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Evolving mechanisms to implement a range of small and large scale water supply infrastructure for households' multiple water uses in South Africa

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South Africa's renewed commitment to poverty eradication is voiced in the water sector through the new Strategic Framework for Water for Sustainable Growth and Development. It recognises the catalytic role that water can play in poverty eradication through home- and village-based economic activity of poor households. This sets the table for the implementation of a range of conventional and less conventional infrastructure solutions of all sizes, to respond to people's need for water for productive uses, and to the diversity of situations found in the South African context. Current institutional arrangements for water supply and management provides a basic framework within which such a range of infrastructure solutions could be implemented, provided some adaptations are made to consultation processes, design criteria and performance measurement. Sufficient attention to operation and maintenance of infrastructure is proving to be a key challenge.

Introduction

The concept of 'multiple use systems' arose from a recognition that as humans, our water needs are multi-faceted, and that water can play a catalytic role in helping people step out of poverty. The well-known finding by AWARD in Bushbuckridge in Mpumalanga Province, recorded that double the economic activity was evident in villages with 'more water' than the 25 lpd required by the Reconstruction and Development Plan (RDP) of post-apartheid South Africa. Further work confirmed that many water-based economic activities do not require purified water, which opened up a host of possibilities to exploit a range of water sources and systems to supply water for multiple uses.

These findings have helped to shape South Africa's new Strategic Framework for Water for Sustainable Growth and Development, whose vision is of a robust, accountable and people-centred water sector, which ensures that water security supports social transformation and economic growth without compromising environmental integrity. The strategy states that decisions regarding the use of water must focus particularly on poverty eradication and social justice, and places much emphasis on the provision of water for productive uses by poor households.

South Africa is highly diverse: annual rainfall varies from approximately 900mm on the Eastern seaboard to desert conditions along the Western seaboard, socio-economic conditions range from ultra-poor to wealthy, operating in parallel 'first' and 'second' economies, often occupying the same geographic space; population is highly dense in places, and settlement patterns were hardly ever determined by the proximity of a good water source.

In the UN World Water Assessment Programme (WWAP) discussion document in 2008, one of the points for debate posed a 'choice between small or large-scale infrastructure'. However, the complexity of the South African geographic, economic and social landscape – which has consequently often been called 'the world in one country' – demands a range of infrastructure solutions to address water supply backlogs, operation and maintenance challenges and an ever-evolving set of institutional questions.

Sustainability

Infrastructure is a means to an end. It supports quality of life and the economy, as long as it delivers the service that individuals and institutions need, in a way that ensures access, affordability and reliability. Service providers can only know what level of service to provide by consulting people about their needs, preferences and levels of affordability. Sustainability is therefore possible only through proper planning, which is dealt with in the next section.

The Water Services Sector in South Africa has infrastructure assets of a replacement value of several hundred billion Rand (1 USD=R8.50). Water Services Authorities (WSAs) are responsible for the development, management and maintenance of this infrastructure. During the next decade a lot more infrastructure will be provided, yet many WSAs do very little to ensure that the correct type of infrastructure is provided for specific circumstances and do very little infrastructure asset management and also do not budget sufficiently for it. Money “saved” on management of assets is not a saving at all. This is a short-term outlook, often said to be due to political short-term imperatives and lack of capacity and know-how within the municipality. It becomes a vicious cycle once infrastructure is allowed to deteriorate as a result of a lack of maintenance. Expensive refurbishment then becomes necessary and there is even less money for ongoing maintenance. In addition, deteriorating infrastructure leads to poor service delivery and reduced payment by consumers, exacerbating the lack of cost recovery.

A poor state of infrastructure can be due to various reasons including amongst others, inadequate level of service, inappropriate design, inappropriate technology, unskilled operators, inappropriate operating rules/systems, inadequate funding, and non-availability of chemicals, lack of equipment and tools or logistical problems.

Access to a tap and toilet is of no use to the community if the water stops flowing or the toilet no longer works. The need to find the correct balance between the type of infrastructure that is provided and the sustainability of services is of utmost importance. It impacts directly on the affordability of the service and the sustainability of a Water Services Authority or Water Services Provider.

Key issues from consultations

The following key issues identified during consultations for the drafting of the Water for Growth and Development Strategy, emphasises the need for a range of interventions to ensure sustainability and appropriateness of water supply infrastructure (extract from draft working documents):

Issue 1: Ensure the upkeep of current infrastructure to continue to provide economic, social and environmental functions of water infrastructure. Absolutely ensure adequate O&M – the skills, capacity, management; siltation, flood protection, environmental releases; need to respond to changed requirements due to climate change and global warming;

Issue 2: Enable 6% economic growth. Need to respond/prepare timely (long advance times for investigation, design & construction of large infrastructure) and spatially (water infrastructure needs to be complemented by other infrastructure development in response to economic development opportunities); essential to ensure effective water access [for basic AND productive water needs] of all strata within society; therefore need for range of types and sizes of infrastructure (from tiny RWH dams to large dams... the global debate about large vs small is nonsensical in our situation, we need a range as appropriate to different circumstances);

Issue 3: Enable the use of alternative strategies (in addition to conventional infrastructure) – WCDM, RWH, etc. Recognise that to implement alternative strategies like WCDM and broad-ranging RWH, we need capacity (skills, people, systems, management, institutions) similar to the capacity developed over generations for the planning, design and construction of conventional infrastructure. We need to start developing these capacities long in advance of a crisis, because in a crisis situation there will no time to do it properly.

Some of the key organisations currently involved in water services provision in South Africa and tasked to ensure that the correct type of infrastructure is provided for specific circumstances are as follows:

- The *Department of Water Affairs and Forestry (DWAF)* is responsible for sector policy, support and regulation. In the past, DWAF did have some water services assets but these assets are currently in the process of being transferred to various WSAs.
- *Water Services Authorities* (metropolitan municipalities, some district municipalities and authorised local municipalities) are responsible for ensuring provision of water services within their area of jurisdiction.
- *Municipalities* operate some local water resource infrastructure (such as dams and boreholes) and bulk water supply schemes, supply water and sanitation to consumers (households, businesses and industries) and operate wastewater collection and treatment systems.

Planning for small and large infrastructure

Water legislation in South Africa distinguishes between water resources, governed by the National Water Act (Act 36 of 1998) and water services, governed by the Water Services Act (Act xx of 1997).

Although South Africa is a water scarce country with a highly skewed rainfall distribution pattern and subject to droughts, water resources planning systems are strong and look at future water needs. Water in South Africa is supplied on a regional basis, therefore drought conditions and low dam levels in one part of the country may result in water restrictions in that area, however, dams in another part of the country may be full as a result of good rainfall. Temporary and geographic imbalances are compensated through strict water allocation processes, and extensive networks of infrastructure that transfer water from different parts of the country to where it is needed.

Water should be a concern for all South Africans, and a consistent campaign is underway to remind our citizens to be water wise by using water sparingly.

From a water resources perspective, there is enough water in our rivers, dams and underground to supply water for socio-economic growth and development, and there are programmes in place to enable timely development of bulk infrastructure for future supply of water to the growing economy and to address the imbalances of the past in regard to access to water for drinking purposes and productive use.

Since 1994, South Africa has been driving an aggressive infrastructure rollout programme to address the backlog in water supply to poor communities across the country. Between 2004 and 2006 nine water resources capital projects were completed at a cost of R1,3 Billion. Another R8,8 Billion is being spent on six major water resources infrastructure projects to be completed between 2008 and 2012. The scope and pace achieved has been possible by focusing on fairly standardised bulk and reticulated supply systems. Two main challenges have since arisen in the water supply sector in South Africa:

- Firstly, it has been virtually impossible to keep up with this pace in the development of institutional capacity for management and maintenance of the infrastructure created through the rollout programme, to the extent that the reliability of even newly created systems are deteriorating;
- Secondly, the remaining population to be served are generally more remote and difficult to reach than those already served.

Both these factors demand a fresh look at alternative options for water supply and institutional arrangements for planning, operation and maintenance. In water services, the primary instrument for planning is the Water Services Development Plan (WSDP) and the primary purpose of the WSDP is to assist WSAs to carry out their mandate effectively. From a Local Authority or WSA perspective, wherever practical, infrastructure should be designed to accommodate mixed levels of service within communities, allowing consumers to select a level of service which suits their needs, is affordable to them and can be upgraded over time. Also, wherever practical, financially viable and sustainable, preference should be given to water supply services which make available at least 50 litres per person per day in close proximity to domestic dwellings (preferably in the yard). Where housing densities are low, low pressure yard tanks could prove to be the most cost-effective means of achieving this.

When it comes to sanitation, and housing densities are low, on-site sanitation systems are likely to be most appropriate. Some form of waterborne sanitation system is likely to be most appropriate where housing densities are high, for example, in urban areas.

Unauthorised and informal settlements where people are living on land without permission of the owner of the land, the provision of services poses a challenge to WSA's. Interim basic water and sanitation services should be provided as appropriate, affordable, and practical in accordance with a progressive plan

that addresses both land tenure and basic services. The DWAF provide best practice guidelines to assist WSAs with regard hereto.

To do justice to the implementation of multiple use systems to enable a larger percentage of poor households to become economically active where they live, two adjustments are necessary:

- First, the basic guidelines mentioned above, as well as the WSDP standard framework, need to be reviewed and expanded to provide for multiple use systems, including rainwater harvesting and water conservation and demand management measures; and
- Secondly, the use of participatory planning methods such as SWELL, needs to be adopted by WSAs for better tailored development of the WSDPs.

Financing mechanisms to implement an appropriate range of small and large infrastructure

The two main financing mechanisms for implementation of small and large water supply infrastructure, are the Municipal Infrastructure Grant (MIG) and the newly established Regional Bulk Infrastructure Grant.

MIG was created to enable WSAs to do proper planning and construction of their local water supply networks and systems. Adjustments are currently under discussion to adapt the conditions and criteria for MIG funding to enable, and indeed encourage, municipalities to implement multiple use systems where appropriate. A specific challenge is to foster close collaboration between affected units within the municipality, for instance between the water supply and local economic development (LED) units. Collaboration may be inadvertently discouraged if the implementation of multiple use systems detract from the performance assessment of participating units. A remaining problem with MIG funding is that it is normally used for the provision of new infrastructure and not for the maintenance of existing infrastructure.

Further major challenges of WSAs in South Africa are that large regional water services infrastructure developments cannot be initiated with current funding available to individual municipalities. These regional schemes are also not always financially viable, because of the vast distance over which water needs to be supplied to various scattered communities (Kwa Zulu Natal, Eastern Cape, Limpopo, etc). The nature of regional bulk infrastructure also requires that various municipalities and economic sectors need to be involved in the planning, financing and operation of such large schemes. Substantial water resources, water user requirements and economic factors need to be considered, requiring complex and comprehensive planning and implementation management requirements.

To help the WSA's to provide the bulk infrastructure that they require, DWAF established the Regional Bulk Infrastructure Grant to assist with the provision of bulk infrastructure. The fund aims to support Government's development targets (e.g. eradication of basic water supply backlogs by 2008 and basic sanitation backlogs by 2010) as well as socio-economic priorities such as the 2010 Soccer World Cup, growth and development initiatives, as well as addressing specific water risks (e.g. water availability, water quality and environmental challenges). The implementation and management of regional bulk water services infrastructure is guided, impacted and driven by various factors, including the following:

- *Socio-economic development:* Regional bulk infrastructure serves both a social and economic component of services. The development and management of such infrastructure is thus dependent on the interaction and cooperation from both sectors. This implies integrated and comprehensive development planning, co-funding and financing mechanisms.
- *Water availability and scarcity:* Water availability and the scarcity thereof dictate the need for and scope of bulk services. In many situations the solution demands that water must be transported over vast distances to serve communities in an integrated manner. Without bulk infrastructure, internal services are often not possible or not sustainable.
- *Integrated water management:* Water resources have to be shared across institutional boundaries and between competing water users. DWAF's role, as national custodian, planner and regulator is of critical importance in guiding and overseeing this process. It involves extensive water resources planning, strategic analysis and prioritization.
- *Benefit of scale:* Regional bulk schemes promote benefit of scale which can reduce development and operating costs for local services through improved efficiency, cost sharing and cross subsidization. Limited funding demands cost optimization.
- *Institutional arrangements:* The fact that water resources must be shared amongst numerous communities demands integrated cooperative management at a scheme level. It implies joint interests and

responsibilities between local authorities and other sector institutions, which is best managed at regional or partnership level.

- *Financial aspects and viability:* Many municipalities are not able to finance and operate large schemes, which imply that many regional infrastructure schemes are either not implemented or are poorly managed. To implement and operate such projects requires alternative funding mechanisms and specific institutional arrangements.
- *Extended implementation options:* Regional bulk services are often better suited for alternative implementation mechanisms such as engineer-procure-construct (EPC), Public Private Partnership (PPP) or build-operate-train-and-transfer (BOTT) contracts, which can introduce cost savings through economy of scale and implementation efficiencies.
- *Sustainable management:* Regional bulk infrastructure development goes beyond the immediate drive and focus of the basic services needs. It also includes sustainable management of bulk infrastructure and service quality through operating efficiency and sustainable water services provisioning. The scale of operations allows for procurement of suitable skills and capacity or the introduction of institutional support through outsourcing.
- *Risk management:* Regional sharing of water resources increases the assurance of water supply. Improved management and operation can further reduce the risk of service interruptions and increase quality of service (e.g. drinking water quality) subject to proper institutional arrangements and management.

Conclusions

It has been shown that in South Africa, in order to provide water and sanitation services which are responsive to the needs of its people, there is a need to implement an appropriate range of small and large infrastructure. The time has arrived to move beyond a narrow focus on large bulk water supply schemes which provide the water to the WSAs who then distribute it in the communities.

Consultation techniques like SWELL have been developed with the specific purpose to enable municipalities to work out, with households in the villages, what their full range of water needs are in terms of quantity, quality and reliability of supply for the different uses. What is needed now, is the adjustment of existing planning tools, guidelines and financing mechanisms to encourage the uptake and implementation of an appropriate range of water supply solutions.

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