Water

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2015
Market Intelligence Report

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GreenCape would like to acknowledge and thank **Chris Millson** and **Annelie Roux** for the time and effort that went into compiling this Market Intelligence Report.

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List of acronyms

AMP	Asset Management Plan
ASGISA	Accelerated and Shared Growth Initiative for South Africa
ASR	Artificial Storage and Recovery
ATR	Agricultural Treatment and Reuse
AWARD	Association for Water and Rural Development
CCT	City of Cape Town
CMA	Catchment Management Agencies
DOHS	Department of Human Settlements
DTR	Domestic Treatment and Reuse
DWA	Department of Water Affairs
DWS	Department of Water and Sanitation
DWWTW	Decentralised Wastewater Treatment Works
ESETA	Energy Sector Education and Training Authority
EWSETA	Energy and Water Sector Education and Training Authority
GDP	Gross Domestic Product
IAMS	Infrastructure Asset Management Strategy
IAP	Invasive Alien Plants
ILI	Infrastructure Leakage Index
ITR	Industrial Treatment and Reuse
MBR	Membrane Bioreactor
Ml/d	Million Litres Per Day
MWIG	Municipal Water Infrastructure Grant
NDP	National Development Plan
NGO	Non-Governmental Organisation
NWA	National Water Act, Act 36 of 1998
NWRS2	National Water Resource Strategy (2nd edition)
PICC	Presidential Infrastructure Coordinating Commission
RML	Reducing Municipal Leaks
RWH	Rainwater Harvesting
SAAWU	South African Association of Water Users
SANCIAH	South African National Council of the International Association of Hydrologists
SETA	Sector Education and Training Authorities
SIP	Strategic Integrated Projects
WCG	Western Cape Government
WESSA	Wildlife and Environment Society of South Africa
WISA	Water Institute of South Africa
WISA	Water Institute of Southern Africa
WMA	Water Management Areas
WRC	Water Research Commission
WSA	Water Services Act, 1997
WSA	Water Services Authorities
WSP	Water Service Providers
WSP	Water Stewardship Programme
WWTW	Waste Water Treatment Works

As many as 400 000 new green jobs could be created by addressing current water security challenges, and by providing water infrastructure to the millions of South Africans who have no access to piped water

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One Million Climate Jobs, 2013.

1 –
Introduction and purpose

This market intelligence report was compiled by GreenCape's water sector desk. It is aimed at investors and businesses who are currently active in or interested in the water sector in South Africa, and the Western Cape specifically. It provides an overview of the market, including the key players, legislation and regulation, opportunities and challenges, key developments and achievements.

GreenCape is a not-for-profit organisation that was established in 2010 by the Western Cape Government and the City of Cape Town to support the accelerated development of the green economy. The vision is for the Western Cape to be the green economy hub for Sub-Saharan Africa – the investment destination of choice, regional headquarters and manufacturing centre for leading companies in this space.

GreenCape's aim is to help unlock the investment and employment potential of green business, technologies and manufacturing. This, in turn, also contributes to improving the resource efficiency, carbon intensity and resilience of the regional economy.

We do this this by assisting viable green businesses across a range of sectors, including energy, waste and resources, to remove barriers to their establishment and growth – working with our partners in government, the private sector and academia.

Our business support activities range from helping potential investors to understand the local market and connect with the right people; providing policy and regulatory advocacy and support; facilitating access to funding; facilitating market access; establishing skills development partnerships; networking and information-sharing events; and publications.

For more information see www.greencape.co.za
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Executive summary

South Africa is a water-stressed country, and climate change models predict that the Western Cape is likely to become drier. Increasing scarcity – combined with increasing demand – is expected to result in water availability becoming a constraint on the province's economic development. This constraint demands innovative solutions.

Despite the challenges, there are numerous opportunities for working towards the development of a sustainable water sector, which in turn can contribute to sustainable agriculture and industry. This report provides essential background to these opportunities, and specifically aims, therefore, to benefit the private sector.

Guided by the National Water Act (Act No. 36, 1998) and the Water Services Act (Act No. 108, 1997), the Department of Water and Sanitation (DWS – previously the Department of Water Affairs – DWA) holds overall responsibility for managing the country's water resources across the sector's value chain. This includes basin management, abstraction, storage, treatment, distribution, use, and wastewater treatment and discharge. The Water Services Act (Act No 108, 1997) also prescribes the legislative duty of municipalities as water service authorities to supply water and sanitation according to national standards and norms.

Key developments

Recent developments within the sector include national government's highlighting of water provision and wastewater treatment as key priority areas in terms of budget allocation. On the supply side, developments within water infrastructure in the Western Cape include the start of work to increase the capacity of the Clanwilliam Dam. In addition, there is growing interest in desalination, with the Cederberg and Mossel Bay municipalities having already invested in this technology.

Major opportunities

The seven major opportunity areas within the sector include:

- Clearing invasive alien plants (IAP)
- Rainwater harvesting (RWH)
- Reducing municipal leaks (RML)
- Agricultural treatment and reuse (ATR)
- Industrial treatment and reuse (ITR)
- Domestic treatment and reuse (DTR)
- Decentralised wastewater treatment works (DWWTW)

Each of these opportunity areas faces barriers – not least, skills shortages.

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Market overview

South Africa is a dry country and experiences significant variability in terms of rainfall, which varies from less than 100mm in the west, to over 1 500mm per annum in the east. The average rainfall of 450mm per annum is well below the global average of 860mm (Strategic Overview of the Water Sector in South Africa, Department of Water Affairs – DWA, 2013).

3.1. Context

Like much of the country, the Western Cape is a water-stressed region. In addition, the province's water resource is becoming increasingly vulnerable to climate variability, with climate models indicating that the Western Cape will become hotter and dryer, and will experience more intense rainfall events and floods (A climate change strategy and action plan for the Western Cape. DEADP, 2008). Given the potential impact on the agricultural sector, this increasing scarcity could potentially have a negative effect on the country's economy.

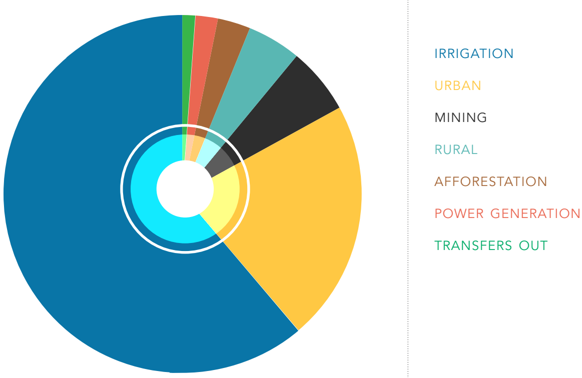
Rising demand and diminishing supplies will require careful management of the country's water resources. If not well managed, the availability of affordable water could become a significant constraint on the region, not only on supporting economic growth but also on providing potable water for growing urban populations. Specifically, the cost of water provision could be a constraint on economic development. This cost varies depending on the local availability of water, the distance of distribution, and raw water quality (Strategic Overview of the Water Sector in South Africa, DWA, 2013).

Job creation requires ongoing economic development, which in turn relies on a secure water supply. Despite the challenges, the opportunities are considerable. According to the One Million Climate Jobs Campaign (2011), as many as 400 000 new green jobs could be created by addressing current water security challenges, and by providing water infrastructure to the millions of South Africans who have no access to piped water (Green Jobs and related policy frameworks, an overview of South Africa, 2013). This would involve restoring damaged water resources, such as rivers and wetlands; ecosystem restoration; and repairing municipal leaks.

3.2. Demand

A large proportion (66%) of South Africa's water use is for agricultural purposes, specifically irrigation (Figure1).

Figure 1: Current water demand in South Africa

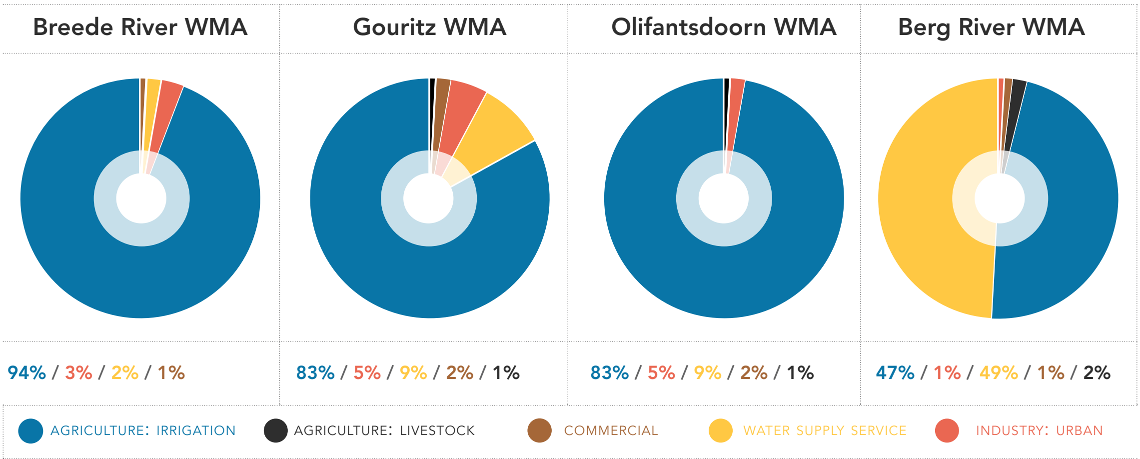


(Source: Food energy water nexus: Understanding South Africa's urgent sustainability challenge, 2014).

Abstraction includes pumping from water sources, including rivers and groundwater. South Africa's water is drawn from a variety of sources. Typically, 77% is surface water, 9% groundwater and 14% is drawn from reusing return flows (DWA, 2013).

In the Western Cape, irrigation to support agriculture is the major water use in the four currently designated water management areas (WMAs), as shown in Figure 2. In the Berg WMA however, water supply service to the metropolitan area of Cape Town also represents a major source of consumption.

Figure 2: Registered water use per WMA – Western Cape areas



(Source: The National State of Water Resources Quarterly Report, July to September 2014).

3.3. Industry landscape

Governance and key players

Two Acts define the governance framework for South Africa's water resources. These are the National Water Act (NWA, Act 36 of 1998) and the Water Services Act (WSA, Act 108 of 1997). The NWA redefined water rights in South Africa in an effort to stimulate inclusive growth. It also established a new framework to regulate water resources. The WSA was promulgated in 1997 and defined the role of the Department of Water Affairs (DWA, replaced by the Department of Water and Sanitation, DWS, in 2014) as a regulator; the role of water boards as bulk providers; and the role of municipalities as service providers.

The National Water Resource Strategy (NWRS) was developed to inform the implementation of the NWA. The Act determines that the strategy should be updated every five years. The first strategy document was released in 2004 and the second version was delayed until 2013. At the release of the NWRS (second edition) or NWRS2, Mrs Edna Molewa, then Minister of Water and Environmental Affairs, emphasised that as the legal instrument for the NWA's implementation, the NWRS is binding on all authorities and institutions involved in implementing the NWA.

The NWRS2 has three key objectives, as follows:

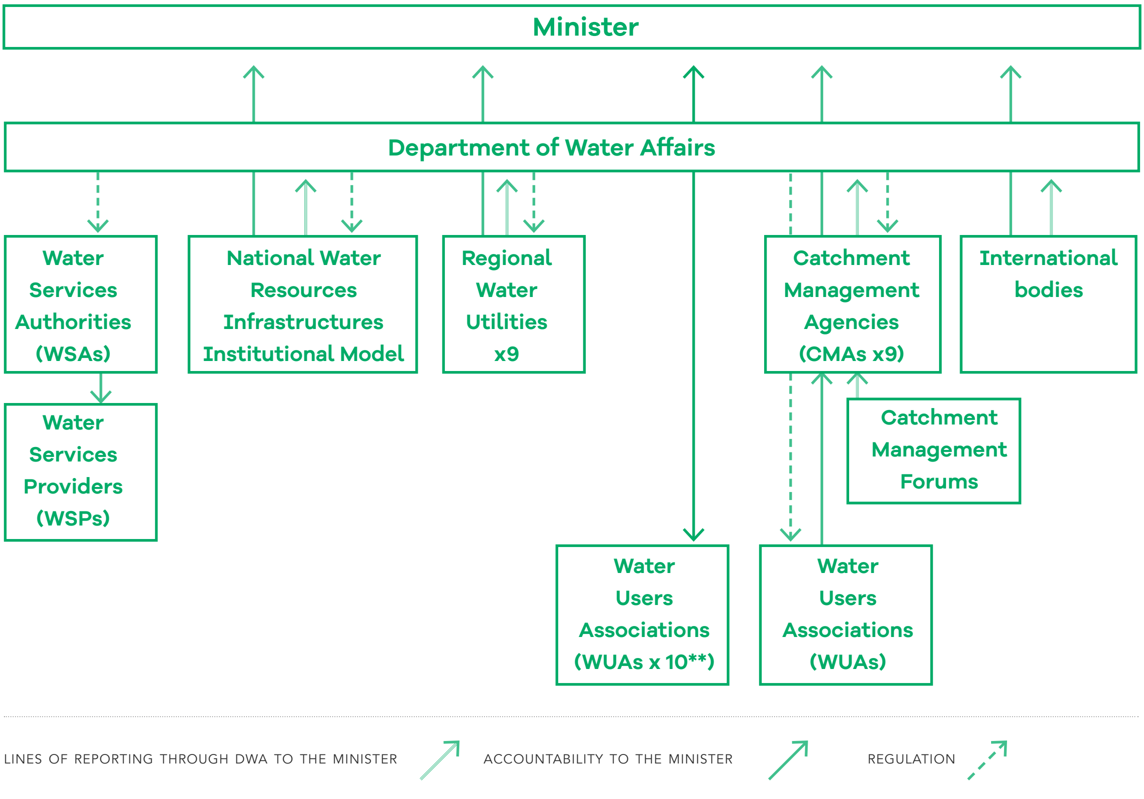
- To increase the contribution of water to the economy and job creation
- To protect, develop and control water resources in a sustainable and equitable manner
- To support the elimination of poverty and inequality.

The DWS formulates and implements policies to regulate the water sector and provides strategies for sector support. It does this by operating at three levels of government – national, provincial and local – across the water value chain. However, the DWS does not execute all functions because some are constitutionally assigned to appropriate sector partners.

Institutional structure

The NWRS2 outlines the institutional structure of the sector, and highlights the roles played by water services authorities (WSA), water services providers (WSP), regional water utilities (RWU), catchment management agencies (CMA), catchment management forums (CMF) and water user associations (WUA) through the sector value chain.

Figure 3: National organisational structure of water resource management

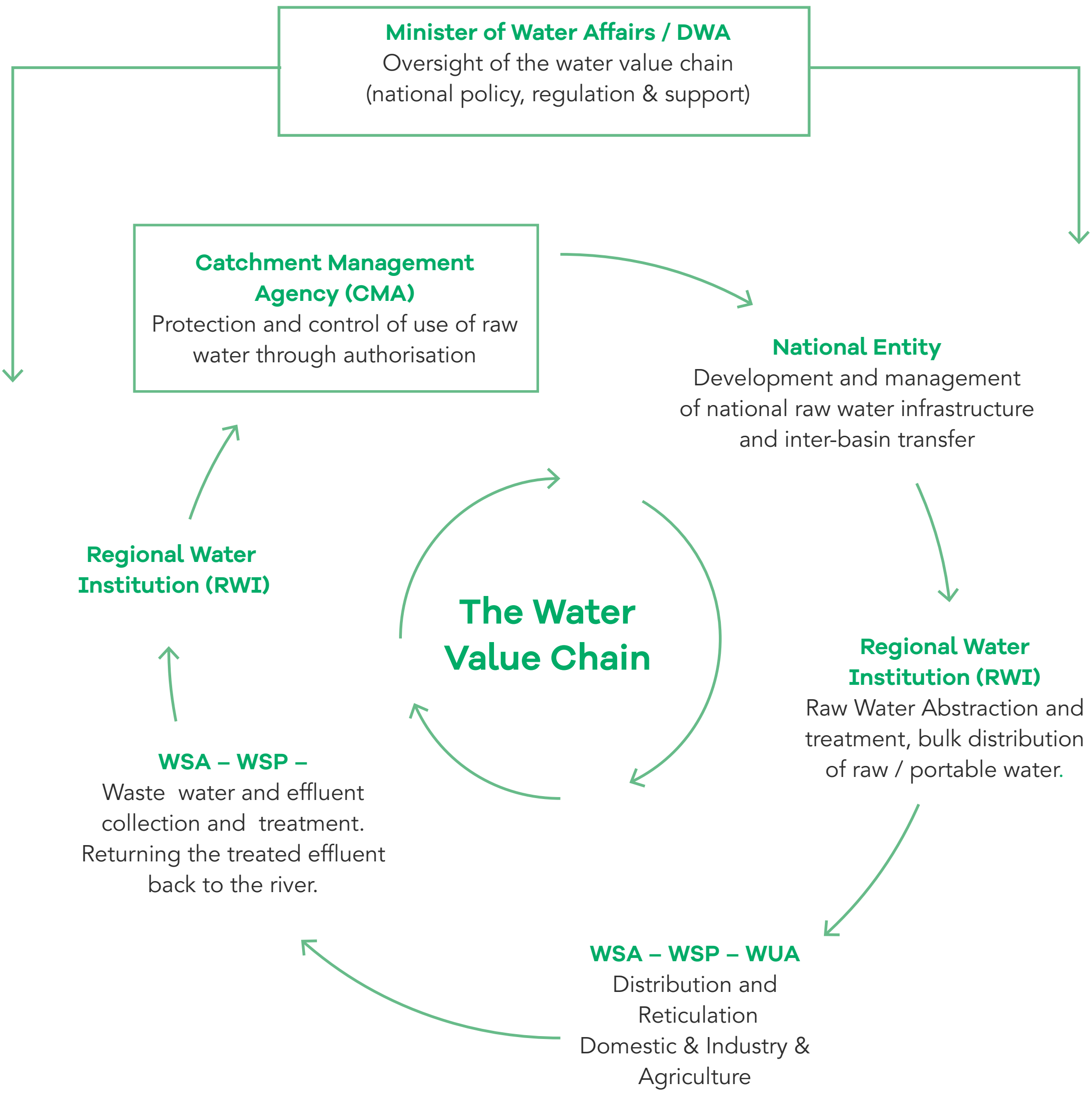


(Source: NWRS2, 2013). Note that The Department of Water Affairs is now the Department of Water and Sanitation (DWS).

The water sector is highly complex. Accordingly, managing water resources involves contributions from various stakeholders at different points in the value chain. The value chain comprises seven broadly defined stages, as follows: basin/catchment management; abstraction; storage; treatment; distribution; use; wastewater treatment; discharge.

A range of stakeholders are active across this value chain, and the following graphic illustrates the roles of key players:

Figure 4: Water value chain and associated role players



(Source: NWRS2, 2013).

Regional water utilities

The NWRS2 (2013) points out that the 12 existing water boards will be consolidated into nine viable regional water utilities (RWU). The intention is to strengthen the development, financing, management, operation and maintenance of regional bulk water (and wastewater) infrastructure. RWUs will manage bulk water service infrastructure and supply bulk water to WSAs and their WSPs, and to bulk water consumers. They will also manage bulk sanitation infrastructure for wastewater treatment, operate existing regional water resource infrastructure, develop new regional water resources infrastructure, and provide support to WSAs and CMAs.

Catchment management agencies

To facilitate water resource management, South Africa is now divided into nine (previously 19) water management areas (WMA). In turn, these are managed by catchment management agencies (CMA). The CMAs are responsible for water resource management within the defined WMAs. As such, they serve as the first port of call for all water resource management issues. CMAs are responsible for delegating water resources management at the regional or catchment level while involving local communities with water management where appropriate.

CMAs contribute towards progressively decentralising national management and realising the National Water Act's integrated water resource management ethos (State of the Environment Outlook Report for the Western Cape Province Inland Water Chapter, DEADP, 2013).
However, the CMAs and the WMAs were not geographically aligned. The NWRS2 (2013) points out that current CMAs will be disbanded and consolidated to align with nine redefined, national-scale WMAs. This will be completed by 2016.
zThe Western Cape will have 2 WMAs in which CMAs will be established: the Berg-Olifants and the Breede-Gouritz.

The NWA envisages that all water resource management functions (excluding those that have national strategic implications) should be delegated to CMAs. This means the functions of CMAs will include water use authorisation; water resource protection; compliance monitoring and enforcement; water conservation and demand management; water quality management; oversight of WUAs; water resources planning and information management; billing and collection of charges; and co-ordination of disaster management.

The Department of Water Services' R12.48 billion budget for 2014-2015 will be commited to bulk infrastructure for water and wastewater treatment works

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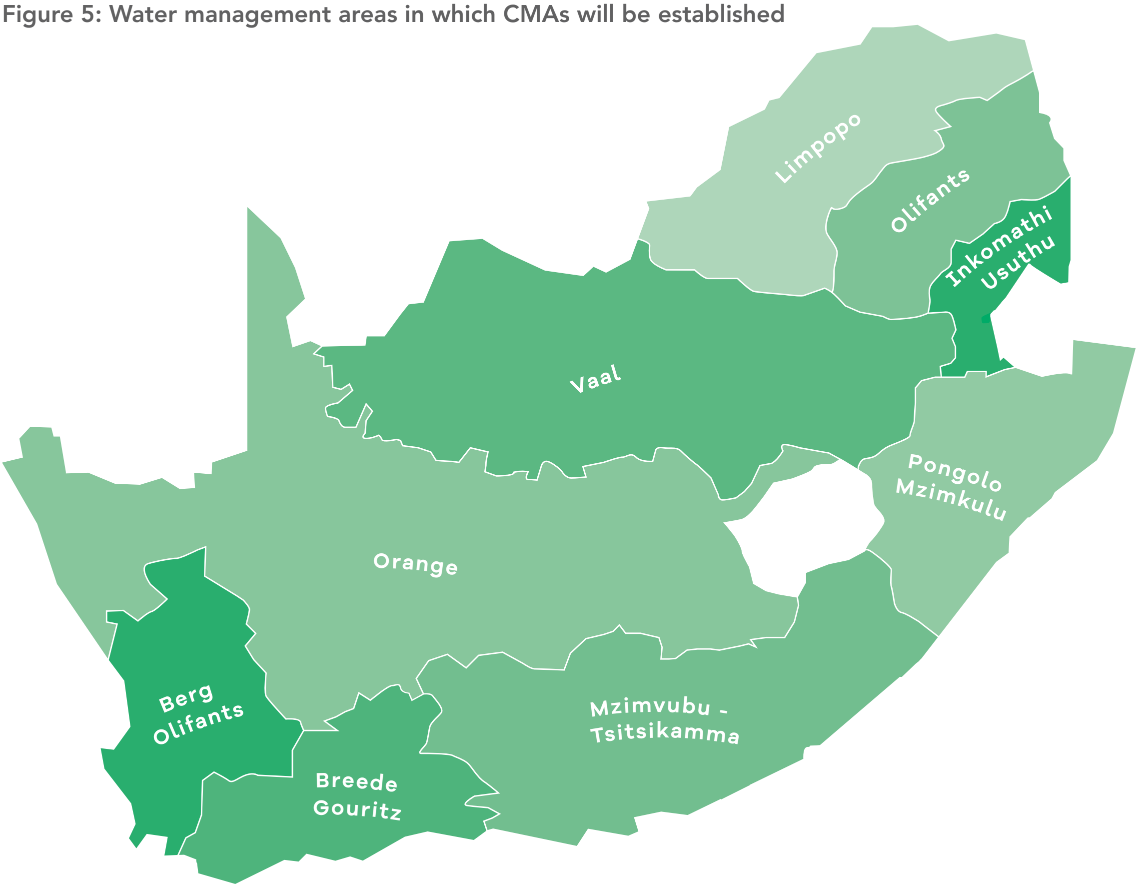
(BMI report, 2014).

Figure 5: Water management areas in which CMAs will be established



(Source: NWRS2, 2013).

Catchment management forums

The NWRS2 (2013) points out that catchment management forums (CMFs) will be established to act as non-statutory bodies to democratise participation in water resource management and to support CMAs. They provide the means to engage with stakeholders on the formation of CMAs and will assist in implementing catchments management strategies (CMS).

Water user associations

The NWA provides for water user associations (WUA) 'to operate at a restricted localised level and in effect be co-operative associations of individual water users who wish to undertake water related activities for their mutual benefit'.

Water services authorities and water services providers

Water services authorities (WSA) are municipalities that have the constitutional responsibility for planning, ensuring access to and regulating provision of water services (including water supply and sanitation) within their area of jurisdiction (NWRS2, 2013). The WSAs are responsible for securing licences from the DWS (or from CMAs, where these are established) to abstract, and discharge water. The 278 municipalities in the country include 152 designated WSAs. In the Western Cape, the Cape Metro and 24 municipalities are designated WSAs. The WSAs may provide services themselves, or contract out to water services providers (WSP).

4 – State of the sector

Infrastructure: requirements and budgets
The DWA was replaced by the DWS in 2014, and the current Minister is Ms Nomvula Mokonyane. The minister committed to focus the department's R12.48 billion 2014-2015 budget on bulk infrastructure for water and wastewater treatment works (BMI report, 2014). Specific attention is being given to budgeting for the full life-cycle costs of projects and to reduce energy costs (NWRS2, 2013).

Pamela Tshwete, Deputy Minister of DWS, highlighted that a significant portion of the national departmental budget has been assigned to water provision and wastewater treatment works (DWS, 2014). DWS will spend over R4.6 billion through the Regional Bulk Infrastructure Grant on various projects across provinces to address water infrastructure challenges. To date, R1 billion has been injected into the Municipal Water Infrastructure Grant to facilitate planning and accelerate and implement various projects to ensure security of supply (DWS, 2014).

Over the next decade, capital investment will be required in new water and sanitation infrastructure for the entire value chain, including the refurbishment of existing infrastructure. This is projected to cost an estimated R670 billion. Currently, 45% of this total is provisionally budgeted for. Therefore, investment will also need to be funded from both on-budget and off-budget sources through partnerships with the private sector. According to the Mail and Guardian (July 2014), public-private partnerships are essential to bridging the funding gap.

DWS is in the process of developing a strategic sourcing and localisation project to focus on local content. This process is being completed in collaboration with three other government departments: the Department of Trade and Industry, the Economic Development Department and the National Treasury (DWS, Empowering municipalities and enhancing bulk infrastructure is key to improving service delivery, 30 July 2014). This represents a significant opportunity for local businesses or investments into new local production.

Municipal performance: water supply
In 2008, the Department of Water Affairs (now DWS) introduced the Blue Drop certification programme for managing drinking water quality. This programme uses water safety planning as its key performance indicator. WSAs are audited and receive a score for their overall performance in managing the quality of drinking water.

Blue Drop certification takes into account numerous factors, such as water safety planning, drinking water quality process management and control, drinking water quality compliance, as well as management, accountability, local regulation and asset management.

Blue Drop reports are released biannually. According to the Blue Drop Report (2012), the best performing area in the Western Cape is the City of Cape Town (CCT) Metropolitan Municipality, with a Municipal Blue Drop Score of 98.14%. Matzikama Local Municipality was cited as the most improved area, whilst Kannaland Local Municipality was ranked as the worst performer.

For full details of the Western Cape's performance, see Chapter 11 of the Blue Drop Report (2012). The release of the 2014 report is awaited.

Municipal performance: wastewater treatment
In 2008, the Department of Water Affairs introduced the Green Drop certification programme for the management of wastewater quality.

The Green Drop process measures and compares the results of the municipalities' performance then rewards or penalises them according to their achievements or failures against minimum defined standards.

Scores are allocated according to criteria that include process control; maintenance and management skill; wastewater quality monitoring and sample analysis; submission of wastewater quality results; wastewater quality compliance and quality failures response management; stormwater and water demand management; bylaws; wastewater treatment facility capacity; and asset management.

The latest Green Drop Report (2013) presented the Western Cape with a favourable assessment, classifying 84% of plants (133 of 158) as low- and medium-level risk. This represents a slight improvement on the 2011 report. However, nine municipalities in the province are cited for their poor performance, receiving a Green Drop score of less than 30%.

Trends in water conservation/ water demand management
The Western Cape Water Supply System (WC WSS) Reconciliation Strategy (2013) highlights the importance of water conservation (WC) and water demand management (WDM), pointing out that CCT has focused on a number of WC/WDM interventions.

These include implementing pressure management; replacing non-functional water metres; reusing treated effluent; installing flow limiting devices; launching leak repair projects in schools and houses; and hosting awareness and education workshops.

The WC WSS Reconciliation Strategy (2013) highlights that the CCT updated its five WC/ WDM goals for 2016-2017, as follows:

- CCT must reduce water losses to less than 15% of total average demand
- Ensure on-going effective management and implementation of integrated water resource zplanning (IWRP)
- Mobilise resources according to the WC/WDM Strategy
- CCT must, by 2020, reduce and maintain non-revenue water (NRW) to below 20% of the total average annual water requirement and within accepted international benchmarks
- Reduce projected potable requirement to an average growth rate of no more than 2% per annum for the next 10 years and conserve Cape Town's available water resources.

According to the WC WSS Reconciliation Strategy Status Report (2013), the most recent update, goals one and four (above) were achieved in the 2012-2013 financial year. NRW was reduced to 19.8% and water losses were contained below the 15% target. In addition, the City of Cape Town was able to sustain growth in water requirements below the 2% target despite a population increase.

Supply-side interventions

Clanwilliam Dam
Work on raising of the Clanwilliam Dam commenced in 2014. Initial work included realigning the adjacent N7 national road, part of which will be flooded by the rising water level. The project is scheduled for completion in March 2017 at an estimated cost of R2.5 billion.

Three quarters of the additional water made available by the project will be reserved for new, resource-poor farmers. As Ms Nomvula Mokonyane, Minister of Water and Sanitation, stated during budget vote 38 on 15 July 2014, this is one of several measures designed to ensure equity and redistribution.

Upgrades to the infrastructure of the Clanwilliam Dam embankment will result in an additional flow of water into the adjacent water canals, which must be equipped to cope with the extra water volumes. Accordingly, the upgrades will demand additional maintenance in future. This was highlighted when one of the canals fed by the dam recently collapsed. More than 300 farmers, local residents and 6 000 hectares of irrigation were affected by the incident. The collapse also threatened seasonal jobs for local residents (Engineering News, 28 January 2015).

Voëlvlei Dam

Raising the Voëlvlei Dam, an off-channel dam located adjacent to the Berg River, by 2 metres is another water resource measure designed to balance supply and demand in the WC WSS.

At present, the dam is supplied by two sources – the Klein Berg River and the Twenty-Four Rivers – through gravity run-of-river diversions. The dam could be raised relatively cheaply by constructing a concrete parapet wall on top of the existing earth embankment. This would eliminate the need for significant and more expensive earthworks associated with a conventional raising (Kleynhans et al., 2011).

Desalination plants

Desalination plants have been constructed in response to increased water demand and to reduce the risk of drought. The 15 million litres per day (Ml/d) plant in Mossel Bay, the largest in the country, was commissioned in November 2011 at a cost of R191.4 million. More recently, Cederberg Municipality decided to supplement the Lamberts Bay water supply by adding a seawater desalination plant. In 2012, Veolia Water Solutions and Technologies SA won the multimillion rand contract, which was completed and commissioned in November 2013 (The Water Wheel, 2014).

The West Coast District Municipality (WCDM) also proposes to construct and operate a seawater desalination plant in the Saldanha Bay area using reverse osmosis technology. The WC WSS Reconciliation Strategy Status Report (2013) indicates that a 25.5 Ml/d seawater reverse osmosis desalination plant in the area would be the most cost-effective option under consideration. However, the report also points out that the plant and associated infrastructure would cost an estimated R500 million, R300 million more than earlier estimates. The report also highlights that funding is a major challenge as the WCDM is not in a position to fund a project of this size.

CCT is conducting a feasibility study into using seawater desalination to augment Cape Town's water supply. Worley Parsons was appointed in July 2012 to conduct this study (WC WSS, 2013). One of the two possible sites identified is near the Koeberg power station. The design capacity of the plant will be 150 Ml/day with the option of upgrading it to 450 Ml/day. The WC WSS report (2013) indicates a lead time of approximately eight years including the feasibility study, environmental impact assessment (EIA), construction and linking to the current water distribution network.

The DWS foresees that by 2030, up to 10% of the country's urban water supply could come from water desalination plants. However, the desalination process has a high-energy demand. South Africa is currently experiencing an electricity crisis. What's more, the country relies on coal to generate its grid electricity and the water and carbon footprints associated with electricity-intensive water provision are high. As a result, the wider costs and benefits of desalination require reconsideration.

Addressing Berg River water quality

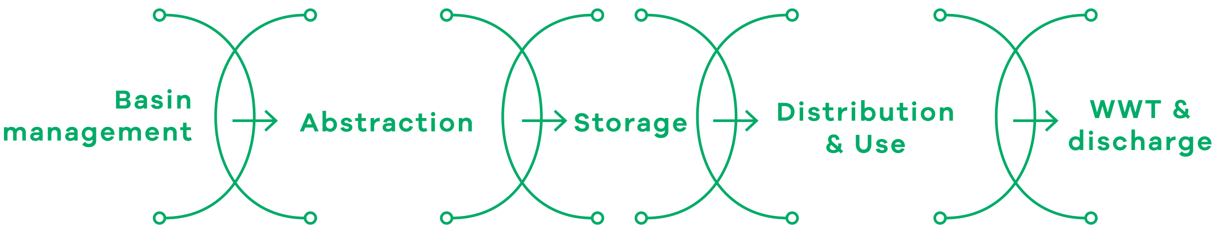
In 2012, the Western Cape Government (WCG) initiated the Berg River Improvement Plan (BRIP) to address water quality concerns in the Berg River. This concern is particularly relevant given the importance of the Berg River to agricultural exports. The BRIP highlights the current status of pollution sources and the various interventions that have been or are currently being undertaken in the Western Cape. The BRIP identifies possible short-term (five-year) and long-term (five-30 years) measures, and assesses their financial implications. The report is focusing on six tasks, as follows:

- Task 1: Implement a Berg River water quality monitoring regime
- Task 2: Upgrade wastewater treatment works and train process controllers
- Task 3: Upgrade informal settlements
- Task 4: Advocate best practice in agricultural and agro-industrial processes
- Task 5: Implement riparian zone rehabilitation and bio-remediation
- Task 6: Pricing water management in the Berg River catchment.

5–
Opportunities and barriers

There are various private sector opportunities – and barriers to taking advantage of them – within the sector's value chain. We will consider them in the order presented in Figure 6, which identifies the main stages of the sector's value chain.

Figure 6: Water sector value chain



The seven major opportunity areas within the sector include:

- Invasive alien plants (IAP)
- Rainwater harvesting (RWH)
- Reducing municipal leaks (RML)
- Agricultural treatment and reuse (ATR)
- Industrial treatment and reuse (ITR)
- Domestic treatment and reuse (DTR)
- Decentralised wastewater treatment works (DWWTW)

Table 1: Water sector value chain, role player involvement and opportunities associated with: invasive alien plants (IAP); rainwater harvesting (RWH); reducing municipal leaks (RML); agricultural treatment and reuse (ATR); industrial treatment and reuse (ITR); domestic treatment and reuse (DTR); and decentralised wastewater treatment works (DWWTW).

	Basin management	Abstraction	Storage	Distribution	Use	WWT and discharge
Provincial government	IAP					
Municipalities				RML		DWWTW
Agriculture					ATR	DWWTW
Industry			RWH		ITR	
Commercial			RWH			
Residential			RWH		DTR	

5.1. Basin management: clearing IAPs

IAPs cover up to 10% of the country, and their distribution is increasing (Pathways to water resource security; South Africa regional study, April 2009). In the Western Cape, over 170 000 hectares of land are covered by invasive alien plants, predominantly in the riparian zones (Integrated Water Resource Management Action Plan: Status Quo, Department of Environmental Affairs and Development Planning, Western Cape Government, DEADP, 2012) In the province, the total cost of water losses caused by invasive alien plants is estimated at R1.29 billion per year.

The Breede-Gouritz water management area (WMA) is the most severely affected. The DEADP (2012) points out that clearing the invasive plants will make land available for use, but subsequent users must be sensitive towards the ecological integrity of the area (State of the Environment Outlook Report for the Western Cape Province Inland Water Chapter, DEADP, 2013).

Clearing IAPs is undertaken by the Working for Water programme, which started in 1995. It offers the private sector numerous potential opportunities when it comes to using waste biomass in, for example, manufacturing and energy production – among other areas. However, further work is required to determine the financial viability of these business models.

5.2. Storage: rainwater harvesting

Initiatives such as RWH can contribute to meeting rising water demand. The NWRS2 (2013) indicates that the DWS will continue to support the national RWH programme, which currently focuses on households in rural communities. The NWRS2 also points out that the intention is to extend the programme to RWH in households and office buildings in affluent neighbourhoods. Over R30 million has been budgeted towards supporting RWH to provide emerging farmers with quality water for their harvests (address by Mrs Pamela Tshwete, Deputy Minister of Water and Sanitation, National Council of Provinces Budget Reviews, Parliament, July 2014).

Opportunities for the private sector include manufacturing, selling and installing household and office rooftop RWH systems.

5.3. Distribution: reducing municipal losses (fixing leaks)

Non Revenue Water (NRW) is water lost through physical leakage, commercial losses through meter under-registration, billing errors, theft and unbilled authorised consumption. The Water Research Commission (WRC) estimates NRW accounts for approximately 36.8% of water supplied nationally. This means that an estimated R7.2 billion of potential revenue is lost every year (NWRS2, 2013).

Growing concern over the lack of action at municipal level has resulted in the DWS taking ownership of this challenge. The No Drop report publishes audited values linked to water use and management in local municipalities. This forms part of the DWS's flagship War on Leaks project (DWS, 2014). The growing emphasis on reducing losses through leaks translates into a growing number of opportunities for the private sector.

While the Western Cape municipalities, specifically CCT, lead the country in fixing leaks, numerous opportunities still exist in the province for the private sector. Specifically, these opportunities are in the installation of leak detection systems and in leak repair.

5.4.Water use: improvements to water efficiency

The WC WSS Reconciliation Strategy (2013) highlights the potential for improved efficiency in agriculture, helping to maintain crop yields and lower water demand while reducing costs. These savings accrue by reducing water and pumping costs, cutting fertiliser costs, and improving yields by maintaining soil quality. Interventions to achieve this include optimising crop selection, irrigation scheduling, irrigation methods, soil enhancement measures, and reviewing water source selection.

To drive improvements to water efficiency in agriculture, Fruitlook, a project established by the Department of Agriculture (DoA), supports farmers in making decisions on their water use. The web-based system provides information on nine growth parameters for each registered plot, using satellite imagery. These include evapotranspiration deficit, crop factor, biomass developed, biomass water use efficiency and nitrogen content.

There are opportunities to improve water efficiency in industry as well as agriculture. For example, SAB Miller has succeeded in reducing its breweries' water footprint by 25% since 2008 by implementing improvements to water efficiency in its manufacturing process (SABMiller, 2014). However, the company concedes that although water efficiency in its breweries is important, improving water efficiency across the agriculture sector would help to achieve more significant water savings.

In South Africa, 155 litres of water are required to produce a litre of beer – with 95% of this water used in agriculture, including freshwater irrigation and runoff. In George, the only part of the country where hops are grown commercially, a water risk assessment indicated that alien vegetation reduces flows by up to 40% (SABMiller, 2014). This highlights the need for a holistic, value chain approach to improving water efficiency.

Other options for improving water efficiency, particularly in the industrial, commercial and residential sectors, include installing permanent products to detect water leaks and excess consumption. These automatically cut off the supply and alert maintenance staff accordingly. For example, a recent project in 2014 involved installing leak detection and control systems in over 60 schools in the Western Cape. These reduced water usage by between 34-86% in the first two months.

5.5. Water reuse

The DWA developed a National Strategy for Water Reuse, to better inform decision making through the development of guidelines for the implementation of water reuse projects (NWRS2, 2013).

There are a number of current initiatives to treat and reuse water to expand production where no further abstraction is permitted. For example, the Atlantis Water Resource Management Scheme (AWRMS) recycles storm water and treated domestic effluent by using it to recharge the aquifer. Approximately 30% of groundwater in Atlantis is augmented by artificial recharging with treated wastewater (CSIR, 2012).

The agro-processing sector can also benefit greatly from continued improvements and increased uptake of water treatment and reuse techniques. This industry is among the sectors identified by the Industrial Policy Action Plan (IPAP), the New

Growth Path (NGP) and the National Development Plan (NDP) for its potential to stimulate growth and create jobs.

5.6. Water and wastewater treatment

Across the country, there are 1 286 wastewater treatment works and municipalities own 826 of them (DWA, 2013). The scale of investment that needs to be made in infrastructure will present numerous opportunities (Infrastructure investment in the Western Cape was expected to reach R4.6 billion in 2014-2015 – budget summary, Western Cape, 2014). At the same time, a lack of available funding may pose a major barrier.

Oversubscription of wastewater treatment infrastructure is now acting as a constraint on property development in certain areas in the province. As a result, municipalities and private developers are seeking alternatives. These include small-scale distributed solutions, which are particularly relevant to urban fringe areas. Apart from housing pressure, reasons for considering the decentralised options include the high cost of pumping which results from low population density; a need for improved access to services; a need to reduce river pollution; and a need for solutions that can be rapidly implemented. These drivers act as motivation for municipalities to facilitate private sector investment in decentralised solutions to waste water treatment.

Barriers to the uptake of decentralised wastewater treatment works include the lack of municipal bylaws to accommodate their installation; the need to monitor the quality of discharged effluent; negative perceptions about cost and maintenance requirements; and a perception that decentralised options are impractical to manage.

Decentralised wastewater treatment options have long been regarded as inferior alternatives to their large-scale counterparts. However, given the improvements in compact activated sludge systems, and given that strained municipal infrastructure is acting as a constraint on the development of urban fringe areas, local government and municipalities are reconsidering decentralised options.

These small-scale wastewater treatment works (WWTW) are particularly suitable for remote locations, farms, school and housing estates that are not close to local sewerage infrastructure. Their attractive qualities include easy installation, the range of available treatment capacities, low power consumption and low maintenance costs.

Crucially, suppliers point out that a three-stage activated sludge treatment process reduces chemical oxygen demand (COD) and biological oxygen demand (BOD) and removes nutrients, conforming to general discharge quality standards. This means that effluent is suitable for irrigation or can be discharged into a natural stream. The modular nature of these systems allows them to be scaled-up to suit a number of applications.
The Western Cape Department of Local Government is supporting municipalities in writing bylaws to allow the use of small-scale decentralised wastewater treatment works. Overcoming this hurdle will create opportunities for suppliers and installers of such plants.

5.7. Other barriers across the value chain

A major challenge in the water sector is the lack of adequate skills. Municipalities are suffering from a chronic shortage of engineers and a high management turnover, with 25% of posts staying vacant for more than three months. Nationally, approximately one in six managers leave the municipality within a year (DWA, Strategic Overview of the Water Sector, 2013). Reflecting this situation on a national scale, spending on consultants was expected to increase from R362.3 million in 2014-2015 to R477.9 million in 2016-2017. In 2013-2014, DWS injected R12.7 million into the Learning Academy to improve the technical capacity to perform operations and infrastructure maintenance.

6 – Investment incentives

There are a number of investment incentive programmes open to greentech manufacturing and service companies planning to set up in Cape Town and the Western Cape. They include:

Atlantis GreenTech Special Economic Zone (SEZ)

GreenCape is the project management office tasked with the preparation of an application for designation of the greentech Manufacturing Special Economic Zone (SEZ) in Atlantis, Cape Town (dti, 2015). As part of the national SEZ programme, the Atlantis SEZ will provide incentives for investments into greentech manufacturing (dti, 2015), which includes the manufacturing of energy efficiency, renewable energy and related technologies. These regulations are yet to be ratified by the dti. Some of the proposed incentives include a 15% company tax and building allowance.

Department of Trade & Industry (DTI) Incentives

The Department of Trade and Industry (dti) also offers a wide range of incentives across industries and sectors for businesses located anywhere in South Africa. Please refer to www.investmentincentives.co.za for more information on incentives that apply to your business.

7– Overview of GreenCape's activities in this sector

GreenCape's water sector desk, which produced this report, serves as a platform for the industry to access relevant information, source assistance in overcoming barriers, and connect to other stakeholders. The water sector desk is part of GreenCape's Resources Programme, which supports the uptake of technologies and practices that enable more productive and sustainable use of natural resources – primarily water and land – in the Western Cape economy.

GreenCape is also involved in other specifically water-related activities. These include assessing the extent to which water availability could act as a constraint on development in Saldanha Bay. This analysis includes a detailed review of the expected water demand from proposed developments in the region, and has highlighted the need to implement supply measures and reduce demand.

As a result, GreenCape's water team has worked with researchers at the University of Cape Town (UCT) to complete a proof of concept for a water exchange network to improve water efficiency through cascaded reuse among industry stakeholders in Saldanha Bay. This work provides a foundation for further collaboration with UCT, which will investigate the strategic prioritisation of water allocations, the associated governance structure, and the use of a geospatial tool to support the visualisation of trade-offs and knock-on effects of decisions in relation to water allocations and supply interventions. This work will start in 2015 with funding from the WCG and WRC.

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