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Report highlights service deficiencies for Brazil's urban poor

A recently-released United Nations (UN) study warns that government policies aimed at slowing urban growth and depriving the poor of benefits and services increase poverty and environmental degradation, creating serious long-term problems that could be avoided with enlightened planning.

The study, 'Brazil's early urban transition: what can it teach urbanizing countries?', published by the UN Population Fund (UNFPA) and the International Institute for Environment and Development, studied Brazil, whose urban growth has been much faster than in Europe and North America.

Brazil's urban centres currently hold 80% of the country's population, up from 36% in 1950. But while cities create 90% of the country's wealth, over 25% of residents are below the poverty line, and one in 15 lives in extreme poverty.

Rather than addressing social inequalities and planning for urban growth, Brazil had adopted policies that discriminated against urban settlement by the poor, the study found.

Consequently, millions are excluded from key services and other benefits of urban life, while facing enormous challenges such as

crime, pollution, unsafe housing and preventable diseases.

The study's co-authors – George Martine, a former UNFPA staff member and past president of the Brazilian Association of Population Studies, and Gordon McGranahan of the International Institute for Environment and Development – said the study has lessons for other developing nations.

Mr Martine said: 'The story of Brazil's urban growth shows how deep-rooted inequalities have combined with negative policy stances to generate many of the social and environmental problems that still plague Brazilian society.

'Policymakers in Africa and Asia should embrace and plan for urban growth, so they can take full advantage of its potential to contribute to development, rather than vainly attempting to prevent it as Brazil did.'

The study concluded that the critical first step is for policymakers to recognise the rights of poor people to live in cities and share in the benefits of urban life. The next is to plan ahead for their land and housing needs within a constantly updated vision of sustainable land use. ●

LS (See Analysis, page 5)

Watsan investment supports 1.8 million more people but MDG achievement still in doubt

The number of people in Africa with access to improved access to drinking water supply and sanitation facilities rose by 1.8 million last year through the financial investment by the US, a new report says.

Sudan, Ethiopia and Burundi have the highest number of people accessing drinking water supply at 355,000, 332,000 and 129,000 respectively among the 19 sub-Saharan countries that took 34 percent of the \$774 million invested by the US through the United States Agency for International Development (USAID) for all water sector and sanitation related activities in developing countries last year.

The Senator Paul Simon Water for the Poor (WfP) Act 2009 Report to the US Congress says that the US, through the Millennium Challenge Corporation (MCC), provided assistance for larger infrastructure projects in several 'compact' countries to improve irrigation systems, rebuild critical infrastructure, and to increase access to clean water and sanitation.

The WfP Act requires that the Secretary of

State in Consultation with USAID and the US state agencies develop and implement a strategy to increase affordable and equitable access to safe drinking water and sanitation in developing countries. The report, the fifth since its initiation of the Act in 2005, shows that at least seven million litres of drinking water got disinfected with point of use treatment in sub-Saharan Africa in 2009.

However, only Ghana and Senegal have made significant steps in increasing the number of people accessing clean drinking water and sanitation services under the MDGs ahead of the 2015 deadline says the report.

Political upheavals, lack of political goodwill and uncoordinated water reform policies' implementation have held back several countries in the sub-Saharan region from reaching their water and sanitation goals. The region is now top among those that are carrying a growing burden of waterborne diseases occasioned by lack of clean drinking water and hygienic sanitary conditions. ●

Shem Oirere
(See Analysis, page 6)

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Water Utility Management International focuses on the interests of utility executives, policy makers and advisors around the world engaged with the key management issues faced by water and wastewater utilities. As well as senior utility managers, the publication will be of interest to regulators, consultants, contractors, academics, and financial, technical and legal professionals.

Utility reform and achieving efficiency are central themes of the publication, encompassing topics such as benchmarking, investment planning, consolidation, public / private sector roles, leadership, IT, and human resources. Other regular themes include financing, regulation, charging policies, procurement, corporate governance and customer issues.

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French-Saudi consortium to improve services to Makkah

Saudi Arabia's National Water Company (NWC) has awarded the contract for management support for water and sewerage in the cities of Makkah and Taif in the Kingdom to the French-Saudi consortium, Saur-Zamil.

Saur entered the Saudi market with the Zamil Group, a Saudi conglomerate with expertise in maintenance and infrastructure management.

This five-year management contract covers all services related to production and distribution of drinking water, and sanitation. It includes the management and operation of 4200km of potable water systems and 2500km of sewerage networks. The distributed volumes represents 555,000m³/day.

Saur and Zamil Group have been chosen from

among ten pre-qualified international companies. Their offer was characterised by its high level of technical expertise and commitment to preserving water through an ambitious leak reduction programme.

Saur and Zamil Group were also able to meet client's requirements relating to the specific constraints of Makkah and Taif, in particular the very high fluctuation in the population served in Makkah, which rises from 1.4 million to five million during the pilgrimage of Hajj.

Saur sees the agreement as 'an important step for the deployment of Saur in the region'. The contract is worth SAR173 million (\$46 million) and took effect this summer. ● LS (See Analysis, page 7)

EPA develops contamination response software

Scientists from the US Environmental Protection Agency (EPA) and the US Department of Energy (DOE) have collaborated to develop innovative water quality software that improves a water system's ability to detect when there has been intentional or unintentional contamination.

The Canary software is said to help detect a wide variety of chemical and biological contaminants, including pesticides, metals, and pathogens. Once contamination is quickly detected, a utility can issue a 'boil water' or 'do not drink' order.

Paul Anastas, assistant administrator for EPA's Office of Research and Development, said: 'This cutting-edge technology helps to protect all Americans and secure our nation's water supply from threats.'

'The new software also improves our drinking water systems and allows water utilities to quickly advise customers when their water is not safe to drink.'

The software is used in conjunction with a network of

water quality sensors to rapidly detect contamination and more accurately assess when and how to respond.

It also helps to distinguish between natural variations in water quality measurements and hazardous contamination, and sends an alarm to indicate when water utilities should investigate and respond to potential contamination.

As well as helping to achieve the US' homeland security goals, EPA says Canary can be used to improve day-to-day water quality management and ensure the safety and security of water.

The Greater Cincinnati Water Works was the first utility to pilot Canary and has been using the software to help detect and manage contamination incidents since 2007. The software is currently being evaluated in four other US cities – New York, Los Angeles, Philadelphia, and San Francisco – and in Singapore.

Canary is available worldwide free to drinking water utilities. ●

Desalination upgrade for Aruba's drinking water treatment

Two Veolia Water Solutions & Technologies companies, NA Water Systems and OTV, have been awarded a contract to design and build a 24,000m³/day desalination plant on the island of Aruba.

The plant will treat seawater from beach wells to provide high quality drinking water to the island. The 22-month contract was awarded by Water en Energiebedrijf Aruba, the island's electricity and water utility.

The desalination facility will use the latest reverse osmosis technology to replace thermal desalination units. Consequently, the new facility will be more economical to operate and better for the environment.

The contract includes performance guarantees for

water production and quality, minimal downtime, as well as electrical and chemical consumption. In addition to the design-build work, the contract includes an option for one year of on-site operational assistance and two years of off-site technical assistance.

Paul Choules, vice president of desalination at NA Water Systems, says the company 'is pleased to be working with Aruba on this project. We have a long history with the island, dating back to 1932 when we installed the first desalination plants there. This new desalination plant will provide the community with a more efficient treatment process and enable Aruba to phase out the older technology.' ●

MDG meeting highlights sanitation deficits

Water and sanitation were an important topic at the United Nations (UN) Millennium Development Goals (MDGs) summit which took place recently, with UN Secretary-General Ban Ki-moon warning that the water and sanitation MDG was vital to the success of other targets.

He told the meeting: 'Without water, there is no life,' adding that that the world is 'on track to meet the target for water but all reports indicate that the MDG target for sanitation is far off track'.

Mr Ban added: 'We must urgently work toward a world in which every person has access to clean, safe water every day. Everyone should have the access to water and sanitation services that we in

this room take for granted.'

Liberian President Ellen Johnson-Sirleaf told an event during the summit that the MDG on increasing access to sanitation services had become the 'the orphan MDG'.

She added that 26 of 54 African countries were on track to meet the target to halve the number of people without safe drinking water by 2015, but that only six nations looked set to meet the sanitation goal.

Maria Otero, US under-secretary for democracy and global affairs, warned that 'we must redouble our efforts. We cannot have a future where children continue to die from water-related diseases.' ●

AWWA backs Obama's call for federal infrastructure bank

The American Water Works Association (AWWA) has released a statement praising President Obama for calling for the creation of a federal infrastructure bank in his Labor Day address. AWWA has been promoting the concept of a water infrastructure bank for nearly two years and has been urging the president and US Congress to include water projects in his plan.

AWWA Executive Director David LaFrance issued a statement saying: 'The American Water Works

Association commends President Obama for proposing the creation of a federal infrastructure bank and strongly urges the inclusion of water systems in any such funding mechanism.

'There are more than one million miles of water mains buried beneath our roads, stretching 20 times the length of our interstate highways. Much of our water infrastructure was constructed between 80 and 100 years ago and is nearing the end of its functional lifespan.

'While transportation funding is important, our water systems, although out of sight, cannot be overlooked. These systems are critical for the public health protection, fire protection, economic prosperity and our overall quality of life.

'AWWA has closely examined the concept of a federal water infrastructure bank and testified to its merits before the US House Subcommittee on Water Resources and Environment last July. The bank would borrow money through

the federal treasury system at very low rates. It could then provide low-cost loans for urgent water projects that would put hundreds of thousands of Americans to work.

'Because the bank would issue loans – not grants – it would have minimal impact on the federal budget and would require no new taxes. It's a fresh, sustainable approach to financing our nation's aging water infrastructure problem that strikes just the right balance between federal assistance and local responsibility.' ●

Honolulu agrees to upgrade problematic wastewater systems

The US Justice Department, US Environmental Protection Agency (EPA), Hawaii Attorney General's Office, Hawaii Department of Health and three environmental groups have announced that a wide-ranging settlement has been reached with the city and county of Honolulu to address Clean Water Act compliance at Honolulu's problematic wastewater collection and treatment systems.

The settlement, which also resolves lawsuits brought by the Sierra Club, Hawaii's Thousand Friends and Our Children's Earth Foundation, includes an all-

encompassing compliance schedule for the city to upgrade its wastewater collection system by June 2020.

Work on the system will include rehabilitation and replacement of gravity and force mains, strategies to minimise the risks of force main spills, a cleaning and maintenance programme, improvements to Honolulu's programme to control fats, oils and grease from entering into the wastewater system from food establishments, and repair to pump stations.

Ignacia S Moreno, assistant attorney general for the Justice

Department's Environment and Natural Resources division said that the settlement 'represents a significant commitment that will address the city and county of Honolulu's aging wastewater collection and treatment systems. The end result will not just be an improvement to the system's infrastructure. It will also significantly reduce both the public health risk caused by exposure to pathogens in raw sewage and the amount of harmful pollutants entering Honolulu's vibrant marine environment.'

Jared Blumenfeld, EPA's

administrator for the Pacific Southwest region, said: 'This settlement will lead to significant improvements in water quality for the people of Oahu, and for the visitors to the island's world-class beaches. It calls for aggressive actions in the near-term to upgrade the city's sewage collection system, and set out a longer term schedule for construction of secondary treatment at the Sand Island and Honouliuli plants. The work is on a multi-year schedule to allow the city to spread out the costs of this critical programme.' ●

Business

Chile's utilities due to invest heavily in potable water services

The president of Chilean water utility association Andess, Guillermo Pickering, has announced that the country's water utilities will invest nearly \$553 million in potable water services between 2010 and 2021. Projects will include expansions of potable water networks, routine maintenance work and pipe replacement, he explained. The country's potable water coverage is now 99.8%, so utilities have to focus on maintaining the service and expanding it as demand increases, he added.

KBR wins ADB sanitation master plan contract

Construction and facilities giant KBR has announced that it has been awarded a contract by the Asian Development Bank to undertake the preparation for a proposed water sector project. KBR will prepare a national sanitation master plan, a draft Land Use Plan for the Samoan capital, Apia, and a Greater Apia integrated water supply, sanitation and drainage master plan. This sustainable development project will focus on providing a secure and efficient water supply and wastewater management. The plans developed will recommend upgrades to existing water infrastructure, as well as new infrastructure, flood mitigation works and components to a water demand management programme.

AECOM wins brackish water RO DBO

AECOM Technology Corporation has been awarded a \$101 million design-build contract by the town of Davie, in Florida. The company will design and construct a 6MGD (22.8MLD) brackish water membrane treatment plant as well as a 3.5MGD (13MLD) membrane water reclamation facility. The project also includes a new utility office for the town, a series of five raw water wells, two deep injection wells and reuse of the reclaimed water. The project is scheduled for completion in 2013.

Mexico desal tender launched

A tender to build a \$34 million desalination plant for the west coast city of Ensenada in Baja California, Mexico, was launched at the end of September. Construction is due to start by the end of 2010, with an estimated two and a half year construction period. The plant will have a 250 litre/sec treatment capacity and will provide water for 96,000 residents.

Royal Haskoning JV win flood control contract

Royal Haskoning and its partners Deltares and DHV have acquired a frontrunner project in a series of Dutch-Vietnamese initiatives to improve flood control in the Mekong Delta. The first, €2 million (\$2.7 million) project aims at reducing flooding in and around Ho Chi Minh City. The project team will develop partnerships and identify funding sources for future projects and strengthen the technical and management capabilities of relevant Vietnamese agencies. The project team will also promote partnerships between Dutch and Vietnamese educational, scientific, water and environmental institutions and between governmental and non-governmental organisations in the field of water management.

KBR becomes part of Melbourne tertiary alliance

KBR has announced that it has been appointed to the Eastern Tertiary Alliance, which will design and build one of the world's largest advanced tertiary wastewater treatment plants for Melbourne Water in the Australian city of Melbourne. The plant currently treats about 40% of the city's wastewater and is Australia's largest activated sludge plant. The new project, which will cost AUD\$330 million (US\$298 million), will install ozone and biological media filtration to reduce colour, odour and suspended solids, followed by secondary ozonation, with UV and chlorine for disinfection.

Suez wins litigation against 2006 decision to terminate contract

The International Centre for Settlement of Investment Disputes (ICSID), the World Bank's independent arbitration body, confirmed at the end of July Argentina's liability in litigation over the termination of the water and wastewater concession contracts for the capital, Buenos Aires, and the state of Santa Fe, which had pitted GDF Suez, Suez Environnement and Agbar against the country.

The then Néstor Kirchner government rescinded the 30-year contract against a backdrop of

economic upheaval and radical devaluation of the peso, accusing Aguas Argentinas (the local operator) of 'non-compliance'.

Suez, which owned 40% of Aguas Argentinas, had announced in 2005 that it wanted to pull out of Argentina for economic reasons – the government had frozen prices in 2002 at the start of the economic crisis, and had forced the conversion of the utility's charges from dollars to the plummeting peso.

A new mainly state-owned company, Aguas y Saneamientos Argentinos (Aysa) was set up to

replace the ousted utility.

The three Suez companies welcomed the ICSID decision, which follows subsequent years of litigation. The ruling will be followed in the coming months by a final determination of the compensation owed to GDF Suez and Suez Environnement for the losses they incurred, which at the time the lawsuit was filed were said to be \$1.7 billion – the total sum invested in the country.

Speaking at an analysts' meeting in Paris, Suez Environnement CEO

Jean-Louis Chaussade confirmed the utility is seeking up to \$1.2 billion in compensation.

The companies called the decision 'an important recognition of the work accomplished on the ground by the employees of Aguas Argentinas, which in 13 years (1993 to 2006) enabled, among other things, two million Argentineans who previously had no access to running water to be connected to the public drinking water service and one million people previously without facilities to be connected to wastewater services.' ●

Water utility risk and resilience standard released

The American Society of Mechanical Engineers (ASME) and the American Water Works Association (AWWA) have unveiled the first risk and resilience management standard designed specifically for water utilities.

The J100 standard, which was created in response to the terrorist attacks on 9 / 11, Hurricane Katrina and other recent disasters, was released at the beginning of July.

The Risk Analysis and Management for Critical Asset Protection (RAMCAP) method is designed to help water and wastewater utilities to identify

potential threats to US water infrastructure and prepare for or mitigate any damage.

Reese Meisinger, president of the ASME Innovative Technologies Institute (ASME-ITI), said: 'This partnership leverages several years of development across multiple industry sectors, resulting in the only multi-sector, quantitative risk / resilience method available. Tailoring this method into an American National Standard reflects the far-sighted leadership in infrastructure security and resilience shown by AWWA and the water sector.'

AWWA executive director

David LaFrance added: 'The J100 standard provides the water sector with a critically needed methodology to support risk and resilience decision making, especially in an already resource constrained economy.'

The manual addresses hazards ranging from terrorist attacks to natural disasters with the new RAMCAP methodology, which differs from others by guiding utilities in calculating the probability of a malevolent attack using an approach based on actual incidents, calculating the probability of a specific natural hazard occurring at a facility, and

calculating asset and utility resilience capacity.

An expert committee representing water utilities, risk assessment practitioners and government agencies spent 18 months ensuring the standard considered specific water sector needs.

AWWA and ASME-ITI have also partnered to develop a training programme for the standard that will provide utilities and practitioners with a functional understanding of the all-hazards RAMCAP method and how it applies to the water sector. The training will be launched in late July through AWWA's E-Learning platform. ●

Loans and tenders

IADB grant and loan package agreed for rural Ecuador watsan projects

A combination of \$20 million in grants from the Spanish government and \$30 million in loans from the Inter-American Development Bank (IADB), will help Ecuador to increase the coverage of efficient and sustainable water and sanitation services in rural communities of up to 20,000 inhabitants.

KfW gives green light for Pakistan water and sanitation grant

Germany's KfW bank is to provide a grant of €3.1 million (\$4 million) for the implementation of the second phase of the water and sanitation extension programme being run by the Aga Khan planning and building service in Pakistan. The programme is expected to benefit around 245,000 people in 307 villages of the Gilgit-Baltistan and Chitral (GBC) region through constructing and rehabilitating the potable water supply and on-site sanitation infrastructure, grey-water drainage infrastructure, community mobilisation and participation in construction and maintenance works, along with health and hygiene education.

World Bank provides extra funding for emergency sewage treatment

The World Bank has agreed additional funding for the North Gaza emergency sewage treatment project. The proposed additional financing will support the original objectives of the project, which are to mitigate the immediate and gathering health and environmental safety threats to the communities surrounding the effluent lake at the Beit Lahiya wastewater treatment plant, and to provide a satisfactory solution to the treatment of wastewater for the Northern Governorate of Gaza.

Moroccan water and sanitation projects benefit from IBRD loans

Agreements have been signed for two International Bank for Reconstruction and Development (IBRD) loans worth \$218 million to improve access to water supplies and expand wastewater systems in Morocco. The objective of the regional potable water supply systems project is to increase access to potable water supply for selected local communities in the provinces of Nador, Driouch, Safi, Youssoufia, Sidi Bennour and Errachidia. The project will finance significant infrastructure investments in water supply production, transmission and distribution systems to meet the growing needs of urban and rural populations in the six targeted provinces.

ADB provides funding to Cambodia for improved water management

The Asian Development Bank (ADB) has agreed to provide loans, grants and technical assistance worth nearly \$34 million to help Cambodia improve the management of its water resources and to upgrade irrigation services to strengthen food security and cut poverty. The funds are for the \$63 million water resources management sector development programme, which includes measures to strengthen national water regulations and improve the management of river basin resources. It also will help the Ministry of Water Resources and Meteorology rehabilitate small and medium-sized irrigation systems within the Tonle Sap basin. ADB will also administer a loan from the OPEC Fund for International Development, and technical assistance grants from the government of Australia and the Nordic Development Fund to support programme implementation.

Brazil's poor pay the price

A new report on Brazil's urban transition has highlighted significant deficiencies in water supply and sanitation provision to the country's low-income population, citing a lack of planning, which forces the poor to the periphery of cities and increases the problems of disease, flood risk and environmental degradation. **LIS STEDMAN** summarises the report's findings.

The International Institute for Environment and Development (IIED) and United Nations Population Fund (UNFPA) have published a report on Brazil's urbanisation and the lessons for urbanising countries, called 'Brazil's early urban transition: what can it teach urbanising countries?', which warns of a lack of strategic thinking on water.

The report suggests that as a middle-income country it would be expected that Brazil's most serious urban environmental problems would include such issues as ambient air and surface water pollution, with only a small percentage of the urban population suffering the sort of domestic water and sanitation problems found in the cities of much poorer countries.

However, the report points to serious weaknesses that have led to water issues in Brazil. It notes: 'The lack of a shared, proactive vision for urban growth is widespread, even when there is a professed faith in master plans. Unplanned and un-oriented rapid urban growth undoubtedly accentuates environmental management problems, and invariably leads to the local degradation of natural resources like land, water and vegetation. In settlements where basic services are not provided it also contributes to environmental health problems, such as those related to inadequate water and sanitation.'

The report adds: 'Deficiencies in access to piped water, sanitation and waste removal are significant, but not as critical as in most other low- and middle-income countries. Nevertheless, some urban environmental management problems are exacerbated by the lack of strategic vision and integrated or proactive approach to urban growth.'

Expansion into peri-urban areas

Brazil's lack of planning and consequently of water and sanitation infrastructure means that the country does not have the same 'middle class automobile-based suburbanisation' – as the report

styles it – as in the US, with most peri-urban growth stemming instead from the extension of low-income residential areas into the periphery.

The report notes: 'This also has distinctive and important environmental implications, but these are of a different nature. For instance, in the MR (metropolitan region) of São Paulo, where these issues have been analysed in greater depth, expansion into peri-urban areas is transforming land use at an alarming rate, degrading the natural environment, contaminating watersheds and invading parks and other environmentally protected areas, including the famously endangered Mata Atlantica.'

There are also more deliberate policy decisions affecting water and sanitation provision, the report found. It says: 'An important study by Feler and Henderson (2008) found evidence of systematic practices to exclude poor urban communities, who are cut off from basic services and infrastructures like central water and sewerage; keeping the poor in bad living conditions has been an effective way of resisting in-migration and urban growth.'

'The study indicates that regulations promoting exclusion are more prevalent in poorer communities and in those with a greater proportion of migrants. In principle, the 1979 national law establishing the minimum plot size for housing ... also made it "illegal" for cities to provide public infrastructure to poor settlements. This gave them an excuse to refuse to provide basic services, and obliged poorer communities to procure more expensive private alternatives.'

The report also found that infrastructure that already existed was being withheld from the poor, thus pushing them to the periphery, noting: 'In a related and even more essential move, the public sector needs to take a proactive stance on the future land needs of the poor. Most cities have land in good

locations that could be built on, but which is being held for speculative purposes. Maricato (2010: 13) observes that "in some cases, as in the cities of Brazil's centre-west (Campo Grande, Goiânia and Palmas), vacant land possessing infrastructure (water, sewage collection, paving, public lighting) could accommodate more than double the population of the cities and would avoid forcing the larger part of the low-income population to live outside the established urban fabric".'

Even when decision-makers want to resolve these problems, the report notes that 'the often haphazard and asymmetrical pattern of occupation in informal settlements makes it difficult to provide vehicular transportation or other types of service.'

Health and environmental impacts

Such difficulties not only exacerbate the miserable living conditions of the urban poor, but ultimately impact on the quality of life and sustainability of the entire city, the report warns. 'Lack of access to shelter and services is the starting point for a vicious circle of poverty,' it adds.

The report reveals that the poor live in areas far from typical urban infrastructure and support. It observes: 'Their daily living environments are typically full of hazards and lack minimal access to clean water for drinking, cooking, washing and bathing, or serviceable toilets and garbage collection. These conditions increase the spread of mosquito-borne diseases like dengue and malaria, multiply disease-causing germs and frequently lead to chronic illnesses of the digestive tract, or cholera epidemics.'

Crowded environments also help spread diseases like diarrhoea, the report adds, and these problems are made worse during periods of heavy rainfall and by flooding caused by unsustainable land use,

as was seen in the Brazilian summer of 2009 to 2010, when significant numbers of lives were lost and households destroyed in lower-income communities in São Paulo and Rio de Janeiro.

Disregarding the land and housing needs of the poor also adds to overall environmental degradation, the report warns, because 'it affects ecosystem services and the city's ability to plan responsibly and effectively for sustainable growth'.

The report points out that with little choice apart from 'stigmatised or off-limits land', the poor sometimes occupy ecologically-fragile areas and watersheds, endangering city water supplies and other ecosystem services.

Deforestation to clear space for housing causes flooding, and occupying urban floodplains and wetlands not only puts the lives and possessions of the poor in danger, the report adds, but also increases the likelihood of flood damage in other parts of the city.

A related problem with master plans, it observes, particularly in metropolitan regions and other large agglomerations, is that they are formulated at the municipal level. 'Many of the legitimate problems that master plans need to address, especially in large urban areas, have important regional dimensions,' it says.

'Key problems such as sorting out land issues, dealing with urban sprawl and peri-urbanisation, ensuring access to permanent water sources, dealing with waste and, even more generally, attracting investment that will generate employment and social welfare, all require a regional approach,' the report explains.

The report concludes that fragmented responsibilities in larger cities lead to administrative inefficiency and make social and environmental problems worse. It notes: 'In short, municipal master plans for larger agglomerations can only deal with certain elements of local issues.' ●

Sub-Saharan Africa struggles to meet water and sanitation goals

With the Millennium Development Goals' (MDG) 2015 deadline drawing near, the Senator Paul Simon Water for the Poor Act Report released earlier this year focuses on progress in sub-Saharan Africa, where many of the countries at their current rates will not achieve MDG targets for access to water supply and sanitation. **SHEM OIRERE** highlights the main issues.

The majority of sub-Saharan African countries are far from meeting their Millennium Development Goals (MDGs) on water according to the fifth edition of the Senator Paul Simon Water for the Poor Act Report, which was prepared in June 2010 and presented to the US Congress the following month.

Leading oil producer and Africa's most populous country, Nigeria, leads the pack of nations that urgently needs scaling-up of intense water reforms and increased funding to facilitate the installation of infrastructure to expand access to water and sanitation services, especially to rural areas.

'Less than half of Nigerians have access to improved sources of water, and only 17.2 percent are served by piped water,' the report says.

The report focuses on the role of United States Agency for International Development (USAID) and the Millennium Challenge Corporation (MCC) in developing and implementing a strategy to increase affordable and equitable access to safe drinking water and sanitation within the context of sound water resources management in developing countries

'Thirty percent of the population does not have access to adequate sanitation,' says the report.

'Under the Nigerian constitution, state and local governments are responsible for providing basic services, including water and sanitation services.'

A lack of capacity to sustain initiated water and sanitation programmes in rural areas is a leading cause of the poor access to these vital services according to

the report.

In the case of Nigeria, the report, which puts the number of people lacking access to safe water at more than 800 million, says that 'most water supply is unreliable' despite all 36 states having state water boards that focus on municipal supply.

Also, it says: 'although some states have established Rural Water Supply and Sanitation Agencies (RUWASAs), these under-resourced entities have weak capacity and local governments have very limited budgets and human resource capacity for implementing sector activities.'

Across sub-Saharan Africa private sector and civil society engagement in the water sector is low the report shows, 'despite a national water policy that calls for a commercial orientation and private sector participation'.

In countries hit by political instability like Sudan and Somalia, the report suggests that the US, through agencies like USAID and MCC, increases support for water supply and sanitation services as one way of bringing about good governance in these nations.

Last year, USAID invested the largest amount of money yet in Sudan to improve water supply, sanitation, and hygiene (WSSH), with a total funding of \$39 million from development accounts with almost \$16 million from development accounts in water supply and sanitation WSSH, and almost \$23 million dealing with International Disaster Assistance (IDA) account water and sanitation activities.

'To support the Comprehensive Peace Agreement by providing peace dividends, the US

Government works to improve the capacity of the Ministry of Water Resources and Irrigation, the Southern Sudan Water Corporation, local authorities, and the private sector to provide essential water and sanitation services,' says the report.

Effect of climate change, population growth and disease

Sub-Saharan Africa's water supply has been closely linked to the dramatic changes in climatic changes in the region, attributed to the environmental degradation that has taken pace, especially in countries with growing populations that need additional land for cultivation and wood for fuel, with the report citing the case of Tanzania.

'Illegal logging continues, and Tanzania has the third-fastest deforestation rate in Africa, due mainly to its position in the bottom 10 percent of the world's economies in terms of per capita income and with 80 percent of the population living in and subsisting on rural areas, the need for fuel wood drives the deforestation rate,' the report notes.

'The impact on watersheds has been devastating, and in some cases total watershed collapse is imminent,' it continues. 'US Government-supported plans to increase agricultural growth and expand the staple food supply through the Global Hunger and Food Security Initiative seeks to reduce Tanzania's dependency on unreliable rain-fed agriculture by increasing the area of developed high potential land for irrigation from 289,245 to over 2,000,000 ha in FY 2010.'

Liberia, still recouping its losses incurred during a decade of civil war, tops the sub-Saharan countries with the highest number of waterborne disease incidents reported.

'Lack of year-round access to water and consumption of contaminated water affects rural as well as urban poor, who are badly served by the formal sector,' the new report says of the West African nation.

'Women and children are the primary drawers and users of water, and many carry water from long distances or pay high prices (for water of questionable quality) from vendors with outbreaks of water-borne or water-related disease (cholera, typhoid fever) and a high prevalence of diarrhoea, putting severe burdens on caretakers of children and health providers, keep children out of school, and lower the labor available for agricultural and other productive pursuits.'

Progress made

However, it is not all doom and gloom as the cases of Ghana and Senegal demonstrate after the two countries made huge strides in their quest to expand the population that has access to clean drinking water and sanitation services.

'Senegal is on track to meet its Millennium Development Goals (MDG) targets for water by 2015, with lesser prospects for sanitation and the United States Government will work with Senegal in achieving the MDGs and in becoming a model for other countries in the region,' the report says.

In Senegal, the US specifically intends to improve water productivi-

ty, strengthen participatory governance, increase demand for sustainable water, sanitation and hygiene services and products and also strengthen the capacity of actors in the sector.

A similar good case is replicated in Ghana where the report notes that 'significant progress has been made in expanding access to

improved water supply over the last decade.'

Achieving Ghana's MDG of 76 percent of the population accessing potable water by 2015 is now feasible, says the report. However, sanitation is only available to a very small proportion of the population in both urban and rural areas, placing Ghana far

behind its MDG goal of 65 percent of the population accessing sanitation facilities.

Since its inception in 2005, MCC has invested a total of almost \$1.3 billion in country-led water sector- and sanitation-related activities globally with USAID investing another \$2.1 billion.

The report says that for WSSH

alone, USAID invested \$482 million while MCC committed \$32 million, for a combined total of \$514 million last year. USAID WSSH-related funding support to sub-Saharan Africa decreased by \$9.3 million last year compared to 2008 and currently represents 34 percent of USAID funding allocated for water worldwide. ●

Fluctuating population challenge for Makkah service improvements

Water scarcity and rapid fluctuations in population are the main issues being faced in the improvement of water and wastewater services in the Saudi Arabian cities of Makkah and Taif. **LIS STEDMAN** speaks to **CHRISTOPHE GUILLET** and **SERGE CAUBET** from Saur, who along with Zamil Group are undertaking preparations to improve service continuity, loss, customer management and network coverage across these two areas.

Saur, a French group that provides service management and plant design / construction, has won a contract to provide water and wastewater management services in the unique Saudi Arabian city of Makkah, and the nearby city of Taif.

Saur has entered the Saudi market with Zamil Group, a Saudi conglomerate with expertise in maintenance and infrastructure management.

The five-year management contract covers all services related to distribution of potable water and wastewater collection and treatment, including the management and operation of 4200km of drinking water mains and 2500km of sewerage networks. The volume of water distributed is 555,000m³/day.

Saur and Zamil Group were chosen from among ten pre-qualified international companies and had to meet very specific constraints, including meeting the requirements of the highly-fluctuating population of Makkah, which can rise from 1.4 million to five million. Christophe Guillet, Saur's international development director, explains: 'The Ministry of Water and Electricity in Saudi Arabia decided to create the National Water Company and to transfer some activities to it, and on the basis of this transfer it decided

to organise the management contract. The plan was to realise five management contracts, for Riyadh, Jeddah, Makkah-Taif, Medina and Damam-Khobar.'

The Makkah-Taif contract was signed on 28 August 2010 and was the first management contract awarded to Saur in Saudi Arabia.

A transitional period began on 1 September, during which preparations for the operational stage of the contract, which begins on 1 January 2011, are being undertaken. Serge Caubet, the contract project director, says: 'At the moment we are preparing for the transfer of employees from the Ministry of Water and Electricity to the National Water Company. The first stage is to transfer all the services and activities and we will build the City Business Unit to manage the water and sewerage services.'

'With the management contract, the focus is on the performance of the management, the training and the transfer of know-how. Payment also will depend on the compliance of the performance indicators fixed by contract. Although Saur has developed a strong experience of PPPs (public-private partnerships),' Guillet notes. 'The context of the present management contract is

very specific to Saudi Arabia,' he continues.

The main objectives of the contract are to improve service continuity up to 24/7, reduce losses, and create true customer management, as well as improving network coverage. 'At the moment it reaches 70% in Makkah,' says Guillet. This is largely due to the city's rapid growth, which makes preparing an investment plan a considerable challenge.

There is considerable scope for improvement, the collection ratio in Makkah is of 50% and one of the key objectives in the management contract is to improve this. Losses on the water network are high, with just 55% of the bulk water entering the network being registered to customers' meters. Controlling unaccounted-for water and reducing leaks will result in limiting bulk water cubic metres and significant cost savings. 'Performance will be really important for economic reasons,' says Caubet.

'The quantity is very far from that of an efficient operation,' Guillet adds. 'Even if the price paid is not in line with the cost, it is very important to know where the water is going.'

One major characteristic is that currently domestic customers are not billed the real cost for their water and wastewater services, and

the Ministry effectively supports the price of water by subsidising the tariffs. 'The price paid by the domestic customer is only symbolic,' Guillet explains. 'It is even zero for sewage. Only industrial and commercial customers pay something – it is under cost, but significant.' This is a real issue as the Kingdom has limited water resources that are provided almost entirely by desalination. 'Today, demand is not controlled by price, so alternative ways should be implemented such as providing information to customers and awareness campaigns,' he says.

'However, the sensitive issue of tariff setting is not within the remit of the City Business Units, which will be in charge of customer-side services. They will be supplied with bulk water from the desalination plants, which will also remain outside their remit.'

Saur has worked in Saudi Arabia before, providing technical assistance on the Damam-Kobar audit of services and technical assistance for Makkah for a year before the current contract. At the moment the company has no other activities in the Middle East, but it is hopeful that this is just a first step. Guillet says: 'This is our first market in the Middle East and we hope to develop our activities in the region.' ●

A practical approach to securing supplies: *Barcelona leads the way*

Located in the Mediterranean, the city of Barcelona has had to adapt its water management to the climatic extremes of the area, but now it is achieving supply security through optimising its use of different sources, improving its sewer system and reducing demand, making Barcelona an example of successful water management. **FERNANDO RAYON** discusses how the approach of Barcelona to managing its water resources provides a practical example of implementation of sustainable water use in the Mediterranean, so providing a useful reference for other utilities in the region and around the world.



The 'Strategy for Water in the Mediterranean' was prepared by the Expert Group of the Union for the Mediterranean (UfM), a community of countries bordering the Mediterranean Sea, as an authoritative perspective on how to approach water supply security in the Mediterranean region. In the end it was not approved at the UfM's Ministerial Conference on Water in Barcelona, Spain on 13 April 2010. The impediment was disagreement between some countries on the drafting of a sentence which in principle had nothing to do with water. The strategy document that was submitted for approval does, however, contain many elements of great value. This is the case for both the problems of water in the coastal countries of the UfM, and the strategies required to solve them – strategies which may also be of use to countries around the world who must also secure their resources.

As indicated in this strategy, the water resources in Mediterranean countries are limited and are unequally distributed in space and in time, the countries of the south receiving only 10% of the total average annual rainfall. Moreover, in the area of the UfM there are over 180 million people living in conditions of permanent scarcity of water (they have less than 1000m³/year per capita), and more than 60 million people in conditions of severe scarcity (less than 500m³/year per capita). Some countries from the south and the east have come to use over 160% of their renewable water resources, while there are still more than 20 million people without access to safe drinking water sources.

In some places, the intensive use of surface and groundwater for domestic, agricultural and industrial purposes has led to the resource being exhausted, and in some cases the overexploitation of groundwater has caused saltwater intrusion in the coastal aquifers. Furthermore, over the last 50 years, water demand for all sectors of activity has doubled, reaching 280km³/year in 2007. Agriculture is the main consumer, with 64% (varying between 50% and 90% depending on the country), followed by industry (including the energy sector) with 22% and the domestic sector with 14%. Population growth and the improvement in the standard of living will foreseeably lead to a notable increase in demand in the short and medium term.

In addition and in general, there is low efficiency in water use, especially in agriculture, and spillages of domestic, industrial and agricultural wastewater have caused considerable pollution in many of the natural bodies of water. The forecast impacts of climate change for the 21st century moreover make the current challenges even more pressing.

In this context, the strategy itself

proposes four key lines of action to confront the aforementioned challenges successfully. These lines are:

- Improvement of governance for an integrated management of water resources.
- Adaptation to climate change and improvement of flood and drought management.
- Encouragement of water demand management, efficiency and use of non-conventional water resources, protecting the water quality and biodiversity.
- Optimization of water financing, especially affecting the pricing policy and the search for innovative financing mechanisms.

In addition, the strategy document incorporates a series of short-term (2012–2015), medium-term (2016–2020) and long-term (2021–2025 and beyond) operational objectives, which indicate the actions to be developed in greater detail.

Barcelona: an exportable water management experience

Barcelona (three million inhabitants) is a typical Mediterranean city, which has historically been – and still is today – subject to the characteristic inconsistency of the Mediterranean climate, with a high risk of droughts and flooding, at times almost simultaneously.

It is, however, this story of love and hate with water that has obliged Barcelona to sharpen its wits in order to confront the high frequency of these extreme situations. Although there are still improvements to be made, the progress experienced both in hard terms (infrastructures and technologies), and in soft terms (governance and management), positions Barcelona as one of the

Barcelona's water distribution control centre.
Credit: Antonio Navarro Wijkmark.





worldwide examples to be followed in water management.

The key lines of the strategy indicated above are therefore extremely familiar in Barcelona, because we subscribe to them, exercise them and perfect them both in our day-to-day management and in our long-term approaches.

Thus, reviewing these strategic lines one by one, we see, for example, that in Barcelona there is an integrated daily management of the water resources, on optimizing the simultaneous use of waters from very different origins, such as surface water from the Rivers Ter and Llobregat, groundwater from the Llobregat and Besòs aquifers, desalinated seawater from El Prat desalination plant, water regenerated in the Llobregat plant and even that from the city's subsoil, which is used to water parks and gardens.

The complexity of the management arising from such diverse sources is dealt with in a solid model of governance. This model is based on the cooperation of a regulating public administration and a private operating company, and has over 140 years of experience and a spirit of continuous improvement, which has allowed it to be exported very successfully to many other places and countries, with very different characteristics. In turn, the experience acquired with this exporting has helped to contrast and improve the model even more, making it more flexible and adaptable and, in short, more exportable again.

In order to confront flooding in the sphere of the city, Barcelona has an advanced urban drainage system, which is pioneering in Spain and one of the most admired worldwide. This has been built and managed also in the framework of public-private cooperation, through a mixed economy company, in which both the municipality of Barcelona and private companies have a shareholding.

Where drought management is concerned, there are still opportunities for improvement. The technological

One of Barcelona's stormwater retention tanks.
Credit: CLABSA.

and economic efforts applied, the close public-private collaboration and the admirable behaviour of the population are, however, clearly examples of good management. In this respect, it is good to point out that, in order to reduce the risks of drought, Barcelona currently has the most advanced technological resources in the world (desalination, regeneration, artificial groundwater recharge, etc.). The problem has not yet been completely solved, but the progress experienced recently is extremely significant. Climate change, in addition to the other effects of global change, will tend to worsen the situation in the future, but work is already being carried out in the sphere of planning and operation in order to mitigate its effects.

Barcelona is also an outstanding case in relation to the idea of water demand management. This concept is based on guaranteeing that water demand is met not only through expansion and improvement of the supply (that is to say by making new water resources available), but mainly by reducing consumption to the minimum necessary. In this respect, in the domestic sphere, Barcelona is a commonly-mentioned worldwide example, with consumption barely above 100 litres per inhabitant per day, the minimum value advised by the World Health Organization (WHO) for cities of this type, and of course well below the consumption of any city with similar socio-economic characteristics. An important improvement in the efficiency of water use is likewise being promoted in the agricultural sector of Catalonia, through ambitious plans to modernize irrigation and innovation projects to apply in the countryside all the knowledge developed and accumulated in the laboratories and research centres of Catalonia, which are recognized worldwide for their quality.

The tendency to use non-conventional resources is another of the characteristics of water management in the region of Barcelona. There is already a notable presence of seawater

Barcelona's desalination plant.
Credit:
Ferran Martí.



desalination plants (the one in Barcelona is the biggest in Europe for urban supply), an increasingly widespread use of regenerated water, obtained with the adequate treatment of wastewater, and a more generalized tendency to make better use of local resources, such as groundwater to irrigate parks and gardens and to clean the streets. The Llobregat wastewater regeneration plant is a paradigmatic case, as it allows the wastewater generated in Barcelona to be recycled for irrigation, recovery of ecological flows of the River Llobregat and protection against saltwater intrusion in the aquifer of the same river's delta. The water quality in this plant is so high that it can even be used for urban supply if necessary.

Likewise, the protection of water quality by means of the ambitious wastewater treatment programme launched in Catalonia in the 1980s, has not only helped to substantially recover the water quality of our rivers, but also at the time was a model for the rest of the country, as regards both the technical aspects and the financing and management model. This programme continues today through the fulfilment of the requirements raised by the European Water Framework Directive, currently being developed, and leading to an improvement in the ecological quality of the bodies of water.

Finally, as regards the economic and financial aspects referred to by a specific line of the strategy, in Barcelona and Catalonia there is also very useful experience in the development of financing models and public private partnerships such as those advocated in the strategy itself. The public-private water management model in Catalonia is indeed an example of soundness, efficiency and good results.

It can therefore be seen that the master lines of the UfM's Strategy for Water in the Mediterranean coincide fully with the vision and the reality of water management in Barcelona. Barcelona therefore has experience and capabilities to bring to the application of this strategy, understood as the best possible to progress with the solution of the problems of water in many other countries and situations. ●

Fernando Rayon presented at the IWA Water Utility Conference – Strategic Opportunities for Future Challenges 2010, held 10-12 May 2010 in Barcelona, Spain.

About the author:

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The power of collaboration: how San Francisco Bay Area utilities are attacking workforce development challenges

BAYWORK, a collaboration of utilities in the San Francisco Bay Area, is aiming to tackle the problem of experienced workers retiring without the knowledge of these workers being passed on, as well as encouraging the use of technology for greater work efficiency. **CHERYL DAVIS** discusses the strategies BAYWORK is using in order for utilities to manage their workforce development effectively.



Cheryl Davis speaking at the 2nd West Coast Water Utility Workshop in January 2010.

Workforce development challenges manifest themselves differently in different parts of the globe. In many countries, including the United States, there is marked concern about upcoming retirements of experienced employees, and the knowledge that will leave with them. In some countries the focus is on capacity building rather than capacity replacement. Either focus reflects the understanding that knowledgeable, prepared workers are a prerequisite for operational reliability.

BAYWORK, a collaboration of water and wastewater utilities in the San Francisco Bay Area, was created in June 2009 to allow utilities and other stakeholders to work together in the area of workforce development. BAYWORK's Roadmap is based on four strategies:

- Find enough of the right people to fill mission-critical jobs (a combination of candidate development and outreach).
- Provide staff with the information they need to do quality work (e.g. through documentation, staff training and development, mentoring, and knowledge management systems that make key operational information readily accessible).
- Modify work to optimize use of the staffing available (e.g. through increased use of information

technology, modification of work practices or job classifications, and inter-agency agreements).

- Work collaboratively with other utilities and stakeholders to maximize the cost effectiveness of workforce development efforts.

Through the efforts of a multi-utility executive committee and multiple working committees, BAYWORK was able to move forward in all four strategic areas during its first year. Development and recruitment of strong candidates for upcoming jobs requires not only cooperation among utilities but also coordination with educational institutions and workforce investment boards. In order to ensure that candidate development efforts were properly focused, BAYWORK partnered with the community college system to conduct a six-county survey of upcoming water / wastewater labour needs in relation to mission-critical positions (e.g. water treatment operators, wastewater treatment operators, electricians, and machinists). Findings from survey responses collected from 45 Bay Area water and wastewater utilities indicated that in some classifications, approximately half of all incumbents would be eligible for retirement within five years. BAYWORK utilities have identified a range of ways to support the training efforts of educational institutions, such as providing tours, classroom demonstra-

tions, assistance in locating instructors, used equipment, and on-site training opportunities. BAYWORK agencies also assisted one college in developing the curriculum for a pre-apprenticeship programme for electricians and instrument technicians.

Encouraging people into the sector

In order to inform both current and future workers about valuable work opportunities in the water industry, BAYWORK has published outreach brochures on water treatment, electrical, and machinist positions. These have been distributed regionally and nationally (on the www.h2opportunity.net website). Write-ups on Bay Area water and wastewater employees have been posted to the website to provide information to standards and potential candidates on the benefits of jobs in the water industry.

BAYWORK has also prepared a Job Opportunity Map, providing contact and location information on all Bay Area water and wastewater utilities. This information is being provided to educational institutions and workforce investment boards in the region, and will be posted online.

Using technology

BAYWORK utilities are equally aware of the need to make sure employees have the information they need in order to do quality work. A workforce development needs assessment conducted by the San Francisco Public Utilities Commission (one of BAYWORK's member agencies) in 2008 indicated that upcoming retirements were only a piece of the problem. Reliance on the knowledge of skilled experienced workers had contributed to inadequate investment in documentation, staff training, and knowledge management. Additionally, changing facilities, regulations, technologies and equipment, combined with inconsistent technical training, had created a situation in which even long-time employees might not be fully equipped to do reliable work.

Subsequent research efforts at both the regional and national level have

confirmed that these deficiencies are widespread. However, some utilities have done exemplary work in these areas, and BAYWORK actively promotes knowledge transfer between utilities. In January of 2010, BAYWORK sponsored a West Coast Water Utilities Workshop on Workforce Development. The workshop held at Santa Clara Valley Water District in San Jose, California, USA was attended by water and wastewater utilities from as far north as Vancouver, Canada and as

Findings from survey responses collected from 45 Bay Area water and wastewater utilities indicated that in some classifications, approximately half of all incumbents would be eligible for retirement within five years.

far south as San Diego, California. Presentations reflected proactive programmes in mentoring, documentation and development of standards, technical training, creation of learning communities, use of video for knowledge capture and staff training, and use of wiki software for knowledge management. Metro Vancouver, for example, discussed their mix of online interactive training videos, field guides, and scenario-based classroom training.

Use of video

The workshop also provided an opportunity to display another BAYWORK product: jointly-produced video standard operating procedures showing how to replace a motor. BAYWORK is now working on two projects to expand use of video technology.

Videoconferencing capacity available at worksites of the San Francisco Public Utilities Commission will be used by BAYWORK agencies to test the feasibility of providing health and safety training simultaneously at multiple sites. Through videoconferencing, participants will be able to see and speak with each other, while viewing visual aids simultaneously. A proctor assigned to each site will, following training, provide on-site follow-up to test skills learned.

BAYWORK will also partner with a local community college to develop a video standard operating procedure on how to develop a standard operating procedure. Topics covered will include development of the script, lighting, editing, and assuring adherence to health and safety procedures and equipment requirements. Different types of work at varying worksites will be used to illustrate these points. The video will be used as a training tool in a work-

shop to teach utility staff how to create videos on how to perform operations and maintenance procedures.

Wiki software

BAYWORK agencies have also begun sharing information on how to use wiki software to support knowledge management. Both East Bay Municipal Utility District in Oakland, California and the San Francisco Public Utilities Commission (SFPUC) discussed their systems at the West Coast Workshop in January. In June two BAYWORK agencies attended an on-site demonstration of SFPUC's system. BAYWORK agencies have also participated in the User Requirements Analysis for IWA's Global Water Platform (which will build on IWA Publishing's WaterWiki); they will also provide content to pilot-test and refine the system.

Looking for new opportunities

Although Bay Area agencies recognize the risks associated with loss of experienced workers, they are also trying to make effective use of new opportunities. Younger workers are sometimes more receptive to use of information technology to make work more efficient and staff turnover presents an opportunity to rethink how work is done, how jobs are classified and how agencies might work together to perform needed work. Therefore, BAYWORK has developed and pilot-tested surveys to see how Bay Area utilities have (or might in the future) modify their work to make better use of staffing available.

Pilot-testing has already provided information on a variety of innovations:

- Use of hand-held devices to collect information relating to equipment maintenance (City of Sunnyvale);
- Use of rugged laptops permanently mounted in service vehicles to allow information access and creation in the field (SFPUC's City Distribution Division);
- Culmination of water and wastewater treatment job

- classifications (City of Daly City);
- Transformation of corporate culture and values (North Coast County Water District);
- Workforce consolidation and restructuring (North Marin Water District); and
- Ideas for more flexible staffing of operations and maintenance tasks (City of San Leandro Wastewater Treatment).

The survey was circulated among all BAYWORK members. Results will be released for preparation of a White Paper and were used as a foundation for a workshop on Innovative Work Practices in September.

All BAYWORK efforts reflect a commitment to collaboration. BAYWORK began in 2008 as a Workforce Development Task Force of staff from four utilities: East Bay Municipal Utility District, Santa Clara Valley Water District, Union Sanitary District, and SFPUC. This effort (which grew out of a Water Research Foundation project on potential benefits of regional collaboration), BAYWORK, resulted in the creation of the BAYWORK Roadmap and organizational structure. This year, executives of Bay Area water and wastewater utilities have begun signing a Charter that reflects their organization's commitment to collaboration in the area of workforce development.

BAYWORK activities reflect the priorities and resources of the San Francisco Bay area. However, when John J Batten, a Vice President of Malcolm Pirnie, made a presentation on behalf of BAYWORK at IWA's Utility Management Conference in Barcelona in May 2010, he discovered that many utilities saw the potential for application of BAYWORK's general strategies. In the end, all components of the water industry need to have good people in mission-critical positions, all have the responsibility to provide their staff with the information they need to do quality work, and all well-advised to use staff turnover as an opportunity to look for new and better ways to perform key tasks. Most of all, the challenges are daunting, and collaboration is more cost-effective than going it alone. ●

Cheryl Davis presented at the IWA Water Utility Conference – Strategic Opportunities for Future Challenges 2010, held 10-12 May 2010 in Barcelona, Spain.

BAYWORK completed a pilot test to determine whether utilities could collaborate in development of a video standard operating procedure which would be useful in more than one utility setting. Credit: BAYWORK.



About the author:

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From financial viability to bankability: the role of debt restructuring

In today's world, with the decreasing availability of grants and increasing competition for investment finance, enterprises and service providers are left with no choice but to harness available resources both internally and externally so as to continue providing services sustainably. Here, **WILLIAM T MUHAIRWE** and **DAVID ISINGOMA KAHWA** discern the concepts of financial viability, sustainability and bankability, and attempt to show Uganda's National Water and Sewerage Corporation's progression towards achieving bankability and the role of debt restructuring.

In today's world, service providers are faced with a number of challenges. On the one hand is the need to provide services to an ever-growing populace. On the other is the dwindling availability of financing from donors and other financing agencies. Typically, service providers are therefore left with no choice but to be pragmatic and harness the available resources internally and externally so as to maximise outputs. This article is an attempt to show Uganda's National Water and Sewerage Corporation's (NWSC) progress from viability to bankability based on the above concepts, and highlighting debt restructuring as a key ingredient.

Financial viability, sustainability and bankability

Financial viability refers to the ability of a firm to continually meet the basic financial requirements of an operation, i.e. to provide acceptable rates of return on financial capital (Thelma, 2005). This presupposes that the utility can adequately cover its operation and management (O&M) and depreciation costs, and post a surplus (Kamara, 2002). By this definition, very few water and sanitation utilities in the developing world are financially viable for the basic reason that tariffs are seldom full cost recovery in nature. Two principles of financial viability are discerned at this point – limited recourse funding limited only to the cash flow of a particular project, and balance sheet financing in which assets less liabilities are staked as collateral for borrowing.

A distinction should however be made between financial viability and financial sustainability. Financial

sustainability allows for the possibility of various forms of subsidies provided directly as grants, such as those in the form of below-market rate loans, to help sustain the firm and enable it to contribute to the government's social and political objectives. As long as such subsidies are transparent and targeted, they are less likely to undermine the financial discipline that promotes sustainability (Thelma, 2005).

Bankability takes us to the next level where an organisation or utility is able to access market finance and is therefore creditworthy in the eyes of financiers. Financial viability is a prerequisite for bankability. Bankability is premised on three main factors codenamed the three Cs: cash flows; character (debt history); and collateral (balance sheet). A bankable utility should exhibit these characteristics. Furthermore, bankability is synonymous with non-financial aspects, such as having a clear long-term strategy, well qualified and able management, environmental compliance and having a transparent management information system (MIS) and information database. One of the key facets of bankability is the balance sheet, which has to be healthy and attractive to debt.

NWSC's background

During the 1970s and early 1980s, like most government agencies, NWSC went through turbulent times, resulting in the dilapidation of its infrastructure and decline in service delivery. This culminated in massive rehabilitation efforts in the latter part of the 1980s and the early 1990s. The rehabilitation was funded through loans from the World Bank and other agencies, which were on-lent to the Corporation by the government at the Treasury Bill rate plus 3% (Muhairwe, 2009).

TOP: Dr William T Muhairwe. BOTTOM: David Isingoma Kahwa.



However, in 1998 the World Bank in one of its aide memoirs noted that: 'Over the last 10 years, the GoU (Government of Uganda) in partnership with the World Bank and Other Donors have made significant investments (over US\$100 million) in the Urban Water and Sewerage sector. These investments have contributed immensely in rehabilitating the existing infrastructure under the NWSC management. Unfortunately, these investments have not been matched with the necessary efficient commercial and financial management

Prepaid water system in one of the urban poor settlements of Kampala, Uganda. Credit: NWSC.





capacity that can ensure the delivery of sustainable services in the medium to long-term.⁷

The corporation at that time faced a host of problems, including a large and inefficient labour force with conflicting and overlapping roles, high unaccounted-for water (more than 50%), poor customer care, low collection efficiency (about 71%), a monthly financial deficit, and a debt age of about 14 months.

Structured reforms (1998-2010)

The corporation therefore faced a moribund performance in which most of the operational indicators were negatively skewed, and an unsustainable debt burden. The debt obligations referenced as of 30 June 2006 comprised loan principal of US\$85 billion (US\$50 million), and accrued interest of US\$68.6 billion (US\$40 million). As a first step, with the visionary leadership of Dr Muhairwe, the Managing Director, the corporation sought to address the operational shortcomings by implementing a plethora of short-term turnaround programmes, which were embedded within the longer-term strategic interventions such as the Corporate Plan and the Performance Contract with the government. The programmes included: the 100 Days programme; the Service and Revenue Enhancement Project (SEREP) I & II; the Area Performance Contracts I, II, and III; the Stretch Out Programme; the One Minute Management Concept; and the Internally Delegated Area Management Contracts (IDAMCs). This was accompanied by financial / commercial reforms, including a strengthened MIS and tariff structure changes (Muhairwe, 2009).

The debt freeze (1999- 2008)

However, in tandem, the GoU within the framework of the Performance Contract with NWSC agreed to freeze the NWSC debt so as to enable the NWSC to carry out critical

New Water Treatment Plant in Entebbe, Uganda.
Credit: NWSC.

investments from its own resources. The reasons for the debt deferment were as follows.

The NWSC tariff was not a full cost recovery tariff, implying that it was not sufficient to repay all costs, including debt servicing. A full cost recovery tariff (which would enable servicing of loans) would imply an increase in tariff of up to 90% across the board, which would make water unaffordable and would defeat the social mission of the government and that of meeting the Millennium Development Goals (MDGs).

By the nature of the water projects, many of the projects undertaken were supply-driven with a strong social element, and were therefore not financially viable. Hence, the revenue streams from the projects were not able to repay the loans, implying that the NWSC was faced with the problem of having to subsidise its operations in some of its towns.

Under the NWSC Act, the corporation was obliged to take on new towns, which were not always viable, and this then imposed a financial burden on the corporation.

It should however be noted that the debt relief was only a temporary measure, which did not provide a structural solution to the financial health of the company, as debt obligations on the company's balance sheet kept accruing.

Performance 1998- 2009

During the period 1999-2009, NWSC made significant improvements and the performance indicators showed remarkable efficiency gains. For instance, access was improved through the increasing number of connections, turnover improved, the level of water losses reduced, staff productivity improved, the metering levels went up, the network length

greatly increased and the corporation was ISO 9001 certified. Table 1 summarises the performance improvements over the period.

At this stage three things were noted that attested to the corporation's increased viability and edge towards bankability. The NWSC's financial performance had greatly improved as depicted by the increase in operating profit, and by the fact that the corporation was able to fully cover its O&M costs, depreciation, and plough back the surplus into investments, both financial and of capital nature.

Secondly, with an efficient long-term and secondary planning system and an enhanced MIS, the corporation edged its way towards being bankable. This also included a five-year investment plan. The corporation had carried out a revaluation of all its assets, ensuring that the value of assets reflected the true position of the corporation's portfolio and corresponding depreciation provisions. Furthermore, as a result of the continued focus on the cash operating margin and the debt freeze, the corporation attained the first tenet of bankability as manifested by a strong cash flow. The NWSC Human Resource complement also provided a robust foundation for operational and financial management.

However, despite the fact that the corporation became more viable, one major impediment still stood in the way of ensuring that the corporation was bankable, and that was the balance sheet that was ridden with an unsustainable debt. Furthermore, the corporation had no history of debt servicing and all financial ratios were in red (See Table 2).

From viability to bankability – restructuring debt into equity

In recognition of the need for NWSC to further expand its services to the fast

Table 1: Snapshot of performance 1998 versus 2009

Performance Indicator	1998 Performance	2009 Performance	Remarks
Water production Cu.m (millions)	44	70.3	57% growth
Water sales Cu.m/day (millions)	22	46.2	100% growth
Non-revenue Water (%)	51	34	15% reduction
New water connections (No./year)	3317	23,305	7% growth in new connections
Total number of water connections (No.)	50,826	234,718	Four-fold increase in the customer base
Service coverage (%)	47	73	26% increase in coverage
Staff per 1000 water connections	37	7	Improved staff productivity
Income (US\$ X. billion)	21.9 (US\$13m)	100.6 (US\$50m)	Four-fold increase in turnover
Operating profit (US\$ X. billion)	-2.0 (-US\$1.2m)	15.1 (US\$8.9m)	From loss making to surplus

Internal liquidity ratios	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Turnover	34,052	37,140	42,617	53,779	58,540	70,407	84,079	100,631
Growth %	16%	9%	15%	26%	9%	20%	19%	20%
Operating costs	27,103	29,069	31,600	40,477	44,523	52,420	68,420	74,425
EBITDA	6,949	8,071	11,017	13,445	14,017	17,987	15,659	25,424
EBIT	(36)	777	1,294	3,900	4,237	6,521	3,318	15,118
Gearing Ratio (Debt Assets Ratio)	0.4552	0.4307	0.4080	0.3469	0.2860	0.0000	0.0000	0.0000
Debt Equity Ratio	0.9995	1.0426	1.0696	0.7281	0.5588	0.0000	0.0000	0.0000
Current asset	21,820	24,090	28,803	37,435	37,357	49,940	52,323	66,545
Current liability	38,171	54,402	67,734	88,340	121,206	12,989	18,272	24,115
Current ratio	0.57	0.44	0.43	0.42	0.31	3.84	2.86	2.76
Return on capital employed (ROCE)	-0.02%	0.47%	0.82%	2.11%	2.68%	1.66%	0.71%	3.16%

growing urban centres, and the fact that other sources of finance such as outright grants were waning, management thought it appropriate that the corporation should access alternative finance from the market, either through banks or bonds. However, it was realized that it would be difficult and pricey for NWSC to access commercial market sources with a substantial amount of debt on its balance sheet and consequently urged the government to capitalize the NWSC through the conversion of its long-term debt into equity.

The logic for the conversion was that NWSC was a strong company that generated positive operating cash flows in contrast to most other parastatals, and thus was in a position to go to the market and leverage its cash flows to accelerate growth, while allowing the government to channel its scarce resources, including donor assistance, to other areas of high need such as NWSC's less commercial projects (e.g. Northern Uganda town investments).

Following this understanding, Cabinet and the then Parliament agreed to convert NWSC's long-term debt, which amounted to US\$154 billion (US\$90 million), into equity, effective 2007.

Impact of debt restructuring

The immediate impact of the debt restructuring was that the corporation was able to achieve the third tenet of bankability, that is a clean balance sheet with a book value of equity of US\$238 billion (US\$140 million). Furthermore, the current ratio moved from a perpetual level of below one level to a positive ratio of between two and four. As a result of the debt restructuring, the following were pursued.

The NWSC embarked on an ambitious investment programme financed from its own resources totalling US\$168 billion (US\$80 million) over a five year period. This is equivalent to US\$30 billion (US\$13.5 million) per annum.

In regard to the accessing of market

finance for critical projects, the NWSC accessed a concessionary loan from AfD (a French development agency) to fund the construction of the water intakes in Kampala and Jinja. This was an emergency project for which time was of the essence.

Regarding accessing market finance for other viable projects, the NWSC sought the option of a bond with support from the Water and Sanitation Program, World Bank Kenya, whose proceeds were mainly targeting the viable investments in Kampala. However, this option did not materialise at that time due to the financial upheavals that affected the capital markets, but the corporation is still open to seeking bond financing in the near future.

Credit rating

In order to further enhance its bankability, the corporation underwent a credit rating process by Global Credit Rating Co. (GCR). The corporation was accorded a short-term credit rating of A2, and a long-term rating of A, which when translated implies that the Company's liquidity factors and Company fundamentals are sound, and that the risk factors in regard to commercial borrowing are low.

At this stage therefore the corporation was able to gear its balance sheet with debt following acquisition of a concessionary loan from AfD. Though in its infancy, this is a step towards building a history of sustainable debt, one of the fundamentals for sustained bankability.

Conclusion

In conclusion therefore, it should be appreciated that the NWSC has moved through a systematic process from viability to bankability.

The following should however be noted. The NWSC tariff is not a full cost recovery tariff, and therefore implies that the corporation is not able to finance its entire investment programme. The Return on Capital Employed (ROCE) is evidently still

Table 2: NWSC summary: revenue performance and ratio analysis (2006/07 – time of debt restructuring).

low despite the debt restructuring averaging between 1–3%.

The main reason for this is that the historically low productive assets still remain on the balance sheet of the corporation. This implies that structured subsidies and grants are still a necessity for non-viable and social mission projects, plus new or green field projects. An important implication of this is that bankability does not preclude an organisation from accessing concessionary finance in order for it to remain operationally and financially sustainable. ●

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Preparing for uncertainty: *the new era of business management*

Agbar's Aqua Development Network works with companies to develop their workforce and business management to achieve a more flexible, ability-driven approach required for today's operational challenges.

LIS STEDMAN speaks to **JOSE NAVARRO** about the need for a new business model.

Jose Navarro, the Managing Director of Agbar's Aqua Development Network (ADN) company, expresses the opinion that the main business model challenges that the water sector faces today relate to the radical way in which markets, governance and society in general are changing, and to which the industry must adapt.

He notes: 'As a sector, there is no difference between the water utilities market and the rest of the companies around the world in that there is a lot of change coming to us. There are new technologies that provide cheap global connectivity, new organisations [and] shared global information. Margins today are blurred, creating a loss of identity, and the global economic crisis has impacted us over the past year or so, just like every company in the world.'

This means that utilities, in common with other companies, are in a situation where they have to be able to manage uncertainty, Mr Navarro explains. 'Five years ago we talked about change – all that we prepared for in companies was to teach people to prepare for change. The problem is today, that the day-to-day reality is that we are in a turbulent globalisation. So, we must prepare our people not only to manage the change but also the uncertainty.'

The water industry also has a unique factor to take into consideration – water stress. The lack of availability of water, and the health and social problems associated with that, mean that the industry is working in a more demanding legislative environment, Mr Navarro says. 'Governments and administrations now request different solutions and services like management contracts or performance obligations that mean we have to change the business more.'

Social responsibility is more important to the sector today, and complying with this means further modification to the business model. And, he notes, the workforce itself is changing radically and this means a further rethink of how water utilities should operate.

Mr Navarro notes: 'Our companies

used to be very traditional and change, at first, was not well received. But there is a new generation of workers that [are] more flexible, that use new channels of organisation and believe that information is to be shared, not just stored. This is another issue we have to manage.'

He adds: 'We realise that the profile of the people we need has changed a lot, and the management rules have to change as well as the way we do business – management performance best contracting, for instance. The role of education is more important than ever before – we need people to be more flexible, more goal oriented, and with a really strong fighting spirit. The old department has disappeared – we work more and more in multi-disciplinary teams, project by project.'

It is also important that innovation is incorporated into the day-to-day business, Mr Navarro says, noting: 'The sources of innovation are today not only internal but external as well. We need different, collaborative tools and we need to work both in the physical and virtual spheres. This is not easy. Our experience in the past was mainly technical, based on physical solutions. But this has to change, particularly the old separation of these roles.'

Ability-led management

How the industry meets these challenges is critical, he adds. 'The administrative model where a manager was a director was really useful in an industrial environment where you need close and consistent systems and close people control. But we need to move on from this administrative system to one focused on ability. The manager is more a person who inspires people to work and to learn to change and be more innovative. Managers have got to be more flexible – to facilitate rather than conduct.'

This significantly alters the perception and focus of power, he notes. 'We have to convince people to do things beyond their position. We have to talk about empowerment and planning, not just giving the solution to them.'

There are various functions and responsibilities of management



across a spread of areas – technical, management, economic, administrative, planning, systems, strategy, clients and people. 'In a traditional company the model is based on efficient control, consistent systems with plenty of indicators based on technology. The focus at the moment is on management and administration. We have to change to dedicate more time to strategy, clients and people, so we have to change the model radically not only in terms of the profile but what we have to do in the day-to-day business.'

This is a significant change, he explains. 'We have to develop new business models because the market is demanding that we do business in a different way.' This means learning to manage differently, he adds. 'Our workforce has to be mobile – it is not possible to be local. We need to think in terms of the region, or globally, because the business is global. The answer, given the complex world that is coming, is to change from the old model.'

He remembers that when he began work, in a production department, 'I was told "Jose, we don't pay you to think, we pay you to do"'. Today that would be impossible, everyone is told to think because the complexity of the business today is simply too great for just one person.'

Agbar itself is an example of this type of radical change in practice. The company's values focus around its people, innovation and the corporate reputation, and therefore the old business model had to change, Mr Navarro explains. 'For instance, we say to people today that they are responsible for their own development. Don't argue about your training or development, take the responsibility and I will help you. You are the real protagonist in your job, not your boss or human resources. That has changed all of our concepts – for instance, in the past there was a department responsible for training and people would be told to do training. Today, people ask us for training to develop their own career plan.'

There is a radical paradigm change, he adds. 'For instance we say that the important thing for us to develop our business is not to know what to do, but how to do it. We know how to manage water and we know the marketplace, but we have to change our way of thinking to make innovation part of the process, alongside training and knowledge management, to allow us to develop our organisation.'

Aqua Development Network

To achieve this Agbar works hard on communication, enabling people to understand these ideas and matching the strategy with the day-to-day business, Mr Navarro notes. 'We are improving continually and we have to develop an accurate evaluation and development system to detect gaps and correct them swiftly.'

For that reason Agbar is today creating new companies that develop new areas of business. An example would be ADN. 'In ADN we transform knowledge in management and development systems for professionals in the water and environment sector,' Mr Navarro says. 'We carry out project selection, training and development, not just internally but to the market – how to develop abilities by training and development and best practices.'

The company also works closely with governments and academia – for example it is currently collaborating with the Algerian government to create a management training school for the water sector, and has a project in Jeddah, Saudi Arabia, building a water research and development and technology transfer hub. The company is also collaborating on a Masters degree in water management development with universities.

Another example of this forward and collaborative thinking is CETaqua, a water technology centre in Barcelona, Spain, that undertakes management research projects. CETaqua's partners are Agbar, the Technical University of Catalonia and the Spanish Research Council. The company develops research programmes in a number of areas both nationally and internationally. 'In our internal information systems we have also transformed the process to share and develop ourselves as best we can,' Mr Navarro concludes. These varied initiatives are tailoring the water utility paradigms to meet the demands of the future and will undoubtedly be regarded with considerable interest across the sector. ●

Jose Navarro presented at the IWA Water Utility Conference – Strategic Opportunities for Future Challenges 2010, held 10-12 May 2010 in Barcelona, Spain.

Lessons and challenges of regulating public water utilities: the Zambian experience

The Zambian water sector began its reformation in 1994, with the aim of developing the poor and declining water and sanitation services in the country. **MUGENI S MULENGA** discusses the lessons learnt and challenges from the changes to the structure and regulation of the sector, as well as Zambia's successes in improving its water sector performance.

The Zambian water sector was reorganized following reforms meant to address poor and declining service delivery.¹ One major achievement of the 1994 National Water Policy was the separation of roles and institutional responsibilities, which was previously characterized by a multiplicity of actors and fragmented roles. The seven sector principles are outlined in the 1994 National Water Policy² and are at varying stages of implementation.

Current legislative and institutional framework

The Water Supply and Sanitation Act No. 28 of 1997 outlines the legal and institutional roles and responsibilities aimed at ensuring efficiency and sustainability in water supply and sanitation (WSS) service provision. The Act provided for the establishment of the National Water Supply and Sanitation Council (NWASCO) as the regulator and defined its powers and functions. The regulator was set up in 2000 at about the same time as most of the commercial utilities (CUs) were formed.

The municipalities / local authorities (LAs), after being granted the mandate of WSS service provision, were given options of running the services through CUs formed individually or as joint ventures.³ The Act also provides for private sector involvement of up to 49% of utility equity. Currently, all of the 11 CUs are joint ventures by two or more LAs, forming provincial / regional utilities. LAs as shareholders appoint Boards of Directors, which include professionals from the private sector. The CUs cover 99% of the urban and peri-urban population.

The Ministry of Energy and Water Development (MEWD) is responsible for water resources management and the Ministry of Local Government and

Housing (MLGH) oversees the WSS sector. The commercial utilities fall under MLGH while the regulator reports to the Minister of Energy and Water Development to enhance accountability and autonomy.

The current institutional framework provides 'a sound enabling environment... and commitment to developing coherent water supply and sanitation programmes'.⁴

Improving sector performance through regulation

The term regulation is very broad⁵ and can be narrowed down for water as 'government imposed controls on water and sanitation providers to ensure that safe, reliable, modern and fairly priced utility services are available'.⁶ The main objective of regulation therefore is to ensure services are provided in an efficient and sustainable manner within the set policy framework and objectives as outlined in the Zambian WSS Act. The balancing of the issues of consumer interest and utility sustainability is thus a regulator's constant challenge.

Table 1 shows the key milestones or stages of regulatory development that have had positive impacts on sector performance.

The reorganization of the sector not only stopped the continued deterioration of services but has resulted in the steady improvement of services, as is apparent from trends in the service provision indicators and coverage.⁷ A good example is the increase in population served from 2.9 million in 2004 to four million in 2009.⁸ The significant progress made towards full cost recovery is commendable despite limited investment.

Success factors

It is generally acknowledged that regulating public or state-owned enterprises is 'problematic because

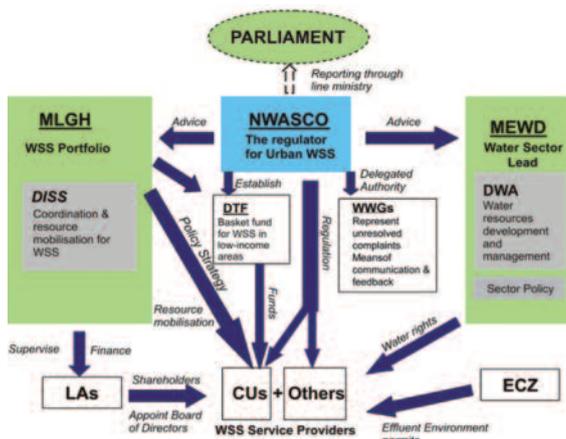


Figure 1:
Institutional
framework for WSS
services in Zambia

rewards and penalties are difficult to implement.⁹

To address this challenge, detailed information on the sector is needed in order to devise effective strategies. The applications of these strategies by NWASCO differ from utility to utility depending on the particular conditions, while providing for transparency to avoid uncertainty and perception of unfairness.

The most notable success factors as applied by NWASCO are institutional and governance framework, effective enforcement tools and consumer involvement.

Institutional and governance framework

For regulation to be effective, appropriate institutional framework and regulatory regimes must be aligned to specific and peculiar challenges affecting the sector.¹⁰

In Zambia, WSS service provision was commercialized, with improving management of the utilities due, to a significant extent, to insulation from constant political interference at the local level. However, utilities' weak financial base was not addressed as initially pledged by the government. This is opposed to what is ideally required when creating such institutions.¹¹

The legislative framework provides wide powers to the regulator to ensure effective enforcement. It also provides essential autonomy, both in the execution of its role and reporting channels.¹² This autonomy also extends to financing of regulatory activities, which are now fully covered by license fees.

Effective enforcement tools

Tools to set, monitor and enforce regulations are provided for in the WSS Act and include licensing conditions, performance guidelines, benchmarking and standard setting, while a responsive tariff adjustment mechanism plays a key role in effective regulation.

Credible and timely information is

critical for effective regulatory decisions and therefore NWASCO invests in monitoring. Apart from the robust and interactive information system and detailed annual inspections, part-time inspectors are enlisted to provide quick feedback on the ground from various parts of the country.

The enforcement of guidelines and standards has been at the core of regulatory functions by using, for example, penalties and fines, special regulatory supervision, enforcement notices, tariff negotiation, suspension and cancellation of licences.¹³ These tools have been used to varying degrees depending on the challenges faced and the intervention considered most effective for the particular utility. Thus far there has been no need to use the ultimate enforcement of cancellation of licence and only three utilities have been placed on special regulatory supervision and threatened with suspension of licence.

In recognition of the inherent power of benchmarking¹⁴, NWASCO publishes annual comparative performance reports. These reports, with attendant

awards and the monetary incentive approaches (through RBI), have been quite effective. The comparative reports include the ranking of utilities according to the set criteria. This exerts pressure on the utilities to continuously improve on current performance and ranking position.

Consumer involvement

The World Development Report 2004 identified appropriate involvement of consumers in monitoring of WSS service provision as a success factor. In Zambia, consumer involvement is both formal and informal by monitoring and enforcing specific service standards, thereby applying the vertical accountability concept.¹⁵

NWASCO established Water Watch Groups (WWGs), which are volunteer organisations. They are actively involved in complaint resolution, public sensitisation, tariff negotiation meetings and annual consumer forums where feedback is given to sector regulators. The benefits of consumer involvement have since also been appreciated by utilities and include a

**Table 1: Key
milestones of
development**

Year	Key milestone	Description	Outcome / output
2002	Guidelines developed	Developed guidelines for regulating WSS service provision	11 guidelines developed Monitoring of WSS has become more transparent and enhanced
2002	WWG concept developed and implemented	Implemented the concept of using voluntary consumer groups in regulating CUs	12 WWGs spread across the country
2003	Pro-poor basket fund established	The Devolution Trust Fund (DTF) was formed and is assisting CUs to extend WSS service to peri-urban areas as provided in WSS Act	All CUs have benefited from the DTF by assessing funds for WSS projects 610,000 people have benefited
2003	Benchmarking and comparative publication introduced	CUs are benchmarked and their performance published to the general public via the annual sector report	Eight sector reports have since been published
2004	Transparent tariff model introduced	Consumers Involvement in tariff setting of process	Public awareness on tariffs
2005	Special regulatory supervision introduced	Enhanced regulatory tools by introducing SRS which entails close monitoring / supervising service providers that consistently fail to comply with standards and/or guidelines.	SWSC and ChWSC that were once on SRS have seen an improvement
2005	Part-time inspectors introduced	Augmented lean structure by engaging inspectors from around the country to inspect service providers in their locality on part time basis	15 PTI have been engaged around the country Strengthened the monitoring of CUs
2008	Regulation by incentives programme introduced	Advanced regulation from the traditional command and control to the use of incentives to attain efficiency gains	Four CUs were piloted onto the programme and have since received monetary incentives of over K2billion (\$24.9 million) after achieving set targets
2009	Commercialization process completed	Assisted in the establishment of CUs	11 CUs formed servicing all the nine provinces in the country. Improved service delivery

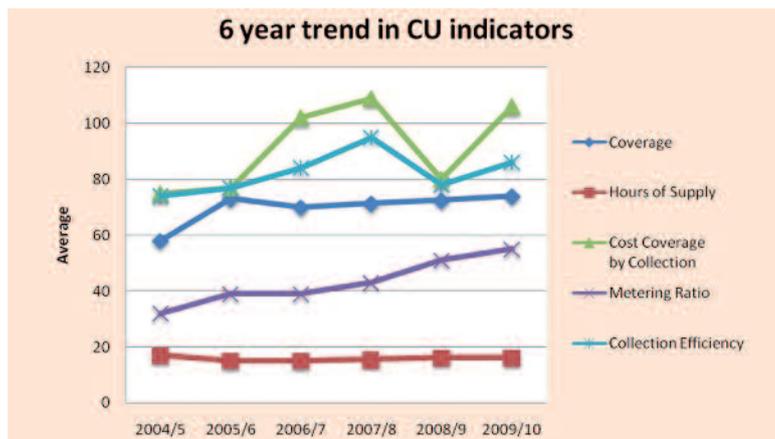


Figure 2: Trends in selected utility performance indicators

reduction in cases of vandalism of WSS installations, acceptance of tariff increments in previously hostile areas and contribution to framing conditions that go with the tariff adjustments. It is worth noting that consumer involvement has its limits but the important thing is to provide the opportunity.

Challenges

Inadequate investment

Inadequate investment in the Zambian water sector remains the major challenge, which has led to deterioration of infrastructure and in some cases to a total collapse of infrastructure, particularly in low income areas as well as in inadequate extension of services to new development areas. Due to the slow but progressive cost recovery rate, mobilizing resources for the sector lies with government. The finalization of a National Urban Water Supply and Sanitation Programme (NUWSSP) is still pending. NWASCO through its advisory function is recommending an independent financing mechanism under the NUWSSP to provide for an effective tool to source funding from the international donor community.

In 2003, NWASCO established the Devolution Trust Fund (DTF) in line with the provisions of the WSS Act to assist utilities to extend services to low income areas through low cost technology.¹⁶ About 610,000 people have so far been reached through the targeted assistance of DTF from 2001 to 2009.¹⁷

As in many other Southern African countries, sanitation continues to lag behind. NWASCO regularly approves sanitation investment fees for some utilities, which is expected to positively contribute towards addressing this challenge. In addition, DTF has developed a low cost sanitation concept, including a comprehensive participatory approach, while the first four projects are under implementation, targeting 15,000 beneficiaries.

Inconsistent adherence to corporate governance principles

Since both people and systems are

critical to the success of utilities, the issue of inconsistent adherence to good corporate governance by stakeholders remains a valid challenge.

Though some positive strides have been made in improving corporate governance as alluded to, much still needs to be done on a continuous basis as board members and shareholder representatives continue to change and new challenges emerge. Apart from the issued guideline on corporate governance, NWASCO also issued a board manual to all utility board members and has been conducting corporate governance workshops for concerned utility stakeholders as needed. Politicians also require constant engagement and feedback to maintain the focus.

Inadequate commercial orientation of utility managers

It is acknowledged that public utilities operating within a developing country have a significant measure of social considerations in service provision, particularly where the majority of the population is living below the poverty line. Improved commercial orientation could further enhance the utility performance and ultimately result in the poor benefitting through cross subsidies. The current levels of commercial orientation and innovation in most Zambian utilities still requires serious attention by both the directors and managers.

Conclusion

Regulation must be flexible to adequately respond to the ever-changing environments and challenges. The Zambian experience shows that an autonomous regulator with the appropriate tools and instruments can have a significant positive impact on the performance of public utilities.

The challenge is to have an effective monitoring mechanism in order to respond timely and appropriately to the different challenges affecting the

utilities performance. Innovation and responsiveness is also key to the success.

There is further need for timely advice to policy makers and stakeholders for continued coherent policy focus. ●

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Managing risk under normal operation and in crisis situations

Water utilities have to manage risk as part of day to day operation and must also be ready to deal with crisis situations. **WOLF MERKEL** and **CLAUDIA CASTELL-EXNER** present Germany's integrated framework approach and report on their experience.

Safety and security of water supplies has received considerable attention in recent years for different reasons. Safe drinking water that complies with accepted health-based standards cannot be guaranteed in many regions of the world and is identified as a major source of illnesses and reduced life expectations in developing countries. The World Health Organization (WHO) has produced a comprehensive framework on drinking water quality (WHO, 2004), which includes a systematic process towards safe drinking water: Water

Safety Plans (WSPs). In terms of European legislation, the European Commission has stated on several occasions that it considers the WSP approach to be a core element to be reflected when revising the European Union (EU) Drinking Water Directive (98/83/EWG). Similar to the WSP approach of WHO is the goal of the Bonn charter for safe drinking water, which is 'good safe drinking water that has the trust of consumers' (IWA, 2004). Security concerns regarding water supplies have been addressed following the 9 /

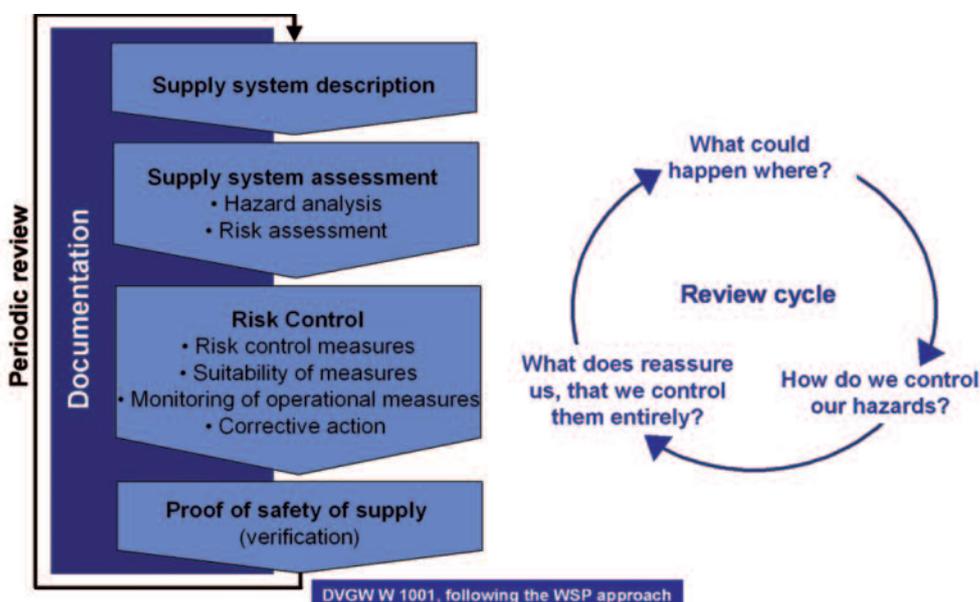
11 terrorist attack on the World Trade Centre and natural disasters in some places of the world. These were major drivers for an initiative taken by the German Association of Gas and Water (DVGW) in 2004 to work on an integrated framework for water safety and security, including the preparatory steps on crisis management.

Adapting the German approach

In Germany an open discussion on the WSP approach started in response to the WHO publication in September 2004. At the beginning, significant scepticism dominated the discussion among water suppliers about the added value of the WSP approach for a safe water supply. From the point of view of German water suppliers, the drinking water sector can look back on a long and successful history of 150 years of delivering safe drinking water at all times. More than 200 technical standards have been collected in the DVGW set of technical rules, which covers most aspects of planning, design, construction, maintenance and rehabilitation of water supply system elements from catchment to tap.

Furthermore, the fact was stressed that Germany has effective drinking water legislation in place, which includes a compulsory reference to the application of (DVGW) technical standards and shows a constantly high level of compliance with the stringent drinking water limit values determined by the German Drinking Water

Figure 1: The extended WSP concept adopted in DVGW W 1001.





and the responsible public authorities were involved in the process. Considerable input came from the Ministry of Health and the Federal Environmental Agency for the systematic risk management approach, and from the German Ministry of the Interior and the Federal Office of Civil Protection and Disaster Assistance for the effective crisis management. Joining forces also meant that unnecessary duplication or misleading redundancies were effectively avoided.

Adapting and extending the WSP concept

Adaptation of the WSP concept has been made with regard to the reference of existing technical safety management procedures already established in the DVGW framework. The original WHO concept on health-based targets was extended to all quality parameters in the German Drinking Water Ordinance, to aesthetic parameters such as taste, odour and colour, as well as the service quality in terms of quantity and pressure of the supply. These extensions have been successfully tested in more than ten technical realisations of water safety plans supported by consultants from IWW Water Centre (Mälzer et al., 2010).

Moreover, the systematic management approach consisting of system description, hazard identification, risk assessment, definition of control measures, verification and monitoring, as described in Figure 1, was also applied to security aspects of the supply system. The hazards involved with the security of premises (resulting from the particular location, the accessibility and fire safety), staff recruiting and contracting, security checks for staff and training could be handled with exactly the same concept as applied for water safety issues.

Risk management practices in detail

As already described, normal operation and crisis handling require different modes of management. Under normal operation, the existing operational functions in a company can work jointly on a systematic risk management process (phase (1) in Figure 2). The analysis according to the WSP principles involves a mixed team of operators and managers, and work out all hazards in the supply chain from resource, treatment, distribution to tap.

Typical outcomes of this exercise are given in Table 1, covering the scope from short-term to long-term measures for different parts of the supply chain, and both for technical and management measures.

As schematically shown in Figure 2,

Ordinance (on the basis of the EU Drinking Water Directive). But at a certain stage of the discussion in 2006, the German water industry and DVGW as their technical and scientific association felt confident that the best approach to deal with the WSP would be an open-minded one, in order to sort out potential areas for improving water supply safety when adapting the WSP approach.

After 9 / 11, diverse initiatives at international (ISO) as well as at European (CEN) and national levels (Federal Office of Civil Protection and Disaster Assistance) started to provide advice for so-called ‘critical infrastructures’ in terms of security issues. This was the time when DVGW took the lead in early 2006 and reached an agreement at a national level with the Ministry of Health and the Ministry of Interior to construct an overall concept for risk management under normal operation (safety) and crisis situations (security) in water supply. The outcome of this interdisciplinary and inter-institutional work was published in August 2008 as DVGW Technical Guidelines W 1001 ‘Safe and secure drinking water supply – risk management under normal operating conditions’ and W 1002 ‘Safe and secure drinking water supply – organisation and management in the event of a crisis’.

Risk management under normal operation and in crisis situations

The newly-developed guidelines on risk management cover different management situations for a water supply system. Under normal operation the focus is on the systematic risk management approach, basically adapting the principles of the WSP concept to the needs of the German water suppliers (DVGW W 1001) (see box).

In times of crises however, the regular operating procedures will not be working, stemming from rare and unusual events putting significant parts of the service under severe risk of failure. By nature, a crisis is something unexpected and not to be foreseen in its particular features, so in the crisis management part of the framework the focus was on the preparation of measures to successfully cope with a crisis situation (DVGW W 1002). Within the scope of this preparation for effective crisis management, the outcomes of the relevant ISO (ISO TC 224, WG 7 crisis management of water utilities) and CEN (CENTC 164, WG 15 security of water supply) working groups on protection of critical infrastructures and the European programme for critical infrastructure protection (EPCIP) have been incorporated.

It was essential in the development of both guidelines that water suppliers

Figure 2: Schematic evolution of risk management practices under normal operation (1), in preparation of a crisis (2), effective crisis management (3) and by resuming normal operation (4).

Plans for normal conditions and crisis events

W 1001 Safe and secure drinking water supply – risk management under normal operating conditions

W 1001 takes the fundamental elements of the WHO WSP approach and integrates them into the DVGW technical rules. It serves as a basis for risk-based and process-oriented management of normal operation aimed at improving the safety of supply by means of continued internal operation monitoring. W 1001 also outlines principles for the development of a continuous improvement process designed to create a ‘culture of improvement’ within the organisation, and promotes the mutual understanding between, and cooperation of, water suppliers with the local supervisory authorities, such as, for instance, health agencies.

W 1002 Safe and secure drinking water supply – organisation and management in the event of a crisis

W 1002 enables water suppliers to take action in the event of a crisis in order to ensure the continued supply of water to the greatest possible extent and to restore normal operating conditions as quickly as possible. It describes the fundamentals of corporate crisis management, including relevant recommendations for water utilities and offers abundant information about the disaster and crisis management organisation of the local authorities.

a crisis usually occurs suddenly with some common features independent of its particular nature:

- Rare and unplanned event
- Limited availability of (often) vague information
- High risk potential with severe consequences
- High pressure on the decision making process
- High public attention
- Limited resources

Thus, a crisis is defined in operational terms as 'a situation for a drinking water supplier requiring more than the usual means of operation and / or organisational structures to control an emergency'. A utility cannot foresee a particular event, but it can prepare processes and facilities to cope with a crisis situation beforehand (phase 2).

As a starting point, decision criteria have to be established in order to identify the start point of a crisis, applying the features from the list above. The members of the emergency task force and the working procedures have to be defined, clarifying the hierarchical decision-making process during the crisis. This crisis hierarchy might be not in line with the regular company structure, thus it is vital for the functioning of the crisis management that it is accepted by all members. There is also the need to define sufficient spare staff capacity in order to secure the continuity of the work over several days.

Attention has to be given to the internal and external communication pathways and strategies. Necessary information has to be provided as efficiently as possible to the emergency task force by associated working groups, in order to allow for fast judgements based on sound facts. For external communication, a communication officer has to be appointed, not necessarily the utility CEO, only giving validated information to the outside world with high reliability. For handling a water supply crisis, the involvement of public authorities is almost the standard situation, so considerable attention must be paid to prepare and organise the respective processes. The better the communication and the mutual trust in good times, the better the cooperation will work in times of a crisis.

Facilities and equipment have to be assigned for the emergency task force: a separate meeting room with close access to communication devices. The communication equipment (phone, computer, fax, internet access, SCADA systems...) should not necessarily be located in the task force room, preferably in a neighbouring room. Special attention must be paid

Part of supply chain Measure

Short-term measures / corrective actions (within six months)

Entire chain	Compilation and update of technical instructions
Resources	Evaluation of existing raw water data to identify irregular variations
Catchment	Evaluation of threshold values for well regeneration
Catchment	Evaluation of subsoil residence times for groundwater recharge under different operating regimes
Treatment	Turbidity meters with recording of normal operation/irregular deviations
Treatment	Smoke detectors in air intakes of stripping columns with online control

Medium-term measures (within two years)

Entire chain	Definition of regular updating activities for the technical instructions manual
Resources	GIS-based hazard source map for systematic monitoring of hazardous sites
Resources	Measures to reduce agricultural impact of farm lands to catchment
Treatment	Re-engineering of the filter backwash lines
Distribution/Treatment	Revision of automation routines for valves and pumps
Distribution	Renewal of a stand-alone asbestos concrete transport pipe (risk of breakage)
Utility level	Review of legal contracts for emergency supply from neighbouring suppliers

Long-term measures (within five years)

Catchment	Renewal program for wells (with investment planning)
Treatment	Re-engineering of filter basins to allow for filtrate discharge after backwash
Catchment	Fencing of the groundwater recharge basins
Utility level	Integration of WSP measures into the existing quality management system
Utility level	Integration of WSP measures into running IT-systems (e.g. SAP-PM)

Table 1: Typical risk management outcomes

to the proper functioning of the communication lines in terms of a crisis as the mobile phone network might potentially be damaged or overloaded in a severe event.

Crisis management in a real case will only work properly after sufficient training. So training emergencies should be designed and organised in regular intervals to verify functioning and to evaluate and to refine structures and processes. Finally, the end point of a crisis also needs to be defined in order to resume normal operation when the operational responsibility is taken over by the standard organisational functions.

'After the crisis is before the crisis ...' – in phase 4, the lessons learned from the actual event have to be elaborated, covering all aspects of the functioning of the crisis management and optimise its structure and processes. The second part of the exercise is to perform a proper cause analysis for the emergency situation. The toolbox for this is the systematic risk management approach as applied in phase 1. Hazard identification and risk assessment provide the information to derive prevention measures and operational control procedures to effectively prevent a repetition of the same event.

Risk management in water supply: safety and security

The experiences drawn from the adaptation of a combined framework for German water supply are quite encouraging. The water suppliers directly benefit from the risk manage-

ment exercise as the method of a risk-based and process-oriented management supports the objective of safeguarding the operational safety and economic efficiency of a supply system in the long-term. Specific benefits in this context are:

- Diligent performance of the operational tasks (overcoming 'tunnel vision')
- Application of the technical rules
- Recognition and elimination of weaknesses in the supply system
- Support of operational planning by a systematic evaluation of the supply system
- Promotion of the internal exchange of experience and safeguarding the practical operational know-how
- Strengthening the organisational reliability
- Improvement of mutual understanding and cooperation with the inspection authorities and further stakeholders as well as communication with the public.

A risk management system in place will help to postpone a potential crisis in the future, but when a crisis occurs, consistent crisis management will likely reduce the length and impact of the crisis on the supply system and on the reputation of the utility.

Implementing a joint framework for water safety and security in good times strengthened the collaboration between utility and public authorities, which will pay off in times of a crisis event.

The application of the guidelines

will serve also to supplement the existing Technical Safety Management (TSM) on the basis of DVGW W 1000 'Requirements on drinking water supply companies'. W 1000 is an important framework paper for German water utilities regarding the organisation and management of drinking water supply. TSM is an ISO-9000 based quality management system with a special in-depth focus on water supply related aspects from catchment to the point of delivery.

Regarding the updating of DVGW technical standards the method of a risk-based and process-oriented management described in DVGW W 1001 is going to be integrated in the set of technical standards for processes (protection of resources, water abstraction, water treatment, water storage, water transport and water distribution) in the water supply chain, within the rolling revision process.

In line with the implementation of the two guidelines on systematic risk management (DVGW W 1001) and on crisis preparation (DVGW W 1002), the DVGW has started a dissemination campaign to spread the concept and to encourage the adoption of the framework by the suppliers. Elements of the dissemination strategy are seminars, a website, the provision of training materials and best practice workshops¹. The utilities already in the process of implementation gave a general recommendation: 'It is important to get started, and not to target at a perfect system on the first run.' ●

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Wolf Merkel and Claudia Castell-Exner presented at the IWA Water Utility Conference – Strategic Opportunities for Future Challenges 2010, held 10-12 May 2010 in Barcelona, Spain.

Note

¹ See: www.dvgw.de/wasser/organisation-management/sicherheit-in-der-wasserversorgung



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The customer care challenge: driving change towards better service

The challenges faced by utilities regarding customer care in the UK include implementing new customer service measures, increased competition and a growing metering base. LIS STEDMAN looks at how UK utility Portsmouth Water has been preparing for these challenges through implementing a system allowing for online account management for customers and flexible tariffs, areas of importance for a future of better customer management.

Echo Managed Services, which provides customer management services, has won a contract to deliver its RapidXtra billing and customer care system to UK utility Portsmouth Water, located in the south-east of England and serving a domestic population of over 650,000, which has an enviable position for customer service and low prices in the industry league tables.

Features of the new system include real-time, fully integrated online management for customers of their accounts and bill payments, and flexible tariff options to help Portsmouth to manage customer demand and provide an even better customer experience moving forward.

Customer relationship management (CRM) is an area of utility service that has always been critical to the industry, both for regulatory reasons and for individual companies' relationships with their customers. Echo's head of business development, Rob Stait, sees a number of key challenges over the next couple of years, including the introduction of new customer services measures (the service incentive mechanism, or SIM, reporting requirements), which are in their pilot year. He explains: 'These take a more holistic look at the customer interaction with water companies, and increasing the quality of this interaction.'

Echo Managing Director Phil Newland adds that these will 'hopefully resolve issues at the first point of contact and drive down the level of complaints. It will be a reasonable incentive for water companies to respond to the agenda. It is quite a change, and the water companies are trying to understand the implications. The situation will change and evolve and companies are reluctant to invest heavily – we've seen that in our research.'

Mr Stait notes that another key area for the water industry is competition. 'The industry is expecting a new Water Act in the next couple of years. This will presumably look at all aspects of the industry. There is an expectation of some movement on competition in the near future, but it is difficult to know which areas will progress most quickly – there are assumptions about retail competition being first, with other aspects later.'

Handling metered customers

In the background, he adds, there is a 'constant, growing metered customer base which will continue to grow. It is projected that most companies over the next five years in terms of billing and communications

systems will have to have the ability to handle metered and unmetered customers at varying proportions.'

Some companies already have a high level of metering and others are at a very low level, but all are moving in the same direction, Mr Newland says. 'This has a bearing on other areas,' he adds. 'We are seeing a debate about internet self-service (ISS) and the amount of interaction customers can have on the internet. Metered customers generally interact more, so the ability to interact can only become more important.'

Obviously a company that does not have the capability for ISS will not have any apparent interest, but the question, he says, is 'if you offer it, will they come? The argument is now tilting towards ISS, and there is an assumption the customer will adopt it. It is driving change for us.' It has always been difficult to create a straight business case for it, he adds, noting that it requires 'a leap of faith'. However, the soaring popularity of the internet itself makes it a logical avenue to explore.

Critical areas for the future

He says that Echo has been focusing on three areas that have to be right for the future. One area is tariff enablement – ensuring that all the tariffs the industry can and may need it has got, via a very flexible tariff engine. The second area is web service enablement for the more complex needs of commercial customers, who will have greater incentives, and will want consumption and trend data.

The third area is more technical – the company has been working to make sure that the systems that are

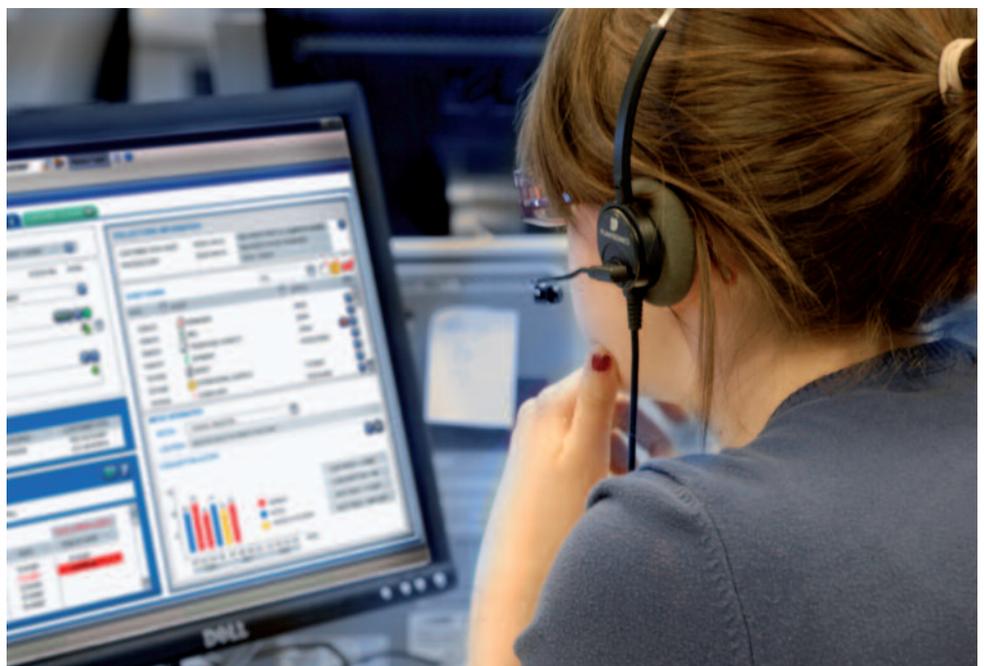
built use service-oriented architecture (SOA), which facilitates the integration of many different systems. 'We've seen all of these played out in Portsmouth Water: procurement background issues and challenges, and how to resolve them. Portsmouth Water has got a very low level of metered customers but knows this will grow, typically, if the past is anything to go by, the industry only replaces billing and customer management every ten years or so. It is beyond one AMP (five year investment period) – it is a long-term decision. Companies are looking at the trends, and trying to buy future-proof systems. It is challenging for them, and we have to be able to answer their long-term questions.'

Mr Stait adds that historically the industry has experienced some 'less than smooth' transitions. 'Companies like Portsmouth are looking for a track record of reliable, smooth transitions because it is such a core and fundamental system, they have to be confident they will get it right and there will be no disruption to service. That is a key priority.'

Mr Newland notes that 'the aim will be that the implementation of new business systems will be invisible to the customers until the company starts introducing new services. The customer should not notice any disruption – it should be invisible. That is quite a challenge, but one we've always been able to deliver on. There is quite a bit of nervousness in the market about it.'

He believes that the right CRM system can enable the industry 'to drive change rather than be driven by it'. 'In such a critical period of change, this ability will be essential.' ●

RapidXtra billing and customer care system. Credit: Echo Managed Services.



PPP to deliver advanced pressure management: *success in South Africa*

Many water distribution systems in South Africa are deteriorating due to many years of neglect, resulting in a serious maintenance backlog. Aiming to find a solution to this, one of the largest advanced pressure management projects in the world was undertaken, which successfully tackled water losses and improved network management. **RONNIE MCKENZIE** and **WILLEM WEGELIN** discuss the project's innovative public-private partnership approach.

Emfuleni Local Municipality is located to the south of Johannesburg in the industrial heartland of South Africa. A separate water utility called Metsi-a-Lekoa was established several years ago to manage the supply of potable water to approximately 1.2 million residents of the municipality, 450,000 of which are located in the Sebokeng & Evaton areas. Water is supplied to Metsi-a-Lekoa from the local bulk water provider, which is one of the largest providers of potable bulk water in the world.

The areas are predominantly low-income residential areas with approximately 70,000 household connections, each of which is supplied with an individual water supply as well as a sewer connection. The combination of low income coupled with high unemployment has resulted in the general deterioration of the internal plumbing fittings over a period of many years, causing high levels of leakage.

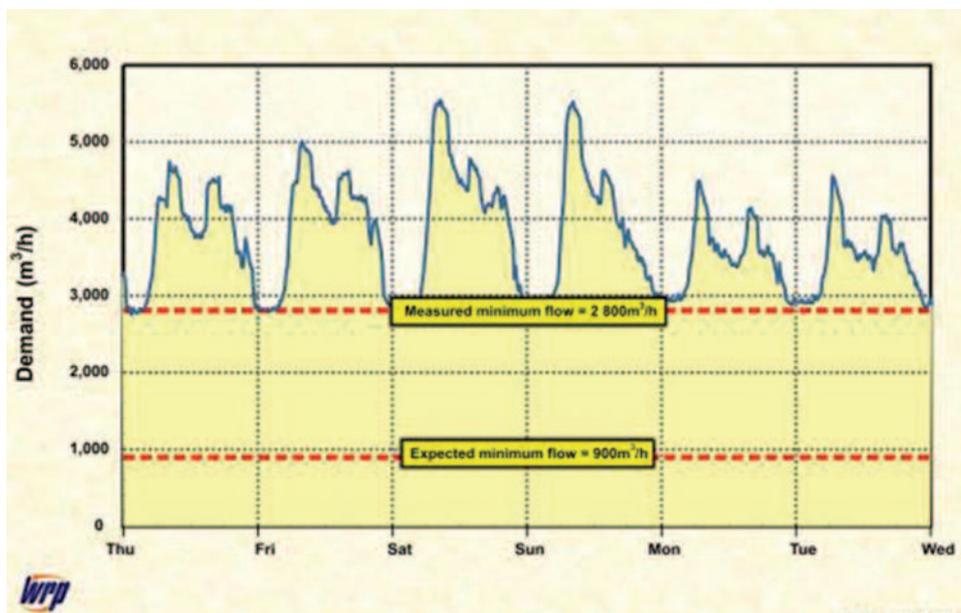
The leakage at the start of the project was known to be extremely high, as indicated by a minimum night flow (MNF) in the order of 2800m³/hr (see Figure 1). This was one of the

highest MNFs recorded anywhere in the world and represents almost two Olympic-sized swimming pools of water every hour during a period when demand for water should be minimal. It should be noted that there is virtually no storage in the Sebokeng & Evaton areas, either at the bulk reticulation level or domestic property level. The high MNF is therefore almost completely due to leakage, most of which occurs inside the properties and is therefore not evident from normal visual inspection. It should also be noted that since most of the leakage occurs inside the households, the leaking water returns to the sewage treatment plant through the sewer network, which is often overloaded to such an extent that spillages of raw sewage into local river courses are a common occurrence in the area.

It was estimated that the wastage in the area before the project was commissioned was in the order of 80% of the water supplied to the area, which in turn represented an annual water bill of approximately R120 million (\$20 million) per year in 2003.

In 2004, the municipality appointed WRP Pty Ltd to design and commission what is one of the largest advanced pressure management installations in the world, as the first phase of a long term strategy to reduce wastage in the area. The project involved no financial input from the municipality and even the initial capital costs were borne in total by the project team. The project was, effec-

Figure 1: Initial water demands for a six-day period entering Sebokeng & Evaton in July 2003.



tively, a small-scale public-private partnership (PPP) involving a simple risk-reward model and the original concept is discussed in detail by Mckenzie and Wegelin (2005). It basically reduces water pressure in the area during off-peak periods and in this manner reduces the water lost through leakage.

It should be noted that Pressure Management is only one of the many possible water demand management (WDM) interventions that can be considered when trying to reduce leakage and wastage from a water reticulation system. The leaks are not repaired and will continue to run, albeit at a much lower flow rate. After pressure management has been implemented, it is usually necessary to address the underlying problems using different techniques and in this regard the full range of WDM techniques should be considered.

The installation

From the outside, the installation is unimpressive and similar to a large concrete box – 10m long by 10m wide and approximately 5m deep. Inside it contains the various pipes and valves required to manage the water pressures into Sebokeng & Evaton.

The Sebokeng & Evaton project is thought to be the largest project of its type in the world and the savings were so large that the installation had a pay-back period of less than two months – this is based only on the water charges, most of which are associated with the pumping costs since the water is pumped from almost 100km away through a head of approximately 200m. The construction was completed using labour-based practices in order to maximise the employment opportunities to the local communities. In addition, a series of more than 50 public meetings were presented in the local communities to inform the residents of the project and to address any concerns they had with regard to the project. Through the detailed public consultation process, the project was completed without any incidence of theft or intimidation of any nature and all residents were in full support of the project, which was a key factor in its success.

The installation involved cutting into the two existing water mains and replacing a short section with a series of smaller pipes and associated valves, meters, strainers etc. The new pipework and fittings enable the pressures into the two areas to be controlled in such a manner that the water pressures can be reduced during off peak periods and restored to the original high pressures during periods of high demand. In this manner, the

leakage from the system as well as the incidence of new burst pipes was greatly reduced.

Project team

The project team involved 12 main role players in a sophisticated and complex PPP, in which the consultant took 100% of the risk associated with the capital funds required to build and operate the installation for five years. This necessitated obtaining loans from a commercial bank, which in turn involved provision of adequate security from several individuals in their personal capacity.

The various key role players are as follows:

- The client is Metsi-a-Lekoa, which is the ring-fenced water utility formed by Emfuleni Local Municipality and was managed at the start of the project by CEO Mr Sam Shabalala.
- The funds required to complete the project were raised privately by WRP through Standard Bank.
- The establishment of the contract on which the project is based was funded and facilitated by the Municipal Infrastructure Investment Unit (MIIU) and Metsi-a-Lekoa.
- The consultant's team comprised the Gauteng-based WRP Pty Ltd in association with DMM

Development Consultants. Additional specialist support was provided by various other sub-consultants, including structural design by Platinum Consultants, and support on the conceptual design by Coplan. In addition Mr Tim Waldron, the CEO of Wide Bay Water in Australia, acted as a specialist reviewer. The main contractor for the project was WK Construction.

Benefits of the project

The most obvious benefits from the project are clearly the savings in water purchases by the municipality from the bulk water provider due to the reduced leakage in the Sebokeng & Evaton areas. The initial projected savings of approximately R20 million (\$3.3 million) per year (Mckenzie and Wegelin, 2005) were in fact exceeded and after the first full year of operation the actual savings achieved were closer to R30 million (\$4.5 million) as highlighted by Mckenzie and Wegelin (2006).

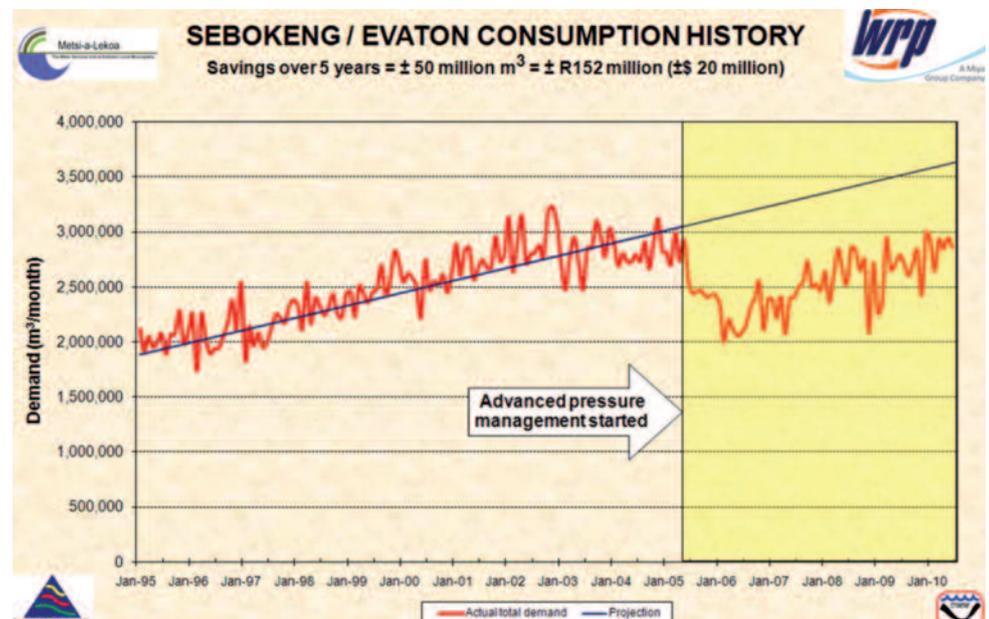
The savings achieved by the project exceeded all expectations of both the project team as well as the municipality and are the most obvious benefits to accrue from the project. After operating and managing the installation for two years, several other benefits also became apparent which were not initially anticipated. In particular the following benefits have been achieved:

- Deferral of infrastructure upgrading;
- Identification of bottlenecks in the system and problem infrastructure;
- Identification of bulk meter errors;
- Catalyst for funding;
- Improved municipality status
- Creation of national WDM fund;
- Catalyst for other WDM interventions;
- Sustainability of savings.

Defer upgrading of infrastructure

With the implementation of the advanced pressure management system the water demand was reduced to 1997 figures, as can be seen in Figure 2. The reduced water demand also had a significant impact on the sewer flows entering the treatment plant, which reduced from 2500m³/h (July 2003) to 1800m³/h (July 2005). As a result of the

Figure 2: Historical water consumption in Sebokeng & Evaton areas for a 13 year period.



project the client has gained a reprieve of at least ten years on the upgrading of the water supply and sanitation infrastructure. The reduced pressures have also resulted in a significant reduction in the number of bursts experienced in the area, which in turn will prolong the life of the infrastructure.

Identification of bottlenecks in the system

Under normal circumstances with large-scale pressure management projects, the system pressures are gradually reduced during the off-peak periods to ensure that some minimum level of service is achieved at the critical point in the system, which is the point experiencing the lowest pressure at the time. The critical point can usually be identified from the reticulation layout drawings or from a hydraulic model of the system if such a model is readily available. The critical point is then monitored continuously as the pressure management activities commence.

In the case of the Sebokeng & Evaton project, the above process did not proceed to plan and numerous communities complained of low water pressures in areas that theoretically should have had no problems. On closer examination of the unexpected problem areas, it was found that many of the problems were caused by poor maintenance or inappropriate operation of various boundary valves and / or control valves. In many cases, the boundary valves were left in a semi-open position due to the fact that the operations staff did not know if they should be open or closed. The operations staff also had the habit of closing sections of pipe in cases where a burst had occurred instead of repairing the burst and reopening the pipeline. This has caused serious bottlenecks in the system, which only became apparent when the pressures were lowered. In each case the project team had to cease all further pressure reduction activities and undertake a full investigation involving significant field work to identify and correct all problem valves and / or sections of pipeline in a particular area. Following the corrective measures, it was normally found that the overall level of service to the specific community improved significantly when the system was reinstated to its original configuration.

Identification of problem infrastructure

In addition to the identification of bottlenecks as discussed previously, there were numerous cases where serious problems were found in the basic reticulation infrastructure. One of the most common problems identified was that of 'missing' pipes or connections. In several cases it was



found that connections from smaller pipes (200mm or less) had not been made to the bulk mains running through a particular area. In one case, it was found that of the four connections shown on the 'as-built' plans, only one had in fact been commissioned. The remaining three connections were sealed with a blank flange plate just before the connection point.

In this instance, the community of approximately 3000 residents had been experiencing intermittent supply (water available only during the night-time periods) for almost nine years and had stopped complaining many years ago since nothing was ever done to alleviate the problem. On excavating the three mystery connections and adding the necessary T-pieces, the area was restored to full system pressure on a 24-hour basis for the first time.

Although the additional connections actually increased the water use in the one problem area, it allowed the pressure to the whole of Sebokeng & Evaton to be lowered during the off-peak periods, which more than made up for any small local increase in use during the remaining periods.

The other key problem identified with the infrastructure was the identification of 'missing' valves which were not shown on any reticulation drawings but were thought to exist by the project team due to the manner in which the system was responding to the water pressure.

In one case, a valve chamber had been buried with rubble and rubbish for approximately 30 years and when the valve was eventually unearthed, it had seized completely. In many cases, the valves are more than 60 years old and must be removed completely and refurbished in order to restore the

Quality control inspection of the installation following construction. Credit: WRP.

reticulation system to its normal operating condition. This type of problem has been a common occurrence and it is anticipated that more than 100 large valves will have to be refurbished.

Catalyst for funding

Prior to the implementation of the project, the municipality was unable to access any funding for WDM activities of any nature and even the various 'development' banks were unwilling to provide funding for the project. Once the project had been completed, however, and the results were published, the situation changed dramatically and suddenly there were several organisations (including the bulk water provider) wishing to invest funding in the Sebokeng & Evaton area. One of the main supporters of the project is now the Department of Water Affairs and Forestry (DWAF) which is the national custodian of all raw water in South Africa and also fulfils the role of regulator country-wide. After assessing the savings from the Sebokeng & Evaton pressure management initiatives, DWAF realised the value of such projects and created a new budget to help overcome the funding difficulties that originally threatened to halt the project. Approximately R50 million (\$8 million) was allocated for WDM activities in 2007. Of this, more than R10 million (\$1.7 million) was used to support WDM activities in Sebokeng and the surrounding areas.

In addition to the injection of DWAF funding, the municipality was able to use some of the surplus funds from the water savings to improve the reticulation network in the area. Approximately R10 million (\$1.7

million) from the savings was returned to the water utility to match the DWAF funding in 2007. Prior to the project, the municipality had virtually no budget for maintenance of the system since all funds were being used to support the water account from the bulk supplier.

Improved municipality status

Prior to the project, the only publicity received by the municipality was usually with regard to spills of untreated sewage in the Vaal River. Such spills were due in part to the poor infrastructure of the multiple sewage pumping stations and in part to the huge sewage inflows, which in turn were caused to a large extent by high internal household leakage. Since the project has been initiated, it has created significant positive publicity for the municipality and has picked up no fewer than four national awards for technical engineering excellence. The publicity surrounding the project has created awareness at the highest levels in government and the project has been acknowledged in Parliament by the Water Portfolio Committee as a model that should be repeated throughout South Africa wherever conditions permit.

Catalyst for other WDM interventions

Perhaps one of the most important benefits to arise from the project is the fact that it has demonstrated what can be achieved with relatively little funding and combined support from both the private and public sectors. Following the successful completion of the project, the municipal managers have since been able to motivate and gain approval for several additional technical and social WDM interventions. Of particular note are the following:

- Sectorisation to enable proper management of the reticulation system;
- Consumer metering and billing as a first step to proper billing;
- Community awareness with particular reference to garden watering;
- Pressure management at district level (<3000 properties) to gain further savings in low lying areas;
- Continuous monitoring of control points to assist with system management
- Development of an asset register as first step to full asset management system.

Sustainability of savings

One of the key problems facing many WDM interventions is maintaining the initial savings after the project has been completed and the project team has been paid for its efforts. In the case of

the Sebokeng & Evaton PPP, the project team was responsible for all maintenance and operation for the full five-year period. The project team received payment in accordance with the savings generated (up to an agreed limit, after which 100% returns to the municipality). It was therefore essential that the project continued to operate properly for the full five-year project period or the financial implications for the project team would have been serious.

This is one of relatively few WDM projects where the savings were audited carefully on a continuous basis and this was one of the key elements to its success.

Conclusions

While the Sebokeng & Evaton PPP is clearly one of the most successful small-scale PPPs to be completed in South Africa, the real benefits of the project are only now materialising several years after the project was commissioned.

As a result of the significant savings in water purchases from the bulk water provider, the municipality has been able to allocate additional



funds for maintenance of the water distribution system.

Due to the availability of the additional funding, many new initiatives have also been implemented in the area that could not have been considered before the PPP had been commissioned. Some of the other initiatives are discussed in the paper by Siqalaba (2006), which highlights many of the softer issues such as community awareness and school education, which have been addressed over the past five years. It is clear that such issues are extremely important and that without proper consultation with the community even the best planned technical interventions will fail.

It is clear that although the financial savings generated exceed all initial expectations, the hidden and often less tangible benefits greatly outweigh the obvious and tangible benefits. ●

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Unearthing of one of the 'missing' valves. Credit: WRP.

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Communicating tap water – *building knowledge for future consumers*

Swedish utility Sydvatten AB has been undertaking a programme in Sweden to teach the next generation of water consumers the benefits of tap water. **MARIE NORDKVIST PERSSON** explains the reasoning behind the Drink Tap Water project and how it is communicating the value of tap water to young consumers.



Tap water is healthy, cheap and climate-friendly. That is the main message for the school project Drink Tap Water that is running at senior-level elementary schools in the south of Sweden. The scale and nature of the Drink Tap Water project is unparalleled in Sweden. The project is managed by Sydvatten AB, Southern Sweden Water Supply, one of the largest drinking water producers in the country, in cooperation with the owner municipalities. The purpose is to communicate the many values of tap water to young consumers.

A special website for the tap water product has been launched at www.drickkranvatten.se, which includes specific school and pedagogic material in the form of fact sheets and lesson proposals that are linked to the teaching curriculum as support for teachers. Also quizzes, web water competitions and a Facebook group have been added to support the initiative!

130 schools and 30,000 pupils in three years

The goal for the Drink Tap Water

project as a whole is that tap water becomes a natural part of the schools' environment work, as well as a healthy replacement for sugar-rich soft drinks and the like. The pupils are made aware of the following points:

- Swedish tap water is maintained at a constant high quality.
- Water is crucial for our health.
- Tap water is a good environmental choice – it has considerably less impact on the environment than bottled water and soft drinks.
- Tap water is cheap – about 1000 times cheaper compared with soft drinks and bottled water.

Free-running artists perform at an inauguration ceremony. Credit: Roos & Tegnér.



Pupils should also be able to contemplate water problems in the world, the need for fresh water, and that water can be the cause of both conflict and cooperation. The project covers 130 schools with more than 30,000 pupils who will be involved over a three-year period. A project manager has been recruited, who is both a teacher and a journalist, to work with the schools and assist the teachers and pupils in their studies of water.

When pupils have worked with the water theme, a tap water dispenser is installed in the school, offering both cooled ordinary tap water and carbonated tap water, and all pupils receive a sports bottle marked Drink Tap Water. During the inauguration, the school also offers activities and entertainment linked to the tap water theme – such as music students who sing and play. They sometimes write their own songs, many of which have a water theme. There are also quizzes, displays and masquerades. When there is a municipal premiere a couple of young free-running artists are invited to perform for the school's pupils and staff.

To further increase the hype of the tap water dispensers, some of them are loaded with sound-snippets so that when you come to take some water,



A tap water post in a school.
Credit: Roos & Tegnér.

the dispenser will randomly start to talk as you get closer to it.

For additional public welfare

Sydvatten AB is a municipality-owned company, which produces drinking water for 800,000 inhabitants in Skåne in the south of Sweden. The company supplies water for 15 joint-owner municipalities up to the boundaries, where each municipality then takes over the distribution within their own respective area.

As a municipality-owned Public Limited Company, collaboration for commercial public welfare is a fundamental concept for Sydvatten. The owners have stated that the company will be a competitive company that contributes towards the development of the municipalities. Company growth is not based on corporate profit maximization but rather the maximization of public welfare. The regulatory documents for Sydvatten AB states that the company shall work to create additional public welfare by communicating the value of tap water and emphasizing the high quality of tap water.

Needs and threats

Up to a couple of years ago, there was hardly any need to communicate information about tap water. Sweden has a lot of good-quality water. Water supply and sewage disposal services are publicly owned, are financed through tariffs, according to the cost-price principle, and may not generate a profit. Most aspects discussed within the sector were about technology and production, and finances to a certain degree. But water in Sweden is very cheap. The average cost in Sweden for tap water is €1 (\$1.3) for one cubic metre.

Things have changed, however. Tap water as a product started in the late 1990s to be the object of external threats in addition to climate change, supply security and other issues the branch normally deals with. These threats include:

- Commercial interests: the brewery industry produces water, which it

claims is healthier and purer than tap water.

- Lifestyle programmes encourage people to buy and drink bottled water.
- Restaurants sell own-filtered tap water and declare that it is cleaner and tastes better than the ordinary tap water.
- Every now and then we have a debate about medicinal and chemical residues in tap water, which scares people.

The concept of tap water was also vague amongst the public. Everyone takes water for granted, like air, thinking that it is just there to be used. A SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis showed Sydvatten the need to start communicating the obvious and hidden values of clear, cheap, palatable tap water.

Objectives and target-groups

The objectives are to raise the value of tap water, to strengthen the brand name of tap water, increase awareness and finally to maintain trust and confidence in the drinking water supply. The target group is pupils at senior-level elementary school in the age range 13-16. The reasons for choosing this group were as follows:

- Young people of this age are large consumers of soft drinks.
- At this age, most of the teenagers start to relate to their body, diet and sporting activities in a new way. It is very important to provide them with information of the value of good drinking habits and raise their awareness in this area.
- To encourage young people to consider how their choice of drink affects health, finances and the environment.
- Young people have their own money, make their own purchases and start to create their own habits.
- They have considerable influence on their own families and shopping habits.
- The project could also stimulate young people to take the right decisions as future consumers.

Within the company, three platforms for collaboration with the joint-owners have long been established. On the platforms, representatives from technology, finance and communication meet regularly and keep in touch with developments in the drinking water sector. The Drink Tap Water project has been prepared by the communications working group. Drink Tap Water is a collaboration project between Sydvatten and the joint-owner municipalities' water service suppliers. The total budget for

the project is about SEK5 million (\$700,000), of which the company stands for half while the municipalities share the other half.

Evaluation with positive results

The project is regularly evaluated through the teachers and pupils answering questionnaires. The pupils' replies show that several of the project's goals have been achieved. 79% of the pupils now choose tap water instead of another drink as a result of the Drink Tap Water project. 75% believe they have greater knowledge of the significance of water for health and the environment. 70% believe they have greater knowledge of the cost of water compared with other drinks.

The teacher questionnaire also points towards positive results regarding the website. One teacher summarized it as: 'An enormous amount of very good information that one can use for the pupils. It saved time, and gave me new ideas.' 69% of the teachers say they have used the lesson proposals. The general support from the teachers is overwhelming. All state that the lesson proposals have saved preparation time and that they are positive towards the project, with 89% very positive. All state that they are positive towards the results of the project, with 67% very positive.

The conclusion is that a communication project definitely can influence habits and drinking behaviour. We want to build knowledge among teachers and pupils, i.e. our consumers, to be able to affect attitudes and ultimately change people's behaviour. We know that it is very difficult to achieve behaviour-changes over time – but we are working on it. But to do so, we think it is crucial to provide accurate knowledge of the issues and to raise the motivation and awareness among teachers and pupils. As an important group of our consumers, they will be tap water ambassadors in homes, athletic clubs, gyms, schools and restaurants once they have learnt the benefits of clear, pure, palatable and cheap tap water. ●

Marie Nordkvist Persson presented at the IWA Water Utility Conference – Strategic Opportunities for Future Challenges 2010, held 10-12 May 2010 in Barcelona, Spain.

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Innovations in financing: the search for ways to fill the investment gap

The water sector needs investment to provide and improve services. **KEITH HAYWARD** spoke with **SOPHIE TRÉMOLET**, lead author of an OECD report on innovative approaches to financing in the water sector that offers recommendations on how to build on and expand the use of 'market-based repayable finance'.

‘It’s a bit of a convoluted sort of term, but that’s the way we defined it,’ comments Sophie Trémolet, referring to ‘market-based repayable finance’, the focus of a recent report from the OECD.

Trémolet is the lead author of ‘Innovative financing mechanisms for the water sector’, a report published by the OECD earlier this year. The report forms part of the recent and ongoing output of the OECD looking at how to expand and improve water and wastewater services provision and broader water resources management around the world.

All spending in the water sector must ultimately be covered by what the OECD refers to as the ‘3Ts’ – tariffs, taxes, and transfers of funds particularly through aid provision. The role of this particular report, and the work that has gone into preparing it, has been to look market-based repayable finance, which means mechanisms such as loans, bonds or equity that give the providers of the finance returns at market rates. Water sector investment tends to be needed in bursts but with revenues recovered over longer periods. The role of market-based repayable finance is therefore presented as being to bridge the financing gap between when investment is needed and when repayment can be made.

‘The key distinction that the OECD is trying to make is between finance that can fill the financing gap and finance that bridges the financing gap – what we call repayable finance,’ comments Trémolet.

‘The water sector is not very familiar with financing terms and jargon,’ she continues. ‘For example, during the era of private sector participation, there was a kind of fantasy that the private operators would bring finance, but there was nowhere mentioned that this financing had to be repaid – that it was effectively repayable finance, brought in as equity or working capital. So effectively what we’re trying to do is make that distinction very clear.’

‘The “market-based” comes in to distinguish it from international

lenders, development banks such as the European Investment Bank and the World Bank, which are providing repayable finance but not always at market rates,’ she adds.

Clearly the use of such approaches in the water sector is not new, and for many the role of market-based, or ‘for-profit’, provision of financing is controversial. But the report notes the scale of the investment needed, citing WHO estimates of \$18 billion annually to extend infrastructure to meet the water-related Millennium Development Goals and \$54 billion a year to sustain current services.

Alongside this, sector reforms, particularly reforms to raise tariffs to levels that are consistent with ensuring service providers remain viable and can support investment, are going to take many years to realise. Hence market-based repayable finance has a role to play.

Trémolet points out that the report provides a contribution as part of ongoing activities, and that the picture as far as private sector financing is concerned is far from complete. She says that the issue of repayable finance has been somewhat overlooked. ‘This report was intended to fill that gap in coverage,’ she comments. The tracking that does take place tends to have a different focus, such as the finance brought in by operators or concessions or provided by ODA, meaning the resulting picture is ‘very biased, it’s very partial,’ she says. ‘So there are gaps and progressively we’re piecing the puzzle together, but it is still a work in progress,’ she adds.

In providing recommendations, the report seeks to build on earlier high-level recommendations that have sought to bring about greater investment in the sector, particularly the ‘Camdessus’ and ‘Gurría’ reports.

‘Basically the report is also trying to assess the experience that has taken place, especially since the Camdessus report,’ says Trémolet. ‘There is mention of the Camdessus report, which was a sort of first attempt to look in a comprehensive manner at the financing issues in the water

sector, and which made a number of recommendations, some of them quite detailed.’

‘Effectively what we’re doing in the report is looking back and saying, OK, there were these recommendations, what’s happened since then,’ she continues. ‘What we found is that not very much has happened. The experience that is presented in the report, I can’t claim it’s absolutely universal coverage of what has been done, but it’s pretty comprehensive – we tried to trawl through the available information and to identify under each category what had taken place.’

The report notes that ‘a change in emphasis may be required to reflect the changes that have affected the water sector in recent years and the impact of the global financial and economic crisis’. The report notes that in particular the market for water services has evolved rapidly, with local private operators accounting for a far greater share of the market. ‘The risk profiles and financing needs of these operators are very different from those of international private operators and there are also significant differences within this group of providers,’ the report states. Official Development Assistance remains ‘critical’, and the global financial crisis ‘means that some innovation called for by the Camdessus and Gurría reports may be more challenging to achieve than before,’ the report adds.

The core of the report presents a range of approaches that offer potential. As a precursor to that, the report considers on the one hand the nature of the entities potentially looking to access this market-based repayable finance and, on the other hand, the different types of market-based repayable finance that are available.

Regarding the former, of particular concern are the many public service providers that may, for example, have been created through a process of decentralisation but without adequate revenues having been transferred from central government, or the case of there not being clear separation between a municipal department and

the service provider. It is therefore often difficult for local water service providers to raise finance, with other key issues being credit-worthiness and legal registration.

Regarding the latter, market-based repayable finance can come through debt financing, including commercial bank loans, bond finance and project finance. Or it can come through equity finance, either through a stock exchange listing or through the use of private equity, the latter being used usually as collateral for other forms of financing, rather than to finance capital investments on its own. The report runs through water sector examples of each of these options, but notes that they have not been used more extensively to deliver financing to the service providers outlined above due to 'critical mismatches'. Addressing these critical mismatches therefore lies at the heart of the report, and the financial mechanisms identified as offering potential are intended to be used in combinations that can help overcome the mismatches (see table).

Innovative financing

The report puts forward nine financial mechanisms, giving a description of each, details of where each has been used, and thoughts on the potential for wider application (see box 'Areas for innovation: mechanisms for helping deliver financing to the water sector' for a brief summary of these).

The mechanisms are presented in a chapter 'Pushing the boundaries of innovative finance'. Trémolet explains that the idea behind this was that public finance, in the form of Official Development Assistance, can be used to trigger a market response. 'We've known what should happen, but somehow the market hasn't delivered the kind of increase in financing to the sector as it may have done in other sectors, so there's a need for perhaps a little bit more intervention due to the nature of the sector,' adds Trémolet. 'There is a need for public intervention to extend the boundaries of market-based repayable finance [beyond] where it's not going basically of its own [accord].'

'We looked through all of them in detail,' explains Trémolet. 'Of course, they should be combined or they shouldn't be looked at in isolation from each other, but the reason for dealing with them in sequence was to give more clarity.'

'Even though OECD reports tend to look at both OECD countries and developing countries, the bulk of our recommendations are effectively for developing country situations,' she comments.

Greater use of micro-finance is one

Critical mismatch

Affordability constraints at household level

Limited availability of funds for domestic operators and small-scale water service providers

Risk profile and difficulties in managing certain risks (e.g. political risk, foreign exchange risk)

Lack of funds at decentralised level

Short tenor of available financing

Under-capitalized balance sheets

Lack of understanding by external lenders and investors

Lack of 'bankable' projects

Examples of innovative financial mechanisms

Blending grants and repayable financing
Micro-finance

Output-based aid

Micro-finance
Output-based aid and innovative contract

Blending grants and repayable financing
Guarantees and risk insurance
Devaluation backstopping facility
Local-currency financing
Revenue agreements in lieu of guarantees

Municipal bonds
Pooled funds, revolving funds and bond banks
Instruments to increase sub-sovereign lending

Guarantees
Equity contributions

Raising equity to strengthen the balance sheet, convertible loans, debt-equity swaps, 'asset-light' expansion models

Blending grants and repayable financing
Credit ratings
Project preparation facilities

Project preparation facilities

Source: Innovative financing mechanisms for the water sector, OECD, 2010, p64.

Examples of innovative financing mechanisms in the water sector

of the recommendations. 'There are some limited experience of micro-finance in water and sanitation, some of them with very good results, but overall the sector hasn't caught onto that trend,' says Trémolet.

Another of the areas for improvement is the use of guarantees to help mitigate the risks to which the provider of the finance is exposed. 'For guarantees, some of the examples that we are referring to were already referred to in the Camdessus report, but that's because not much has happened since,' says Trémolet. 'So we went to the main guarantee providers – MIGA (the Multilateral Investment Guarantee Agency), the World Bank – and they just haven't been very active in the water sector for a whole variety of reasons which are explained.'

'What is particularly worth highlighting I would say is blending grants and repayable financing,' she continues. 'That links with aid effectiveness and the need for increased donor coordination. And it links with the need for better project preparation, because something that comes back over and over again is that it is not a lack of financing; there's quite a lot of financiers who would be eager to lend to the water sector, especially if there's a grant element, if blending takes place, but there's often a lack of good projects.'

'If you have one entity, likely to be a donor, that takes the lead in developing a project in a comprehensive manner but then identifies what can be commercially financed, what requires subsidies, which can be ODA subsidies

or could be different forms, that's definitely something that would enable better financing flows to the sector,' she explains.

Trémolet points to two examples that are cited in the report in the context of blending – the Maputo project in Mozambique, and the case of FINDETER in Colombia. The former is project-based, while the latter operates at an institutional programme level. 'That links to a need for national level institutions,' comments Trémolet. 'I think one of the key conclusions from the reports is, for example, if you try to provide guarantees – and guarantees are very much needed and are a way of improving the lending terms – but if every time we have to go back to MIGA to do it, it's just not going to happen because the transaction costs are simply too high.'

She continues: 'So to reflect the evolution in the water sector, the whole reduction in the spread of international private operators, the rise of domestic operators, increased decentralisation, etc, there is a need for the establishment of these national level institutions that can do the blending at a domestic level.'

The report probably has more of a water mindset, but in sanitation that challenge is even greater,' she adds. Here she cites the example of Dar es Salaam as somewhere where there is limited centralised sanitation alongside poorly functioning latrines and a fragmented service by small-scale providers. Here again she highlights the potential role of blending, this time in conjunction with the facilitation of

access to finance. 'I think there's an increasing role for intermediaries in matching financiers with the demand of finance. For example, the use of micro-finance could be explored in much greater detail.'

A new mindset

The recommendations in the report will of course be viewed in the light of the real world in which they need to be implemented. That means they will be seen in the context of the ongoing global financial upheaval, but Trémolet offers a wider view: 'There are other broader trends such as climate change, the whole need [to move] towards changing the growth model, less focused on high return investments and more focused perhaps on green

growth investments.'

She adds: 'I think one thing that is worth stressing is that there are huge investment needs in the water sector. That's something we highlight in the subsequent reports that will be coming out from the OECD.'

'So the investments are huge,' she continues. 'Obviously government budgets are increasingly being constrained, but with climate change, with catastrophic weather events that are occurring, there is a growing realisation that they can't be avoided. Investment in water is needed, so there is a need to mobilise finance for it, and it can be part of the whole green growth agenda, in creating jobs which are green, etc.'

'I think it's a whole shift in mindset,'

adds Trémolet. 'For me the financial crisis is important in the sense that it led to a drying up of commercial finance, which is what we described, but it also led to a partial gradual shift in mindset away from high returns sort of investment focused on growth towards more sustainable growth. That's where I see the water sector as potentially benefiting, but of course we have to bear in mind the overall constraints of a lack of finance and a lack of public finance with heavily-indebted governments.' ●

'Innovative financing mechanisms for the water sector', OECD 2010, ISBN 9781843393672, can be obtained from OECD and from IWA Publishing, see www.iwapublishing.com.

Areas for innovation: mechanisms for helping deliver financing to the water sector

The OECE report 'Innovative financing mechanisms for the water sector' sets out nine key areas in which innovation offers the prospect of helping increase financing in the water sector.

Blending grants and repayable financing

This approach looks to combine grants or loans with a grant element with market-based or other repayable finance and offers the prospect of minimising affordability problems. A project-level example is the grant financing provided by the EU Water Facility and the Agence Française de Développement to the Maputo water supply project in Mozambique, on which the European Investment Bank is the lead financier. The approach can also be applied at the institutional level, either internationally or nationally, with FINDETER of Colombia being given as an example of the latter. According to the report, blending offers 'great potential', especially in the context of the ongoing financial crisis.

Micro-finance

Micro-finance seeks to provide financing to those who cannot normally get access to financial institutions, such as households or small-scale water service providers. Examples include a credit scheme in Togo to encourage small-scale providers to set up supply enterprises and a credit line for projects to upgrade urban infrastructure offered by Peru's Mibanco microfinance institution. The report proposes that donor funding could help overcome

constraints on the further use of microfinance.

Output-based aid

Output-based aid involves the payment of subsidies only once a specific action has been carried out. For example, a subsidy to cover a new network connection would be paid only once the service provider had made the network connection. This approach has been used, with a notable example being the Global Partnership for Output Based Aid. The report notes that projects need to be pre-financed to cover the period up to the subsidy being paid and that this can be 'a real constraint'. One option is therefore to combine the approach with micro-finance, as is being done by Kenya's K-Rep bank.

Mitigating risks with guarantees and insurance

Risks may dissuade those who provide market-based finance from getting involved or mean the finance is offered on less favourable terms, and there is a wide variety of means to mitigate these risks. Two key instruments are Partial Credit Guarantees, which cover part of the debt payment of debt-based financing, and Partial Risk Guarantees, which cover the full debt in the event of a default because of certain risks. According to the report, the broad range of risk mitigation instruments has not been used on a large scale in the water sector. An example of a Partial Credit Guarantee was that provided by the International Finance Corporation to the City of

Johannesburg, while a Partial Risk Guarantee was provided by the World Bank Multilateral Investment Guarantee Agency to Ecuador's Guayaquil concession.

Grouped financing vehicles

Grouped financing vehicles include, for example, revolving funds, where loan repayments can be used to support new loans and so extend the number of beneficiaries, or pooled financing, where small municipalities issue a collective bond, helping to overcome credit risks and transaction costs. Examples given in the report include the Global Development Alliance programme developed by USAID, in association with Evensen Dodge International, which helped establish a bond bank for water sector financing in Mexico's State of Quintana Roo.

Increased lending to sub-sovereigns

A further route for increasing lending is for financing to be provided directly to entities below the national level, particularly municipalities or water utilities. The key change is to do so without requiring a central government guarantee. The report notes that the European Bank for Reconstruction and Development has been 'leading the way' in this area, with a key tool being a 'project support agreement' in which municipalities commit to tariff increases to allow debt repayment. While recognising that sub-sovereign entities may be weak, the barrier may be the willingness or rules of the lender, or reluctance on the part of central governments.

Equity injections

Injections of equity can strengthen the balance sheet of a water service provider and so enhance the ability to obtain financing. Official Development Assistance can support this process by either taking equity directly, such as with SONES in Senegal, or by developing models of private sector participation that require equity provision.

Credit ratings

Credit ratings offer a means of giving investors greater confidence in an investment. There are a growing number of national agencies alongside established international agencies, although the report states that 'the use of credit rating should be considered with caution', especially where markets are too small to establish a national rating scale. India is given as an example of where urban entities have obtained credit ratings and accessed capital markets.

Project preparation facilities

The final area for innovation presented in the report is the use of project preparation facilities. The key point here is that there is an aim for projects to be 'bankable' – they need to be sound and attractive from a financing perspective. Project preparation facilities can help ensure projects achieve this aim. Examples given in the report include the Project Preparation Committee of the 'Environment for Europe' process. The report calls for greater support in setting up such initiatives, including national level facilities.