7

Water and sanitation

Introduction

Water is fundamental to life, the environment, food production, hygiene and power generation

Water is probably the most fundamental and indispensable of natural resources – fundamental to life, the environment, food production, hygiene and power generation. Prosperity for South Africa depends on the sound management and use of many resources, of which water is a crucial one.

The nation gains directly from improved access to basic water and sanitation services through improved health, averted health care costs and time saved. Poverty reduction and improved water management are inextricably linked.

Water-related diseases are among the most common causes of illness and death among children below the age of five, affecting mainly the poor in developing countries. In South Africa, the recent outbreaks of cholera and typhoid in Eastern Cape, Gauteng and KwaZulu-Natal due to water contamination have emphasised the need for prioritising sanitation, which falls under the municipal water services function.

This chapter gives an overview of:

- the composition of the water sector in South Africa
- the management of water resources
- the institutional arrangements in the water services sector
- access to water and sanitation
- municipal and municipal entity budgets
- factors influencing the efficient provision of the water services function.

Composition of the water sector

There are three fundamental objectives for managing South Africa's water that are firmly grounded in the provisions of the Bill of Rights of the Constitution. These are, to achieve:

- equitable access to water and to the benefits from the use of water resources
- sustainable use of water by making progressive adjustments to water use with the objective of striking a balance between water availability and legitimate water requirements and by implementing measures to protect water resources
- efficient and effective water use for optimum social and economic benefit.

The water sector in South Africa is classified into two main sub-sectors - water resources management and water provision. Water resources management focuses on the protection, optimal utilisation, development, conservation, management and control of the country's water resources in a sustainable and equitable manner for the benefit of all people. Water services management focuses on the provision of adequate, sustainable, viable, safe, appropriate and affordable water and sanitation services to all people in South Africa. Water services include education on the wise use of water and the safe practice of sanitation.

Management of water resources

The management of water resources is an exclusive national competency

In terms of the Constitution of the Republic of South Africa, the management of water resources is an exclusive national competency and in terms of the National Water Act (1998) it falls within the portfolio of the Minister of Water Affairs and Forestry.

Although renewable, water is also a finite resource. Water sources include rivers, streams, groundwater and rainfall. These water sources are captured or contained into dams (South Africa has 358 state dams and many thousands of smaller farm and private dams) and from there the water is taken to water treatment plants for purification.

South Africa is a semi-arid country with only around half the average rainfall of other countries

South Africa is a semi-arid country that receives an average rainfall of 450 mm per annum, which is well below the world average of 860 mm per annum. Rainfall is also not evenly distributed across the country, with some regions in the west receiving less than 100 mm per annum of rainfall while some regions in the east receive over 1 000 mm per annum. In global terms, South Africa's water resources are scarce and extremely limited. The country does not have any truly large rivers and the combined flow of all the rivers amounts to approximately 49 000 million m^3 per annum, less than half of that of the Zambezi River, by world standards the closest large river to South Africa. Four of South Africa's main rivers are shared with other countries. These are the Limpopo, Inkomati, Pongola (Maputo) and Orange (Senqu) rivers.

Due to the uneven distribution of rainfall, the natural availability of water across the country is also highly uneven and further compounded by the strongly seasonal and erratic nature of rainfall. In areas where the average rainfall is low, dry periods with no rainfall at all can last up to eight months, which means that there will be no open flow in the rivers and streams for many months. Groundwater therefore plays a pivotal role in water supplies, especially in rural areas. Because of the predominantly hard rock nature of the South African geology, however, only about 20 per cent of groundwater can be used on a large scale.

South Arica has been divided into 19 catchment-based water management areas

To facilitate the management of water resources, the country has been divided into 19 catchment-based water management areas. The interlinking of catchments gives effect to one of the main principles of the National Water Act (1998) which designates water as a national resource. This act makes provision for the progressive establishment of the catchment management agencies for delegating water resource management to regional or catchment level agencies and for involving local communities in decision-making. Five catchment areas have already been established: the Inkomati (Mpumalanga), Thukela and Usutu-Mhlathuze (KwaZulu-Natal), Gouritz (Western Cape) and Olifants-Doorn (Western Cape). Work is currently being undertaken by the Department of Water Affairs and Forestry to oversee the progressive rollout of the remainder of the catchment areas, which will include a review of the appropriate number of catchment areas to be established. The role of the catchment management agencies includes the equitable allocation of water resources to prospective water users, including domestic users, agriculture, commerce and industry and the environment.

Table 7.1 Reconciliation of requirements for and availability of water for the year 2025

Water management area m^3/annum	Reliable local yield	Transfers in	Local requirements	Transfers out	Balance
Limpopo	281	18	347	–	-48
Luvuvhu/Letaba	404	–	349	13	42
Crocodile West & Marico	846	727	1 438	10	125
Olifants	630	210	1 075	7	-242
Inkomati	1 028	–	914	311	-197
Usutu to Mhlathuze	1 113	40	728	114	311
Thukela	742	–	347	506	-111
Upper Vaal	1 229	1 630	1 269	1 632	-42
Middle Vaal	55	838	381	503	9
Lower Vaal	127	571	641	–	57
Mvoti to Umzimkulu	555	34	1 012	–	-423
Mzimvubu to Keiskamma	872	–	413	–	459
Upper Orange	4 734	2	1 059	3 589	88
Lower Orange	-956	2 082	1 079	54	-7
Fish to Tsitsikamma	456	603	988	–	71
Gouritz	278	–	353	1	-76
Olifants/Doring	335	3	370	–	-32
Breede	869	1	638	196	36
Berg	568	194	829	–	-67

Source: Department of Water Affairs and Forestry, National Water Resource Strategy, First Edition, September 2004

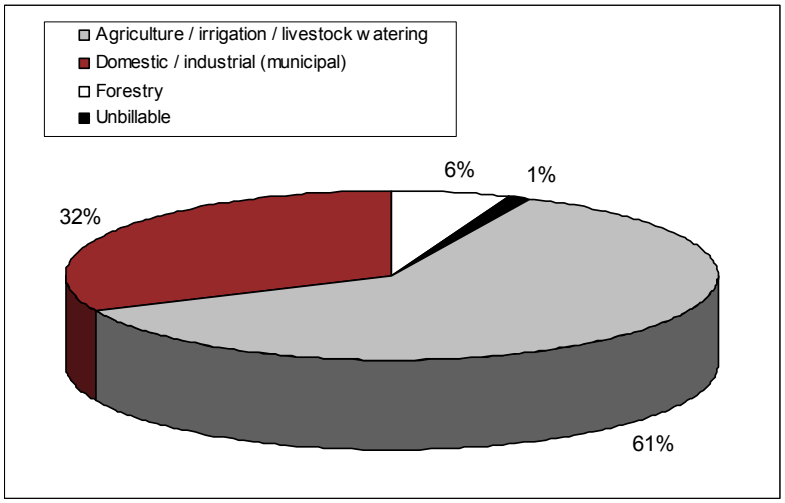
Trends in demand for water

Like electricity, water plays an important role in supporting economic growth in the country. Statistics South Africa reported that the water industry, made up predominantly by the water boards and other national agencies, contributed about R6.4 billion to the country's annual gross domestic product (GDP) in 2006. This accounted for an average of 0.4 per cent of GDP.

Table 7.1 gives a perspective on the possible future requirements for water for the year 2025 and the water that will potentially be available. It also highlights the regional differences in terms of water resources in the country, with more than half the water management areas showing a deficit in terms of water requirements.

Demand for water is dominated by agriculture, specifically irrigation and livestock watering, which in 2006/07 used 10.6 billion m^3 (61 per cent) of the total of 17.2 billion m^3 water used by all users in the country. Agriculture was followed by domestic and industrial customers (32 per cent), forestry (6 per cent) and 206.4 million m^3 (or 1 per cent) is unbillable as illustrated in figure 7.1.

Figure 7.1 Total use of water by sector, 2006/07



Source: Department of Water Affairs and Forestry

There needs to be a balance between water requirements in urban and rural areas

It is expected that future growth in water requirements will largely be in the metros. However, this needs to be balanced with rural water needs, particularly agriculture. Specific attention will therefore need to be given to ensuring adequate future water supplies to urban growth areas as well as ensuring equitable access to the existing supplies.

Spending on infrastructure development and rehabilitation in water resources management is expected to increase from R1.3 billion in 2007/08 to R2.6 billion in 2010/11, driven by the additional allocations for the Olifants River water resources development project (De Hoop Dam), related bulk distribution infrastructure and the dam safety rehabilitation programme.

The implementation phase of the De Hoop Dam project will be partly funded from the budget vote of the Department of Water Affairs and Forestry. For subsequent phases, a portion of the funding will be provided from the financial markets, which will be determined together with commercial user charges. A similar arrangement will be applied to the Mokolo River water resources augmentation project, for which an estimated 75 per cent of the estimated total cost of R1.9 billion will be attributable to commercial users. Funding for new dams, such as the Nwamitwa Dam, the Mzimkulu Off-Channel Storage Dam and the Zalu Dam is fully provided for in existing baseline allocations. Funding for rehabilitating dams to ensure safety will continue throughout the MTEF period.

As part of the institutional framework for managing water resources, it is proposed that a National Water Resources Infrastructure Agency be established through the South African National Water Resources Infrastructure Agency Limited Bill, which is currently under debate. The agency, which will be wholly owned by the state, will be responsible for operating national water resource infrastructure that will ensure the efficient and effective water supply to all water users.

Water quality

In addition to appropriate quantities of water being made available for use, it is also essential for water to be of a suitable quality for a particular use, either for human and economic purposes or for the maintenance of ecosystems. Water use thus has an economic value and the use of water should reflect this value.

The WSSD recognised the importance of adequate and clean water supplies

Recognising the importance of adequate and clean water supplies throughout the world, participating countries at the World Summit on Sustainable Development (WSSD) held in Johannesburg in 2002, agreed to:

- intensify water pollution prevention to reduce health hazards and protect ecosystems by introducing technologies for affordable sanitation and industrial and domestic wastewater treatment, by mitigating the effects of groundwater contamination and by establishing, at the national level, monitoring systems and effective legal frameworks
- adopt prevention and protection measures to promote sustainable water use and to address water shortages.

Historically, South Africa's tap water has been of very high quality by international standards, but due to problems in some areas, quality can no longer be guaranteed. The Department of Water Affairs and Forestry is implementing appropriate clean-up programmes and municipalities have been instructed to provide communities affected by contaminated water with safe drinking water.

Investigations have revealed that not all water purification works are functioning according to the required specifications, resulting in a risk of contaminated water being distributed to users in certain areas. Therefore, investments in storage, transfer and distribution infrastructure need to be complemented by ongoing investments in

refurbishing, replacing and/or maintaining existing infrastructure and the training of staff.

Global climate change will lead to an increased incidence of both drought and floods

Global climate change is likely to worsen many existing environmental trends such as water stress. It is predicted that global climate change will cause mean temperatures to rise, accompanied by an increased incidence of both drought and floods, where prolonged dry spells will be followed by intense storms. As agriculture makes up a large component of the South African economy, this kind of climate change could have adverse implications for the country in terms of the economy, food production and employment.

There are also important interrelated effects between environmental issues. For example, inadequate waste management practices can contribute to water pollution problems.

The Department of Water Affairs and Forestry is currently in the process of developing a wastewater discharge charge system (WDCS). The aim is to recover the costs associated with different wastewater treatment and water quality management programmes and to provide incentives for water users to treat their waste in-house rather than discharging it untreated into a water resource. The major sources of direct pollution include industrial effluent, domestic and commercial sewerage, acid mine drainage, agricultural runoff and litter. The WDCS will be payable by polluters who exceed certain resource objectives and the charge rate will be determined per sub-catchment. Piloting of the WDCS will start in 2009.

Examples of recent water service delivery failures

Below are examples of recent water service delivery failures that have affected the quality of life of citizens and the environment:

- During December 2007, thousands of fish, eels and other marine life washed up dead in and around the Durban port estuary due to the build up of organic matter in the water.
- A number of participants in this year's 58th Dusi Marathon, held in KwaZulu-Natal, went down with chronic diarrhoea and/or vomiting after the race. According to international standards, for water to be drinkable, an acceptable count of the human intestinal bacteria, E. Coli, is 150 to 100 ml of water. But tests done along the Umsundusi River, just nine days before the race, showed E Coli levels were measuring up to 115 000 per 100 ml.
- On 16 April 2008, the Gauteng Department of Health confirmed the outbreak of two cholera cases at the Chicken Farm informal settlement in Kliptown, Soweto and indicated that an urgent investigation is under way to confirm the source of the infections. Soweto residents pointed to deep-seated problems related to poor sanitation facilities and the lack of access to potable water. The local utility, Johannesburg Water, however, has subsequently indicated that Kliptown's water was cholera-free and safe to drink.
- The Eastern Cape's Daily Dispatch reported on 22 April 2008 that nearly 80 children had died in the Eastern Cape district over the last three months from diarrhoea and other complications. A health department official in Bisho confirmed that "these babies are dying because of the dirty water that they drink".
- During May 2008, people suffering symptoms of typhoid fever have been urged to seek medical assistance after an outbreak in Delmas, Mpumalanga. It is reported that at least 18 people have been hospitalised and a further 380 could be infected. The outbreak is suspected to have originated in Delmas's water supply.

Institutional arrangements in the water services sector

Water services refer to water supply and sanitation services and include regional water schemes, local water schemes, on-site sanitation and the collection and treatment of wastewater. The Department of Water Affairs and Forestry, water boards and municipalities are the primary players in water services sector.

The Department of Water Affairs and Forestry, water boards and municipalities are the primary players in water services sector

National government

The Department of Water Affairs and Forestry has repositioned itself as sector leader responsible for policy development, regulation and support functions. As part of this process, the department is phasing-out its role as implementing agent by transferring water schemes to the relevant municipalities.

Progress with the transfer of water schemes to municipalities

The Department of Water Affairs and Forestry administered a number of water services schemes in poor areas before 1994. The transferring of water schemes to municipalities is to be finalised over the next three years and funding is to be phased into the local government equitable share from 2009/10. All funds for this programme will subsequently be transferred directly to municipalities in terms of the provisions of the transfer agreements. The operating grant amounts to R1.1 billion in 2008/09, R0.9 billion in 2009/10 and R0.6 billion in 2010/11, or a total of R2.3 billion over the MTEF period.

The transfer of water schemes involves the transfer of assets and staff and the resulting operating costs of salaries and free basic services. The 321 schemes employ 8 094 staff and supply water to 53 municipalities. So far, 56 out of 60 transfer agreements have been signed, 3 157 staff have been transferred to local authorities while 3 500 staff have been seconded. A total of 1 701 schemes with a total asset value of approximately R6.0 billion have been transferred. Full costs for the operations of the schemes are being finalised. R554 million (44 per cent) of funds set aside for the refurbishment of assets has been transferred.

Water boards

Water boards are established in terms of the Water Services Act (1997) as national government business enterprises, in terms of schedule 3B of the Public Finance Management Act (1999) (PFMA). There are currently 15 water boards that employ over 6 000 staff.

Water boards are intermediaries between the raw water supply and reticulation functions under contract to water services authorities (municipalities). Traditionally, water boards provide bulk water to a number of municipalities in a defined geographic area, but some water boards also provide a limited retail or reticulation function. Through their role in the operation of dams, they also play an important role in water resources management.

Water boards provide bulk water to a number of municipalities in a defined geographic area

Table 7.2 provides a summary of the budgets for the 15 existing water boards for the period between 2004/05 and 2005/06.

The two largest water boards are Rand Water and Umgeni Water, not only in terms of budget size but also people served (Rand Water in Gauteng serves 11 million people and Umgeni Water in KwaZulu-Natal serves 4.8 million). Rand Water's budget accounted for 62 per cent of the total revenue and 64 per cent of total operating expenditure for all water boards, followed by Umgeni Water, which accounted for 18.1 per cent of the total revenue and 13.4 per cent of total operating expenditure. Although Rand Water services a relatively

Rand Water accounts for most revenue and operating expenditure

small area compared to other water boards, it serves the most customers and has the largest number of staff, which reflects the high density of Gauteng's population. Ikangala Water Board (falling within portions of both the Limpopo and Mpumalanga provinces) is the smallest water board with respect to budget size. It also has the least number of staff of all water boards, with just four staff members.

Table 7.2 Income and expenditure of water boards, 2004/05 and 2005/06

	2005/06			2004/05	2005/06	2004/05	2005/06	2004/05	2005/06
	Population served (thousands)	Service area (sq km)	Number of staff	Revenue		Capital expenditure		Operating expenditure	
R thousands				Actual	Estimated actual	Actual	Estimated actual	Actual	Estimated actual
Albany Coast	10	20	5	2 584	2 807	113 821	98 706	1 884	1 539
Amatola	1 300	43 400	230	80 071	88 035	12 987	11 076	84 271	94 711
Bloem	900	35 150	192	146 697	158 604	6 463	985	104 074	141 093
Botshelo	900	49 858	305	54 577	52 045	605	3 175	95 405	125 615
Bushbuckridge	1 600	12 320	167	37 716	44 563	790	527	47 515	27 476
Ikangala	1 600	4 008	4	1 175	1 383	–	60 530	3 009	1 459
Lepelle	1 000	82 000	272	159 761	179 656	2 226	14 464	90 203	115 069
Magalies	800	35 000	395	175 589	140 108	28 552	42 005	236 390	160 852
Mhlathuze	400	37 000	143	143 710	166 437	14 507	7 942	102 856	109 845
Namakwa	40	1 487	31	7 489	8 986	–	–	8 615	14 904
Overberg	70	6 700	70	15 546	20 053	376	825	15 353	16 397
Pelladrift	7	9 531	–	5 711	5 664	–	–	5 455	5 745
Rand Water	11 000	18 001	3 006	3 460 099	3 672 119	385 486	339 137	2 990 992	3 087 775
Sedibeng	1 600	86 000	600	274 896	278 388	14 182	5 066	275 674	266 764
Umgeni	4 800	32 000	789	1 008 352	1 084 544	20 353	79 376	627 237	688 657
Total	**26 027**	**452 475**	**6 209**	**5 573 973**	**5 903 392**	**600 348**	**663 814**	**4 688 933**	**4 857 901**

Source: Department of Water Affairs and Forestry

According to the Department of Water Affairs and Forestry's 2006/07 annual report, most of the water boards managed to remain financially viable as they were able to accumulate surpluses (which are, among others, necessary for infrastructure rollout) and repay their debts. Some of the notable successes include:

- The overall financial position of Mhlathuze Water improved considerably and the net operating surplus increased at an average of 9.1 per cent over the past five years.
- Overberg Water improved its financial viability and is on a steady path to sustainable service delivery and expansion of its services.
- Umgeni Water overcame its liquidity and solvency problems of the past five years.

Water boards do, however, face a number of challenges. These include concluding long-term bulk water supply agreements with municipalities, which means they are not able to make long-term infrastructure capital projections, they also experience problems in the recovery of costs for services rendered to municipalities, especially in the rural areas that were previously unserviced and there does appear to be weaknesses in their systems relating to internal control and accountability. In addition, 3 of the 15 water boards (Botshelo in North West and Bushbuckridge and Ikangala in Mpumalanga) are not financially viable and are dependent on subsidies to cover their operating expenses.

Local government

Water and sanitation systems is a local government function

Section 4B of the Constitution lists water and sanitation services limited to potable water supply systems and domestic wastewater and sewage disposal systems as a local government function.

The two-tiered local government system requires that powers and functions be divided between category B and C municipalities to avoid duplication and co-ordination problems. An asymmetric approach has been followed in relation to water and sanitation, where all category A (metros) municipalities are authorised, category B (locals) municipalities are authorised in certain instances and category C (district) municipalities in others. There are currently 22 district municipalities and 123 local municipalities authorised for the water services function. An authorised municipality may, however, appoint another organisation (including another municipality) to provide the water services function on its behalf (referred to as the water services provider).

The sharing of the water services function between category B and C municipalities may have contributed to some of the difficulties currently being experienced in providing the service, including problems in the allocation of resources through the intergovernmental fiscal system. The current practice is that the only recipients of the national grant for water and sanitation are the authorised municipalities. This becomes a problem in cases where authorised district municipalities delegate the responsibility for service provision to local municipalities without the (adequate) necessary resources/funds.

The Department of Provincial and Local Government will as part of its review of the White Paper on Local Government (1998), among others, also deal with a number of issues related to the two-tier local government system.

Access to water and sanitation

Government's objective is to ensure that all South Africans have access to basic water supply and sanitation services

Government's objective is to ensure that all South Africans have access to basic water supply and sanitation services. Government has prioritised not only the rollout of infrastructure necessary for the rendering of services but also the provision of free basic services to the poor.

A basic water supply facility refers to the infrastructure necessary to supply 25 litres of potable water per person per day supplied within 200m of a household and with a minimum flow of 10 litres per minute (in the case of communal water points) or 6 000 litres of potable water supplied per formal connection per month (in the case of house connections).

A basic sanitation service refers to the provision of a basic sanitation facility which is easily accessible to a household and the sustainable operation of the facility. This includes the safe removal of human waste and wastewater from the premises where this is appropriate and necessary and the communication of good sanitation, hygiene and related practices.

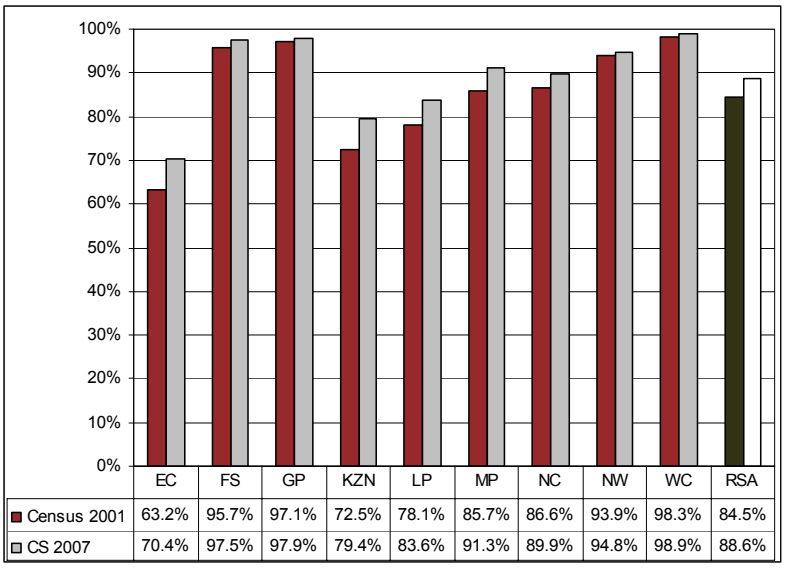
While there has been substantial improvements in the rollout of water services infrastructure and the rendering of free basic water and sanitation, the sector does face some challenges in the period ahead as implementation capacity remains a constraint. Furthermore, the sustainability of existing infrastructure cannot be neglected and is requiring more and more funding as infrastructure ages, making bigger demands on the available funds for the provision of new infrastructure to communities.

Progress with basic water infrastructure rollout

Between 2001 and 2007, access to piped water increased in all provinces

Figure 7.2 shows that the percentage of households with access to piped water has increased in all nine provinces when comparing the Census 2001 and the Community Survey 2007 results. The province with the lowest percentage of access is Eastern Cape (70.4 per cent), followed by KwaZulu-Natal (79.4 per cent) and Limpopo (83.6 per cent). However, these three provinces made the most progress in percentage terms from 2001 to 2007, where access percentage in the Eastern Cape increased by 7.2 per cent, KwaZulu-Natal by 6.9 per cent and Limpopo by 5.5 per cent, compared to Western Cape which increased by 0.6 per cent and Gauteng by 0.8 per cent.

Figure 7.2 Percentage of households with access to piped water by province, 2001 – 2007



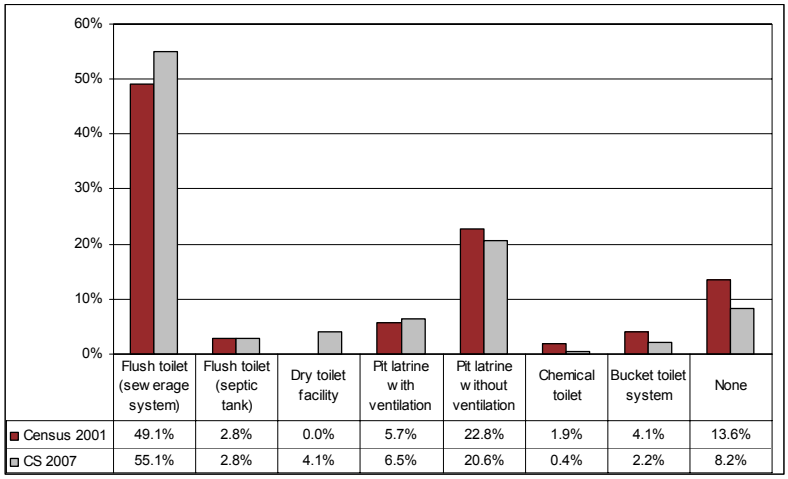
	EC	FS	GP	KZN	LP	MP	NC	NW	WC	RSA
Census 2001	63.2%	95.7%	97.1%	72.5%	78.1%	85.7%	86.6%	93.9%	98.3%	84.5%
CS 2007	70.4%	97.5%	97.9%	79.4%	83.6%	91.3%	89.9%	94.8%	98.9%	88.6%

Source: Stats SA, Census 2001 and Community Survey 2007

Progress with basic sanitation infrastructure rollout

Many different types of sanitation technology are currently used in South Africa, including buckets (priority has been given to eradicating this system), pit latrines (with or without ventilation), chemical toilets (also to be replaced with more appropriate technology types), flush toilets with on-site septic tanks and disposal and flush toilets with waterborne and central treatment works. Figure 7.3 shows the percentage of households by type of toilet facility in 2001 and 2007.

Figure 7.3 Percentage of households with access to flush toilets, 2001 – 2007



	Flush toilet (sewerage system)	Flush toilet (septic tank)	Dry toilet facility	Pit latrine with ventilation	Pit latrine without ventilation	Chemical toilet	Bucket toilet system	None
Census 2001	49.1%	2.8%	0.0%	5.7%	22.8%	1.9%	4.1%	13.6%
CS 2007	55.1%	2.8%	4.1%	6.5%	20.6%	0.4%	2.2%	8.2%

Source: Stats SA, Census 2001 and Community Survey 2007

Although progress had been made with the eradication of the bucket toilet system backlogs remain

The figure shows that the percentage of households in the country with access to flush toilets has increased from 49.1 per cent in 2001 to 55.1 per cent in 2007, while households with no toilet at all decreased from 13.6 per cent in 2001 to 8.2 per cent in 2007. Gauteng, Free State, Northern Cape and Western Cape were the only provinces that had more than 50 per cent of households using flush toilets. Although progress had been made with the eradication of the bucket toilet system (from 4.1 per cent in 2001 to 2.2 per cent in 2007), backlogs remain. Free State had the highest number of households still using the bucket system in 2007. But government has been committed to fast-tracking the completion of the bucket eradication programme.

Funding of basic water and sanitation infrastructure

As they can cross-subsidise more easily, metros are less reliant on transfers

Table 7.3 shows the per capita operating and capital expenditure on the water and sanitation service and the per capita operating and infrastructure grants allocated for the service. Capital expenditure is investment in new and existing infrastructure and operational expenditure is mainly bulk water purchases. The water and sanitation services are financed through the water and sanitation components in the local government equitable share (LGES) and capital spending on water and sanitation assets are financed through the basic services component of the municipal infrastructure grant (MIG). Metros contribute substantial own revenues towards supplying water and sanitation services to complement the LGES, while other categories of municipalities do not do so (this is indicated by the 'Difference' columns in table 7.3). This could be because metros serve a larger variety of customers, including businesses and industries, compared to smaller municipalities that largely serve a residential customer base. Metros are accordingly more able to cross-subsidise between and within different types of customers and services so that they are much less reliant on transfers to fund their basic operations than smaller municipalities. Infrastructure grant funding is supplemented by internal sources and external borrowing for all types of municipalities, with the exception of district municipalities where less is spent on

water and sanitation infrastructure than what is allocated through the water and sanitation component of the MIG, which could be indicative that infrastructure expenditure is being redirected to other municipal services or a lack of capacity to spend.

Table 7.3 Water and sanitation expenditure and grants per capita

R thousands	Bulk purchases per capita	LGES per capita	Difference	Capital expenditure per capita	Water and sanitation component of MIG per capita	Difference
Category A (Metros)	238	166	72	111	29	82
Category B (Locals)	54	216	-162	56	30	26
Category C (Districts)	5	57	-52	47	53	-6

Source: National Treasury local government database

Although contributions by metros and larger urban municipalities are larger, there is probably more scope for increased borrowing by larger municipalities. Funding from external sources will enable these municipalities to accelerate the rollout of both social and economic water infrastructure.

Free basic water and sanitation

Free basic water

Table 7.4 shows the number of households that benefited from free basic water services.

There has been an increase in the number of households receiving free basic water and sanitation

The total number of households that received basic water increased by 10.4 per cent between 2005 and 2006, while the number of households that received free basic water increased by 10.2 per cent over the same period. In 2005, Gauteng municipalities registered the best performance, providing free basic water to 99.2 per cent of all households with access to basic water. In contrast, Limpopo municipalities provided free basic water to only 43.6 per cent of households with access to basic water infrastructure.

Table 7.4 Number of households receiving free basic water, 2004 – 2006

Province	2004	2005	2006	2004	2005	2006
	Basic water services			Free basic water		
Eastern Cape	985 873	1 163 962	1 231 817	688 452	547 892	620 664
Free State	692 038	500 087	560 341	500 899	406 474	493 458
Gauteng	2 144 620	2 113 866	2 258 846	2 083 478	2 066 391	2 240 085
KwaZulu-Natal	1 540 245	1 705 659	1 999 834	938 634	1 120 091	1 248 565
Limpopo	917 324	1 151 289	1 310 883	539 640	565 811	571 470
Mpumalanga	510 455	587 492	684 837	367 984	429 132	512 385
Northern Cape	190 374	200 831	211 886	104 522	101 683	109 856
North West	585 654	670 697	742 743	391 391	393 541	460 885
Western Cape	1 066 982	845 012	869 066	977 455	764 273	788 336
Total	**8 633 565**	**8 938 895**	**9 870 253**	**6 592 455**	**6 395 288**	**7 045 704**

Source: Stats SA, Non-financial census of municipalities for the year ended 30 June 2006

Free basic sewerage and sanitation

Table 7.5 shows the number of households receiving free basic sewerage and sanitation. The total number of households receiving basic sewerage and sanitation increased by 6.8 per cent between 2005 and 2006, while the number of households receiving free basic sewerage and sanitation increased by 7.4 per cent of households over the same period. Of the 7.7 million households receiving basic sewerage and sanitation from municipalities, 3.8 million (49.7 per cent) had access to free basic sewerage and sanitation. Municipalities with a high percentage of rural population will not be in a position to provide free basic sanitation as they still lack the necessary equipment and other resources to empty ventilated pit latrines (the sanitation service provided to most rural communities).

Table 7.5 Households receiving free basic sewerage and sanitation, 2004 – 2006

Province	2004		2005		2006	
Consumer units	Basic sewerage and sanitation	Free basic sewerage and sanitation	Basic sewerage and sanitation	Free basic sewerage and sanitation	Basic sewerage and sanitation	Free basic sewerage and sanitation
Eastern Cape	871 702	363 961	905 339	396 294	918 496	411 691
Free State	611 652	272 923	534 817	192 891	608 725	402 069
Gauteng	2 122 600	1 282 276	2 101 101	1 846 790	2 171 581	1 427 019
KwaZulu-Natal	1 110 071	213 511	1 165 379	214 381	1 329 021	546 724
Limpopo	444 602	116 353	605 013	148 503	642 099	109 973
Mpumalanga	436 528	149 845	372 009	84 597	407 676	161 561
Northern Cape	176 372	63 293	186 916	66 571	202 376	77 848
North West	362 314	79 782	517 274	63 228	557 601	106 472
Western Cape	1 009 849	815 326	846 719	565 151	887 814	599 853
Total	**7 145 690**	**3 357 270**	**7 234 567**	**3 578 406**	**7 725 389**	**3 843 210**

Source: Stats SA, Non-financial census of municipalities for the year ended 30 June 2006

Municipal and municipal entity budgets

The water services function is an important municipal function, which comprised 11 per cent of total municipal budgets in 2007/08. Municipalities are intending to spend R16.6 billion on water and sanitation in the 2009/10 municipal financial year compared to the R8.5 billion spent in 2003/04. This represents a real annual growth in expenditure of 5.7 per cent between 2003/04 and 2009/10.

A progressive shift towards increasing expenditure in sanitation is evident

Although the majority of water services expenditure is directed towards water, a progressive shift towards increasing expenditure in sanitation is evident. In 2003/04, water expenditure amounted to 80 per cent (R6.9 billion) and sanitation to 20 per cent (R1.6 billion) while in 2006/07, water expenditure amounted to 75 per cent (R10.3 billion) and sanitation to 25 per cent (R3.4 billion).

Municipal water budgets

Table 7.6 indicates that most of the water expenditure (both operating and capital) occurs in metros and large urban municipalities. In 2006/07, over 69 per cent of water expenditure took place in the 27 municipalities with the largest budgets.

Table 7.6 Budgeted water expenditure by category of municipality, 2003/04 – 2009/10

R million	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
	Outcome			Estimate	Medium-term estimates		
Operating expenditure							
Category A (Metros)	3 034	3 459	3 683	4 032	4 255	4 436	4 724
Category B (Locals)	1 178	1 457	1 550	1 695	1 985	2 080	2 199
Secondary cities	*739*	*978*	*1 049*	*1 162*	*1 274*	*1 350*	*1 420*
Remainder	*439*	*478*	*501*	*533*	*711*	*730*	*778*
Category C (Districts)	112	265	190	152	242	251	280
Subtotal operating	**4 324**	**5 180**	**5 423**	**5 879**	**6 482**	**6 767**	**7 202**
Capital expenditure							
Category A (Metros)	820	1 146	1 350	1 307	2 185	2 023	1 851
Category B (Locals)	907	1 027	1 341	1 624	1 826	1 872	1 799
Secondary cities	*308*	*370*	*564*	*587*	*698*	*658*	*719*
Remainder	*598*	*657*	*777*	*1 037*	*1 128*	*1 214*	*1 080*
Category C (Districts)	801	542	1 159	1 446	2 529	2 230	2 265
Subtotal capital	**2 527**	**2 715**	**3 849**	**4 377**	**6 540**	**6 125**	**5 914**
Total							
Category A (Metros)	3 853	4 605	5 032	5 339	6 439	6 459	6 574
Category B (Locals)	2 085	2 483	2 891	3 319	3 812	3 951	3 997
Secondary cities	*1 048*	*1 348*	*1 612*	*1 749*	*1 973*	*2 007*	*2 139*
Remainder	*1 037*	*1 135*	*1 278*	*1 570*	*1 839*	*1 944*	*1 859*
Category C (Districts)	913	807	1 349	1 599	2 771	2 481	2 545
Total	**6 851**	**7 895**	**9 272**	**10 257**	**13 022**	**12 892**	**13 116**

Source: National Treasury local government database

Metros show a progressive shift towards increased spending on water infrastructure. The significant cost drivers for operating expenditure are bulk water purchases, employee costs and repairs and maintenance.

Local municipalities also show a progressive shift to increased spending on water infrastructure.

The district municipalities, authorised for water and sanitation, direct most of their water expenditure towards infrastructure. This could also be an indication that most of the districts authorised for the water services function do not provide the retail function (actual delivery of water to customers) at this stage. In a number of instances, this function is still performed by the non-authorised local municipality.

Municipal sanitation budgets

Municipalities are prioritising the rollout of sanitation infrastructure

Table 7.7 shows that municipal sanitation expenditure more than doubled between 2003/04 and 2006/07. Most of the sanitation budget is directed towards infrastructure expenditure: 72 per cent for metros (R996 million), 91 per cent for local municipalities (R1.6 billion) and 95 per cent for district municipalities (R322 million) for 2006/07. Municipalities are therefore prioritising the rollout of sanitation infrastructure. But good sanitation includes acceptable, affordable and sustainable sanitation services and appropriate health and hygiene awareness and behaviour. It is therefore important that municipalities complement any sanitation infrastructure investment with initiatives focused on behaviour change.

Table 7.7 Budgeted sanitation expenditure by category of municipality, 2003/04 – 2009/10

R million	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
	Outcome			Estimate	Medium-term estimates		
Operating expenditure							
Category A (Metros)	226	415	360	379	441	470	509
Category B (Locals)	116	173	174	145	131	141	151
Secondary cities	*61*	*126*	*131*	*57*	*65*	*68*	*71*
Remainder	*55*	*47*	*44*	*88*	*67*	*74*	*80*
Category C (Districts)	27	24	16	17	4	2	2
Subtotal operating	**369**	**613**	**551**	**540**	**576**	**614**	**662**
Capital expenditure							
Category A (Metros)	364	522	639	996	1 063	1 062	954
Category B (Locals)	668	688	1 333	1 551	2 165	1 457	1 211
Secondary cities	*215*	*308*	*585*	*647*	*849*	*571*	*536*
Remainder	*453*	*380*	*747*	*904*	*1 316*	*885*	*675*
Category C (Districts)	225	159	291	322	632	617	639
Subtotal capital	**1 257**	**1 370**	**2 262**	**2 869**	**3 859**	**3 135**	**2 803**
Total							
Category A (Metros)	590	937	999	1 375	1 503	1 532	1 462
Category B (Locals)	784	861	1 507	1 696	2 296	1 598	1 361
Secondary cities	*275*	*434*	*716*	*704*	*913*	*639*	*607*
Remainder	*508*	*427*	*791*	*992*	*1 383*	*959*	*754*
Category C (Districts)	252	184	307	339	636	619	641
Total	**1 626**	**1 982**	**2 813**	**3 410**	**4 436**	**3 749**	**3 465**

Source: National Treasury local government database

Progress in water and sanitation rollout by Joburg Water as at March 2008

Joburg Water introduced a number of large projects in 2006/07, which focused on extending water and sanitation services to the poor. Major projects include:

- Thonifho, a project to provide basic water to indigent communities. This project has extended basic water provision to an additional 17 332 households and extended basic sanitation provision to a further 12 427 households.
- Water provision to the Diepsloot area and supply of and the sewer system in Cosmo City have been improved.

Joburg Water will invest over R5 billion in the coming five years on eradicating the backlog and upgrading and rehabilitating water and sanitation infrastructure.

Source: Statement by Ms Ros Greeff, Member of the Johannesburg Mayoral Committee for Infrastructure and Services at a media briefing by Johannesburg Water

Water services budget of two municipal entities

Municipal entities are responsible for water provision in municipalities. A prominent feature of the two municipal entities, Joburg Water in Gauteng and Maluti-A-Phofung in Free State, is the difference in the size of their budgets. According to the Community Survey 2007, Joburg Water serves about 3.9 million people (compared to 3.2 million in 2001) while Maluti-A-Phofung serves about 385 000 people (compared to 361 000 in 2001). This highlights the difference in size between several municipal distributors. The variations between the two municipal entities are clearly linked to the size of the populations served by the municipalities, but could also be attributed to per capita expenditure, the extent to which a municipality purchases bulk services and the level of service offered in a municipality, among others.

Table 7.8 indicates that Joburg Water collected R3.3 billion in water services revenue in 2006/07 and Maluti-A-Phufong Water collected R76 million. This total is projected to increase to R3.5 billion and R92 million for the two entities respectively in 2009/10. This represents a real decline of 3 per cent between 2006/07 and 2009/10, which is more likely to be attributed to conservative multi-year budgeting rather than actual declines in the funding of the service.

Table 7.8 Budgets of two municipal entities focused on water and sanitation provision, 2006/07 – 2009/10

R million	2006/07	2007/08	2008/09	2009/10	2006/07	2007/08	2008/09	2009/10
	Joburg Water				Maluti-A-Phufong Water			
Income	3 302	3 254	3 304	3 512	76	83	93	92
Expenditure	3 177	3 225	3 215	3 398	71	82	92	99
Income:								
User charges for services	3 070	3 165	3 225	3 416	34	41	47	49
Other income	232	90	79	95	43	41	46	42
Total operating income	**3 302**	**3 254**	**3 304**	**3 512**	**76**	**83**	**93**	**92**
Expenditure:								
Employee costs: wages and salaries	444	528	559	584	33	37	39	41
Employee costs: social contributions	–	–	–	–	–	–	–	–
Bad debts	397	347	253	248	–	–	–	–
Depreciation	218	122	141	157	–	–	–	–
Repairs and maintenance	9	12	13	13	14	16	19	22
Interest expense: external borrowings	25	36	35	32	–	–	–	–
Bulk purchases	1 395	1 441	1 431	1 524	6	6	6	6
Contracted services	183	247	258	269	–	–	–	–
General expenses: other	234	270	282	295	18	23	28	29
Direct operating expenditure	**2 904**	**3 002**	**2 972**	**3 122**	**71**	**82**	**92**	**99**
Internal transfers	273	222	243	276	–	–	–	–
Contributions to municipality	–	–	–	–	–	–	–	–
Internal charges	–	–	–	–	–	–	–	–
Total operating expenditure	**3 177**	**3 225**	**3 215**	**3 398**	**71**	**82**	**92**	**99**
Surplus/(Deficit)	**125**	**30**	**89**	**114**	**5**	**0**	**0**	**-7**

Source: Municipal budgets documentation

The scale at which Maluti-A-Phufong Water invests in repairs and maintenance is substantially higher than that of Joburg Water. This could be because of a number of factors, including possible under-investment in repairs and maintenance by Joburg Water and older water services infrastructure in the Maluti-A-Phufong area, which requires more maintenance and refurbishment.

Only Joburg Water is running at a surplus over the four-year period, while Maluti-A-Phufong Water runs at a surplus only in the first year, breaks-even in 2007/08 and 2008/09 and runs at a loss in 2009/10. Although Joburg Water makes a surplus, these surpluses are much lower than in the electricity sector (see discussion on City Power in chapter 8 of this Review). The water services function provided by Maluti-A-Phufong Water is therefore not run as a profit-making entity but rather to break-even.

The trends reflected in these two water entities are also reflected in other municipalities, where some make marginal profits, others break-even and others are rendering water services at a loss. The more rural municipalities with high levels of poverty (where poor households are entitled to free basic services), struggle particularly to run this service profitably.

Factors influencing the efficient provision of the water services function

A range of external and internal factors impact on the ability of municipalities to provide the water services function. These issues are discussed below.

Total losses in municipal water reticulation systems

Total losses from municipal water reticulation systems for the whole of South Africa in 2005 were in the order of 1 150 million m^3 per annum, which is equivalent to 28.8 per cent of the approximately 4 000 million m^3 of total municipal system water input at that time.

The total municipal non-revenue water (NRW) for the whole country was estimated to be 1 430 million m^3 per annum, excluding the free basic water allocation, which is considered to be revenue water which is billed at a zero rate. This NRW figure was equal to 35.8 per cent of total municipal system input. Table 7.9 illustrates water losses per income area.

Table 7.9 Water losses per income area, 2005

Non-revenue water categories	Water losses due to	Medium-to-high income areas	Low income areas
Non-recoverable revenue	Billed consumption that is not paid	3%	10%
	Unbilled metered consumption	2%	55%
	Unbilled unmetered consumption	2%	–
Apparent losses	Unauthorised consumption	1%	11%
	Customer meter inaccuracies	5%	1%
Real losses	Leakage on service connections up to point of customer meter	70%	18%
	Leakage on transmission and distribution mains	16%	3%
	Leakage on overflows at storage	1%	2%
Total		**100%**	**100%**

Source: Department of Water Affairs and Forestry

Most difficulties with revenue collecting are experienced in low income areas

Most difficulties with revenue collection are experienced in low income areas, which is probably due to the lack of administrative capacity that is often evident in rural municipalities. Even poorer areas within richer urban municipalities are difficult to monitor in terms of illegal consumption.

The majority of water losses are real losses, occurring due to infrastructure and transmission leakages. Recorded water losses occur mainly in the medium income to richer areas. This could be due to the

complexities of networks and the cost of repairing and refurbishing current infrastructure. Losses in the smaller municipalities are often not measured and hence not reported.

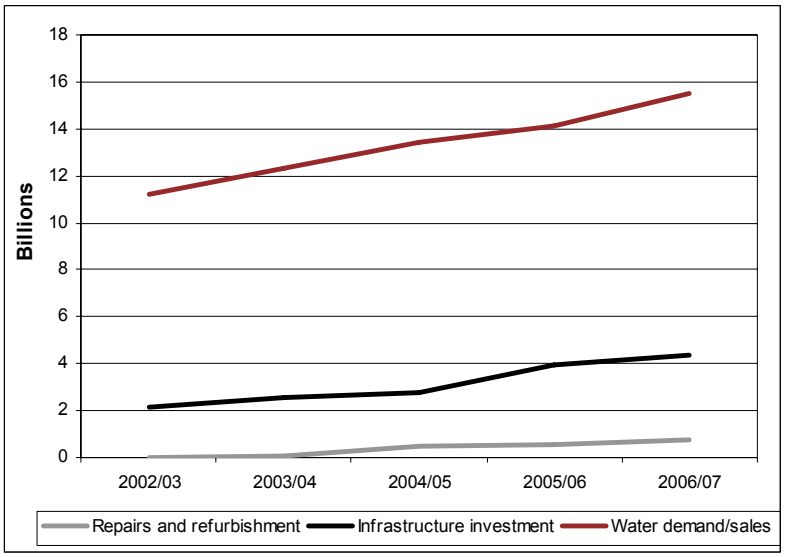
Maintenance of existing infrastructure

Water losses could also be due to insufficient investment in repairs and refurbishment. Municipalities spent 18 per cent of their annual operating budget on repairs and maintenance in 2006/07, with water maintenance making up 6.2 per cent (2 per cent for metros, 2.7 per cent for local municipalities and 1.5 per cent for district municipalities).

Increased service requirements are placing more strain on the existing infrastructure

Figure 7.4 shows the growth in water sales (a proxy for demand), infrastructure investment spending as well as spending on repairs and maintenance of existing infrastructure. Investment in new and existing water services infrastructure could be lagging behind as it does not correspond to the growth in water sales. This places strain on existing infrastructure assets to cope with these increased service requirements.

Figure 7.4 Water demand and investment, 2002/03 – 2006/07



Source: National Treasury local government database

Municipalities can exercise a number of measures to reduce water losses, wastage and inefficient use for both distribution system and consumer demand management. These include leak detection and repair, pressure management, effective zoning of the distribution system, repair of visible and reported leaks, pipe replacement/ management programme, cathodic protection of pipelines, meter management programme, unauthorised connection management programme, effective tariff setting and billing and awareness and education on the importance of water conservation.

Water pricing and tariffs

There are six stages of water tariffs and charges in the water cycle:

- raw water tariff (water resources development charge)

- bulk water tariff
- retail water tariff
- sanitation charge
- bulk waste-water tariff
- waste water discharge.

This charging system is complemented by nationally-funded subsidies for infrastructure and ongoing services to poor households. The municipal infrastructure grant and equitable share to local government are meant to complement municipal resources to enable municipalities to provide access to water and sanitation services.

Most major dams in South Africa are owned by the national government through the Department of Water Affairs and Forestry. The department sells raw water to either a water board or to the water service authority, i.e. the municipality. Certain municipalities, such as the City of Cape Town, operate their own dams. Municipalities that purchase raw water directly from the department need to carry out the purification process of the water internally. In most cases, water boards purchase raw water from the department, purify and refine it and sell the purified water to municipalities.

The Department of Water Affairs and Forestry regulates the tariff charged by water boards to municipalities

The tariff charged by water boards to municipalities is regulated by the department. Several factors influence the tariffs that each water board charges. These include the actual purchase price of the raw water, cost and methods used in the purification of water and financial viability and capital investment requirements to be addressed by the water board. The average bulk price charged by water boards was R4.06 per kℓ in 2006/07, with the highest bulk tariff charged by Mhlathuze Water Board in KwaZulu-Natal (R7.13 per kℓ) and the lowest bulk tariff charged by Magalies Water Board, which supplies potable water to parts of the Northwest, Gauteng, Limpopo and Mpumalanga (R2.09 per kℓ). This suggests that there is considerable variance in the price of treated bulk water from water boards, which has implications for municipalities' retail water price setting as bulk forms a large proportion of the overall retail tariff.

The Department of Water Affairs and Forestry prescribes norms and standards for water services tariffs as provided for under section 10 of the Water Services Act (1997). These are aimed at promoting socially equitable, financially viable and environmentally sustainable tariffs. Although the water services authority will either be setting tariffs or deciding the parameters within which tariffs are set, water services providers may in some circumstances also set tariffs within the prescribed parameters. The regulations, however, apply to all water services institutions and no water services institution may use a tariff which is substantially different from any prescribed norms and standards.

Municipalities need to take a number of issues into account when setting appropriate tariffs for sanitation. The servicing of on-site sanitation systems is not a monthly activity and is also highly dependent on the type of sanitation system installed, the role of the household maintaining the system and the accepted final disposal

method of the wastes. An investigation of the emptying of pit latrines, for example, has indicated that these should be scheduled for emptying once every 5 to 8 years and will cost between R600 and R1 200 to empty (2007 prices). The approach to collecting tariffs for providing such a service may either be built into the water bill, to charge a fee for emptying at the time of emptying, or a number of other alternatives.

Appropriate investments need to be made to ensure the sustainable delivery of water

It is important that appropriate investments be made to ensure the sustainable delivery of water (resources and services), otherwise there will be significant price increases in the future. These include appropriate investment in maintaining water quality and regular refurbishment and replacement of the water sector infrastructure.

Possible reforms to South Africa's water services sector

The problems that the water services sector face are similar in many ways to those currently being experienced in the electricity distribution sector. Many smaller municipalities do not have the necessary economies of scale, skills and specialisation to provide a water services function efficiently and effectively. The Department of Water Affairs and Forestry is currently supporting a number of institutional reform investigations that are aimed at advising water services authorities (municipalities) on the most appropriate institutional options applicable for that service provision area. Three areas in which reform investigations are currently taking place, are Central Eastern Cape, Western Highveld (Mpumalanga) and Southern Free State.

Conclusion

The quality and availability of the water and sanitation services are of extreme importance to the quality of human life and living standards. The Community Survey 2007 confirms that strides have been made in increasing access to this service to all members of the community. Several reforms and measures are being implemented to improve the quality and efficiency of the water sector as well as measures to improve sanitation and prevent outbreaks of related diseases. A concerted effort is required from all stakeholders in the water sector to address challenges, such as deterioration in the water services infrastructure, which impact on the quality and reliability of service and ultimately the quality of water itself.