



Department : Water Affairs  
and Forestry

# Integrated Water Resources Management



**Guidelines for Water Conservation and Water Demand Management**  
Executive Summary



**DEPARTMENT OF WATER AFFAIRS AND FORESTRY**

**INTEGRATED WATER RESOURCES MANAGEMENT**

**GUIDELINES FOR WATER CONSERVATION AND WATER DEMAND  
MANAGEMENT IN WATER MANAGEMENT AREAS AND IN THE  
WATER SERVICES SECTOR, SOUTH AFRICA**

**EXECUTIVE SUMMARY**

**DANIDA**  
FUNDING AGENCY

**Edition 1**

**March 2004**

**TITLE:** GUIDELINES FOR WATER CONSERVATION AND WATER DEMAND MANAGEMENT IN WATER MANAGEMENT AREAS AND IN THE WATER SERVICES SECTOR, SOUTH AFRICA: (3 VOLUMES)

EXECUTIVE SUMMARY

**FUNDING AGENCY:** DANIDA

**CATEGORY:** Guideline

**PURPOSE:** To assist in planning water conservation and demand management measures, in accordance with national strategy, across all water use sectors, at a water management area level (Volume 1)  
To assist in planning water conservation and demand management measures in the water services sector, so as to reduce non revenue water, improve service efficiency and service delivery in a water services institution (Volume 2).  
To assist in implementing and sustaining water conservation and demand management and related efficiency measures in a water services institution (Volume 3).

**TARGET GROUPS:** DWAF and CMA managers responsible for water resources, water utilisation and water allocation (Volume 1). Managers in Water Services Authorities and Water Service Providers (including bulk supply providers), who are responsible for the planning new or improved water services; or who are responsible for managing the operation of infrastructure and meeting service delivery objectives (Volume 2). Technical and other staff who are responsible for implementing and sustaining water conservation, demand management and related efficiency measures (Volume 3).

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## INTRODUCTION

The National Water Act (Act 36 of 1998) recognises that effective water resource management can only be achieved if all water resources are managed in a holistic manner. To achieve this, the Department of Water Affairs and Forestry is developing integrated water resource management strategies and guidelines, which has been implemented on a pilot basis in three water management areas. This document outlines the guidelines for water conservation and water demand management as part of integrated water resource management in South Africa.

Water resource management is presently in a state of transition, with many new water resource management institutions being established, or existing institutions being aligned with the National Water Act. Water resources governance will occur in an integrated manner, with water management authorities acting in a co-ordinated manner. All water management authorities, water services providers and water users have a role to play in water conservation and water demand management.

Conserving natural water resources, making the most efficient use of both the water, which is abstracted, and the costly infrastructure, which delivers it, for the benefit of all communities and sectors on an equitable and sustainable basis, represents a major intellectual challenge. This challenge is at least equal to those met in the past, and which continue to be faced, in harnessing the natural resources and providing the extensive and technically complex infrastructure which enables the urban and industrial economy of the nation to flourish.

In all situations there should be a balanced and optimised position in which water conservation and demand management measures make a real and cost effective contribution to making maximum use of the existing infrastructure assets, whilst also reducing the investment cost of new infrastructure compared with the cost if the traditional approach is adopted.

### VISION FOR WATER CONSERVATION AND WATER DEMAND MANAGEMENT IN IWRM

At a **water management area level**, the vision is for water resources to be managed in such a way as to ensure that:

- The quantity and quality of the natural resources are maximised in relation to abstraction of water for beneficial uses
- Water which is abstracted is utilised efficiently and that excessive use or waste by one user or sector does not adversely affect the basic needs of other users or sectors.

### VISION FOR WATER CONSERVATION AND WATER DEMAND MANAGEMENT IN IWRM

Within the **water services sector**, the vision is for there to be a shift in the balance away from capital expenditure and towards more operational management solutions to achieving consumer service levels. This shift is given additional focus with the need to improve services to historically disadvantaged communities, when in many areas there is also a shortage of water resources, if not now then in the foreseeable future.

Inherent in this vision is for water service providers to adopt a pro-active approach to managing their systems, rather than the re-active stance, which has often prevailed. A spin-off will be the creation of new employment opportunities.

A related vision is for engineers with expertise in the provision of new infrastructure to broaden their outlook and develop their skills in the management of the infrastructure, water utilisation and relationships with consumers.

## THE GUIDELINES MANUALS

The guidelines are set out in three volumes:

### **Volume 1: Water Conservation and Water Demand Management – A Planning Framework at Water Management Area Level**

This volume is primarily aimed at Catchment Management Agencies or DWAF personnel fulfilling those functions, but should also be useful for organisations with sectoral water management responsibilities, in appreciating the integrated water resource management context and assisting them in dialogue with CMAs / DWAF. In this regard there is a section on the responsibilities of a CMA in WC/WDM.

The guideline describes how to undertake an **existing situation analysis** using standard tabular formats that are especially relevant to making decisions on WC/WDM actions. This is basically in two parts:

1. Check lists for evaluating the progress of achievement of the declared objectives of the strategies for WC/WDM in each sector
2. Water audits, water management efficiency and consumption assessments

A key part of the guideline is the chapter on **integrated resource planning**. Whilst some WC/WDM actions may appear to follow immediately and logically from the existing situation analysis, invariably there is a range of options available to address a given supply / demand deficit situation (either existing or forecast). Each option, including the supply augmentation option, can be quantified in terms of the volume of new water that is generated and its financial, social and environmental impacts. The guideline explains how these options can be compared on a common basis so that decisions can then be made as to which should be selected and in which order of priority, in order of benefit – cost.

Volume 1 also includes a chapter on **stakeholder participation** which draws on DWAF's generic public participation guidelines and suite of models.

### **Volume 2: Guidelines for Undertaking a Water Conservation and Water Demand Management Situation Assessment and Development of a Business Plan within the Water Services Sector**

Volume 2 is intended for use by local authorities and other water services institutions (WSIs) in developing WC/WDM strategies and business plans.

There is a full explanation of what constitutes an existing situation assessment, how this should be undertaken and what outputs are required. It includes:

- Details of the **information that is required** to undertake the analysis
- Definition of the several components of the **water mass balance** to be quantified and block diagrams to facilitate this
- Procedures for assessing the **levels of losses and consumption** and for quantifying the **potential for water savings** (benchmark values are included in the guideline)
- The basis for assessing the **quality and efficiency of water services provision**, since deficiencies in service levels and/or excessive operational cost provide the motivation and justification for implementing WC/WDM
- Formats for undertaking basic appraisals of the **condition of the infrastructure** and the adequacy of vital **instrumentation** (meters) and other **information systems**, without which competent assessments cannot be done or measures planned and implemented

The development of a WC/WDM business plan should be harmonised with the water services development plan, but with a strong focus on the supply – demand balance and the contribution that can be made by WC/WDM measures. This part of the guideline deals with water demand forecasting and a business plan **Decision Maker Matrix (BP-DMM)** is included, which embraces the same integrated resource planning approach that is featured in Volume 1. The **BP-DMM** provides a framework for setting out the potential measures that are applicable, in a clear way, according to the structure, which is set out in the national strategy, namely:

- Resource management
- Distribution management
- Consumer demand management
- Return flow management

Volume 2 includes a format for the contents of a WC/WDM Situation Assessment and Business Plan.

### **Volume 3: Guidelines for Implementing Water Conservation and Water Demand Management Measures within the Water Services Sector**

Volume 3 also follows the four phase structure set out in the national strategy. Generally for each measure, an explanation is given, the methodology or approach, and a step-by-step procedure. The measures included are

#### ***Resource management:***

- water quality management – surface and ground waters
- removal of invading alien plants
- optimisation of reservoir storage

#### ***Distribution management:***

- flow measurement, zone metering and sectorisation, selection of water meters
- leakage reduction – passive and active leakage control, pressure management
- asset management, including rehabilitation of networks and management of the consumer meter stock
- dual distribution systems
- intermittent supply rationing

#### ***Consumer demand management:***

- water efficient appliances
- water conservation habits and practices
- water reclamation and re-use
- delivery point water management
- financial management (tariff structures, credit control)

#### ***Return flow management:***

- minimising groundwater infiltration, surface water inflow and exfiltration from sewers
- effluent re-use

Within the scope of consumer demand management, a separate chapter is devoted to **social awareness and education**. Volume 3 also covers **management and institutional aspects**.

In an Appendix, there is guidance on typical costs and human resource implications. In the present issue of the guideline this is not complete, since relevant information from the pilot projects has only recently been collected and has still to be analysed and presented in standard format.