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CDE
ROUND
TABLE



WATER: A LOOMING CRISIS ?

Edited proceedings of a Round Table convened
by Business Leadership South Africa and
the Centre for Development and Enterprise

The Centre for Development and Enterprise is one of South Africa's leading development think-tanks, focusing on vital national development issues and their relationship to economic growth and democratic consolidation. Through examining South African realities and international experience, CDE formulates practical policy proposals for addressing major social and economic challenges. It has a special interest in the role of business and markets in development.

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Transmedit Place, 5 Eton Road, Parktown, Johannesburg 2193, South Africa
P O Box 1936, Johannesburg 2000, South Africa
Tel 2711 482 5140 • Fax 2711 482 5089 • info@cde.org.za • www.cde.org.za

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Participants

Adv Reuben Baatjies, director, intergovernmental relations and governance, South African Local Government Association (SALGA)

Ann Bernstein, executive director, CDE

Prof Gerald Boon, head of department of paediatrics and child health, Eastern Cape Provincial Government

Themba Camane, director: infrastructure and services, City of Johannesburg Metropolitan Municipality

Phiroshaw Camay, director, Co-operative for Research and Education (CORE)

Linda Chamberlain, project officer, water and sanitation, Delegation of the European Commission

Richard Chance, public policy manager, South African Breweries (SAB)

Doyen Claire, general manager, French Institute of South Africa

Henk Coetzee, specialist scientist, Council for Geoscience

Tony Cole, technical manager: engineering, SAB

Ian Cockerill, chief executive officer, Anglo Coal

Tony Da Cruz, environmental manager, AngloGold Ashanti

Jenny Day, director, Fresh Water Unit, Department of Zoology, University of Cape Town

Hameda Deedat, South African Water Caucus

Mark Dent, Centre for Environment, Agriculture and Development, University of KwaZulu Natal

Louise Dreyer, researcher, Ministry of State Security

Gerald Dumas, managing director, Johannesburg Water

Laurie Dippenaar, chairman, FirstRand

Mahesh Fakir, chief director: urban development and infrastructure, National Treasury

Martin Ginster, environmental advisor, Sasol

Nandha Govender, water procurement manager, Eskom

Lance Greyling, member of parliament

Sarah Haswell, consultant, Palmer Development Group

Greg Heale, business development and marketing director, Group Five

Dr Chris Herold, chairman: water division, SA Institution of Civil Engineering (SAICE)

Thami Hlekiso, economist, SA Reserve Bank

Karin Ireton, director: group sustainability management, Standard Bank Group

Maarit Ivalo, policy officer: socio-economic cooperation, Royal Netherlands Embassy in South Africa

Paul Jagals, professor of environmental health, Tshwane University of Technology

Brittany Kesselman, analyst, Global Crisis Solutions

Frank Kruger, managing director of engineering solutions, Murray & Roberts

Nico Kruger, managing director, Tongaat Hulett

J P Landman, political economist

Nikisi Lesufi, senior executive: health and environment, Chamber of Mines of South Africa

Saul Levin, operations manager: group corporate affairs, Standard Bank Group

Dr Lauraine Lotter, chief executive officer, Chemical & Allied Industries Association

Pierre Lourens, head: corporate social investment, Impala Platinum Holdings

Janet Love, national director, Legal Resources Centre.

Annette Lovemore, member of parliament

Solly Mabuda, Department of Water Affairs

Megan MacGarry, researcher, CDE

Bonani Madikizela, research manager, Water Research Commission

Dr Jacopo Martino, first counsellor, Italian Embassy in South Africa

Karen Marx, regional manager: Northern Region, Wildlife and Environment Society of South Africa (WESSA)

Zandile Mathe, chief director: finance, Department of Water Affairs

Shepherd Mchunu, project development officer, International Organisation for Migration (IOM)

Prof Anne McLennan, deputy director-general: executive development, Public Administration Leadership and Management Academy (PALAMA)

Neil Macleod, head of water and sanitation, Ethekwini Metropolitan Municipality

Andries Meyer, technology manager: water supply & utilisation, Sasol

Shadrack Shivumba-Homu Mkhonto, deputy director general: compensation commissioner, Ministry of Labour

Lerato Molebatsi, head: group public affairs & CSI, Sanlam Capital Market

Maggy Momba, department of environmental, water, and earth sciences, Tshwane University of Technology

Helgard Muller, chief director: water services, Department of Water Affairs

Soto Ndukwana, executive chairman, Ifula Holdings

Neville Nicolau, chief executive officer, Anglo Platinum

Dr Koos Pretorius, founding director, Federation for a Sustainable Environment

Nic Opperman, director: natural resources, AgriSA

Dr Mamphele Ramphela, chairman, Circle Capital Ventures

Thabani Myeza, project manager, Water Initiative, NEPAD Business Foundation

Barbara Schreiner, practice director: water strategy, Pegasys Strategy and Development

Percy Sechemane, chief executive officer, Rand Water

Nirvashnee Seetal, deputy director, Ministry of Science and Technology

Dr Nick Segal, consultant

Connie September, advisor, Ministry of Water and Environmental Affairs

Laila Smith, director: policy unit, Mvula Trust

Mike Spicer, chief executive officer, Business Leadership South Africa

Prof David Spurrett, consultant, CDE

Vaughn Townsend, group engineering manager, Impala Platinum Holdings

Marlene van der Merwe-Botha, independent consultant, waste water and regulations

Johan van Rooyen, director of national water resource planning, DWA

Martie van Rensburg, chairman, Johannesburg Water

Dr Kevin Wall, principal researcher, South African Institution of Civil Engineering (SAICE)

Abbreviations

AMD	acid mine drainage
CMA	catchment management agency
DWA	Department of Water Affairs
NWA	National Water Act (No. 36 of 1998)
NWRIA	National Water Resource Infrastructure Agency
NWRS	National Water Resource Strategy
WAR	water allocation reform
WMA	water management association
WSA	Water Services Act (No. 108 of 1997)
WSA	water services authority
WSP	water services provider
MDGs	Millennium Development Goals
WWTP	waste water treatment plant

Introduction

SOUTH AFRICA is one of the driest countries in the world, and its water sources are far from its biggest economic centres. To cope with this, the country developed a high level of competence in storing water and transferring it across large distances. Prior to 1994, though, access to water and sanitation was very uneven, with large parts of the population being very poorly served.

Following the transition to democracy, the government initiated a comprehensive overhaul of the country's water management system, aligning it with international norms and practices, and embarking on a major drive to extend access to potable water. Since 1994 the country has made impressive progress in extending water and sanitation services to poorer communities throughout the country.

However, in recent years the water supply system has been beset by a growing array of challenges. A long spell of good rainfall across a large part of the country, along with its well-developed capability to transfer bulk water between catchment areas, has meant that the few water shortages that have occurred have been localised. However, given that 98 per cent of the country's water resources are fully developed, the very long lead times for building large dams and associated infrastructure, and the inevitability of future periods of poor rainfall, long-term water security seems increasingly uncertain. These factors are compounded by high levels of wastage and other inefficiencies in the supply system. Besides this, the quality of water is deteriorating in many parts of the country, compromising the health of local communities, and causing long-term ecological damage. Is South Africa facing a water crisis? And if so, how urgent, and how severe?

Given these concerns, Business Leadership South Africa and the Centre for Development and Enterprise convened a Round Table on 2 November 2009 to examine the state of the water sector, probe the reasons for its mounting problems, and explore the way forward.

Participants included government officials, representatives of business and civil society, academics, consultants, and other experts and analysts. The presentations and discussions are summarised in this publication.

'The quality of water is deteriorating in many parts of the country, compromising the health of local communities, and causing long-term ecological damage'

Planning for long-term security

Johan van Rooyen

Director of National Water Resource Planning, Department of Water Affairs

SOUTH AFRICA'S fresh water is limited, and unevenly distributed, so different parts of the country tend to experience shortages at different times, and with varying degrees of severity. The government's 2004 National Water Resource Strategy will lead to the establishment of 19 catchment management agencies (CMAs).

The DWA also assesses the future water requirements of metropolitan areas and other large systems, and recommendations are made on how these should be met. It has completed studies for the Western Cape system (including Cape Town); the Amatola system (the East London area); the Vaal River system (from Ermelo to Kimberley, including Gauteng); and the Crocodile West system (from north of the Magaliesberg to Rustenburg and including the Lephalale catchment, as well as all mining activities in the Crocodile River catchment). It is currently studying the KZN Coastal metropolitan area (Pietermaritzburg, Durban); the Algoa system (Port Elizabeth); and the system supplying the Bloemfontein area, and will then move on to the Olifants systems as well as the Richards Bay area.

Its planning is based on high-requirement scenarios, fluctuations in rainfall and run-off, and the impact of climate change. The solutions entail more than just additional infrastructure, and the following factors could all form part of the mix of solutions.

Depending on the area, demand needs to be reduced by between 15 and 30 per cent, so water conservation is very important. Implementation will be very challenging, because demand management measures are spread over many institutions, municipalities and households. Without this, we will face water restrictions during the next drought.

Ground water is an important resource with huge potential. Its dispersed nature makes it ideal for smaller users like towns and villages. However, some banks say they will not fund it because it is not a secure resource. This view needs to be changed.

Re-used water already makes up about 14 per cent of our water resource, especially in the inland areas, and has great potential. About 50 per cent of water used in urban areas – including all the effluent from Gauteng – goes back into the rivers for re-use. But along the coast the used water goes into the sea, so there is potential to increase re-use there, as well as in the Vaal and the Crocodile systems, where re-used water can help to supply the Eskom power stations in the Lephalale area. Strict quality standards will have to be applied where water is re-used for domestic purposes.

Desalinating sea water can compete with re-use along the coast, where costs will be acceptable. Cape Town and Durban are doing feasibility studies, and other coastal cities will probably follow.

'Depending on the area, demand for water needs to be reduced by between 15 and 30 per cent'

'Industries may move to the coast rather than pay the cost of pumping desalinated seawater inland'

Most of the good dam sites have been used. The few remaining large dam sites will have to be reserved for large urban and other high-value use. They will cost more to build per unit of yield, and the water will have to be transferred over longer distances.

Transfer costs are increasing. Existing inter-basin transfer schemes move large volumes over fairly short distances, but this will not be the case for future schemes. The tariff to transfer water over about 200 kilometres to the Lephalale coal fields will be between R15 and R20 a cubic metre for untreated water, a dramatic increase over the R5 a cubic metre that consumers pay in Gauteng. It will cost about four times as much to transfer water over 800 kilometres from the Zambezi, or to pump desalinated seawater to Gauteng.

In each study area, strategy steering committees are being established to monitor implementation, update strategies, and communicate with users and the public. They include representatives of the department, provincial governments, municipalities, CMAs, water boards, and water users' associations and user groups. We also encourage the business community to participate.

Our fresh water resource is very limited, and we have to use it efficiently. Plans are in place to prevent shortages in all areas, and these now need to be effectively implemented. The problem is mainly one of human and financial resources.

Looking to the future, industries may move to the coast rather than pay the cost of pumping desalinated seawater inland. The high costs of supplying coal-fired power stations with water may strengthen a move towards nuclear power.

We may want to consider moving water from less efficient to more efficient users, for example from irrigation to mining, industries and urban use. We also need to start thinking about food production in neighbouring countries with higher rainfall. Hopefully we will learn to use water far more efficiently, and to appreciate our ground water.

Martin Ginster

Environmental advisor, Sasol

SOUTH AFRICA FACES growing constraints on the availability of water. Many of its river basins are effectively closed, meaning that no additional consumptive water use is feasible within those basins. There is a point where an inability to access water limits development, resulting in economic growth competing with social expansion. Sasol has a relatively large demand for an assured supply of water, but this can't be at the expense of other users. We need to realise that it is very difficult to take water issues identified in the course of a high-level debate, and address them locally. I agree that we have a good understanding of what needs to be done, and that implementation is now vital.

We need to bear in mind the consequences of drought, which came close to affecting Sasol's operations in the 1980s and again during the mid-2000s. We also need a greater awareness of and communication about our water resources, particularly in respect of the complexities of the water resource planning process. We need to continue improv-

ing our water resource monitoring, and present the findings in ways that water users and the general public can understand.

I am concerned about our slow progress with providing basic water and sanitation services. Since 1994 an additional 12 million people have been given access to water, but about 3 million people, and a number of schools, still do not have access to basic water services.

Investments in water infrastructure are generally regarded as no-regret investments in adapting to climate change, which is an additional stress factor in the inland area where we are operating. We need to discuss this more.

Lastly, there is greater scope to engage in water stewardship initiatives. In Europe and America organisations like the WWF and the Pacific Institute are working with corporates to map their water footprints. Water foot-printing is quite different to carbon foot-printing, which is about reducing emissions – with water, it's about managing risks.

Percy Sechemane

Chief executive, Rand Water

WE NEED to focus on regulation because most companies, and even the water industry itself, do not fully understand their water footprint. Technical solutions – including desalination – are available to address the looming water crisis, but their feasibility will hinge on whether people will be able to afford them.

We are losing up to 30 per cent of water in some areas because of ageing infrastructure, while many people, particularly in the rural areas, still do not have access to water. We have not been spending enough on infrastructure and maintenance relative to economic growth. Dams, pipelines, distribution networks, purification plants and sanitation are all affected. In Gauteng, for instance, the infrastructure was designed 40 or 50 years ago and does not cater for the current population.

Raw water quality is also an issue. Our policies say the polluter must pay, but they have to be enforced by municipalities, some of which pollute water themselves. This issue needs urgent attention.

Gauteng has seen a lot of mining over a long time. Environmental legislation has improved, but we are only now beginning to realise the long-term effects of mining on underground water. When a mine closes, we have to ensure that the quality of water entering the rivers is acceptable.

Once industries understand their water footprint, they need to establish what they can do to meet the water needs of the people in the areas in which they operate. This could include the harvesting of rainwater, which some countries now require from industries. National strategies have to take these issues into account, as well as the fact that people will continue to stream to our cities.

'About 3 million people, and many schools, still do not have access to basic water services'

Discussion

Points made during the discussion include the following:

- Dam-building will decline in importance because the major dam sites have been used, and the remaining basins are too flat to capture all the flood water. Also, water that flows into the sea should certainly not be regarded as lost, because it provides essential nutrients for marine life.
- Most irrigation water is used efficiently. Although the 60 per cent of water used for agriculture may seem high, it should be remembered that South Africa is a dry country, and that agriculture is vital for food security as well as for exports. However, diverting even a small amount could make a significant difference elsewhere. Over and above the influence of price on the sectoral use of water, any such decisions need to be taken at the national level and not by one government department alone.
- Businesses need to pay more attention to their water footprints and to using water efficiently, including re-use and recycling. A company's water footprint extends to its supply chain. Coca-Cola thought it was using 2.5 litres of water to produce a litre of coke, but when it looked at its supply chain it realised the actual figure was 200 litres. This prompted it to link up with the WWF and adopt an integrated systems view of water resources on a catchment basis. Eskom looks at sustainability issues, social issues, and the needs of towns and industries that will develop alongside the projects it is planning.
- South Africa shares four of its main river basins with six neighbouring countries, and has bilateral water commissions with each of its neighbours. It cannot develop new dams on the Komati, Usuthu, Limpopo or Orange rivers without agreement from its neighbours.

Other issues raised included the indiscriminate issuing of mining licences without consideration of other users, and with disappointingly little regard for long-term ecological sustainability; the fact that in general banks do not fund ground water extraction; excessive losses in the water distribution system; and pollution by municipalities.

'We have not been spending enough on water infrastructure and maintenance relative to economic growth'

Trends and problems in water quality

Jenny Day

Director, Fresh Water Unit, Department of Zoology, UCT

WE ARE facing increases in well-known water pollutants as well as the emergence of some new ones (see box), both of which have major consequences for human health and aquatic ecosystems. These pollutants, as well as salination and acid mine drainage (AMD), have a growing effect on agriculture and on industry, including power generation. Ultimately, declining water quality threatens to undermine economic growth and development.

More than 90 per cent of municipalities are unable to meet the water quality standards for discharges from their waste water treatment plants (WWTPs), causing pollution hot spots and widespread health risks. Given our sound legislation and good policies, how have we got into this state? The ultimate cause is the erosion of water quality management. One reason relates to the decision to focus on water supply in order to

Major water pollutants

According to Jenny Day, water pollutants include the following:

Well-known pollutants

- *Pathogens*: A great deal is known about bacteria, but less about parasites, and very little about the waterborne viruses. Major diseases caused by pathogens in water supplies are diarrhoea, cholera, and typhoid.
- *Agrichemicals*: These include pesticides and fertilisers, as well as antibiotics and hormones, widely used in livestock farming.
- *Persistent organic pollutants*: These include some organo-chlorine pesticides and industrial by-products that are persistent and dangerous, and need particular attention.
- *Salination*: Increased salts in certain water systems affect agricultural productivity.

Emerging issues

- *Acid mine drainage*: Potentially the biggest water quality issue in South Africa, AMD mine drainage occurs when water collecting in disused mines dissolves minerals in ore seams, and becomes highly acidic as a result. The contaminated water drains back into wetlands and rivers, and can also dissolve limestone, leading to sinkholes.
- *Cyanobacterial toxins*: These substances are produced by blue-green algae growing in rivers, dams and wetlands. They can be carcinogenic, and are known to kill livestock.
- *Endocrine-disrupting substances*: These pollutants act as feminising substances, affecting male vertebrates, including humans. The full extent of the problem is not known.

'Policies on pollution have to be enforced by municipalities, which sometimes pollute water themselves'

‘Businesses need to pay more attention to their water footprints and to using water efficiently, including re-use and recycling’

meet the Millennium Development Goals (MDGs); as a result, upkeep of WWTP infrastructure has not received enough attention, and water is returned untreated or poorly treated to our rivers.

The second major reason is a lack of technical capacity. Most of the old-generation technocrats have left the DWA, taking its institutional memory with them. There are far too few new-generation technocrats, with too little experience and influence. As a result, many WWTPs are on their last legs, while others are too small for the loads they receive. The Parliamentary Monitoring Group which investigated the outbreaks of typhoid in the Delmas area found they were also caused by ‘crucial inefficiencies’ in the municipality concerned. The lack of technical capacity has resulted in an overdependence on consultants, which further contributes to the lack of institutional memory, and does nothing to build new human capacity.

Poor governance and unclear divisions of responsibility among national, regional, and local authorities result in convoluted decision-making and a lack of delegated authority and accountability, while a lack of enforcement contributes to non-compliance. The Minister of Water Affairs recently announced a policy of zero tolerance of non-compliance, and apparently some municipal managers are being prosecuted. However, enforcement continues to be a problem, with only one of the department’s ‘blue scorpions’ apparently still operating. Furthermore, there seems to be a lack of political will to get things right.

Solutions need to start with improving technical capacity in the public sector, reducing the use of consultants, and reducing staff turnover, particularly among senior staff. We also need a proper plan for upgrading WWTPs and purification works, and improving water quality monitoring. At the same time, we need to clarify lines of responsibility, enforce existing legislation, and increase the costs of polluting (although this becomes tricky when most of the pollution comes from local authorities). We will also need to develop specific plans for threats such as AMD.

Nikisi Lesufi

Senior executive: health and environment, Chamber of Mines

CURRENTLY WATER is a limiting factor for mining development, which faces a challenge when ore bodies and water resources do not coincide. We have had 100 years of mining, and a combination of inadequate regulatory oversight and corporate greed has probably led to the water quality legacy that we have to deal with today.

This raises two challenges. The first is the responsibilities and obligations of current mining companies in respect of this legacy. Mining companies as well as municipalities have ageing infrastructure, much of it more than 50 years old, and many mine dumps are poorly located because the knowledge and practice at the time they were established were far more limited.

The second challenge is regulatory capacity, which comes from both skills and numbers on the ground. Skills problems lead to a lack of enforcement, which allows mining companies to get away with doing the minimum to comply with regulations.

Intergovernmental co-operation is also a problem. The procedures for issuing mining licenses may need to be revisited. Given the skills shortage, recent graduates are reviewing applications submitted by mining engineers with 30 years' experience. That kind of mismatch leads to poor decisions.

As regards AMD, the departments of Water Affairs and Mineral Resources have proposed regional closure strategies for adjacent mines that are unable to close on their own. The problem is that processing the average water licence takes about three and a half years. This may lead to applicants losing interest, and the country getting a bad reputation in the international mining sector. The Chamber of Mines is ready to participate in innovative approaches to the treatment of AMD. We need to move fast on this issue, and if the departments have technical problems it needs to sort them out so that decisions can be taken.

Henk Coetzee

Specialist scientist, Council for Geoscience

GOLD AND coal mines cause the most AMD, with the latter possibly causing larger and more long-term problems than the former. The problem relates to both operating mines and the estimated 6 000 abandoned mines in the country, with very little known about areas like the copper district in Namaqualand and the gold mines near Barberton and Giyani. We need to do a lot of work before we will know the true scale of the problem.

The solutions involve fairly simple inorganic chemistry, but the processes are costly, and anything beyond basic treatment, which does not produce water suitable for discharge or domestic use, will make the water very expensive. The DWA's best practice guidelines on AMD identify prevention as the first priority, and that is where we need to be on water quality issues in general.

It is difficult for the department and the industry to keep up with research and international trends. For instance, issues around the toxicity of uranium are poorly reflected in DWA guidelines, and poorly communicated by the National Nuclear Regulator. This has become a human rights issue; for example, the ground water around Pofadder has high concentrations of uranium which are potentially related to health problems in the area. Other issues include the quality of non-regulated water supplies, like those from boreholes on private properties as well as rivers.

This is the reality; how do we manage it? It is difficult to regulate a natural process, and we need to look at how science informs policy. One major problem is that we don't have enough qualified and experienced people in the right places, which is often used as an excuse for inaction.

'Declining water quality threatens to undermine economic growth and development'

Koos Pretorius

Founding director, Federation for a Sustainable Environment

AS A FARMER, I look at issues surrounding water quality from the other side. We refer to the area on the eastern escarpment between Dullstroom, Belfast and Carolina through to Ermelo and Wakkerstroom as the 'cradle of rivers'. This small area, which receives a lot of rain, is the source of most of the rivers that play important roles inland. It provides water to Eskom's power stations, and feeds a number of transfer schemes which bring water to drier areas.

There is a small amount of evaporation and surface run-off from this area, but about 60 per cent of the rainfall seeps into the ground, where it lies between the surface and the water table and then slowly runs downhill into wetlands and rivers.

The Highveld coalfields lie in the same area as the cradle of rivers, concentrated between Middelburg and Witbank and down to Secunda. Coal has been mined around Witbank for the past 120 years. The top layer of the coal seam is quite acidic. Normally it is covered by a layer of sandstone and then the regolith, which forms the water table. Mining breaks through the water table, allowing water to flow into the pit. While the mine is operating the water is pumped out, but when it is abandoned the water collects, dissolving minerals in the coal seam and eventually decanting into the wetlands and rivers.

Tests show increased levels of toxic dissolved solids (TDS) and sulphates in the Loskop, Witbank and Middelburg dams. The water quality has deteriorated over the past 30 years, and sulphate levels in the Middelburg Dam are now above safe human consumption levels 40 per cent of the time. Water quality in the Vaal river system deteriorates hugely as it passes through Gauteng, with growing consequences for downstream users. This is a major problem that requires urgent attention.

Turning to water balances, we see that demand in the Komati and Olifants systems far exceeds supply, so there are big shortages.

Only two of the 11 mines in the Komati catchment have water use licences, and they don't have plans for treating the AMD once they close. Some of the others are decanting

'More than 90 per cent of municipalities do not meet waste water quality standards'

Table 1: Water balance (million m³)

Sub catchment	Total available for allocation	Water requirements	Surplus / (deficit)
Komati	426.5	883.0	(456.5)
Crocodile	273.0	664.0	(391.0)
Middle Olifants	301.0	456.2	(155.2)
Lower Olifants	101.0	178.7	(77.7)
Steelpoort	61.0	50.9	10.1
Upper Olifants	409.0	350.5	58.5
Sabie / Sand	162.0	101.0	61.0
Total	1733.5	2684.3	(950.8)

acid run-off, and have no plans to deal with it. There are a large number of applications to mine in the catchment, but none of the applicants have any plan to deal with the decant once they close. The same holds for the upper Vaal catchment.

Marlene van der Merwe-Botha

Independent consultant: waste water and regulations

THE MUNICIPAL waste water industry is in trouble. Many of the approximately 850 municipal treatment plants are discharging substandard effluent into the water we use for drinking, agriculture, and recreation. Their replacement value is about R23 billion, so this really is a problem of scale and quantum. Many plants are exceeding their maximum capacity, thus compromising effluent quality. With substandard disinfection, bacteriological quality is a particular cause for concern. The problem is compounded by the fact that we are losing 20 to 30 percent of our clean drinking water into the waste water system.

The DWA is planning huge upgrades to municipal waste water infrastructure. Part of the solution is that municipalities should ring-fence and manage water services as a business, in order to ensure their future viability and sustainability. Most of the problems in water provision are caused by a lack of technical and management skills.

The Green and Blue Drop incentives are positive steps that could bring about positive change in the municipal sector. We need to push incentive-based, risk-based, and punitive regulatory measures. In Belgium, which faced a similar decline in infrastructure and service provision, the turning point came when municipal officers responsible for water provision and quality were sent to prison. 'Support' alone will not achieve a turnaround in the water sector, and will not drive compliance without being aligned with the regulation of water services and resources.

Another positive trend is that 'sewerage' is now finally enjoying as much attention as energy, agriculture, and job creation. Rightly so, as water is a vital catalyst and enabler of economic growth.

There are many vacancies for process controllers and plant managers in municipalities, and the people filling these positions often do not have the required qualifications and experience. Besides this, operations and maintenance are being sacrificed in favour of building new infrastructure. As a result, good infrastructure that could have been repaired will soon require replacement, or major retrofitting and refurbishment. Infrastructure needs to be operated and maintained, which requires funds, skills, and long-term planning. The valuable investment in new infrastructure since 1995 will be nullified if this is not prioritised.

Another trend is inappropriate technology choices due to the pressured environment. Technology choice needs to take affordability and sustainability into account. There is political interference, and often we don't have enough information to make good decisions. For example, in some areas there is a push for higher levels of service

'Most of the old-generation technocrats have left the DWA, taking institutional memory with them'

(such as flush toilets and pressurised water supply to households) without considering the availability of raw water, the capacity of sewerage system, and the costs of maintaining the new infrastructure.

We also see increasingly poor design and workmanship by professional service providers due to a lack of technical expertise and project management competency on the contracting and municipal side.

Professional bodies like ECSA, SAICE, and WESA have a vital role to play in this regard. Municipal officials are wasting precious time on resolving contractual issues, and infrastructure remains uncommissioned as a result.

Positive trends include the emergence of some world-class WWTPs, and highly competent people in municipalities overseeing these pockets of excellence.

The health and social impact of water

Gerald Boon

Head: department of paediatrics and child health, East London Hospital Complex

WE ARE not doing well in terms of child health. We have about 50 deaths in the first year per 1 000 live births, with a significant link between infant mortality and access to safe water. The MDG is about 15, and most developed countries have four or five.

A lot of effort needs to be put into more effective food production and better use of water, particularly in rural areas. Many rural people do not have access to piped water, or even to standpipes. But there are also children without access to safe water in cities like East London.

In both rural and urban towns, there are reticulation systems containing high levels of faecal coliforms. Algal blooms due to cyanobacteria and by-products of disinfection can also cause harm. Water can leak in or out of old piping, so municipalities need to provide residual disinfection to ensure safety. The fact that a lot of pathogens are getting into our water – some of which, like *Cryptosporidium* and the *Giardia* Cysts, are not easily killed or filtered – is a big issue in a country in which many people have compromised immune systems, and many are dying from diarrhoea as a result.

We need to look at new ways of cleaning and storing water at the household level. Water scientists need to guide us on the best methods of managing our water. Educationists need to provide information to communities and to water technicians, so that they can do their jobs. And leaders in the public and private sectors need to provide us with the necessary resources.

About 10 000 children under five die every year in the Eastern Cape. Many of these deaths are due to HIV, but diarrhoea, malnutrition, and drowning are also significant causes. Waterborne diseases are also often the immediate cause of many deaths due to

‘Water is a limiting factor for mining development, which faces a challenge when ore bodies and water resources do not coincide’

HIV. Both water quality and quantity are important. Ninety per cent of diarrhoeal deaths are children, with 88 per cent related to water management in households, hygiene, and sanitation. Safe water, reduces the risk of diarrhoeal disease in children by 20 to 40 per cent, and by 60 per cent if the water is piped. Having either pit toilets or flush toilets can reduce the risk of diarrhoeal disease by 15 to 50 per cent.

Paul Jagals

Professor of environmental health, Tshwane University of Technology

I WANT to talk about situations where people do not have piped water in their homes. In the rural areas, people have to collect water, convey it in containers often over substantial distances, and store it. In these conditions, even good quality piped water becomes contaminated to the point where it will pose a health risk. While water treatment at home remains a further option, I think our emphasis should be on bringing high-quality water closer to households to reduce the need for household storage containers.

Another key issue is continuity of access. When water systems in rural and peri-urban areas break down, people have to fall back on some other resource of water. Even in situations where a community gets a supply system with communal taps, the rudimentary system they had before, perhaps a hand pump, is often removed. They then have to go back to the primary source, often an untreated water source like a river. Utilities can address this problem through smart system management.

Rural urbanisation was and still is underestimated in the design of many small water reticulation systems. As a result, they are unlikely to cope with rising demand, even with proper technical management. But even if they do, it will not in many instances resolve the problem around containers. Households should therefore be assisted to manage their container situation in such a way that contamination is reduced. This is no easy task, as people are accustomed to using water storage containers in an unsafe way.

I see many billboards about practising safe sex, but none about practising safe water. This is a key issue, because no technology (whether a tap or container) will be effective and sustainable if people do not buy into it, work with it, and change their habits.

We have very little, if any, good data linking child morbidity due to diarrhoea to water sources and contaminated containers. We have done research on water containers and found that they contain all sorts of toxins, and although we don't yet know how much this contributes to the disease burden, we are certain it is significant, especially for children. Those containers can negate any benefits from bringing in clean water.

Then there is the issue of water quantity. Washing hands often is the sentinel activity for hygiene and better health. But many people say they don't have enough water in their homes to allow them to wash their hands as frequently as they should, so we need to enable households to bring more water into their domains to enable them to do so.

We need to look at new ways of cleaning and storing water at the household level

Hameda Deedat

South African Water Caucus

IN 2000 people in the Madlebe area had to go back to their traditional water source, the uMhlathuze River, when their prepaid meters broke down. A sewage spill in the river resulted in the biggest cholera outbreak in South Africa's history, worse than anything under apartheid.

This episode underlines that, if we don't treat health and hygiene as a far greater priority, the consequences will be severe. This applies to communities with or without piped water. It's not only about providing formal systems; it's also about making sure that those systems work properly.

One of the issues we have raised with the DWA is that people don't know that they have rights and responsibilities related to quality as well as access. When someone opens the tap, and the water has a different taste, smell or colour, what should they do? Is their health being compromised?

I think the health implications of AMD and other forms of pollution for families living downstream are being underestimated. Rural people often don't have access to clean piped water, and use raw water to grow vegetables. If this water is contaminated, their health is being compromised. We need to adopt a more holistic approach to these issues.

Discussion

Points made include the following:

- The often-quoted figure of water having been delivered to an additional 12 million South Africans since 1994 relates to infrastructure rather than services. We don't know enough about where those services are working, and whether they are delivering drinkable water. Where water is provided, people are not fully aware of the potential health and hygiene benefits. We need more effective communication to make them aware of this, and to get a better understanding of their needs.
- Given the health problems associated with containers, participants asked about the cost implications of taking water into homes. Others replied that the piped systems were meant to supply 65 litres of water per household per day. The cost of increased water consumption would be greater than the cost of laying pipes, though a rigorous cost-benefit analysis would be necessary to enable a robust conclusion to be drawn. Moreover, some smaller aquifers could not supply so much extra water on a sustainable basis.
- Unless people have housing and their own water supply, they don't take responsibility for water. When people share communal facilities, water gets wasted, and no one takes responsibility for maintenance.

'We don't have enough qualified and experienced people, which is often used as an excuse for inaction'

- Providing access to water in informal settlements presents many challenges. If there is no sanitation to cope with the increased water use, waterborne diseases can actually increase. Laying pipes can lead to conflict in unplanned communities, especially if neighbours are not on good terms.
- People in peri-urban and rural communities don't use water only for domestic purposes, but also for growing crops. We need to adopt a multiple-use approach to water needs, and address them as a package. In addition, people need to know what their rights are and have recourse to magistrates or headmen to take up issues. Rights also imply responsibilities, but these conversations are not taking place.
- Although the department has announced a zero-tolerance approach, and issued 43 directives to those polluting water, it has taken legal action in only one case. This needs to change, and corrupt and incompetent municipal officials should be charged. The National Water Act (NWA) allows citizens to lay charges, and the department has enabled civil society organisations to participate in regulation. The regulatory function needs to be made much more effective, and the 'blue scorpions' need greater resources and political support.
- During a recent drought, children and adults died when springs dried up and the e.coli count in the available water increased. These deaths are often not recorded. Attempts to address the situation through water boards, municipalities and the provincial government foundered because there were no clear lines of responsibility. Short-term solutions, such as drilling boreholes, should be considered for communities which are waiting for standpipes.
- The government's focus has been on numbers (of new connections etc) at the expense of quality and process, with major implications for local governance. The biggest problem is the adoption of a technocratic approach despite the lack of technocrats at the local level. The government has gone for the easy solution of getting the pipes in, but much of the infrastructure is dysfunctional and below-standard in its output, and too little attention has been paid to public education on health and hygiene.

'Water quality in the Vaal river system deteriorates hugely as it passes through Gauteng, with growing consequences for downstream users'

Problems: causes and remedies

Nick Segal

Independent consultant

EVERYONE AGREES that we have good principles and policies. The question is, what is going wrong, and why do we have such serious problems in delivering on our universally lauded objectives?

Essentially, the government has taken on too much, too quickly. On the institutional level, none of the 19 intended Catchment Management Agencies (CMAs) is up and running, 11 years after their establishment was proposed. One agency has existed for a few years, but it still has no authority or budget, and there are unresolved tensions between it and the department.

On the policy front, the apparently simple intentions with respect to numerous issues, of which pricing is an important example, have proven difficult to operationalise, and therefore have yet to be implemented. As a result we continue to under-recover costs, even from agriculture, which is the biggest user. Probably only the (few) bulk users pay an economic price for water. The failure thus far to implement the concept of the ecological reserve is another example of aspiration exceeding capability to execute.

Overall, there is a long list of unfinished business, due in large measure to the depletion of managerial and technological/technical capacity in the DWA. If one looks at the DWA age profile, there is a big valley between the 25-35 and 55+ age groups, which is worrying in terms of skills transfer and institutional memory. This fact raises serious questions about how well the next generation of technologists, technicians, and managers will be equipped to deal with the many challenges facing the sector.

Poor implementation is also due to a failure to design policies that can be implemented. Good policies that can't be implemented for lack of capacity turn out to be bad policies. It is better to start with more modest goals that can be achieved, and gradually develop capacity. Along with this, we need a much greater investment in people. There is now a small academy in the DWA, and the lack of capacity in local authorities is at the early stages of being addressed, but we need to intensify this investment in order to enhance our technical, managerial and other abilities.

None of this is new, so why hasn't it been recognised? It's a puzzle, but I think it points to the need for greater realism at the highest level in government – a recognition that things aren't going right and have to be confronted directly, honestly and realistically. That will lead to proper prioritisation, and partnerships across spheres of government and between government and other parties. At least eight national government departments have a direct interest in water. There is confusion over accountability for (poor or non-delivery of) water services and the resultant adverse impacts on health and other

'Only two of the 11 mines in the Komati catchment have water use licences, and neither has plans for treating AMD once they close'

sectors, and how local, provincial and national government should interact in dealing with these matters. These governance issues need to be urgently addressed.

We need strategic approaches based on an honest recognition of the problems, a willingness to prioritise and a serious commitment from the top. There are many willing partners outside government who want to be involved, within a strategic framework created and led by government, because their respective and our collective futures depend profoundly on a secure supply of good water.

Barbara Schreiner

Practice director: water strategy, Pegasys Strategy and Development

OUR CLIMATE and geography put us at a disadvantage in terms of water availability, and climate change will make this worse. On top of that we have technical and social challenges, including very high levels of poverty. We have failed to reallocate water and use it effectively for poverty eradication and for social transformation; there are financial challenges that mean we are not getting value for money; and there are institutional challenges that must be resolved, such as deciding whether we have nine CMAs or 19. Paralysis around these decisions is hampering us.

In implementing the NWA we need simpler methodologies and implementation approaches that match our financial and human resource capacity. We need to define our priorities, identify the approaches that will have the greatest impact with limited resources, and get the public and private sectors to collaborate and make things work. We must focus on implementation rather than on refining policies and strategies. We must identify immediate interventions we need to make, and how we should build capacity for the future.

At the same time, we must hold government accountable. There has been discussion today around local government accountability, and how the department regulates municipalities. But, as an ex-DWA official, I have to ask who holds the department to account when licences aren't issued, the reserve is not implemented, and the National Water Resources Strategy (NWRS) is not revised on time.

The solutions may seem expensive, but not getting water management right results in deaths, and limits economic growth and social development. We need to convince the whole country that unless we get the water sector right, we're going nowhere. We can't have a situation, as we have had, where agriculture develops a national strategy without adequately dealing with water. Every department and every sector needs to think about water, because it is a critical limiting factor.

'We are losing 20 to 30 percent of our clean drinking water into the waste water system'

Janet Love

National director, Legal Resources Centre

WE HAVE heard that the department is performing the functions of the CMAs while they still don't exist. The essence of these functions is to enable water users to manage their own water resources, and particularly their allocation. In reality these functions have never been operationalised, and that is the key problem. We have to think about water as a valuable resource, because, in terms of international rankings, our water is as scarce as Oman's. We have almost no underground aquifers – an added reason why we have to conserve, protect, and develop our water resource.

For example, since 1968 government reports have told us that AMD is poisoning the water system. Along the western reef, the nuclear regulator had to step in because water contaminated with nuclear waste was being released into the water system. We have to start looking at the responsibilities of water users with regard to the protection of this scarce resource. For example, the mining industry has the capacity to extract a number of the heavy metals that are contaminating our water, and sell them in order to help offset the costs involved.

The agricultural sector needs to deal with water more effectively; we need to do cost-benefit analyses, and analyse the opportunity costs of using water for certain purposes rather than others. This involves government as a whole. For example, the government is promoting irrigated sugar cane production for small-scale producers. However, the price of sugar needs to be propped up on the international market, and the sugar industry uses vast amounts of water. The government has chosen this crop because it does not require much extension or support. But we should not continue to allow disorganisation to stand in the way of the provision of proper extension services for high-value crops, thereby enabling the scarce water resource to be put to sustainable use.

This does not mean that the state should not allocate water to agriculture; on the contrary, it is a vital sector. But such allocation and its costs should be transparent, so that people in agriculture recognise the support they are getting. We need to start looking at how the big sectors are using water.

Connie September

Special advisor, Ministry of Water and Environmental Affairs

WE MUST look at the central role that water plays in the unequal distribution of wealth in South Africa, currently the most unequal country in the world; at the role it can play in the economy; and how it can help to unlock the current financial crisis. The productive use of water is highly skewed, influenced by compromises around property rights and land rights. Everything we have said needs to be located in the context of the unequal distribution of resources, in South Africa and across Africa as a whole.

'If we don't treat health and hygiene as a far greater priority, the consequences will be severe'

The situation will be worsened by climate change. Some provinces – notably Limpopo, the Eastern Cape, and parts of the Western Cape – already have a shortage of water. We must look at equity, remembering the department’s slogan ‘some for all, forever’. We require a paradigm shift that will provide a single focus around policy and regulation. We thought this would happen with the devolution of water services to municipalities, but we need to have that conversation now.

The real crisis in this country is water management, and we need to attend to this urgently. The challenge is not to fix the pipes, but to fix the institutions that fix the pipes.

Discussion

Points made include the following:

- The review of the NWRS, which is already overdue, presents an opportunity for a national debate about priorities for the next five years.
- The NWA encourages people and communities to assume responsibility for water management. A number of community projects have achieved some success in informing and mobilising communities. However, government needs to play a strategic leadership role.
- Decisions on urbanisation, industrialisation and agricultural development need to be integrated with resource management. The CMAs need to focus on intersectoral co-ordination rather than executive functions, which have unnecessarily complicated their role. The Water Research Commission also needs to play a more active role in bringing together scientists and managers.
- There has been no specific training for water engineers, but the University of Pretoria is establishing a chair for this purpose. The University of Fort Hare has run a successful on-the-job training scheme. The Department of Education should play a more active role in training; however, it does run an award programme called Baswa le Meetse (Youth in Water) to link water and education.
- Rather than amending policies, the remedy lies in improved regulations and accountability for policy implementation.

‘None of the 19 intended Catchment Management Agencies is up and running’

Getting pricing and regulation right

Zandile Mathe

Chief director: finance, DWA

THE DEPARTMENT acknowledges that it is experiencing problems with human and financial resources. In 2008, through Project Zakhile, the department established an asset register using the World Bank model, recording all the water infrastructure asset and assessing their condition. Based on this we estimate that we need about R10 billion to eliminate the backlog. The current price strategy does not allow full cost recovery. The department needs about R2,4 billion a year to run the infrastructure, and is only collecting R600 million. This results in a heavy reliance on capital markets to fund capital expenditure; current facilities are sitting at about R80 billion, with another R20 billion signed up.

Funding is being handled in a very fragmented way. There is no communication between the National Treasury and other government departments, including the DWA. The role of the private sector is not considered at all when looking at capital investment. The department has initiated a project to look at the current funding model, and I invite everybody who is interested to contact me. We have identified the following stakeholders: civil society, commercial agriculture, mining, energy, forestry, emerging farmers, and sector experts. The target date for finishing the project is 31 March 2011. By then we need to have a funding model for the whole sector from source to tap, so that we can implement it by 1 April.

Laila Smith

Head of policy, Mvula Trust

REGULATION OF water services has shown us the limits of decentralisation. We have about 160 water service authorities, and about 300 water service providers. Many municipalities don't have the skills to deliver or regulate services. Part of the problem is that a lot of effort has gone into accountability between local and national regulation, but very little into accountability between citizens and the public sector. It is also partly due to the growing levels of authoritarianism in local government with politicians increasingly saying that accountability is limited to ward committees and that other civil society structures are a threat. For more effective regulation at the local level, we need a wider range of local accountability measures.

The incentives for compliance are inadequate, partly due to the weakness of the national regulator, and partly to national government not knowing whether to play the local government support role or the mean enforcer. To play the enforcer it has to have

'We continue to under-recover the costs of water, even from agriculture, which is the biggest water user'

the paperwork to show that it has provided the support. This situation has improved, but this is part of the reason why we have reached the current state.

Given these constraints, I would advocate an independent water regulator. When I first raised this five years ago, the then director-general said form should not precede function. Five years on, that approach has not got us anywhere.

Nic Opperman

Director, Natural Resources, AgriSA

AGRICULTURE USES about 60 per cent of the available water in South Africa (the international norm is about 70 per cent). At present this does not deny other users access to water, although we accept that, given the relatively low productivity of water use in the agricultural sector, economic growth in other sectors will demand that it give up some of its water. The DWA is adjusting water tariffs in the sector because it believes prices are below long-term marginal costs. We have serious reservations about the current costing method, and also about whether the government is the most efficient supplier of water. We are, however, grateful that the department has made its financial statements public for the first time, although we see this as only the first step in transparent financial reporting.

A proper water market should be considered instead of the current hybrid system of market principles and partial government involvement. AgriSA accepts that some aspects, like pollution, will need to be regulated, but this should be minimised with as little price distortion as possible. In our view a direct and visible subsidy aimed at the

'Poor implementation is also due to a failure to design policies that can be implemented'

Blue and Green Drop certification

The Blue and Green Drop certification programme is an incentive-based regulatory tool introduced by the DWA. It aims to restore the trust of the general public in the quality of tap water by certifying the water quality status of municipalities.

Blue Drop certificates are issued to municipalities which achieve a score of 95 per cent or higher against the department's criteria for tap water, and Green Drop certificates to those which score 90 per cent or higher against its criteria for waste water management.

Red Drop status is assigned to municipalities which fail repeatedly to deal with health threats, and communicate effectively with communities.

Municipalities will be assessed every year. In 2009, following the first round of assessments, 23 out of 425 water supply systems received Blue Drop certificates. Recipients included some small or rural systems such as Peddie and Loxton in the Amathole district municipality in the Eastern Cape, and the Ubuntu local municipality in the Northern Cape. By February 2010, Green Drop results had not yet been publicly released.

CDE 2010

‘We need strategic approaches based on an honest recognition of the problems, a willingness to prioritise, and a serious commitment from the top’

local sector will not be out of line with international practice, and can be reconciled with a well-functioning water market.

AgriSA supports black economic empowerment, but the way in which the NWA is selectively – and we believe wrongly – applied in this regard does not serve BEE, economic growth, or employment creation. Applications for transfers of water rights between willing buyers and willing sellers are currently being refused, thus violating efficient water use, while water set aside for BEE purposes is not being used.

Successful cost recovery depends on an overall alignment of policy with development objectives in agriculture; effective service delivery; and participation by farmers in water management at the local level. Specific issues that must be addressed are the business and financial risks of modern commercial farming, and the extent of poverty in the traditional subsistence farming sector. Accurate water metering and volumetric water use charges will provide economic incentives to use water more efficiently. Feasibility studies and economic, fiscal, social and environmental impact studies are necessary before user charges that recover all costs are introduced.

The water subsidy to the agricultural sector should be viewed in the context of international competition that enjoys much higher levels of support, cost pressures such as increasing electricity prices, and increasing calls on the sector to support food security in South Africa and SADC.

Internationally, taxpayers and other water users pay most of the costs of investment in irrigation, while national treasuries finance dams, reservoirs, delivery networks, and a large part of the cost of installing local and farm infrastructure. Governments recover some of the costs on irrigation water, but rarely cover operational and maintenance costs. Farmers generally get water they pump themselves for free, or for a nominal charge, and several OECD countries have preferential tariffs for electricity used to pump water.

Mahesh Fakir

Chief director, urban development and infrastructure, National Treasury

THE WATER sector, and infrastructure in general, have a wide range of funding sources. These include taxes raised by national government (with VAT and personal income tax making up two thirds of revenue, followed by company taxes); municipal taxes like property rates and surcharges on water and electricity; bank deposits, or the savings of individuals which are borrowed for the construction of infrastructure; and user charges, which ultimately pay for infrastructure and the costs of services.

The retained income or profits of companies is another huge potential source of funding, as is international donor funding. This does not cover everything, but it shows that there are many sources of funding for infrastructure that we have not explored. This is partly because we have an industry structure with large public sector players, hindering the use of private capital.

Turning to regulation, how do we get that right? Parts of the water price along the value chain are too high, and parts are too low. Overall, water prices are too low, leading to the crisis we are in; for example, revenues (or user charges) from raw water are lower than we pay for the supply, and are inadequate to maintain, expand and develop new networks without fiscal support. Then we have to ask whether what we pay to water boards is being wasted on high salaries, projects in Africa, speculation on the stock exchange, and so on. When we look at reticulation, how much is wasted by poorly managed municipalities?

Getting regulation right means unravelling both the cost structure and the price structure throughout the value chain, eliminating wasteful practices, and ensuring value for money to users. What are different entities pricing for, and what are the costs of different components in the different places and organisations? The DWA has started to do this, but I don't know with how much success.

We need to know which municipalities are delivering what. What is in the cost structure of every municipality and water board, and how are these services being managed? So getting a handle on the value of water is basically about examining the management of water, and the actual cost structure. Better institutional and organisational alignment will help us develop a more refined and uniform price structure that forms the basis for efficient and appropriate price regulation in the sector. We need to get this right soon.

Discussion

Points made include the following:

- Current pricing is not covering costs, and there is a big backlog in maintenance and infrastructure. We need to look at how other countries have dealt with similar problems without penalising the poor. Would a basic income grant enable people to pay municipalities for water services so that they can finance water services and treatment plants? An independent regulator would ensure transparency on infrastructure costs from national government and on service delivery from municipalities. Other issues include who will pay the costs of treating AMD, and the use of a narrow accounting perspective, which can lead to cost escalations, as illustrated by the price of the Delmas pipeline, which went from R35 to R98 million while parties argued over who would pay the VAT.
- The current regulatory framework has a short-term perspective and does not look at sustainable long-term pricing or total life-cycle costing, leading to poor technology choices. The establishment of the national water resources infrastructure agency and the CMAs was meant to resolve the situation where the DWA is both player and referee in water pricing. Given that these bodies are not operational, this remains an issue.

'We need to convince the whole country that unless we get the water sector right, we're going nowhere'

- The information needed for sound decision-making is invariably lacking. Many people have moved from the department to water boards and the private sector because of better pay and the government's deployment policy. The CMAs could help to re-involve these people by appointing them on their boards.

Intergovernmental and cross-sectoral co-operation

Thabani Myeza

Project manager, Water Initiative, NEPAD Business Foundation

WE LOOK at how business can interact with water issues, and we try to push businesses to see water as a business imperative and not just a corporate social investment project. We look at ways to facilitate processes that will lower transaction costs, and build consensus among the stakeholders.

Much of the initial planning has to do with cross-sectoral co-operation. We do this from the approach of business, and I must make it clear that businesses get involved in water because of business imperatives. Great things are happening out there, in which some of the organisations represented here are involved, although business people like to stay under the radar until they know they've got it right, and their interventions are ready to be scaled up. The industry recognises that there are capacity constraints in the public sector, and is willing to engage with it, but it will only do so within the limits of what it can practically do.

We are doing quite a lot of work with the support of the World Economic Forum and USAID, not just in South Africa but also in SADC. By getting the right parties around the table, we make sure that business can play its role without being forced to assume full responsibility.

Reuben Baatjies

Director, intergovernmental relations and governance, SALGA

ONE OF the major problems in respect of water services is a lack of understanding of the limits of decentralisation, and the context of co-operative governance. South Africans take co-operative governance to mean that we don't take each other to court, and are very friendly to one another at the expense of delineating clear lines of authority and accountability such as those in the DWA's National Water Services Regulation Strategy.

The current constitutional arrangement has fragmented functions and services that should be integrated, adversely affecting the provision of water services. For example,

'The challenge is not to fix the pipes, but to fix the institutions that fix the pipes'

municipalities struggle with operational issues like mapping usage patterns, riparian rights, and monitoring compliance with licenses, as when commercial users disadvantage users downstream. The DWA does not provide clear guidance on these issues or on broader policy like adapting to climate change, and a lack of understanding of co-operative governance results in little or no responsibility being taken by any particular role player.

The interdependence of functional areas requires a more holistic approach towards funding local government, and towards services in general. For example, introducing free basic services has fundamentally changed the business model for water, as a result of which water services are no longer profitable. We need to address this. The DWA should urgently engage National Treasury and the Department of Cooperative Governance and Traditional Affairs (COGTA) on the water and sanitation business model that was applicable in the 1990s and which formed the basis for the Water Services Act (WSA) and other water legislation. Such engagement should reflect on the revenue opportunities from water and sanitation against the current economic reality and against local municipalities' current collection rates.

In addition, we need to ring-fence at least 10 per cent of water income for maintenance and repairs, because those functions suffer first in difficult economic times. To conclude, the voluntary nature of our culture of co-operative governance needs a rethink.

Helgard Muller

Chief director, water services, DWA

WE NEED intersectoral and cross-sectoral co-operation because of the linkages among water, health, mining, and other sectors and activities. Our constitution has complicated the roles of national, provincial and local government. However, it is clear that supplying water is a local government function, and funds follow function, because the municipal infrastructure grant (MIG) and the equitable share goes to local government for this purpose.

The constitution also states that national and provincial government must support and strengthen the capacity of municipalities. It's often a challenge to know when to support and when to regulate. As a regulator we can prosecute, and we do, but this is costly and complex, and afterwards the problem is still there. That is why we try to rectify problems before going to court.

COGTA is responsible for overall local government policy, but it depends heavily on the sector departments like the DWA for details such as water. They are currently revising policy on local and provincial government, and will look at whether we should have district and local municipalities. We have said that one level of local government would be better. Last week, COGTA produced a report on the state of local government, and stakeholders should engage on this.

'The department needs about R2,4 billion a year to run existing water infrastructure, but is only collecting R600 million'

We have some excellent municipalities providing examples of good practice that compare well internationally. Small municipalities like Peddie in the Eastern Cape and Loxton in the Northern Cape have Blue Drop certification for drinking water, so it is not a question of being big or small. We should learn from those examples and build on them.

Planning is vital, and business can participate. We have discovered that business often works on projects without looking at wider planning for a given area, which we can share with them.

Barbara Schreiner asked who holds the DWA accountable. It's the public, through parliament, which gets very tough on the department to perform, but also the media, and that is why we publish our results. We have published the Blue Drop for drinking water, and we will publish the Green Drop for water treatment. We want to share what we are doing.

Discussion

Points made included the following:

- The construction industry builds sewage works and water treatment plants, and is willing to enter into public-private partnerships, but government needs to take the lead. Similarly, some companies build and manage their own WWTPs, and could share their expertise and capacity with municipalities. The capacity, infrastructure, and technology exist, but the public sector needs to create an appropriate framework and reduce the transaction costs involved.
- A participant reported that, in the course of undertaking source vulnerability assessments, SAB and Coca-Cola encountered problems in getting information on water performance, strategic plans, and the performance of effluent plants from municipalities. Other participants recommended using the Promotion of Access to Information Act. Although this can be costly, it can also lead to media exposure, which puts pressure on municipalities.
- The department is working with the National Treasury to include key water performance indicators in the annual reports that will be compulsory for municipalities. It also had figures on drinking water quality in each municipality on its website. The Blue Drop and Green Drop certification processes also provide access to some information.
- A lot has been said about co-operative governance and accountability but as far as water quality issues go we can't afford to wait for another couple of years to sort it out. Besides improving local government, pressure should also be brought to bear on the national and provincial departments that are meant to support them. Although there were many issues around intergovernmental co-operation, when the parties

'Current pricing is not covering costs, and there is a big backlog in maintenance and infrastructure'

actually sat down together and engaged on concrete issues it was possible to get to the bottom of things.

- The wisdom of moving sanitation to the Department of Human Settlements was questioned. Low-cost housing development was a priority, but providing housing without infrastructure was a futile exercise. In the past decade there was a lot of emphasis on chasing housing targets, but 15 years later the poor state of infrastructure, due to the lack of investment in maintenance, had caught up with policy priorities and was threatening to erode those gains.

Leadership, management and accountability

Neil Macleod

Head of water and sanitation, eThekweni Municipality

THE MAIN problem in the water sector is a lack of leadership at the national and local levels. Most of the experienced people have left in frustration, died, gone to better paying jobs, or been redeployed. As a result the institutional memory is gone, and because very few municipalities have written up standard operating procedures they have lost continuity. There is a big gap in the 30-55 age group, leaving very few mentors.

The number of engineers and technicians are declining rapidly. In the 1990s there were 3 000 to 4 000, but only 1 400 are left. As a result people are being promoted or redeployed beyond their level of expertise. We don't get information, because municipalities don't have it, or are too embarrassed to tell us.

Traditionally, municipalities have seen their customers as problems and have avoided them rather than seeing the positive side of engagement and developing initiatives together. Most of the information obtained through the Access to Information Act is probably concocted to get rid of people. Initiatives to address this have not succeeded.

We work in a difficult environment marked by rapid urbanisation. Under apartheid influx control stopped people moving to the cities, so when it was lifted the floodgates opened. Every year we have 30 000 new shacks in eThekweni, and because we can't respond quickly enough, slums start to develop. Input costs are soaring, and most municipalities have payment arrears, resulting in cash flow issues. Customer expectations are very high, and with elections in 2011, politicians want delivery, and are blaming officials when it is lacking.

With water costs rising, we won't be able to afford flush toilets in 30 years. There won't be any fresh water to drink; we will be drinking recycled sewerage. There won't be any phosphorus to make fertiliser, and we will have to use urine and faeces to grow food. There are technical solutions, but we have to address social perceptions first before they will be accepted. This will require innovation from both the public and private sectors.

'We have some excellent municipalities providing examples of good practice that compare well internationally'

‘The construction industry is willing to enter into public–private partnerships, but government needs to take the lead’

Leadership is an endangered species. You see it in toyi-toying and in municipalities not getting things done – we have five-year-old license applications that haven’t been processed. On the other hand, assessing every water works and water treatment works and issuing Blue Drop and Green Drop certificates has had an amazing effect. Suddenly it became hard to lie because government sent people to gather data. When the Blue Drop results were published, only 22 out of 400 water works got certificates. The Green Drop results, for 1 400 treatment works, have not been published, which says a great deal; they have been kept secret so that communities won’t make a fuss. This tells us where we’re at in terms of leadership and accountability.

We really need to increase accountability at the community level so that people know what’s going on, and have platforms for engaging with service providers. Then we’ll have real regulation, because people will march in the streets at the drop of a hat, but it needs money and some passion in the sector to set it up.

Municipalities need to operate as businesses, integrating different functions like water, finance and HR. We need to manage our assets. The VIP toilet is a classic example. We build them and then when they fill up we don’t empty them, so people return to the bush.

We need regulation to force our councillors to understand their roles. And we need people who know how to run water institutions. At the moment there are 90 municipalities without a single professional. We presented a proposal to the department on how to address this. We could take 100 or 200 young people in these jobs and teach them how to run a water institution, including asset management and customer relations. It has to be done on the job, a week every now and again. Then we would have people who know how to put together and evaluate tenders and manage consultants so that you can bring in the private sector. At the moment we can’t get the work through the supply chain.

At the other end of the scale, we need artisans who can run the water systems and treatment plants. Japan has a classic model. They have schools linked to their three biggest metros where they do the theory, and then they work in the metros, which have plants and trainers. Again the department has to take the initiative to set this up across the country. It won’t work if only one or two metros are involved.

Anne McLennan

Deputy director general, executive development, Public Administrative Leadership and Management Academy (PALAMA)

PALAMA IS responsible for leadership and management development in the public sector, currently at the national and provincial levels, but increasingly focusing on local government. Its core function is to develop management and leadership capacity in the public sector in order to enable the system to deliver. Management development takes time, resources, and commitment, but the challenge is that the skills are needed now.

A further challenge is a generic management versus a sectoral approach. It might be easier to use a sectoral approach for specific technical expertise, but for broader institutional development a more generic approach to capacity-building might be better.

Training on its own doesn't build management or leadership capacity. For managers to perform effectively in an institutional environment, they need three things: technical and managerial skills; the will to perform; and the institutional space to work effectively and make decisions. These factors are all linked to the broader organisational and policy context.

As a government training academy, it is easiest to work on building knowledge and skills. We can work with a sector to build specific management competencies, such as supply chain or financial management or finances. We can also develop people's commitment to realising the government's objectives. The real challenge, though, is the institutional environment which involves the politics around turf and mandates.

There seem to be three sets of processes around water management. The first involves challenges around economic development, scarcities and sustainability raising questions of accountability and of ensuring compliance with current policies and legislation. The second involves communities, the impact of poor water management on health and welfare, and engaging with government. Accountability is important here because communities need to hold business and government to account. The third is governance, and here you need to look at linking capacity to pull together scarce resources, and do what needs to be done.

Kevin Wall

Principal researcher, South African Institution of Civil Engineering (SAICE)

IN 2006 SAICE produced an infrastructure report card that gave the DWA a D+, for its water infrastructure, major urban centres a C+, and all other areas a D-. For sanitation, it gave major urban areas a C-, and all other areas an E. According to the National Treasury and World Bank, we need a staggering R500 billion over the next ten years to address backlogs and fix infrastructure. While 17 per cent of the backlog consists of people who have never had services, 34 per cent is due to people moving around the country, as well as new household formation. The biggest charge, R250 billion, is for rehabilitation. The study estimated that 30–40 per cent of the infrastructure is no longer working, and needs fixing.

Solutions depend on fixing the service delivery chain made up of management, financial, engineering, economics, and social practices and techniques, within a robust framework and management plan. According to CSIR, 31 per cent of water services infrastructure failures are due to a lack of human resource and skills, followed by finance at 16 per cent and management and leadership at 13 per cent.

The role of engineering in municipalities has been reduced by interposing political levels between engineers and decision-makers. Many technical directors have

'Most experienced people have left in frustration, gone to better paying jobs, or been redeployed'

'The numbers of engineers and technicians are declining rapidly. In the 1990s there were 3 000 to 4 000, but only 1 400 are left'

non-technical backgrounds. Many civil engineering technicians are inexperienced, and mentorship is lacking, with the situation steadily getting worse. The ratio of engineers to the total population is completely inadequate compared to international norms.

Recommendations focus on leadership, management, institutional capacity, and accountability. Where should we focus our efforts? Often the things that can really bring the town to a halt are so big that nobody tackles them in time. We need to retain existing competence, build potential, and supplement from the outside. What happens to the person who allowed things to fall into such a state of disrepair? We need an end to employing and promoting people who aren't able to do the job.

As our president said recently, we need a 'differentiated approach, not one size fits all'. But first, instead of denying them, we need to acknowledge where the problems lie; develop the political will to address them; identify the weakest links in the chains; prioritise; provide incentives; and establish accountability by means of reward and punishment, including naming and shaming. We need to outsource when this will be most effective and efficient, and where there is someone competent to outsource to. We need to think outside the box. Pre-1994 there were divisional councils outside the municipal areas; perhaps we need to revisit solutions such as those, giving them a different name.

The way forward

Helgard Muller

Chief director, water services, DWA

THE WATER business is highly complex, and politicians, the media and the public often underestimate this. We welcome this debate, because it is important to communicate and discuss these issues, but it is also important that we don't just react to the public and the media. I will try to summarise the issues.

We need a specific plan for AMD, which we need to implement. We need to improve co-ordination between our department and the Department of Mineral Affairs, especially on licences and co-ordination among scientists. We acknowledge the backlog in issuing licences, but our Mpumalanga regional offices are committed to sorting this out by March next year.

Overall our planning is in place, but it needs decisions, funding, and the right institutions. We must take a life-cycle view of all asset management, not just building them.

The department needs to improve strategic leadership. It's a serious problem in this sector; among other things we've had a succession of DGs and acting DGs, We need to make decisions about the number of CMAs, the water resource management agency, and what powers to delegate to these institutions, so they can help move the sector forward. We are developing a number of strategies; we have heard that these are not always

practical, so this is an opportunity for the stakeholders present today to engage with these processes. They include a pricing strategy, water for growth and development, a national water resource strategy, and a turnaround plan from COGTA.

We need to ring-fence the water business at the municipal level. The Constitutional Court ruling on Phiri Mazibuko has provided some basic principles which have been lacking until now. Municipalities can now act against people who fail to pay for water, but must comply with certain conditions. For example, if you want to apply water cut-offs or credit control, you need to put it in your by-laws.

At the Fifth World Water Forum held in Turkey in March 2009, participants agreed that the question is not public versus private, but rather how utilities can and should optimise a mix of public and private resources. Consultants must do a better job. We believe we need specialised technical skills, but a balance is important. We need to understand the problems as a client, and how to manage them properly.

The Green Drop results are with our minister, and she will hopefully announce them very soon. But we need to consider whether or not the regulation should be independent in the future, and take a decision on this. We also need to communicate on basic health and hygiene.

Dr Mamphela Ramphele

Executive chairman, Circle Capital Ventures

WHAT STRUCK me most clearly today is that we have to deal with these issues very urgently, and in an inclusive way. We are facing a social dilemma, but we don't think about it in that way. We think the government must fix this, and the private sector must stop being greedy, but actually water is a metaphor for what is happening in the rest of our society. Unless we deal with the sustainability issue, we are going to have 30 per cent less water than we are used to having.

We have heard a lot about management, but what is really at stake is governance. There is a difference. You can have the best managers, but if they are working in an environment which is not properly governed, they are wasted, they get frustrated, and they leave.

We have heard that we are limited in our ability to govern water properly because of a range of issues centring on trust. When you don't get the required information from municipalities, or it is doctored, this is partly because they don't trust you, and that's a big problem. But the question is, what rules and regulations work at the local level, which don't, and why do they work and why not?

Those people living on the banks of the Crocodile River just outside the Kruger Park subscribe to the rules about parks. If you remove them, they're not going to think you are acting in the public good, because they don't believe their public good and yours are the same.

'Input costs are soaring, and most municipalities have payment arrears, resulting in cash flow issues'

On the availability side, we have a problem of predicting the real ceiling of available resources. Without trust you can't actually govern the commons, in this case water. The 2009 Nobel Prize in economics went to people who worked on the governance of the commons. You can't solve this problem through rules without getting people together to build trust, and a common language.

We talk about the huge maintenance backlog and new infrastructure. Is there a different way of looking at it, using different approaches, in which ordinary people play a role in managing water reticulation and maintaining water systems, creating jobs in the process, and building the self-confidence of people who currently feel they are being treated like cattle? Humiliation is not a good basis for well-governed systems.

What we really need is stewardship around the issue of water, to deal with it as a commons. And for that to happen, you need people. Obviously the government must play a major strategic leadership role, but you also need other people to have a conversation such as the one we have had today, which acknowledges that we can only survive if we work together.

Discussion

Points made include the following:

- Water issues are central to development and environmental sustainability. Government needs to play the strategic leadership role, and take the necessary decisions to address the water crisis. People from different sectors, not just the water sector, need to come together to discuss issues and make plans. The country needs a water champion at the heart of government who can give the lead to the cabinet and all departments. Without this it will be impossible for the corporate and civil sectors to engage with the state on these issues. We also need a spatial development framework to zone areas for water conservation, mining, urbanisation and other uses, and to resolve conflicts between development options due to water scarcity.
- It is vital to communicate the extent of the crisis and the threat to the country's future, using hard facts. Everyone will need to think differently if they are to cope with a situation in which the country has 30 per cent less water.
- Civil society needs to think about how it can play a role outside the state. Major interests such as metros, the corporate sector, industry, and agriculture have a fundamental interest in how this situation will be addressed. They need to have a strategic approach, and a game plan. The state and civil society need to think hard about what each can do, and how they should interact.
- Businesses need to understand their water footprint, and take this into account when making business decisions. They need to think what they are going to do differently, and what role they can play in ensuring long-term water security. One possible way for business to be part of the solution would be to create a niche market for the

It is vital to communicate the extent of the crisis and the threat to the country's future, using hard clear facts

private sector in water services delivery. In the Eastern Cape, for example, the CSIR is piloting a business model for school sanitation.

- There is a crisis around basic rights and responsibilities which contributes to weak accountability. Public education to inform previously disenfranchised communities on how to relate to local government is very important. To build trust between civil society and officials and councillors, we need platforms where users can engage with them. The citizen's voice programme in eThekweni is helping people to look at the real issues involved in resolving the problems in their communities. This requires officials with confidence in their skills who do not feel threatened by that kind of dialogue.
- The government is spending a lot of money on infrastructure. We need to ensure that some of the funding is allocated to the water sector, particularly for sanitation and repairing water infrastructure. The department should also address pricing anomalies in the supply chain, and assist the state to support poor people.
- Training for the top 200 people in municipal water, as well as the next 200 who support them and should be able to replace them when they retire or move on, needs to be high on the agenda. A water management academy drawing on SETA or university facilities and funding could be established quite quickly. Some of the large metros, such as eThekweni and Tshwane, have good training programmes, and can help other local government structures to develop the required skills.
- AMD needs urgent attention. Mining licences are issued for five years with the option of a three-year extension, and there are hundreds of applications in Mpumalanga each year. This means that those issued in 2004 when the new legislation came into effect will be valid until 2012. The cabinet should stop the Department of Mineral Resources from granting applications for licenses that do not reflect the full life-cycle costs of mining. Past and present mine owners should be made to take responsibility and prosecuted if necessary. It does not help to speed up the issuing of mining licences when the applications do not include plans for post-closure water rehabilitation.
- The health sector, specifically public health and child health specialists, should be involved with water affairs in looking at both long-term and short-term health issues. Steps should be taken to educate communities adequately.
- Some issues vital to water management – including climate change and the environment – are seldom discussed. One key issue is whether South Africa should build more coal-fired power stations, or search for other ways to meet its power needs. South Africa is a water-scarce country, and while agricultural consumption of 60 per cent may be low in terms of international norms, it is high in the context of the limited amount of water. Policy-makers and planners need to start thinking laterally about climate change and related issues.
- Water use affects the aquatic ecosystems that support our biodiversity. South Africa is a signatory of the Convention on Biological Diversity and we need to consider the effect of further environmental degradation. CMAs have a self-funding model based

The deterioration in water management is largely due to a failure of government at all levels

on water sales. This means that the CMAs in the most important conservation areas will get the least funding because most of their water will be used for environmental purposes.

- South Africa's population will grow by 50 per cent in the next 20 to 30 years, and we need to plan how we will accommodate these people.

Key insights from the Round Table

THOUGH NOT yet as visible a crisis as electricity provision, it is clear that mounting problems with South Africa's water supply could impede our social and economic development, and indeed are already doing so in some localities. On current trends, South Africans may one day have to make do with significantly less water. For a country already using almost all its available water resources, this would be a dramatic change, with far-reaching implications for households, businesses, communities and government.

One reason why we are in this position is that South Africa is a very dry country – as dry, on some measures, as the desert state of Oman. Another is that, unlike most other countries, our largest economic centres are not situated near our major sources of water. Yet another is that what water we have is being managed badly.

At the time of the transition to democracy, South Africa had a well-functioning system for managing bulk water and providing water and sanitation services, albeit mainly to a minority of people. The new government introduced a comprehensive new policy framework which focused on providing the entire population with potable water. Its new approach was widely praised; however, its new policies and associated institutional frameworks were designed without considering their feasibility, and without considering what other factors – notably investment in managerial and technological skills, and in establishing effective, accountable and transparent governance – would be needed to realise this vision.

Institutional disarray

Moreover, government allowed its technical capacity to decline at precisely the same time as it launched its drive to extend access to potable water and devolve the provision of water services to local authorities, which largely lacked the capacity to do so. As a result, water supply has come under growing strain; indeed, it has become clear that the deterioration in water management is largely due to a failure of government at all levels.

Given the conflicting interests of different users – including agriculture, mining, industry, and urban and rural communities – water management is not easy, and requires effective institutions on a number of levels. South Africa's are in disarray.

Serious problems exist across the system. None of the 19 CMAs established under the NWA is operational. Some 90 municipalities do not have a single professional water

Water management is not easy, and requires effective institutions on a number of levels. South Africa's are in disarray

engineer; and very few have written sets of standard operating procedures. Equally revealing is the rapid deterioration in water quality in many parts of the country. This is the result of the cumulative and continuing incidence of AMD in the Witwatersrand goldfields and increasingly in the Mpumalanga and KZN coalfields; the long-standing problems of industrial and agricultural pollution; the recent deterioration of water distribution systems and WWTPs; and the inability of government to enforce its own regulations.

Institutional weaknesses as severe and extensive as these usually have their roots in poorly conceived policies and systems. This is certainly true of water management, where an ambitious programme of institution-building and reform has been attempted with very little grasp of the vital importance of skills and experience in managing water. In the process, the desire to meet targets of demographic representivity, along with the all too frequent practice of securing jobs for friends and political allies, has trumped almost all other priorities in the process of staffing both existing and newly established entities.

Massive backlog

These institutional problems are serious enough on their own; however, they have emerged in the same period that the government has sought to extend access to water and sanitation to people and communities who have long been neglected and are often far away from existing infrastructure. Though this initiative was and remains justified on moral grounds, it has resulted in a massive backlog in investment and maintenance throughout the country. Given this, and the illegal use of water (notably in the upper Vaal system), some 30 per cent of our usable water is being wasted.

On current trends, then, the country is headed for a crisis of water security and quality that will hamper our socio-economic development, both directly and indirectly. One example of this arises in relation to South Africa's spatial development. It is usually easier and cheaper to supply water to urban centres than to low-density communities in remote rural areas. This means that, despite its political popularity, any ambition to extend services to all South Africans would raise input costs, increase wastage, and reduce efficiency. Obviously, not all schemes beyond urban areas are unaffordable or undesirable. However, the increasing scarcity of water means that its availability and quality has to be factored into decisions about public and private investment and resource allocation, including those about the balance between urbanisation and rural development.

Water scarcity should also be taken into account in other areas. Government support for the expansion of some industries and the development of some geographical areas may need to be critically reviewed. Taking a very long view, water availability and price may well lead to a shift in the country's settlement pattern, with coastal areas being favoured because of the advent of economic desalination. Similarly, the promotion of some water-intensive agricultural crops, such as sugar, may be unsustainable, and other countries in the region such as Zambia with higher and more consistent rainfall than

Emerging water supply problems will soon impact on the whole spectrum of South Africa's development challenges

South Africa, may become more important producers of crops such as maize. Moreover, plans for developing a biofuels sector may need to be reviewed.

Our current and projected trajectory with respect to water also raises important questions about health, rural development and land reform, mining, industrial development, and a variety of other sectors. Sooner than many policy-makers anticipate, emerging water supply problems will impact on the whole spectrum of South Africa's development challenges.

Seven vital steps

If we are to reverse these trends, we need to focus on addressing those factors over which we have a degree of control.

- *Political leadership is vital:* A necessary first step is for Cabinet and the Presidency to recognise the severity of the current situation. Moving forward will require a recognition that many aspects of the looming crisis are the direct consequence of the overambitious policy and institutional goals formulated in the 1990s. While they were and remain laudable in principle, the harsh truth is that they have proved impossible to implement effectively. Only leadership from the highest reaches of the state can produce the kind of action needed in the face of the serious threats to water security and quality.
- *Water management institutions must be improved:* Their governance should be transparent, accountable, and understandable by all parties. The Round Table clearly exposed the confusion surrounding public water institutions, and their resultant dysfunctionalities. Water management and delivery systems should be properly staffed with skilled and experienced people.
- *Existing infrastructure must be properly maintained.* It is much more expensive to replace infrastructure than to maintain it, but this principle has been neglected. As a result, water infrastructure has not been sufficiently expanded to cope with growing populations, nor adequately maintained.
- *The legacy and continuing problem of AMD must be urgently addressed.* The state must recognise that it needs to take the lead in dealing with this issue. Some of the reasons are that underground water systems are interconnected; some of the offending mines have been closed, and the companies no longer exist; and the state's currently liberal granting of coal mining licences, especially in Mpumalanga, is gravely exacerbating the problem. Solutions are available, but are very expensive, and the resources needed to address them can probably only be mobilised via public-private partnerships.
- *Prices must reflect costs and scarcity:* A central lesson from past and present policy experience is that the underpricing of water will eventually undermine both security and quality. Setting prices too low means that institutions don't receive the revenues they need, water is used inefficiently, wastage occurs with little consequence, and

A central lesson from past and present policy experience is that the underpricing of water will eventually undermine both security and quality

polluters (private and public, individual and institutional) are permitted to do serious damage (public health, the environment) and impose clean-up costs on others. Getting prices 'right' is not a simple matter – central government, for instance, has no authority over prices set by local government, and in a country with such large income disparities, consideration has to be given to the capacity to pay on the part of a large section of the population.

- *We need to focus on the long term:* Our current water policies privilege short-term gains over long-term sustainability. This needs to change. We need to ensure that systems are in place to secure water supplies, deliver water services, and recover monies owed so that cash flow problems do not undermine maintenance and other operational processes. Above all, prices paid for water must reflect the reality that water is scarce and difficult to manage, rather than the short-term preferences of politicians and various interest groups.
- *We need to minimise waste:* We cannot afford to waste any water. Government at all levels needs to ensure that we reduce the volume of water lost through leaking pipes, broken valves, and outright theft. At the same time, all water users need to use water more efficiently. Businesses should be encouraged to assess their own water footprints, and reduce both their use of water as well as the pollution they release. Households and communities must be encouraged to use water more economically. Again, appropriate pricing as well as persuasive and committed national leadership is vital.

Urgent action is required

Water security and water quality are vital for everyone. The present problems, though related to the dryness of the country, and the history of unequal access, have also arisen because a highly ambitious policy agenda has been pursued with scant regard for the vital role of skills and experience in water management, and the opportunity costs when they are lacking (most evident in the mounting maintenance backlog).

If we continue on our present course, water will undermine South Africa's national development. To improve the country's outlook, urgent attention must be paid to putting in place the appropriate policies and institutional capabilities to deliver water services today without undermining the ability to do so tomorrow.

Above all, prices paid for water must reflect the reality that water is scarce and difficult to manage

If we continue on our present course, water will undermine South Africa's national development. To improve the country's outlook, urgent attention must be paid to putting in place the appropriate policies and institutional capabilities to deliver water services today without undermining the ability to do so tomorrow

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CENTRE FOR DEVELOPMENT AND ENTERPRISE
Informing South African Policy

Transmedit Place, 5 Eton Road, Parktown, Johannesburg 2193, South Africa
P O Box 1936, Johannesburg 2000, South Africa
Tel 27 11 482 5140 • Fax 27 11 482 5089 • info@cde.org.za • www.cde.org.za

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