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The WRC operates in terms of the Water Research Act (Act 34 of 1971) and its mandate is to support water research and development as well as the building of a sustainable water research capacity in South Africa.

TECHNICAL BRIEF

# Water conservation

## Compendium of water conservation and water demand management interventions

A completed WRC study has collected case studies relating to water conservation and water demand management (WC/WDM) interventions at the municipal level in South Africa.

## Background

Water is crucial for the prosperity and growth of any country. This is especially true for South Africa, which as a developing country, faces multiple challenges to water supply. These include pending water stress, growing and urbanising populations, socio-economic imbalances of the past, widespread poverty, geographically skewed availability and demand, changing weather patterns and persistent drought in many parts of the country.

As a result of the infrastructure intensive supply systems needed at a national, regional and local level to deliver water to end-users, many municipalities across the country are struggling to sustainably meet consumer demand. The dichotomy is that while municipalities are struggling to meet demand, water losses are at an all-time high, with non-revenue water estimates of around 35% of system input volume for the country as a whole. Much of this loss can be attributed to leakage and losses in both the network and on consumer properties which, in many areas, are not unaccounted for and represent a revenue loss to the municipality.

## Need for WC/WDM

The need for demand-side interventions that effectively reduce physical losses in water networks, artificial demand at the end-user level created through leakage, as well as apparent losses due to metering and billing deficiencies is abundantly clear.

In response to this need, municipalities have initiated interventions, programmes and projects to reduce the demand for water with varying levels of success. Aimed at identifying, documenting and disseminating the experiences of municipalities in WC/WDM, the WRC directed the development of a Compendium of Case Studies relating to WC/WDM at the municipal level in South Africa, presenting 40 case studies in an anecdotal easy-to-read format. The presented case studies highlight not only best practice in the industry, but also less effective approaches that can potentially achieve greater effectiveness through improved management and implementation.

The Compendium is aimed for use as a tool to identify, conceptualise, formulate and implement initiatives based on case studies presented that effectively address WC/WDM and reduce water wastage.

## Methodology and approach

The basic approach followed was to identify WC/WDM interventions within the municipal water-supply sector, then, where possible, interview municipal officials, followed up with as much research on the project as possible.

A set of selection criteria was set in order to discern which case studies should be prioritised for further research, namely:

- **Extent of success**: focus was given to projects that have achieved water savings. Projects that have had a lot of energy and synergy and then have failed could be considered to understand why the project failed, but interventions that did not even get off the ground were not considered.
- **Availability of information**: The extent and availability of information was an important part of selecting and compiling a case study.
- **Access to information**: The granting of permission to access the information.

- **Intervention focus area representation**: A spread of a variety and representation of interventions documented as case studies across the different types of focus areas within the water-supply sector.
- **Diversity of the case study**: The diversity to the same type of intervention.
- **Innovation of intervention**: Interventions that have viewed or found unique approaches to addressing WC/WDM.

Types of interventions identified to potentially include in the Compendium were, among others, financial and pricing strategies, non-revenue water strategies, metering, logging of consumption, bulk line repairs, leak repairs, pressure management, network repairs, marketing and awareness campaigns, commercial and small industries set within or in conjunction with urban areas, communication and awareness, home and garden water efficiencies, reuse and recycling, management of illegal connections, and rainwater harvesting.

The aim was to contact as many municipalities as possible. If potential case studies were identified, a face-to-face interview with staff of the municipality was arranged and conducted so as to obtain as much information as possible and so as to gain an understanding of the implemented intervention. Close on 30 municipalities were consulted as part of this process. After intense scrutiny and investigation, 40 case studies were eventually included in the Compendium.

## Presentation of case studies

In order to allow for easy referencing and improve the readability of the Compendium, case studies have been categorised into the following broadly defined sections:

- Technical interventions
- Financial interventions
- Institutional measures
- Behavioural change

Some case studies document projects that incorporate a multi-faceted approach to implementation, including components in a number of listed categories. In such instances a case study has been categorised based on the department within the municipality most responsible for implementation.

### Technical interventions

Although WC/WDM cannot be viewed purely as a technical function due to the cross-cutting nature of municipal service delivery, it remains at its core a technical exercise. This can best be explained in terms of the extensive infrastructure required to deliver the physical element of water in large quantities to thousands of consumers through an extensive network consisting of primary and secondary pipes, storage reservoirs, water towers, pump stations, consumer connection pipes and water meters, among others.

*Physical leak detection using leak detection equipment.*

The largest majority of case studies documented in the Compendium are technically oriented interventions implemented by technical departments of the municipality, aimed at providing a technical-type solution to the problem at hand (which may or may not be technical in nature).

These technical case studies include aspects such as infrastructure, pressure management, on-property leak repairs, water reuse and end-user metering.

### Financial interventions

In terms of the delivery of water and sanitation services at a municipal level, a strong link exists between WC/WDM and financial management. Typically, the better delivered services are managed in terms of metering, billing and revenue collection functions, the lower the demand for water will be and the need to intervene or change the status quo.

By implication then, financial interventions can be extremely effective in reducing excessive water demand and any


*An awareness campaign presentation.*

WC/WDM programme implemented by a municipality should focus on financial issues such as tariff formulation and structure, meter reading, financial management and enhancement, accuracy of metering and billing data, asset management and even credit control.

Almost all documented case studies in the Compendium have a financial component to them. Some intervention types, such as prepayment metering, have both a technical and financial intervention component to them.

## Institutional measures

Municipalities exist as third-tier government institutions with a specific mandate to deliver services to resident communities and end-users. They are usually large and complex organisations employing hundreds or thousands of officials and workers. Often the volume of water used by the municipality itself can be considerable and usage by other government departments, institutions and entities can be of equal or even greater proportion.

The complexity of the organisation and its bureaucratic processes can hinder and distract from service delivery and make managing water demand extremely difficult. Therefore, institutional arrangements in relation to WC/WDM are important and case studies that highlight institutional planning for WC/WDM, institutional water use, policy, alternative service delivery mechanisms and the adoption of austere water restrictions during a severe drought have been documented in the Compendium.

## Behavioural change

Programmatic approaches to WC/WDM should include initiatives that are aimed at modifying behaviour of the end-user towards water and water use. This is even more critical in the national context relating to water stress and future scarcity.

These could include changing attitudes towards water and its perceived value, changing habits relating to water use, changing habits relating to water use, encouraging the use and uptake of alternative technologies that can lead to water savings as well as education and awareness campaigns. These are in addition to interventions aimed at transferring ownership of plumbing fixtures and consumption to the end-user, such as improved metering and billing.

A selection of case studies that document successful approaches to behaviour modification are presented in the Compendium. These include public campaigns, customer education drives, individual metering as opposed to bulk metering of apartment buildings and rainwater harvesting.

## Conclusion

A key challenge in planning for future economic growth and social upliftment in South Africa is ensuring efficient use of water supplies and reducing water consumption through improved management of demand for water. This notion also recognises that the eradication of poverty cannot take place without water.

Case studies demonstrated in this Compendium abundantly demonstrate that it is possible to reduce water demand of municipal customers through carefully managed interventions, and in so doing also achieve greater financial efficiency, reduce non-revenue water and improve operation and maintenance procedures.

**Further reading:**
To order the report, *Compendium of water conservation and water demand management interventions and measures at the municipal level in South Africa* (**Report No. TT 519/12**) contact Publications at Tel: (012) 330-0340, Email: orders@wrc.org.za, or Visit: www.wrc.org.za to download a free copy.