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Implementation

BULK SUPPLIERS OF POTABLE WATER

By: P. Pybus & H. Buckle

Guideline
3 of 9



Building Awareness and Overcoming Obstacles to Water Demand Management



275-05BU-18718

The guidelines in this series are:

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- 2. Bulk Suppliers of Untreated Water**
- 3. Bulk Suppliers of Potable Water**
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The IUCN-RoSA (World Conservation Union-Region of Southern Africa office) managed a Water Demand Management (WDM) programme between 1997 and 2002 to study WDM practices and applications within the SADC member states. These studies indicated the urgent need for improved water resource and supply management in much of the region and the broad potential of WDM to be an important tool in achieving this aim.

Currently, IUCN-RoSA is committed to sharing the knowledge gathered in the studies to promote the adoption of sound WDM practices as a method of accelerating effective water resource and supply management throughout the region. These guidelines on Building Awareness of and Overcoming Obstacles to Water Demand Management are a part of IUCN-RoSA's WDM sharing initiative.

They have been written by a multi-disciplinary team assembled from several countries in the SADC region.

The guidelines comprise 9 separate booklets, aimed at all the people who can influence WDM outcomes or who should be responsible for actively promoting or implementing WDM, within different water management, supply, and user sectors. Since every water user and water resource or supply stakeholder can improve the quality of life for him/herself or others, by ensuring WDM plays an important role in his/her planning and actions, related to water management and usage, one or more of these booklets has been written with you in mind. The titles are listed on the inside of the back cover, Check the titles, see which apply to your situation, and obtain copies. They will help you to do your job better.



In these guidelines, WDM includes all actions that improve the efficiency and equity of water use. Efficient water usage includes using water in a manner that minimises pollution. Thus, WDM is not about getting poor people with insufficient water to use less, but about, all users, using water wisely so that everyone has sufficient water. In this context, WDM is seen as an integral part of Water Resource Management (WRM) and Water Supply Management (WSM).

When implemented effectively, WDM will:

- Reduce water supply costs per unit volume, whilst assisting to create more financially sound water supply institutions, through:
 - Postponing the development of new sources;
 - Reducing water wastage; and
 - Equitably reducing unpaid water bills.
- Ensure the delivery of sufficient water to meet the reasonable demands of all users, for domestic and productive water, at a reasonable cost in both water abundant and scarce areas, whilst assuring ecological sustainability, or, in the few situations where this is not practical, WDM will maximise equity and minimise deprivation.
- Improve the assurance of supply through ensuring that the demand does not exceed the yield of the source.
- Prepare users and supply institutions to manage with less water as scarcity arises, through population increase, general development or climate change.
- Prevent continuous serious water pollution.

By definition, WDM, on balance, always produces positive outcomes. However, effective implementation requires:

- A good knowledge of current demands and usages;

- Planning and resources to introduce behavioural change within well-managed time frames; and
- Communication with other stakeholders upstream and downstream of your place in the water supply/usage chain.

These guidelines have been produced to assist you to plan vital WDM programmes and to motivate your superiors, colleagues, and other stakeholders to support you, as required. They do not contain detailed advice on each WDM option, but they do indicate where further information and help can be obtained.

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Abbreviations and Acronyms

BSoPW:	Bulk Supplier(s) of Potable Water
ILCP:	Integrated Least Cost Planning
MDGs:	Millennium Development Goals
SADC:	Southern African Development Community
UAW:	UnAccounted for Water
WDM:	Water Demand Management
WCM:	Water Cycle Management



1.1 Target readership

This Guideline is directed at bulk suppliers of potable water (BSoPW) in the SADC region. A secondary readership group is the users of water supplied by these agencies. Due to the range of conditions in southern Africa, the bulk supply of potable water may involve more than one agency. This Guideline, therefore, aims to highlight the benefits of WDM to all agencies and users of potable water. Some of the agencies and role players that may be involved with the bulk supply of potable water are listed below.

1.1.1 Water allocation agencies

In the SADC countries, National Government is generally responsible for the allocation and supply of bulk raw water. It, therefore, has the ultimate responsibility to ensure that it is distributed equitably and that it is used efficiently. For this reason, it should be the

leading body ensuring the adoption of WDM strategies down the supply chain.

This can be effected by securing the cooperation of all the users through the supply chain and providing information, encouragement in the form of information, publicity for the best performers and providing guidelines using, for example, the current series.

There is also the duty of auditing and, where the legislation provides, of regulating water supplies, to make sure that WDM targets are being met.

1.1.2 Bulk suppliers of potable water

There are different groups within a bulk potable water supplier organisation that need to be informed of the value of WDM and the strategies that are involved in implementation.

WDM is a powerful strategy that must be promoted from the highest level. Failure at this

level will mean that the groups that should be responsible for implementation will not do so.

The governing body or more usually the Board of a BSoPW is the highest body in contact with potable water retailers that needs to be fully aware of national WDM policy and results of poor implementation. It should, therefore, keep itself informed of:

- The effects on the bulk raw water tariff of postponing future schemes as the result of a managed demand not rising above the assured yield of existing schemes;
- The short-term unfavourable effect on bulk water tariffs of reduced bulk water sales, as a consequence of the successful implementation of water demand strategies;
- The role that the bulk potable water supplier can play in assisting its own customers as well as the end-users to manage their water consumption and hence maintain the current demand as the number of water users or uses increases; and
- The steps that need to be taken in-house to reduce the losses in the production and distribution of potable water.

The Board will then need to develop a strategy and set targets in conjunction with all the stakeholders for the management of water demand, keeping in mind the full social, economic and environmental value of water and the need to improve the conditions for those who currently do not have sufficient.

The senior professional officials in bulk potable water supply organisations have a dual role to play.

Firstly they should inform the members of their Board of:

- The importance of managing demand in order to be able to postpone capital expenditure for both the infrastructure of the bulk potable water supplier and perhaps, more importantly, for

augmentation by others of the raw water supply source;

- The effect that reduced sales, if such occurs, would have on the revenues of the bulk supplier and hence on the tariff. It is anomalous that if the demand reduces for any extended period, the bulk tariff may have to increase for a time, although total costs and charges should be lower;
- The effect that postponing the augmentation of the raw water supplies will have on keeping tariffs from rising;
- The state of the infrastructure of the bulk potable water supplier and the measures that need to be taken to reduce internal and bulk distribution losses; and
- The need to engage all the stakeholders and customers in pursuing various WDM measures depended on the total current, the future demand, the need to improve equity and the capacity of current raw water resources and other water delivery and wastewater collection and treatment infrastructure.

In addition, the senior professional managers will need to develop strategies and tactics for the implementation of various initiatives, including:

- The measures to prevent leakage from the bulk potable water suppliers system;
- Measures to assist the customers, which may be municipal, industrial or mining to plan and implement WDM;
- The practical assistance to customers that do not have the necessary knowledge or skills base to implement the measures;
- The actual implementation of the measures where there is a lack of capacity to do so.

This will generally be the smaller municipalities and, in certain instances, mining or industrial enterprises;

- Publicity concerning WDM measures, to inform users and enlist their support for programmes

through the creation of forums, newsletter and fact sheets; and

- Developing financial strategies to overcome the diminution of the cash flows that result from reduced bulk sales. Except for when there has been a serious drought or an existing resource has been seriously over exploited, if WDM implementation is well managed the financial position of retailers improves, as they reduce unaccounted-for-water (UAW) and improve credit control.

Planning staff can cause a major problem if they are not kept fully informed of WDM initiatives or if they do not understand or acknowledge their effect on long-term future demand. There are few things worse than planners using current trends to predict future demand, at a time when retailers and end users have agreed to implement WDM. Such planning would cause unwanted new bulk resource augmentation and supply infrastructure to be built causing, in turn, unprecedented tariff increases due to the poor utilisation of the new infrastructure.

Operational staff need to examine the intake system, the raw water pumping, the water treatment plant and the potential for wash-water recovery, and then on the delivery side they need to ensure that there is minimal leakage from the delivery pipes and that measures are in place to prevent overflow or leakage from the terminal reservoirs.

The same operating staff may also be called upon to advise and help implement water management measures for the bulk supplier's customers. This is very important as it is at the retailing end of a water supply system that the greatest savings can be made. This system includes the retailer's individual customers who can be contacted through a bulk supplier's forum and other media.

1.2 Aims of the Guideline

This Guideline aims to reduce the constraints currently impeding the adoption of best WDM practices by raising awareness and establishing a knowledge base that encourages timely implementation. The intention is not to present BSoPW with more obstacles to development, but to promote the adoption of WDM as a key feature of more equitable sustainable development in the region. By doing so, it is hoped that BSoPW will recognise the financial and efficiency benefits of WDM to themselves and their customers as well as the improved longer-term water security.

The Guideline is intended to assist, in conjunction with the other guidelines in the series, in:

- Identifying appropriate and feasible WDM options for bulk suppliers of potable water;
- Raising awareness and providing a knowledge base that can be used directly by bulk suppliers of potable water, and by them in their interaction with water retailers and the retailers customers;
- Identifying opportunities where WDM can be implemented to best advantage; and
- Providing examples of water demand management programmes for bulk suppliers of potable water.

1.3 Guideline limitation

It is important to realise that this is only a guide to building awareness and knowledge of WDM. It does not purport to be a "how to" manual or a code of practice. Although certain techniques are mentioned, such is the variety and range of possibilities, that it would be impracticable to cover all eventualities.

The Guideline is also drawn up in conjunction with other guidelines covering municipal, industrial and mining consumers. In this

regard this guideline concentrates on techniques that are least dealt with elsewhere.

While figures demonstrate the scope for potential actions and the benefits; the information does need to be adapted to each country's and company's specific situation. The Guideline does not go into lengthy technical detail about procedures such as how to do pressure management, for example. Rather its aim is to make stakeholders aware of these measures,

and to indicate how to find more information about them.

There are certain constraints to WDM implementation by BSoPW. They can overcome some of these directly themselves, but others lie outside their control. However, being placed close to the beginning of the man-made water cycle, they are in an advantageous position to create awareness, and to advocate and motivate others.

Box 1 details the responsibilities of the various decision makers.

Box 1: Responsible agents for overcoming the results of various poor water management practices

Results of poor management practices	Responsible agent
Runaway water demand causing unnecessary additional resource development and runaway costs which are not matched by the rise in income of many retail service providers because of customer disaffection and affordability problems.	Others
The weak and, sometimes, deteriorating financial position of retail water services providers.	Others, including national governments and donor funders
The weak skills capacity of many retail water services providers.	Others
A lack of integrated planning between role players.	Whole industry
Too little or no information on unaccounted-for-water (UAW).	Own and others
A general lack of user awareness creation and education among all stakeholders: politicians, consultants, service providers, users, and the youth.	Whole industry
Poor decision making by political and senior public servants leading to unnecessary interference in the affairs of services providers.	Others
Poor decision making or lack thereof.	Own and others
A lack of information on current consumption and future demand.	Others
Little or no WDM implementation strategy.	Own and others
Reduced revenue for the bulk suppliers of water due to lower water sales because retailers have instituted UAW and/or credit control.	Others
No WDM champion.	Own and others
Not enough understanding of WDM and related issues.	Own and others
Very little information is available on the social and economic status of the water users.	Others
Substandard maintenance on water reticulation systems.	Others

To overcome the constraints to the implementation of WDM that lies outside their control, BSoPW need to integrate their strategies with those of the whole sector. If one studies the table, the fact is that a fair number of the constraints to WDM implementation lie with “others”. This makes integration of efforts throughout the water cycle essential.

Box 2: Powers of water utilities to promote emergency WDM

In the event of a shortfall in the availability of water due to climatic conditions or other disaster outside the control of a service provider, or during maintenance, a service provider may:

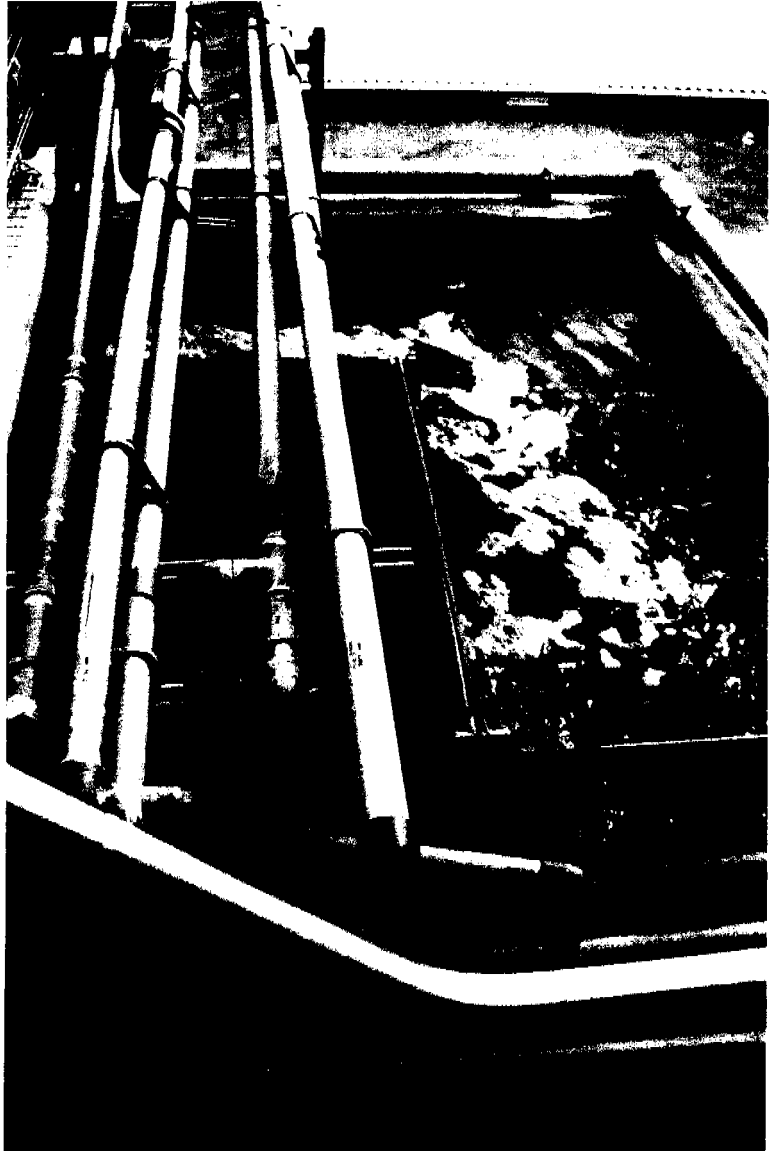
- Ration supplies;
- Restrict the hours of supply;
- Terminate supplies to non-essential users and to other users for non-essential uses;
- Levy additional consumption charges for non-essential water consumption to reduce usage; or
- Modify their normal operating procedures.

Source: Consultancy to review Water Demand Management programme for Southern Africa: phase II Zambia, Dr Imasiku A Nyambe et al, May 2002

There is a hierarchical chain of water supply. Raw water is obtained from either underground or surface resources. It is then treated and made safe for use before distribution to a retailer and then to individual customers. These customers may be individual households, large factory complexes, or other industries, including mining. The water may be treated by an individual retailer, but this is normally undertaken by a regional BSoPW.

It is common for national governments to take responsibility for the provision of the bulk raw water. There are a number of reasons for this. The cost of augmenting raw water supplies is becoming ever greater as convenient resources become fully committed to existing customers and the augmentation schemes must be ever larger and more distant from the point of use. However, it is better for national governments to break this inefficient cycle by setting up strong regulatory institutions that ensure the

equitable allocation of the water as between users and the objective evaluation of WDM options before allowing any augmentation to take place. Thereafter, national governments can



Background



support the provision of bulk raw water supplies, rather than being directly responsible.

Next in the hierarchy are the regional BSoPWs, which usually receive the raw water from an independently developed resource, whether surface or subterranean. The regional BSoPWs will supply to retailers, separate stand-alone large industries, mines and, occasionally, potable supplies to individual farms.

The retailers are the main distributors of potable water to individual households, industries and business within the municipal areas. They often operate vast reticulation pipe networks, which stretch many thousands of kilometres in length. They generally sign a contract with the BSoPW. A good contract will oblige the retailer to terms and conditions that include stringent WDM targets.



Arising from the foregoing there is a great deal the BSoPW can do to initiate WDM in their areas of supply. As regional authorities they generally have access to greater resources than their customers. This applies to both human and financial resources. They are, therefore, in a good position to lead any initiative to introduce and engage in WDM, not only within their own organisations, but also with their customers and the users of water.

The first major reason for implementing WDM is to be able to supply all reasonable demands without placing too much stress on easily exploitable water resources. Creating improved equity is often a central need in supplying these demands. Since many of these new customers will be poor, increased efficiency is essential for providing services that are nationally affordable. Among other requirements, this entails ensuring that all water suppliers and users manage water efficiently.

A second reason is to minimise expenditure on developing new resources, a long-term strategy. A third reason is to postpone expenditure on expanding the infrastructure associated with bulk suppliers of water services. These needs for WDM will be dealt with in the order they occur in the supply chain.

3.1 Bulk Suppliers of Potable Water

The most significant losses come from the de-sludging of settling tanks and clarifiers and then from the filter wash-water. It is normal practice to recycle as much of this water as possible. Each may be treated separately or in combination.

Two methods are available for the handling of the filter wash-water. The first is to recycle it directly to the head of the works. This is not the best practice, as the sporadic increase in the rate of water entering the works, with a sudden increase in suspended solids causes upset to the dosing, and the coagulation and

flocculation. In addition, there is the danger of recycling pathogenic bacteria that have not been enmeshed in the floc.

Under normal operating conditions, the volume of raw water entering the works will be relatively constant and can be measured. Storage volume should be provided on the basis of these measurements to smooth out the load that will be applied to the sludge de-watering system and, at the same time allow a slower rate of return of the supernatant liquid to the head of the works. The volume of the storage should be sufficient to cater for periods of high raw water turbidity when the volumes of sludge and wash-water will be higher.

The storage tank can be operated as a batch settler, or can be used to balance the flow to the thickeners, which would be operated at a steady rate. In either case, a substantial portion of the wash water can be recovered.

The systems should be properly designed, both to ensure that the sludge can be disposed of in an environmentally satisfactory manner, and so that the wash-water and the clarifier underflow can be recovered.

The next most significant point of loss is that of reservoir overflow as a result of over pumping due to inaccurate telemetering equipment or of faulty valves that do not seal. The latter is more relevant for gravity feeds to the reservoir.

Tests should be conducted to check the cut-off point for the pumps to ensure that over pumping would not occur. In addition, the reliability of the telemetry equipment should be checked from time to time, to ensure that it is working correctly and that no false information is being transmitted.

It is also prudent to install an alarm in the overflow of every reservoir to indicate and record whenever an over flow occurs.

Pipelines are a potential source of leakage. Periodic pressure testing should be undertaken to ensure that there are no leaks. In addition, the routes of the pipelines should be walked regularly to see if there are any wet patches caused by leaks. If any do appear, they should be attended to immediately. During the course of these walked inspections all valve chambers should be opened up, to check for leakage at the valve installations. The slightest sign of leakage should be attended to as soon as possible. Gland leakage can be stopped during the course of the inspection. It should be noted all leaks cause greater losses than one would expect and that small leaks will grow into major leaks.

Bulk water services providers need to be in a position to deal with any emergency that may arise in the form of a burst pipe. As well as

wasting water, such bursts can quickly lead to serious environmental damage and to interruptions in the supply of water to customers. Apart from these serious direct consequences of a pipe burst, it also presents a very bad example to the public if any significant burst or leak is allowed to continue.

3.2 Possible financial implications of implementing WDM

Bulk suppliers of water services should be aware of the possible negative financial implications of water retailers implementing WDM. As retailers reduce their demand through the successful implementation of UAW reduction and credit control programmes the sales of bulk suppliers will drop unless there are new customers to be supplied with water at the same time, which is often, but not always, the case. The recurrent



costs of bulk suppliers of untreated water are practically constant until a loan has been paid off. The recurrent costs of BSoPW will reduce if sales drop, but up to 80% of costs are likely to remain constant. Thus, ironically, bulk water suppliers are likely to have to make compensating adjustments to their operating efficiency or tariffs if sales drop.

The successful implementation of emergency drought demand reduction strategies will also reduce sales. This is normally not a major problem to bulk suppliers, as such, emergencies rarely last more than 12 months, provided schemes are reasonably well designed and managed, and they are usually able to impose temporary tariff increases to the top end of the demand to force a reduction. However, in such cases, bulk suppliers should place as much of this tariff increase proceeds in a special fund for future innovative WDM pilot projects carried out by their customers. Rand Water, South Africa's largest BSoPW, did this after imposing punitive top end of demand tariffs during the 1992 – 93 drought. These projects are described in a booklet, ISBN 0-620-29503-1, titled *Leakage Reduction Projects Undertaken by Rand Water* published jointly in August 2002 by the UN Habitat programme for Managing Water for African Cities, Rand Water and the authors WRP.

However, in the long term, financial challenges will not come from reduced water usage, but from the many poor water management practices reported in Box 1. To those challenges must be added a central aim of WDM: to increase the availability of water cost-effectively to more users, through more equitable, efficient and eco-friendly allocation and usage. The equity portion of this objective refers to making both domestic and productive water available to the poor. Unless the SADC countries, together with the international community, make dramatic gains in income

poverty reduction throughout the region, this is, in fact, a double challenge, because fulfilling it successfully requires retailers to improve their efficiency to enable them to supply water to an extended customer base where affordability is a real issue for a larger proportion of customers, while, at the same time, the average quantity of water delivered per customer is reducing.

Increasingly, retailers are going to discover that relying on high sales to a minority of rich customers is not a sustainable option either as the total demand for water increases, causing sustainable yield of local water sources to be exceeded. These customers will also have to manage their water use more efficiently to create a new untapped source, and the retailers will have to increase their operational efficiency to keep costs down, whilst maintaining the integrity of their infrastructure and the quality of their services to all customers, not just the rich.

It is in the interests of both bulk suppliers of water and national governments to ensure the financial position of water retailers is strong: for bulk suppliers, so that retailers do not default on their payments; for national governments, so that retailers satisfy a basic right of the poor on which their general welling so fundamentally depends. In poor areas where cross-subsidisation is not an option, national or donor sourced subsidies to help retailers cover all recurrent costs are already needed. As already implied, if poverty is not significantly reduced in the SADC countries, these subsidies will have to be increased gradually with time, as retailers are forced to ensure that the rich do not waste water to manage total demand. Scenario 1, from box 1, graphically describes how the situation will be much worse if WDM options are not adopted.

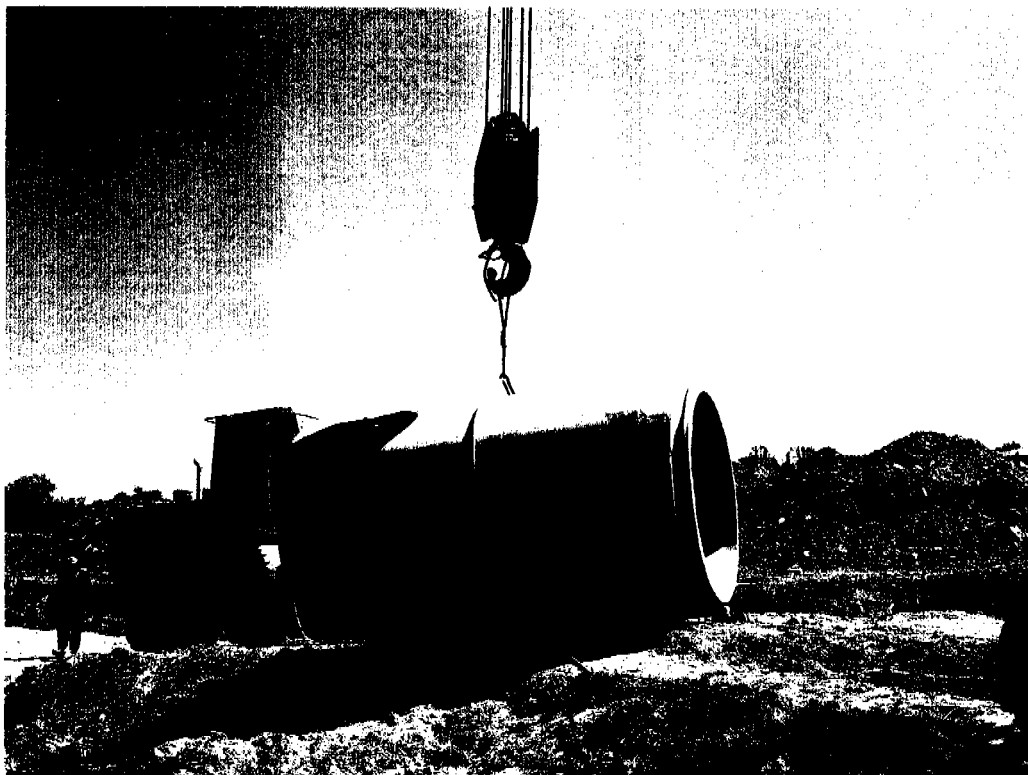
Another difficult task for BSoPW is the prediction of future demand. This applies to predicting the short-term and the long-term

WDM action plan



demand that is required for planning infrastructure extensions. The factors that will influence this are:

- The extent to which WDM affects demand, in both the short term and long term;
- The effect of the HIV/AIDS pandemic on the demographics of the area;
- The effects of government policy with respect to the relative prioritising of rural and urban development;
- The effect on the tariff of postponed or implemented infrastructure developments;
- The effect of WDM awareness creation initiatives; and
- The effect of reduced demand on the need for future expansion. In this regard, this is the most difficult decision as the demand for the next 15 years or more will need to be predicted. The sustainability of the reduced



- The effects of retailers responding to the water and sanitation Millennium Development Goals (MDGs) by increasing the coverage or levels of service in poorly supplied areas;
- The effects of altered pro-poor and pro-WDM tariff structures;

demand and the changing demographics also need to be considered.

It is very hard to forecast in conditions of uncertainty, but good communication between stakeholders helps to reduce those uncertainties, and the predictions will have to be made and



incorporated into a business plan for the bulk water services provider. The business plan would then have to be reviewed annually and the assumptions on which the predictions have been made need to be assessed and amended as necessary, with corresponding changes to the business plan.

The financial viability of BSoPW depends significantly on the accuracy of demand predictions. A single wrong decision with respect to investing too early to increase the capacity of a BSoPW's infrastructure can cause detrimental financial problems to continue for many years. On the other hand, investing too late can cause equally serious problems for both industrial and domestic end users. If people want affordable quality services, there is a need for them to plan effective WDM together and involve planners in their decision-making processes. Thereafter, planners need to be able to forecast demands accurately to allow bulk suppliers of untreated surface water sufficient time to develop new storage facilities in a manner that takes into account the probability of drought conditions while the "first fill" is taking place.

It is important to realise that WDM happens at the technical, social and political levels, and all stakeholders need to be fully involved for a WDM programme to succeed. Box 3 focuses on one of the stakeholders, municipal councillors,



who in SADC generally have the responsibility of ensuring the delivery of quality water supplies to the people that elected them. It uses Rand Water, a BsoPW to municipalities in and around Gauteng Province, South Africa, to illustrate what should be done with respect to the BsoPW-politician interface.

Box 3: The place of politicians in the planning of a WDM implementation programme

When an agreement project is entered into to assist a municipality's retailer to implement WDM at a technical level, the responsible political body, the Council of the municipality, needs to be informed and empowered to take informed decisions and to support the initiative. In the case of social aspects of WDM, funds must be made available to do the interventions. Too many times these aspects are neglected due to the responsible politicians not having the knowledge, motivation or funds to take the task seriously and because of the incredible challenges they face in supplying all their constituents, including poor households with adequate services. Thus the first point of awareness creation needs to illustrate how WDM can assist them in this task.

For WDM to succeed, a strategy must be drawn up and offered to a municipality to debate. Councilors need knowledge to make informed decisions. In South Africa, Rand Water has started with the development of interactive courses to assist Councilors to

understand the water sector better, where the less obvious needs are and how to position themselves and other city officials to be able to improve service delivery. One such course has been developed by the South African Institution of Civil Engineers and is on good governance in municipalities.

These courses are to be registered with the South African Qualification Authority, to have additional value attached to it with respect to opening up a career path for the learners.

In the legislative framework, all the political players have a duty to learn about the issues and benefits of WDM in achieving quality services delivery to all. This helped by the direct interaction between Rand Water's most senior staff members and all levels of Councilors from the Executive Committee to Ward Councilors.

Rand Water has set up a whole department to facilitate this interaction.

The bulk water services providers are likely to be in a better position than most of their customers in respect to both the numbers and the experience of their technical staff. This fact should be used in a developmental manner to guide, assist them in instituting WDM practices within their own organisation, but externally as well.

Take leak detection as an example. It is not the purpose of this Guideline to describe such matters in detail. However, the bulk water services providers should be in a position to advise on the following issues in this regard:

- The creation of metering districts;
- The planning and installation of pressure reducing valves;
- The creation of a water auditing system;
- Setting up a system of leak detection;
- Providing logistical support to the above initiatives; and
- Assistance with night flow measurement.

The assistance and advice should not be confined to this aspect or to retail institutions. Help can be provided to industries by assisting them to reduce their intake- and wastewater costs to the minimum through the application of a technique known as 'Pinch Point Analysis'.

In most water using industries, water may be used in different operations and processes on a once through cycle in parallel or in a cascading series feeds. It may also be a combination of the two. In the Pinch Point Analysis, the limits on



quality in and out are determined, together with the mass flow rates. By arranging the different flows in a nominal series it is possible to identify the so-called pinch point, which is the limiting process. The method is specialised and should not be undertaken without the assistance of a competent practitioner unless the bulk water services provider has the necessary in-house expertise.

The method should be studied as it is:

- Rigorous;
- Transparent;

- Methodical; and it results in
- Minimum water usage and wastewater discharges;
- Establishes the principle that water should be renovated from above the pinch point, where the quality is poorer; and
- Indicates where water streams should be combined, renovated and recycled.

(For details of the method, refer to Prof. C Buckley of the University of KwaZulu-Natal, in South Africa)





A BSoPW needs to promote structures that encourage sound communication between itself and its customers.

Typical such structures could be:

- Monthly forums where matters of mutual interest are discussed;
- Regular meetings with each municipality on technical, political, social, financial levels, to discuss cooperation and assistance;
- The setting up of agreements between the BSoPW and retailers, pledging cooperation and assistance;
- Meetings where bulk water tariff structures are explained and agreed;
- Establishing WDM targets with each municipality and, thereafter, determining regional water demand goals in an iterative process;
- Follow-up meetings specifically to discuss best estimates of future demands. These meetings must not be used to put pressure on retailers to improve the WDM implementation;
- Discussing with the municipalities the best organisational structure to achieve goals.

The current system, which encourages a silo effect, should be broken down and different departments within the municipalities should be encouraged to attend all the meetings. In this regard, the town treasurer can act as a key figure; and

• Discourage the concept that the water account can be used to subsidise any other activities of a municipality.



Bulk water suppliers should not shrink from introducing new ideas and concepts in order to encourage innovative thinking on the part of the retail services providers and politicians.

Box 4: Institutional aspects identified by stakeholders

- Institutions are largely supply oriented and do not view WDM as part of their mandate.
- There are negligible budget allocations for WDM.
- There is a need for one strong coordinating institution if WDM is to be implemented. A reformed water resources branch or new institution is needed to formulate a water resources management strategy that will include WDM.
- More experts are needed to implement WDM complemented by the training of existing staff.
- There is need to increase capacity of water sector institutions by purchasing modern equipment.
- Information dissemination should be improved beyond current levels.
- Investment in better physical facilities could facilitate the implementation of WDM.

Awareness campaigns, operational policies, the involvement of all stakeholders and incentives are some of the main prerequisites for the successful implementation of WDM.

(Source: Water Demand Management programme for Southern Africa phase II country study report: Swaziland, Emmanuel J. Mwendera et al, April 2002)

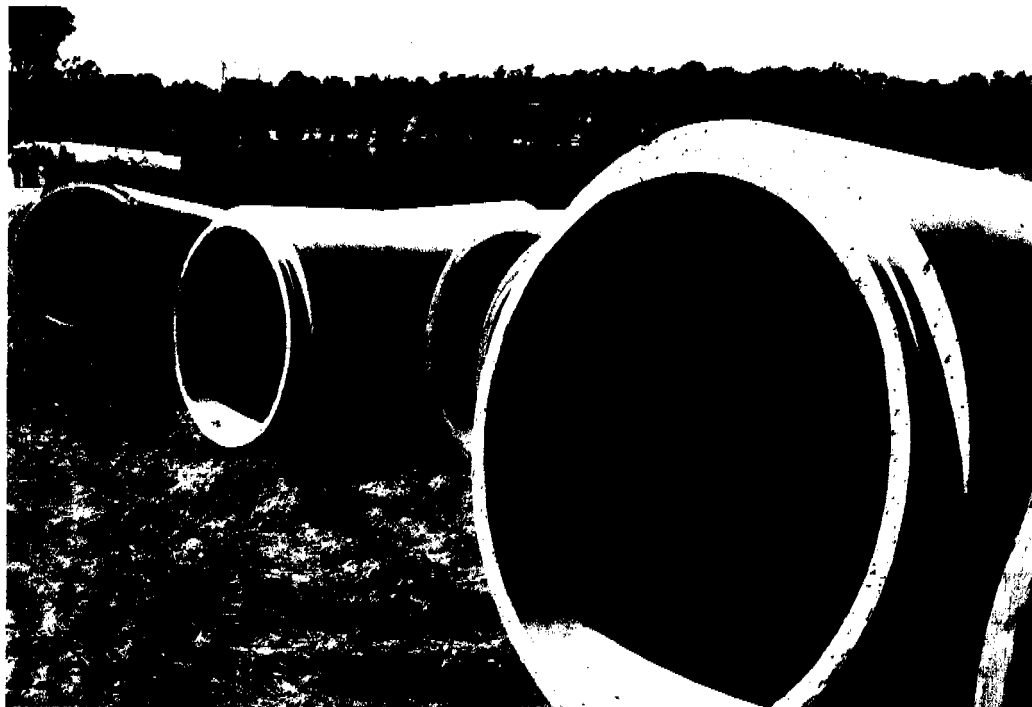
Box 5: The SADC Protocol

The SADC Protocol is one of the multi-lateral agreements envisaged under the 1997 law on non-navigational use of shared waters. Interestingly, instead of promoting equitable and reasonable use, the Protocol promotes equitable use of shared waters. It does not provide much more detail, but rather reiterates commitments to the international law.

SADC's Regional Strategic Action Plan for Water Resources Development and Management (1999 – 2004) is much more detailed and concrete. This plan was expected to be approved at the 1998 summit in Mauritius

The action plan identifies several constraints for regional water development. These are:

- Legal inadequacies: inadequate national legislation, conflicting national laws, and lack of incorporation of regional conventions in national laws.
- Lack of a comprehensive, integrated, river-basin approach in water development and management.
- Inadequate economic incentives for water conservation and management.
- Lack of knowledge, data management, and dissemination.
- Inadequate awareness of the state of water resources. Inadequate human capacity.



- Lack of stakeholders involvement, other than through individual projects.

Women, non-governmental organisations and community-based organisations are important stakeholders, who need more representation. Women matter in water management because they spend a lot of their time on household water collection and are most involved in family sanitation.

The plan intends to offer a regional framework for the development of a comprehensive and integrated approach to water development and management. This requires more human resources and a larger institutional capacity. It also requires the more efficient management of existing and planned infrastructure, which is already devoted to sustainable water management.

The plan's objectives are to:

1. Improve national and regional legal and regulatory framework.
2. Improve national and trans-boundary river basin management.
3. Strengthen linkages between macro-economic, social, and environmental policies.
4. Improve information acquisition, management, and dissemination.
5. Support awareness building, education and training.
6. Promote public participation.
7. Invest in infrastructure and ensure efficient use of water.

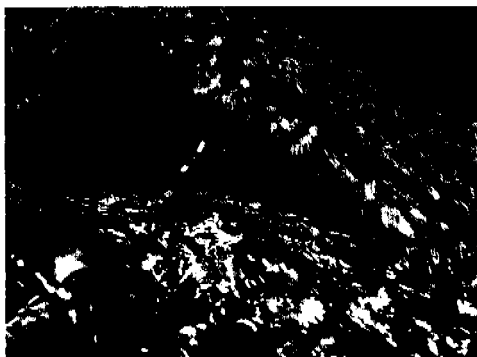
Importantly, the Action Plan sets out guidelines for water pricing. Water prices should be based on:

- Direct and overhead costs of water provision;
- Prices which encourage effective water consumption;

- Prices which encourage efficiency in the allocation of water supply among competing users;
- Prices which are affordable to all households;
- Tariffs that support the objective of encouraging water conservation, thus lowering the demand for additional water resources;
- Tariffs which encourage the protection from pollution;
- Harmonisation of pollution control policies, including joint quality standards; and
- The duty to take remedial action in the event of harmful pollution inflicted on another state (mitigation and compensation).

These considerations explicitly link water prices to WDM and justify water subsidies only to ensure adequate resource access by households. This means that subsidisation of irrigation is considered undesirable.

The Action Plan encourages WDM measures such as water pricing; otherwise WDM is rarely explicitly mentioned. The SADC efforts fall short of calling for the development and harmonisation of comprehensive national WDM efforts, as it could be a logical follow up of the international law and SADC's Protocol.



Box 6: Findings of the Botswana country study on WDM

The broader analysis of a WDM study in Botswana yielded additional important findings. First, the water management structure in the country is fragmented and inadequately coordinated. Parallel formal and informal water sectors exist. In the former, many institutions are involved, but usually one institution holds the monopoly of water supply. In the latter, consumers have to secure their own supply and no incentives exist for WDM. Because of the fragmentation and inadequate coordination, it is almost impossible to practice *comprehensive water planning in districts or catchment areas*. Second, the attitude within central and local government is still inclined towards the supply side. This attitude has been encouraged by donor support and favourable macro-economic conditions. Both conditions facilitated large investments in the expansion of the water supply.

Mounting concerns about the ecological sustainability and rising supply costs are the reasons why WDM is only slowly penetrating into plans and activities. Third, regional and international, conventions, which have been signed by Botswana, constitute a direct incentive for WDM. For example, the amount of water that may be extracted from shared water courses is determined, *inter alia*, by the extent to which Botswana has exhausted domestic water resources and its practice of WDM.

Moreover, the extractable amount is restricted because environmental use is recognised as a major form of water use. In other words, Botswana cannot extract water if it is at the expense of the environment. Fourth, there is a lack of planning capability at the central and local government level. While the preparation of the BNWMP was a wise and timely move, it has not been followed up by systematic monitoring of trends in water consumption and supply in districts and at the national level. Moreover, it has not led to the establishment of a water statistics unit/bank, which could strengthen water management.

The study showed that many data exist and with the required compilation and analytical efforts could guide water management. Fifthly, the scope for WDM is increasing with the expansion of formal supply systems and the establishment of sewage systems in urban areas and large villages. Potential areas for substantial WDM successes are:

- Recycling of effluent in Gaborone and other large settlements;
- Reduction of water losses in reticulation systems; and
- Rainwater harvesting.

Source: Botswana Country Study, Phase I of IUCN Southern African WDM project, J W Arntzen et al, June 1999

Further reading

6 FURTHER READING

- Arntzen J W et al, June 1999. 'Water Demand Management Botswana country study' Analytical Paper, IUCN Regional Program for Southern Africa
- Buckle H, et al, 2002. 'Illustrating the benefits of Water Demand Management' Research Study 5, IUCN Water Demand Management Phase II
- Gumbo, B et al, May 2002. 'Urban water demand management in Southern Africa: Information management system for implementation and monitoring'

7 USEFUL ORGANISATIONS AND WEBSITES

- Rand Water, URL: <http://www.randwater.co.za>
- Umgeni Water, URL: <http://www.umgeni.co.za>

- Thames Water, URL: <http://www.thameswater.com>
- International Water Organisation, URL: <http://www/iwa.com>
- American Water Works Association, URL: <http://www.awwa.com>

8 GLOSSARY

Integrated Least Cost Planning

It there was one 'owner' of the entire infrastructure required to provide water and that 'theoretical owner' had the skills and knowledge to make the optimal decision (least cost to the end consumer), what decision would they make?

