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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 quality management

Water quality management model

A completed WRC study proposes the use of an Integrated Water Quality Management model to align the management of the quality of water resources with that of drinking water quality.

Background

The overall premise is that good water quality is in everyone's best interests.

In 2008, the WRC initiated a project on Integrated Water Quality Management (IWQM); the aim of the project being to develop a conceptual model for aligning the management of the quality of water resources with that of drinking water quality in order to support the effective management of water use in the interest of all water users.

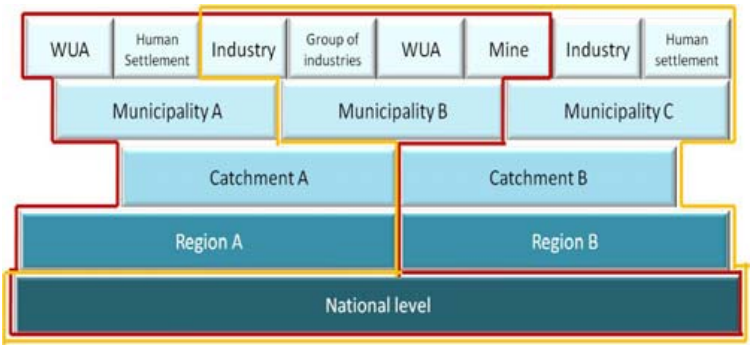
Rationale

The IWQM approach that was developed 'breaks down' water management into smaller management units while establishing both a horizontal and vertical reporting framework. A further benefit of the model is that responsibility for water quality is based on significantly smaller geographical areas.

In this way accountability to the adjoining areas (horizontal accountability) and to the next level of management (vertical accountability) is established with the establishment of a management unit. This allows accountability for water quality to be focused on smaller management units.

In other words, **it makes all water users aware of their own responsibility for the protection of South Africa's water resources and accountable for the impacts that they have on the resource**.

It is the mutual understanding between water users of the impacts of their own uses, which is aimed at bringing to life the 'Everyone is downstream' and 'Every water user is a water manager' philosophy.



The IWQM Management framework

As part of the implementation testing, hardcopy forms a well as Excel spread sheets were used for recording the requirements of the business process, critical control points (CCP) and Critical Risk Factors (CRF) as well as putting in potential reporting structures and links to performance targets.

However, while the implementation process in a management unit – or setting up the model will take at least 6 months, once data collection from the established management units (even those who do not have access to electronic media) is initiated, data collected will need to be stored electronically and used to create reports.

Furthermore, most CRFs and CCPs are points, and management units do have spatial boundaries, so it was proposed that the model should ideally be linked to GIS.

The management model was tested and subsequently refined in several management units in the Breede River catchment of the Western Cape Province of South Africa. In addition the model is being implemented as a water quality management tool by the Okavango Basin Management Committee (OKBMC) in the Kavango, Namibia.

A follow-up WRC report, further elaborated on here, describes the IWQM model and the proposed way of rolling out the product to help water users and Department of Water Affairs (DWA) manage the implementation of the water use authorisations.

Web-based system

The aim of the latest WRC project was to produce a Web-based system that would ultimately link to existing tools, such as the DWA Water Management System and electronic Water Quality Management System (eWQMS), the stakeholder database and geographical areas, and be available for use by other water users at various levels. Emphasis will be placed on developing a system that is intuitively obvious and efficient to use.

A second aim was to present the system to show how it can support the implementation of Integrated Water Use Licences (IWUL) and other Water Use Authorisations (WUA) (at both the regulator and user level) and ultimately improve catchment management; and present the system at one relevant conference over the proposed duration of the project.

In order to achieve this, the project team eveloped an electronic system that has included stakeholder and document management, and the ability to spatially reference the management units and their control points. This has included the development of an easy to use training manual that will allow those undergoing the training session to roll-out the system to other potential users.

The Web-based system has been populated with data from the phase 2 test cases to test that the system works and refine it as necessary. In addition, an information/training session was held to present the system to regulators and relevant water users.

Results

In developing the Web-enabled system the following aspects were considered.

- Ease of use; and
- Links to a map facility.

In light of all the other systems and reporting requirements that officials often need to give input to, the system needed to be user friendly and not data intensive. It needed to produce a simple report that could add value to the officials, environmental officers and managers' report backs to senior management, regulators and to the downstream water users.

In other words;

- These are the targets;
- These are the measured values;
- These targets were met (Y);
- Those were not met (N); and
- This is what is going to be done about it, all on one page.

In this way a history of problem areas can easily be built up and dealt with. The maps accompanying the system will make it easy for users to ensure that their CCPs and CRFs are correctly located.

In terms of using the system to help with the implementation of water use authorisations the following National Water Act (Act 36 of 1998) (NWA) sections were considered:
Section 21 which details both consumptive and non-consumptive water uses;

- Section 41 which requires that all water uses listed in Section 21 of the NWA be authorised; whether it be under General Authorisation (GA), Existing Lawful Use (ELU) or a water use licence (WUL);
- Section 28 of the NWA which sets out the essential requirements of water use authorisations; and
- Section 29 which sets the conditions which need to be met in the authorisations issued. It is these conditions that the IWQM system would help in implementation.

All of the authorisations contain conditions relating to quality, quantity and management options related to the water use. The conditions can be related to CCPs and CRFs and are most often associated with standards that need to be met (targets).

Conclusions

At the start of the project the main objective was to set up a Web-based system. The Web-based system was developed, tested and refined using existing data as well as including second phase data. However there is still some concern around who should administer such a system. In this respect it was decided that the system would be presented on a CD.

As this project was specifically related to aiding the implementation of water use authorisations, it is proposed that the CMA/DWA Regional Office be the administrator for those users that have a water use authorisation or who have applied for a water use authorisation.

However, it should be noted that an authorisation is not required to become a MU; CRFs, CCPs and associated targets can still be set up and managed.

Further reading:
Using an integrated water quality management model to support the implementation of National Water Act Use Authorisations (**Report No. 2059/1/13**). To order this report contact Publications at Tel: (012) 330-0340, Email: orders@wrc.org.za or Visit: www.wrc.org.za to download a free copy.