



Strategic Overview of the Water Sector in South Africa 2015



water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

STRATEGIC OVERVIEW OF THE WATER SERVICES SECTOR IN SOUTH AFRICA 2015

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Prepared by the DWS Directorate: Water Macro Planning

See terms and conditions on last page.



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FOREWORD

The Department of Water and Sanitation (DWS) is the leader and regulator of the water and sanitation sectors in South Africa and has the mandated responsibility to ensure that all people have access to sustainable water resources and water services.

South Africa is a water scarce country and it is essential that all available water is used effectively, efficiently and sustainably in order to reduce poverty, improve human health and promote economic development.

Both surface water and groundwater resources are managed to ensure a balance between usage and availability in order to meet the country's present and future water demands.

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LIST OF ACRONYMS

CAPEX	capital expenditure
CMA	catchment management agency
DCOG	Department of Cooperative Governance
DM	district municipality
DOEA	Department of Environmental Affairs
DOHS	Department of Human Settlements
DORA	Division of Revenue Act
DWS	Department of Water and Sanitation
DWQ	drinking water quality
FBS	free basic sanitation
FBW	free basic water
HH	household
IAM	infrastructure asset management
IDP	integrated development plan
LM	local municipality
MAR	mean annual runoff
MDG	millennium development goal
Metro	metropolitan municipality
MFMA	Municipal Finance Management Act
MIG	municipal infrastructure grant
MUSSA	municipal strategic self-assessment

NRW	non-revenue water
NWRS	National Water Resource Strategy (2013)
OPEX	operating expenditure
RWU	regional water utility
SALGA	South African Local Government Association
SANS	South African national standards
SDBIP	service delivery and budget implementation plan
StatsSA	Statistics South Africa
WC/WDM	water conservation and demand management
WMA	water management area
WS	water services (i.e. water and sanitation)
WSA	water services authority
WSDP	water services development plan
WSP	water services provider
WTW	water treatment works
WUA	water user association
WWQ	wastewater quality
WWTW	wastewater treatment works
10 ⁶ m ³ /a	million cubic metres per annum

1. SETTING THE SCENE

1.1 DEMOGRAPHY

According to the 2014 mid-year population estimate of Statistics South Africa, (StatsSA), the census 2011 population of 51.77 million people grew to 54.0 million by July 2014. Of the nine provinces, Gauteng is the most populous and densely populated area, with 12.91 million people, whilst the N. Cape is the least so, with 1.17 million people.

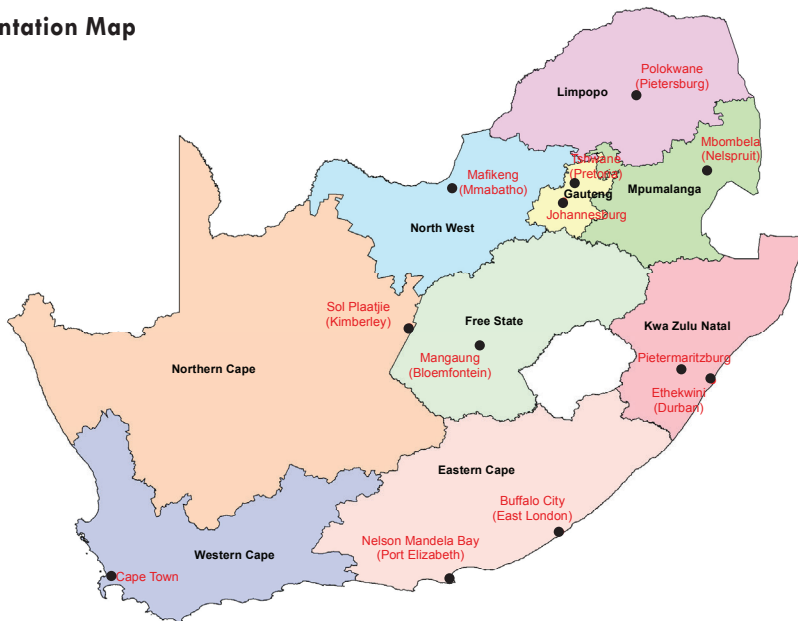
1.2 KEY FINANCIAL INDICATORS

South Africa's 2014 Gross Domestic Product is \$350 billion, (R3738 billion), or 0.5% of the world economy, considerably down from the \$404 billion in 2012, with the result that Nigeria has now overtaken South Africa as Africa's largest economy. The Producer Price Index grew to 8% in 2014 and the unemployment rate has risen to 25.5%.

1.3 WATER GOVERNANCE AND MANAGEMENT

The Department of Water and Sanitation, (DWS), leads and regulates the water and sanitation sectors in South Africa, develops policy and strategy, and provides support to the sector. DWS is governed by two Acts, (currently being amalgamated), the National Water Act (1998) and the Water Services Act (1997), and together with national strategic objectives, and governance and regulatory frameworks, provides an enabling environment for effective water use and management.

Orientation Map



1.4 INSTITUTIONAL ARRANGEMENTS & PARTNERSHIPS

DWS operates at national, provincial and local levels across all elements of the water cycle, i.e. from water resource management, water abstraction, water processing and distribution of potable water, wastewater collection, to treatment and discharge. DWS does not execute all of these functions; some are constitutionally assigned to sector partners. DWS owns most of the large dams and related water resource infrastructure and undertakes the necessary planning and implementation of future water resource development projects.

Regional bulk water distribution is managed by water boards, municipalities and the DWS. Water boards and some larger metropolitan municipalities (metros), also purify water to potable standards. Water services (water supply and sanitation) provision is the constitutional responsibility of local government (metro, local or district municipalities,) who act as water services authorities (WSAs), and often also water service providers (WSPs), in their areas of jurisdiction. Where wastewater management is a regional challenge, some WSAs have contracted out this function to bulk water services providers; however, responsibility remains with them to ensure an effective service.

A wide range of water resources management functions within a catchment area may be delegated to Catchment Management Agencies, (CMAs), which are in the process of being established, while Irrigation Boards, (in the process of being transformed into Water User Associations (WUAs)), operate at a local level, managing water-related activities. River health and related catchment management functions are shared between the DWS and the Department of Environmental Affairs (DOEA).

The Water Research Commission (WRC), undertakes water related research activities for the DWS. The DWS maintains close partnerships with the South African Local Government Association (SALGA), the Development Bank of Southern Africa (DBSA), CMAs, WUAs, the Trans Caledon Tunnel Authority (TCTA), the Water Institute of Southern Africa (WISA), universities and technikon.

1.4.1 SECTOR LEADERSHIP AND REGULATION

The DWS oversees and regulates the WS business through appropriate policies and regulations which are implemented through its nine provincial offices. It also monitors the performance of the sector and regulates the drinking water quality and effluent quality against industry standards and recommends changes to the business environment within which the various role-players have to perform.

The National Water Resource Strategy (2013) sets out the strategic direction for water resources management over the next 20 years, it provides the framework for the protection, use, development, conservation, management and control of water resources, as well as the framework within which water must be managed at catchment level. It is binding on all authorities and institutions exercising powers or performing duties under the National Water Act. The Strategic Framework for Water Services of 2003, (currently under review), sets out a comprehensive approach with respect to the provision of WS.

National water strategies are supported by regional and local plans, notably catchment management plans, provincial growth and development plans, bulk water supplier business plans, water master plans and water services development plans, (WSDPs). DWS also provides inputs into and ensures strategic alignment with the National Framework for Water for Growth and Development, the National Development Plan, the New Growth Path and the Medium Term Strategic Framework.

1.5 STRATEGIC FRAMEWORK

1.5.1 OUTCOMES

In recognition that service delivery had not adequately addressed the country's needs, the Presidency identified 12 strategic areas requiring attention, each with a particular outcome. Outcome 9 is a responsible, accountable, effective and efficient local government, (including the water and sanitation functions). Outcome 6 is an efficient, responsive and competitive, economic, infrastructure network.

1.5.2 STRATEGIC INFRASTRUCTURE PROJECTS (SIPS)

Following on from the identification of required outcomes, the President introduced the National Infrastructure Plan of 2012, consisting of 18 strategic infrastructure projects, or SIPS, to be implemented over a 15 year period at an estimated cost of R4 trillion. Two SIPS deal with water and sanitation.

- SIP 6 will address backlogs and upgrades to municipal water, sanitation and electricity bulk infrastructure.
- SIP 18 will address water and sanitation backlogs, as well as the maintenance and construction of waste water treatment works. It will also consolidate water services institutions and implement water leak management and water demand awareness programmes.

Together the Outcomes and SIPS strategies form the foundation on which the various water and sanitation programmes are based.

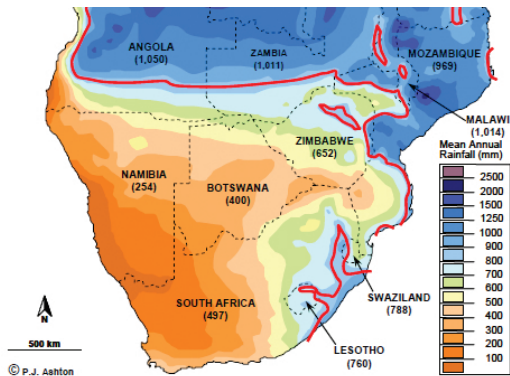
2. WATER RESOURCES

2.1 RAINFALL AND WATER AVAILABILITY

South Africa is ranked as the 30th driest country in the world. The country is semi-arid with rainfall varying from less than 100 mm per annum in the west to over 1500 mm per annum in the east. Average rainfall is 450 mm per annum which is well below the world average of 860 mm per annum. Climate change predictions are for a drier western half of the country and for far more variability, with more extreme events, in the east.

2.2 WATER RESOURCE PROFILE

South Africa is not just a water scarce country, but has extreme rainfall fluctuations. Management of South Africa's water resources involves catchment and river systems management, water storage, water abstraction and return-flow management. Integrated management techniques are required to ensure that water is both protected and utilized to its full potential.



DWS manages the country's water resources in order to:

- Ensure reliable and equitable supply of water for sustainable economic and social development including poverty eradication;
- Ensure protection of the resource;
- Ensure and support the development of effective water management institutions; and
- Align staff and stakeholders towards a common vision of integrated water resource management.

In order to manage the variability of surface water runoff and to supply water to locations of economic activity, South Africa has built comprehensive water resources infrastructure that includes 794 large dams (i.e. dams with a wall height $\geq 15\text{m}$, or a wall height between 5 and 15m and a storage capacity exceeding 3 million m^3). Their combined storage capacity is in the order of 31 billion m^3 . More than two thirds of the country's mean annual runoff (MAR), is stored in these dams.

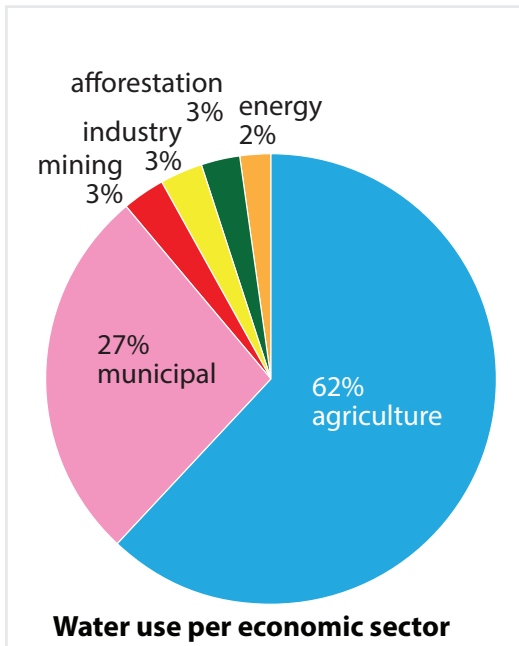
The De Hoop Dam, on the Steelpoort River in the Limpopo Province, has recently been completed and the bulk pipeline from De Hoop to Steelpoort is due for completion in 2015. The Mooi-uMgeni Transfer Scheme's Spring Grove Dam (KZN) has also been completed. The Mokolo Crocodile River Water Augmentation Project's pipeline is under construction in the Limpopo province. The Lesotho Highlands Phase 2 was launched early in 2014 and will start with construction of the Polihali Dam and tunnel. The following projects are in the planning or design phase: construction of the Mzimvubu Dam (E. Cape), and Nwamithwa Dam (Mpumalanga), and the raising of the Hazelmere Dam (KZN) and the Clanwilliam Dam (W. Cape).



2.3 WATER BALANCE

South Africa has a reliable yield, (at 98% assurance of supply), of only about 15 billion m³/annum, comprising 68% surface water, 13% groundwater, 13% return flows and 6% from other sources, such as desalination.

South Africa's MAR is about 49 billion m³/annum, however only some 10.24 billion m³/annum of this is available at the required 98% assurance. Ground water usage is about 2 billion m³/annum, (although this may be an underestimation). Recent estimates indicate that the potential, reliable, groundwater yield could be over 5 billion m³/annum. It is estimated that return flows from irrigation, urban domestic uses and bulk industrial and mining effluents could offer re-use opportunities of up to 1.9 billion m³/annum. Current usage is estimated to be between 15 and 16 billion m³/annum, roughly split between agriculture (62%), municipal (27%), mining (3%), industry (3%), energy (2%) and afforestation (3%).



An estimated 9.5 billion m³/annum is required to satisfy the total ecological reserve requirement. Rivers, lakes, wetlands and estuaries are some of the key ecosystems requiring protection. The human reserve is required to satisfy basic human needs by securing a basic water supply, for people who are, or who will, in the reasonably near future, be: (i) relying upon; (ii) taking water from; or (iii) being supplied from, the relevant water resource. The current basic domestic water use component, (or 25 litres/person/day), translates to 490 million m³/annum or 11% of the total domestic water use of 4.5 billion m³/annum. Many rural settlements still have insufficient water resources to meet their basic water demands and further groundwater and surface water resource developments are necessary. Without effective metering and billing, consumption in urban and rural areas could rise to over 7 billion m³/annum resulting in an increase in total water use of close on 20 billion m³/annum.

According to DWS's Water Authorization and Registration Management System database, the total registered water usage, (not to be confused with actual use), has already reached the estimated 2025 high water requirement of 17.3 billion m³/annum. Current water usage already exceeds reliable yield and will mean that during a drought year it is likely that the country will experience water restrictions on a fairly large scale. Additional water resources need to be developed in order to provide for increased domestic water requirements. In future some Water Management Areas will need to develop additional local water resource bulk infrastructure. A National Bulk Water Services Infrastructure Programme has been established by the DWS to address this deficiency.

Comprehensive water resource assessments, (or reconciliation studies), in 13 key demand/economic areas, have been completed along with other water resource assessments, (the so-called All Towns Studies), in 905 towns. From these assessments it was found that 28% of the towns have inadequate water resources and are in need of urgent attention. Water resource actions were identified and water conservation and demand management (WC/WDM), was identified as a key requirement, yet 50% of towns do not currently implement WC/WDM.

Climate change is predicted to impact negatively on the country's water resource adequacy, both in terms of availability and storage requirements. DWS is monitoring the implementation of the recommendations of these reconciliation studies.

It is worth noting that although agriculture uses over 60% of our water, only 12% of South Africa's landmass is considered arable and just 3% "truly fertile". Only 1.5% of the land is under irrigation, producing 30% of the country's crops, whilst 69% is given over to grazing and livestock farming.

2.4 OTHER WATER SOURCES

Growing water shortages mean that municipalities will increasingly have to consider alternate sources. Chief among these are desalination (of seawater or brackish groundwater) and water re-use. These can be energy intensive and thus expensive, but are still generally less costly than inter-basin transfers. Already a number of desalination plants have been built, with the largest being a 10Ml/day plant at Mossel Bay. eThekweni is however planning to construct two desalination plants with a combined capacity of 150 megalitres per day. Because of low, unpredictable rainfall, rainwater harvesting plays a negligible role as a water source. There are only about 150 000 rainwater tanks in South Africa at present.

2.5 WATER TRANSFERS

Water is unevenly distributed across the country and not always available where needed. To overcome this it is necessary to transfer water from areas where there is surplus water available to areas of need. An example is the Lesotho Highlands Water Scheme which supplies water to Gauteng's Vaal Water Management Area through transfer from Katse and Mohale Dams in Lesotho. There are 29 inter-basin and inter-river system transfer schemes with a total transfer capacity of 7 billion m³/annum. Phase 2 of the Lesotho Highlands Water Project, which was recently given the go-ahead, will transfer an additional 465 million m³/annum to South Africa.

2.6 WATER MANAGEMENT AREAS

The responsibility and authority for water resources management rests with CMAs and, at a local level, WUAs. These institutions are representative of water users and facilitate effective participation in the management of water resources in their areas and will ultimately enable the DWS to withdraw from its role of operator to that of sector leader, policymaker, regulator and performance monitor.

There are nine planned Water Management Areas, (WMA_s) that will be decentralized to CMAs, namely Limpopo, Olifants, Inkomati-Usuthu, Pongola-Mzimkulu, Vaal, Orange, Mzimvubu-Tsitsikama, Breede-Gouritz and Berg- Olifants. Currently only two CMAs are operational, namely the Inkomati-Usuthu and Breede-Gouritz CMAs.

A wide range of water resources management functions may be delegated to these CMAs, depending upon the local priorities and capacity, including:

- Developing strategies for integrated water resources management within the WMA;
- Developing and supporting organizations in the WMA, including coordination and capacity building;
- Regulating water use, including authorization and charging of water use;
- Managing information to support the other water resources management functions;
- Implementing physical interventions, including conservation and demand management and possibly infrastructure development and/or operation; and
- Auditing water resources management, in terms of the stated objectives of organizational business plans and water resources management strategies.

Water Management Areas

(see page 2 for orientation map)



CMA's will need to be smart in the way they manage their catchments and adopt an Integrated Water Resources Management approach, an approach widely recognized, but poorly understood, even within the water sector.

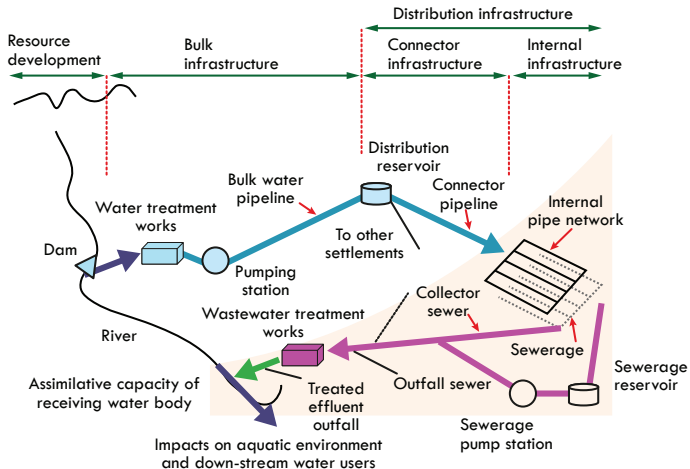
Although WUAs are water management institutions, their primary purpose, unlike CMA's, is not water management. They operate at a restricted localized level, and are in effect co-operative associations of individual water users who wish to undertake water-related activities for their mutual benefit.



3. WATER SERVICES

3.1 WATER SERVICES BUSINESS LIFECYCLE

Water services provision is a 24/7 business, “from source to tap and back to source”, dependent on sequential delivery along a value chain. Rainfall runoff flows into rivers is captured and stored in dams. This “raw” water, and water from other sources such as groundwater, is purified and piped to reservoirs for distribution to customers. Once the water is consumed, grey water, (wastewater from washing, laundry etc.), and sewerage is collected and passed through a network of sewers to a treatment works. Here the wastewater is purified and released back into rivers or dams where it once again becomes a water resource.



3.2 ROLE-PLAYERS

Besides the DWS, there are a large number of sector organisations involved in the WS business.

- National Treasury financially supports the DWS and other state departments to fulfill their support and regulatory roles in so far as these roles relate to fiscal and financial matters.
- The Department of Cooperative Governance and Traditional Affairs (DCOG), ensures local government provides basic services, regulates municipal services partnerships, ensures integrated municipal development planning, allocates funds to local government, regulates municipal affairs and with Provincial Government intervenes in cases of non-performing WSAs.
- The Department of Human Settlements, (DOHS), sets national housing policy aligned to local government's WS policies and is responsible for the eradication of WS backlogs in informal settlements.
- WSAs are responsible for planning, implementing and operating the necessary infrastructure to provide effective, affordable and sustainable WS to their customers.
- The Department of Rural Development and Land Reform's focus is on agrarian transformation of agricultural systems especially in terms of irrigation schemes for small scale farmers.
- SALGA is an autonomous political association of municipalities with its mandate derived from the 2006 constitution of the Republic of South Africa.
- The Department of Health ensures that all hospitals and clinics are provided with adequate water and sanitation facilities.
- The Department of Public Works is responsible for implementing the community based public works programmes, often acting as the owner and operator of public buildings, including schools, hospitals, etc.
- The Department of Environmental Affairs ensures that environmental impact assessments for water services projects are carried out, while promoting conservation, cleaner technologies and waste minimization.
- Regional water utilities or water boards operate water resource and wastewater infrastructure, and manage bulk potable water supply schemes, selling water to municipalities and industries.

- Water services providers (WSPs) provide water and/or sanitation services for municipalities and perform contractual duties as specified by the WSA. WSP entities can be public, private or mixed entities, or municipal government itself.
- Public or privately owned water companies such as Johannesburg Water, the Greater Nelspruit Utility Company and Siza Water Company (Dolphin Coast), which provide water services on behalf of the municipalities.
- The Department of Education is responsible for identifying schools that have no access to water services.
- The National Planning Commission, established by the Presidency, is responsible for developing a long term vision and strategic plan and for advising on cross-cutting issues that impact on long term development.
- The DBSA, (together with the European Union), launched a multi-billion rand Infrastructure Investment Programme to provide grant funding in support of loans for essential infrastructure projects.
- The Municipal Infrastructure Support Agency, (a component of DCOG), provides technical support to and assists municipalities strengthen their internal capacity for delivery and maintenance of basic service infrastructure.
- The Presidency facilitates an integrated and co-ordinated approach to governance, through creative, cross-sectoral thinking on policy issues and the enhancement of the alignment of sectoral priorities with the national strategic policy framework and other government priorities.
- StatsSA through its censuses and surveys monitors various aspects of WS performance.
- The WRC, the Council for Scientific and Industrial Research, the Human Sciences Research Council, academic institutions, consultants and professional organizations such as the Cities Network, the WISA, the Institute of Municipal Financial Officers, the South African Institute of Civil Engineers, the TCTA and the Institute of Municipal Engineering of South Africa all contribute.

3.3 CUSTOMER PROFILE

3.3.1 Demographics

South Africa's 54 million people are spread over some 28 000 settlements countrywide, of which:

- 40% live in large metropolitan areas;
- 19% live in medium-sized cities and towns;
- 6% live in small towns in rural areas; and
- 35% live in small rural villages and scattered settlements.

The country's age and gender pyramid depicts a broad base, indicative of a growing population and high proportions of youth, (with 30% of the population being younger than 15 years of age).

3.3.2 Population Growth

Since 2011 the population has grown at 1.24% per annum, whilst the number of households has grown at a rate of 2.65% per annum, indicating a reduction in the number of people per household. However average household size decreased by only 1.1% per annum. The difference can most likely be ascribed to the influx of illegal immigrants to the cities, as well as the many migrants who continue to maintain homes in their rural villages.

3.3.3 Population Migration

More than 20% of the population have migrated from rural areas to the major metropolitan areas and large regional centres over the last 10 years. An estimated 6 million illegal immigrants, (mainly from neighbouring countries), form a significant portion

of this migration. The biggest influx is to the Gauteng Province, with an expected 1.1 million people migrating there between 2011 and 2016. Migration is predicted to continue, so that by 2030 an estimated 70% of the population should be found in urban areas. This trend can be clearly seen in the above table.

Population split	2000	2009	2014
Urban	58%	60%	62%
Rural	42%	40%	38%

3.4 MUNICIPALITIES AND WATER SERVICES AUTHORITIES

In South Africa municipalities are classified, (on a financial basis), as follows:

Province		Description	Number
A		Largest cities or metros	8
Local municipalities	B1	Secondary cities; those with next largest budgets	19
	B2	Municipalities with a large town as core	27
	B3	Relatively small population, significant proportion of urban population, but with no large town as core	110
	B4	Municipalities which are mainly rural with, at most, 1 or 2 small towns	70
C1		District municipalities that are not WSAs	23
C2		District municipalities that are WSAs	21
		Total	278

* In accordance with the Local Government Structures Act 117 of 1998 and the Municipal Infrastructure Investment Framework of 1998.

A municipality that has been accorded responsibility for ensuring access to water services is termed a water services authority (WSA). Although South Africa has 278 municipalities, only 152, as shown below, are WSAs.

Province	DM WSAs	LM WSAs	Metro WSAs	Total
Eastern Cape	5	9	2	16
Free State	0	19	1	20
Gauteng	0	7	3	10
KwaZulu Natal	10	3	1	14
Limpopo	4	7	0	11
Mpumalanga	0	18	0	18
Northern Cape	0	27	0	27
North West	2	9	0	11
Western Cape	0	24	1	25
Total	21	123	8	152

Water Services Authorities by Type (WSAs)

(see page 2 for orientation map)

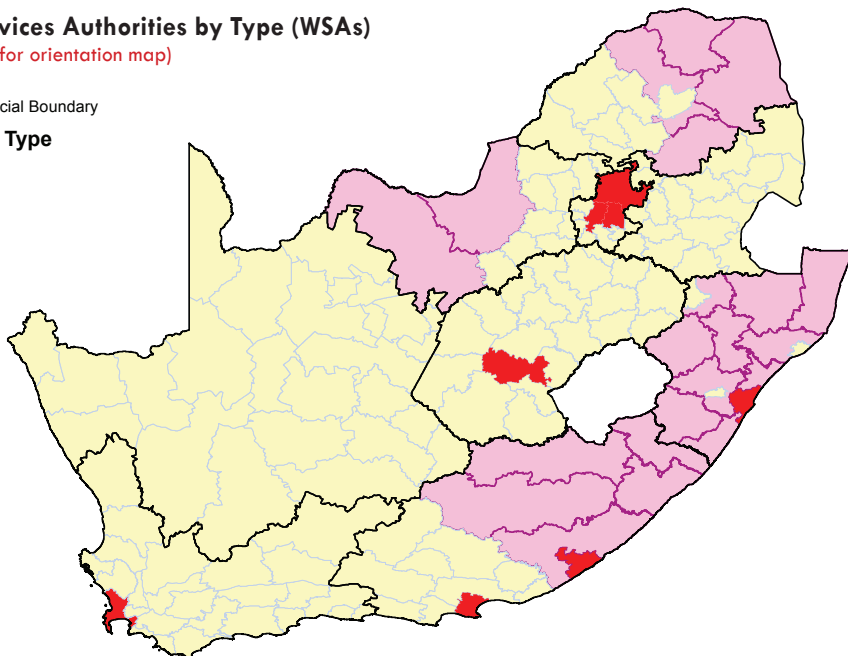
 Provincial Boundary

WSA's by Type

 Metro

 DM

 LM



3.5 WATER BOARDS

Water boards distribute raw and potable water across vast distances, (via regional water supply schemes), a role mandated and controlled by the Minister of the DWS. The WS Act added new responsibilities, in that water boards or any other WSPs must be formally appointed by the recipient municipalities to provide such services, where required. Not all municipalities depend on water boards for regional bulk water supply infrastructure, but can do so as long as they operate within the norms and standards of the WS Act, National Water Act and related regulations and strategies.

With Botshelo, Pelladrift and Bushbuckridge Water having recently been disestablished and incorporated into other water boards, South Africa now has 9 water boards. These supply about 2.56 billion m³/annum of bulk potable water. This represents 55% of the total domestic supply, up from 53% in 2007. Potable water is supplied to 28 million people; however their geographic supply footprint could be extended to reach 39 million people, (about 11790 communities, including several large industries). The total value of their fixed assets/ infrastructure is over R20 billion. Some water boards' infrastructure is already operating at design capacity and major capital programmes are required.

An institutional reform and realignment process is underway in the DWS, with the view to restructure the water boards into regional water utilities (RWUs), so as to improve efficiency. A target date of March 2016 has been recommended. The major functions of the RWUs will be to:

- manage bulk water services infrastructure and supply bulk water to WSAs and their WSPs, and to bulk water consumers;
- manage bulk sanitation infrastructure for wastewater treatment;
- operate existing regional water resources infrastructure;
- develop new regional water resources infrastructure;

- provide support to WSAs, where appropriate; and
- provide support to CMAs to undertake water resources management functions.
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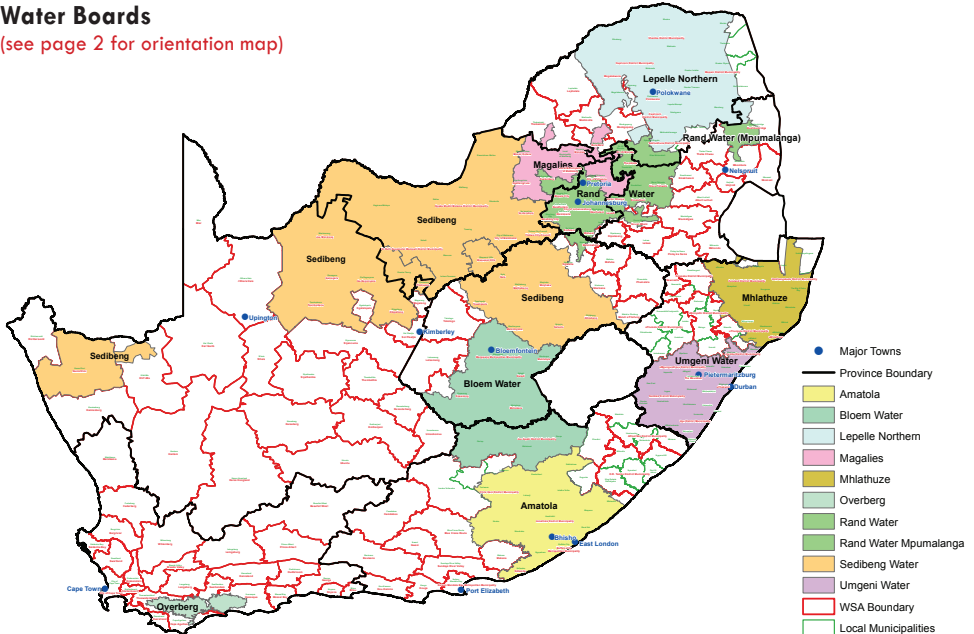
A recent study recommended that as part of the water board restructuring process:

- Rand Water should be the RWU for Gauteng and Mpumalanga and parts of Limpopo;
- Sedibeng Water combined with Magalies Water should be the RWU for North West and Northern Cape and perhaps parts of Limpopo.
- Umgeni Water combined with Mhlathuze Water should be the RWU for KZN
- Amatola Water should be substantially expanded and should also take over regional infrastructure supplying Nelson Mandela Bay from the DWS.
- A new RWU should be established for the Western Cape. Cape Town/DWS/National Water Resource Infrastructure Agency can operate regional infrastructure in the meantime.



Water Boards

(see page 2 for orientation map)



3.6 BASIC LEVEL OF DOMESTIC WATER SUPPLY

A basic (or RDP) household water supply is defined by in the Strategic Framework for Water Services (2003) as either 25 litres per person per day, or 6000 litres per household per month), supplied to the following criteria:

- Minimum flow rate of not less than 10 litres per minute;
- Within 200 metres of a household;
- Interruptions of < 48 hours (at any one time) and a cumulative interruption time year of < 15 days/year; and
- At a potable standard (SANS241).

Note: At time of writing, Cabinet has approved that a basic water supply be amended from within 200m to within the yard. This is yet to be promulgated.

3.7 MEDIUM AND HIGHER LEVELS OF DOMESTIC WATER SUPPLY

In the longer term, it is government's intention to ensure that all households receive 50 to 60 litres per person per day via an individual connection, either in the house or yard. Currently, high and medium levels of domestic water use about 4 billion m³/annum (89% of the total urban and rural use), which is approximately 26% of the total water requirement. Unfortunately South Africa's gross average consumption of 229 litres per person per day is too high for a water scarce country. This limits the potential to provide an increased level of service.

3.8 INTERIM SERVICE LEVELS

Because a number of schemes are no longer functional due to poor operation and maintenance, (see 4.5), the DWS recognized that the 2014 water services targets would not be met.

Consequently an Interim/Intermediate Water Supply Strategy has been adopted to ensure that all the people of South Africa have of June 2014. This will be achieved by accelerating existing basic service delivery projects or by providing an interim water supply solution until more sustainable and permanent water supply solutions can be implemented.

It will also include the rehabilitation and re-commissioning of non-functional schemes.

The DWS identified that most of the water supply challenges are within 24, (later increased to 27), district municipalities. All communities living in settlements that are greater than 50 households within these areas will be prioritized to receive at least a minimum interim water supply by 30 June 2015. The minimum standard for the interim/intermediate water supply is:

- 10 litres per person per day within 500 meters of a household and fit for human consumption (SANS 241).
- No consumer is without a water supply for more than seven full days in any year and no more than three consecutive days.

Action plans have been drafted for each district municipality (refer to Paragraph 4.1), and National Treasury has made substantial funding available through the Municipal Water Infrastructure Grant (MWIG). The relevant WSAs are responsible for the implement of these plans.

3.9 BASIC HOUSEHOLD SANITATION

A basic toilet facility is regarded as a toilet which is safe, reliable, environmentally sound and easy to keep clean, provides privacy and protection against the weather, well ventilated, keeps smells to a minimum and prevents the entry and exit of flies and other disease-carrying pests. A basic level of sanitation in South Africa is regarded as a Ventilated Improved Pit Latrine (VIP) which is a “dry” toilet facility. The preferred temporary sanitation solution is a chemical toilet. Bucket toilets are unacceptable.

3.10 HIGHER LEVEL OF SANITATION

There are a number of sanitation options that constitute a higher level of service. Examples are full waterborne sanitation, septic tanks, soak-aways and urine diversion toilets.

3.11 WATER SERVICES DELIVERY TARGETS

3.11.1 Basic water and sanitation targets

South Africa comes from a history of separate development which has resulted in many rural areas not having access to basic water supply and sanitation services. A dedicated basic services development programme was initiated in 1994 to eradicate the historic backlogs according to specific targets, namely:

- All people in South Africa have access to a functioning basic water supply facility by 2014.
- All people in South Africa have access to a functioning basic sanitation facility by 2014.

Note: *These targets will not be met, but with the amendment to the definition of a basic water supply, comes new target dates of 2019 for basic water services delivery, as per the 2014 Medium Term Strategic Framework.*

3.11.2 Millennium Development Goals

South Africa has committed itself to a number of international declarations on sustainable water services development. These include the “Earth Summits” (1992 and 2012), the UN resolution on millennium development goals (MDGs), (2000) and the World Summit on Sustainable Development (2002). The MDGs are poverty focused.

The water services MDGs are:

- To halve the proportion of people not having sustainable access to safe drinking water by 2015 using 1994 as a base year. This goal was achieved in 2005.
- To halve the proportion of people without sustainable access to a basic sanitation service using 1994 as a base year. This goal was achieved in 2008.

The RSA definition of a basic water service exceeds that of the MDG, which defines a basic water supply as 20 litres/capita/day within 1000 metres, by means of piped water, public tap, borehole or pump, protected well, protected spring or rainwater. Basic sanitation it defines as access to facilities that hygienically separate human excreta from human, animal and insect contact. Facilities such as sewers or septic tanks, pour-flush latrines and simple pit or ventilated improved pit latrines are assumed to be adequate, provided that they are not public.

A further water related MDG calls for a two-thirds reduction in the under-five mortality rate between 1990 and 2015. South Africa’s mortality rate in children under 5 years of age has dropped from 59 per thousand births in 1990 to an estimated 44 in 2014. The major cause of these deaths is diarrhoeal in nature, and is particularly prevalent in informal settlements and rural areas. Diarrhoea is a symptom of an illness which can indicate the presence of high levels of e-coli in drinking water. The death rate can be greatly reduced by the provision of a basic supply of potable water.

New post 2015 MDGs are in the process of being set.

3.11.3 Sustainable development goals

The Sustainable Development Goals (SDGs), are a similar concept to the MDGs, but focus on sustainability and see poverty as merely one of a number of global issues to be addressed. The SDGs and post 2015 MDGs will however be integrated and coordinated. Although the SDGs are still being developed, seventeen goals have been proposed, with goal 6 “to ensure availability and sustainable management of water and sanitation for all”, being specifically aimed at WS. Eleven other goals are however water related in some way.

3.12 WATER SERVICES DEVELOPMENT PLANS

The primary municipal water services planning instrument is the water services development plan, (WSDP). All WSAs must develop a 5 year WSDP, which must be updated on an ongoing basis and submitted annually to the DWS. The WSDP indicates how the WSA plans to provide universal access to water services, including the eradication of historical backlogs within its area of jurisdiction. The WSDP integrates technical, social, institutional, financial and environmental planning and feeds into the integrated development planning (IDP) process. The WSDP status countrywide can be viewed on the DWS website. A new WSDP guideline document, developed by the DWS, can be utilized by municipalities to develop and update their WSDPs.



3.13 BASIC WATER SUPPLY PROGRESS

	1994	2001	2011	2014
source	DWS	DWS	Stats SA	Stats SA
Households (HH) (million)	8.66	11.52	14.45	15.60
HH below RDP (million)	3.89	3.07	2.16	2.20
% HH below RDP	44.9%	26.7%	15%	14.1%
HH equal to or above RDP	4.77	8.44	12.29	13.40
% HH equal to or above RDP	55.1%	73.3%	85%	85.9%

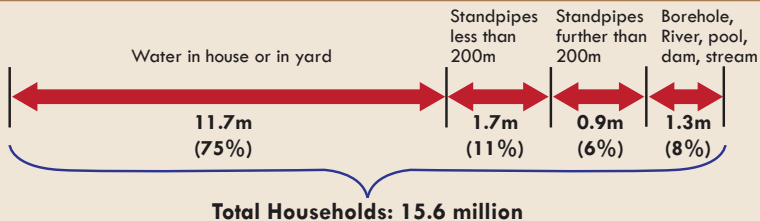
Note:

1. Initial progress monitoring by DWS was based on infrastructure provided. More recent monitoring, as done by Stats SA, measures functioning infrastructure. Lack of maintenance has caused some schemes to become non-functional. The StatsSA figure is thus less than the % HHs provided with infrastructure; (discussed in Chapter 4.5).
2. Amending the definition of basic water supply, to a yard or house connection, will reduce the above 2014 value of 85.9% by about 11% to 75%.
3. If recent moves to include the reliability, (assurance of supply), element of service delivery are adopted, then the above 2014 progress figure of 85.9% will drop to about 66%. [A combination of 2 and 3 above could possibly lower the 2014 progress value to about 55%, but is yet to be determined].

Currently the biggest backlog still lies with 27 DMs, largely rural in nature and chiefly within “old homelands” areas. Despite the existence of a progressive informal settlements upgrading programme since 2004, informal settlement upgrading in these areas and in the cities remains a daunting task. In 2014, 75% of households in South Africa had a tap in their house (48%) or yard (27%).

Water Supply Perspective: Households

(Census 2011 updated to April 2014)



Perspective 1: Households to be brought up to a bare minimum supply i.e safe source but still lacking quality

1.3m (6%)

Perspective 2: Total households to be brought to within 200m.

2.2m (14%)

Perspective 3: Total households to be brought to in-house/yard connections.

3.9m (25%)

Note: These figures reflect access to operational infrastructure

3.14 BASIC SANITATION PROGRESS

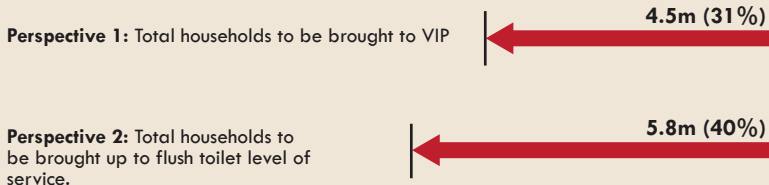
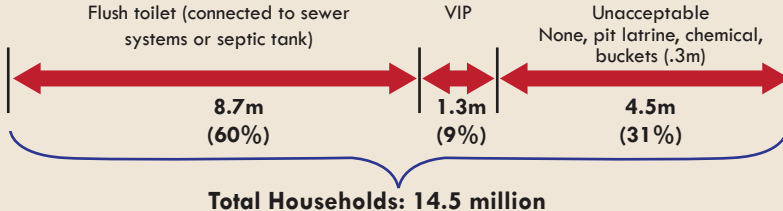
In 2014 the DWS took over responsibility for sanitation provision from the DOHS, having had the function transferred from it to the DOHS in 2009. Although there has been substantial progress since 1994, a great deal of effort is still required to accelerate delivery of sanitation services. Currently an updated delivery status verification process is underway.

	1994	2001	*2011
Households (HH) (million)	8.66	11.52	14.45
HH below RDP (million)	4.50	4.95	4.52
% HH below RDP	52%	43%	31.3%
HH equal to or above RDP (million)	4.16	6.57	9.93
% HH equal to or above RDP	48%	57%	68.7%

*Based on Stats SA data.

From the above it should be noted that although the percentage unserved is declining, the absolute number of unserved has remained relatively constant since 1994, due to population growth, at about 4.6 million households. If the sanitation backlog is to be eradicated, then additional finances combined with appropriate project management skills and effort will be required. Political pressure to provide full waterborne sanitation as a basic level of sanitation is severely impacting the cost of service provision and operation in certain parts of the country and the overall municipal viability, as well as slowing down delivery.

Sanitation Perspective: Households (Census 2011 STATS SA)



Note: These figures reflect access to infrastructure, not necessarily effective services

3.15 BASIC WATER SERVICES DELIVERY NEEDS

The estimated current (2014) WS needs are reflected below. The magnitude of the sanitation backlog and functionality problem are yet to be verified.

Service Type	Estimated 2014 backlog split (million households)		
Basic Water Supply	2.20	0.68	New service
		1.52	* Infrastructure rehabilitation
Basic Sanitation Provision	4.9		

**Based on difference between infrastructure provided and functional infrastructure.*

Note: The amendment to the definition of a basic water supply will greatly increase the above water backlog.

3.16 FREE BASIC WATER AND SANITATION

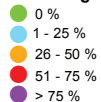
A poor or indigent household is usually defined as one with a monthly income not exceeding the social grant amount, currently R1350 per household per month. Such households, if registered as indigents with their municipalities, may qualify for free basic water, sanitation, solid waste and energy. According to the StatsSA 2013 non-financial census, in 2013, 5.27 million households received FBW and 3.10 million households FBS.

The WS backlogs are spatially depicted on the following two maps.

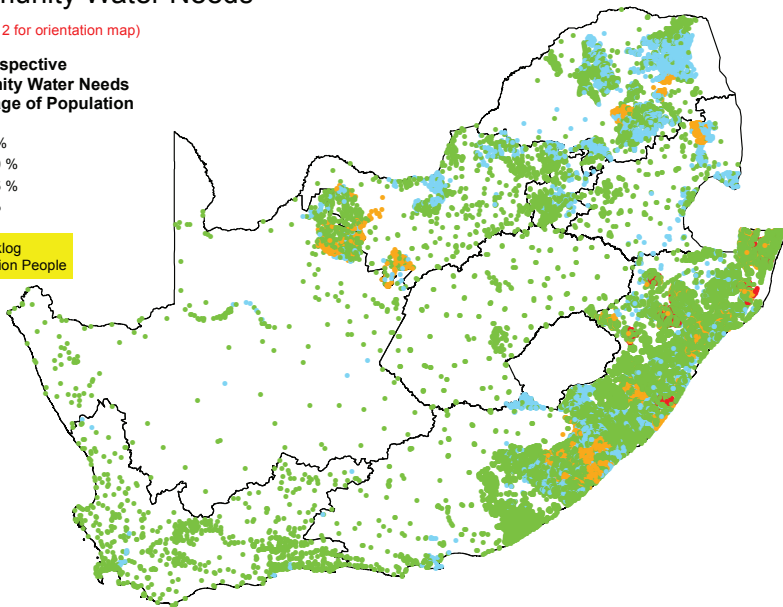
Community Water Needs

(see page 2 for orientation map)

2012 Perspective Community Water Needs Percentage of Population



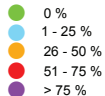
Water Backlog
= 2.74 Million People



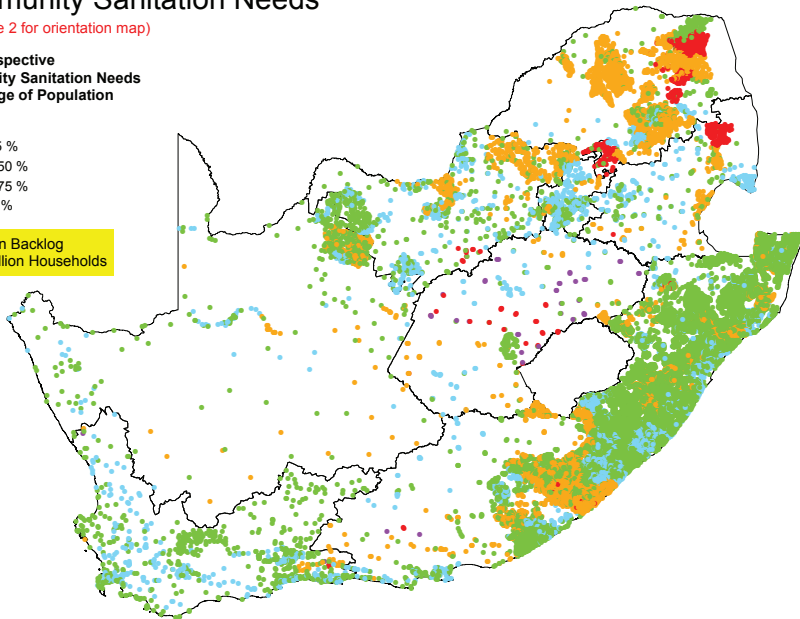
Community Sanitation Needs

(see page 2 for orientation map)

2012 Perspective
Community Sanitation Needs
Percentage of Population



Sanitation Backlog
= 4.5 Million Households



4. KEY DWS WATER SERVICES PERFORMANCE AREAS

4.1 PLANNING

The DWS has developed a GIS based, national geo-database that has detailed information pertaining to demographics, services, infrastructure, operations and maintenance, WC/WDM, finances, socio-economics, water resources, institutional arrangements and customer requirements. This database goes down to community level, covering some 28 000 communities, and in the case of infrastructure to scheme level, covering about 1700 schemes. The database is used by the DWS for master planning and is also available to WSAs to assist them with their planning and WSDP development.

Using the geo-database, the DWS is currently developing nine Provincial Bulk Master Plans, so to gain a national view of regional bulk water requirements. Secondly the DWS has developed backlog eradication strategies for each of the 27 DMs. These strategies are based on a comprehensive evaluation of each DM's situation, including service delivery/backlogs, water resources, infrastructure functionality/condition, and operation and maintenance. In addition, for 11 problematic WSAs, (mainly within the 27 DMs), the DWS is developing comprehensive WS Master Plans. These master plans address the total WS needs and consist of three main sections, namely the current situation and performance, a detailed plan of action for resolving current needs and a detailed plan of action for meeting future needs. The DWS also develops Municipal Priority Action Plans for selected municipalities; (refer to Paragraph 4.5).

In terms of wastewater management, the DWS is developing provincial WWTW Master Plans. Every WWTW is assessed as regards its operating versus required capacity, infrastructure condition and refurbishment/extension requirements etc., so as to get a total needs perspective.

4.2 REGULATION OF WATER SERVICES

As regulator of the WS sector, the DWS monitors the performance of WSAs and where necessary takes action. To do this the DWS utilises a performance measurement system, which assesses 4 performance areas, namely technical efficiency, customer satisfaction, financial viability and institutional effectiveness. Where a formal regulatory programme is not yet in place, WS regulation is supported by other monitoring and assessment initiatives or tools, as indicated in the table below.

KPA	Regulatory Programme	Support Tool
Service quality		Customer surveys, Municipal IQ
Financial viability	Tariff regulation	
Institutional effectiveness		Municipal Strategic Self-assessment
Technical efficiency	Blue, Green and No Drop programmes	

The WS regulator is supported by a compliance monitoring and enforcement unit, the so-called “Blue Scorpions”. This unit focuses exclusively on water related issues. There is some debate as to whether the regulatory function should become independent of the Department. When it comes to environmental issues such as may occur with wastewater spills, the DOEA has an enforcement unit known as the “Green Scorpions”. Together these two units oversee water and wastewater compliance.

4.3 SERVICE QUALITY

Service quality or customer satisfaction is measured through customer surveys and the monitoring of complaints/protests, continuity of supply, affordability and service level indicators. The Municipal IQ is also utilised to monitor satisfaction. The StatsSA General Household Survey of 2013 found that from 2005 to 2013 the percentage of people rating their municipal WS as good fell from 76% to 63%, (slightly up from 2012).

4.4 FINANCIAL VIABILITY

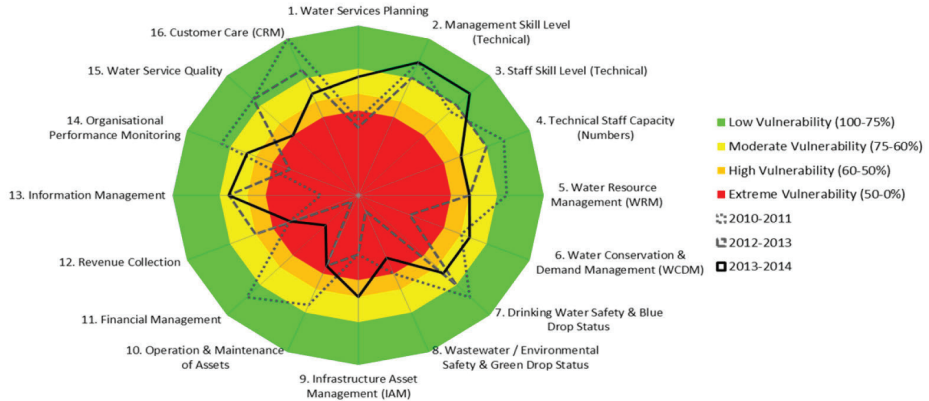
The DWS gathers municipal tariff information and analyses it in terms of the WS tariff regulations. It considers the entire water and sanitation pricing chain. Tariffs should be cost reflective and affordable. Where necessary the DWS can take action. In order to determine and report on the overall financial viability of WSAs, the DWS however utilises the results of the National Treasury monitoring programme.

4.5 INSTITUTIONAL EFFECTIVENESS (MUSSA)

The Municipal Strategic Self-assessment is used to determine the overall business health of a WSA. By identifying key municipal vulnerabilities across a range of business attributes, it allows municipalities to effectively plan and direct their resources and the DWS to provide more focussed support. MUSSA assesses 16 key business health attributes by asking senior municipal officials 5 questions per attribute. Answers provide strategic vulnerability flags. The scores are translated into percentages and a “Spider-Diagram” of the 16 attributes, that presents a municipal WS vulnerability snapshot, created. A typical “Spider-Diagram” is presented on following page.

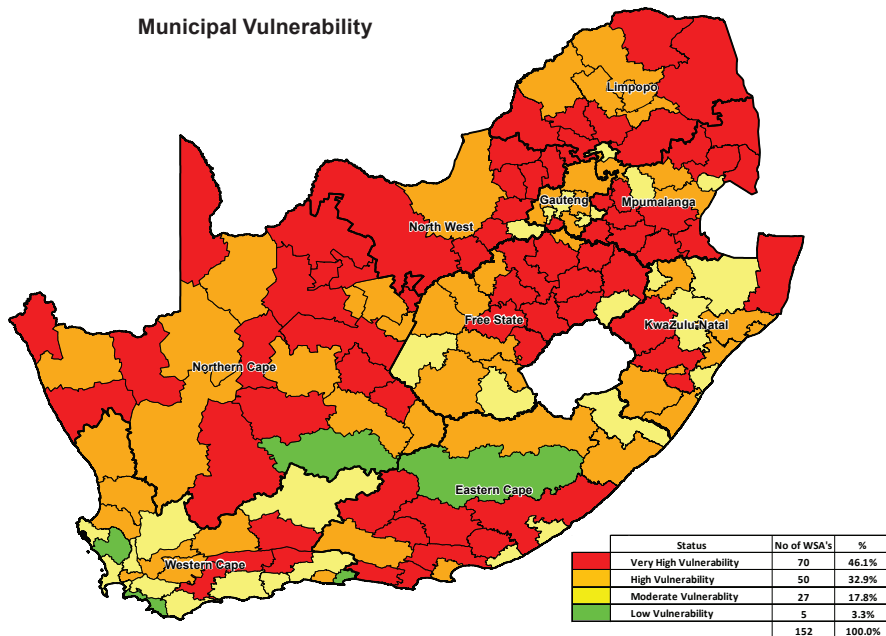
Areas of highest vulnerability (2013)

- Technical staff capacity (numbers)
- Operation & maintenance of assets
- Staff skill levels (technical)
- Wastewater/environmental safety and green drop status
- Revenue collection



All WSAs were assessed in 2013. Only 5% were rated as having a low vulnerability, while 31% had a high vulnerability and 47% were extremely vulnerable. Regular cross-checking with quantitative assessments, (Blue Drop, Green Drop, NRW etc.), has shown a very high correlation. In order to address the identified municipal shortcomings, the DWS develops Municipal Priority Action Plans (MPAPs) for selected municipalities. The key objective of these plans is to guide the WSAs to prioritise actions and allocate budget in accordance with their identified areas of greatest need

Municipal Vulnerability



4.6 WATER QUALITY AND CONSERVATION

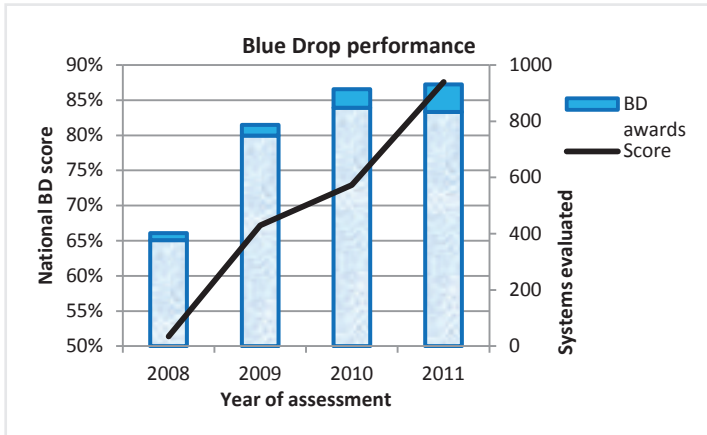
4.6.1 Water treatment works

Drinking water must comply with potable water quality standards as specified in SANS 241 (Class 1). Most water sources require treatment to comply with this drinking water standard. In South Africa there are estimated to be well over 1300 WTWs, mostly owned by WSAs, but also by water boards or privately owned. There are however still rural communities not served by a WTW, who are reliant on groundwater and/or other local water sources. Overall, South Africa's water purification works are operating at close to 80% of their collective capacity.

4.6.2 Drinking water quality compliance (Blue Drop)

Compliance to drinking water standards must address all elements in the water supply system including sampling and testing of water at the treatment works intake and outflow, in distribution pipelines and reservoirs and at the point of use. The DWS has adopted an incentive based risk management approach, the Blue Drop system, whereby all variables are assessed to rate the risk of failure of each works. Works that achieve a certain rating are awarded the prestigious Blue Drop status. Although initially done yearly, the Blue Drop assessment was changed to alternate biannually with the Green Drop assessment (see Paragraph 4.2). During intervening years a less comprehensive progress assessment is done.

Since the Blue Drop inauguration in 2008, there has been a consistent improvement in the overall rating of drinking water quality, with an associated reduction of risk. This is despite the fact that with the phasing in of the programme, requirements are becoming more stringent. This improvement can be clearly seen in the following figure.



The 2012 BD report, found that, (in 2011), Gauteng, W. Cape and KZN were the best performers, (each scored over 90%), with Mpumalanga and N. Cape faring worst at 61% and 68% respectively.

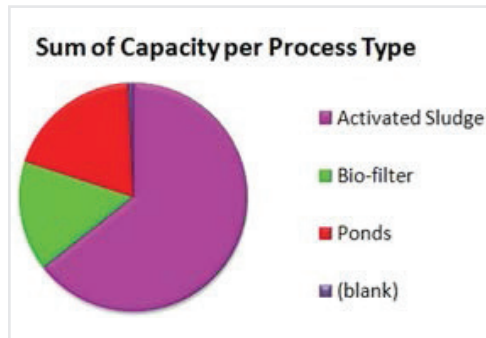
4.6.3 Water conservation (No Drop)

Water conservation and demand management has been identified in the water reconciliation studies as a priority for water resource security. Similarly to the Blue and Green Drop programmes, a No Drop programme has been developed. This incentive based risk management system will evaluate WC/WDM activities and reward excellence. Assessments are currently underway, with results expected in 2015. This will be repeated every 2 years in conjunction with the Blue Drop assessments.

4.7 WASTEWATER QUALITY

4.7.1 Wastewater treatment works

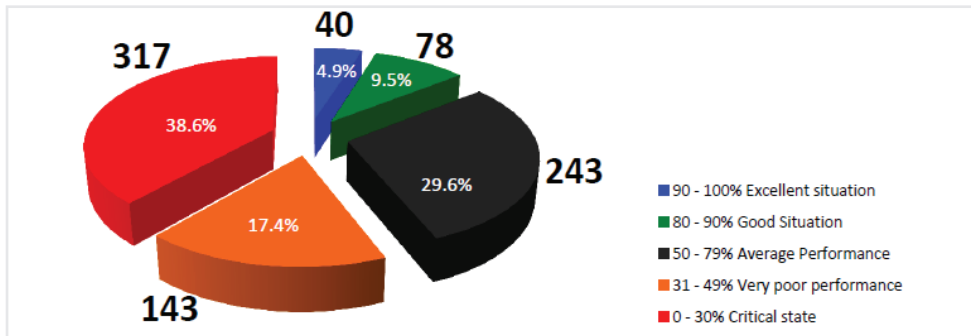
Wastewater treatment is a critical performance area as it impacts directly on human health and on the environment and indirectly on downstream drinking water purification systems. Of the 1363 registered WWTWs, 897 are municipal owned, 393 privately owned and 73 Department of Public Works or Department of Health owned. The breakdown of WWTW capacity per process type is shown in the adjacent figure



4.7.2 Wastewater quality compliance (Green Drop)

DWS issues WWTW licences and regulates WWTWs and effluent releases, through an incentive based, risk management approach, which addresses design and operating capacity of works, compliance of the effluent to agreed standards, and infrastructure management and condition, (i.e. asset management practices). This process, known as the “Green Drop” certification process, assesses the risk of failure of each works. Works that achieve a certain rating are awarded the prestigious Green Drop status. Systems scoring below 30% are awarded a “Purple Drop” and given 30 days in which to provide the DWS with a corrective action plan. These are placed under regulatory surveillance, in accordance the WS Act Sections 62 and 63. GD assessments are done every second year, alternating with BD assessments. During intervening years a less comprehensive progress assessment is done.

The last released Green Drop assessment, the 2011 report, (which provides 2010 data), found that 317 (38%) of the works required urgent attention and that 143 had a high risk of failure, whilst 90% were found to be non-compliant on more than 3 final effluent determinants. The lack of skilled and qualified process controllers and poor asset management were identified as areas needing urgent attention. The assessment breakdown is shown in the figure below. Provincially the W. Cape, KZN and Gauteng performed best, whilst Limpopo and the N. Cape did worst.



Recent assessments indicate that the situation is deteriorating, with a large number of systems being awarded a Purple Drop. This is extremely concerning given that water resources are becoming ever more scarce and as a result pollutants will need to be treated to ever higher standards before discharge. Together, water resource security and wastewater treatment, probably pose the biggest threat to the WS sector.

4.8 NON-REVENUE WATER, WATER LOSSES AND CONSUMPTION

Non-revenue water (NRW), is the term used by the International Water Association (IWA) to represent the volume of water used by a municipality, for which no income is received. It assumes that water billed is paid for and excludes bad debt. The IWA water balance has been modified for the South African situation, (see overleaf).

Municipalities currently use about 4500 million m³/annum, of which 39% is NRW and 36% WL. Average per capita consumption is about 230 litres, high for a water scarce country. Although the %NRW compares well with international norms, there is definite scope for improvement given the high per capita consumption. Halving water losses will mean an annual saving of over R2 billion, excluding the additional income from improved metering and billing, deferred capital costs and electricity savings.

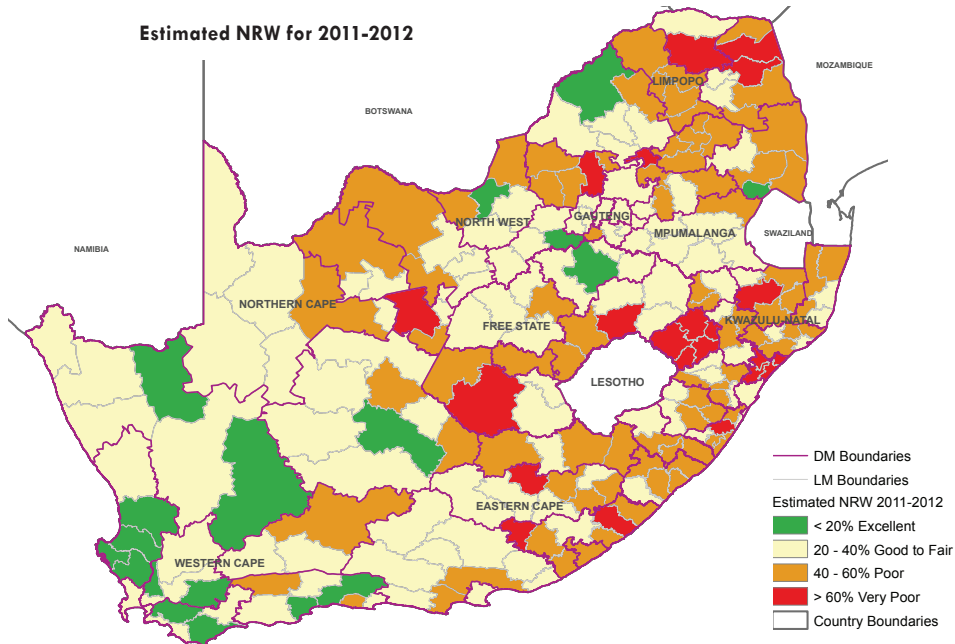
The highest NRW and WLs are found in the smaller, more rural municipalities. Fortunately their impact is not large. Category B4 municipalities only use about 17% of the national volume, whereas metros use about half. However NRW and WL percentages are increasing fastest in the B1 and B2 category municipalities. This is most probably because they still have relatively complex systems, but lack the skills and capacity to manage them. About half of the municipalities cannot, at any given time, provide reliable water balance data, said to be due to a lack of water meters and inadequate skills and capacity. Fortunately, these municipalities account for only about 25% of municipal water consumption. As can be expected data is best in metros, becoming progressively worse in the B1 to B4 municipalities, with the B4 municipalities only being able to provide reliable basic data for a quarter of their water consumption.

The Infrastructure Leakage Index indicates leakage compared to a benchmark likely minimum value. Values range from 1, (best practice), to 10 which indicates that losses are 10 times the benchmark value. South Africa's national average ILI is about 5.3.

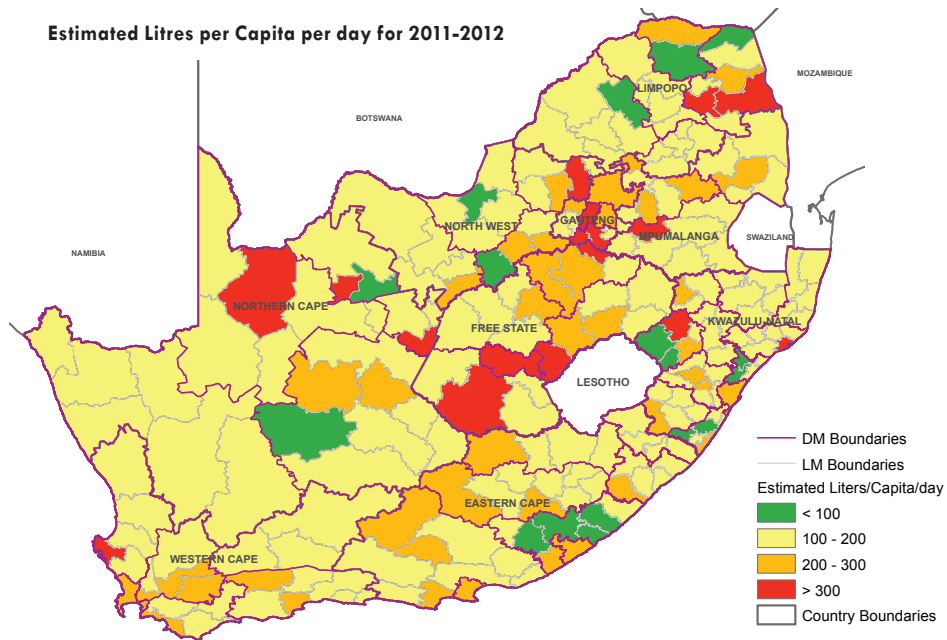
Standard IWA Water Balance (modified for South Africa)

<p>System Input Volume:</p> <ol style="list-style-type: none"> Total water treated and measured at treatment works outlet Total water pumped directly from boreholes into reticulation system Total water purchased from bulk water services provider 	<p>Unaccounted for Water (UAW/UFW)</p>	<p>Authorised Consumption:</p> <ol style="list-style-type: none"> Billed metered water Billed un-metered water Unbilled metered water Unbilled un-metered water 	<p>Billed Metered:</p> <ol style="list-style-type: none"> Water is billed for based on a metered consumption (see further explanatory notes) 	<p>Revenue Water:</p> <ol style="list-style-type: none"> Billed metered Billed un-metered
		<p>Total Losses:</p> <p>Total water not used for legitimate purposes</p> <ol style="list-style-type: none"> Apparent losses Real losses 	<p>Billed Un-metered:</p> <ol style="list-style-type: none"> Water is billed based on a flat rate tariff (ie not based on a meter reading) Free basic water used through unbilled un-metered standpipes or yard connections (see further explanatory notes) 	<p>Non Revenue Water:</p> <ol style="list-style-type: none"> Unbilled metered Unbilled un-metered Apparent losses Real losses
			<p>Unbilled Metered:</p> <ol style="list-style-type: none"> Usually very small in RSA can include government buildings or parks that is metered but not billed. 	
			<p>Unbilled un-metered:</p> <ol style="list-style-type: none"> Estimated water used for legitimate purposes such as fire fighting. Also usage above free basic water for un-metered unbilled standpipes and yard connection usage (see notes) 	
			<p>Apparent Losses:</p> <ol style="list-style-type: none"> Water used through illegal connections Water used but not billed for because of inaccurate meters Water used but not billed for because of data transfer errors, low estimated readings or any administrative errors. 	
		<p>Real Losses</p> <ol style="list-style-type: none"> Water that leaks from the system through pipes and connections or overflows from reservoirs 		

Estimated NRW for 2011-2012



Estimated Litres per Capita per day for 2011-2012



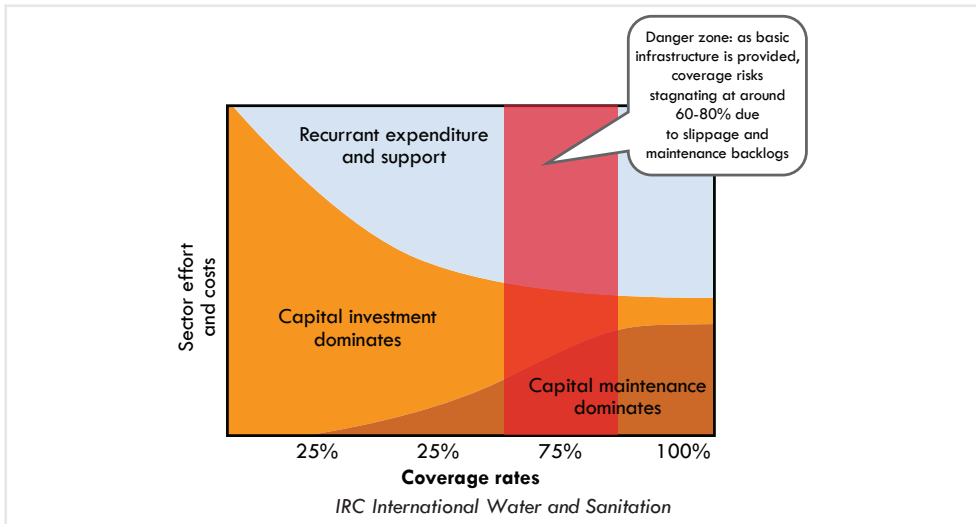
4.9 SCHEME FUNCTIONALITY

Since 1994 the focus of Government has been on the provision of basic WS infrastructure. The effective operation and maintaining of this infrastructure is an essential part of service delivery that has been much neglected. An assessment of 1689 water schemes found that at least 10% were dysfunctional, (lying mainly within the 27 DMs), a further 20 to 24% were experiencing serious water security problems, and 48% needed urgent refurbishment. In the Limpopo and Mpumalanga up to 60% of infrastructure experiences functionality problems. Functionality issues can be ascribed to a number of factors, (as below), mostly related to poor management.

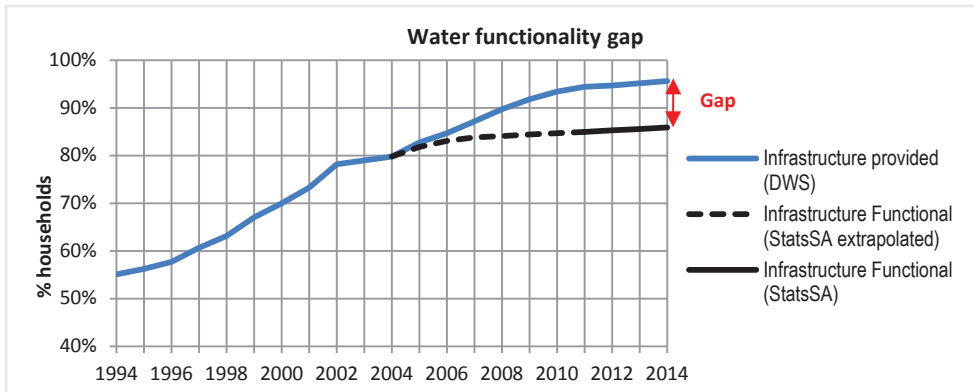
Typical Functionality Problems	
Category	Type of Problem
Governance/ Policy	No enforcement of regulations
	Inadequate bylaws/regulations
	Unsustainable policy/level of services
Institutional	No capacity to manage
	Corruption
Financial	Cost of supply greater than income
	Equitable share less than O&M costs
	No revenue collection
	Tariffs not affordable
Community	Excessive demands
	Non-payment
	Plumbing leakages
	Vandalism/theft and illegal connections
	Inadequate community buy-in
	Inadequate education

Typical Functionality Problems	
Category	Type of Problem
Technical/ Operations	Operational problems
	Condition and age of infrastructure
	Lack of maintenance
	Badly designed infrastructure
	High level of leakages
	Inadequate infrastructure
Water Resources	Insufficient water supply
	Abstraction problems
	Poor management
	Droughts
	Pollution of WR

The functionality problem is typical of developing countries that provide first time coverage by constructing new infrastructure, but fail to maintain the infrastructure or operate it adequately. After several years of rapid growth in coverage a point is reached where this stagnates – basically new systems being brought online are offset by old ones failing. This is illustrated in the figure below.



The burgeoning functionality problem is reflected in the South Africa scenario by the gap that has gradually developed between the DWS, (infrastructure provided), and the StatsSA, (functional infrastructure), delivery figures. This requires urgent attention if further headway is to be made with the reduction of the backlog.



Besides infrastructure functionality, there is also the matter of assurance of supply, or scheme reliability. A scheme may be functional but not reliable. The definition of a basic water supply stipulates that the consumer may not experience interruptions of more than 48 hours, (at any one time), or a cumulative interruption time exceeding 15 days per year. The DWS is required to also report on scheme reliability. When reliability is taken into account, the above % households with a basic water supply drops by a further 20%.

4.10 ASSET MANAGEMENT

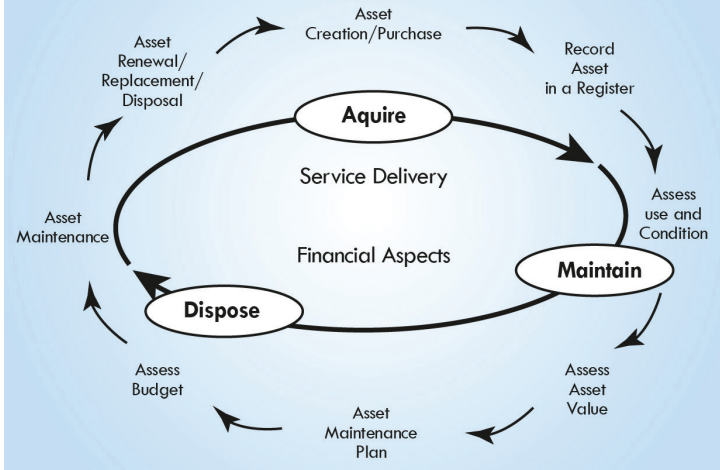
In order to ensure long term effective water services delivery, an asset management approach must be followed when buying or creating an asset, and when maintaining, replacing and disposing of assets in a cost effective manner. This process is depicted in the opposite diagram.

Looking after WS infrastructure is just as important as building new infrastructure for future demands. In terms of the WS Act it is a legal requirement for every WSA to have an asset management plan. WSAs must protect their assets by ensuring that an appropriate maintenance and rehabilitation plan is developed and implemented. Unfortunately a number of WSAs do not budget sufficiently for asset maintenance and replacement. Expensive refurbishment becomes necessary and then there is less money for ongoing maintenance. Deteriorating infrastructure also leads to poor service delivery and reduced levels of payment by consumers due to dissatisfaction, exacerbating lack of cost recovery. The DWS has developed an infrastructure asset management strategy, tools and processes to assist WSAs ensure that their assets are properly managed and maintained.

4.11 BACK TO BASICS PROGRAMME

In 2014 the DCOG announced its “Back to Basics” programme. A recent review of all municipalities revealed that 31% were dysfunctional, with endemic corruption, dysfunctional councils, no structured community engagement and poor financial management, leading to poor service delivery. Whilst not ignoring the other municipalities, this programme’s first priority is to get these municipalities out of a dysfunctional state and able to perform their basic functions. This will be done, (at all three levels of government), through enforcing policies and legislation, managing performance and accountability, and enforcement. Minimum performance requirements include proper council functioning and the provision of basic services. The basic building blocks are good governance, public participation, financial management, infrastructure provision and maintenance, and adequate institution capacity.

The Asset Management Cycle



5. WATER SERVICES FINANCES

5.1 SECTOR INVESTMENT

The 2014 replacement value of all water supply and sanitation infrastructure and associated services is estimated to be R1220 billion. The National Investment Framework for the Water Sector (2012) set out the 2011 investment requirements for existing and new water resources and WS infrastructure. In deriving these needs it assumed that:

- Basic infrastructure backlogs had to be eradicated by 2014;
- Eradication of the refurbishment backlogs would take place over 4 years; and
- Implementation of large water resource projects take on average 10 years.

Note: As the 2014 target could not be met the 2012 Framework document is currently being revised.

The 2012 Investment Framework found that the annual total investment required, (including essential WC/WDM initiatives), was R67billion/annum, as shown in the adjacent table.

Note: The amendment to the definition of a basic water supply will greatly increase these financial requirements.

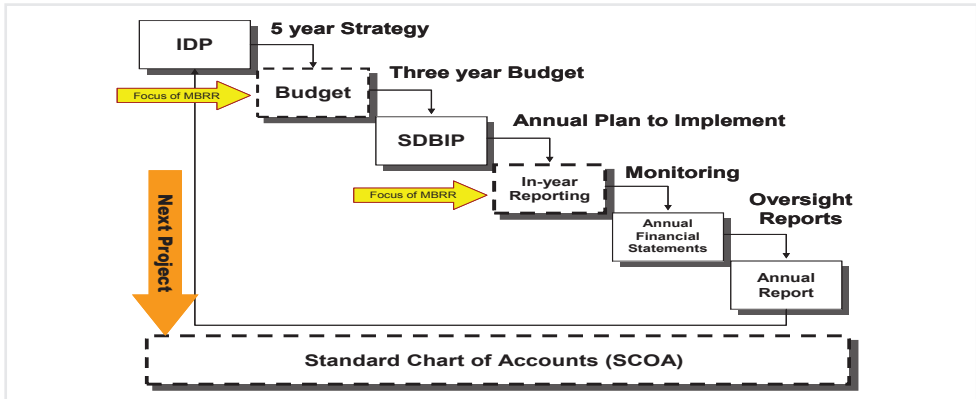
R billion 2021		New	Upgrade	Rehab	Total
Sanitation		90		51	141
Water	Water supply (potable)				
	Internal	27	4	40	71
	Connector	27		43	70
	Local bulk	30		22	52
	Regional bulk	45		34	79
	Non-potable distribution	10		32	42
	Water resources	149		64	213
TOTAL		378	4	287	668

Increasing the implementation timeframe for backlog eradication from 4 years to 8 for refurbishments and basic services backlogs and from 10 to 15 years for water resources and bulk infrastructure, reduced the annual need from R67 billion/annum to R47 billion/annum. After eradication of all backlogs, (regional bulk and internal reticulation), the annual requirements reduced to about R30 billion/annum.

Clearly a large amount of infrastructure investment is required over the short term. Current provisions fall far short of actual requirements. Total government grant funding for 2011/12 amounted to R33 billion, R34 billion less than the required R67 billion. Current municipal budgets cannot meet this shortfall. Considering the nature and extent of capital required, it is inevitable that some of the financial requirements will have to be met with loan funding and that most of the economic developments will have to be co-funded by beneficiaries. The biggest concern is with municipalities who lack the necessary revenue streams to co-fund their current obligations. Improved financial management at municipal level is thus also key to successful implementation of the investment framework.

5.2 STANDARD CHART OF ACCOUNTS/BUDGETING PROCESS

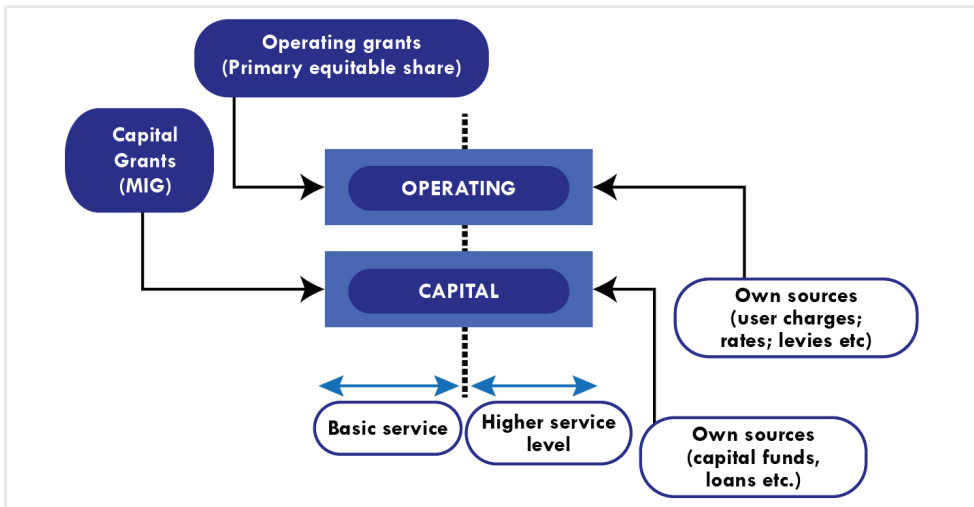
National Treasury is rolling out the municipal Standard Chart of Accounts (SCOA), to all municipalities by July 2015. This will in future ensure consistent municipal financial reporting and enforce better financial planning over a multi-year period, to ensure that professional services are acquired in time in order to free the supply chain management blockages and increase spending. The municipal accountability and planning cycle is shown schematically on following page.



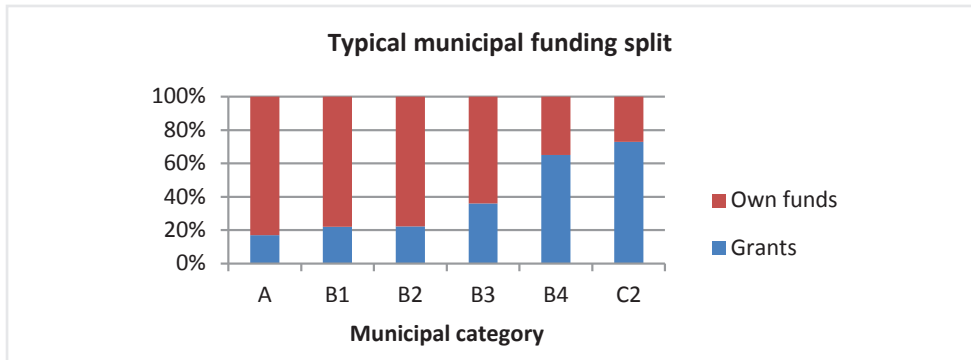
The SCOA underpins the municipal Integrated Development Planning process. The IDP sets out a municipality's high level plans; (the WSDP gives more WS detail). Budgets are allocated to a Service Delivery and Budget Implementation Plan (SDBIP), aligned with the IDP, and progress is reported in their annual financial statements presented in annual reports, sent to the National Treasury and Auditor General's office. The SDBIP, prescribed by the Municipal Finance Management Act, is thus the yardstick against which municipal performance can be measured.

5.3 MUNICIPAL FUNDING

Municipal funding comes either from government grants/subsidies or own revenue, raised as indicated below. In 2011/12 the overall revenue split was 68% own income and 32% grants. By 2013/14 this had improved to 73% own income and 27% grants.



This revenue split however varies tremendously between the different municipal categories as shown below. The WS function is an important municipal function, accounting for about 11% of the total municipal budget.



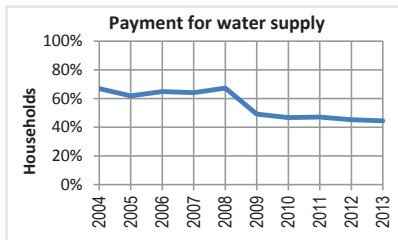
The Division of Revenue Act, revised annually, sets out the various government grants to municipalities, (as well as provincial and national government). Municipalities consistently underspend. In 2011/12 there was a 12% under-spending on *conditional grants. This has however subsequently improved. The biggest and most persistent under-expenditure is to be found in the rural municipalities, especially within the 27 DMs, where the biggest service backlogs exist.

**Conditional grants are grants that can only be utilized for a prescribed purpose, whereas with unconditional grants, municipalities have autonomy as to its use, even if there are recommended usage guidelines.*

5.3.1 Operational revenue and expenditure

Municipal own revenue comes mainly from payment for services. Unfortunately StatsSA reports that the increase in the percentage households with access to water has coincided with a decline in the percentage households who paid for it, dropping from 66.9% in 2004 to only 44.5% in 2013. This negatively impacts municipal financial viability.

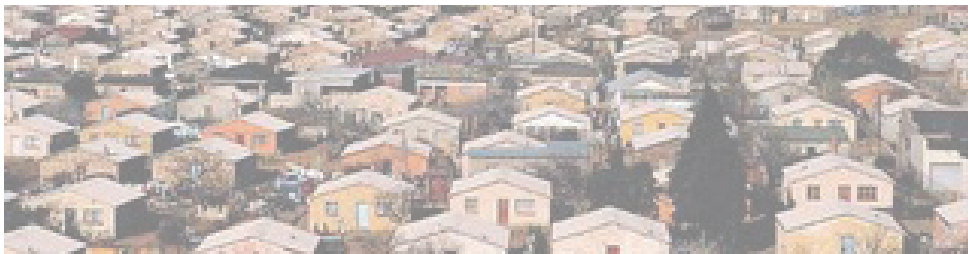
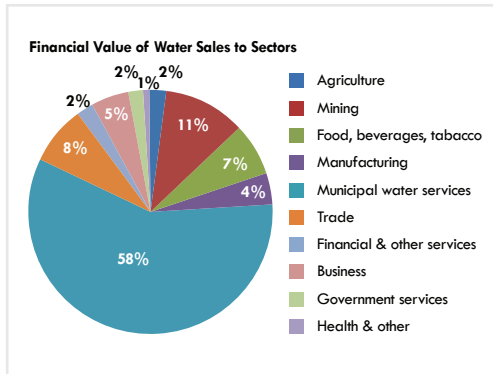
According to the StatsSA 2011 GHS analysis of domestic water consumers, reasons for non-payment, (excluding FBW), were as below.



Non-payment reasons	WC	EC	NC	FS	KZN	NW	GP	MP	LP	RSA	
Councillor says don't pay	6.9%	22.4%	43.9%	15.0%	43.7%	28.6%	8.5%	3.6%	39.4%	24%	Within municipal control
No/non-functional meter	27.8%	16.5%	3.7%	24.3%	29.9%	15.7%	20.5%	43.8%	36.8%	28%	
No bill received	18.8%	15.2%	16.3%	13.6%	8.3%	22.3%	10.5%	24.9%	14.1%	14%	
Sub-total	53.5%	54.0%	63.9%	52.9%	81.9%	66.5%	39.4%	72.3%	90.3%	66%	
Can't afford	18.6%	24.5%	7.7%	7.1%	10.8%	12.8%	22.0%	13.8%	7.8%	14%	Beyond municipal control?
Other	27.8%	21.5%	28.4%	40.0%	7.3%	20.7%	38.5%	13.8%	1.9%	20%	
Sub-total	46.5%	46.0%	36.1%	47.1%	18.1%	33.5%	60.6%	27.7%	9.7%	34%	

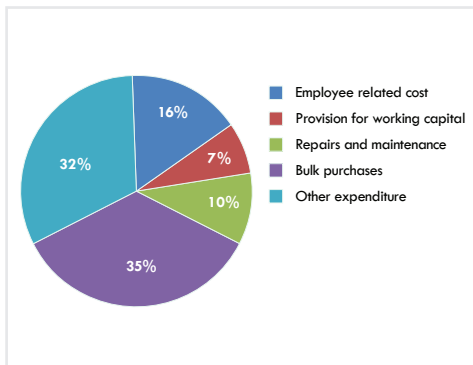
The potential for improved payment is particularly high in Limpopo and KZN. Nationally only 14% say their water is unaffordable.

Municipal revenue from the sale of water and sanitation in 2013/14 was R25.5 billion and 8.1 billion respectively. The distribution of this value amongst water users is shown in the adjacent pie chart. Of the municipal sales, about 62% typically comes from domestic residential use and 38% from commercial and industrial use.



The primary operating municipal grant, the equitable share, is an unconditional grant intended for the operation and maintenance of infrastructure and the provision of basic and free basic services. Roughly 22% of the grant is intended for water and 18% for sanitation. The estimated grant amounts for water and sanitation are shown in the adjacent table. As an unconditional grant, municipalities have autonomy over the use of this grant and unfortunately do not always utilize it as intended, namely for basic service provision.

Equitable share for water and sanitation			
R billion	2013/14	2014/15	2015/16
Water	8.75	9.79	11.05
Sanitation	7.16	8.01	9.04
Water + Sanitation	15.91	17.80	20.09



The WS Operating Subsidy grant is to subsidize, refurbish and restore the functionality of WS schemes previously owned and/or operated by the DWS or other agencies on behalf of it. The 2014/15 allocation is R450 million.

In 2012/13 municipalities budgeted R27bn and R10bn for water and sanitation operations respectively. The average O&M cost per kiloliter of water supplied in 2013 was estimated to be R8.69 for potable water and R2.97 for non-potable. A typical breakdown of operating costs is shown in the pie chart. Average operating costs for water supply are about 13% of municipal OPEX, and sanitation 4%. Trends show an insufficient increase in repairs and maintenance, a direct cause of the functionality problem.

5.3.2 Capital revenue and expenditure

Municipal capital revenue from own funds comes largely from internal income and external loans. However the smaller, less financially stable municipalities are often unable to access loans due to their high risk profile. Given the persistent, often significant funding shortfall, this is of concern.

There are six main water services related capital grants. In total, direct infrastructure transfers to local government in 2013/14 amounted to R34 billion.

- The largest capital grant is the Municipal Infrastructure Grant (MIG), which funds a basic or social level of infrastructure. This conditional grant is managed by the DCOG. 54% of it is intended for water and sanitation and is given directly to municipalities. The MIG allocation formula was recently amended in favour of the smaller, less capacitated, mainly rural municipalities.

MIG water and sanitation allocations (R billion)		
2013/14	2014/15	2015/16
7.77	8.20	8.82

- The rapid increase in WS infrastructure provision at municipal level necessitated the need for more regional bulk water schemes. The Regional Bulk Infrastructure Grant (RBIG) programme of the DWS was established in 2007 to support capital funding of the social component of new bulk infrastructure. All projects must have a feasibility study and be implementation ready before funds are released for implementation. This grant is managed by DWS. The above table sets out the regional bulk funding allocations.

R BIG allocations (R billion)		
2013/14	2014/15	2015/16
3.26	3.99	4.22

- The Accelerated Community Infrastructure Grant programme ended in 2013/14.

- The Municipal Water Infrastructure grant (MWIG) assists WSAs to provide a basic water supply to consumers without, through the facilitation, planning, acceleration and implementation of projects, via the DWS' Interim Water Supply Programme, (see 3.8). The programme will address functionality related problems as well as new infrastructure requirements and will initially focus on the 27 DMs. A target date of 30 June 2015 has been set. To qualify, projects must be in the municipal IDP and WSDP and the municipality must enter into a formal agreement with DWS. A technical team comprising the DWS, the DCOG, Water Boards, the WSA and the Municipal Infrastructure Support Agency must approve all projects where the cost is above R20 million.
- The Human Settlements Development Grant, administered by the DOHS is for the creation of sustainable human settlements through the facilitation and provision of access to basic infrastructure, top structures and basic socio-economic amenities. The 2014/15 allocation is R17.1 billion.
- The Urban Settlements Development Grant, administered by the DOHS, supplements the metros' capital to support the development of human settlements for the poor. The 2014/15 allocation is R10.3 billion.
- The Rural Households Infrastructure Grant, (RHIG), administered by the DOHS, provides capital funding for the reduction of rural sanitation backlogs and to target existing households where bulk-dependent services are not viable. The 2014/15 allocation is R51 million.

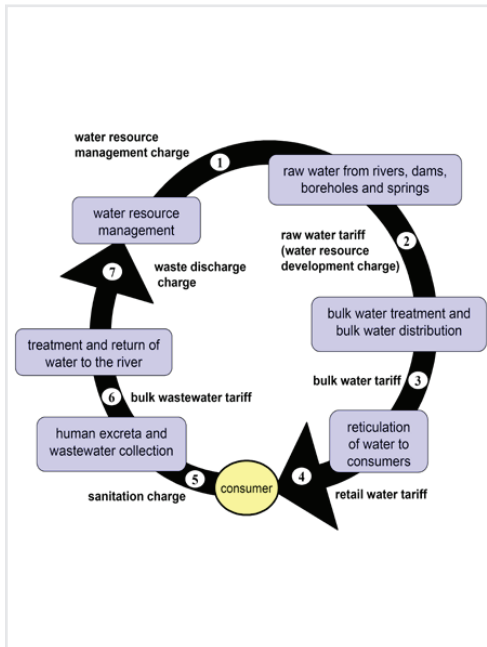
MWIG allocations (R billion)		
2013/14	2014/15	2015/16
0.40	0.53	1.38

In 2012/13 municipalities budgeted R8.5 billion and R5.4 billion for water and sanitation infrastructure respectively. Under-expenditure on infrastructure grants is about 15%, and highest in the less capacitated, more rural municipalities. Lack of capacity and skills combined with supply chain management challenges are often blamed for this.

5.3.3 Tariffs

To sustain water and sanitation services it is essential to recover costs, thus cost reflective tariffs and payment for services are essential. Tariffs must however be affordable and cater for the indigent. The latter is achieved through the FBW and FBS policies. FBW is most often applied through the use of a rising block tariff, with the first block being set at a zero tariff. An effective payment mechanism must also ensure water is used effectively and sparingly. Unfortunately in most municipalities, water services tariffs are not cost reflective and the service runs at a loss. Thus in future many municipalities will have to increase tariffs substantially. The WS pricing chain is depicted here.

DWS monitors all tariffs along the water provisioning cycle annually, including water management charges, raw water tariffs, water board tariffs and municipal tariffs for domestic, commercial and industrial users. This indicates that the real value of water is not fully reflected in the tariffs and that it can be expected that the cost of WS will increase when water resources become limited and/or water quality deteriorates.



Tariff/charge	Responsibility for setting tariff and source of authority
Water resource management charge.	CMA in terms of National Water Act. DWS if there is no CMA.
Raw water tariff (WR development charge- recovers infrastructure and operating costs of schemes).	DWS in terms of the Water Act and the National Raw Water Pricing Strategy and in consultation with water users including local government.
Bulk water and wastewater tariffs in order to recover cost of conveying and treating bulk water and wastewater.	Negotiation between WB and WSA or its appointed provider. WSA where it undertakes function itself. Consultation between WSA and external provider of service.
Retail water tariff and sanitation charge, (includes bulk water and wastewater tariff).	WSA in terms of the WS Act and Municipal Systems Act. Regulated by WSA (subject to DWA oversight). DWS sets national norms and standards for setting of retail tariffs.
Waste discharge tariff. (A water resource charge based on “polluter pays” principle).	CMA in terms of National Water Act, in consultation with water users including local government. DWS where there is no CMA.

a) Raw Water Tariffs

The raw water charge is made up of a resource management charge, a Water Research Commission levy, consumptive charges and a Trans Caledon Tunnel Authority levy to users benefitting from the Lesotho Highlands Water Project. In 2012/13 raw water tariffs increased on average by 7%.

b) Bulk Water Tariffs

For Water Boards, the average 2012/13 bulk potable water tariff is currently R5.59 per m³. This cost varies widely from R3.41 to R12.47 per m³ subject to the availability of water, the distance of distribution and raw water quality. On average in 2012/13 bulk water tariffs increased by 5%.

c) **Municipal Water Tariffs**

All WSAs are required by legislation (WS Act and MFMA) to establish tariff policies and set tariffs annually. The tariffs must take into account the operational costs, capital repayments, refurbishment and asset management needs. The DWS monitors and reviews the municipal water and sanitation tariffs, annually and takes the necessary regulatory action where service increases are inappropriate and not in support of national objectives.

Municipalities use a rising block tariff for water. In 2012/13 municipal water tariffs increased by 15 to 40%. High tariff increases were noted in the lower basic services component (e.g. block-1) and around 15% for the high-end water users. Above-average increases were mainly due to the steep rise in electricity tariffs and the cost of water treatment.

There are three types of municipal water tariffs, namely residential, commercial and industrial. In general residential tariffs are less than commercial and industrial tariffs up to about 60 kl/month, after which they equalise. The highest domestic water tariffs are in Gauteng and the W. Cape, primarily due to the high cost of inter-basin transfers. The W. Cape has a steep rise in their block tariffs to force water users to reduce wastage. Lower tariffs are associated with poorer areas, such as the E. Cape, Limpopo, Mpumalanga, N. West and N. Cape provinces. Rural tariffs are less than urban tariffs and generally flatter as there is less opportunity to cross-subsidize from affluent customers.

d) **Municipal Sanitation Tariffs**

For sanitation, municipalities resort to a number of different tariff models. Examples are rate per toilet type, per stand, a flat rate and per metered volume of effluent. Sanitation tariffs vary widely according to the service type, but on average increased in 2012/13 by about 10%, with a higher increase of about 19% for waterborne sanitation.

Average domestic water and sanitation tariffs are shown in the following table.

Tariff	Component	Amount	Average 2012/13 tariff
Raw Water	Water Resource Management Charge	R0.026 per kl	R 1.62per kl
	Water Research Fund Levy	R0.046 per kl	
	Water Resource Infrastructure Charge	R1.55 per kl	
Bulk Water		0 to 6 kl	R5.72 per kl
Municipal Water	Domestic	0 to 6 kl	R3.87 per kl
		6 to 20 kl	R7.88 per kl
		20 to 60 kl	R10.44 per kl
		Over 60 kl	R12.65 per kl
	Commercial	0 to 6 kl	R8.76 per kl
		6 to 20 kl	R9.26 per kl
		20 to 60 kl	R10.18 per kl
		Over 60 kl	R11.27 per kl
	Industrial	0 to 6 kl	R10.11 per kl
		6 to 20 kl	R10.46 per kl
		20 to 60 kl	R10.85 per kl
		Over 60 kl	R11.32 per kl
Municipal Sanitation			R110 per month

Note: 1 kl = 1 m³

e) **Bulk Wastewater Tariffs**

DWS has a Waste Discharge Charge System in place. This is based on the “polluter pays” principle, made up of the following four components:

- Basic charge: independent of pollution level based on volume of discharges
- Load-based charge: proportional charge per waste load
- Deterrent charge: progressive charge per waste load
- Rebates: for better quality than abstracted

6. ACHIEVEMENTS

Since 1994, DWS has embarked on an ambitious program to eradicate backlogs in water supply and sanitation, underpinned by the development of sound sector policy and legislation. The WS Act was promulgated in 1994, and defined the role of the DWS as regulator, the role of Water Boards as bulk providers and the role of municipalities as service providers, while the National Water Act of 1998, redefined water rights in SA and established a new framework to mandate and regulate water resources.

Initially, the water and sanitation delivery programme was driven by the DWS. In 2003 responsibility for service provision was transferred to local government, bringing with it the need to support and build capacity at this level. The Strategic Framework for Water Services was published to guide Water Service Authorities in carrying out their service provision role. In 2010 DWS's emphasis moved from support to regulation. The National Water Services Regulation Strategy was adopted and the Blue and Green Drop incentive based regulatory processes were conceived. These have been implemented with a particularly visible improvement in drinking water quality. Much has been done to assist local government to effectively deliver on its mandate, especially from a planning perspective, where WS Master Plans have been drafted for a large number of struggling municipalities.

Since 1994 no less than 8.6 million households have benefitted from a basic supply of water. Similarly about 6.5 million households have received at least a basic level of sanitation. The DWS has met and exceeded the MDG targets and has also developed and implemented the Free Basic Water and Sanitation Policies that ensure that the poor are not denied access to water or sanitation due to financial constraints.

DWS has continued to successfully manage the country's water resources and in 2004 published a National Water Resource Strategy. More recently the DWS carried out its Reconciliation All Towns Studies where the water resources were studied, compared to future requirements and reconciliation strategies developed for implementation. The DWS revised its National Water Resource Strategy in 2013 and is also amending/ amalgamating the Water Services and National Water Acts into a single Act.

7. CHALLENGES

To ensure a sustainable supply of water into the future, a number of challenges must be met.

- No surplus water is available and what there is, is unevenly distributed. 28% of towns already have inadequate water, and climate change will worsen this. Water consumption is too high and there is poor water use efficiency and little WC/WDM implementation.
- Due to scarcity of water, pollutants will need to be treated to ever higher standards before discharge; however wastewater treatment works are generally in a poor condition, deteriorating and many are over their capacity. Acid mine drainage adds to the pollution problem.
- The remaining backlogs are generally in remote, difficult to service areas, with high associated costs.
- Many municipalities are just not able to run a successful water services business. Their water tariffs are often not cost reflective and the service runs at a loss.

- The current funding levels are inadequate to meet the sector's financial requirements. Under-expenditure, especially of grants, worsens the situation.
- Municipalities lack skills and capacity, especially technical. High staff turnover is problematic. A 2011 study found that although 72% of posts were filled, only 51% were budgeted for; furthermore half of technical managers were under-qualified. Research has found that civil engineering capacity, (expressed as civil engineering professionals per 100 000 people), in local government is too low to deliver, operate and maintain local government infrastructure in a sustainable manner; (pre 1994 South Africa had 20 engineers per 100 000 people). This has now dropped to 3 per 100 000.
- An infrastructure focused approach, where lifecycle costing is not done during planning and design of schemes, leads to high O&M costs. This contributes to the lack of infrastructure asset management and collapse of schemes, the so-called functionality problem, which effectively increases the service backlog.
- Inappropriate, unsustainable higher levels of service are often provided for short term political gain. This leads to the leakage of basic services funding to higher levels of service.
- Growth in number of HHs and influx of illegal immigrants to informal settlements adds to the service backlog.
- The growing number of informal settlements, especially in the North West Province, is problematic.
- Migration to urban areas, and specifically Gauteng, will shift service provision needs.
- Delegated responsibilities for water services to a number of bodies such as the DWS, DCOG, DHS and WSAs has led to a fragmented approach to service delivery.
- Effective monitoring of backlogs and delivery is problematic. The MIG Management Information System (run by the DCOG), is not able to provide the required information. Estimates have thus to be based on Stats SA information and grant allocations.
- Increasing the basic level of service of a water supply to "in yard" will increase the backlog and funding needs.

8. STRATEGIC IMPLICATIONS

- High unemployment with low economic growth rate indicates an increased potential for social unrest, which could affect service delivery and increase the incidence of protests. Job creation is thus very important.
- The high household growth rate, (relative to the population growth rate), inflates delivery needs. The influx of illegal immigrants is likely to continue, as is the migration to urban areas. Service provision needs will shift to urban areas, where it is fortunately usually easier and more cost effective to provide services.
- Unless housing provision is accelerated, informal settlements, with their own challenges, will continue to grow.
- Water will become scarcer, particularly with climate change. The latter will increase storage requirements, yet there are limited suitable dam sites and opportunities for further water transfer schemes.
- Lack of appreciation of the value of water is partially due to low tariffs which are not cost reflective. This, together with poor O&M and lack of metering, contributes to wastage, high consumption, high NRW and financial loss. If not addressed this will continue to threaten municipal viability.
- Lifecycle costing minimises scheme lifetime costs. Should an infrastructure focused approach continue, this will lead to higher than necessary O&M costs, scheme non-functionality and an increase in the service backlog.
- Many WWTWs operate above capacity, are in poor condition and deteriorating due to inadequately trained operators and a lack of maintenance. Growing water scarcity will mean that effluent discharge standards become more important.
- Funding will remain inadequate unless municipalities generate more own revenue through better financial management.
- Lack of municipal capacity, especially technical, will reduce their capacity to provide sustainable services.
- Services in some areas, (in particular the 27 DMs), will most likely continue to be problematic.
- Unreliable information, which leads to bad planning, will continue unless the current fragmented monitoring problem is addressed.

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