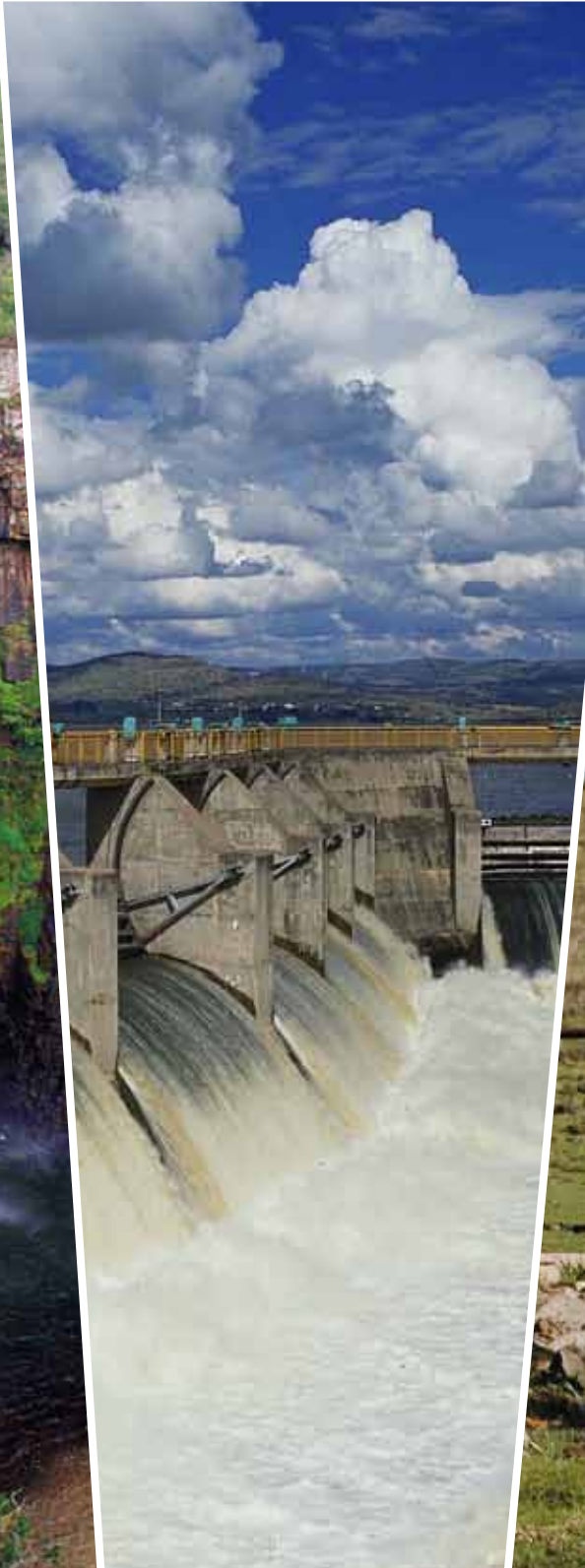


SOUTH AFRICA YEARBOOK 2012/13



# Water affairs

Water is at the heart of economic growth and forms the backbone of all social and economic development initiatives. However, factors such as climate change and increasing population growth result in an ever increasing demand for water and diminishing supplies.

While striving to ensure that all South Africans have access to clean water and safe sanitation, the water sector must therefore also promote effective and efficient water-resources management.

The Department of Water Affairs as the custodian of South Africa's water resources, leads the management of water resources, and is responsible for the formulation and implementation of policy governing this sector. The department also has an overriding responsibility for water services provided by local government.

With its vision of being dynamic and people-centred, the department is strategically positioning itself to ensure that the whole value chain, from "source-to-tap and waste-to-source" functions effectively.

The department is committed to ensuring that water is placed at the heart of all planning decisions made in the country, and that any decisions taken that rely on the steady supply of water, in terms of both quantity and quality, adequately take into account the availability of water.

While there is a need to expand the country's national infrastructure, water conservation and water demand management has been identified as a critical step to be implemented to give effect to reconciliation strategies.

All users and all sectors, including local government, therefore have to implement the necessary conservation and management measures. To this end, the department has been working with several municipalities on water conservation programmes to minimise water losses.

The department is also working closely with the agriculture, industrial and mining sectors to set water-use efficiency targets for their sub-sectors.

In addition, the department is increasing the exploitation of the country's groundwater resources, and intensifying projects on water recycling, as well as desalination of water in coastal areas.

## Legislation

South Africa's Constitution and Bill of Rights enshrine the basic human right to have access to sufficient water and a safe and healthy environment. Government fulfils these rights through the Department of Water Affairs, assisted by specific legislation:

- The National Water Act, 1998 (Act 36 of 1998), ensures that South Africa's water resources are protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner, for the benefit of all people.
- The Water Services Act, 1997 (Act 108 of 1997), prescribes the legislative duty of municipalities as water service authorities to provide water supply and sanitation according to national standards and norms. It also regulates water boards as important water service providers and gives the executive authority and responsibility to the Minister of Water Affairs to support and strengthen the capacity of municipalities to manage their own affairs, exercise their powers and perform their functions. The Water Services Act, 1997 places an obligation on the Minister to maintain a National Water Services Information System and to monitor the performance of all water services institutions.
- The Water Research Act, 1971 (Act 34 of 1971), provides for the promotion of water-related research through a Water Research Commission (WRC) and a Water Research Fund.
- The National Environmental Management Act (Nema), 1998 (Act 107 of 1998), makes provision for cooperative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that promote cooperative governance and procedures for coordinating environmental functions exer-

South Africa is ensuring the security of its water supply with the completion of several major new water projects throughout the country by 2014. These include the Mokolo Augmentation Project to supply water to the planned Medupi Power Station in Lephalale in Limpopo, and the Mooi-Mgeni Transfer Scheme Project, which will include the construction of the Spring Grove Dam around eThekweni/Durban and Umgungundlovu in KwaZulu-Natal.

cised by organs of state.

- The National Water Policy is underpinned by three fundamental principles for managing water resources: equity, (environmental) sustainability and efficiency.

The department is responsible for policy development, regulation and oversight of sanitation provision. Currently, sanitation provision is governed by the Strategic Framework on Water Services (2003) and the Water Services Act, 1997.

The Department of Human Settlements also has a strong mandate regarding the provision of sanitation by driving a sanitation policy review process to clarify roles and functions regarding sanitation, to be completed during the 2012/13 term. It may also result in a legislative review.

All water users who do not receive their water from a service provider, local authority, water board, irrigation board, government water scheme or other bulk supplier, and who use water for irrigation, mining purposes, industrial use, feedlots or in terms of a general authorisation, have a statutory obligation to register. This includes the use of surface and groundwater.

Other uses of water that must be registered include:

- diversion of rivers and streams
- discharge of waste or water containing waste
- storage, which includes any person or body storing water for any purpose from surface run-off, groundwater or fountain flow in excess of 10 000 m<sup>3</sup>, or where the water area at full supply level exceeds one hectare (ha) in total on land owned or occupied by that person or body, and who is not in possession of a permit or permission

- local authorities and other bulk suppliers with their own water sources and purification works
  - controlled activities such as irrigating with waste, power generation with water, atmospheric modification or recharging of aquifers.
- An assessment of the environmental requirements of the rivers and streams concerned is conducted before a licence can be issued.

To further promote sustainable and equitable water resources management, the department has developed and continues to update a range of strategies for water management.

## Policies and strategies

### National Water Resource Strategy (NWRS)

The NWRS provides a roadmap on how water should be used, protected, conserved, distributed and managed for the benefit of all South Africans.

The second edition of the NWRS, gazetted in September 2012, is a culmination of a process of wide and extensive consultation by the department with experts in the water sector and stakeholders both in government and in the private sector.

The first edition, the NWRS-1, set out the blueprint for water resources management in the country for the first time. The NWRS-2 sets out the strategic direction for water resources management, with particular focus on priorities and objectives for the period 2013 to 2017.

The NWRS-2 is centred around the recognition of water as a basic human need, and an understanding of the critical role it plays in ensuring equitable socio-economic development. The NWRS-2 recognises the need to address equitable allocation of water resources, which has not as yet been fully realised.

### Water for Growth and Development (WfGD)

The WfGD framework sets the foundation and provides the necessary pointers for the review of the NWRS. It provides strategic guidance for supporting South Africa's requirements for

economic growth and development. It includes both water resources and water services and places emphasis on the challenge of ensuring access to adequate potable water for all South Africans. It focuses on social and economic growth dimensions of water management within the environmental sustainability paradigm.

Although the WfGD framework was approved by Cabinet, it was never gazetted. The revised NWRS-2, however, has incorporated aspects of the WfGD that pertain to water resources management, as key core strategies.

Major dams of South Africa

Dam	Full supply capacity (10 <sup>6</sup> m <sup>3</sup> )	River
Gariep	5341	Orange
Vanderkloof	3171	Orange
Sterkfontein	2616	Nuwejaarspruit
Vaal	2603	Vaal
Pongolapoort	2445	Pongola
Bloemhof	1264	Vaal
Theewaterskloof	480	Sonderend
Heyshope	451	Assegai
Woodstock	380	Tugela
Loskop	361	Olifants
Grootdraai	354	Vaal
Kalkfontein	318	Riet
Goedertrouw	304	Mhlautze
Albert Falls	288	Mgeni
Brandvlei	284	Brandvlei
Spioenkop	277	Tugela
Mthatha	253	Mthatha
Driekoppies	250	Lomati
Inanda	241	Mgeni
Hartbeespoort	212	Crocodile
Erfenis	207	Groot Vet
Rhenosterkop	204	Elands
Molatedi	22	Groot Marico
Ntshingwayo	198	Ngagane
Zaaihoek	192	Slang
Midmar	175	Mgeni

Source: Department of Water Affairs

### Raw Water Pricing Strategy

The National Water Act, 1998 makes provision for the three types of water use charges, namely:

- the water resource management charge
- the water resource development and use charge
- a charge for achieving equitable and efficient allocation of water.

The objective of the water pricing strategy is to promote financial sustainability and economic efficiency in water use. The Act also makes provision for financial assistance in the form of grants, loans or subsidies.

A sustainable water price in South Africa is one that will:

- reflect true costs (including infrastructure, management, operation and maintenance and environmental costs)
- incentivise efficient water use
- reduce pollution
- promote least-cost solutions to providing water
- achieve equity in terms of incorporating cost-sharing practices as needed
- enhance affordability for poor water users
- enhance the long-term viability of water institutions.

The 2013 review of the Raw Water Pricing Strategy will address the issue of water scarcity and how best to use water pricing as a tool for driving improved water-use efficiency without having a negative impact on small-scale or under-resourced water users.

### Institutional Realignment and Restructuring

The Department of Water Affairs initiated an Institutional Reform and Realignment Project in December 2010 with the purpose of establishing an appropriate institutional design for the sector and to facilitate its implementation through appropriate institutional reforms and realignment.

In line with its vision, the strategy separates policy-making, shareholding and regulation to ensure effective governance in the sector. It is also aimed at facilitating institutional integra-

tion to ensure that functions are allocated to institutions that are best placed to undertake them, to optimise the sector's capacity and to facilitate economies of scope and scale.

### National Groundwater Strategy

Groundwater is a strategic resource in many parts of South Africa, especially in rural areas. It also plays an important role in the supply of water to small towns and villages in the drier parts of the country. There is considerable potential for additional development of groundwater resources to augment existing resources. The need for improved groundwater management to ensure sustainable and efficient use of the resource was recognised in NWRS-1 and led to the formulation of a National Groundwater Strategy through which strategic actions are undertaken.

### Re-Use Strategy

In 2000, re-use of water (mainly water flowing back to rivers) already accounted for 14% of all available water. The return flows of urban areas to rivers are about 50% of the water being used.

Re-use could be significantly increased with re-use of return flows in coastal cities, where it would otherwise drain into the sea. In coastal cities, water re-use and desalination compete as two options for water conservation.

Re-use is becoming increasingly acceptable and feasible owing to increasing shortages, improved purification technology and decreasing treatment costs. For example, membrane

In February 2013, the Minister of Water and Environmental Affairs, Ms Edna Molewa, published the *Environmental Impact Assessment (EIA) Guideline for Aquaculture in South Africa*, for public comment in the *Government Gazette*.

The guideline seeks to, among others, align the EIA process and environmental authorisations to the specific nature of aquaculture. It also seeks to identify and promote awareness of the potential positive and negative impacts associated with aquaculture and present measures of mitigation to the potential impacts of aquaculture.

technologies, also used for desalination of seawater, have become more affordable and have improved. The re-use of treated wastewater will have to be managed carefully to ensure public health safety.

Currently, about 280 million m<sup>3</sup> a year of re-use is in a pre-feasibility stage and 15 million m<sup>3</sup> is in a reconnaissance phase. The Department of Water Affairs has developed a water re-use strategy with the intent to encourage informed decisions relating to water re-use.

### Rainwater harvesting

The Department of Water Affairs supports a national rainwater harvesting programme, which has a narrow but important focus on the construction of above- and below-ground rainwater storage tanks by rural households for food gardens and other productive water uses.

Several municipalities are already using roof rainwater tanks for domestic purposes. These have been found to be particularly effective when used in conjunction with other water supply options. Although there are no hard figures yet on how many cubic millimetres per year rainwater harvesting can contribute, it is an option that can be implemented within a short timeframe.

eThekweni Municipality has piloted rainwater harvesting to supplement the water supply to 500 poor households in Inanda, Ntuzuma and KwaMashu in the greater Durban Metro and managed to save 10% on bulk water demand.

### Desalination Strategy

Desalination of seawater could potentially provide an unlimited resource of fresh water. It has become more attractive since the NWRs-1 because of improved technologies, decreasing costs and increasing water scarcity. However, the rising cost of energy may be a deterrent.

Like other infrastructure projects with potential environmental impacts, the planning for a desalination plant will have to undergo an environmental impact assessment in compliance with Nema, 1998. The Department of Water Affairs will ensure that desalination is considered as an option for meeting future water

requirements, in particular in coastal cities where there is sufficient electricity for desalination. The target is not only to implement desalination in several locations in South Africa, but also to become an international knowledge centre in this particular field. The department has developed a supporting desalination strategy, which also includes desalination as a technology for treating water other than seawater for water re-use.

### Budget and funding

The current budget allocation is R8,8 billion, of which R2,5 billion is earmarked for the Regional Bulk Infrastructure Programme (RBIG), and R2,2 billion is earmarked for water resources infrastructure development and rehabilitation projects.

Spending by the department increased from R5,1 billion in 2008/9 to R9 billion in 2011/12 at an average annual rate of 20,6%. This was largely driven by the increase in expenditure on the development of bulk water infrastructure, which includes funds allocated for the construction of new dams and rehabilitation of existing bulk infrastructure.

Expenditure in the Water Sector Management Programme increased from R413,1 million in 2008/9 to R882,2 million in 2011/12, at an average annual rate of 28,8%. In this period, this was the department's fastest growing programme as it incorporates expenditure on the development of a long-term national strategy detailing South Africa's response to the challenges arising from acid mine drainage.

Between 2008/9 and 2011/12, expenditure in the Water Infrastructure Management Programme increased from R1,6 billion to R2,4 billion, at an average annual rate of 13,2%. This increase resulted from the increased transfer payments to water services authorities and water boards, which act as implementing agents on behalf of the department.

Expenditure on transfers and subsidies increased from R2,7 billion in 2008/09 to R3,5 billion in 2011/12, at an average annual rate of 9,2%, as a result of the development of bulk water infrastructure. This included funds

allocated for the construction of the De Hoop Dam and ancillary infrastructure such as distribution pipelines for the Nandoni Dam and the rehabilitation and repair of existing bulk infrastructure.

Over the medium term, expenditure is expected to grow from R9 billion in 2011/12 to R10,7 billion in 2014/15 at an average annual rate of 5,8%. The increase is mainly attributed to growth in the Regional Implementation and Support Programme, which is expected to increase from R4,8 billion in 2011/12 to R5,7 billion in 2014/15, at an average annual rate of 6,3%.

The department received additional allocations of R418,9 million for 2012/13, R647,2 million for 2013/14 and R940,9 million for 2013/14 as follows:

- R226,5 million, R266,3 million and R396,1 million over the next Medium Term Expenditure Framework (MTEF) period for the construction of the De Hoop Dam's regional bulk distribution systems to connect to the national bulk distribution systems
- R60 million, R140 million and R200 million over the MTEF period for the Sedibeng District Municipality wastewater bulk infrastructure
- R95 million, R200 million and R300 million over the MTEF period for the OR Tambo District Municipality regional bulk water and wastewater infrastructure
- R25,4 million, R28,3 million and R31,6 million over the MTEF period for improvements in conditions of service for the department
- R12 million, R12,6 million and R13,2 million over the MTEF period for improvements in conditions of service for the water trading entity (WTE).

## Role players

### Water boards

The primary activity of water boards is to provide water services (bulk potable and bulk waste water) to other water services institutions within their respective service areas. They may perform other activities under conditions set out in the Water Services Act, 1997. In

certain situations, the Minister of Water Affairs may direct water boards to amend their business plans to meet all the requirements of the Water Services Act, 1997.

The 12 water boards and their service delivery areas are:

- Amatola Water: Eastern Cape
- Bloem Water: Free State
- Botshelo Water: North West
- Bushbuckridge Water: Mpumalanga
- Lepelle Northern Water: Limpopo
- Magalies Water: North West and Gauteng
- Mhlathuze Water: KwaZulu-Natal
- Overberg Water: Western Cape
- Pelladrift Water: Northern Cape
- Rand Water: Gauteng, Mpumalanga, Free State and North West
- Sedibeng Water: Free State, North West and Northern Cape
- Umgeni Water: KwaZulu-Natal.

### Catchment management agencies (CMAs)

The main responsibilities of CMAs are to manage water resources at catchment level in collaboration with local stakeholders, with specific focus on involving local communities in the decision-making processes, in terms of meeting basic human needs, promoting equitable access to water, and facilitating social and economic development.

In essence, CMAs are service-delivery agencies and are listed in the Public Finance Management Act, 1999 (Act 1 of 1999).

There are two CMAs in South Africa, namely the Breede-Overberg Catchment Management Agency and the Inkomati Catchment Management Agency.

### Water-user associations (WUAs)

WUAs are cooperative associations of individual water users who wish to undertake water-related activities at local level for their mutual benefit. They operate in terms of a formal constitution as set out in Schedule 5 of the National Water Act, 1998.

Currently, all irrigation boards are in the process of being transformed into WUAs to fall within the ambit of the National Water Act,

1998. Out of the 279 irrigation boards, 111 have been transformed into 59 WUAs. The remaining 168 irrigation boards will be transformed into WUAs in the next five years. In addition, 35 new WUAs have been established; most of these are focused on supporting resource-poor farmers.

### Water Research Commission (WRC)

The WRC plays a pivotal role in water research by establishing needs and priorities, stimulating and funding research, promoting the transfer of information and technology, and enhancing knowledge and capacity-building in the water sector.

The commission provides support to the water sector and all its relevant institutions and partners. Over the medium term, it will focus on water resources management, water-linked ecosystems, water use and waste management, and water use in agriculture.

### Water Trading Entity (WTE)

The Department of Water Affairs is responsible for the regulation of water use in South Africa by ensuring that water is allocated equitably and used beneficially in the public interest, and is also required to create a register of all water users in the country.

The National Water Act, 1998 makes provision for cost recovery on services rendered by the department to water users. It is against this background that the department created the WTE within its administration.

The main function of the WTE is development, operation and maintenance of specific water resources infrastructure and managing water resources in specific water management areas.

### Trans-Caledon Tunnel Authority

The Trans-Caledon Tunnel Authority is a state-owned entity specialising in project financing, implementation and liability management. It is responsible for the development of bulk raw-water infrastructure. It also provides an integrated treasury management and financial advisory service to the Department of Water

Affairs, water boards, municipalities and other entities that are linked to bulk raw-water infrastructure. The Trans-Caledon Tunnel Authority is primarily responsible for off-budget projects.

### Komati River Basin Water Authority

The Komati Basin Water Authority was established in terms of a treaty between South Africa and Swaziland. The aim of the authority is to manage the water resources of the Komati River basin sustainably. The authority is responsible for financing, developing, operating and maintaining the water resources infrastructure in the basin, comprising the Driekoppies Dam in South Africa and the Maguga Dam in Swaziland.

### Water Tribunal

The Water Tribunal was established in 1998 to hear appeals against directives and decisions made by responsible authorities, CMAs or water management agencies about matters covered by the National Water Act, 1998, like the issuing of licences to use water. It is an independent body and can hold hearings anywhere in the country.

The WRC and the Judicial Services Commission recommend people to be members of the Water Tribunal, and the Minister of Water Affairs appoints them. The members have to be familiar with water management, engineering, law and other related matters, and they are given administrative support by the Department of Water Affairs.

### Resources

South Africa's water resources are, in global terms, scarce and extremely limited. The total flow of all the rivers in the country amounts to about 49 200 million m<sup>3</sup> per year. This is less than half of that of the Zambezi River, the closest large river to South Africa. Groundwater plays a pivotal role, especially in rural water supplies.

The country's climate varies from desert and semi-desert in the west to sub-humid along the eastern coastal area, with an average rainfall of about 450 mm per year. This is well below



the world average of about 860 mm per year, while evaporation is comparatively high.

Water resources are unevenly spread across South Africa. The variable rainfall distribution and characteristics give rise to an uneven run-off and distribution of water resources, with more than 60% of the river flow arising from only 20% of the land area.

To compensate for the uneven spread of water resources and to manage floods and droughts, more than two thirds of the country's mean annual run-off are stored in dams. Most of the economically available yield from surface water resources has been fully developed and used, and opportunities for developing new and economic dams are few.

South Africa's inland water resources include 22 major rivers, 165 large dams, more than 4 000 medium and small dams on public and private land, and hundreds of small rivers.

However, owing to the predominantly hard-rock nature of South Africa's geology, there are few major groundwater aquifers that can be used on a large scale.

The poor spatial distribution of rainfall means that the natural availability of water is also highly uneven. This is compounded by the strong seasonality of rainfall over virtually the entire country, and the high within-season variability of rainfall, and consequently, of run-off.

As a result, stream flow in South Africa's rivers is at relatively low levels most of the time, with sporadic high flows occurring – characteristics which limit the proportion of stream flow

that can be relied upon to be available for use, and which also have implications for water-related disasters such as floods and droughts.

To aggravate the situation, most urban and industrial development, as well as some dense rural settlements, have been established in remote locations away from large watercourses. As a result, the requirements for water already far exceed its natural availability in several river basins. Widespread and often large-scale transfers of water across catchment areas have, therefore, been implemented in South Africa.

Measures will also be introduced to ensure the most beneficial and efficient use of water from a social and economic perspective.

Provided that South Africa's water resources are judiciously managed and wisely allocated and used, sufficient water of appropriate quality will be available to sustain a strong economy, high social standards and healthy aquatic ecosystems for many generations.

South Africa depends mainly on surface-water resources for urban, industrial and irrigation water supplies in the country. In general, surface-water resources are highly developed over most of South Africa.

Groundwater is also extensively used, particularly in the rural and more arid areas, contributing to some 60% of newly serviced households since 1994.

In the northern parts of the country, both surface and groundwater resources are nearly fully developed and used. Some over-exploitation occurs in localised areas, with little undeveloped resource potential remaining. The reverse applies to the well-watered south-eastern region of the country, where there are still significant undeveloped and under-used resources.

The total mean annual run-off of water in South Africa under natural (undeveloped) conditions is estimated at a little over 49 200 million m<sup>3</sup> per year, including about 4 800 million m<sup>3</sup> per year of water originating from Lesotho, and about 700 million m<sup>3</sup> a year originating from Swaziland, which naturally drain into South Africa.

Agricultural irrigation represents close to

IBM marked World Water Day on 22 March 2013 with the launch of a crowd-sourcing project to capture, share and analyse information about the water distribution system in South Africa.

The project, called WaterWatchers, is driven by a new smartphone application and SMS capability that will enable South Africans to report water leaks, faulty water pipes and general conditions of water canals. Every update will provide vital data points to an aggregated report to create a single view of the issues challenging South Africa's water distribution system. This WaterWatchers report will be made available to local municipalities, water control boards and other water system stakeholders once the data is filtered appropriately.

National Water Week 2013 was marked by the unveiling of the Komati Water Scheme Augmentation Project (KWSAP) on 19 March. The R1,2 billion project, which was launched in Kriel in eMalahleni, was designed to resolve the water supply problems to Eskom's Duvha and Matla power stations in Mpumalanga.

The KWSAP augments the Komati Water Scheme from the Vaal Eastern Sub-system to help Eskom overcome its water supply challenges. The Matla power station reservoir will in turn also provide water to Kusile power station, which is under construction.

The interaction of the water resources of the Komati, Usutu and Vaal River systems provides a higher assurance of water supply to all Eskom's thermal power stations and other water users in the Mpumalanga area.

The KWSAP will be able to deliver an additional 57 million m<sup>3</sup> of water per year to the Komati Water Scheme.

60% of the country's total water requirements, while urban requirements constitute about 25% as the second-largest user sector. The remaining 15% is shared by the other sectors (all standardised to 98% assurance of supply).

The total nett abstraction of water from surface water resources amounts to about 10 200 million m<sup>3</sup> per year for the whole of South Africa, after allowing for the reuse of return flows. This represents about 20% of the total mean annual run-off of 49 200 million m<sup>3</sup> per year (all standardised to 98% assurance of supply). A further 8% is estimated to be lost through evaporation from storage and conveyance along rivers, and 6% through land-use activities. As a national average, about 66% of the natural river flow (mean annual run-off) therefore still remains in the country's rivers.

Early in 2012, The British Geological Survey and University College London published a report, *Quantitative Maps of Groundwater Resources in Africa*. According to this paper, maps indicate that the total volume of water in aquifers is more than 100 times the amount found on the surface and 20 times the fresh water stored in African lakes.

Southern Africa also has large hidden underground water reserves, with 12 to 15 aquifer systems, of which three are considered very important for the future.

In South Africa, a substantial resource lies in a massive dolomite aquifer system east of Johannesburg in Gauteng. This aquifer covers a vast area, extending from Springs and Brakpan east of Johannesburg; to Lenasia south of the city; Zuurbekom, Carltonville and Magaliesberg on the West Rand; Kuruman in the Northern Cape and even as far as parts of Botswana.

The Witwatersrand mining basin's aquifer storage capacity is about the size of Lake Kariba. Other countries such as Mozambique, Zambia, Zimbabwe, Namibia, Botswana and Ghana also have hidden aquifers.

### Dams and water schemes

In an attempt to adequately respond to demand and anticipate future demand, South Africa has built numerous large and medium-sized dams, and developed sophisticated inter-basin transfer schemes. The country now has more than 500 government-owned dams spread across all nine provinces. They range in storage capacity from a volume of 5 500 million m<sup>3</sup> of water down to 0,2 million m<sup>3</sup> of water.

South Africa currently uses about 10 200 million m<sup>3</sup> of water per year from its major dams. This amount is about 20% of the total mean run-off volume of water South Africa receives a year. Evaporation accounts for a very high 8% loss of stored water resources (the hot climate contributes to this, as well as the large surface areas of many dams), and a further 6% is lost through various land-use activities. The majority of water consumption can be attributed to drinking, irrigation, electricity, mining processes and industrial processes.

The Department of Water Affairs follows an integrated approach to managing South Africa's water resources. Proposed new water schemes need to comply with the NWRS, requiring that water-demand management programmes be implemented before embarking on new infrastructure development.

Strict environmental impact assessments must also be performed in accordance with laws and regulations administered by the Department of Environmental Affairs, while the

guidelines issued by the World Commission on Dams must also be followed.

Bulk infrastructure is a critical element of water-services infrastructure and an integrated part of water-services management.

Government has implemented key projects to augment South Africa's water resources. Some are discussed below.

- The Trans-Caledon Tunnel Authority has procured funding to implement the Mokolo and Crocodile River West Water Augmentation Project's first two phases with a cost of about R2 billion, to deliver water to Eskom's new Medupi power station and other industries in the area, as well as domestic water to the Lephalale Local Municipality. The first water delivery is expected in 2014.
- On the Mooi River in KwaZulu-Natal near Rosetta, a R2,2-billion contract was awarded for the construction of the 42 m-high Spring Grove Dam, with a storage capacity of 142 million m<sup>3</sup>.
- R91,2 million was spent in 2011/12 to raise the Hazelmere Dam, to augment the water supply provided by Umgeni Water to KwaZulu-Natal's north coast.
- De Hoop Dam will deliver water for domestic and agricultural use in the Greater Sekhukhune, Waterberg and Capricorn district municipalities. The estimated cost of its construction is approximately R3,1 billion. This will deliver water to three million Limpopo residents.
- During 2011/12, the construction of a water conveyance system from the Vaal Dam to Secunda to augment the water supply to Eskom power stations and Sasol was commissioned, comprising abstraction works, a storage reservoir, a high-lift pump station and a 121-km pipeline.

In addition to the infrastructure development currently underway, planning and preparing for the construction of other dams and related infrastructure is also in progress.

These include:

- completion of the water treatment works and bulk distribution system from Nandoni Dam in Limpopo

- construction of a pipeline from the Flag Boshielo Dam to Mokopane and nearby communities
- completion of feasibility studies and designs for the Umzimvubu and Foxwood dams in the Eastern Cape
- construction of the bulk distribution pipelines and reticulation networks from the Jozini Dam in KwaZulu-Natal and the Groot Letaba Augmentation Project, comprising raising the Tzaneen Dam
- finalising plans for the construction of the N'wamitwa Dam and the associated water treatment plants and bulk distribution pipelines.

### Groundwater resources

Groundwater, despite its relatively small contribution to bulk water supply (13%), represents an important and strategic water resource in South Africa, since it services between 52% and 82% of community water-supply schemes in the Eastern Cape, Limpopo, Northern Cape, North West and KwaZulu-Natal.

Owing to the lack of perennial streams in the semi-desert to desert parts, two thirds of South Africa's surface area are largely dependent on groundwater. Although irrigation is the largest user, the supply to more than 300 towns and smaller settlements is also extremely important.

Through government's commitment towards meeting the basic water needs of communities, groundwater has become a strategic resource for village water supply in the wetter parts of the country, because of its cost-effectiveness in a widely scattered smallscale-user situation.

Groundwater also contributes a considerable portion to river flow. This requires reserving a significant share of groundwater resources to protect aquatic ecosystems in terms of the National Water Act, 1998. The maximum quantity of groundwater that can be developed economically is estimated at about 6 000 million m<sup>3</sup> a year, while some 4 000 million m<sup>3</sup> of groundwater (mainly in the dry season) contributes to surface-water flow annually.

## Managing and developing water resources

To facilitate the management of water resources, the country has been divided into 19 catchment-based water management areas, of which 11 share international rivers.

Sufficient water resources have been developed and are available to ensure that all current requirements for water can reasonably be met, without impairing the socio-economic development of the country.

Where feasible, special management techniques may be applied to improve water quality to appropriate standards for particular uses. The quality of groundwater varies according to hydrogeological conditions and anthropogenic impact. However, most major aquifer systems contain potable-quality water.

To underscore its commitment to the pursuit of universal access to water, the department is investing in new infrastructure and maintaining and rehabilitating dysfunctional systems to ensure operational efficiency.

This commitment is particularly relevant regarding developing water infrastructure to meet the specific needs of different rural communities. Closely related to rural development is the need for mainstream support to local government to sustain the infrastructure underpinning efficient service delivery to communities.

Through the department's rural development programme, 3 100 farmers were issued with water licences, rehabilitated and upgraded infrastructure, operation and maintenance subsidies, rainwater tanks and bulk pipelines/ infrastructure in 2011/12. Some 14 768 rainwater harvesting tanks were provided.

## Managing water quality and waste water

To ensure compliance with minimum water quality norms and standards, the department started the annual Blue Drop and Green Drop assessments to guarantee that water and waste-water systems are managed according to set norms and standards.

The department has set a target of 99% compliance with drinking-water quality stand-

ards and 80% compliance with waste-water effluent standards.

Introduced in 2008, this incentive-based regulation system aims to improve municipal drinking-water quality and waste-water management.

Because of the scale and the magnitude of resources needed for the national certification programme, the Green Drop and Blue Drop programmes take place every second year, alternating with each other. In a programme's "gap" year, progress in the wastewater sector is

**Natural mean annual run-off and ecological reserve (million m<sup>3</sup> per year)**

Water management	Natural mean annual run-off <sup>(1)</sup>	Ecological reserve <sup>(1,2)</sup>
Limpopo	985	156
Luvuvhu/Letaba	1 185	224
Crocodile West and Marico	855	165
Olifants	2 042	460
Inkomati <sup>(3)</sup>	3 539	1 008
Usutu to Mhlatuze <sup>(4)</sup>	4 780	1 192
Thukela	3 799	859
Upper Vaal	2 423	299
Middle Vaal	888	109
Lower Vaal	368	48
Mvoti to Umzimkulu	4 798	1 160
Mzimvubu to Keiskamma	7 241	1 122
Upper Orange	6 981	1 349
Lower Orange <sup>(5)</sup>	502	69
Fish to Tsitsikamma	2 154	243
Gouritz	1 679	325
Olifants/Doring	1 108	156
Breede	2 472	384
Berg	1 429	217
<b>Total</b>	<b>49 228</b>	<b>9 500</b>

1) Quantities refer to the water management area under consideration only (water that originates or is required in that water management area).

2) Total volume given, based on preliminary estimates, impact on yield being a portion of this.

3) Includes Komati catchment in Swaziland (mean annual run-off = 517 million m<sup>3</sup>/a).

4) Includes Pongola catchment in Swaziland (mean annual run-off = 213 million m<sup>3</sup>/a).

5) Includes contributions from Senqu and Caledon rivers in Lesotho (mean annual run-off = 4 765 billion m<sup>3</sup>/a).

Source: Department of Water Affairs

tracked and reported via the assessment of the cumulative risk status of treatment systems.

The department was honoured to receive international recognition in terms of Environmental Engineering Excellence for the Blue Drop and Green Drop Certification programmes from the American Academy for Environmental Engineers. This academy is affiliated to the International Water Association.

### Blue Drop Programme

South Africa's drinking-water quality matches best international practice and follows the guidelines set out by the World Health Organisation. As it involves a benchmark score of 95%, the Blue Drop certification is the recognition of exceptional performance, and should not be equated to a pass mark. It simply credits exceptional drinking-water quality.

The *National Blue Drop Water Quality Assessment Report* was released in May 2012. The number of systems where water safety planning is underway increased from 154 in 2011 to 579 in 2012. Some 269 of these risk management processes compare well with the expectations of the World Health Organisation.

In 2012, 98 of the country's municipalities were awarded Blue Status, up from 66 in 2011.

The average national Blue Status score jumped from 72,9% in 2011 to 87,6% in 2012. The scores have increased year on year since the first Blue Drop report was released in 2009, when municipalities notched up a national average of 51,4%.

Some 153 of South Africa's 287 municipalities and 931 water systems were audited for the 2012 report.

The top 10 municipal performers were:

- Ekurhuleni Metropolitan Municipality in Gauteng (98,95%)
- City of Johannesburg Metropolitan Municipality in Gauteng (98,92%)
- Mogale City Local Municipality in Gauteng (98,79%)
- eThekweni Metropolitan Municipality in KwaZulu-Natal (98,77%)
- Tlokwe Local Municipality in North West (98,45%)

- City of Cape Town Metropolitan Municipality in the Western Cape (98,14%)
- George Local Municipality in the Eastern Cape (98,12%)
- Eden District Municipality in the Western Cape (98,12%)
- Bitou Local Municipality in the Western Cape (97,74%)
- Witzenberg Local Municipality in the Western Cape (97,63%).

Of the 98 municipalities that achieved Blue Drop certification, 38 were serviced by water boards and about 20 by the private sector.

The top-performing province was Gauteng with a score of 98,1%, followed by the Western Cape (94,2%) and KwaZulu-Natal (92,9%).

### Green Drop Programme

The Green Drop certification measures the performance of waste-water treatment works. The last publication, the *Green Drop Report* of June 2011, reported on municipal wastewater performance.

The results can be summarised as follows:

- 156 municipalities provided wastewater services via a network of 821 collector and treatment systems
- 14 of 33 systems retained Green Drop status
- 73% of the 821 systems were micro, small and medium-sized systems, while the remainder of 27% were large and macro-sized systems
- 33 systems were awarded Green Drop status in 2009
- 40 systems were awarded Green Drop status in 2011, up from 33 systems in 2010.

The *Green Drop Risk Profile Progress Report 2012* is the product of a "gap" year, whereby progress is reported in terms of the improvement or decline in the risk position of the particular wastewater treatment facility, as compare to the previous year's risks profile. The tool to collect, assess and report the risk profile is called the Green Drop Progress Assessment Tool (PAT) and all municipalities, public works and selected private works participated in PAT assessments from November 2011 to February 2012.

In October 2012, the Minister of Water Affairs, Ms Edna Molewa, launched the Rand Water Academy in Zuikerbosch, Vereeniging. The first group to be trained comprised 130 young graduates in the fields of science, artisanship, engineering and process control.

The 2012 report presented the current risk profile and a three-year trend analysis of treatment plants on three levels, namely system-specific, region-specific and national.

Some 153 municipalities and 831 plants were assessed in the *2012 Green Drop Risk Profile Progress Report*.

The overall progress on a nationwide scale can be summarised as follows:

- 440 plants showed progress by taking up lower-risk positions, while 323 plants digressed by taking up increased risk ratios, and 68 plants maintained their status of 2011
- The majority of plants were in moderate risk (241 plants) and low risk (225 plants), with 212 plants in high risk and 153 plants in critical risk space.

## Programmes and initiatives

### Integrated Water Resources Management (IWRM)

The Department of Water Affairs, with the assistance of the Royal Danish Government, initiated a programme in 2000 to pilot IWRM approaches in three water management areas of South Africa: Crocodile West – Marico (mainly in the North West province), Mvoti to uMzimkulu (KwaZulu-Natal) and Olifants-Doorn (mainly in the Western Cape).

These water management areas were selected as they represent a cross-section of water resources conditions as well as water use conditions and user interests.

The IWRM requires intensive planning to ensure efficient, equitable and sustainable management of water resources and for coping with conflicting demands.

The department developed two key strategic frameworks to guide it, namely the NWRS of

2004 and the Water for Growth and Development Framework of 2008. The strategy seeks to achieve reconciliation between available water resources with growing requirements.

### National Water Resources Infrastructure (NWRI) Programme

The NWRI ensures reliable supply of water from bulk raw-water resources infrastructure. The programme solicits and sources funding to implement, operate and maintain bulk raw-water resources infrastructure efficiently and effectively by strategically managing risks and assets.

Some augmentation projects were identified and prioritised for implementation by 2014. These include:

- emergency works in Mopani
- construction of the Nwamitwa Dam in the Groot Letaba Water Augmentation Project
- raising of the Tzaneen Dam in the Groot Letaba Water Augmentation Project
- the Mdloti River Development and raising of Hazelmere Dam
- the Mokolo from Crocodile River (West) Water Augmentation Project Phase 1
- the Nandoni Pipeline Project
- raising of the Clanwilliam Dam in the Olifants-Doorn River Water Resources Project
- phase two of the Olifants River Water Resources Development Project
- the Komati Water Augmentation Project
- phase two of the Mooi-Mgeni Transfer Scheme
- the Vaal River Eastern Sub-System Augmentation Project.

The NWRI Maintenance Programme ensures the availability of water supply for domestic use.

During 2012, the Department of Water Affairs, in partnership with the Department of Public Works, started a programme of using the services of retired engineers to mentor and coach young and prospective engineers in the department. In addition, the graduate recruitment programme has since its inception also played a role in recruiting a total of 240 graduate trainees; 35 of whom have been placed as candidates in various engineering positions.

- The following progress was made in 2012:
- rehabilitation of nine out of 25 national dams was completed
  - seven of 28 water conveyance projects were completed; measures were put in place to expedite the process to meet the 2014 targets
  - following the process of verification to determine safety, health and environment, about 91 dams with a safety risk were classified
  - a total of 195 dams were identified for safety risks.

### **Regional Bulk Infrastructure Grant (RBIG) Programme**

Regional bulk infrastructure is defined as the infrastructure required to connect water on a macro or sub-regional scale, over vast distances, with internal bulk and reticulation systems or any bulk infrastructure that may have an impact on water resources in terms of quality and quantity. The department is responsible and accountable for the management of funding, which is administered by the National Treasury.

During 2011/12, R1,785 billion was allocated and the expenditure as at 31 March 2012 was R1,739 billion, which represents 97,4% of the total budget. By March 2012, 25 projects were completed as part of the programme.

In 2011/12, five compared to the planned seven regional bulk infrastructure schemes were completed. In addition, 4 505 instead of the planned 1 210 job opportunities were created.

In 2012, the RBIG Programme continued construction of 55 bulk water-supply projects and 12 waste-water bulk infrastructure projects. These projects address the water supply needs of communities in 39 district municipalities.

The Dwarsloop-Acornhoek steel pipeline for the provision of water supply to nine rural communities with a total estimated population of 265 000 in the Bushbuckridge Local Municipality was expected to be completed by December 2012. Each community is being connected as the pipeline completion progresses with two

communities already connected and receiving water. The total projected cost is R130 million.

In addition, the Nandoni Bulk Distributed System, including steel pipelines, is being constructed and is expected to be completed by 2013 at an estimated cost of R750 million.

The RBIG was allocated R2,597 billion in 2012, an increase that illustrated the infrastructure need, as well as the ability and capacity of the department and its entities to spend and deliver on these projects.

In the previous financial year, 173 625 people benefitted from completed projects. In 2012, it was expected that about 550 000 people would benefit.

### **Strategic integrated projects (SIPs)**

The Infrastructure Plan announced by President Zuma in February 2012, sets out a number of SIPs. Water infrastructure is critical for the SIPs, as well as for the development of industrial sectors as identified in the New Growth Path for South Africa.

These SIPs include:

- Mokolo and Crocodile River (West) Water Augmentation Scheme
- De Hoop Dam
- Mooi-Mgeni Transfer Scheme
- Hazelmere Dam
- Umzimvubu Dam
- Zalu Dam
- Foxwood Dam
- Nelson Mandela Bay Nooitgedacht Scheme.

### **Dam Safety Rehabilitation Programme**

The Dam Safety Rehabilitation Programme was established in 2005, after a large number of South Africa's dams were identified as being in need of rehabilitation. The programme ensures the continued structural and operational safety of the dams owned by the Department of Water Affairs.

The project has an estimated cost of R2,6 billion, of which R1,7 billion had been spent up to 2011/12 and R1,2 billion had been budgeted over the MTEF period. Given the nature of the project, only 942 short-term jobs will be created.

The department allocated approximately R370 million to the programme for 2012/13, with the aim of completing rehabilitation work at 25 dams.

As part of government's infrastructure development drive, R2,8 billion was allocated to the programme for the 2013/14 period, towards rehabilitating 315 reservoirs owned by the department.

### Support for resource-poor farmers

In accordance with the National Water Act, 1998 and regulations on financial assistance to resource-poor farmers, the Minister of Water Affairs may allocate assistance to those farmers who fulfil requirements as per regulations.

To ensure that water resources are protected, the regulations explicitly state that financial assistance may be granted and used only for activities that ensure water is protected, used, developed, conserved and managed in a sustainable and equitable manner.

In 2012, 4 174 resource-poor farmers were supported with access to water, compared to the planned 1 000.

### Rainwater harvesting

Rainwater harvesting enables people who live in areas where reticulation has not as yet been implemented to have access to water. The programme targets rural communities through the installation of tanks and awareness creation sessions.

An additional 8 068 compared to the planned 6 000 rainwater harvesting tanks were distributed to improve access to water and food production. Of the 8 068 rainwater harvesting tanks, 6 308 were for access to water supply and 1 760 were for food production.

### River health and interventions

The River Health Programme (RHP) is part of the National Aquatic Ecosystem Health Monitoring Programme, which was initiated in 1994.

Based on the information obtained from the RHP, four compared to the planned two major rivers were rehabilitated:

- Buffalo River in the Eastern Cape
- Luvuvhu River in Limpopo
- Hart River in the Northern Cape
- Berg River in the Western Cape.

Two additional rivers in the Eastern Cape and Limpopo were also identified as flagship projects.

### Water Allocation Reform

The Water Allocation Reform Programme was launched in 2005, with the objectives of ensuring equitable access to water in eradicating poverty and promoting social and economical development. The programme's priorities are to meet the water needs of historically disadvantaged people, ensure their participation in water resources management and promote the beneficial and efficient use of water in the public interest.

Licences are required for storage and use of water, among other things. To facilitate availability of water for historically disadvantaged people, attention is also given to the allocation of water following principles of equity and sustainability. During 2012, 93 licences were issued to these people, which constitutes 52% of licences received during the year. A total volume of 52 million m<sup>3</sup> of water was allocated to historically disadvantaged individuals. The allocation of water to these individuals is dependent on the number of applications received, and the process of validation and verification has improved the allocation of water.

### Accelerated Community Infrastructure Programme (ACIP)

In 2011, the Department of Water Affairs initiated the ACIP, which was allocated R83 million in the Cape Town, eThekweni and Nelson Mandela metros. This programme is a rapid intervention that seeks to focus on four key areas:

- community water and sanitation infrastructure
- water conservation and demand management
- waste-water infrastructure refurbishment
- drought intervention.



In 2011/12, 69 waste-water treatment plant refurbishment projects were implemented.

### **Women in Water**

The Women in Water Project aims to strengthen active participation of rural women in water resources management. Women identify water-related challenges in their communities and conceptualise ideas to implement them. They are registered for Women in Water awards. The national winners receive cash prizes which are used for further project development and implementation.

Some 309 households benefitted from this project. Twenty women-headed households, which includes girl-headed households from Mbangwane Village in Mpumalanga, were provided with rainwater harvesting tanks.

### **Water Conservation and Demand Management**

Although South Africa has been classified as a water scarce country, water from the source to the consumer is often lost as a result of inappropriate and inadequate asset management.

Lack of education on the part of the consumer also leads to inefficiency in the day-to-day use of water. The loss of water not only depletes the country's resources, but also reduces revenue to the water services authorities. The municipalities' revenue is lost due to leaking pipes, illegal connections and poor billing systems.

In terms of the water-use efficiency programme, 68 municipalities were supported in implementing water conservation and water demand measures to reduce water loss by 519 million m<sup>3</sup>.

Measures to improve water use efficiency in the catchment areas were also undertaken and the volume of water loss was reduced to 32 million m<sup>3</sup>.

### **Enhanced Local Government Support Approach (Elgosa)**

In March 2011, the Minister of Water Affairs signed off the Elgosa concept paper that sets out the overall framework within which the

department provided support to local government. This has enabled the adoption of a structured approach to local government support and an improvement in linkages of activities impacting on local government across the water value chain.

The department established a rapid response unit to address poor performance of water and waste-water systems, which resulted in community protests in some cases.

The unit deals with proactive and reactive non-compliance cases of municipal service delivery. The specialists within the unit enable the department to intervene directly in high-risk operational situations, where the lives of the citizens and the environment are under threat as a result of water and waste-water treatments failures.

During 2011/12, the unit assisted municipalities in developing 36 business plans for waste-water treatment works, of which 24 were implemented. In addition, five waste-water risk abatement plans and seven water safety plans were finalised. Municipalities were also assisted in developing 18 water conservation and demand management strategies.

As a result of the success of unit, a decision was made to partner regional offices with water boards and decentralise the unit to each regional office.

### **Freshwater Programme**

Recognising the value and threatened status of South Africa's freshwater biodiversity, and the need to build competence and leadership in this area, the South African National Biodiversity Institute (Sanbi) has established a programme focusing on freshwater biodiversity.

The Freshwater Programme aims to expand and consolidate the freshwater activities within Sanbi.

The Freshwater Programme focuses on supporting collaborative freshwater initiatives. These include Working for Wetlands, the National Wetland Inventory, National Freshwater Ecosystems Priority Areas Project, a wetlands mitigation banking scheme with the Grasslands Programme and coal-mining indus-

try, and water-related payments for ecosystem services pilot projects. Key to the programme's operation will be further development of strategic relationships with other organisations with shared objectives.

This includes the management of the Working for Wetlands Programme on behalf of the departments of water affairs, environmental affairs and agriculture, forestry and fisheries. Working for Wetlands champions the protection, rehabilitation and sustainable use of South Africa's wetlands through cooperative governance and partnerships.

### Monitoring programmes

River flow is monitored at 1 200 flow-gauging stations and some 260 major reservoirs are monitored. The evaporation and rainfall station network comprises 360 stations.

The oldest flow-gauging station still in operation in South Africa is on the Mooi River near Potchefstroom in North West.

There are 21 operational rainfall stations in the mountains of the Western Cape and five in the Mpumalanga escarpment. Observations are relayed through the cellular short-message system. The data is updated daily on the department's website at [www.dwa.gov.za](http://www.dwa.gov.za).

Water levels are monitored at some 1 000 observation boreholes across South Africa. Particular attention is given to monitoring in dolomitic areas. In addition, a small network of rain gauges is in operation to monitor rainwater quality.

The importance of qualitative information on South Africa's water resources has led to an increasing drive towards creating a national water-quality monitoring network.

The formal protection, restoration and rehabilitation of wetlands need to be strengthened through improvements in land-use planning, land and development management policies, as well as operational and regulatory means at national, provincial and local level.

The adoption of ecosystem-based approaches and aggressive implementation of the open-space planning and management programmes will add impetus to the

protection of these systems and associated services, especially at local government level. Such implementation will require integrated approaches and the involvement of multiple sectors, particularly those dealing with human settlements, development and planning.

The Department of Water Affairs' Compliance Monitoring and Enforcement Unit is also known as the Blue Scorpions. In 2011/12, they managed to reduce the unlawful use of water, as well as the dumping of agricultural waste, industrial sewerage, and abattoir waste along rivers, among other achievements.

In the Vaal River System they ensured drastic reduction in unlawful activities and loss of revenue to the department. The physical volume that was stopped amounts to 16,6 million m<sup>3</sup> a year. A total of 86 mines were audited, six mining operations were stopped for operating without water licences and five criminal charges were laid.

The Department of Water Affairs is also designing programmes to assess and report on the radiological (radioactivity) and toxicological quality status of the country's water resources.

### River Health Programme (RHP)

The *River Health Report* will be used for assessing the pattern of water quality. Generally, water quality is good in the upland regions and deteriorates downstream, particularly in areas affected by mining and urban development. Because of the longitudinal nature of rivers, poor water quality may extend far downstream of the source of pollutants.

The RHP was implemented in all nine regions, comprising 48 projects.

Products of the RHP have attracted wide attention and recognition, and provide strategic water-resource management information and training material for use in schools and universities, as well as in awareness creation.

To date, 1 008 jobs have been created through the Adopt-a-River Programme. In 2012, the department aimed to train 90 young women on basic water testing, who would then be twinned with the department's officials responsible for river health.

The implementation of resource-directed measures, such as ecological water requirements/reserve, the classification of water resources and the setting of resource quality objectives as part of water-use authorisations, also indicated a need for the massification of natural-resource management programmes. These include Working for Water (WfW), Working for Wetlands, Working on Fire, Working for Woodlands and Working for Energy, which are key components of the management of water quantity and quality in South Africa.

### **National Aquatic Ecosystem Health Monitoring Programme (NAEHMP)**

The NAEHMP is responsible for managing aquatic ecosystems. It focuses on the biological attributes of a river that serve as indicators of its ecological health. The rationale for initiating a biomonitoring programme is that the classic approach of monitoring only physical and chemical water-quality attributes was inadequate for generating information on the overall health of an aquatic ecosystem. Monitoring chemical attributes alone was found to be insufficient to detect, for example, the cumulative effects on aquatic ecosystems of extended exposure to multiple stressors.

Such stressors include habitat alteration, barriers that alter stream flow, water abstraction and alien species being introduced. Aquatic communities (for example, fish, riparian vegetation and aquatic invertebrate fauna), however, are adapted to live within a certain range of environmental conditions.

If healthy and diverse biological communities inhabit a watercourse, the watercourse as a whole is considered to be ecologically resilient and healthy. However, from an RHP point of view, a healthy water resource does not guarantee the fitness of that resource for domestic, recreational, industrial and agricultural use.

The NAEHMP's main objectives are to:

- generate a national perspective of the health of aquatic ecosystems in South Africa
- develop the capacity and information base required to enable the department and other role players to report on the status of

and trends in the ecological health of South Africa's river systems, in an objective and scientifically sound manner

- generate information products and audit-management strategies that could assist in distinguishing between aquatic ecosystems exposed to sustainable use and those experiencing ecological deterioration.

### **National Chemical Monitoring Programme**

The National Chemical Monitoring Programme assesses and reports on the chemical status of water resources in South Africa. Based on a report produced in 2002, the main water quality challenges for domestic water users are high levels of dissolved salts and, in some places, high fluoride concentration. The other challenges facing irrigated agriculture are the high sodium-absorption ratio, high electrical conductivity, high pH and high levels of chloride.

Another global challenge affecting South Africa is eutrophication or excessive plant (including algae) growth in dams. This is due to high levels of nutrient input from point sources of pollution and diffuse sources of pollution from catchments. Annual reports indicate that 50% of dams in South Africa are seriously affected (hypertrophic), while the rest range in quality from good (oligotrophic) to poor (mesotrophic).

Another problem is the sporadic outbreak of cholera and other water-borne diseases, mainly due to poor sanitation and hygiene at household level. The Eastern Cape and KwaZulu-Natal are especially prone to cholera outbreaks.

### **National Toxicity Monitoring Programme**

The National Toxicity Monitoring Programme reports on the status of DDT (dichloro-diphenyl-trichloroethane) and other persistent organic pollutants. This information is reported internationally to the Stockholm Convention through the Department of Environmental Affairs.

### **Education and awareness**

The department's school-based water and

environmental education programme implemented in collaboration with the Department of Basic Education have achieved the following:

- Water and environment has been incorporated into the Curriculum Assessment and Policy Statement. Through the 2020 Vision Programme, the department reached 1 000 schools through the South African Youth Water Prize and Baswa Le Meetse projects in 2011.
- In 2012, it was expected to implement the Eco Schools Project in 17 schools. This is a three-year programme. It is anticipated that these schools will be model schools in terms of natural resource management.
- The national winners of South African Youth Water Prize Project participate in the annual Stockholm Junior Water Prize held in Sweden. Through the department's collaboration with the WRC and the Department of Science and Technology, it patents and develops the inventions developed by young people, and ensures piloting and implementation. The department also awarded bursaries to learners who were the national winners of this project to study for water-related careers.
- In partnership with mobile communications company MTN, the department provided 700 computers to the national winners of the Baswa Le Meetse Project.

### Youth development

The Department of Water Affairs implemented the following youth development projects:

- In 2011, the War on Leaks Project was launched in Mogale City in Gauteng. It is aimed at educating water users about the importance of repairing water leaks. The project educates the community on how to fix leaking taps and toilets, while creating job opportunities and skills development for the youth of the community. By mid-2012, 6 393 kilolitres of water had been saved in Mogale City. Some 40 people had been trained on how to fix leaking taps and toilets, logging, control valve operation and maintenance. The project covered 200 households and 21 schools.

- Sebenza Nathi is a partnership project with Rand Water, aimed at training unemployed graduates to address the scarce-skills challenge in the water sector. Through this project, the department trained 17 unemployed graduates as technicians who were placed in Lesedi, Merafong, Emfuleni, Midvaal and Randfontein municipalities. Through its learning academy, it awarded 494 bursaries over the past five years, with 82 graduate trainees appointed in the department.

### National Water Week

National Water Week is an awareness week campaign by the Department of Water Affairs to highlight the value of water, the need for sustainable management of this scarce resource and the role water plays in eradicating poverty and under-development in South Africa.

The campaign seeks to continue building on the ongoing awareness creation within the broader South African community.

In 2013, Water Week was observed from 18 to 24 March under the theme *Water is Life – Respect It, Conserve It, Enjoy It*.

National Water Week celebrations coincided with the UN General Assembly declaring 2013 as the United Nations International Year of Water Cooperation. The objective is to raise awareness, both on the potential for increased cooperation, and on the challenges facing water management in view of the increase in demand for water access, allocation and services.

The aim is to highlight water cooperation initiatives, as well as identify burning issues on water education, water diplomacy, transboundary water management, financing cooperation, national/international legal frameworks, and the linkages with the millennium development goals.

### Regional and international cooperation and initiatives

South Africa has signed cooperative agreements with a number of countries in the southern African region with which it shares water resources, such as:

- Mozambique and Swaziland on the Inkomati and Maputo rivers
- Botswana, Lesotho and Namibia on the establishment of the Orange Senqu River Commission
- Botswana, Zimbabwe and Mozambique on the establishment of the Limpopo Watercourse Commission
- Lesotho on the Lesotho Highlands Water Project
- Swaziland on the Komati River Development Project.

These cooperative agreements improve South Africa's bilateral and multilateral relations in the African Union. All the countries involved benefit, while sharing development costs.

Four of South Africa's major river systems are shared with six immediate neighbouring countries, namely Botswana, Lesotho, Mozambique, Namibia, Swaziland and Zimbabwe.

In the area of shared river basins, South Africa continued to participate in joint water commissions to form part of Africa bilaterals with Botswana, on Joint Permanent Cooperation and with Mozambique regarding the breach of the Usuthu River, where a feasibility study was completed.

As President of the African Ministers Council on Water (AMCOW), South Africa made significant contributions towards the council's work through its strong leadership on the financial and staff regulations. South Africa provided leadership in the preparation of a triennial workplan, which has instilled donor confidence in AMCOW's programmes.

The Department of Water Affairs facilitated a workshop on water between South Africa and Japan, to share and exchange technical information and opportunities. This led to the signing of a joint resolution between South Africa and the Japan Ministry of Land, Infrastructure, Transport and Tourism to encourage and strengthen mutual cooperation in water management.

South Africa entered into a partnership with the World Economic Forum. The Strategic Water Partners Network was established, focusing on the water efficiency supply chain, with a focus on agriculture and water quality.

In June 2012, South Africa signed an agreement with the Democratic Republic of Congo (DRC), enabling the transfer of funds from the African Renaissance Fund to Randwater, which was appointed to implement projects in Lubumbashi and Likasi.

In August 2012, Cabinet approved a draft treaty between South Africa and the DRC for the development of the Grand Inga Hydro-electric Project on the Congo River.

The Inga Hydro-Electric Project could become the largest hydro-electric project in the world, and is expected to generate a massive 40 000 MW of electricity – more than the current electricity generation in South Africa.

### Conclusion

In just under 20 years, the percentage of people with access to clean and safe drinking water increased to 94,7% from 59%, an increase of 35,7%. The backlog now stands at 5,3%, or 710 000 households, compared with 3,9 million households in 1994.

However, while considerable progress has been made, many people are still without water and South Africa's fresh water resource is at its limit in many areas.

To be able to respond to developmental needs will require a dramatic change in the approach towards water governance.

To this end, the National Water Resource Strategy, which describes how water resources will be protected, used, managed and conserved, is being revised to reflect the existing state of water resources in the country. The department is also updating the Raw Water Pricing Strategy to enhance cost recovery from previously exempted sectors.

A high-level National Water Investment Framework for South Africa, which provides guidance on overall water investment requirements in the sector at national, regional and local level, has already been drafted. The department will build on the framework to formulate detailed plans.

Investment in water infrastructure remains a critical element if South Africa is to attain its developmental goals. First results from the

National Water Investment Framework indicate that at least R573 billion, of which R162 billion for water resources and R394 billion for water services, will be required over the next 10 years. Currently, only 42% of the need has been secured from various sources.

At least 25% of this is required for refurbishment. This implies an urgent increase in financing, which will require new and innovative funding mechanisms.

An investment of R2,23 billion has been made in regional bulk water infrastructure programmes during the 2012/13 financial year. This includes the construction of 43 regional bulk scheme projects, 27 of which are in the rural parts of the country and 16 in urban areas.

The department will continue working with the departments of environmental affairs and mineral resources to implement a process that will cover water-use licences, environmental impact assessment authorisations and waste licences with a view to later integrating further permits to streamline the regulatory processes.

During 2012, the department investigated how best to structure the economic regulation for the delivery of water services, as well as water resources.

Considering the scarcity of water in South Africa, the correct pricing of water, including the revision of the Raw Water Pricing Strategy, is an important issue.

An investigation was launched into the possible restructuring of water boards to fund and develop the necessary bulk water-services infrastructure, and to support municipalities, particularly those that require immediate intervention, including enabling the cross-subsidisation of and service delivery in particularly under-resourced rural areas.

Looking to the future, the Department of Water Affairs remains committed to using its budget, its human resources, and its skills to meet the water needs of all South Africa's people.

## Acknowledgements

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*Business Report*

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Water Research Commission

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## Suggested reading

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Movik, S. 2012. *Fluid Rights: Water Allocation Reform in South Africa*. Cape Town: HSRC Press.

*Productive Use of Domestic Piped Water for Sustaining Livelihoods in Poor Households*. Gezina: WRC.

*Review of Regulatory Aspects of the Water Services Sector*. 2009. Gezina: WRC.

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Thompson, P. 2009. *The Development of a Generic Water Safety Plan for Small Community Water Supply*. Gezina: WRC.

*Upgrading Existing South African Filtration Plants to High Rate Filters*. 2009. Gezina: WRC.

Walker, C & Walker, A. 2012. *The Rhino Keepers: Struggle for Survival*. Auckland Park: Jacana Media.

