

GUIDELINES FOR FINANCING CATCHMENT MANAGEMENT AGENCIES IN SOUTH AFRICA

by

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**“Development of guidelines for the financing of
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MANAGEMENT IN SOUTH AFRICA**

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Executive Summary

Introduction

The National Water Act (Act 36 of 1998) provides for the progressive establishment of Catchment Management Agencies (CMAs) throughout South Africa. The intention is for CMAs to be largely financed at a WMA scale, through appropriate "user charges", which enable CMAs to be financially self-supporting and sustainable.

This document is aimed at supporting those people involved in assessing the financial viability of a proposed CMA (as part of the proposal to the Minister for establishment of a CMA), as well as those involved in preparing the annual business plan (required of every CMA, once established). It provides background and interpretation to the relevant policy and legislation, with an emphasis on the user charges for water resource management that are set and recovered to cover the CMA costs. The document is supported by a financial model, that assists in the calculation of CMA costs and water use charges.

The Role of Catchment Management Agencies

In line with current international practice, South Africa has adopted the approach of establishing statutory river basin organisations (i.e. CMAs) to facilitate the integrated management of water resources and participation of stakeholders in local decision making. The CMA must develop a catchment management strategy, outlining the framework and intent of water resources management within its water management area (WMA). This must be consistent with the national water resources strategy (specifying international, inter-WMA and strategic use) and resource directed measures (specifying requirements for resource protection).

A wide range of water resources management functions may be delegated to these CMAs, depending upon the local priorities and capacity, including:

- Developing strategies for integrated water resources management within the WMA;
- Developing and supporting organisations in the WMA, including coordination and capacity building;
- Regulating water use, including authorisation and charging of water use;
- Managing information to support the other water resources management functions;
- Implementing physical interventions, including conservation and demand management and possibly infrastructure development and/or operation; and
- Auditing water resources management, in terms of the stated objectives of organisational business plans and water resources management strategies.

On establishment, a CMA is required to perform a number of *initial functions*, including the development of a catchment management strategy, the coordination of organisations and facilitate the participation of stakeholders. Additional water resources management functions may be delegated or assigned to the CMA, once it has demonstrated the ability to perform these initial functions throughout its WMA.

This process of delegation should begin with *financial and administrative functions* such as the registration of water users and making and collecting water user charges. Once financial and administrative capacity has been created, *water resource management functions* may follow, based on the particular priorities outlined in the catchment management strategy. Finally, once the CMA has demonstrated capacity to fund and

exercise these water management functions, the powers and duties of a *responsible authority* may be delegated to the CMA, which relate to the ability to authorise, license and regulate water use.

Based on this, the progressive delegation of functions can be separated into four phases, namely the initial, financial, management and responsible authority phases.

Financing Catchment Management Agencies

The National Water Act and the *Pricing Strategy for Raw Water Charges* provides the financial framework within which CMAs operate. The two main sources of funding for CMAs are user charges (for water resources management) and parliamentary appropriations (through DWAF). The intention is that CMAs are largely financed through user charges on water resources management.

Currently, the Pricing Strategy seems to be (understandably) oriented towards the collection of charges by DWAF, and is not entirely appropriate for CMAs in its existing form. However, it provides the space for appropriate adaptation for this purpose. The key issues raised by the Pricing Strategy in terms of CMA financing, and which require greater attention, are:

- The requirement that the Reserve allocation be covered by charges on other use may not be consistent with the fiscal theory of user charges, because the Reserve may be interpreted as a collective public service that should be funded through general taxation.
- The application of charges is currently constrained to consumptive use of water, but this is being extended to other users, including waste discharge.
- The differentiation of user charges between users requires greater resolution, to address various issues, such as assurance of supply and the benefit obtained from water resources management.
- The proposal that DWAF subsidies to a WMA are based on the portion of unallocated water is appropriate for DWAF regional offices, but may not be appropriate for CMAs in a highly developed WMA with significant management requirements.
- The appropriate division of user charges between the CMA and DWAF regional office, based on responsibility for functions, requires clarification.
- The basis for estimating inter-WMA financial transfers for water transfers (the portion of the costs in the donor WMA) needs to be revisited, because there are costs associated with the use and discharge of water in the receiving WMA, that are not incurred in the donor WMA.

In summary, the Pricing Strategy provides a good basis for recovering the costs of water resources management, particularly from the perspective of DWAF. However, this needs to be adapted for application to the financing of a CMA. In particular, the approach and conditions for DWAF financial support to a CMA for establishment and operation requires clarity. The need of a CMA for financial support during its establishment (particularly for start-up capital expenses) and initial operation (in first 5 years) is unquestioned. However, medium term support may also be required, particularly in less developed WMAs.

The issue of CMA borrowing is a highly problematic issue that has not been resolved. A distinction should be made between short-term borrowing, to cover initial capital and operating costs against cash-flow, and long-term borrowing associated with water resource infrastructure development. Short-term borrowing should be capped relative to income, and this will likely be the case automatically when the CMA applies for overdraft

and loan facilities from private financial institutions. Although, the NWA permits CMAs to raise funds for and manage water resource infrastructure development, this introduces several complexities.

Firstly, the skills required to raise finance and project manage this type of development are completely different from those required to manage water resources. This is more appropriately performed by organisations that are set up for this purpose, such as DWAF, water boards and water user associations. Secondly, the required budgets (and associated water use charges) are far in excess of the water resource management budget, which will possibly shift the focus of the organisation from resource management to resource development.

Catchment Management Agency Costs

A CMA's costs are largely associated with staff salaries (or payment of services where these are outsourced). The following table highlights possible ranges in remuneration costs for the four phases of CMA evolution, with estimates of the costs associated with the governing board, overheads and monitoring. This was based on the estimation of the staff complement required to perform the functions during each phase. It excludes the external consultancy costs, as these are likely to vary considerably between CMAs.

Possible ranges operating costs (R 000/annum).

	Initial	Financial	Management	Authority
Governing board	400	500	500 - 600	500 - 600
Remuneration	1 900	3 800	6 600 - 10 500	9 100 - 11 400
Overhead	400	700	1 100 - 1 800	1 400 - 1 800
Monitoring	-	-	800 - 3 000	1 000 - 4 000
<i>Total</i>	<i>2 700</i>	<i>5 000</i>	<i>9 000 - 15 900</i>	<i>12 000 - 17 800</i>

In addition to these operating costs, the CMA will require capital expenditure (both during establishment and on an ongoing basis), for items such as information technology, communications, buildings, vehicles and library. Where short-term loans are taken to cover these capital costs, these must be repaid with interest over an agreed period. These capital costs do not include the costs of water resource infrastructure development and operation, which is covered by the user charge for water resource development, and must therefore be kept separate for accounting purposes.

Calculating User Charges for Water Resources Management

The following process is proposed for estimating user charges for water resources management.

Step 1: Estimate registered water use

Water use charges can only be raised from registered water users, therefore this must be estimated for the different sectors over time (ten years).

Step 2: Estimate the total costs

The capital and operating costs of the CMA establishment and functioning must be estimated (over time), taking account of any subsidies or grants to the CMA.

Step 3: Allocate functional cost components to water use

The benefit received from a water resource management function must be linked to each water user group, which enables the unit cost per user group to be calculated.

Step 4: Set user charges

User charges should be set through a process of negotiation with user groups (based on the unit costs), so that the CMA cash flow is managed, and considering the financial affordability of the charges for the users, willingness to pay these charges, and possible implications for default.

Step 5: Reconcile income and expenditure

The annual and cumulative cash-flow projection provides the basis for reconciling of CMA income versus expenditure.

The preceding steps, when implemented within the framework of the CMA Financial Model, provide the basis for effective CMA financial planning and the setting of user charges.

Likely Range for User Charges

Preliminary analysis of the probable CMA costs and registered water use in various WMAs indicates that the user charge for water resources management during the initial phase of CMA evolution would be about 0.3 cents/m³. However, it is likely that only about 80% of municipal and industrial users and 30% of agricultural users would register and pay in the initial phase, which implies that a charge of between 0.5 and 1 cent/m³ is more likely during this phase. Assuming the same charge for all user sectors, this may increase to between 1.3 and 1.9 cents/m³ for full CMA functioning (the responsible authority phase), and may be higher if the levels of non-registration and non-payment are significant.

It may be appropriate to differentiate the charges for irrigation and forestry from those for municipal and industrial use. Despite this, the above analysis indicates that it is very unlikely that the domestic and industrial user charges for water resources management will be greater than 10 cents/m³, while the charges for irrigation and forestry are likely to be between 0.5 and 2.5 cents/m³. This implies that the user charge for water resources management applied to irrigated agriculture would be between R40 and R200 per hectare, while forestry charges would be about R5 to R25 per hectare.

It should also be noted that current DWAF estimates of the charge that must be paid to DWAF, where all functions are performed by DWAF, ranges from about 0.25 cent/m³ for forestry to about 1 cent/m³ for domestic and industrial users. This would reduce as functions were transferred to the CMA, but must be added to the charge required to cover the CMA's operating cost.

Recommendations

The document provides a useful background reference to financing CMA establishment and functioning, and highlights areas where the Pricing Strategy needs to be engaged. The CMA financial model provides a valuable tool to support the CMA business planning process and the calculation of user charges for water resources management.

DWAF has identified the need to formulate a policy and guidelines for the financing of CMAs, based on the Pricing Strategy, and has initiated a project to do this. It must address the issues raised in this document, namely:

- The conditions and mechanisms for financial support to CMA establishment and operation by DWAF, taking account of the theoretical basis for user charges.
 - Detailed guidelines on the allocation of the costs of different water resource management functions to users.
 - Financial management systems and procedures to ensure efficient CMA operation.
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GUIDELINES FOR FINANCING CATCHMENT MANAGEMENT

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ANNEXURE B: Case study of the Inkomati catchment.

ANNEXURE C: Manual for the catchment management finance model.

Acronyms

CMA	- catchment management agency
CMS	- catchment management strategy
DWAF	- Department of Water Affairs and Forestry
DWAF HO	- DWAF: Head Office
DWAF RO	- DWAF: Regional Office
IWRM	- integrated water resources management
NWA	- National Water Act (Act No 36 of 1998)
NWRS	- national water resources strategy
RDM	- resource directed measures
RQO	- resource quality objectives
WMA	- water management area
WMI	- water management institution
WSI	- water services institution
WRM	- water resources management
WSA	- water services authority
WSP	- water services provider
WUA	- water user association

1. INTRODUCTION

1.1 Background to the Project

The National Water Act (Act 36 of 1998) provides for the progressive establishment of Catchment Management Agencies (CMAs) in water management areas (WMAs) throughout South Africa. One of the critical issues that needs to be resolved to enable integrated water resources management at a catchment scale is the financing of these CMAs. Without adequate financing, the implementation of catchment management in South Africa will be significantly impeded and the establishment of CMAs may not be viable.

The intention is for CMAs to be largely financed at a WMA scale, through appropriate "user charges", which enable CMAs to be financially self-supporting and sustainable. Water use charges to cover the cost of water resource management within a WMA are provided for in the National Water Act¹. These are related but distinct from charges for water resource development, which cover the costs of bulk and reticulated infrastructure development and operation, and resource conservation charges, which reflect the economic scarcity value of water resources in water-stressed catchments.

Recognising this urgent need, the WRC funded a project to develop guidelines for financing catchment management in South Africa, together with the development of a simple financial model to assist CMA financial planning. The stated objectives of this research were to:

- *review the current policy with regard to the charges which may be levied by Catchment Management Agencies (CMAs);*
- *establish cost centres associated with catchment management functions and typical costs which may be incurred in the management of catchments;*
- *identify the financial flows associated with CMAs, to and from either government or external stakeholders;*
- *evaluate appropriate mechanisms to ensure the financing of catchment management functions;*
- *combine this financial information into a model which can be used to assess the viability of a CMA in any catchment area; and*
- *test the model on two catchments in South Africa.*

This research represents a synthesis and unpacking of the perspectives on the topic during 1999/2000, which were still embryonic in nature. It is therefore not definitive, nor does it imply DWAF policy, but rather a contribution to the broader ongoing process of implementing catchment management in South Africa.

A number of other South African studies have been conducted and documents produced as part of this broader process, which are of relevance to this project. This study takes these as the point of departure, particularly:

- *White Paper on a National Water Policy for South Africa. DWAF (1997).*
- *A Pricing Strategy for Raw Water Use Charges. DWAF (1999).*
- *Guides for the establishment of Catchment Management Agencies and Water User Associations. DWAF (2000).*
- *Implementation of Catchment Management in South Africa: The National Policy. DWAF (2000).*

¹ These charges are for use by organisations involved in water resources management within the WMA, including the CMA or DWAF, and are not paid to the National Treasury.

- *Guidelines for CMA organisational development*. DWAF (forthcoming 2000).
- *Roles, functions and inter-relationships of institutions involved in the management of water resources*. DWAF (forthcoming 2000).
- *Guidelines for catchment management to achieve integrated water resource management in South Africa*. Görgens et al (1998).
- *A Strategic Plan for the Department of Water Affairs and Forestry to Facilitate the Implementation of Catchment Management in South Africa: Discussion Document*. DWAF & WRC (1998).
- *Catchment Management: Turning Policy into Practice*. WRC/WISA (1999)

1.2 Objectives of this Report

The National Water Act (NWA) requires the financial viability and sources of funding of a proposed CMA to be evaluated for a proposal to the Minister for establishment of a CMA (**Section 77(d)&(e)**). Furthermore, **Schedule 4:Section 21** requires a CMA governing board to prepare a business plan, within six months of its establishment. The business plan must include financial targets, financial strategies for the CMA, and a forecast or revenue and expenditure for a period of not less than 3 years (**Schedule 4:Section 23**).

The objective of this guideline document is to support those people involved in assessing the financial viability of a proposed CMA, as well as those involved in preparing the business plan. It provides background and interpretation to the relevant clauses in the NWA and National Water Pricing Strategy. Further, it outlines the possible financial transfers between water users and organisations involved in catchment management, supports the estimation of CMA costs and the assists with the calculation of water resource management charges to cover these costs, as functions are progressively delegated to the CMA over time. The statutory requirement to establish CMAs has been taken as the point of departure for this research, and therefore other possible institutional arrangements have not been addressed.

The guidelines are supported by a financial model, which assists in the calculation of CMA costs and appropriate water use charges. The emphasis of these guidelines is on the water use charges for water resource management that are set and recovered within a WMA by CMA, including inter-WMA transfers. Although the DWAF Regional Office is considered in the guidelines and model, they have been developed from the CMA perspective.

1.3 Target Audience for this Document

This document is a guideline for all those involved in the establishment and management of Catchment Management Agencies, or in the setting and collection of water use charges for water resource management. It focuses on the recovery of the costs of CMA functioning, rather than those for DWAF. It is intended to support the analyses for the establishment of CMAs, as well as the annual financial business planning process.

In particular, it is relevant for DWAF staff involved in CMA establishment and CMA governing board members and staff, as well as stakeholders and water users that will be responsible for paying the costs of water resources management by a CMA.

Finally, it is intended to highlight areas that require further policy development by DWAF for the effective and efficient financing of CMAs.

1.4 Structure of the Document

The remainder of the document is structured in seven parts:

- **Chapter 2** presents the policy and legislative context for water resources management at a catchment level in South Africa and describes the evolution of CMA functions.
- **Chapter 3** provides the theoretical background to financing CMAs, including international experience and the approach to financing water resources management in South Africa.
- **Chapter 4** indicates the possible structure associated with each phase in the evolution of a CMA and provides estimates of the associated costs.
- **Chapter 5** outlines the financial arrangements for catchment management, between the CMA, DWAF and other institutions involved in water management.
- **Chapter 6** highlights the sources of funding and financial flows between users, the CMA, other users and DWAF.
- **Chapter 7** provides guidance on the calculation of water resource management charges for different sectors to meet the costs of the CMA.
- **Chapter 8** concludes the report and makes recommendations about the further policy development and research that is required to support CMA financing.

2. CATCHMENT MANAGEMENT IN SOUTH AFRICA

2.1 Imperatives of the National Water Policy and Legislation

In 1995 a legislative review process was initiated for water resources management (WRM) in South Africa, culminating in the 1997 *White Paper on a National Water Policy for South Africa* and the National Water Act (Act 36 of 1998). These provide the imperatives for WRM, by defining the purpose and objectives of WRM, as well as certain requirements for performing WRM.

The main objective of the National Water Act (Act 36 of 1998) is to provide for the management of the nation's water resources so as to enable the achievement of sustainable and equitable use of water for the benefit of all water users. This chapter provides a brief summary of the manner in which this is proposed under the new water policy and legislation.

2.1.1 Purpose of WRM

The following three inter-related principles underlie the policy and Act, and may be rephrased as the main purpose of WRM.

Sustainable utilisation and protection of water resources

This requires a balance between the protection of water resources and their development and utilisation for social and economic purposes. In a developing country context, such as South Africa, this implies basic protection of the water resource to ensure continued use of its services. However, the value of any additional ecological protection must be weighed against the economic and social benefits of utilisation.

Equitable allocation of water

The allocation of water between sectors and users should be equitable, just and transparent. However, South Africa's history requires redress of past gender and racial discrimination, as well as meeting international obligations.

Efficient use of water

As a water scarce country, there is an obligation for efficiency of use by all water users in South Africa. Similarly, there is an obligation on those responsible for allocating water to ensure this (effectively/optimally) supports social and economic development.

2.1.2 Requirements for WRM

The policy and legislation also outlines a number of requirements for performing WRM. The following imperatives may be viewed as the means (or tools) for giving effect to the above objectives.

Integration of WRM functions

Underlying the new approach to water resource management is the recognition that water should be managed in an integrated manner. *Integrated water resource management* is simultaneously a philosophy, a process and an implementation strategy to achieve equitable access to and sustainable use of water resources by all stakeholders at catchment, regional, national and international levels, while maintaining the characteristics and integrity of water resources at catchment scales within agreed limits.

Integrated water resources management (IWRM) may be viewed as the principal policy requirement for WRM in South Africa.

Participation of stakeholders

Involvement of stakeholders and water users in WRM decisions represents a key policy requirement of WRM in South Africa. The challenge is to ensure that people want to, can and will continue to participate in WRM, either through statutory bodies or informal consultative bodies. Stakeholder participation has two key components, namely to:

- facilitate effective local decision making (based on local knowledge and priorities), which is required for equitable allocation and efficient use; and
- foster stakeholder support (buy-in and ownership) of WRM decisions, which is particularly important for the effective delegation of WRM functions and acceptance of financial responsibility for WRM.

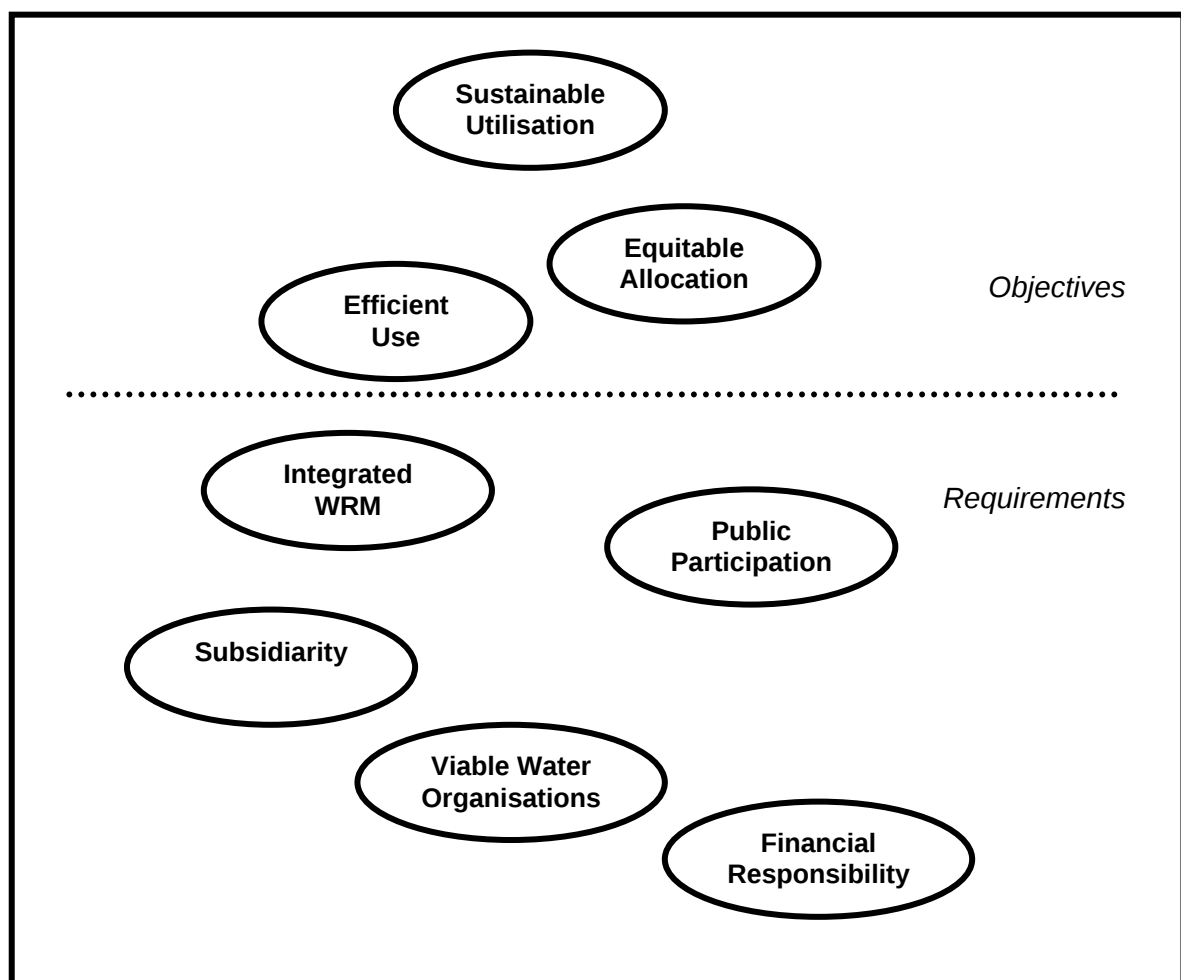


Figure 2.1. A hierarchy of fundamental objectives and requirements for WRM

Subsidiarity

An important component of fostering participation is to delegate (or assign) decision making power (and associated WRM functions) to the lowest appropriate level. This highlights a policy imperative for outsourcing of functions to water management

institutions² (WMI) to ensure local participation in decision making (which is different from outsourcing to achieve efficiency in performing non-core functions). However, this imposes greater requirements for institutional coordination and capacity building.

Viable water organisations

Participation of stakeholders and delegation of responsibility to a local level is provided for in the NWA through the establishment of various WMIs, particularly catchment management agencies (CMA) and water user associations (WUA). These organisations must be technically, administratively and financially viable, otherwise the potential of the NWA is unlikely to be achieved. The viability of all these WMIs must be considered in the context of the parallel establishment of water services institutions (particularly water boards), in particular given the current technical (human resource) capacity constraints of the water sector in South Africa.

Financial responsibility

The financial viability of organisations is crucial to their sustainability and effectiveness. This imposes a stringent requirement for collection of user charges to pay for the implementation water resources management functions at a local and regional level, supported to a limited extent by fiscal transfers. It should be noted that WMIs are public enterprises and must therefore operate according to the strict controls and requirements of Chapter 6 of the Public Finance Management Act (Act 1 of 1999).

The imperatives outlined above (and illustrated in Figure 2.1) highlight the importance of ensuring the financial viability of water management institutions for successful performance of water resources management in South Africa. This document is aimed at assisting in this process.

2.2 Water Resources Management Approach for South Africa

2.2.1 Introduction

In addition to the above imperatives, the National Water Act (NWA) outlines the approaches that must be adopted, which are briefly described in the following sections.

2.2.2 Water Resources Management Strategies

The *national water resource strategy* (NWRS) gives effect to the need for integrated water resources management at a national level, by providing a framework for water resources management between water management areas (WMAs); there are currently 19 WMA in South Africa, representing the main boundaries for delegated WRM. The NWRS outlines the institutional arrangements, specifies the principles and strategic requirements, outlines the pricing strategy, and provides national objectives, guidelines and procedures, for water resources management in each WMA.

The NWRS must reconcile the requirement and availability of water within each WMA, and indicate the allocatable water within the WMA, after the requirements of the Reserve (see below), international obligations, inter-basin transfers, strategic use and a contingency have been met.

² Institutions are the set of rules and relationships within which an organisation operates. Where possible, this definition has been used throughout this report, except when referring to terms used in the policy or National Water Act, such as the term *water management institutions*.

The recognition that water resource management should be performed at a catchment scale, with input from all stakeholders, led to the requirement for *catchment management strategies* (CMS) to be formulated and established in law. This CMS must outline a framework for water resource protection, use, development, conservation, management and control within a WMA and the principles for allocating water to existing and prospective water users, which is consistent with the NWRS and resource directed measures (see below). The CMS should reflect the water resource management priorities in different parts of a WMA.

The CMS also must set out the water management institutions to be established in the WMA and guides these organisations in performing their functions in terms of the Act. Effective implementation of water resources management in a WMA requires the CMS to inform the catchment management functions that must be performed, and therefore the capacity and resources that are required, by the different water management institutions that already exist or are to be established in the WMA. As such the CMS provides the linkage between priority water resource management issues and organisations responsible for their management.

2.2.3 Resource Protection

The NWA is also grounded in a resource protection approach, based upon resource directed measures specified in Chapter 3 of the NWA. *Resource directed measures* aim to provide an appropriate level of protection for different water resources. This will be done within a water resources classification system, which is given effect through the determination of the Reserve and resource quality objectives (RQOs). The Reserve is that quantity and quality of water required for basic human needs and to maintain the sustainability of the aquatic ecosystem, while RQOs specify numeric and narrative objectives for different water bodies in terms of the protection requirements of the Reserve and the needs of other users.

In this context the concept of *resource quality* is utilised to encompass the full set of characteristics that describe the condition of a water resource, namely quantity, quality, habitat and biota. This definition extends the conventional interpretation of water resources, to represent the entire aquatic ecosystem, rather than mere water quantity and quality. Accordingly, the *interrelationships* between the four elements of resource quality are as important as the elements themselves. As such, the concept of resource quality is a keystone of integrated water resource management.

The procedural requirements for determination of a class, the RQOs and the Reserve for a water resource are separate from the NWRS (although the results may be reflected in the NWRS), and are not part of the CMS (although the CMS must give effect to them).

2.2.4 Water Use

The definition of water use has been expanded in **Section 21** of the NWA to include all activities that have an impact on the quantity, quality and/or aquatic ecosystem (habitat and biota) of a water resource, following the principle of integrated water resource management. These can be grouped into those that are primarily related to water quantity, water quality and instream & riparian zone (albeit with some overlap).

Water quantity related activities:

- taking water from a resource [s21(a)];
- storing water [s21(b)];

- impeding or diverting the flow of water in a water course [s21(c)]; and
- engaging in a streamflow reduction activity [s21(d)].

Water quality related activities:

- engaging in a controlled activity [s21(e)];
- discharging waste into a water resource through a conduit [s21(f)];
- disposing of waste in a manner which may impact on a water resource [s21(g)];
- disposing waste water from any industrial or power generation process [s21(h)]; and
- removing, discharging or disposing of water found underground [s21(j)].

Instream and riparian related activities:

- altering the bed, banks, course or characteristics of a watercourse [s21(i)]; and
- using water for recreational activities [s21(k)].

Management required to implement resource directed measures, must focus on the management of water use, through what are referred to as *source directed controls*. Water use management occurs through regulatory, economic, cooperative governance and/or persuasive approaches, measures and instruments.

The national water resources strategy and catchment management strategies should outline, at the appropriate scales, how these are intended to achieve the levels of protection specified by the resource directed measures.

Although all the above activities are defined as water use, not all are required to register and pay water use charges (as outlined in Section 3.3 below).

2.3 Functional Areas for Water Resources Management

There are a number of possible models for grouping WRM functions, but the six functional areas model presented below provides a useful approach from the perspective of financing catchment management functions³ (and associated organisational structure) in the context of this document (see Chapter 4).

Develop Policy & Strategy

Developing coherent policies, strategies and regulatory frameworks for other functions to implement. It is the main repository of technical expertise/knowledge (including resource protection and water allocation), and should provide for effective integration of WRM.

Regulate Water Use

Giving effect to the policies, strategies, frameworks, plans and regulations for managing the use of water resources, including quantity, quality and instream activity. This is primarily a statutory *responsible authority* function.

Support Organisations

Facilitating and supporting the establishment, development, management and coordination of water management institutions. This would concern both statutory WMIs, such as CMA, WUA and international bodies, other statutory bodies (Water Tribunal and advisory committees) and non-statutory bodies (such as catchment fora), to ensure stakeholder participation in WRM at a local level.

³ This model has evolved through the DWAF WRM Restructuring process.

Physical Implementation

Implementing actions related to the management and development of water resources, usually as physical interventions in response to identified needs in the strategy formulation process. This may involve the design, implementation and operation of water resources infrastructure and intervention programmes, for ensuring the sufficient water availability of adequate quality for users.

Manage Information

Managing the collection, storage and assessment of all information required for WRM, as a support to the other functions. This would include information on water resources, catchment physical, social, economic and institutional characteristics, water use and authorisation.

Audit WRM

Audit the implementation of water resources management, in terms of organisations, functions and water resources, including assessment and corrective action.

2.4 The Role of Catchment Management Agencies

2.4.1 The Establishment of CMAs

The White Paper on a National Water Policy (DWAF, 1997) states that the National Government is “custodian of the nation’s water resources and its powers in this will be exercised as a public trust”. The Department of Water Affairs and Forestry is the primary agency responsible for water resources management. In exercising its mandate, DWAF must reconcile, integrate and coordinate diverse and often conflicting interests of different stakeholders, within the framework of sustainable and equitable utilisation of South Africa’s water resources.

The Minister may establish water management institutions to support the DWAF in exercising its mandate. The NWA provides for the phased establishment of Catchment Management Agencies (CMAs) to undertake water resources management in defined WMAs. CMAs may be responsible for implementing the statutory provisions of the NWA, as well as developing and implementing catchment management strategies in their WMA.

The requirements for establishing CMAs, together with an overview of evolution of these organisations, have been explored in *Guides for Establishing CMAs and WUAs* (DWAF, 2000). These issues are not repeated in this document, but are referred to and built upon where they have implications for financing CMAs. The reader is particularly advised to review the relevant parts of Guides 1 and 2 of that series.

2.4.2 CMA Powers, Duties and Functions

Guide 2 (DWAF, 2000) provides a detailed exploration of the functions required for catchment management, particularly in terms of the powers and duties of the CMA. Powers, functions and duties may be differentiated as follows:

- ◇ *Powers* are jurisdictions and competencies, that *may* be exercised, and that are derived from statutory provisions in the NWA; such as authorising use of a water resource.
- ◇ *Duties* are obligations and responsibilities that are imposed by prescriptions in the NWA, and that *must* be performed; for instance, a CMA *must* establish a catchment management strategy and *must* give effect to it in the exercising of its powers.

- ◇ *Functions* are the official tasks, activities and actions that are required to exercise the powers or to perform the duties described above; for a CMA these represent all the operational undertakings required to perform catchment management.

Specific powers and duties relating to authorisation, licensing, regulation and control of water use and enforcement of conditions of use may only be exercised and performed by a “responsible authority” (**Chapter 4** of the NWA). A CMA may only act as a responsible authority if such specific powers and duties have been assigned to the CMA by the Minister, who is the original responsible authority.

2.4.3 Initial Functions of a CMA

Upon establishment, all CMAs are expected to execute the following *initial functions* (as specified in **Section 80** of the NWA):

- (a) *to investigate and advise interested persons on the protection, use, development, conservation, management and control of the water resources in its WMA;*
- (b) *to develop a catchment management strategy;*
- (c) *to co-ordinate the related activities of water users and of the water management institutions within its WMA;*
- (d) *to promote the co-ordination of its (catchment management strategy) implementation with the implementation of any applicable development plan established in terms of the Water Services Act, 1997 (Act No. 108 of 1997); and*
- (e) *to promote community participation in the protection, use, development, conservation, management and control of the water resources in its WMA.*

In order to perform these functions, certain *inherent powers* are vested in the CMA by virtue of its establishment (DWAF, 2000):

- the powers of a natural person of full capacity (**Section 79(1)**);
- a range of powers related to planning and conducting the routine administrative and organisational business of the CMA (**Schedule 4**); and
- powers to make and recover charges in terms of the Minister's pricing strategy for water use charges to cover their costs in executing the *initial functions* (**Sections 57**).

2.4.4 Other Possible Functions of a CMA

The Minister may delegate or assign additional powers and duties to a CMA, including some or all of those of a responsible authority (**Chapter 4**), those of **Schedule 3** of the NWA and those relating to water use charges and related financial provisions (**Chapter 5**).

Table 2.1 unpacks the six functional area model presented above (in Section 2.3), by listing a range of possible functions that may be performed by a CMA. In reality, not all of these would be performed in the early part of a CMA's existence, but would rather be progressively delegated (as outlined in the following section). Similarly, certain CMA functions are likely to be performed by other bodies (outsourced), under delegation or contract.

Table 2.1. Possible CMA Sub-functions by Functional Area.

Functional Area	Sub-functions and activities
Develop Policy & Strategy	Long-term strategic planning for the CMA Develop CMS, including Allocation Plans Determine the resource directed measures

	Reconciliation of water availability and requirements Financial and business planning for the CMA
Support Organisations	Creation of non-statutory consultative and participative bodies/for a Identify water resource management related stakeholders Coordination of the activities and relationships for WMIs in the WMA Fostering cooperative governance and creating partnerships Building capacity in WMIs and fora Resolution of water conflicts between organisations Support/advise water resource planning and management activities Supportive or emergency organisational interventions Ensuring appropriate stakeholder participation in these bodies
Regulate Water Use	Registering water use Authorising of water use (licensing etc.) Setting, billing and collecting water use charges Ensuring dam safety and dam zoning Monitoring authorisation requirements Ensuring compliance (including enforcement) Negotiating co-regulation and cooperative agreements
Physical Implementation	Implement the water conservation programmes Implementing water demand management interventions Rehabilitation of water resources (such as wetland or riparian zone) Emergency response interventions (including disaster mitigation) Operate and maintain water resource systems (water works)* Develop (design and construct) water resources infrastructure (waterworks)*
Manage Information	Monitoring water resources (collect, source and capture data); Develop and maintain data-bases (including quality control); Develop and maintain information management/evaluation systems Conduct research on water resources Perform needs assessment and water resource problem identification Communicate with stakeholders and collect anecdotal information
Audit WRM	Develop and maintain indicators for auditing Perform financial and organisational audits of WMIs Perform functional performance audits Perform water resources audits, against specified objectives Propose and facilitate corrective action

* It is preferable that water resource infrastructure development and operation are performed by organisations other than the CMA (or DWAF).

Although the development and operation of water resource infrastructure (waterworks) has been included as a possible CMA function, this introduces an inherent conflict, as the CMA would ultimately become the regulator (gamekeeper) and operator (poacher). It is philosophically preferable that the CMA identifies the need, plans and regulates water resource development and operation in an integrated manner, but that the design, construction, financing, operation and maintenance is performed by another designated organisation, such as a water board or water user association.

This model is premised upon the water resources management function, which has a number of other components, which are not directly associated with any one of these six functional areas. Rather, these components may be associated with a number of the functional areas, and therefore represent interfaces between them. They include disaster management, water use and conservation, consultation and empowerment.

Finally, in addition to the line functions described above, the CMA will need to perform support (staff) functions, such as secretariat to the Governing Board and human resources management, as well as administrative, legal and financial support to the technical line functions. This may be included as a *Provide Corporate Services* function.

2.4.5 Other Unlikely Functions

It should be noted that integrated water resources management (directing catchment management) may be viewed from three perspectives, each with fundamentally different implications for CMA functions (Görgens *et al*, 1987; Mitchell, 1990). Firstly, it may imply the systematic consideration of all components of the water resource, including ground and surface water, as well as water resource quantity, quality, habitat and biota. Secondly, it may imply interaction between the water, land and the environment, recognising the impacts that these have on one another. Thirdly, the broadest interpretation implies relationships between the water system and social and economic development.

The first interpretation has been explicitly incorporated into the National Water Policy and Act and implies the functional areas described above. Many people view the objective of catchment management to be at least the second and possibly the third. This may take place at a normative-philosophical level, where the linkages between environmental management-spatial planning or social-economic development are highlighted, with implications for water resources management. However, constitutional and mandatory fragmentation of government responsibilities prevents strategic or operational integration of water resources management with environmental, spatial (land use), social or economic planning/management functions of other departments or spheres of government.

As a result, in the foreseeable future, CMAs will not be directly involved in these other non-water-related functions, but this does not mean that CMAs should not attempt to be involved and influence these other processes as stakeholders or partners, where appropriate. This highlights the critical need for the CMA (*Support Organisations* function) to actively foster cooperative governance and public partnership relationships with relevant organs of state and civil society, respectively.

2.5 Probable Evolution of a Catchment Management Agency

2.5.1 Progressive Delegation and Assignment of Functions to a CMA

Guide 2 (DWAF, 2000) presents a “plausible sequence” for progressive assignment and delegation of functions to CMAs, in addition to the initial functions. These have been adapted to reflect the above mentioned functional description:

- i. Registration of current and new water users (in addition to prior registrations).
- ii. Setting and collecting water use charges, particularly for water resource management.
- iii. Fostering cooperative governance and partnerships.
- iv. Making input to the DWAF Regional Office regarding licence applications.
- v. Development and operation of waterworks and schemes.
- vi. Auditing catchment management activities by WMIs in the WMA.
- vii. Routine monitoring (and information management) in the WMA.
- viii. Implement physical interventions, including *Working for Water*.
- ix. All outstanding functions that flow from Schedule 3 powers.
- x. All functions that flow from the powers of a “responsible authority”.
- xi. Monitoring of water use.
- xii. Enforcement of licence conditions.

The particular functions and rate at which they are delegated would depend upon the water resource management priorities outlined in the catchment management strategy, as well as the capacity and resources available to the CMA and/or WMIs in the WMA. The policy for catchment management (DWAF, 2000) highlights the principle that functions should only be delegated where the CMA has demonstrated the ability (capacity) to perform and fund (largely through the collection of water use charges) the existing functions throughout the WMA.

2.5.2 Probable Phases of CMA Evolution

Four generic phases in the evolution of all CMAs may be identified from the above sequence of catchment management functions, as indicated in Table 2.2 and outlined below. The focus and extent of the CMA during each of these phases will depend upon the specific conditions, water resource issues and role-players in the WMA. Furthermore, significant evolution of the organisation may occur within each phase, as well as the likelihood of some overlap between phases.

- *Initial phase*: is associated with the initial functions of a CMA, and is characterised by water resources strategy, institutional coordination-stakeholder communication and administrative activities.
- *Financial phase*: is associated with making and recovering water use charges, and requires financial competence, in addition to the organisational development, policy & strategy and administration requirements for the initial phase.
- *Management phase*: is associated with the implementing, monitoring and auditing water resource management activities outlined in Schedule 3 of the NWA, and requires multi-disciplinary technical water resource related competency, together with financial, organisational development and administration requirements.
- *Responsible authority phase*: is associated with the authorisation and control of water use, which requires a technical-legal competency, supported by the technical, financial, organisational development and administration requirements of the other phases.

Table 2.2. Phases of CMA evolution and associated functions.

Phase	Delegated or Assigned Functions	Key Functional Areas
Initial	Initial functions	<i>Policy & Strategy Organisational development Administrative support</i>
Financial	Registration of water users Setting and recovering water use charges Fostering cooperative governance and partnerships	<i>Financial regulatory</i>
Management	Making input to DWAF:RO regarding licences Development and operation of waterworks Auditing of catchment management activities Routine monitoring (and information management) Implement physical interventions Outstanding functions in Schedule 3 of the NWA	<i>Physical implementation Information management WRM Audit</i>
Responsible authority	Function for responsible authority Monitoring of water use Enforcement of licence conditions	<i>Regulatory</i>

The CMA evolution from the initial phase to the financial phase will depend upon the registration of users in the CMA. Thereafter, the further delegation or assignment of functions associated with the management and responsible authority phases, will depend entirely upon the successful implementation of the financial functions in the financial phase; only functions that can be paid for through water use charges should be delegated. This highlights the importance of the financial arrangements in the CMA evolution.

3. BACKGROUND TO FINANCING CATCHMENT MANAGEMENT

3.1 Theory of Financing Water Resource Management

3.1.1 Water Resource Management as a Public Service

The previous chapter outlined the possible water resource management functions that may be undertaken by catchment management agency (CMA). A distinction was made with the water resource infrastructure development and operation functions. This distinction is particularly important in terms of water resource management as a public service, as opposed to infrastructure development and operation, and the financing thereof.

As outlined in Gildenhuys (1997), public goods and services are supplied and delivered by government, because they are:

- collective in nature and cannot be supplied by the private sector;
- required to attain government's social and economic goals and objectives, which will not be achieved without collective effort; and/or
- more effectively and efficiently delivered by collective effort.

Gildenhuys goes on to identify three basic characteristics for classifying services for financial purposes, namely:

- **Apportionability:** the ability to divide the service into consumption units and supply it at a price per unit, based on supply and demand.
- **Exclusiveness:** the ability of the service provider to exclude those who do not pay for the service, or conversely people's ability to use the service.
- **Exhaustibility:** relating to whether the service is consumed during use, thereby requiring replenishment.

According to this, services may be classified as:

- *Collective* services: are non-apportionable, non-exclusive and inexhaustible.
- *Particular* services: are apportionable, exclusive and exhaustible.
- *Quasi-collective* services: have characteristics of both services.

Collective services are usually provided as a *natural monopoly* by the public sector, funded through taxation for which taxpayers do not get direct *quid pro quo* return. Particular services are generally supplied by the private sector, although it may be made a public sector function through legislation, and consumers receive commensurate value for payment rendered for each discrete unit of the service.

Following this classification, water resources management is a quasi-collective service, with certain management functions (such as ensuring resource sustainability through the Reserve) being collective in nature, while the functions ensuring reliable availability of water of adequate quality for users are more particular in nature. This is different from infrastructure development and operation for water supply, which has a more particular service nature, as customers pay for the water they receive and one person's use prevents another person from using the service.

There is a need for integrated and coordinated management and regulation of water resources at a river basin scale, in order to ensure efficient and sustainable utilisation of the resource. The current policy and legislation implies that this requires public (i.e.

CMA) regulation of water resources within a WMA, in a monopolistic administrative manner, although certain functions may be outsourced to other organisations where this is more efficient. However, the possibilities for economically based pricing mechanisms for localised water allocation may yet be explored under the NWA.

3.1.2 Public Sector Financing and Water Resources Management

Based on this approach, the costs of water resource management may be funded through a mixture of parliamentary appropriations (taxation) and revenue collected directly from consumers of water. Gildenhuys (1997) indicates that in general, tax revenue should cover the *fixed capital costs*, while user charges cover the *direct operational costs* of providing the service. Although this is a useful point of departure, it may not be directly applicable to the complex situation of water resources management, where the fixed capital costs are relatively minor (not including the capital costs of infrastructure development). However, what is significant is the principle that not all costs need be covered through user charges.

In the water resource management context it may be more appropriate for the fiscus to cover functions that are non-apportionable and non-exclusive; water resources are exhaustible, even though they are renewable. Of particular relevance in this regard is the allocation to the ecological Reserve, which provides for sustainable functioning of the resource and in some cases the protection of systems with national importance. It may be argued that this should be funded from the general taxation through DWAF's parliamentary appropriation, because it benefits current and future generations of the country as a whole. On the other hand, the local users may not be able to use the resource at the same level in the future if the Reserve is not maintained, which may imply that they have a responsibility to contribute to its maintenance. This issue is revisited in Section 3.3 below.

A CMA is a national public business enterprise as defined under the Public Finance Management Act (Act No 1 of 1999). The CMA governing board is the accounting officer for the CMA, and as such the board members have fiduciary duties and responsibilities, as outlined in this Act. Furthermore, the CMA (through the governing board and appointed officials) must comply with certain statutory financial management requirements.

3.1.3 User Charges for Water Resources Management

User charges are levied to recover some of the costs of providing quasi-collective services, while consumer tariffs are charged for particular services and covers the entire cost of providing the service. User charges (and consumer tariffs) have three key features, namely they are voluntary based on choice to use a service, they are based on benefit received by the consumer of the service, and they relate to the cost of providing the service.

However, neither should be confused with pricing, which is the process by which supply and demand are reconciled through the market in the private sector. This is applicable to a water market, which is a policy option that has been recorded in localised areas, particularly in terms of agricultural water use.

The main objective of user charges is to recover some of the costs of providing a quasi-collective service, with the following advantages:

- They register a realistic demand for the services, as reflected by the payment for its use.
- They improve equity in providing the service, in that those that benefit directly from the service contribute directly to its costs (rather than increasing the public tax burden).
- They generally improve the operating efficiency of service provision, because the service also needs to respond to user demand, rather than administrative criteria alone.
- They correct price signals for goods and services in the private sector, by ensuring that their prices include the actual financial costs of their inputs.

User charges for quasi-collective services should cover the operating costs of providing the service to users, while the fixed capital cost should be financed through taxation. According to this, the capital costs of establishing a CMA should be funded through grant finance. Similarly the capital and operation costs that would be incurred in managing a pristine water resource without users should be funded through parliamentary appropriation. The additional capital and operating costs required to manage the use of water should be financed through user charges. Although this is philosophically sound, the reality of estimating the difference is not simple, but this will be revisited in Chapter 7.

3.2 The International Experience

3.2.1 Introduction

Internationally, there has been a general increase in the demand for water, often with a concurrent deterioration in its quality, together with a recognition of the importance of environmental sustainability (Saleth and Dinar, 1999). This has contributed to a shift in the paradigm of water resource management, from a development approach with the emphasis on water quantity, to an allocation and integrated management approach, with a greater water quality emphasis. It is worthwhile to note that this paradigm shift has been captured in the South African water law and policy, as outlined in Chapter 2.

Along with this paradigm shift, the concept of water pricing, to reflect the economic (or scarcity) value of water, has increasingly been recognised as a mechanism to achieve improved water allocation and encourage water use efficiency. However, in practice water pricing schemes have been implemented to achieve other objectives, such as cost recovery and redistribution of income (Dinar and Subramanian, 1998).

Unfortunately, for the purposes of this project, the international experience in water pricing, user charges and tariffs has been focussed on recovering costs of water resource infrastructure development and operation (including reticulation), rather than on the costs of managing and allocating water resources. Although these management and allocation functions are the primary purpose of CMAs, a brief review of the international experience is instructive.

3.2.2 Transition to River Basin Organisations

The above-mentioned paradigm shift has been associated with and/or highlighted a number of institutional water resources management problems common to the water sector in many countries, including (Saleth and Dinar, 1999):

- Increasing relative water scarcity;
- Water quality deterioration;

- Inter-sectoral and inter-regional water allocation conflicts;
- Poor cost recovery and operational performance;
- Excessive government involvement and bureaucratic control; and
- Inappropriate institutional arrangements;

In many countries this has led to an institutional review, with the following focus:

- Shift from development to allocation;
- Emphasis on decentralisation;
- Integrated approach to water management; and
- Emphasis on economic viability and sustainability;

In particular, significant importance has been placed on the establishment of river basin organisations to perform water resources management, taking account of the needs of local people. This has been accompanied by a shift from water users as clients receiving a service to stakeholders having an input to decisions. Emphasis is therefore placed on mechanisms for equitable allocation and conflict resolution between users. However, as highlighted in Chapter 2, this requires adequate capacity and financial viability for these organisations, which in turn depends upon adequate cost recovery and responsibility from the water users.

Although the water resource management sectors in different countries operate within varying institutional, political and economic systems, there are interesting parallels, particularly in those countries that have attempted or are attempting to implement river basin level organisations. They have been relatively successful at making management decisions according to hydro-geological boundaries, and thereby adopting an integrated approach to water resource management. From the perspective of South Africa, the experiences of Australia, Chile, Brazil, Mexico, Spain, India and China, in the creation of regional mechanisms for decentralised management and stakeholder participation, are instructive.

Australia has developed the institutional basis for decentralised management and user participation, as well as market-based allocation. It has also created one of the best managed river basin authorities in the Murray-Darling basin, which has to address the cooperative governance challenges of a multi-state basin in a country where water resource management is a state competency.

Brazil and India also have federal-state tensions in the management of water resources. Brazil has developed sound strategies for managing water resources and has clearly demarcated responsibilities, whereas the role of central government in India remains weak.

Mexico has made progress on the delegation of irrigation management to water user associations and the creation of some river basin organisations, which have been successful in resolving major conflicts over allocation and water quality problems. For many years, Spain has operated successfully with a number of river basin authorities responsible for most water resources management functions, but these have not been financially self-sufficient.

While some countries have developed independent agencies, basin level organisations are an extension of the water ministry in China and Sri Lanka, which contributes to a bureaucratic management approach.

Chile has embarked on a process of market-based water allocation, with decentralised management and clear demarcation of the responsibilities of water administration and users. It is important to note that even in situations where water markets are being developed, water resources remain in the public trust under the “ownership” of the state, with private water rights.

A further consideration is that river basin organisations are often responsible for both water resource development (infrastructure) and managing water use allocation, which potentially introduces the “poacher-gamekeeper” dilemma. Furthermore, it complicates the international experience as far as the setting and collection of charges for water resources management, as opposed to infrastructure development and operation (as discussed in the following section).

3.2.3 Charging for Water Use

As may be expected, the international experience with charging for water use has focussed on the costs of water resources infrastructure development and operation (including water services). These are by far the greatest costs associated with water management, with the administrative-management costs of managing water use representing a relatively small portion of the total cost (Dinar and Subramanian, 1997).

Where river basin organisations are responsible for both water resources infrastructure development and water use management, the distinction is seldom made in terms of the organisations’ financial systems. This is compounded by government financial support to these organisations, which facilitates a situation of partial cost recovery (usually oriented towards the infrastructure operation and maintenance costs). In many countries, the infrastructure capital costs and water use management costs are therefore not calculated and not charged for. It is even more unlikely that the costs of water resources (water use) administration-management will be estimated and charged for, where a government department (Ministry) performs this function.

Although the evolving water resources management paradigm has not yet established a general requirement for explicit charging for water use administration-management costs, the concepts of pollution charges and water markets have been introduced in a number of countries, as discussed below.

- Australia has historically recovered costs, but is more recently investigating water markets to increase water use efficiency, as well as the possibility of recovering the costs of water resources management.
- Until recently, Brazil has not charged bulk water tariffs, but this has now been addressed at a policy and legislative level, although administration and implementation is ongoing. Water markets are being introduced in certain areas.
- In England, there is an abstraction charge for the administration of licensing on authorised use (not actual use), which consists of a fixed access fee plus a proportional charge to recover the resource management costs. These charges related to volume, season, loss (or consumption) and region, but are not generally consistent throughout the country, an issue that is recently being addressed.
- France has charges that include the recovery of infrastructure costs (resource tax) and pollution discharge (pollution tax), with both fixed and variable portions (for irrigation). The pollution charge system has been functioning for a number of years and represents the major portion of the revenue for water resources management.
- Although irrigators in India have been charged for water use for many years, even the capital and operational costs have been widely subsidised. An interesting issue is

that charges are based on the area of irrigation, rather than volume used, due to the technological difficulty and expense in measuring actual consumption.

- Israel and Italy have recently introduced user tariff systems to reflect the quality of water supplied, but this is more related to allocation than management requirements.
- Namibia has a policy on the recovery of the full financial costs of water supply. There is also an emphasis on efficiency and water demand management, but this focuses on communications rather than water use charging.
- Regional Councils in New Zealand issue “resource consents” for water use and recover the administrative costs of permitting and compliance monitoring of this use.
- Spain has regulation levies (for beneficiaries of water infrastructure), tariffs for water use (consumption) and discharge levies (to cover the costs of externalities). However, the emphasis is on the users (and costs) of infrastructure, as illustrated by irrigators not being charged once the costs of water resources infrastructure have been paid off.
- Water markets have been established in the arid south-west of the United States, but these do not include the recovery of the costs of water resource management charges.

Pollution charges cover the administrative costs of managing waste discharge into water resources (which is a component of the water resources management charge), as well as some portion of the negative externalities associated with the waste discharge. They may be used to raise funds to mitigate the impacts of pollution and/or cause the polluters to reduce their waste discharge to an optimal level.

On the other hand, water markets have been introduced in areas where there is significant competition over water allocation. These markets are localised and managed, and are designed to increase water use efficiency. However, they are only of interest for this study, where the water resources managers recover the costs of water use management (including the transaction costs associated with the market) through this process. This may be more likely under an “administrative bidding system” (where the organisation is paid for the right to use water), rather than an open market between users (where users pay each other).

Based on this international experience, charging users for water resources management is most likely where the functions have been delegated to a river basin organisation, which is not primarily responsible for infrastructure development and operation. South African water resources management policy and legislation incorporates the international best-practice, and has extended this to explicitly distinguish between the costs of infrastructure development and operation, and the costs of water resources management.

The application of water use charges in the context of a water market requires is complicated where different charges are applied to the two parties involved in a transaction. In terms of the water resources management user charge, differential charges are only likely between uses in different sectors or in different catchments, as the user charges are consistent within an area and sector. In the near future, trading of water use is likely to be localised within a particular water use sector, and therefore this would not be an issue. However, were this to become an issue, the water use registration process would capture the change in use, and thus the associated change in charge. Furthermore a transparent charging system would provide all parties with information about the differences in charges, which would be factored into the transaction decision making process.

3.3 The South African Approach to Financing Catchment Management

3.3.1 Introduction

National policy with respect to pricing of water is set out in the White Paper (DWAF, 1997) and the NWA. This has been refined in *A Pricing Strategy for Raw Water Use Charges* (DWAF, 1999)⁴. The following four principles guide the water pricing strategy: social equity, ecological sustainability, financial sustainability and economic efficiency.

The principle of social equity is deemed important because it seeks to address the imbalances of the past, both with respect to adequate access to water supply services and with respect to direct access to first tier water. Ecological sustainability is important because South Africa is committed to following a path of development that is environmentally sustainable. Financial sustainability is interpreted to mean that the full financial cost of supplying water should be recovered directly or indirectly from water users, including the cost of capital. Economic efficiency is interpreted to mean pricing water so as to reflect its scarcity value and the opportunity cost of alternative uses. The pricing strategy asserts that each of these principles is of equal importance (DWAF, 1999).

The water pricing strategy under **Section 56(2)** of the NWA provides for setting of water use charges for: *funding water resource management, funding water resource development and operation, and achieving the equitable and efficient allocation of water*. This concept of three types of charge was incorporated into the White Paper, but as *catchment management charges, infrastructure charges and resource conservation charges*.

The focus of this guideline document is the financing of CMA water resource management functions. In terms of the user charges, this will predominantly be through user charges to cover the costs of water resources management (not infrastructure development and operation). The following sections highlight the pertinent points in the Pricing Strategy, and evaluate their applicability for CMA financing.

3.3.2 The Scope of the Pricing Strategy

There are a number of overarching issues in the strategy that should be noted:

Firstly, it should be noted that this first edition strategy seems to be (understandably) oriented towards the collection of charges by DWAF, and is not entirely appropriate for CMAs in its existing form. However, it provides the space for appropriate adaptation for this purpose, as is indicated below.

Secondly, the Schedule 1 allocations, the basic human need and ecological Reserve, international obligations and inter-WMA water exports have first claim on the water in a WMA (as part of the NWRS). The remaining water, including inter-WMA water imports, can be allocated within the WMA and represents the economic use of water. However, certain international obligations and water exports may also generate revenue.

⁴ Although this is referred to as a "Pricing Strategy" it is in effect a "Strategy for Setting User Charges", because this will be an administrative process for the foreseeable future.

Based on the resource protection philosophy underlying the NWA, the Pricing Strategy specifies that water use charges are not applicable to the requirements of the ecological and basic needs Reserve. This implies that the other “economic” users of water must cover the costs of catchment management in a WMA, which may be interpreted as a deviation from the public finance theory of user charges. Rather there is a strong argument that the allocation to the Reserve should be funded from the fiscus, as a public good, rather than being implicitly cross-subsidised.

Thirdly, the strategy only addresses consumptive use of water that may be expressed in volumetric terms, namely:

- abstraction of surface or ground water under section 21(a) of the NWA,
- evaporative losses associated with storing of water for recreational purposes under section 21(b), and
- forestry plantations as streamflow reduction activities under section 21(d).

Charges for waste discharge or disposal are not included, but are being addressed as part of a separate DWAF/WRC project to develop a Waste Discharge Charge System, although the administrative costs of water quality management may be collected through the existing system. Other users, such as recreation and instream activities are not yet included, but in the mean time may be addressed through the licensing conditions for authorisation of these water uses.

Fourthly, the strategy distinguished explicitly between four user sectors, namely:

- *water services authorities*, and by implication water service providers;
- *industrial, mining and energy*, and storing water for recreational purposes;
- *irrigation*, of agricultural lands; and
- *streamflow reduction activities*, which currently only includes forestry.

The two primary sources of funding for CMAs are fiscal transfers via DWAF from Parliamentary appropriations or water use charges collected from registered water users [Section 84 of the NWA]. Money may also be obtained from “any other lawful source for the purpose of exercising its powers and carrying out its duties”, which may include donor funds or loans.

The water use charges for funding water resource management represent the main source of income from water users for catchment management. **Section 56(2)(a)** of the NWA specifies that the pricing strategy for setting “water use charges for funding water resource management, (may) include the related costs of -

- (i) gathering information;
- (ii) monitoring water resources and their use;
- (iii) controlling water resources;
- (iv) water resource protection, including the discharge of waste and the protection of the Reserve; and
- (v) water conservation.”

The pricing strategy expands this into “those activities that are required to regulate, manage and maintain the water resource or catchment” (DWAF, 1999: pg 14). The particular functions referred to are:

- *Planning and implementation of catchment management strategies in terms of Chapter 2, part 2 of the Act.*
- *Monitoring and assessment of water resource availability, quality and use.*

- *Water quantity management, including flood and drought management, water distribution, control over water abstraction, storage and stream flow reduction, and to promote the beneficial use of water.*
- *The evaluation and processing of water use licensing and registration applications.*
- *Water resource protection, water quality management and water pollution control.*
- *Water conservation and demand management.*

As part of the implementation of the new policy and legislation, DWAF's budget has been restructured to contain an Integrated Catchment Management Trading Account, for the allocation of costs and collection of charges associated with:

- Functional support (indirect costs and regional office overheads);
- Catchment management strategies (planning and implementation);
- Dam safety control;
- Water quality management;
- Water utilisation (authorisation and monitoring); and
- Water conservation (including Working for Water).

These functions represent sub-areas of the water resources management function described in Chapter 2 of this document, but are not comprehensive. Rather they represent the status quo management activities, rather than those implied by the new policy and legislation. Furthermore, the DWAF WRM function is currently undergoing a restructuring process, which may result in a change in the Trading Account structure. Therefore, these will not be used further for the purposes of this guideline, but rather the broader CMA functions of water resource management will be addressed.

3.3.3 Considerations in Implementing the User Charge for Water Resource Management

The *Pricing Strategy* outlines a number of considerations and principles for setting water use charges for water resources management. The key considerations for this document are presented and discussed below:

Water use charges are only applied to and collected from registered water users

This simplifies the logistical requirements of setting, billing and collecting user charges, but introduces problems where users have not yet registered. Water users may be required to register their water use through conditions on a general authorisation, in terms of a regulation or as part of a license application. Registration (and associated billing) may be for groups of users represented by a single organisation, such as domestic and industrial users represented by water services authorities in a municipal area. Registration of existing water is taking place between April 2000 and March 2001. The pricing strategy then comes into effect in April 2001.

Water use charges are based on average registered volumetric water use

This is appropriate for the consumptive users addressed by the strategy, where irrigation and forestry use is estimated according to specified relationships with factors such as regional evapotranspiration, crop type and management practice (see Section 7 of the *Pricing Strategy*). This may take account of assurance of supply from government water schemes, which may need to be explored further from the CMA perspective, in terms of the applicability of the principle to all users.

The costs of WRM activities may be allocated differently to the user sectors

The pricing strategy goes further to indicate that irrigated agriculture will have 90% subsidy on water conservation, while forestry does not pay this component of the costs.

This is relevant for DWAF, where water conservation represents a large portion of the DWAF regional office budget, but needs to be extended for application to a CMA where various functions benefit different users to a greater or lesser extent. This topic will be revisited in Chapter 7 of this document.

Subsidies for under-utilised water in a WMA

The strategy proposes that the users in a WMA will only pay a portion of the total water resource management costs, based on the ratio of allocated (used) water to the total economically utilisable (allocatable) water in the WMA. This is an appropriate mechanism for the collection of charges by DWAF, where the relevant costs of the regional offices (and therefore each WMA) are relatively consistent. This facilitates a subsidy to relatively undeveloped WMAs with fewer users and resources. However, when applied to a CMA, this would penalise the highly developed WMAs in which the costs of water resources management are significantly higher than for undeveloped WMAs. This issue will be explored further in Chapter 7 of this document, in terms of the fiscal policy principles presented earlier in this Chapter. However, a policy debate needs to be fostered around the subsidy issue.

Revenue will be split between DWAF and the CMA relative to the activities performed

This is appropriate, particularly in the transitional phase while functions are being transferred from DWAF to CMAs. In practice, the CMA should be performing additional functions that DWAF was not performing, and therefore the CMA cost is likely to be far greater than the estimated DWAF cost. The most likely scenario is that DWAF would estimate the user charges needed to cover the costs (less subsidies) of the remaining DWAF (undelegated) functions, and would bill the CMA for this. The CMA would treat this as a financial input cost, in the same way as the cost of an inter-WMA import or outsourced function.

A recipient WMA pays the proportional costs for water from donor WMA

The financial transfer between two WMAs involved in an inter-WMA transfer is to be based on the relative portion (ratio of export to total available) of the total WRM budget in the donor WMA. This implies that water used in another WMA has the same water resource management costs as water used in the donor WMA. This is applicable for DWAF regional offices managing water resources and collecting charges, but not for CMAs. There are a number of benefits that the residents of a WMA gain from water resources management, other than the availability of water supply of adequate quality. Furthermore, the donor catchment does not have to carry the costs associated with as managing the effluent return flow and organisational development for the actual users. A case may be made (and will be in Chapter 7 of this document) for the reduction of user charges for water exports, in line with the benefit accrued to the users and the management requirements for the CMAs.

Monthly billing for municipal and industry and 6-monthly billing for irrigation and forestry

This simplifies the billing and collection of charges. The strategy also introduces the possibility of a threshold amount below which users may not be billed, as the administrative costs outweigh the cost recovery. It should be highlighted that water use charges may be collected from water management institutions or consumers directly (**Section 56(3)(b)** of the NWA). **Section 57(2)** indicates that “charges made within a specific water management area may be made by and are payable to the relevant water management institution.” From a logistical perspective, all water use charges applicable to a particular water user should be billed and collected together.

No inter-WMA subsidies for water resource management

Water use charges for water resource management are meant to cover the costs, and not constitute the imposition of a levy, duty or tax. Therefore, the Pricing Strategy prevents users in one WMA from subsidising users in another WMA, although they would have to cover the relevant costs of water management in a donor WMA in the case of inter-WMA transfers. Any grant or subsidy to a WMA should be in the form of a parliamentary appropriation, channeled through DWAF ICM Trading Account. However, this does not apply to cross-subsidies between catchments or sectors within a WMA

In summary, the Pricing Strategy provides a good basis for recovering the costs of water resources management, particularly from the perspective of DWAF. However, this needs to be adapted for application to the financing of a CMA.

3.3.4 Financial Support from DWAF

Since the promulgation of the Pricing Strategy, there has been limited further development of policy on the issue of CMA financing. However, the following issues from the forthcoming national policy on catchment management are relevant.

- The subsidy for the unutilised portion of the allocatable water in a WMA may be (partially) transferred to the CMA.
- An establishment grant may be provided to CMAs, based on motivation presented in the proposal for establishment. This is consistent with water resources management as a quasi-collective service.
- In cases of limited affordability, low registration or excessive default of users in a WMA, DWAF may provide the CMA with additional funds for operation, for a certain period after establishment, particularly in catchments in previously disadvantaged regions of South Africa.
- Where cost recovery is limited, the preference should be for the DWAF RO to perform any functions that have been delegated to the CMA, according to the policy and strategy of the governing board. In general, further functions will not be delegated to a CMA until it can demonstrate that it is satisfactorily performing and recovering cost for the currently delegated functions throughout the WMA.
- The CMA should receive any other subsidies related to water resources management activities that they are performing, such as working for water programme. Similarly, the CMA may be the most appropriate institution through which to channel subsidies aimed at redress, such as support for emerging farmers.

Although these issues have been highlighted, the details and mechanisms required for implementation have not yet been put in place. A DWAF project has been proposed to address these issues.

The following issues are pertinent in this regard.

The need of a CMA for financial support during its establishment (particularly for start-up capital expenses) and initial operation (in first 5 years) is unquestioned. However, a CMA that cannot cover its operating costs in the medium term is financially non-viable. It should therefore not be established, based on the results of the viability study in the proposal for establishment conducted under **Section 77** of the NWA.

The issue of CMA borrowing is a highly problematic issue that has not been resolved. A distinction should be made between short-term borrowing, to cover initial capital and operating costs against cash-flow, and long-term borrowing associated with water resource infrastructure development. Short-term borrowing should be capped relative to income, and this will likely be the case automatically when the CMA applies for overdraft and loan facilities from private financial institutions. Although, the NWA permits CMAs to raise funds for and manage water resource infrastructure development, this introduces several complexities.

Firstly, the skills required to raise finance and project manage this type of development are completely different from those required to manage water resources. This is more appropriately performed by organisations that are set up for this purpose, such as DWAF, water boards, water user associations. Secondly, the required budgets (and associated water use charges) are far in excess of the water resource management budget, which will possibly shift the focus of the organisation from resource management to resource development. Finally, the Department of Finance is likely to resist providing guarantees for CMAs, which would restrict the possibilities for the CMA being able to raise the require loans.

4. ESTIMATING THE COST OF CMA FUNCTIONS

4.1 Introduction

This Chapter explores the costs associated with catchment water resources management, with the emphasis on the role of the CMA. The estimation of costs is based on an unpacking of the resources required to perform the functional areas and phases of CMA evolution discussed in Chapter 2.

There are a number of ways in which a CMA may ensure the execution of any functions. In reality, the CMA may use a combination of the following general management models:

- *In-house CMA capacity*: requires the CMA to acquire the personnel and infrastructure necessary to perform the functions.
- *Shared CMA capacity*: enables neighbouring CMAs to “share” certain highly skilled personnel or infrastructure, particularly where there are capacity constraints or the need for significant cooperation between WMAs.
- *Re-delegation*: of functions to other water management institutions (or possibly other organs of state) in the WMA that have the necessary administrative or technical capacity.
- *Outsourcing*: of functions under a management or services contract, to private companies, public institutions or representative organisations (such as catchment forums).

The discussion in this section is oriented towards the estimation of the full costs of catchment management to the CMA. Therefore, for the purposes of this analysis, the number of staff and associated resources required to perform the functions during each phase is estimated, possibly representing efficient in-house capacity. In reality, where these functions are outsourced, this would be a budget item managed by fewer CMA staff.

It should be noted that the CMA should outsource functions to other organisations, particularly where these organisations are already performing these functions. This approach reduces the inefficiencies associated with duplication, as well as highlights the management role of the CMA, thereby potentially increasing its legitimacy.

4.2 Staffing Requirements for an Evolving CMA

A CMA governing board may develop the CMA organisational structure in various ways, and this may change as the CMA evolves and/or adopts different management approaches through the four phases. However, the functions that may be performed by a CMA as it evolves through the four phases of development require particular areas of competence. The capacity and resources required to support these competencies can then be identified.

4.2.1 Competencies Required to Perform the CMA Functions

Table 4.1 presents the likely or possible competencies required by a CMA in each of the key functional areas, during each phase. Although this does not explicitly relate to the

structure or organogram of the CMA, as this may be designed in various ways, it highlights the expertise that the CMA requires to perform its relevant functions. This is used to estimate the personnel requirements in Table 4.2 and the possible range in financial costs of the CMA as it evolves in Table 4.3.

Table 4.1. Evolving CMA competencies required for the key functional areas

Function	Phase	Competency
Corporate Services	Initial	CEO to manage/coordinate CMA activities Secretariat to the CMA Governing Board Administrative support for the CMA functioning
	Financial	Financial accounting/management (possibly linked to the other financial requirements – business planning and charges)
	Management	Human resources management General Administrative support to the other functions
	Authority	Legal support (possibly linked) to regulatory function
Policy & Strategy	Initial	Strategic water resources planning – CMS development
	Financial	Business and financial planning for the CMA (possibly linked to the Corporate Service financial accounting competency)
	Management	Sectoral/issue based water resources planning, including WC&DM Social, economic and ecological planning, including resource directed measures (Reserve and Classification) expertise
	Authority	<i>Note 1</i>
Support Organisations	Initial	Communications and public consultation Coordination of water sector organisations
	Financial	Cooperative governance and partnership creation and relationship management
	Management	Organisational development and capacity building
	Authority	<i>Note 1</i>
Regulatory	Financial	User charge management - setting, billing and collecting (possibly supported by Corporate Service finance)
	Management	Advisory water resources management to DWAF:RO
	Authority	Technical water resources, social and economic licensing Legal expertise (possible provided by Corporate Services legal)
Information Management	Financial	Management of financial-economic information for user charges (possibly as part of Corporate or Regulatory finance function)
	Management	Water resources monitoring (hydrology and quality) Catchment (wr, social and economic) information management Evaluation methodologies research and development
	Authority	Monitoring of water use (quantity, quality and other) Management of water use/authorisation information
Audit	Financial	Internal financial audit (by independent body) Audit WMLs (possibly by Organisational Development function)
	Management	Audit compliance with CMS and RQ objectives (possibly as part of Information Management function) Audit CMA internal functional performance
	Authority	Audit compliance with water use allocation
Physical Interventions	Management	Water conservation programme implementation Water resources remediation and rehabilitation Technical water use/demand management interventions Water resource infrastructure development and operation?
	Authority	Source (water use or pollution) directed interventions to ensure directives for control and enforcement

Note 1: No additional competencies required, but possible increase in required resources.

At the CMA viability study or even business plan stage, the only real financial difference between the alternative management models outlined above would be in the administrative overheads (such as the human resources function) and possibly the efficiency (depending upon the CMA management effectiveness). DWAF (1999) provides more detail about the considerations for CMA structure and evolution, upon which the following discussion is based.

4.2.2 Possible Evolution of the CMA Structure

Table 4.2 indicates potential staff requirements for the different functional areas during each phase of the CMAs evolution, according to the competencies outlined in Table 4.1. For the purposes of this exercise, these estimates assume that all the relevant functions are performed by CMA staff, rather than being outsourced.

Table 4.2. Possible evolving staff requirements for the CMA functions.

Functional Area	Staff level	Phase			
		Initial	Financial	Manage.	Authority
Corporate Services	Manager	1	1	2	2
	Senior	1	1	2	2
	Junior	1	2	2-3	2-3
	Admin	1	1	2	2
Policy & Strategy	Manager	1	1	1	1
	Senior	1	1	2-4	2-4
	Junior	2	2	1-2	1-2
	Admin	1	1	2	2
Support Organisations	Manager	1	1	1	1
	Senior		1	1-3	2-3
	Junior	2	2	2-4	3-6
	Admin	1	1	2	3
Regulatory	Manager		1	1	1
	Senior		1-2	2	4
	Junior		2-4	2-4	4-6
	Admin		1	2	5
Information Management	Manager			1	1
	Senior		1	2-3	3
	Junior		2	2-6	6
	Admin		1	4-10	6-12
Audit	Manager			1	1
	Senior		1	1-3	2-3
	Junior		1	2-3	3
	Admin		1	1	2
Physical Interventions ¹	Manager			1	1
	Senior			2-5	3-5
	Junior			2-6	3-6
	Admin			2	2
Total staff complement	Manager	3	4	8	8
	Senior	2	6-7	12-22	18-24
	Junior	5	11-13	13-28	22-32
	Admin	3	6	15-20	22-28

Note 1. This does not include capacity for infrastructure development and operation.

These estimates would vary, depending upon the type and severity of the water resources priorities in the particular WMA and the functions that have been delegated or

assigned to the CMA. The water resources management priorities and associated staffing requirements, would be identified by the CMA Governing Board (as representative of the stakeholders in the WMA), and should therefore reflect the needs and resources within the WMA.

In reality, there would be a number of staff levels (or grades). However, for the purposes of this analysis only four generic staff levels are differentiated, namely:

- *Manager*: CEO and the directors of sections.
- *Senior*: Sub-function coordinators and specialists.
- *Junior/officer*: Technical staff and senior admin assistants.
- *Admin assistant*: Clerks, secretaries and administrative support staff.

Table 4.2 implies a maximum staff compliment where functions are performed in-house by the CMA. Table 4.3 presents a possible minimum staff compliment, where most functions are outsourced to other organisations, with appropriate capacity and expertise. Under this scenario, the CMA plays a regulatory and coordinating role, and would therefore need capacity (particularly managerial skills) in the policy-strategy, regulatory-audit, organisational support functions. The technical and implementation functions would largely be outsourced.

Table 4.3. Minimum CMA staff requirements with outsourcing.

Functional Area	Staff level	Phase			
		Initial	Financial	Manage.	Authority
Total staff Complement	Manager	3	4	6	6
	Senior	3	4	6	8
	Junior	-	2	4	8
	Admin	3	4	6	8

4.3 Estimates of Catchment Management Agency Costs

4.3.1 Introduction

CMA costs are associated with the operating and capital expenditure required to perform water resources management functions. This section provides an overview of the CMA costs, while the *Catchment Management Finance Model* described in Appendix A provides more information on the detailed costs, and how they are used to estimate the CMA expenditure and cash-flow.

Before embarking on this description, the different types of CMA expenditure need to be highlighted (relating to different types of costs):

- *Capital and operating expenses*: Capital costs represent occasional expenditure by the CMA on buildings, equipment and machinery (which is often financed through loans), while operating costs are the recurrent expenses (staff and overhead costs) required to support the CMA functioning. This distinction is important in terms of their treatment in the CMA financial model. For CMAs (which do not finance infrastructure development), operating expenditure is likely to greatly exceed capital expenditure.

- **Fixed and variable costs:** Fixed costs are those that constant every year, independent of the amount of water used (i.e. charged for), while variable costs relate to the amount of water used. This distinction could be important in terms of estimating charges for different water users, particularly if seasonally variable charges are to be implemented. However, the costs of CMA functions have a negligible variable component, and in fact generally increase during drought periods when more intensive regulation may be required.

A distinction should also be made between the costs of CMA establishment (start-up expenditure) and ongoing capital and operating expenditure. The once-off costs associated with establishing a CMA are likely to be largely for capital expenditure, which may be linked to an establishment grant from DWAF, while the ongoing expenditure should be financed from revenue collected (possibly supported by operating subsidies).

4.3.2 Annual CMA Costs

By far the greatest portion of CMA operating costs are associated with personnel remuneration, and thus the staffing estimates in Table 4.2 provide the basis for estimating operating costs. *The South African Staff Survey* provides ranges for total remuneration at different levels as outlined in Table 4.4, including extras such as pension and medical aid. It must be noted that these values actually vary in different parts of the country and for the particular job description (skill), but for brevity average values have been presented. The forthcoming *DWAF Guidelines for CMA Organisational Development* (DWAF, 2000) provides a more accurate breakdown of these values for different positions.

Table 4.4. Ranges annual remuneration for different generic staff levels.

Staff	Lower quartile	Median	Upper quartile
Manager ¹	R 280 000	R 340 000	R 400 000
	R 210 000	R 240 000	R 265 000
Senior	R 155 000	R 190 000	R 210 000
Junior ¹	R 110 000	R 130 000	R 150 000
	R 90 000	R 100 000	R 120 000
Admin	R 45 000	R 55 000	R 65 000

Note 1. The range in remuneration represents the differences in responsibility between technical and administrative staff.

The overheads required to operate the CMA may include service fees, rates, stationary, travel and subsistence and communications. These may be estimated on an itemised basis, as in the CMA Financial Model. However, these costs may be simply estimated as a percentage of staff costs, generally ranging between 15% and 20% (excluding capital repayments, as discussed below).

The above overhead estimates do not include the cost of monitoring, including collection and analysis of hydrological, water quality and biomonitoring data, which becomes relevant in the management and responsible authority phases. Depending upon the characteristics of the WMA, the water resources problems and the intensity of monitoring, this may vary from at least R 800 000 up to R 4 000 000 per annum (excluding the staff remuneration). This monitoring function may be outsourced (which would also reduce the number of admin level staff), where local capacity exists.

The CMA governing board would be supported by the CEO and other functions of the CMA, but there will also be the remuneration and subsistence and travel (S&T) for

governing board members. The DWAF policy is that this will be limited. It can be assumed that there would be about 12 (8 to 15) board members with 6 to 10 meetings per year, depending upon the phase of development. At R4000 remuneration and R1000 S&T per member per meeting, this would be R 400 000 to R 600 000 per annum.

Currently, there is significant expenditure by DWAF (about R 100 million per annum) on the Working for Water Programme, particularly in certain WMAs. This may be delegated to a CMA during the Management phase of evolution, and may require up to R 5 000 000 per annum to support.

Finally, there may be the need to obtain specialist technical advice to support decision making and the development of the CMS, particularly while the CMA is still in the Initial and Financial phases. DWAF staff may provide this support, or additional funds may be required to hire specialist consultants. However, this should not account for more than R 500 000 per annum.

Table 4.5. Possible ranges operating costs (R 000/annum).

	Initial	Financial	Management	Authority
Governing board	400	500	500 - 600	500 - 600
Remuneration	1 900	3 800	6 600 - 10 500	9 100 - 11 400
Overhead	400	700	1 100 - 1 800	1 400 - 1 800
Monitoring	-	-	800 - 3 000	1 000 - 4 000
<i>Total</i>	<i>2 700</i>	<i>5 000</i>	<i>9 000 - 15 900</i>	<i>12 000 - 17 800</i>

Table 4.5 highlights a possible range in total remuneration costs for the four phases of CMA evolution, with estimates of the overhead and monitoring costs, based on the above information. It excludes the consultant and Working for Water costs, as these are likely to vary considerably between CMAs. The remuneration costs are based on the staff complement and average remuneration presented in Tables 4.2 and 4.4, respectively.

In addition to these operating costs, the CMA will require capital expenditure (both on establishment and on an ongoing basis) for the following types of items

- Information/communications equipment, such as computers, faxes, etc.
- Vehicles, for the monitoring, organisational development and regulatory functions.
- Library, particularly during establishment
- Buildings, where these are purchased rather than rented.
- Laboratory equipment, where monitoring is performed in-house.

Where short-term loans are taken to cover these capital costs, these must be repaid with interest over an agreed period. The CMA Financial Model provides more detail on the capital costs.

These capital costs do not include the costs of water resource infrastructure development and operation, which is covered by the user charge for water resource development, and must therefore be kept separate for accounting purposes.

4.3.3 Unit Costs for Catchment Management

A total estimated water use in South Africa of about 17 500 million m³/annum (DWAF, 1997)⁵ was assumed for the purposes of this report in estimating average user charges, with:

- Municipal and domestic using about 2 900 million m³/annum (17%);
- Industrial and mining using about 3 200 million m³/annum (18%);
- Irrigation using about 10 000 million m³/annum (57%); and
- Forestry using about 1 400 million m³/annum (8%).

This is equivalent to an average of about 920 million m³/annum use in each of the 19 WMA, although in reality the total water use in various WMA ranges between 500 million m³/annum and 1 500 million m³/annum. The registration of irrigation and forestry users is likely to be slow, which implies that municipal, domestic, industrial and mining users are likely to pay the majority of the users charges for water resources management within the first few years of CMA establishment, unless DWAF provides an establishment operating subsidy. Furthermore, there is likely to be some default, particularly immediately after a CMA's establishment.

Based on the above values, if all users paid equal charges, on average the user charge during the Initial phase would be about 0.3 cents/m³ increasing to between 1.3 and 1.9 cents/m³ for full CMA functioning (the Responsible Authority phase)⁶. This increase would take place in a gradual manner as the CMA evolves over a number of years, thereby allowing users to adjust to the new charges and perceive the benefits of the CMA. The CMA governing board (representing stakeholders and users) and in consultation with DWAF (as representative of the public trust) would be responsible for the development of the CMA as an organisation and its associated costs. It should therefore not allow the expansion of the user charges above what is affordable and acceptable to the users.

However, it is likely that only about 80% of municipal and industrial users and 30% of agricultural users would register and pay in the initial phase, which implies that a charge of between 0.5 and 1 cent/m³ is more likely during this phase. Similarly there will be non-registration and non-payment, even at the later phases of development of the CMA.

It may be appropriate to differentiate the charges for irrigation and forestry from those for municipal and industrial use, because the assurance of supply to this sector is lower and they may not benefit from as many of the water resources management functions. Despite this, the above analysis indicates that it is very unlikely that the domestic and industrial user charges for water resources management will be greater than 10 cents/m³, while the charges for irrigation and forestry are likely to be between 0.5 and 2.5 cents/m³. This implies that the user charge for water resources management applied to irrigated agriculture (at an average use of 8 000 m³/ha) would be between R40 and R200 per hectare, whereas forestry (at an average use of 1 000 m³/ha) would be between R5 and R25 per hectare.

It should also be noted that current DWAF estimates of the charge that must be paid to DWAF, where all functions are performed by DWAF, ranges from about 0.25 cent/m³ for forestry to about 1 cent/m³ for domestic and industrial users. This would reduce as

⁵ This estimate is being updated in the National Situation Assessment Modelling process, but for the purposes of this study, these values provide adequate average values.

⁶ These estimates are based on the estimated cost of a fully functioning CMA (R12 million to R17.8 million per annum) divided by average water use (920 million m³/annum).

functions were transferred to the CMA, but must be added to the charge required to cover the CMA's operating cost⁷.

The case studies discussed in Appendix A provide a more detailed analysis of the user charges for two WMAs, namely the Nkomati WMA and the Crocodile-Marico WMA.

⁷ Depending upon the treatment of the Reserve and possible operating subsidies, the average user charges estimated in this section may be reduced by the ratio of the Reserve to total use (probably in terms of yield). Assuming this ration is about 10%, this would result in a reduction of these user charges by about 10%. This may require a total CMA operating subsidy through DWAF (from the fiscus) in the order of R30 million per annum (or an average of about R1.5 million per CMA), once all CMAs are fully functional, depending upon the average CMA expenditure.

5. INSTITUTIONAL CONSIDERATIONS FOR FINANCING CMAS

5.1 Institutional Arrangements for Financing Catchment Management

The *Guides for the Establishment of CMAs and WUAs* (DWAF, 2000) provide an outline of the possible roles and relationships of different groups in catchment management, which is also the focus of an on-going DWAF-funded project. Without duplicating these studies, the following discussion highlights the possible roles and responsibilities of these groups from a financial perspective.

Before unpacking the details of the financial relationships, it is useful to highlight the different types of institutional relationships that may develop *between a CMA and the other key role-players* (organisations and stakeholders) that may be involved in catchment management in a WMA. Although there are similar relationships between these other role-players, the focus of this discussion is on the CMA, and thus these other relationships are not explicitly addressed.

- *Statutory* relationships are based on the establishment of a statutory body by another statutory, and/or the assignment or delegation of powers, duties and functions between statutory bodies. Responsibility and accountability is clearly specified in terms of these functions. Establishment and delegation of functions to a CMA by DWAF, and the re-delegation of functions to WUAs represents this type of relationship.
- *Cooperative governance* is a statutory obligation, which may take the form of formal agreements or informal arrangements between organs of state. It contributes to the clarification, alignment or efficiency in performing functions by two or more organs of state. Coordination of planning functions between the CMA and other government departments represents cooperative governance.
- *Contractual* relationships are based on a legal agreement between parties, and usually involve payment for services rendered. The contracting organisation is primarily statutorily responsible and accountable for the function. For catchment management, this will generally be between the CMA and private sector (consultants), non-statutory bodies (fora) or even statutory institutions (water boards).
- *Representative* relationships are those between a representative body and its stakeholders or members, and provide a mechanism for public participation in decision making. The relationship between members of CMA governing board and the stakeholders is particularly relevant for catchment management, as the board members should represent and be accountable to the general interests of water users, while the water users are financially responsible for the financial sustainability of the CMA.
- *Informal* relationships are voluntary associations, based on common interests and provide for information sharing and consultation. Catchment management fora and their relationship with the CMA and stakeholders may be based on informal relationships. Similarly informal relationships may be developed between the CMA and other interest groups or other organs of state.

It is possible for more than one type of relationship to exist between a CMA and another organisation. These institutional relationships provide the basis upon which the financial relationships may be developed. In particular:

- statutory relationships may be associated with powers to raise water use charges or may be supported by fiscal transfers in the form of grants or subsidies;
- cooperative governance relationships between a CMA and other organs of state are not generally associated with financial transfers (although financial support for land use management functions with catchment management benefits may be appropriate);
- contractual relationships are associated with payment for services rendered, which may be in the form of deduction of that portion of the users charge where the contracted organisation is also responsible for recovering water use charges;
- representative relationships are usually associated with payment of water use charges (or membership fees), in return for accountable water resource management; and
- informal relationships do not generally involve financial transfers, although certain bodies (such as fora) may receive funding for their activities where these further the interests of water resources management.

Based on this, Figure 5.1 summarises the financial flows between water users and institutions from the perspective of the CMA, particularly in terms of water resource management related water use charges and fiscal transfers.

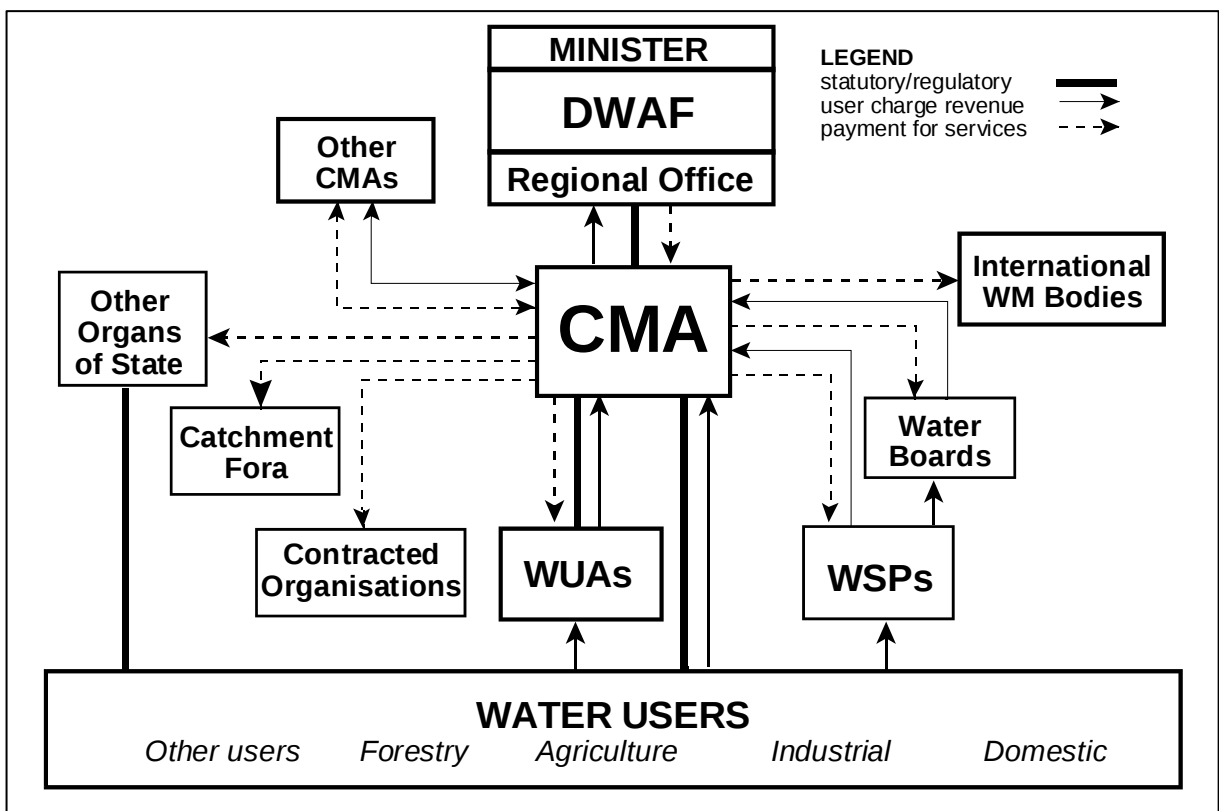


Figure 5.1. Financial flows between a CMA and other institutions within a WMA

Inter-WMA transfers

In the case of inter-WMA transfers, there are a number of possible financial-institutional arrangements to collect and transfer charges from users in the recipient WMA to the CMA in the donor WMA, as illustrated in Figure 5.2.

- The most likely scenario is that the CMA in the recipient WMA collects all user charges (possibly supported by water boards or WUAs) and then pay these directly to the CMA in the donor WMA (particularly where transfers are into surface water resources).
- An adaptation of this is that the DWAF regional office acts as an intermediary for transferring these user charges between the two CMAs.
- In the case of domestic and industrial users in the recipient WMA that are supplied by a water board that spans both the donor and recipient WMAs, the water board may collect the charges and then transfer a portion of these charges to the donor CMA.
- Where strategic users (such as ESKOM) are supplied directly from a donor WMA (according to the NWRS), payment may be made directly to the donor CMA.

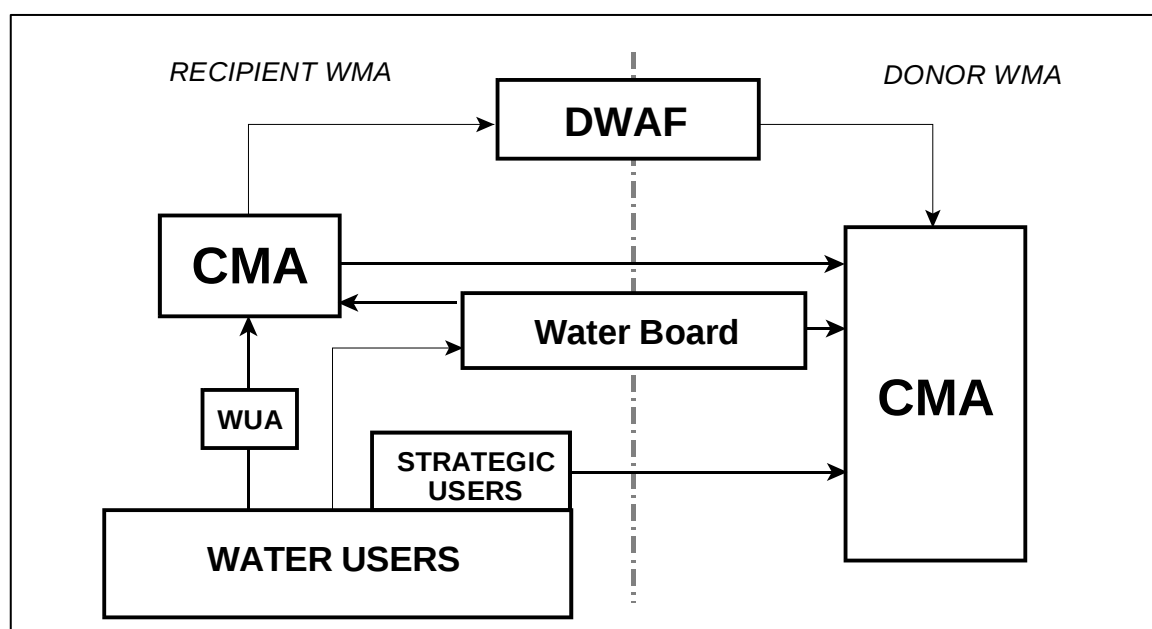


Figure 5.2. Financial flows to a CMA in a donor WMA.

The following sections outline the roles of various institutions in the collection and distribution/flows of user charges for water resource management.

5.2 DWAF

The National Government acting through the Minister of the Department of Water Affairs and Forestry is the public trustee of the nation's water resources, and *must ensure that water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner* [Section 3(1) of the NWA]. Furthermore, in areas where a CMA has not been established, is not functional, or has not had certain powers assigned or delegated to it, the powers and functions of the CMA vest in the Minister [Section 72]. Therefore, the DWAF Regional Office will continue to perform all catchment management functions in a WMA, until those functions have been delegated or assigned to a CMA or any other water management institution.

Currently, most of the costs of the DWAF Regional Office (DWAF:RO) are covered by parliamentary appropriation. However, as outlined in the *Pricing Strategy* (DWAF, 1999) the intention is to recover the DWAF:RO costs associated with water resource management functions through water use charges. Therefore, even where there is a CMA that is recovering water use charges, part of these charges may be transferred to DWAF to cover the catchment management functions that have not been delegated, together with the water use charge that is associated with water resource development (i.e. the infrastructure charge). The charge for water resource management that must be transferred to DWAF would be calculated by DWAF, at least at a regional and possibly at a national average.

On the other hand, DWAF may support the establishment and operation of a CMA through parliamentary appropriation, as an establishment grant or operating subsidy, as discussed in Section 3.3.

5.3 Catchment Management Agencies

As outlined in Chapter 2, catchment management agencies (CMAs) are the statutory body that is intended to coordinate and conduct all catchment management functions in a WMA, so as to promote local community participation in water resources management. Therefore, the CMA acts as the “institutional node” for catchment management, and should aim to set and ensure the recovery of all water use charges for water resources management in the WMA, as soon as possible after its establishment.

However, from a logistical perspective, the CMA should avoid billing and recovering water use charges directly from water users, except where a (large industrial or agricultural) user is licensed directly by the CMA. The CMA should coordinate with WUAs and WSPs to recover charges. This coordination may occur through the so-called catchment management committees, established under **Section 82(5)** of the NWA. These committees may be responsible for a specific catchment within the WMA or a specific function.

In the case of inter-WMA water transfers, the CMA (or DWAF:RO acting as the CMA) in the recipient WMA would pay the relevant water users charge to the CMA in the donor WMA. This would most likely be directly between CMAs, but could possibly be through the DWAF:RO. However, as indicated above, a regional water board may collect and pay charges directly to the CMAs in the donor and WMA, while strategic users may pay the CMA in the donor WMA directly.

In situations where a neighbouring (or upstream-downstream) CMA has more capacity, or may perform a function more effectively, a CMA may delegate or contract this function to the other CMA, with appropriate payment for services rendered.

5.4 Other Water Management Institutions

Water user associations and bodies responsible for international water management (in addition to CMAs) are explicitly mentioned as water management institutions (WMIs) in **Section 1(xxvi)** of the NWA. The roles of these bodies in terms of the financing of catchment management are briefly discussed in this section.

The definition of a WMI also includes “any person who fulfils the functions of a water management institution” in terms of the NWA. This implies that any organisation to which

catchment management functions have been delegated is a WMI, which is most likely to be a water services institution, another organ of state or a contracted organisation. Each of these types of organisation are discussed in the following sections.

Water User Associations

Water user associations (WUAs) may be established under **Section 92** of the NWA with powers delegated to them by the Minister under **Section 63(1)(c)**. Their primary purpose is not water management, but rather a cooperative association of individual water users who wish to undertake water management activities for their mutual benefit at a restricted localised level. However, WUAs may play an important role in catchment management, particularly in recovering water use charges from their members and performing localised management functions.

WUAs may be either uni-sectoral or multi-sectoral in nature, but registration and allocation of water use to the WUA should differentiate between types of users within and between sectors. Similarly, setting and recovery of water use charges should differentiate between these types of users, whether or not the same water resource management charge is applied to them. The WUA should transfer the recovered costs to the CMA at a regular frequency.

A CMA may delegate or contract a specific function to a WUA, in which case the WUA should be paid to perform that function. It is most likely that the WUA will hold back that portion of the total recovered water use charge, although it may be preferable for the CMA to collect all income and redistribute it, particularly where rates of non-payment are high.

International Water Management Bodies

Where international water management bodies have been established in internationally shared river basins under **Section 102** of the NWA, the Minister may delegate powers to them under **Sections 103(2) & 63(1)(c)**. These bodies are not created primarily for catchment management, but rather as vehicles for international cooperation, as well as the development and operation of large international water resource infrastructure. However, in certain cases they may perform catchment management functions and should be paid accordingly. They may recover charges directly from the water users associated with the infrastructure that they operate, or would depend upon the CMA to collect and transfer the relevant charges, either directly or through DWAF.

5.5 Water Services Institutions

Water services institutions, and particularly water boards, established under the Water Services Act (Act No 108 of 1997), may be included as water management institutions, where they perform delegated or contracted catchment management functions. However, in terms of the financing of CMAs, they play an even more important role in collecting water use charges from individual water users.

Water Boards

Water boards are established and operate under **Section 1** of the Water Services Act. They are not automatically defined as water management institutions, except where they have been delegated specific management functions under **Section 63(1)(e)** of the National Water Act. However, in certain WMAs they have significant capacity to perform

catchment management functions, and these are likely to be contracted or delegated to them by the CMA.

Where water boards exist, their primary role is the operation and development of water resources infrastructure. They are generally responsible for the collection of bulk infrastructure water use charges from their municipal and industrial customers, and thus they present the most appropriate organisation to collect all water use charges.

Water Service Providers

Water service authorities (i.e. a local authority), water service providers and water services committees as defined in the Water Services Act, are responsible for supplying water and sanitation services to the people in their area of jurisdiction. They are also responsible for billing and collecting revenue from their customers. These bodies would register the total domestic and industrial use of their customers with the CMA, and would be required to recover the relevant water use charge for water resource management. This may be paid directly to the CMA or via a water board, noting that the CMA should collect charges from the highest level organisations to reduce administration.

5.6 Other Organs of State

Chapter 3 of the South African Constitution requires all organs of state to conduct their activities within the principles of cooperative governance. This is particularly important for CMAs, which are established and have powers under the NWA, but require the cooperation of other organs of state for land use related management in the catchment.

National and Provincial Government and Statutory Agencies

Environmental management in South Africa is highly fragmented between and within the three spheres of government. Therefore, CMAs need to actively foster cooperative governance relationships with other government departments and statutory agencies. In some cases, this may mean financial support to ensure that these organs of state have the capacity to perform their mandated (or delegated) functions that are particularly important for catchment management in that WMA.

Local Government

Local government plays a number of roles with respect to catchment management. Firstly they are water services authorities, and thus represent the interests of the water users within their area of jurisdiction, as well as being responsible for collecting water use charges on behalf of the CMA. Secondly, as part of this responsibility, local authorities may be involved in the development and operation of water resources infrastructure, particularly where there is no water board, but this generally has no financial implications for the CMA. Thirdly, they may perform certain contracted or delegated catchment management functions in their area, such as monitoring, for which they may be paid.

Finally, they have a mandate for local land use planning and municipal services provision (including water services development plans), which have significant consequences for catchment management. This highlights the need for the CMA to foster cooperative governance relationships, and may lead to “subsidy” of a local authority to implement a source directed intervention that contributes to improved water resource management.

5.7 Contracted Non-statutory Organisations

A CMA may contract a private company, consultant, academic or research institution or catchment forum to perform a catchment management function at a sub-catchment or WMA scale. They may require a payment for services, where the CMA is responsible for recovering water use charges (service contract) or a proportional reduction of collected revenue, where the contractor collects water use charges (management contract or concession).

Catchment Fora

Catchment fora play a critical role in catchment management and may be involved in any of the following activities:

- assisting in the establishment of a Vision for the WMA or a sub-catchment;
- facilitating the participation of stakeholders in water resources management;
- advising the CMA on water resources management issues;
- fostering cooperation and integrated planning between institutions (eg. local authorities);
- performing monitoring, auditing and information collection functions; and
- information dissemination to stakeholders and water users.

As such it may be in the interest of the CMA to pay for these fora to perform functions, or to support the on-going operation of a forum, where this facilitates the CMA in performing its functions.

6. RECOVERING WATER RESOURCE MANAGEMENT CHARGES

6.1 Introduction

As highlighted in Chapter 2, the definition of water use has been expanded in the NWA to include all activities that have an impact on the water resource. In general, three types of activities may be identified, namely those that primarily have an impact on water quantity, water quality and directly on the instream & riparian zone, noting that this includes water abstracted from or returned to a surface or ground water resource.

The traditional domestic, industrial and agricultural water use sectors generally have impacts on water quantity through regulation and abstraction (or use directly from the resource) and on water quality through effluent discharge and return flow. However, the broader definition of water use under the NWA implies a number of other water use sectors, which are associated with land use, waste disposal and instream activities that have impacts on the water resource.

The following discussion describes the various water use sectors, based on the breakdown used in the CMA Financial Model. This definition of water user groups is commonly used by DWAF and local authorities, which makes input data more readily available. The organisations that are responsible for providing (or coordinating) use of water to these generic sectors are highlighted, particularly in terms of their role in billing and collecting water use charges from individual users.

In this context, water use charges can only be collected from registered users, either directly under their registration or licensing procedures, or via a body to which they already pay water tariffs or membership fees. An important consideration in setting charges for a water user group relates to the costs of recovering the charges relative to the revenue, particularly where this must be done directly from the users (see Chapter 5).

6.2 Municipal Users

Municipal water use may relate to urban or rural communities supplied by a water services provider on behalf of a local authority (water services authority) and consists of three main water user groups:

- ❑ *Domestic*: ranging from rural communities through peri-urban settlements, to high-income households with formal in-house water supplies;
- ❑ *Commercial, Institutional and Dry Industrial*: using water for general consumption, rather than in production; and
- ❑ *Industrial*: related to productive use of water for manufacturing, mining or power generation (or cooling) located in the local authority area and supplied by the WSP.

The CMA should recover water resource management charges from the relevant water services provider (or water board), based on their registered use for different groups (or sectors) which is then collected from the individual users through water tariffs. These charges should be based on the registered quantity of water abstracted from the resource. User charges on waste discharge (including effluent from wastewater works) may also be set, once this is incorporated into the *Pricing Strategy* as part of the proposed *Waste Discharge Charge System*.

6.3 Industrial, Mining and Power Generation

This category of water use is similar to the municipal industrial user group, except that they abstract water and discharge effluent directly to the water resource (not through a local authority). Strategic use (defined under the NWRS), such as power generation may be included in this group. Water resource management charges will generally have to be recovered directly from these users, and would be based on their registered or licensed water use. In the short-term, the charges should be based on quantity of water abstracted, but this is likely to be the first user category upon which charges for effluent discharge will be made in the medium term.

Where these industrial users are members of a WUA, it may be appropriate to recover revenue via the WUA, particularly if there are a number of similar users. However, these industrial water users should be registered and licensed directly by the CMA, rather than through the WUA, due to their potentially significant impact on water resources.

6.4 Agriculture

Agricultural water use primarily involves irrigation, stock watering (including confined animal facilities) and aquaculture. These users are supplied through regional water schemes, local water user associations or directly from a ground or surface water resource. Where there is a body (usually WUA) collecting infrastructure water use charges or membership fees, this body is most appropriate to collect water resource management charges as well, particularly where the agricultural water use is registered for the WUA as a whole. Only where there is no WUA, should these charges be recovered directly from the registered or licensed water users.

Water resource management charges may be based on the long-term average quantity of water abstracted, as specified in the registration or license conditions, based on the approaches specified in the *Pricing Strategy* (DWAF, 1999). In the longer-term, charges may be set on return flow from irrigation or effluent discharge from confined animal facilities (piggeries and dairies) and aquaculture facilities. However, this introduces major complexities in terms of the estimation of return flows and contaminant loads, and would have to be done on a case by case basis to reflect management practices. This implies that the CMA would be more involved in the registration of and recovery of revenue from individual users, which may outweigh the benefits.

6.5 Streamflow reduction activities

Streamflow reduction activities (SRAs) may be declared under **Section 36** of the NWA. Currently only forestry has been declared, but certain other dryland agricultural activities (such as sugar cane) may also be considered for declaration as SRAs. SRAs are liable for water resource management charges, which should be collected through the relevant WUAs (where these exist) or directly from the registered and licensed users. The charge may be based on the average streamflow reduction, based on the approach outlined in the *Pricing Strategy* (DWAF, 1999).

6.6 Other registered or licensed water users

The broad definition of water use in the NWA, introduces a number of other possible water user groups that may be required to register and/or apply for licences, and may therefore contribute to the costs of water resource management in a WMA:

- ❑ *Storage* that causes water loss to the system, particularly those impoundments that are not related to abstraction, such as urban “waterfront lakes” or possibly flood control impoundments; the *Pricing Strategy* excludes storage required for abstraction, because these users already pay charges for the abstracted water.
- ❑ *Recreation* associated with a water resource, such as water sport, conservation and tourism activities associated with large water supply impoundments that provide revenue, particularly where this may lead to operational constraints on the storage level.
- ❑ *Instream & riparian activities* that alter the water course, particularly construction and quarrying-mining activities that require a license.
- ❑ *Activities* that are defined as having a detrimental water quality impact on water resources, particularly in terms of waste disposal (including groundwater from mining) and nonpoint source discharge, and are therefore required to register or apply for a license.

Apart from recreational users, these user groups will not generally be members of a WUA, and thus the CMA would need to recover the water resource management charges directly. Recreational water use charges should only be set where there is a WUA or organised recreational body, that is collecting membership fees from its members, that can be registered.

On the other hand, instream, riparian and land based activities may also be associated with water supply, and the existing water tariffs may be used as the mechanism for collecting the charges. However, this approach would introduce significant complexity for the CMA in setting and administering the pricing system, and should only be considered in the medium-term as part of the effluent discharge pricing strategy.

In the short-term, the most appropriate approach is to recover water resource management charges from the individual water users that require registration or authorisation as storage, instream-riparian or land based activity water users. This may be recovered either through annual charges specified in their license conditions or through registration or licensing fees. It is particularly important that the revenue gained is greater than the administration cost of its recovery, as well as contributing to the actual costs of water resource management.

6.7 Non-registered water use

The water users specified in Schedule 1 of the NWA are not required to register, as they are deemed to be negligible or for emergency purposes. However, the following users may be significant from the perspective of catchment management, because by their cumulative individual actions they have an impact on the water resources in a catchment:

- (a) *take water for reasonable domestic use in that person's household, directly from any water resource to which that person has lawful access;*
- (b) *take water for use on land owned or occupied by that person, for -*
 - (i) *reasonable domestic use;*
 - (ii) *small gardening not for commercial purposes; and*
 - (iii) *the watering of animals (excluding feedlots) which graze on that land within the grazing capacity of that land, ...*

An argument may be made that these users should make a small contribution to catchment management through their local authority rates, both in terms of covering their costs for catchment management and in order to promote an awareness of catchment management issues. However, this approach is outside of the scope of a water use

charge for water resources management, as defined in the NWA. Rather it would have to be implemented by local government, through some type of cooperative agreement with the CMA.

7. CALCULATING WATER RESOURCE MANAGEMENT CHARGES

7.1 Principles

Together, the National Water Act and Pricing Strategy provide the principles for calculating user charges for water resources management. Firstly they must reflect the purpose of the Act, which may be summarised as:

- promoting equitable access to water, while redressing of past discrimination;
- ensuring sustainable utilisation and protection of water resources; and
- promoting efficient and beneficial use of water for social and economic development.

A number of principles for water use charges may be derived from the Financial Provisions in Chapter 5 of the NWA, including that water use charges:

- may only apply to voluntary use of water;
- should reflect the benefit derived from management activities;
- should reflect the type of use, including the impact that it has on water resources;
- should reflect assurance and reliability of use;
- should consider the resource class and resource quality objectives; and
- should consider the social and/or economic characteristics of use.

7.2 Procedure for Calculating Water Resource Management Charges

The preceding Chapters in this document have highlighted many of the important issues and considerations supporting the calculation of user charges for water resources management, with the emphasis on funding CMA establishment and operation. In practice, it will be a process of negotiation between the CMA and water users, facilitated by the CMA governing board.

The CMA Financial Model (see Appendix A) provides a structured framework to support this process. The following steps underlie the process and guidelines on conducting each step are provided.

Step 1: Estimate registered water use

Water use charges can only be raised from registered water users, therefore this must be estimated for the different sectors. Currently registered users will be available from the CMA or DWAF information system, while predictions must be made about the probable increase in registered users over the next ten years (linked to possible changes in water use).

Step 2: Estimate the total costs

The capital and operating costs of the CMA establishment and functioning must be estimated, based on the type of information presented in Chapter 4. This must attempt to forecast the probable increase in costs over the next ten years, which would involve identifying the evolving CMA function-structure, estimating evolving staffing requirements and then costing these requirements, with overheads and capital expenditure.

Step 3: Allocate functional cost components to water use

This step addresses the issue of linking the benefit received from a water resource management function to the user charge applied to a particular user group. The following issues are pertinent in this regard:

- Municipal and industrial users tend to benefit from all CMA functions, and therefore there is little rationale for reducing their contributions, except where subsidies have been allocated to domestic supplies. However, it may be appropriate to increase the charge associated with certain users that have a particularly severe water quality impact.
- Where water is supplied directly to municipal or industrial from another WMA, but effluent is discharged, the functions associated with general water resources management and in particular managing the impact on the receiving water resources should be charged.
- Conversely, water supplied to users in another WMA should be allocated the costs associated with managing the water resource for abstraction, rather than those associated with effluent discharge.
- Irrigated agriculture has an agreement with DWAF to only pay 10% of the costs of water conservation and demand management (particularly Working for Water), while Forestry does not attract any of these costs.

It may be argued that irrigated agriculture should be allocated a portion of the water resource management costs allocated to municipal and industrial users, because the assurance of supply to these users is lower. However, this should be taken into account in the water use registration process, in terms of the long-term average water use.

Apart from these considerations all users should generally pay the full costs of water resource management in the WMA. Based on this information, the unit cost per registered user group may be calculated.

Step 4: Set user charges

The art of setting user charges is to use the unit cost per use to guide the charge, so that the CMA cash flow is managed. This should take account of any establishment grants and operating subsidies to the CMA. If the allocation of functions has been done appropriately, this should be relatively straightforward. At this stage, user charges for a particular user group are assumed to be consistent throughout the WMA.

However, in reality, this is a negotiated process between the CMA and the water users. Consideration must be taken of the financial affordability of the charges for the users, willingness to pay these charges, and possible implications for default. Great care and sensitivity must be taken to avoid alienating agriculture and forestry during the initial period of collecting charges, because these sectors have not been required to pay these sorts of water charges and they may represent a significant portion of their input costs. Where possible, the agriculture and forestry charges should be no more than half of the equivalent municipal and industrial charges. This may be rationalised on the basis of relatively higher management requirements to ensure higher assurances of supply and mitigate more severe water quality impacts.

Step 5: Reconcile income and expenditure

The annual and cumulative cash-flow projection provides the basis for reconciling of CMA income versus expenditure, based on the above information. The income estimate must

take account of the expected percentage levels of default, which hopefully would reduce over time. Where necessary additional grant financing must be found, charges must be increased or actions must be taken (with consequent costs) to reduce default.

The preceding steps, when implemented within the framework of the CMA Financial Model, provide the basis for effective CMA financial planning and the setting of user charges in an informed and integrated manner.

7.3 The Catchment Management Finance Model (CMFM)

As part of the work undertaken for this guideline, a model has been developed to assist newly establishing CMAs with assessing the long term viability of their activities. The model is described in full in a manual which is included as Annexure C to this guideline.

The model is spreadsheet based and allows a user to estimate tariffs over a 10 year period, based on the registered water use in various categories and the cost of running the CMA. The viability of the CMA is assessed by looking at long term cash flow (income from tariffs and other sources of finance less costs).

The model includes the following main features:

- A variety of water use categories are provided for.
- Registered water use can be increased with time.
- Organisational functions are user selected.
- Cost allocation between user groups is flexible.
- Abstraction-related and return-flow-related tariffs are calculated separately in order to provide for inter-basin transfers.

The model is well suited to undertaking a sensitivity analysis to ascertain the effect of changes to key variables.

The model has been tested provisionally on two proposed CMAs: the Crocodile/Marico and the Inkomati. These two case studies of the model application are included as Annexures A and B to this guideline.

8. CONCLUSION AND RECOMMENDATIONS

This document provides a useful background reference to financing CMA establishment and functioning, and highlights areas where the Pricing Strategy needs to be engaged. The CMA financial model provides a valuable tool to support the CMA business planning process and the calculation of user charges for water resources management. It will be tested in one or more actual CMA establishment processes, most notably in the Crocodile-Marico WMA.

Through this study, a number of issues have been identified, either in terms of an approach to be adopted, or where more policy development or other studies are required. The Pricing Strategy needs to be extended to address the particular requirements for financing CMAs. In particular, the following issues must be addressed.

- ❑ The level of financial support that DWAF will provide to a CMA both for establishment and for ongoing operation where the CMA is not viable (i.e. underdeveloped WMAs).
- ❑ The financial implications of the need to fast-track the evolution of a CMA, in order to avoid confusion in responsibilities and accountability between the CMA and DWAF.
- ❑ A policy decision on whether DWAF will provide an operating subsidy to a WMA (via the CMA), possibly based on the Reserve determination, as well as functions in the national interest that the CMA is performing on behalf of DWAF (including revisiting the subsidy for under-utilised catchments).
- ❑ Clarity on the division of revenue for user charges between the CMA and DWAF, while catchment management related functions are being performed by both organisations.
- ❑ The approach to be used to estimate user charges under the situation of inter-WMA water transfers, either directly to users or into the receiving WMA water resource.
- ❑ Specification of the institutional pathways for collection of water use charges from users, particularly in terms of the roles of possible intermediary organisations, such as WUAs, local authorities (as water services authorities) and water boards.

In response to this need, DWAF has proposed to formulate a policy and guidelines for the financing of CMAs, based on the Pricing Strategy. It should address the issues raised in this document, namely:

- The conditions and mechanisms for financial support to CMA establishment and operation by DWAF, taking account of the theoretical basis for user charges.
- Detailed guidelines on the allocation of the costs of different water resource management functions to users.
- Financial management systems and procedures to ensure efficient CMA operation.

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