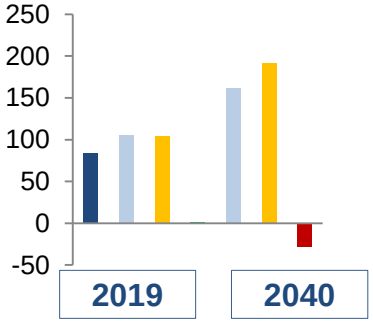
Mgeni and Coasts



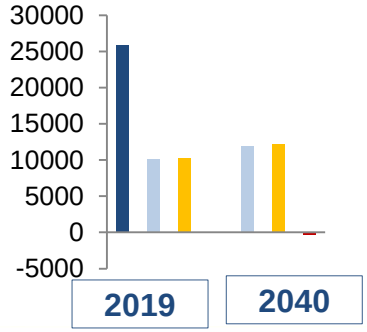
Richards Bay



Bloemfontein



TOTAL



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Key: Capacity, Yield, Demand, Surplus, Deficit

2030 NDP
NATIONAL DEVELOPMENT PLAN
Our Future - make it work

WHAT WATER RESOURCES ARE WE WORKING WITH?

Characteristics of South Africa's Water Resources

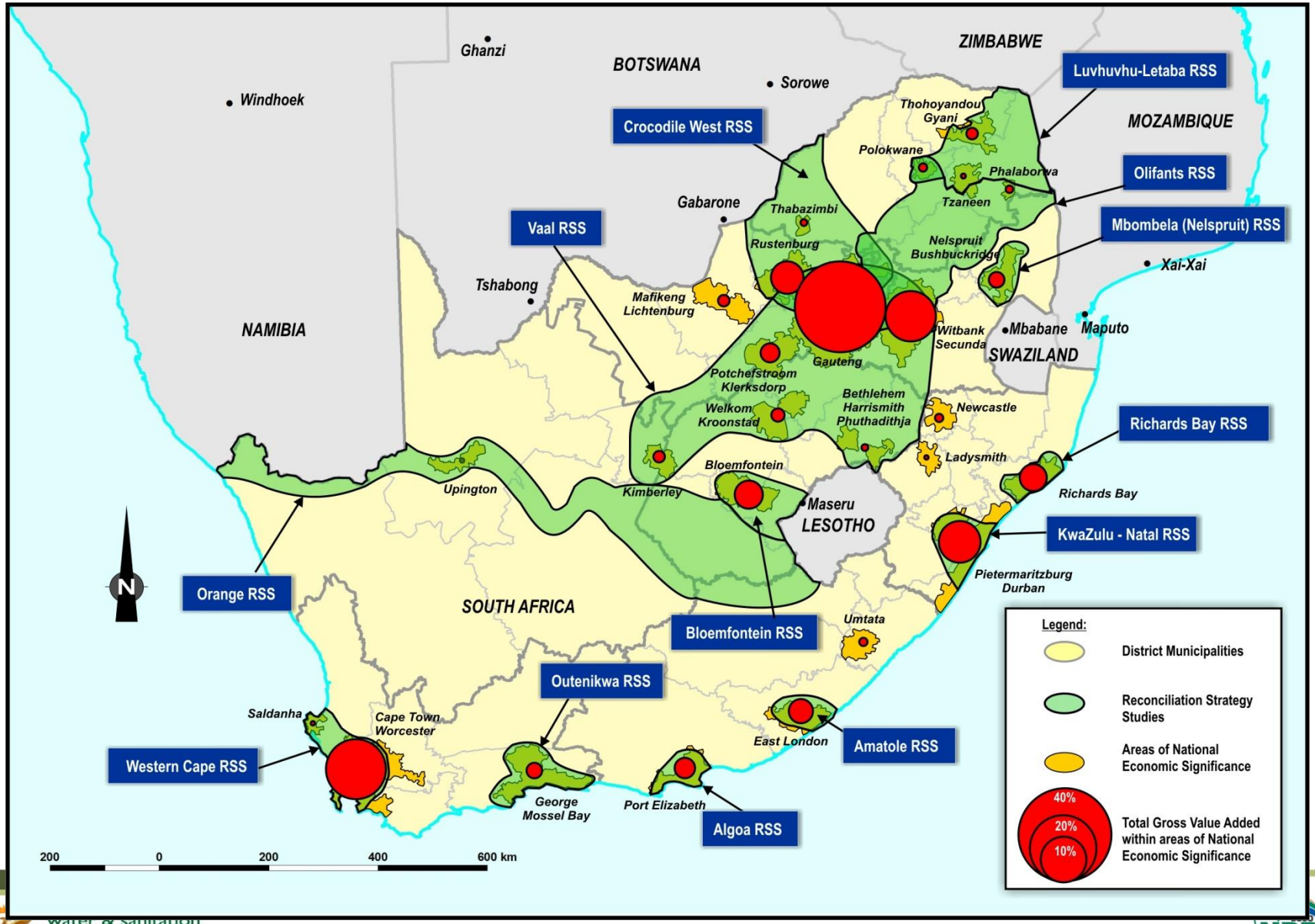
i. Water scarcity - Low rainfall/ High evaporation
ii. Uneven distribution of rainfall in time and space
iii. Internationally shared surface and ground water
iv. Poor water quality – Pollution of rivers from agricultural runoff and urban discharge
v. Mature phase of development/ Highly regulated water resources
vi. Very high competition amongst water users
vii. Leakage / wastage
viii. Fragmented governance
ix. Inadequate /Limited investment

WHAT WE DO

Balancing Water Requirements & Water Availability

- DWS undertakes and updates scenario planning to ensure water security for the country over at least 25-year-planning horizons.
- Outputs of the scenario planning are **reconciliation strategies**
- Commissioned by the DWS, Directorate: Strategic Water Resource Planning
- Aims to reconcile the water requirements with the available water by **recommending and sequencing appropriate intervention measures**.
- Role players in planning and implementation - Government, civil society, municipalities, water entities, water use sectors, etc.
- Reconciliation strategies feed water security perspectives into national, provincial and local planning instruments like the **NDP, NWRS, WSDPs etc**.
- Due to the dynamic nature of a water balance in a water system, reconciliation strategies are continuously monitored and updated.
- **On going work** – update of the water balances & strategies across the country

Water Reconciliation for major growth areas



Reconciliation Strategy Components

Water requirements

- Validation and Verification studies
- Economic and demographic assessments
- Reserve requirements
- Water requirement scenarios

Water Conservation

- Status assessment
- Strategy development
- Saving scenarios
- Intervention plan
- Implementation and monitoring

Water availability

- Hydrological Study
- Yield analysis
- Operational analysis
- Scenario analysis
- Allocation planning
- Monitoring
- Fitness for use

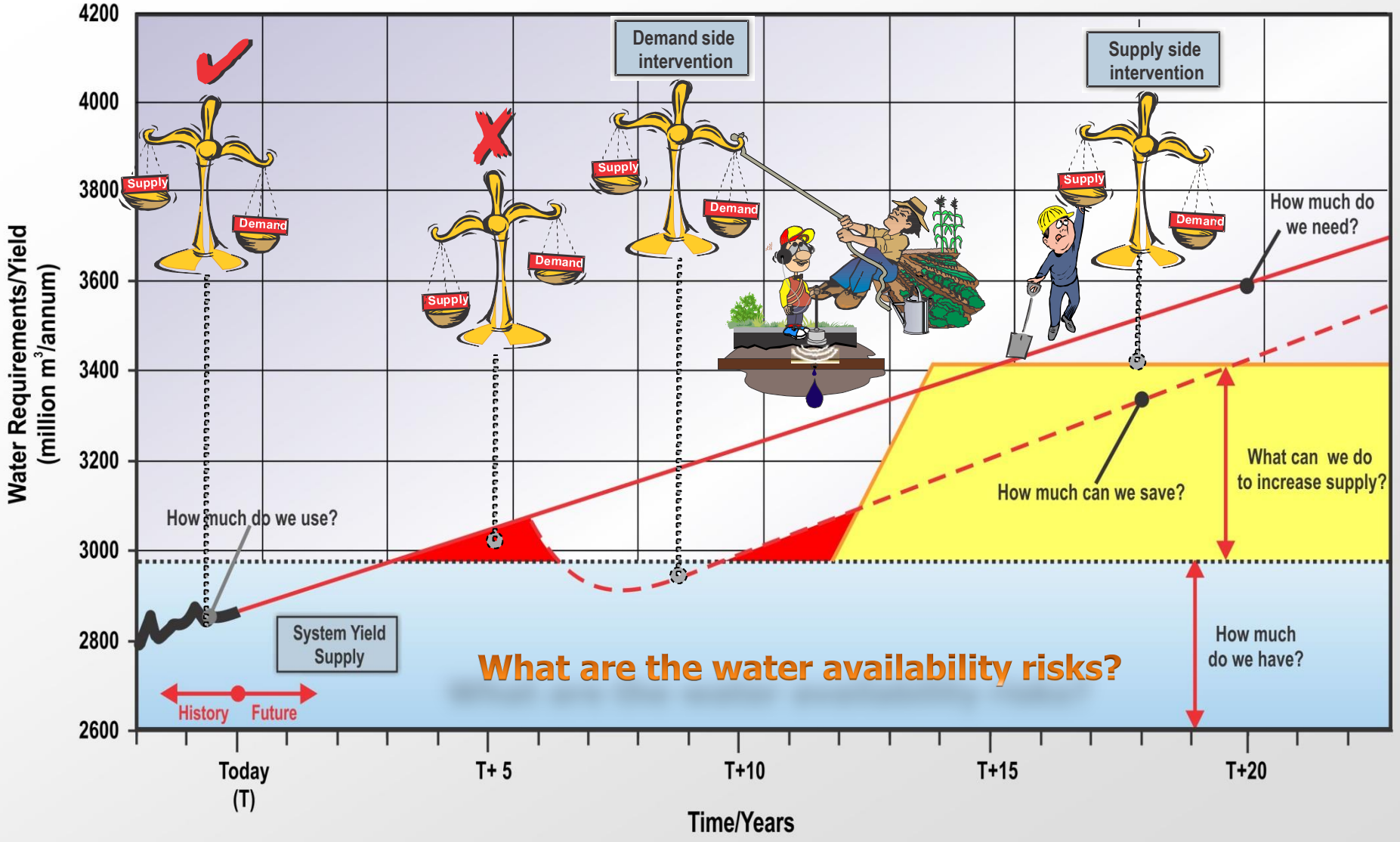
Water use compliance

- Status assessment
- Develop legal process
- Regulations
- Litigation
- Monitoring

Infrastructure planning

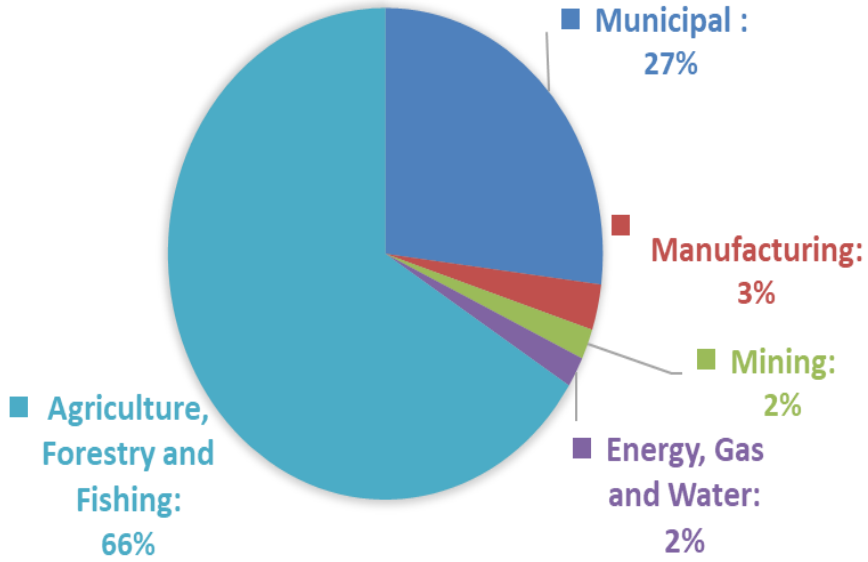
- Engineering feasibility
- Economic comparison
- Social and environmental implications
- Legal requirements
- Contractual agreements
- Financing arrangements

Water resource water balance

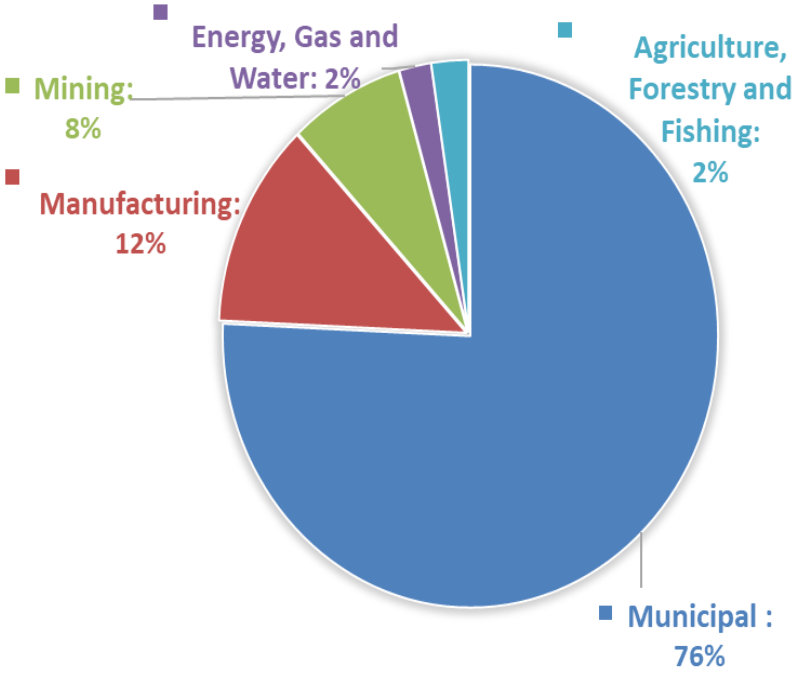


GDP CONTRIBUTION PER SECTOR vs WATER USE PER SECTOR

WATER USE (DWS National Water & Sanitation Master Plan)



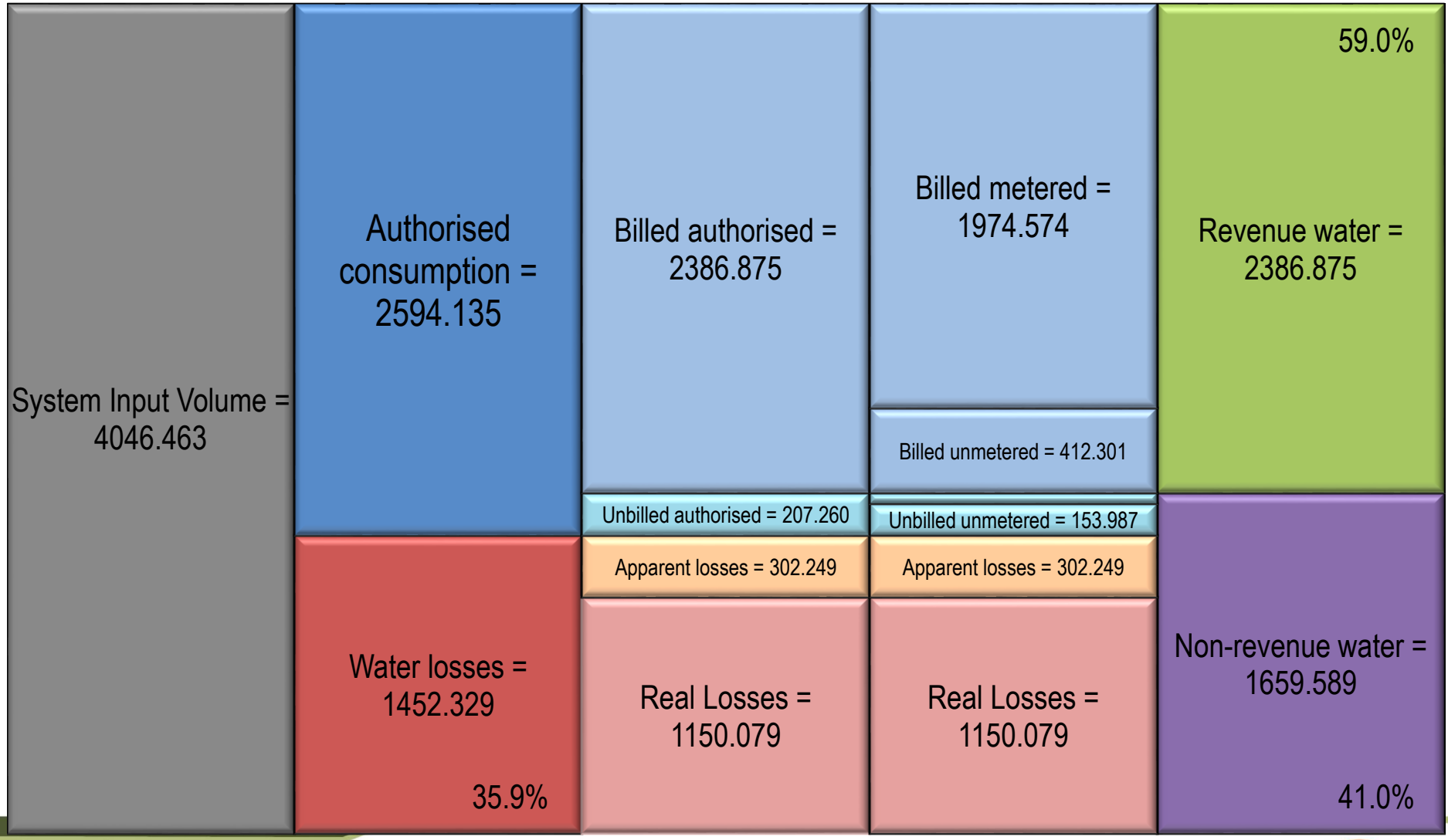
GDP CONTRIBUTION (Stats SA PO441)



WC/WDM is important across all water use sectors

STATUS OF WATER LOSSES AND NRW IN SOUTH AFRICA

National Water Balance



IMPORTANCE OF NON REVENUE WATER

3 million households do not have access to reliable drinking water.

14.1 million people do not have access to safe sanitation

Only **64%** of households have access to a reliable water supply service

56% of waste water treatment works and **44%** of water treatment works are in a poor or critical condition. **11%** are dysfunctional

41% of municipal water does not generate revenue. **35%** is lost through leakage **(R9.9 billion lost annually)**

33% of the remaining wetlands are critically endangered (more than **50%** already lost)

A **R33 billion** funding gap each year for the next 10 years must be closed through improved revenue generation and reduced costs

Only **5%** of agricultural water is used by black farmers

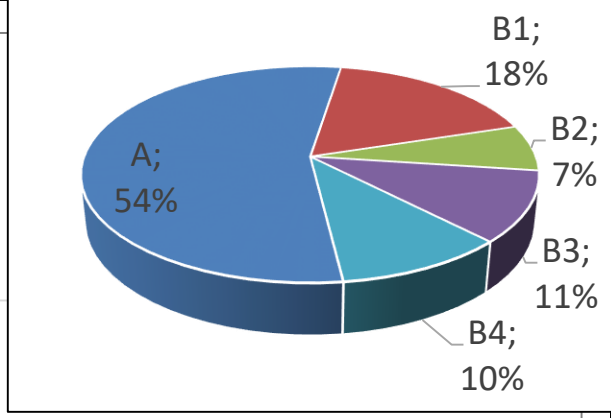
South Africa is facing a projected **3%** water deficit by 2040 if it does not successfully implement the planned measures

Pursue WC/WDM aggressively

Water Balance per Province

Province	Population served	SIV (m^3/annum)	NRW (m^3/annum)	% NRW	% WL	l/c/d	ILI
EC	4 477 918	332 151 376	158 647 165	47.8%	45.0%	200	4.8
FS	2 723 028	207 835 805	106 908 574	51.4%	46.6%	209	4.8
GT	12 978 281	1 473 100 700	528 839 540	35.9%	27.4%	305	5.8
LIM	4 225 967	281 235 907	155 016 679	55.1%	55.1%	182	5.0
KZN	8 491 508	697 751 184	327 444 107	46.9%	43.0%	225	6.2
NW	3 039 995	206 496 825	105 577 898	51.1%	51.1%	186	4.7
NC	1 085 944	94 205 305	45 418 308	48.2%	45.5%	238	7.1
WC	6 108 993	482 695 411	102 720 237	21.3%	16.7%	201	2.4
MP	3 622 506	270 990 713	129 852 490	47.9%	43.9%	205	4.3
National	46 754 140	4 046 463 225	1 659 588 711	41.0%	35.9%	233	5.3

SIV per category



System Input Voume (m3/annum)

1,000,000,000
100,000,000
10,000,000
1,000,000
100,000

A= 275.4 million m³/a

B1 = 37.6 million m³/a

B2 = 10.7 million m³/a

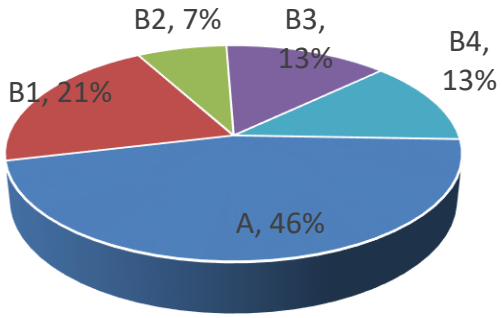
B3 = 4.21 million m³/a

B4 = 6.79 million m³/a

Buffalo City, eThekwini, Ekurhuleni, Stellenbosch, Steve Tshwete, Newcastle, Sol Plaatjie, City of uMhlathuze, Mbombela, Vulamehlo, Greater Kokstad, uMdoni, Mossel Bay, Msukaligwa, Dawid Kruiper, Saldanha Bay, Breede Valley, King Sabata Dalindyebo, Kareeberg, Laingsburg, Ubuntu, !Kheis, Magareng, Tokologo, Kou-kamma, Mamusa, Dikgatlong, Tswelopele, Dipaleseng, Endumeni, Cape Agulhas, Mantsopa, Kopanong, Mafube, Nketoana, Sunday's River Valley, Umvoti, Victor Khanye, Maquassi Hills, eDumbe, Ndlambe, Amahlathi, uMuziwabantu, Theewaterskloof, Tswaing, Thaba Chweu, Lesedi, Lekwa, Raymond Mhlaba, Ramotshere Moiloa, Abaqulusi, Ba-Phalaborwa, Nkandla, Ntabankulu, Ndwedwe, Mfolozi, Engcobo, Umhlabuyalingana, Emalahleni, uMshwathi, Umlalazi, Molemole, Umzimvubu, Aganang, Nyandeni, Greater Taung, Mnquma, Mandeni, Elias Motsoaledi, Moses Kotane, Bushbuckridge

Jun-16 — Category average

NRW per category



Non-revenue Water (m3/annum)

1,000,000,000
100,000,000
10,000,000
1,000,000
100,000

A= 94.8 million m³/a

B1 = 18.07 million m3/a

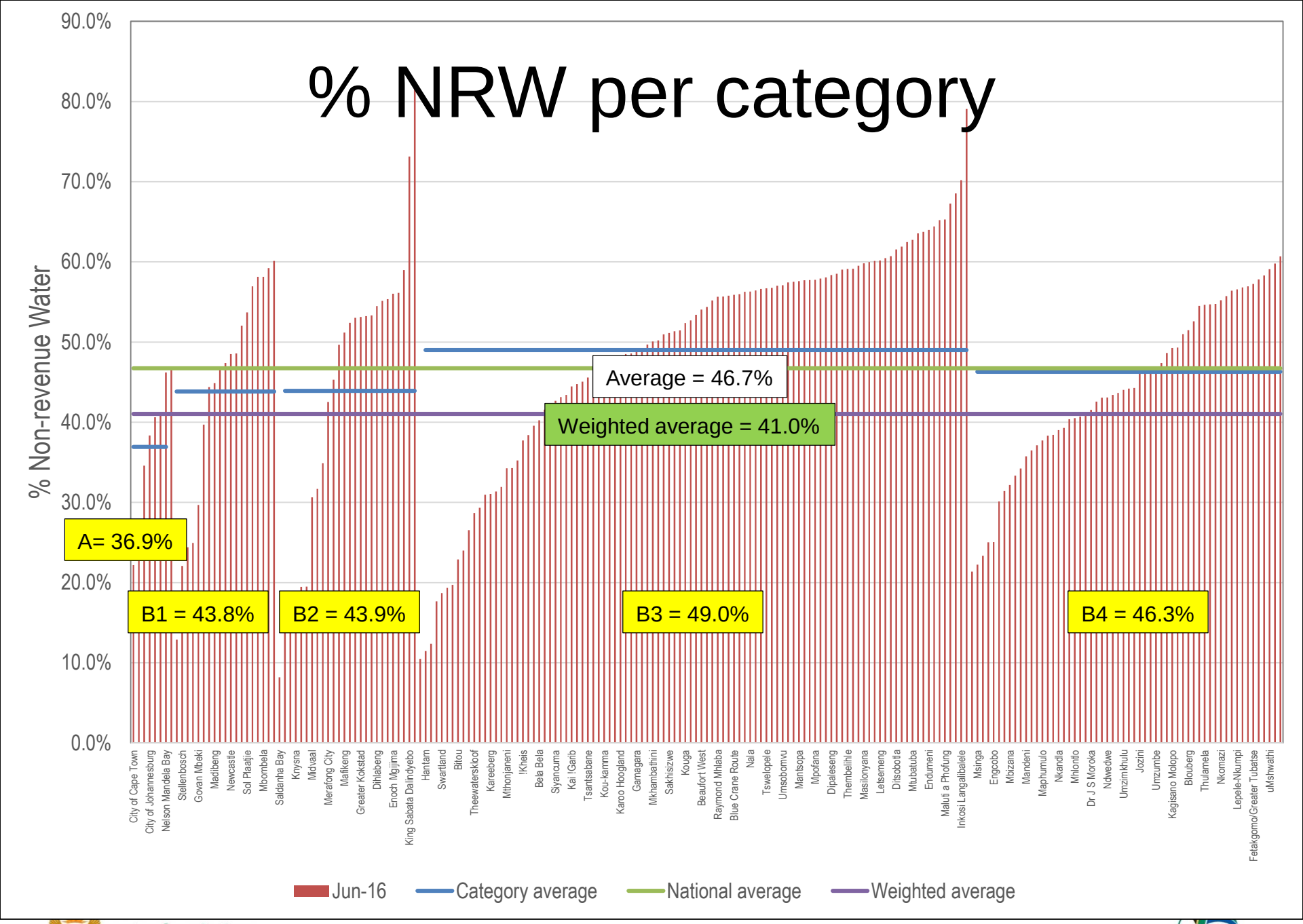
B2 = 4.76 million m³/a

B3 = 2.22 million m³/a

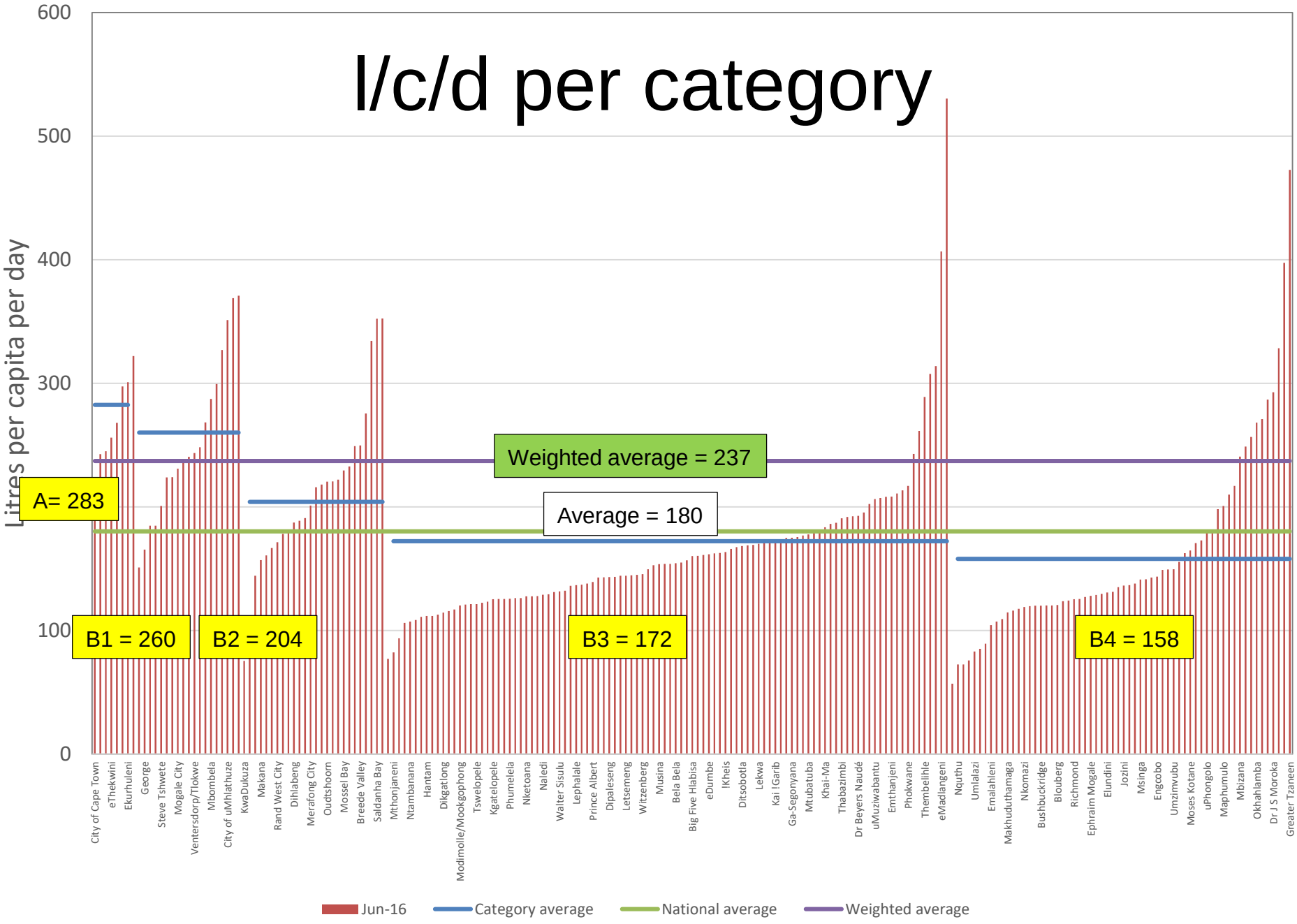
B4 = 3.37 million m³/a

Buffalo City, eThekwini, Ekurhuleni, Stellenbosch, Steve Tshwete, Newcastle, Sol Plaatjie, City of uMhlathuze, Mbombela, Vulamehlo, Greater Kokstad, uMdoni, Mossel Bay, Msukaligwa, Dawid Kruiper, Saldanha Bay, Breede Valley, King Sabata Dalindyebo, Kareeberg, Laingsburg, Ubuntu, !Kheis, Magareng, Tokologo, Kou-kamma, Mamusa, Dikgatlong, Tswelopele, Dipaleseng, Endumeni, Cape Agulhas, Mantsopa, Kopanong, Mafube, Nketoana, Sunday's River Valley, Umvoti, Victor Khanye, Maquassi Hills, eDumbe, Ndlambe, Amahlathi, uMuziwabantu, Theewaterskloof, Tswaing, Thaba Chweu, Lesedi, Lekwa, Raymond Mhlaba, Ramotshere Moiloa, Abaqulusi, Ba-Phalaborwa, Nkandla, Ntabankulu, Ndwedwe, Mfolozi, Engcobo, Umhlabuyalingana, Emalahleni, uMshwathi, Umlalazi, Molemole, Umzimvubu, Aganang, Nyandeni, Greater Taung, Mnquma, Mandeni, Elias Motsoaledi, Moses Kotane, Bushbuckridge

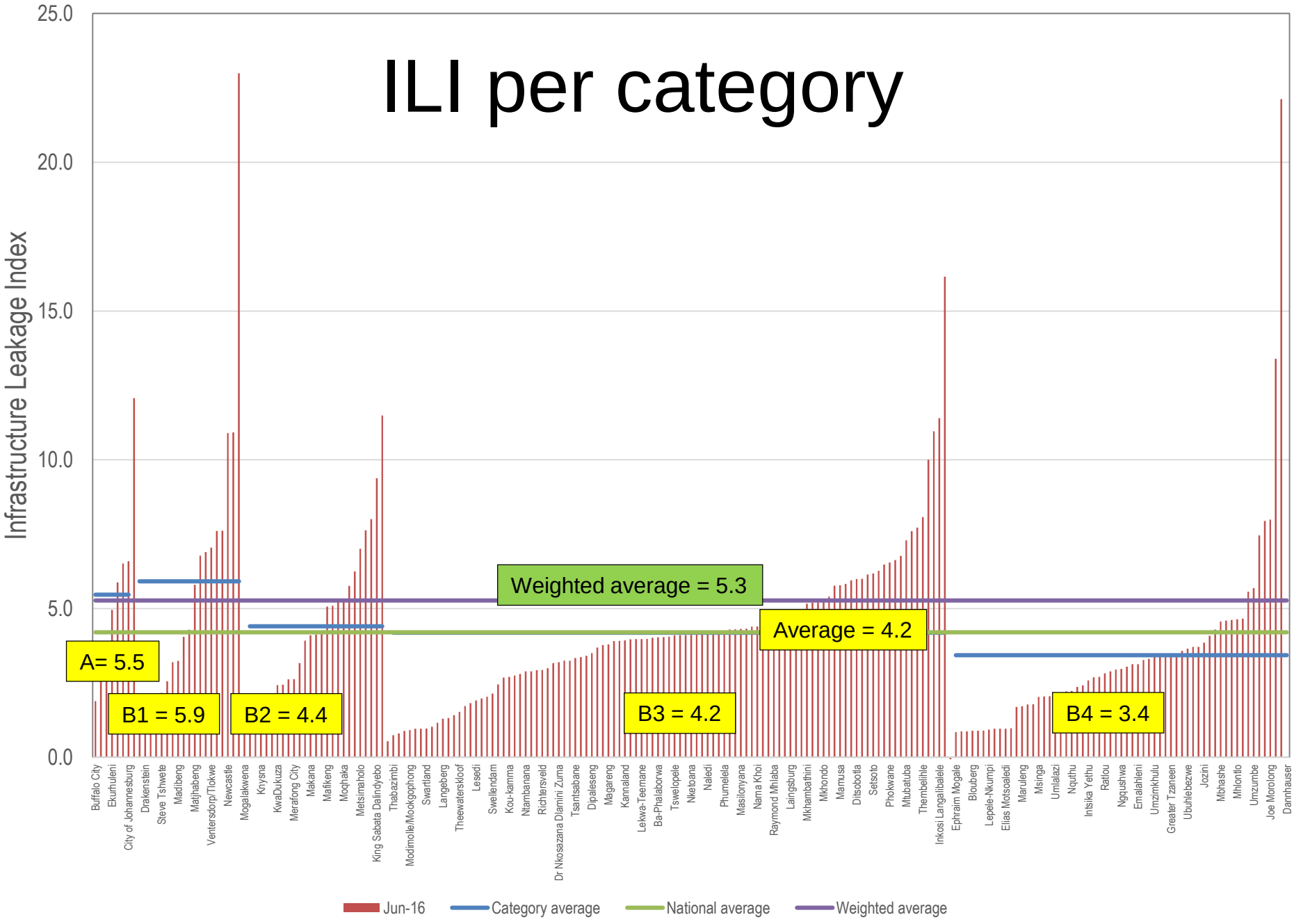
Jun-16 Category average


% NRW per category
% Non-revenue Water
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
A= 36.9%
B1 = 43.8%
B2 = 43.9%
B3 = 49.0%
B4 = 46.3%
Average = 46.7%
Weighted average = 41.0%
City of Cape Town
City of Johannesburg
Nelson Mandela Bay
Stellenbosch
Govan Mbeki
Madibeng
Newcastle
Sol Plaatjie
Mbombela
Saldanha Bay
Knysna
Midvaal
Merafong City
Mafikeng
Greater Kokstad
Dihlabeng
Enoch Mgijima
King Sabata Dalindyebo
Hantam
Swartland
Bitou
Theewaterskloof
Kareeberg
Mthonjaneni
!Kheis
Bela Bela
Siyancuma
Kai !Garib
Tsantsabane
Kou-kamma
Karoo Hoogland
Gamagara
Mkhambathini
Sakhisizwe
Kouga
Beaufort West
Raymond Mhlaba
Blue Crane Route
Nala
Tswelopele
Umsobomvu
Mantsopa
Mpofana
Dipaleseng
Thembelihle
Masilonyana
Letsemeng
Difsobolla
Mtubatuba
Endumeni
Maluti a Phofung
Inkosi Langalibalele
Msinga
Engcobo
Mbizana
Mandeni
Maphumulo
Nkandla
Mhlontlo
Dr J S Moroka
Ndwedwe
Umzimkhulu
Jozini
Umzumbe
Kagisano Molopo
Blouberg
Thulamela
Nkomazi
Lepele-Nkumpi
Fetakgomo/Greater Tubatse
uMshwathi
Jun-16
Category average
National average
Weighted average

l/c/d per category



ILI per category

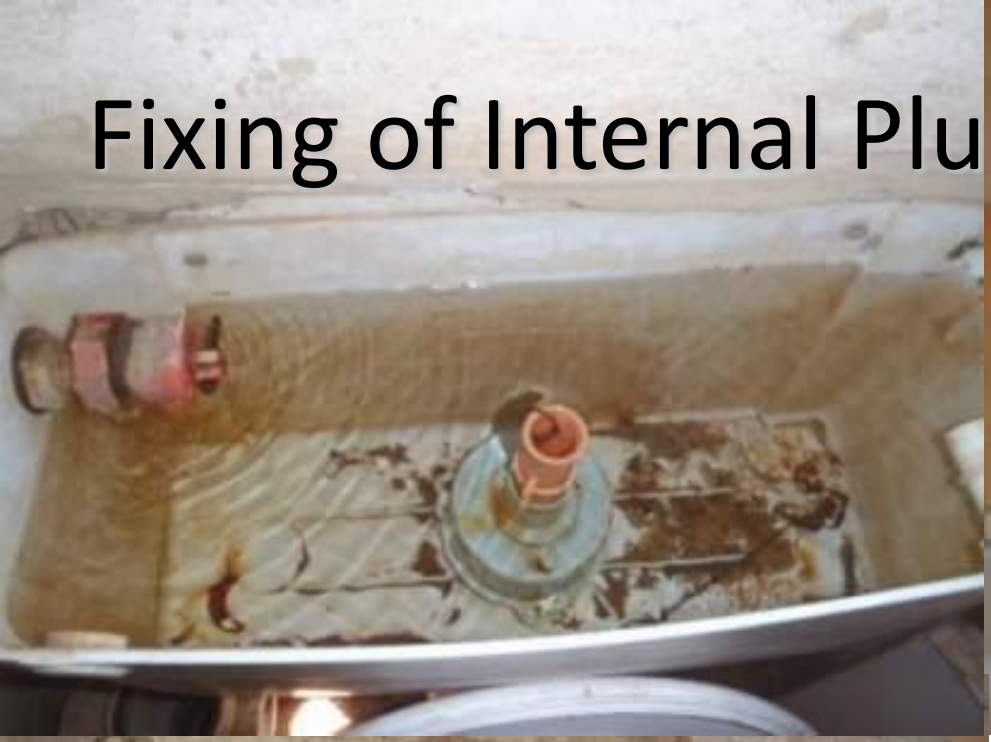


THE REALITY

Valuing SA's Scares Water Resources

Diverting leaks into drain

Fixing of Internal Plumbing Leakage



Managing the water security risk

No Drop ... ??

Current situation regarding water use as compared to its available resources and Water Use Authorisations/Licenses

Inefficient water usage and water loss

Prime risk to the municipal sector in terms of water availability and financial sustainability. This primary risk translates to direct risk to all water users.

Minister and industry partners (SWPN) concerned about the water security, developed an Incentive and risk based regulatory programme -NO DROP PROGRAMME

PURPOSE OF NO DROP PROGRAMME

No Drop programme seeks to :

- Improve service delivery and water security, whilst reducing water losses and non revenue water
- Provides a **guideline** to water services institutions on what is required to achieve WCWDM objectives.

- Incorporate the **whole water services cycle-**Political and management levels, finance and technical departments and customers.

- Encourage **continuous improvement and performance excellence** in water use efficiency, water loss and NRW management in South Africa

- Use **credible data** to report against defined targets

- **Benchmark** within defined municipal- and performance clusters and/or contribute to sector-wide benchmarking initiatives

NO DROP CRITERIA

	blue drop CERTIFICATION drinking water quality REGULATION		no drop CERTIFICATION water use efficiency REGULATION		green drop CERTIFICATION waste water service REGULATION
1	WSP	1	**Strategy & planning**	1	W_2RAP
2	Asset management	2	**Asset management**	2	Asset management
3	Technical skills	3	**Technical skills**	3	Technical skills
4	Credibility & accountability	4	**Credibility & accountability**	4	Credibility & accountability
5	Compliance	5	**Performance & Compliance**	5	Compliance
		6	**Local regulation**	6	Local regulation / Bylaws
		7	**Customer care**		

90-100%	Excellent
80-<90%	Good status
50-<80%	Average performance
31-<50%	Very poor performance
0-<31%	Critical state

NO DROP CRITERIA

no drop CERTIFICATION
water use efficiency REGULATION

Strategy, planning, implementation	Available resources Water Use Licenses IWA Water Use diagrams WDM strategy & targets (own and national)
Asset management	Asset registers Mains Replacement Programme Consumer Meter Replacement Programme Valve and Bulk Meter Programme Monitoring and analysis of high water loss supply zones. Budget and expenditure
Technical skills	WDM management structures & performance targets O&M staff, meter readers. Training Meter reading to billing process Accuracy of systems independent audit, flow meter
Compliance, performance	Leaks in the reticulation systems Physical water loss indicators Commercial water loss indicators Non-Revenue Water indicators Per Capita Usage indicators Pressure management systems
Local regulation	Metering, billing and credit control policy Consumer meter replacement policy Bylaws Indigent database Water use installations / SABS.
Customer care	Customer Care Centre Informative billing Community Awareness- and Schools Awareness Campaign

VALUE PROPOSITION

Technical

- ✓ Credible, verified information on water losses in the municipal sector
- ✓ System, process and procedure to measure progress or digress on a continuous basis

Social

- ✓ An informed municipal sector, public and water sector

Legal / Institutional

- ✓ A focussed, informed and results-orientated Regulator and Local Government
- ✓ Foundation to improve technical and financial requirements for WC/WDM in municipalities

Economic / Financial

- ✓ Business Case for private-public partnerships
- ✓ Rand-based opportunity and investment framework
- ✓ Projects / intervention types to address the identified gaps.

NO DROP APPROACH

No Drop system will 'gauge' the status of the sector

- Allow lower-capacity municipalities to 'catch up'
- Encourage municipalities who already apply advanced WCWDM programmes to further improve on current practices - to 'excellence'.
- Metro's represent >47% of SA's water use and are expected to perform at a certain level

Criteria 1:

WCDM STRATEGY, PLANNING AND IMPLEMENTATION

Criteria 1: Key Objectives

Measure

- the **state** of water consumption and security, water losses and non-revenue water in the water services institution
- the **plans** of the water services institution to reduce system input volume, water losses and non-revenue water
- **progress** made in the implementation of these plans.

Tips and tricks

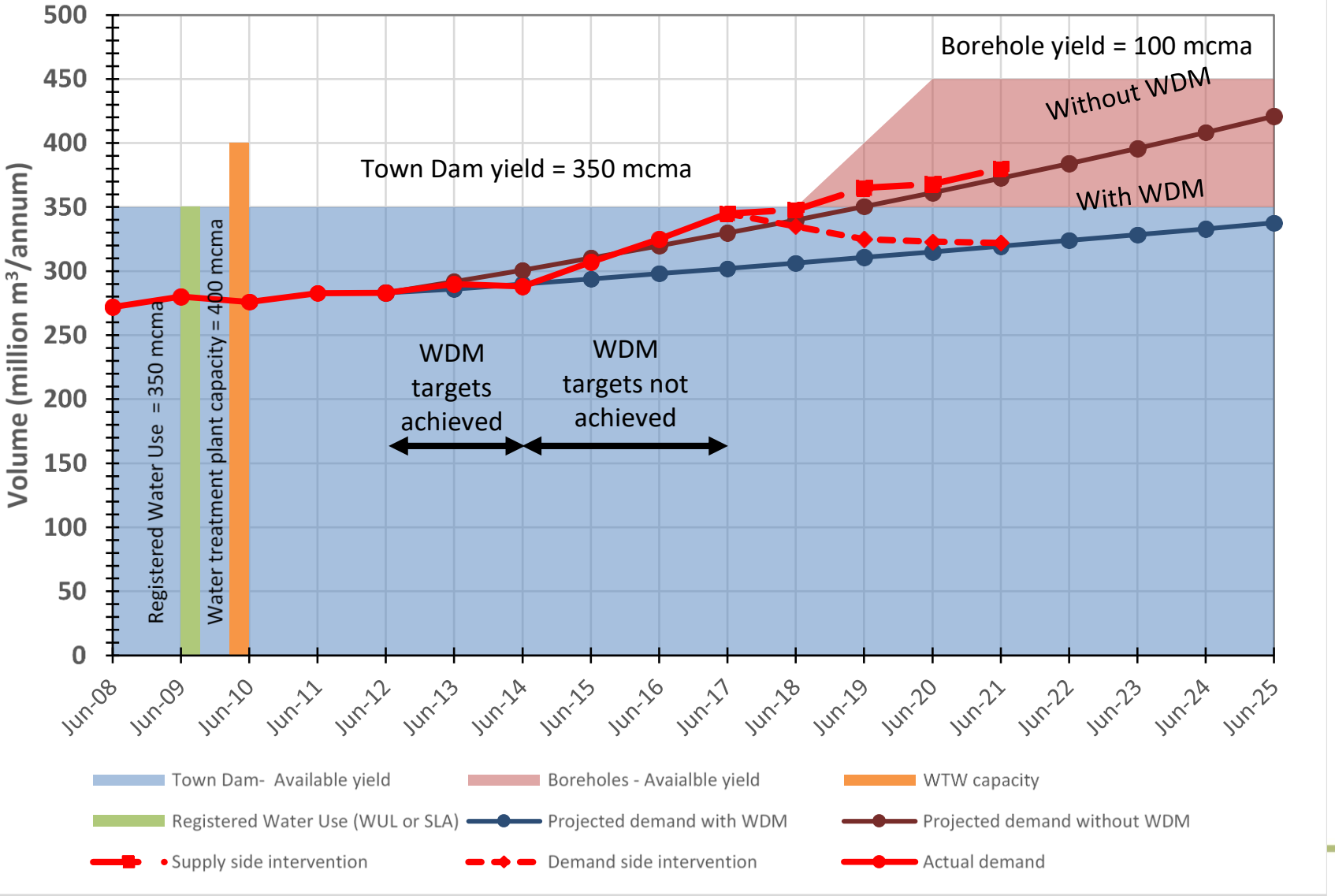
- Align water resource balance diagram with reconciliation and all town strategies
- Prepare an accurate IWA water loss balance diagram
- Present a water demand management strategy that shows targets, timelines, budgets, interventions, etc.

BUILDING BLOCKS

WCWDM Strategies: Key Areas

- ✓ **WSA to have a strategy and plan in place to address water losses and water use, against its WUL**
  - ✓ **Background and context**
  - ✓ **Situation assessment including need statement**
  - ✓ **Key issues and challenges**
  - ✓ **Focus areas of interventions**
  - ✓ **List of proposed interventions**
  - ✓ **Set targets for demand, NRW, commercial and real losses**
  - ✓ **Allocations of responsibilities**
  - ✓ **Budgets and multi year implementation timelines**
- ✓ **A council approved WDM strategy or Business Plan**
- ✓ **Status of implementation**

Water resource balance diagram



IWA water balance

<table>
<tr><td rowspan="8">System input volume

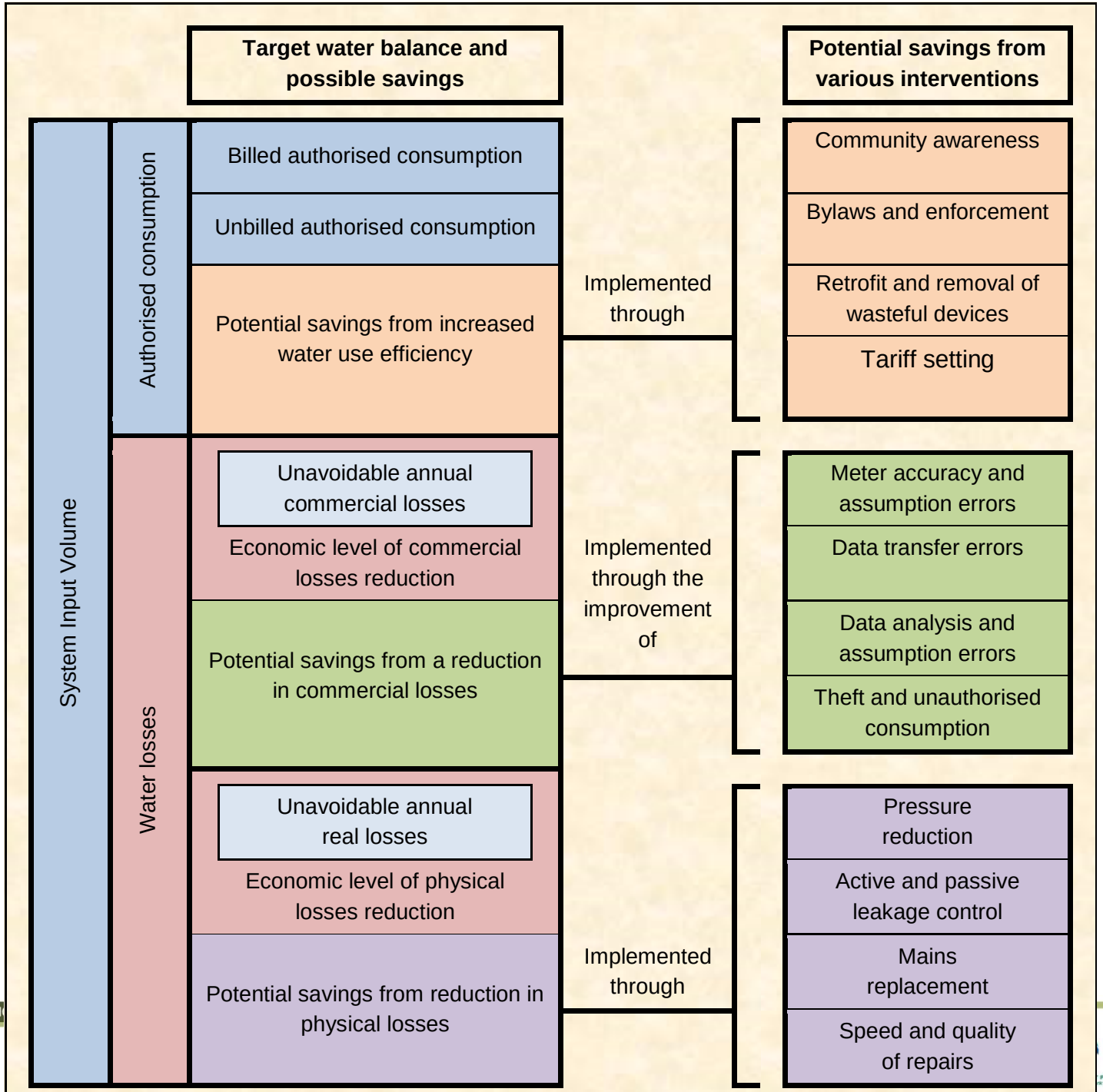
(Water security and efficiency)</td><td rowspan="3">Authorised Consumption
(All water use and wastage after connection on user side)</td><td rowspan="2">Billed authorised</td><td>Billed metered</td><td rowspan="2">Revenue water (Includes free basic water)</td></tr>
<tr><td>Billed unmetered</td></tr>
<tr><td rowspan="2">Unbilled authorised</td><td>Unbilled metered</td><td rowspan="2"></td></tr>
<tr><td>Unbilled metered</td></tr>
<tr><td rowspan="5">Water Losses

(All losses before the connection on municipal side)

(Environmentally and financially unattractive)</td><td rowspan="3">Commercial / Apparent losses</td><td>Unauthorised consumption</td><td rowspan="5">Non-Revenue water

(Financial sustainability of the WSI and promotion of water use efficiency)</td></tr>
<tr><td>Meter inaccuracies</td></tr>
<tr><td>Transfer errors</td></tr>
<tr><td rowspan="3">Physical / Real losses</td><td>Leakage on distribution pipes</td></tr>
<tr><td>Leakage & overflows on storage tanks</td></tr>
<tr><td>Leakage on connection pipes up to point of connection</td></tr>
<tr><td></td><td>Connection</td><td></td><td></td><td></td></tr>
</table>

Alignment of the IWA water balance and interventions



CONCLUDING REMARKS

- **WCWDM and** attention to water quality **must be 1st port of call**, before new water resource development programs in improving resilience for municipal water.
- Most of the key large water supply systems (WSS) are stressed
- Broadening of South Africa's water resource mix is critical for water security as there are now limited opportunities for further surface water developments.
- Evidence suggests that Non-revenue water has regressed over the past few years in the country
- Capacity to procure, manage and operate large water projects is limited in the municipalities including for WC/WDM

CONCLUDING REMARKS

- WC/WDM is important across all water use sectors, we are required to pursue WC/WDM aggressively – it is a no-brainer
- We need to “manage” our water much better than we are currently doing!!
- Utilise the tools developed as a guideline and implement WCWDM - “No Drop” - measure and report progress!!
- Phases I and II of the No Drop programme is regarded as a steep learning curve. The buy-in and commitment by local government shows the need for such a programme in SA. Results will improve over time, as municipalities invest more and more in terms of human and financial resources towards WCWDM.
- No Drop will play an important role to change perceptions, raise awareness, improve performance
- Preparations for 2021/22 cycle has already started-requirements of the IWA water balance

Water Security:

New water developments and Non revenue water

- Water conservation / Water demand management
  - Pressure management
  - Leak detection
  - Tariffs
  - Water efficient devices
  - Water restrictions
  - Awareness campaigns / behaviour change

Who is going to pay for the plugging?

THANK YOU