

## **DEPARTMENT OF WATER AFFAIRS**

NATIONAL WATER ACT (ACT No. 36 OF 1998)

### **ESTABLISHMENT OF A PRICING STRATEGY FOR WATER USE CHARGES IN TERMS OF SECTION 56(1) OF THE NATIONAL WATER ACT, 1998**

I, Edna Molewa, MP, Minister of Water and Environmental Affairs, with the concurrence of the Minister of Finance, hereby in terms of section 56(1) of the National Water Act (Act No. 36 of 1998), publish a draft pricing strategy for raw water use, as contained in the schedule hereto, for the purposes of comment and consultation with interested and affected parties.

#### **SCHEDULE**

### **A DRAFT PRICING STRATEGY FOR WATER USE CHARGES IN TERMS OF THE NATIONAL WATER ACT**

#### **FOR COMMENT**

#### **PREFACE**

The National Water Act, 1998 (Act no. 36 of 1998), gives power to the Minister with the concurrence of the Ministry of Finance, from time to time by notice in the Gazette to establish a pricing strategy for charges for any water use within the framework of existing relevant government policy.

The previous pricing strategy was published in March 2007 and since its publication there have been various developments that necessitate this review which include:-

- As an element of the NWRS the Pricing Strategy for Raw Water Use Charges (Pricing Strategy) should be reviewed at least every five years.
- Further development has been done on the Waste Discharge Charges which must be reflected in the Pricing Strategy for implementation to take place;
- A number of issues have been raised by the Department and stakeholders regarding elements of the 2007 Pricing Strategy that must be addressed, including the caps on certain charges, how the Return on Assets is calculated, and the possibility of adopting multi-year charges.

The Pricing Strategy, in addition to the above, must also consider the financing of the nine Catchment Management Agencies that are in the process of being established, which will have a significant bearing on the way water resources are managed and protected.

This document sets out the draft strategy for implementing water management charges according to the user pays and polluter pays principles, for consultation and comment by interested and affected parties.

**Edna Molewa, MP**  
**Minister of Water and Environmental Affairs**

DRAFT

## TABLE OF CONTENTS

DEPARTMENT OF WATER AFFAIRS .....	1
PREFACE.....	1
TABLE OF CONTENTS.....	3
ABBREVIATIONS.....	5
1 INTRODUCTION.....	6
2 LEGAL MANDATE.....	6
3 THE OBJECTIVES THAT SHAPE THE PRICING STRATEGY.....	6
4 CLAIMS ON WATER NOT SUBJECT TO PRICING.....	8
5 DEFINITIONS OF WATER USE.....	8
5.1. REGISTERED WATER USE / MEASUREMENT OF WATER USE .....	9
6 OVERVIEW.....	9
7 WATER RESOURCE MANAGEMENT CHARGE .....	9
7.1. BUDGETING OF ACTIVITY COSTS .....	11
7.2. WATER RESOURCE MANAGEMENT ACTIVITIES THAT MAY BE TAKEN INTO ACCOUNT FOR CHARGE SETTING INCLUDES:.....	11
7.3. DETERMINATION OF SECTORAL WATER RESOURCE MANAGEMENT (WRM) CHARGES PER WMA FOR ABSTRACTION RELATED WATER USES .....	13
7.3.1. <i>Water use sectors</i> .....	13
7.3.2. <i>Determination of annual sectoral use volumes per WMA for pricing purposes</i> .....	13
7.3.3. <i>Geohydrology and Hydrology</i> .....	14
7.3.4. <i>Cost Allocations to Sectors: Abstraction charges</i> .....	14
7.3.5. <i>Calculation of Water Resource Management Charges</i> .....	15
7.4. DETERMINATION OF SECTORAL WATER RESOURCE MANAGEMENT (WRM) CHARGES PER WMA FOR WASTE DISCHARGE RELATED WATER USE.....	15
7.4.1. <i>Water use sectors</i> .....	15
7.4.2. <i>Determination of charges</i> .....	16
7.4.3. <i>Cost allocations to sectors</i> .....	16
7.4.4. <i>Water resource management charges (Waste Discharge)</i> .....	17
7.4.5. <i>Implementation of the charge</i> .....	17
7.5. OTHER FUNDING ARRANGEMENTS AND LIMITATIONS.....	17
7.5.1. <i>SFRA (Forestry) Charges and Subsidies</i> .....	17
7.5.2. <i>Irrigation Charges and Subsidies</i> .....	17
7.5.3. <i>Phasing in of WRM charges</i> .....	17
7.5.4. <i>WRM functions undertaken by Water Boards, CMAs and WUAs on behalf of DWA</i> .....	18
7.5.5. <i>CMA as a DWA agent for National Functions</i> .....	18
7.5.6. <i>Other possible CMA sources of Income</i> .....	18
8 FUNDING OF WATER RESOURCE DEVELOPMENT AND USE OF WATERWORKS.....	19
8.1. GOVERNMENT WATERWORKS .....	19
8.1.1. <i>Operations and Maintenance</i> .....	20
8.1.2. <i>Depreciation/Refurbishment</i> .....	21
8.1.3. <i>Return on Assets (ROA)</i> .....	22
8.1.4. <i>Water resources development charge</i> .....	23
8.1.5. <i>Government schemes funded off budget</i> .....	24
8.1.6. <i>Lump sum user contribution</i> .....	25
8.1.7. <i>Betterments</i> .....	25
8.1.8. <i>Methodology in determining unit cost</i> .....	26
Assurance of Supply (Section 56 (4)(b)(iii) of the Act).....	26
Consumptive charges on social projects.....	27
8.1.9. <i>Phasing in of consumptive charges</i> .....	27
Domestic/Industrial/Mining/Energy sector.....	27

Agricultural sector .....	27
8.1.10.    WUAs as Billing Agents .....	28
8.1.11.    Treatment of Reserve Funds .....	28
8.1.12.    Water Supply Agreements.....	29
8.1.13.    Hydropower.....	29
8.1.14.    Interbasin transfers .....	29
8.1.15 Clearing of Invasive Alien Plants (IAP's).....	29
8.2.    SCHEMES OWNED BY CMA'S AND WUA'S .....	29
9    ECONOMIC CHARGES (S56 (2) (C)) .....	30
10   THE WASTE DISCHARGE CHARGE SYSTEM .....	31
10.1.  THE BASIS FOR A WASTE DISCHARGE CHARGE SYSTEM .....	31
10.2.  PRINCIPLES FOR THE WASTE MITIGATION CHARGE .....	32
10.3.  CALCULATING THE MITIGATION CHARGE RATE.....	33
10.4.  INSTITUTIONAL ARRANGEMENTS .....	34
10.5.  IMPLEMENTATION OF THE WDCS .....	34
11   APPLICATION OF PRICING STRATEGY TO DIFFERENT CATEGORIES OF WATER USE/USER SECTORS.....	35
11.1.  SUMMARY OF WATER USE CHARGES PER SECTORS.....	36
11.2.  NATURAL DISASTERS.....	38
11.2.1.  Forest fires and floods .....	38
11.2.2.  Droughts.....	38
11.2.3.  Purchase of "extra water" .....	38
11.2.4.  Interest on arrear water charges.....	39
12   MULTI-YEAR CHARGES .....	39
13   TRANSPARENCY AND ACCOUNTABILITY .....	39
14   IMPLEMENTATION DATE .....	39
15   ANNEXURE A: GLOSSARY OF TERMS .....	40

## ABBREVIATIONS

CMA	=	Catchment Management Agency
CUC	=	Capital Unit Charge
DWA	=	Department of Water Affairs
GWS	=	Government Water Scheme
IAP	=	Invasive Alien Plants
NWA	=	National Water Act, 1998 (Act 36 of 1998)
NWRS	=	National Water Resource Strategy
O&M	=	Operations and Maintenance
PPI	=	Producer Price Index
ROA	=	Return on Assets
RQO	=	Resource Quality Objective
SFRA	=	Stream Flow Reduction Activity
TCTA	=	Trans Caledon Tunnel Authority
WARMS	=	Water Use Authorisation & Registration Management System
WDCS	=	Waste Discharge Charge System
WMA	=	Water Management Area
WMI	=	Water Management Institution
WRC	=	Water Research Commission
WRDC	=	Water Resource Development Charge
WRM	=	Water Resource Management
WSDP	=	Water Services Development Plan
WUA	=	Water User Associations

## 1 INTRODUCTION

This document is a draft revised Pricing Strategy, published for comment, as part of the process of revising the Pricing Strategy for water use charges in terms of the National Water Act which was published in the Government Gazette No. 29697 of 16 March 2007.

This strategy refers to pricing for the use of water from South Africa's water resources and not to the pricing of water services, which is dealt with separately under the Water Services Act, 1997. In other words, the approach deals with first tier water, i.e. the use of raw (untreated) water from the water resource and/or supplied from a government waterworks and the discharge of water into a water resource or onto land. The strategy deals with all first tier water as reflected in the use of ground and surface water resources and covers the setting of prices by DWA as well as by water management institutions as defined in the NWA.

It does not deal with charges and tariffs for second and third tier water, i.e. water supplied in bulk (often by water boards) and distributed to households or other water users (usually via a water services authority), except for water supplied from government water schemes.

## 2 LEGAL MANDATE

In terms of Section 56 of the NWA, the Minister may, with the concurrence of the Ministry of Finance, from time to time by notice in the Government Gazette, establish a pricing strategy for charges for any water use within the framework of existing relevant government policy.

The Pricing Strategy contains the objectives, methodology and implementation strategy for setting water use charges for purposes of:-

- funding water resource management by DWA and water management institutions, through water use charges, Section 56 (2) (a).
- funding water resource development and use of waterworks by DWA and water management institutions, Section 56 (2) (b).
- achieving the equitable and efficient allocation of water, through a charge hereafter referred to as the "economic charge", Section 56 (2) (c).
- providing for a differential rate for waste discharges, hereafter referred to as the WDCS, Section 56 (5) to enable the control and treatment of pollution of water resources
- enabling the provision of financial assistance and the use of water pricing to support the redress of racial and gender imbalances in access to water and to support the redistribution of water for transformation and equity purposes.

## 3 THE OBJECTIVES THAT SHAPE THE PRICING STRATEGY

The following objectives are of principal importance when formulating or amending the pricing strategy:

- **Enabling equitable economic development**

The Pricing Strategy will support the pricing of water in a manner that enables the provision of water to support new economic development in identified nodes, within the national aims of enabling equitable economic development, job creation and sustainable economic growth.

- **Social equity**

The Pricing Strategy for water use charges coupled to the granting of financial assistance will contribute to social equity and redress of the imbalances of the past, both with respect to equitable access to water supply services and direct access to raw water.

- **Ecological sustainability**

In terms of Chapter 3 of the NWA, the water needs for the effective functioning of aquatic ecosystems must be protected. The management activities required to ensure the provision of sufficient water for the ecological reserve must be paid for by all registered and billable users in terms of Section 56(2) (a) (iv) of the NWA as part of the water resources management charge. Infrastructure design requirements to enable the achievement of the reserve will be included in infrastructure charges. To promote the preservation of resource quality, the polluter pays principle for waste discharge is adopted in this pricing strategy.

- **Financial sustainability**

In order to ensure financial sustainability adequate revenue must be generated to fund the annual cost related to:

- the management of the country's water resources.
- the operations, maintenance, refurbishment and betterment of existing Government water schemes and waterworks owned by water management institutions.
- the development of new user-funded schemes.

The pricing strategy makes accommodation for significant financial contribution from user charges to WUAs and CMAs but recognises the need for fiscal support in the establishment of water management institutions, and for core national and public interest functions to be performed by these bodies. In some water management areas the full financial cost of water resource management cannot be recovered solely from water users, and ongoing fiscal support, as is currently provided to DWA, will be needed for CMAs to ensure their financial viability.

Water pricing must be based on sound business principles, recognising that where, for social equity, environmental or affordability reasons, water management cannot be sustainably financed from specific water users, the shortfall must be recovered from the fiscus or through cross-subsidisation.

- **Economic efficiency**

In the context of water scarcity, ensuring an efficient allocation of scarce water resources requires that the price of water is set to reflect its scarcity value, to ensure firstly that water is conserved and secondly that some water used for low-value purposes is redirected to alternative high value purposes. This can be done administratively or by using market related mechanisms. It is also critical to ensure that the water resource management systems implemented are cost effective and do not become an unnecessary financial burden on the water users.

In addition to the five objectives outlined above, the pricing strategy is premised on the following principles:

- **Polluter pays and user pays**

This principle sets out that polluters and users must pay for the costs of their water use in this regard, taking into account the need for targeted subsidies where, due to socio-economic conditions, users or polluters are not able to afford the costs resulting from full application of these principles.

- **Equity and affordability**

The water use charges under this pricing strategy must take into account the principles of equity and affordability in access to water for poor, marginalised and historically disadvantaged communities.

- **Take or pay principle**

Off-budget schemes will be based on the take or pay principle, which means that users will pay for the full volume of water allocated to them from the scheme even if they do not use the full volume.

## **4 CLAIMS ON WATER NOT SUBJECT TO PRICING**

**Permissible water use as described under Schedule 1 of the NWA and generally authorised.** A person may use water in or from a water resource for purposes such as reasonable domestic use, non-commercial gardening, animal watering, fire-fighting and recreational use, as set out in Schedule 1 of the NWA. General authorisations in terms of section 39 of the NWA also allow certain water uses not to register, which would then not be charged.

**Basic human needs.** This represents the first component of the Reserve as defined in Section 1 of the Act, and provides for the essential current and future (10 years horizon) needs of individuals served by the water resources concerned and includes water for drinking, food preparation and personal hygiene defined as 25 litres per capita per day. The portion of water supplied to water services authorities to meet the free basic water requirements for the indigent population will be supplied free of charge in terms of depreciation, RoA and/or CUC charges. This cost will be borne by the fiscus.

**International obligations.** The water required to meet South Africa's commitments regarding international waters will receive priority and will not be allocated for pricing purposes, except where specific agreements have been reached concerning the supply of water to neighbouring countries.

## **5 DEFINITIONS OF WATER USE**

Section 56 of the NWA instructs the Minister to establish a Pricing Strategy for charges for any water use described in Section 21:

- (a) taking water from a water resource;
- (b) storing water;
- (c) impeding or diverting the flow in a watercourse;
- (d) engaging in stream flow reduction activity;
- (e) engaging in controlled activity which may have a detrimental impact on water resources;
- (f) discharging waste or water containing waste into a water resource;
- (g) disposing of waste in a manner which may detrimentally impact on a water resource;
- (h) disposing of water which contains waste from any industrial or power generation process;
- (i) altering the bed, banks, course or characteristics of a watercourse;
- (j) removing, discharging or disposing of water found underground for continuation of an activity;
- (k) using water for recreational purposes.

The above-mentioned water uses can be broadly grouped under three categories in the NWA:

Abstraction related uses



- Section 21 (a), Section 21 (b) and Section 21 (d)

Waste discharge related uses

- Section 21 (e), Section 21 (f), Section 21 (g), Section 21 (h) and Section 21 (j)

Non-consumptive uses

- Section 21 (c), Section 21 (e), Section 21 (i), Section 21 (j) and Section 21 (k)

The pricing strategy prioritises the uses of water stated above, and over time will charge for most defined water use after consultations with stakeholders. Strategies are already in place and under review for abstraction related uses. With the implementation of the waste discharge charge system, most of the above-mentioned use will be charged for.

### **5.1. REGISTERED WATER USE / MEASUREMENT OF WATER USE**

Water charges where water use is not measured or metered are made against registered water use. Water for productive use is available or is abstracted at different assurances and this must be reflected in the annual payment for water resource management services and is taken into account in the registered volume. Assurance of availability is taken into account by registering the estimated long-term average annual volumetric use of the various users. This determination takes into account the historic availability of water through rainfall, run-off and storage characteristics in respect of individual water users and the imposition of water restrictions during droughts.

The intention is, however, to phase in the compulsory measurement of water abstraction so that water use charges relating to development and use of waterworks can be charged against actual abstraction rather than registered use. This will result in fluctuating revenue depending on water use during the year, with reduced revenue during certain periods. The calculation of the charges using the assurance of supply is intended to ensure that the full costs are recovered over time despite the inter-annual water use fluctuations. Water resources management charges will continue to be charged against registered use for stability of revenue and administrative ease.

## **6 OVERVIEW**

The Pricing Strategy deals with three sets of charges:

- Water Resources Management Charges, which cover the charges required to manage water resources within the nine water management areas determined in the NWRS-2;
- Charges relating to the development and use of waterworks, which cover the charges related to planning, capital costs, operation and maintenance, depreciation, and RoA on government water schemes and
- Waste Discharge Mitigation Charges which cover the charging for discharge of water containing waste into a water resource or onto land.

The Waste Management Levy is not dealt with in this strategy but will be determined through a Money Bill that will be tabled in Parliament.

Each of these charges is dealt with separately in this Strategy.

## **7 WATER RESOURCE MANAGEMENT CHARGES**

The purpose of the Water Resources Management Charge (WRMC) is to fund a portion of the water resources management activities across the country. Water resource management activities are

those that are required to protect, allocate, conserve, manage and control the nation's water resources. These activities do not relate only to water subject to pricing, but to the management of all water within a water management area. The activities that may be partially or completely funded from the WRMC include but are not limited to the following:-

- Planning, developing and implementing catchment management strategies.
- Monitoring and assessing water resource availability, quality and use, including rainfall monitoring where required.
- Allocating water and authorising water use.
- Water quantity management, including flood and drought management, water distribution, control over abstraction, storage and stream flow reduction activities.
- Water resource protection, resource quality management and water pollution control.
- Water conservation and demand management strategies, plans and monitoring.
- Enabling the public to participate in water resources management decision-making.
- Disaster management planning
- Economic regulation of water charges and tariffs across the value chain
- Compliance monitoring and enforcement.
- Administrative costs of the above.

A more detailed description including a split between abstraction and waste discharge activities is provided later in this document.

Water resource management remains the task of DWA in those water management areas that do not yet have a CMA in place. However, the intention is for the nine CMAs outlined in the NWRS-2 to be established within the next three years. DWA will delegate or assign significant water resource management functions to these CMAs. The activities of the CMAs will be funded largely from water resource management charges. Regional offices will continue to undertake some WRM functions in WMAs where not all functions have been delegated to CMAs due to a lack of capacity. In WMAs where both DWA and CMAs are performing WRM functions, income will be shared pro-rata to input cost and this split will be reflected in all sectoral charges.

It is clear that support from the analysis of the financial viability of CMAs that there will be a need for funding from the fiscus to support the establishment of the CMAs, and for ongoing support for certain functions and in certain areas. Currently there is significant under-recovery of the WRMC across the country, and a period will be needed to allow DWA and CMAs to improve these recovery rates. Until improved rates have been achieved, CMAs (and proto-CMAs) will need fiscal support to cover the under-recovery.

In addition to this, fiscal contributions will be required to support the public interest functions to be performed by CMAs i.e. activities that are interest of society as a whole, not just the water users in the catchment. Fiscal contributions may also be required to ensure affordability of charges, and financial viability of CMAs, particularly in under-developed water management areas where not all of the available water is being used.

It must be recognized that some WRMC charges may go to DWA in perpetuity e.g. if the hydrometry function stays with DWA rather than moving to CMAs.

Differential charges may be put in place within the WMA, based on defined geographical areas, or pertaining to specific sectors.

## 7.1. BUDGETING OF ACTIVITY COSTS

DWA/CMAs will budget annually for the estimated costs of activities to be performed by them in each WMA (or defined sub-area of a WMA) over a three year period. The WRM functions that may be relevant are shown in the schedule hereunder. The division of functions between abstraction and waste discharge related uses will be done in accordance with the schedule hereunder<sup>1</sup>. The water resource management charge for abstraction related water uses will be based on the budget for abstraction activities and a portion of the integrated functions. The cost of waste discharge activities and a portion of the integrated functions will be used for setting the waste discharge component of the WRM charge.

The costs of certain functions may be entirely allocated to either abstraction or waste discharge related uses as indicated, while there are other functions that are inherently integrated in nature. The costs of integrated functions need to be allocated between abstraction and waste discharge related use in a transparent manner reflecting the management effort incurred in the WMA. Allocation of the costs of integrated functions between waste discharge and abstraction will therefore be according to the management effort (resources) being allocated to abstraction related uses versus management effort allocated to waste discharge related water uses within the WMA.

An inter-basin transfer scheme refers to infrastructure constructed to transfer water between river systems located in different WMAs, in order to augment the allocable yield of water stressed catchments. Examples are the Riversonderend – Berg River, Tugela – Vaal, Orange – Fish, Tugela – Mhlathuze and Usutu – Vaal transfer schemes, constructed by DWA.

Water to be imported via an inter-basin transfer scheme will reduce the potential for generating funds in the donor WMA through water use charges and increase the potential in the receiver area. This loss in income in the donor WMA must be funded by water use charges raised in the receiver WMA. The receiver CMA must reimburse a fixed portion of the WRM budget of the donor CMA, based on the yield transferred calculated as a fraction of the total available yield in the donor WMA at 98% assurance of supply, in accordance with the NWRS.

If the receiver WMA is still managed by DWA and the donor WMA is taken over by a CMA, then DWA needs to pay the CMA. If both the receiver and the donor WMA are still managed by DWA, then DWA will ring fence the transfer payment and spend this amount in the donor catchment.

Where the quality of streamflow from an upstream WMA to a downstream WMA imposes an additional water quality management cost on the downstream WMA, this additional cost needs to be funded by WRM charges on waste discharges in the upstream WMA. The upstream CMA must reimburse a fixed portion of the WRM budget of the downstream CMA (related to the additional water quality management cost), based on the discharge load in the upstream WMA as a ratio of the total discharge load in the downstream WMA.

## 7.2. WATER RESOURCE MANAGEMENT ACTIVITIES THAT MAY BE TAKEN INTO ACCOUNT FOR CHARGE SETTING INCLUDES:

Functional area	Abstraction related WRMC	Waste discharge related WRMC
Investigate and advise interested persons	On water resource protection, use, development, conservation, management and control	

<sup>1</sup> It should be noted that this part of the WRMC only relates to the activities of managing and controlling waste discharge. The mitigation and incentive charges are separate from this.

Functional area	Abstraction related WRMC	Waste discharge related WRMC
<b>Develop policy and strategy</b>	Long-term strategic planning for the CMA (including climate change) Resource studies, investigations and integrated strategy development Develop and or revise catchment management strategy (CMS) Develop WMA specific rules for water use Engage with NWRS development and implementation	
	Develop allocation plans Reconciliation of water availability and requirements	Develop water quality management plans
<b>Co-ordination</b>	Of the related activities of water users and of the water management institutions within its water management area Of CMS implementation with the implementation of any applicable development plan established in terms of the Water Services Act, 1997 (Act No. 108 of 1997)	
<b>Promote community participation</b>	In the protection, use, development, conservation, management and control of the water resources in its water management area	
<b>Resource directed measures</b>	Reserve determination, classification & determination of Resource Quality Objectives. Monitoring of reserve implementation	
<b>Support institutions</b>	Creation of non-statutory consultative and participative bodies or forums Coordination of the activities and relationships of WMIs in the WMA Fostering cooperative governance and creating partnerships Building capacity in WMIs and forums Resolution of conflicts Supportive or emergency organisational interventions Ensuring appropriate stakeholder participation in these bodies	
<b>Regulate water use</b>	Registration and verification of water use Authorisation of water use (licensing) Setting, billing and collecting water use charges Ensuring compliance (including enforcement) Negotiation of co-regulation and cooperative agreements Implement compulsory licensing	
	Ensuring dam safety and dam zoning Abstraction & stream flow reduction activities control & monitoring Compliance monitoring and enforcement with regard to dam safety regulations (non-DWA dams)	Waste discharge & marine outfall licensing Waste discharge and marine outfall control & compliance monitoring
<b>WRM programmes</b>	Control of water weeds	
	Planning and management relating to control of invasive alien plants with acknowledged negative impacts on water resources; e.g. riparian zones, mountain catchment areas, wetlands and in areas where there could be an impact on aquifers Provision of technical support to and monitoring of water conservation and	Pollution incident planning and response (management) Waste discharge programmes [e.g. cleaner technology, dense settlements, waste discharge strategies]

Functional area	Abstraction related WRMC	Waste discharge related WRMC
	water demand management (WCWDM) interventions Rehabilitation of water resources (such as wetland or riparian zones) Flood and drought management	
<b>Manage information</b>	Monitoring water resources (collect, source and capture data) Development and maintenance of databases (including quality control) Development and maintenance of information management/evaluation systems Conducting research on water resources Performance of needs assessments and water resource problem identifications Communication with stakeholders and collection of anecdotal information	
<b>Audit WRM</b>	Development and maintenance of indicators for auditing Performance of financial and organisational audits of WMIs Performance of functional performance audits Performance of water resources audits against specified objectives Proposition and facilitation of corrective action	
<b>Geohydrology and hydrology</b>	Monitoring groundwater yields and compiling of maps and yield information Extending and maintaining the hydrological database and compilation of information	Water quality monitoring and compilation of information
<b>Administration and management</b>	Financial and business planning for the CMA Training and capacity building of staff	
<b>Equipment and rental</b>	Office accommodation Replacement and upgrading of office equipment and furniture	

### 7.3. DETERMINATION OF SECTORAL WATER RESOURCE MANAGEMENT (WRM) CHARGES PER WMA FOR ABSTRACTION RELATED WATER USES

#### 7.3.1. Water use sectors

The user sectors for which unit sectoral water resource management charges will be calculated are:

- Domestic/industrial (water services authorities, industry, manufacturing, mining, power generation including hydropower)
- Agriculture (irrigation of agricultural crops; feedlots)
- Stream flow reduction (commercial forestry at this stage, other sectors may be added)

#### 7.3.2. Determination of annual sectoral use volumes per WMA for pricing purposes

The registered water use of the various sectors must reflect volumes as determined by using the following methodologies for the water uses as defined.

Section 21 (a) use

- **Domestic/Industrial** Water allocations as reflected on a lawful permit, general authorisation or licence or which constitute an existing lawful use in terms of section 32 of the NWA, and amended for assurance of supply.

- **Agriculture** The existing lawful water use related to irrigated agriculture or allocated through new licences, and amended for assurance of supply. The SAPWAT programme developed by the Water Research Commission or other methods as approved by the Department will be used to determine average annual volumetric use. Irrigation quotas, amended for assurance of supply, will be registered in former water control areas and on waterworks owned by water management institutions.

Section 21 (d) use

- **SFRA (Forestry)** Modified tables based on the WRC Report No TT 173/02 (April 2002): Estimation of streamflow reductions resulting from commercial afforestation in South Africa [MB Gush, DF Scott, GPW Jewitt, RE Schulze, TG Lumsden, LA Hallows and AMM Gorgens] or other methods as approved by DWA or a CMA where the function has been delegated will be used to determine average annual use of existing lawful plantations and for new licences.

The total volume of registered water use per WMA as captured by WARMS must be compared with the total yield of current resources at 98% assurance within the WMA, which can be allocated for productive purposes, in terms of the NWRS or the most recent determination. This allocable volume must exclude the quantities set aside for the Reserve, international obligations and transferred to other WMAs.

Where water in a WMA is fully utilised or over-allocated (registered use exceeds allocable yield) the total volume of registered sectoral water uses will determine charges. In an under utilised WMA the volume of allocable water will determine volumetric unit charges. The estimated allocable sectoral use volumes will then be determined by applying the ratio of volumes registered by each sector to the allocable yield. The funding gap between the revenue from WRMC and the costs of water resources management in an under-allocated catchment will be covered by the Parliamentary appropriation.

### 7.3.3. Geohydrology and Hydrology

The main charge under the above mentioned water resource management activity is for monitoring and is broken down into:-

- **Operational Purpose** – This type of monitoring is necessary for efficient water resources management and for water use billing.
- **National Network** – The national network is designed to effectively monitor the country's water resources for national water resource planning purposes. This function should be covered by funding from the fiscus. However, data and information gained at existing and new sites may be of direct benefit to a specific scheme or water management area for purposes that are not national in nature. In these cases it is reasonable to charge a specific WMA or water scheme a reasonable portion of the monitoring costs excluding the infrastructure costs.
- **Reserve monitoring:** Reserve determinations are being made and will be made in future. It is necessary to monitor the availability of the reserve on an ongoing basis. The monitoring will be funded from the water resources management charge.

### 7.3.4. Cost Allocations to Sectors: Abstraction charges

Abstraction related water resource management activity costs must be allocated to sectors in proportion to volumetric mean annual sectoral use as registered, which reflects assurance of supply. Cost allocation will thus take assurance of supply into account, and differentiate between activities.

Certain activities will only benefit some sectors and therefore will not be allocated to all user sectors. Cost allocations for abstraction related uses will be determined as follows:-

- **Domestic/Industrial** – This sector will attract all abstraction related water resources management costs pro rata to its share of total productive use in the water management area. The basic human needs requirement for the indigent population (see Section 4) will not attract depreciation, RoA or CUC costs.
- **Agriculture** – This sector will attract all abstraction related activity costs pro rata to productive use.
- **Stream flow reduction activities** – Afforestation will attract all abstraction related activity costs, pro rata to productive use, except for dam safety control.

The activity input cost regarding an inter WMA transfer will be allocated only to those sectors that benefit directly from the transfer through water allocations in the receiver WMA.

### **7.3.5. Calculation of Water Resource Management Charges**

Sectoral water resource management charges for each WMA will be calculated as follows:

- Total budget cost of each activity will be divided by the registered volumes to arrive at a unit charge per activity.
- The budgeted activity cost will be applied only to those sectors attracting such cost (e.g. the forestry sector will be excluded from charges relating to dam safety control).
- The unit charge for all relevant WRM activities will then be applied to each user's registered volumes to arrive at a WRM charge per user.

Unless other arrangements are approved by the DWA/CMA the charges will result in a payment, which will be invoiced on a six monthly basis for the irrigation and stream flow reduction sectors, and on a monthly basis for the other sectors.

Minimum cut-off values for annual payment can be laid down by CMAs where the cost of collection would exceed income. Reimbursements of inter WMA transfer payments will be done on a monthly basis in equal installments.

It must be noted that if water use charges are too low they may lead to non-viable institutions, sub-optimal water resources services and overall deterioration of the water resources. There is therefore a need to adjust to higher real charges within a limited time period to accommodate the cost of effective and financially sustainable water management institutions, taking cognisance of affordability constraints within user sectors. There is also a need for fiscal support for the activities of CMAs.

## **7.4. DETERMINATION OF SECTORAL WATER RESOURCE MANAGEMENT (WRM) CHARGES PER WMA FOR WASTE DISCHARGE RELATED WATER USE**

### **7.4.1. Water use sectors**

The sectors for which waste discharge related water resource management charges will be calculated are similar to the sectors for the abstraction related charges, namely municipal (domestic), industrial, mining, energy and agriculture (excluding streamflow reduction activities). However, in calculating this charge, a distinction must be made between:

- Point source discharges directly to surface water resources
- Discharge to land based facilities (with potential non-point source impacts), such as irrigated effluent, tailings dams and evaporation ponds
- Point source discharges to the marine environment (marine outfalls)

The water resource management charges for waste discharge related use will be made against the following water uses as defined in section 21 of the National Water Act:

- (e) engaging in a controlled activity identified as such in section 37 (1) or declared under section 38 (1); (where to controlled activity relates to waste discharge activities)
- (f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
- (g) disposing of waste in a manner which may detrimentally impact on a water resource;
- (h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- (i) altering the bed, banks, course or characteristics of a watercourse; (where such activities have impacts on the water quality of the water course)
- (j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people;

#### **7.4.2. Determination of charges**

The calculation of charges will be based on the volume of wastewater discharged from a point source, and on the degree of management activity required for non-point source registered uses as listed above.

#### **7.4.3. Cost allocations to sectors**

The budgeted water resources management activity costs allocated to waste discharge related water use will be allocated to the water use categories according to the ratio of management effort applied in the WMA. Certain activities will only benefit or be related to specific water use categories and therefore will only be allocated to those categories. No differentiation will be made between sectors within a water use category. Cost allocations will be based on:-

- **Point source discharges** - Management effort for point dischargers, attracting all waste discharge related activity costs.
- **Marine outfalls** - Management effort for marine outfalls, attracting waste discharge activity costs except water resources monitoring, resource directed measures and waterweed control.
- **Waste disposal to facilities / land** - Management effort for waste disposal to land, attracting all waste discharge related activity costs.
- **Irrigation of land with water containing waste** - Management effort for irrigated effluent, attracting all waste discharge related activity costs.

The additional water quality management cost related to discharge into a downstream WMA will be allocated to the waste discharge water use categories, except marine outfalls, based on the same management effort ratios.



#### **7.4.4. Water resource management charges (Waste Discharge)**

Waste discharge related water resource management charges for each water use category in each water management area will be determined by dividing the total cost allocated to each category by the total registered wastewater volume discharged by that water use category.

The charges will result in a fixed payment, which will be invoiced on a monthly or six monthly basis, according to the abstraction related invoicing cycle.

#### **7.4.5. Implementation of the charge**

The WRM charge for waste discharge will be implemented after the registration of dischargers has been completed.

### **7.5. OTHER FUNDING ARRANGEMENTS AND LIMITATIONS**

#### **7.5.1. SFRA (Forestry) Charges and Subsidies**

WRM charges to the forestry sector have historically been capped at R10 per hectare plus Producer Price Index (PPI) rate (%) at April of each year with 2002-03 financial year as the base year. This cap has resulted in significant under-recovery of actual costs, and is to be removed, over a five year period, decreasing at 20% per annum, with targeted subsidies from the fiscus provided instead as determined by DWA in consultation with DAFF and National Treasury. Such subsidies will be determined in line with national economic development objectives, and with transformation objectives relating to race and gender and to the reduction of inequality in South Africa. These subsidies will be payable directly to DWA.

Resource poor foresters and non-irrigation growers with land equal to or less than ten hectares under cultivation will be excluded from this charge.

#### **7.5.2. Irrigation Charges and Subsidies**

Historically, water resource management charges to the irrigation sector have been capped at 1.5 cent per m<sup>3</sup> plus the PPI rate (%) at April of each year with 2007-08 as base year. This capping has results in significant under-recovery of costs.

This capping is to be removed over a five year period, decreasing at 20% per annum, and the full WRM charge is to be applied after those five years to the irrigation sector with targeted subsidies to be applied as determined by DWA in consultation with DAFF and National Treasury and as supported by fiscal subsidies. Such subsidies will be determined in line with national development objectives, and with transformation objectives relating to race and gender and to the reduction of inequality in South Africa. These subsidies will be paid directly to DWA.

#### **7.5.3. Phasing in of WRM charges**

WRM charges for resource poor farmers and resource poor forest growers will be phased in over five years from the date of registration of the water use with fiscal subsidy of amounts not recovered from the beneficiaries. 20% of the WRMC will be charged in the first year, 40% in the second year, etc to 100% in the fifth year.

#### **7.5.4. WRM functions undertaken by Water Boards, CMAs and WUAs on behalf of DWA**

In instances where Water Boards, CMAs, WUAs or local government perform water management functions on behalf of DWA, an appropriate agency and compensation agreement will be drawn up between DWA and the relevant Water Board, CMA, WUA or local government.

#### **7.5.5. CMA as a DWA agent for National Functions**

A CMA may be contracted or delegated by DWA to perform certain national functions, which are exclusively funded through parliamentary appropriation. A service or management fee will be payable by DWA to the CMA as a condition of this contract or delegation. Functions that may be dealt with in this manner may include:

- National water resource monitoring (if this is not done by another institution)
- DWA water resource management programmes or projects, where the CMA acts as an implementing agent on behalf of DWA, possibly including compulsory licensing and classification.
- National developmental and/or empowerment programmes and projects where the CMA acts as an implementing agent for DWA.

#### **7.5.6. Other possible CMA sources of Income**

In addition to water use charges and possible financial support from parliamentary appropriation, there are a range of other lawful income sources that the CMA may consider.

- Recreational concessions – A CMA may become responsible for implementing, administering recreational concessions on or around state dams, in terms of an agreement with DWA.
- Licence application fees – The CMA should receive a major portion of the license application fee as soon as it is, performing licensing functions, and ultimately should receive the entire fee once it is the responsible authority.
- Donor support and sponsorship – A CMA may fund its activities through any lawful source in addition to water user charges and parliamentary appropriations, which may include donor support or sponsorship. However, transparency must be maintained, as actual or perceived conflict of interest must be avoided. This should include constraints over the types of functions that may be supported, particularly from bodies with a vested interest in the WMA. All sponsorship and donor contributions in excess of R2000 must get prior approval from the Minister of Water Affairs.
- Contractual payments – The CMA may perform ancillary functions outside of its WMA, as well as non-water resource management activities that are related (incidental) to its functions or mandate, as long as this does not jeopardise its functions or detrimentally affect another water management institution, and that such functions are set out in its annual corporate plan.
- In-kind contributions – Although in-kind contributions are not explicitly income, they would reduce the expenditure and required income of the CMA. They are most relevant for institutional development and stakeholder participation related functions, but may include other bodies involved in monitoring and other water resource management activities coordinated by the CMA. All in kind contributions in excess of R2 000 will require prior approval from the Minister of Water Affairs.

The Minister may from time to time review and amend the value of the minimum in-kind contribution, donations and sponsorship requiring prior approval by way of a written announcement.

## 8 FUNDING OF WATER RESOURCE DEVELOPMENT AND USE OF WATERWORKS

Water resource development and use of waterworks refer to the planning, design, construction, operation, maintenance, refurbishment and betterment (improvement) of Government water schemes and schemes to be funded by water management institutions like the TCTA and WUAs. If water use charges are too low, they will lead to underinvestment, over-consumption and unwarranted fiscal subsidies. There is therefore a need to adjust to higher real charges over time to accommodate the cost of investing in supply capacity to meet rising demand and to refurbish existing infrastructure. There is also a need to invest in economic regulation of infrastructure financing and management.

### 8.1. GOVERNMENT WATERWORKS

In terms of section 56 (2)(b) of the National Water Act, 1998, water resource development costs may include the related costs of investigation, planning design and construction of water schemes, **which constitute the capital cost of projects.** This pricing strategy utilises a capex planning approach based on a combination of funding through **depreciation, return on assets (ROA), the fiscus and off-budget funding** for funding the capital cost in respect of development, refurbishment and betterment of government water schemes. This requires that DWA, TCTA and any other bodies involved in the development, operation, maintenance, refurbishment or betterment of national water resources infrastructure must develop a capital and operational expenditure plan covering a minimum of ten years to be updated annually and reviewed in detail every five years at least. Allocation of costs in relation to user costs and parliamentary appropriations must be done against this plan, in consultation with National Treasury and after consultation with stakeholders.

The mechanism of off budget funding of commercially viable new water infrastructure through the TCTA has become accepted policy. The funding of these infrastructure developments requires loans, which naturally have certain repayment periods associated with them during which bulk water users must pay charges as per contractual agreement.

State funding will in the future be confined mostly to social water resource development or betterment projects, which conform to the purpose, set out in section 2 of the NWA, 1998, and where the demand is not driven by specific commercial water users or sectors. Capital expenditure related to the promoting of equitable access to water, meeting current and future international obligations and dam safety betterments on State owned dams will qualify for State funding.

New infrastructure development or betterment may have a social as well as a commercial component in which case state funding and related charges will apply on the social component, while loan funding and related charges will apply on the commercial component.

There may be instances when the state will develop water infrastructure in the expectation of promoting future economic development. In these instances social users will be charged in terms of the policy for on-budget governmental funding, while a rate equivalent for off-budget funding will be negotiated with economic users. In due course, if the economic development takes place, some users may move from being classified as social users to being classified as economic users with the concomitant change in charges. The classification of a project (social or commercial) will be at the sole discretion of the Minister of Water Affairs.

The construction cost of gauging stations for the national monitoring network will be funded from the fiscus. However, where new monitoring infrastructure is needed for non-national purposes it should be paid for by the users at the WMA or scheme level.

It should be noted that the need for monitoring, as captured in the priority list for new gauging stations, stems from wide consultation which identified these requirements for purposes of planning, operation, resource quality management, surface and groundwater monitoring, flood and drought management. Charges for the above will only be applied to users if the monitoring is specific to a particular water management area or a specific water scheme.

The tables below show the charges that may apply for infrastructure funded under different circumstances.

CHARGES TO BE LEVIED	EXISTING SCHEMES			NEW PROJECTS		
	Commercial portion of schemes funded from exchequer	Social portion of schemes funded from exchequer	Funded off-budget and debt has been repaid	Fully or partially funded by Government	Funded by Government and recouped from users	Off-budget funded portion of scheme
Operation and Maintenance	✓ (see 8.1.1)	✓ (see 8.1.1)	✓ (see 8.1.1)	✓ (see 8.1.1)	✓ (see 8.1.1)	✓ (see 8.1.1)
Depreciation	✓ (see 8.1.2)	✓ (see 8.1.12)	✓ (see 8.1.2)	✓ (see 8.1.2)	✓ (see 8.1.2)	✓ (see 8.1.2)
Return on Assets	✓ (see 8.1.3)	X	X	X	X	X
Water Resource Development	X	X	✓ (see 8.1.3)	X	X	✓ (see 8.1.4)
Refurbishment	X	X	✓ (see 8.1.2)	X	✓ (see 8.1.2)	✓ (see 8.1.2)
Betterment	X	X	✓ (see 8.1.5)	X	✓ (see 8.1.5)	✓ (see 8.1.5)
Capital Unit Charge	X	X	X	X	✓ (see 8.1.4)	✓ (see 8.1.4)

### 8.1.1. Operations and Maintenance

The operation and maintenance charge shall consist of the following:-

a) Direct costs:

Fixed and variable costs, which can be attributed directly to administrating, operating and maintaining schemes and include:

- Administrative costs
- Operating and maintenance costs (e.g. pumping cost, water weed control, pump maintenance, flood gate maintenance, etc.)
- Distribution costs

Direct costs will be allocated directly to sectors where this is possible. The cost of joint works and operations will be shared on a volumetric basis.

b) Indirect cost:

These are the costs which cannot be directly attributed to a specific scheme, but which contribute towards the sustainable management of the water schemes of the entire area, and comprise of:

- Allocated regional office/utility cost
- Allocated area office cost
- Allocated economic regulation costs

Indirect operation and maintenance costs will be allocated to the different sectors in an equitable manner.

Operation and Maintenance charges shall be recovered on a scheme, system or national (for economic regulation charges) basis. These charges (which include direct and indirect costs) can be recovered either on an actual cost recovery basis or through an Operations and Maintenance Charge that is based on the forecast of annual O&M costs and of water use.

### 8.1.2. Depreciation/Refurbishment

Depreciation is defined as the loss in functional performance and real term value of existing water resource infrastructure that occurs due to wear and tear, decay, inadequacy and obsolescence, not restored by regular maintenance. This standard performance and capital value can only be restored through refurbishment. Examples are the replacement of pumps, sluice gates on dams, the concrete lining of a canal or a portion of a pipeline.

For charge calculation purposes, depreciation is the systematic allocation of a depreciable amount of an asset over its useful life and will be applied as follows:-

- On a straight-line basis over the useful life of the assets.
- The depreciation amount = annual depreciable portion of the replacement value of assets.
- Replacement value = revaluation of the value of the assets as determined in the most recent revaluation. Full technical revaluation will be carried out at least every 10 years. In intervening years, the PPI of April of each year will be applied to escalate the base value of the infrastructure assets, and thus the annual depreciation amounts, to nominal values.

Schemes are in various stages of depreciation and need refurbishment at different points in time. It is intended that through cost recovery, depreciation charges will be used to refurbish existing assets on a prioritised basis, as and when required. Depreciation income from the general revenue base will be used for the refurbishment of infrastructure assets from a dedicated refurbishment fund.

As refurbishment will only restore the original capital value of assets in real terms, no increases in charges will take place as a result of refurbishment. On schemes funded off budget, the depreciation charge will only be applicable once the loans have been repaid. If refurbishment is required during the repayment period, a refurbishment charge will be arranged by agreement between the parties.

The depreciable portion and useful life over which the asset will be depreciated are in accordance with the table below, which is subject to revision when the next engineering revaluation of assets is due.

Component	Depreciable Portion (%)	Estimated Total Useful Life (years)
-----------	-------------------------	-------------------------------------

Dams & Weirs	10	45
Canals	40	45
Tunnels	10	45
Pump Stations	40	30
Syphons & Concrete pipelines	30	45
Steel pipelines	75	30
Buildings	100	40

Calculation formula for annual depreciation cost (ADC):

$$\text{ADC} = \text{Replacement value} * \text{Depreciable portion\%/expected useful life}$$

The depreciation charge is applicable to all sectors supplied from Government waterworks.

### 8.1.3. Return on Assets (ROA)

This component of the charge reflects payment towards the development, refurbishment and betterment capital value of the social or public interest portion of government water schemes.

The Department will develop a ten year capital budget for on-budget infrastructure clearly defining what portion of this budget is social or public interest infrastructure. The capital budget will determine, over a rolling three year period, what portion of the budget will be recovered from the RoA and what portion will be recovered from Parliamentary appropriation.

The calculation of the RoA portion of this capital budget must take into account the social and economic impacts of the RoA costs on water users.

In order to implement the RoA in this fashion, the Department must ring-fence the RoA revenue for this purpose and be able to retain it over a multi-year cycle.

In view of the off-budget funding arrangement for certain projects, the target level of income to be generated through ROA charges is directed towards recovering a portion of the annual capital cost requirement for state funded social and public interest projects.

The current approach taken in the 2007 Pricing Strategy, of charging a 4% RoA on national water resources assets (excluding those funded through the TCTA) is considered no longer appropriate, since the 4% figure is not directly related to the actual costs of funding future social betterment works or new infrastructure.

The proposed approach requires the department to calculate the costs of planned social infrastructure over a ten year period, and to develop a capital funding plan based on these costs, including RoA and funding from the fiscus. On this basis, the RoA will contribute a portion of the required costs, while the rest will come from the fiscus. The RoA will, therefore, be calculated against actual costs.

The planned social and public interest development, betterment and refurbishment infrastructure costs over a period of ten years will be calculated by the department, for D&I social infrastructure, and for agricultural infrastructure. The D&I costs will be apportioned against the volume of water used by non-social users in the D&I sector, and the same for the agricultural sector. Social users in the D&I sector are indigent households as per the Stats SA census figures and any users who the

state decides to waive charges against for a period in order to support equitable economic development. In the agricultural sector, social users are resource poor farmers or timber growers who are entitled to state support.

The charges will be calculated for a rolling three year period with the second and third year as estimates which can be amended either way within a 5% margin. Any proposed amendment outside this margin will require stakeholder consultation and special motivation to the economic regulator.

For this approach to work, it is necessary that DWA is able to ring-fence the RoA revenue and to retain it in a multi-year reserve fund which enables it to be used for funding future infrastructure.

The ROA charge is applicable to the non-social portion of the following sectors supplied from government waterworks:

- Domestic and industrial
  - Local Government (domestic)
  - Industry
  - Mining
  - Power generation
- Agriculture

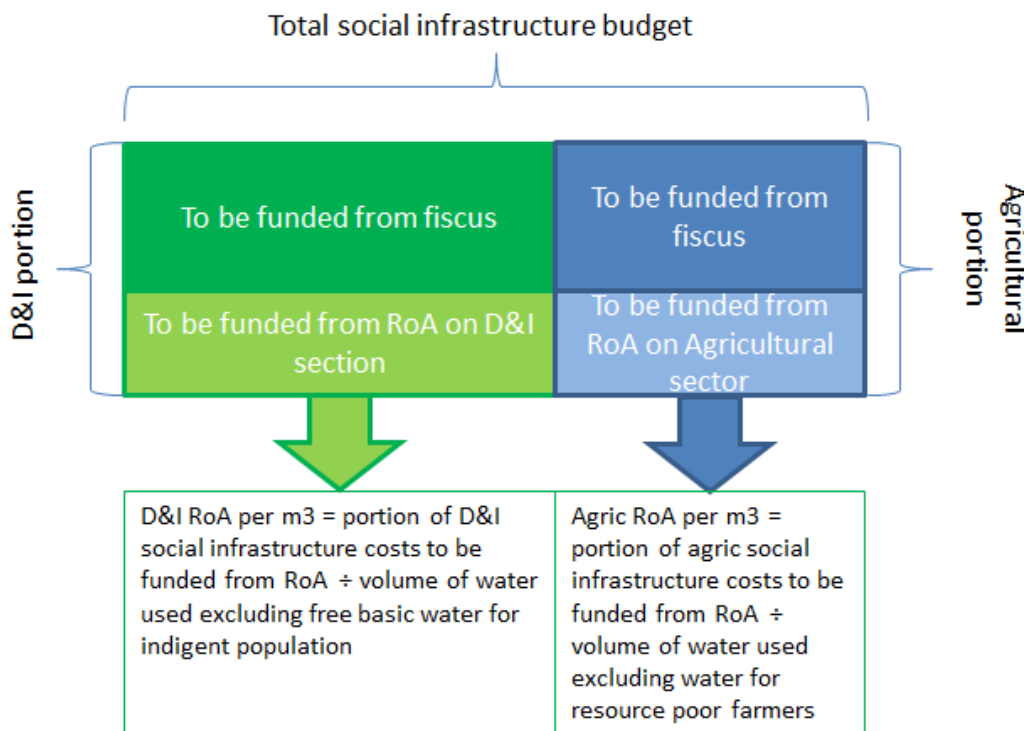


Figure 1: Calculation of RoA for funding social betterment and new infrastructure projects

#### 8.1.4. Water resources development charge

In terms of Section 56 (2) (b) of the NWA, DWA will be within its rights to raise funding from water users for water resource development and use of waterworks, including-

- (i) the cost of investigation and planning;
- (ii) the costs of design and construction; and

(iii) the pre-financing of development

of new water infrastructure and in terms of section 56 (2) (c) to set charges for achieving the equitable and efficient allocation of water, which would reflect the scarcity value of water.

These elements will form a **Water Resource Development Charge (WRDC)** to be charged on off-budget schemes once the loan on such a scheme has been repaid. Similar to State funded schemes the charge will be determined by earning a specific rate of return on DWA's asset value for price-setting purposes of any fully paid up off-budget scheme and will be applicable for as long as such scheme is in operable use and/or the relevant water users are licensed. The asset value will be based on engineering valuation at the time that the loan has been repaid.

Cognisance will be taken of the fact that certain users have paid off loans associated to these schemes. For licensed water users who were subjected to off budget funding, the charge rate for this WRDC will be determined by the Minister of Water and Environmental Affairs at the time when it becomes applicable (after loans are paid off) and will be applicable for all similar schemes. As a principle this rate will be less than the ROA rate on state funded schemes. For other water users licensed after the off budget debt has been repaid, the full ROA charge will be applicable.

#### **8.1.5. Government schemes funded off budget**

Water management institutions such as the TCTA, which are directed by the Minister of Water and Environmental Affairs to implement and fund government water schemes off-budget, are entitled to raise loans to finance the development of new water resource infrastructure, and to service these loans through cost recovery.

The TCTA or any future body responsible for off-budget national water resources infrastructure will on a project-by-project basis determine the extent of charges as determined by the proposed financial modeling. The primary charge will be the Capital Unit Charge (CUC). These charges must be developed after consultation with relevant water users.

The TCTA may enter into an implementation agreement with the Department of Water Affairs ("DWA") and DWA may thereafter enter into a water supply agreement with the end-users. Consequently these agreements will be "back-to back" and serve the purpose of recording the rights and obligations of the parties in the implementation, financing and supply of water pertaining to the new government water work. In these instances, the TCTA will levy the CUC onto DWA and DWA will in turn levy the CUC onto the end-users. A cession may be signed between the parties whereby the CUC charge is paid directly to the water management institution.

In this scenario, when the project debt has been repaid, the project will attract all charges that are applicable to State funded schemes except for the ROA charges which will be replaced by the WRDC as explained above.

##### **Guidelines for the CUC**

- A charge is determined which will ensure that the debt on the project will be fully paid by the end user within a reasonable period of time. A reasonable period is usually determined as being between 18 to 25 years, taking cognisance of both end user affordability and future augmentation of a scheme.
- The reasonable period of time to repay the debt, which shall not be longer than the economic life of the asset, will be determined on the basis of:
  - The debt profile and acceptable growth and level of debt of the project;



- Not allowing the debt of a project to overlap to an unreasonable extent with another project causing financial strain to end users or unhealthy financial balance in the water sector; and
- The anticipated future funding requirements of the augmentation of the project.
- A charge is calculated such that it is constant in real terms and grows with inflation, being CPI-X, unless otherwise agreed to between the parties or any of the review triggers being applicable.
- A charge may be phased-in during the construction period.
- Parties should endeavour not to capitalize interest after completion of construction. The terms by which interest will be capitalized will be included in the terms of the original binding contract, or alternatively a supplementary agreement, agreed to by all signatories to the original contract.
- The charge will be based on water used from a scheme or system and not necessarily water provided into a scheme or system, which will enable water demand management, water restrictions etc.
- Phasing-in and step down of the charge can be allowed for if it still facilitates end user affordability, provision for future augmentation will also be considered.
- Demand projections are used to determine a charge which is set for a three year period taking account of changes in:
  - Water demand projections;
  - Real interest rate projections;
  - Inflation projections and/or
  - Cost of the scheme as well as cost and timing of future augmentation.
    - From date of invoice amounts are payable to the water management institution within 30 days, unless otherwise agreed to between parties.

#### **Review triggers of the CUC**

The CUC charge may contractually be subject to an annual review where increases are passed through automatically or under specific conditions negotiated between the parties. These conditions shall take into account but not be limited to the following factors:

- Changes in the yield of the system;
- Changes in macro economic projections;
- Changes in legislative charges;
- Changes in construction costs;
- Any revenue generated by the scheme other than the CUC and as agreed to by the parties to decrease the amount outstanding to repay the scheme;
- Changes in water use allocations and compulsory licensing; and
- The timing and cost of future schemes.

#### **8.1.6. Lump sum user contribution**

Where the users or a portion of the users of new infrastructure fund their portion of such infrastructure planning, design and construction through a lump sum contribution they will not be liable for paying the CUC of that scheme. They will, however, be responsible for paying the WRDC once any loan has been paid off, or after an equivalent time period if there is no loan.

#### **8.1.7. Betterments**

Betterment implies an improvement of existing water resource infrastructure resulting in an increased functional performance and/or real term capital value thereof. Examples are the raising of an existing dam to increase the yield, the enlargement of a canal to increase capacity and

improving the stability of dams for safety purposes.

Betterment of social projects will be funded through the ROA provision and from the fiscus. After betterment is introduced, the real value of the asset will increase, resulting in an increased ROA amount for charge setting purposes.

For betterment of commercial driven projects using off-budget funding, the Minister of Water and Environmental Affairs or the water management institution may levy a betterment charge in consultation with the end-users post construction of the new water infrastructure. The charge may, at the discretion of the end-user, either be determined on an actual cost recovery basis or determined taking into consideration the need to smooth over time the impact of the charge if high capital costs have to be incurred to increase the availability of water or to maintain the assurance of supply.

The same principles of the CUC will apply in collecting revenue from the charge.

### 8.1.8. Methodology in determining unit cost

#### Assurance of Supply (Section 56 (4)(b)(iii) of the Act)

The capital cost of multipurpose dams will be divided between sectors in proportion to the long-term estimated average annual sector use of allocations. Average sectoral use will reflect curtailment during water restrictions, thus taking into account the assurance of supply. The ROA and depreciation charges per sector will then be determined by using the divided capital cost allocations.

Unless scheme-specific assurance of supply is available, the long-term average annual use of the various user sectors will be considered to be the following percentage of allocations on government water schemes:

Sector	% of Sectoral allocation	Calculation of sectoral allocation %
Irrigation sector	91%	(100%@70%+70%@30% of the time)
Domestic, industrial and mining	97%	(100%@70%+90%@30% of the time)
Strategic industrial sector	100%	No water restrictions

- In the case of conveyance structures, the division of capital costs will be done in proportion to the required peak rates of supply to the various sectors.
- Percentages may be applied to determine the price differential on the CUC charges based on the Assurance of Supply.

The assurance of supply is applied as follows:-

- If for example a scheme has 100 million m<sup>3</sup> of available water per annum:
- If 30% is allocated to domestic and industry, (30 million m<sup>3</sup>) and the balance of 70% is allocated to agriculture, then the long term average use of allocations will be calculated as follows:-

Domestic & Industry	30 million m <sup>3</sup> x 0,97	29.1 million m <sup>3</sup>
Irrigation	70 million m <sup>3</sup> x 0,91	<u>63,7 million m<sup>3</sup></u>
Total		<u>92,8 million m<sup>3</sup></u>

Domestic and Industry allocation of cost will be	29,1 / 92,8	31.36%
Irrigation allocation of cost will be	63,7 / 92,8	<u>68,64%</u>
Total cost allocation		<u>100 %</u>

Under the current example, Domestic and Industry will pay a premium of 1.36% as a result of a greater assurance of supply while Irrigation will receive a discount of 1.36% as a result of a smaller assurance of supply.

### **Consumptive charges on social projects**

A unit cost will represent the consumptive charges to be levied on existing and new social (Government funded) water schemes. Unit costs will be determined based on the annual sectoral cost allocations in respect of depreciation and operation and maintenance.

Unit costs will be based on the estimated water use but consumptive charges will be invoiced on actual measured or registered use.

On social projects where the long-term yield of the dams has not been fully allocated, consumptive charges will be based on the long-term yield, which implies a State subsidy. The RoA will not apply on social projects.

On canal or pipeline scheme elements of social projects which are under utilised because full utilisation as planned could not materialise, the capacity of the canal/pipeline should be used as a basis for calculating charges.

Unless other arrangements are approved by DWA, consumptive charges will be invoiced on a monthly basis for the domestic/industrial sector and bi-annually for the agricultural sector.

In order to promote water conservation and demand management, consumptive charges can consist of fixed and variable payments where agreements are concluded with user bodies.

### **8.1.9. Phasing in of consumptive charges**

#### **Domestic/Industrial/Mining/Energy sector**

Consumptive charges for existing state funded schemes will be based on full cost recovery with targeted subsidies provided where appropriate and necessary. Charges will not be reduced below the previous year's level, except in extraordinary circumstances, which would make a reduction inevitable.

#### **Agricultural sector**

- Commercial farmers

(a) Full Operation and Maintenance costs will be recovered annually, with targeted subsidies provided from the fiscus to DWA where necessary and appropriate.

(b) Full depreciation charges for existing schemes will be charged with targeted subsidies provided from the fiscus to DWA where appropriate.

(c) Full financial cost recovery (including ROA) for new commercial schemes.

- Resource poor farmers

(a) Operation and maintenance charges will be waived entirely for five years from the date of registration of the water use. Thereafter the O&M costs will be phased in over five years starting at

20% of the full O&M costs in the first year, 40% in the second year, etc. After this ten year phasing in the charges will be as for commercial farmers.

(b) Depreciation charges will be waived entirely for five years from the date of registration of water use. Thereafter the depreciation charges will be phased in over a five year period starting at 20% of the full depreciation charge in the first year, 40% in the second year, etc. After this ten year phasing in the charges will be as for commercial farmers.

(c) Capital costs for new development will be subsidised by the fiscus or through the RoA.

(d) Further waiving of charges will be considered for a limited time period on request by other relevant Departments, for example, where land and agricultural reform programmes are involved.

#### **8.1.10. WUAs as Billing Agents**

As WUAs capacity develops, they may be used as billing agent for water charges. The timing of the transfer of responsibilities will be subject to an assessment by the Department of Water Affairs. WUAs acting as billing agents will be entitled to a 15% management fee to be subtracted from the collected revenue.

#### **8.1.11. Treatment of Reserve Funds**

The depreciation, return on assets and water resource development charges (WRDC) will require reserve funds to be managed by DWA / TCTA over time.

DWA will only be in a position to finance capital cost requirements for refurbishment on specific schemes from its general depreciation charge revenue base and to finance the development of new social projects and betterment of existing projects from the general ROA and WRDC revenue base once a dedicated reserve fund has been put in place, from which capital expenditure can be made in a controlled manner.

When the above structures have been put in place the depreciation charge revenue may serve as a stabilization reserve for refurbishment whilst the ROA and WRDC income may serve as a provisioning reserve for betterment and development of social projects and could also be applied to dam safety betterments on existing social schemes.

Use of depreciation funds will be prioritised in accordance with DWA integrated water resource risk management systems.

As stated above, once a ring fenced provision account for ROA and WRDC has been established, this revenue will be applied to the funding of water resource development, prioritised as follows:

- (i) Planning and feasibility of future augmentation, (social or commercial projects),
- (ii) Betterment and/or development of social projects.
- (iii) Dam safety betterments on existing schemes (social).

Further cost such as those required for international obligations will be funded from the exchequer.

Prior to developing new water infrastructure projects, DWA will assess the viability of undertaking a water conservation and demand management project as a cost effective alternative to developing new water infrastructure projects. Such projects may be funded through the infrastructure charges if appropriate.

### **8.1.12. Water Supply Agreements**

DWA/TCTA shall enter into water supply agreements with major bulk raw water users and also with water boards, which have to enter into long-term water supply agreements with municipalities.

### **8.1.13. Hydropower**

Hydropower power schemes using state owned infrastructure will pay the D&I charges based on the volume of water passing through the turbines, except in the case of pump storage schemes where the charge will be based on the volume of water removed from the system i.e. additional evaporation due to the pump storage scheme over and above normal evaporation from the dam.

### **8.1.14. Interbasin transfers**

As mentioned previously, an inter-basin transfer scheme refers to infrastructure constructed to transfer water between river systems located in different WMAs, in order to augment the allocable yield of water stressed catchments. Examples are the Riversonderend – Berg River, Tugela – Vaal, Orange – Fish, Tugela – Mhlathuze and Usutu – Vaal transfer schemes, constructed by DWA.

Water to be imported via an inter-basin transfer scheme will reduce the potential for generating funds in the donor WMA through water use charges and increase the potential in the receiver area. This loss in income in the donor WMA must be funded by water use charges raised in the receiver WMA. The receiver CMA must reimburse a fixed portion of the infrastructure costs of the donor CMA, based on the yield transferred calculated as a fraction of the total available yield in the donor WMA at 98% assurance of supply, in accordance with the NWRS.

The revenue from the recipient WMA must be paid to DWA which will transfer the money to the TCTA where the scheme has been funded off-budget.

### **8.1.15 Clearing of Invasive Alien Plants (IAP's)**

The full cost of control of certain IAP's will be charged to affected water users where this is the most cost effective solution for making more water available in the catchment. In this regard the DWA or the CMA, in consultation with affected stakeholders, will recommend that the control of IAPs in a particular catchment as necessary for water security and, from the range of options available, the control of IAPs is the best and most cost effective action possible to increase long term water security and availability. Once agreement is reached on the method of control IAPs, and before going ahead with clearing, the total cost of control must be communicated to all affected stakeholder organisations. These costs may be supported by subsidy where available and appropriate.

The agreed upon cost of control will then be allocated to all water user sectors in proportion to their registered abstraction related water use.

## **8.2. SCHEMES OWNED BY CMA'S AND WUA'S**

Catchment management agencies and water user associations must, when determining their revenue requirements on which water use charges for development and use of waterworks are based, take into account the following:

- (a) recovery of overheads/management, operations and maintenance costs;
- (b) recovery of capital costs and the servicing of loans (water management institutions are entitled by the Act to raise loans to finance new water supply infrastructure, and should therefore be able to service these loans through cost recovery);

- (c) reasonable provision for the depreciation of assets, which can be placed in a reserve fund for utilisation at the appropriate time for refurbishment;
- (d) other charges levied by law on the institution and in terms of this pricing strategy; and
- (e) the financial targets included in its business plan.

Charges levied by water management institutions may be levied on a proportional or differential basis, depending on the relevant constitution, or if directed so by the Minister to give effect to the provisions regarding the rendering of financial assistance in terms of the NWA.

## **9 ECONOMIC CHARGES (S56 (2) (C))**

The economic charge will support the objective of economic efficiency as covered under chapter 3 in providing an incentive to shift water use from low to high values. The economic charge can be set only by DWA, on a scheme or system related basis and the revenue would accrue to Treasury.

There are two methods of setting the charge, i.e.:-

- administratively by determining a proxy for the economic value of water, or
- via market-orientated mechanisms.

- Administrative mechanisms

The administratively determined charge can be used in water stressed catchments to provide an incentive for existing users to increase economic efficiency. The administratively determined charge will be based on the opportunity cost of water as determined by prevailing trading transactions but will be capped to the level of the return on assets charge or CUC for the relevant scheme or system. This implies that only water users not charged for ROA or CUC may be subjected to this charge.

Since the pricing strategy introduced financial charges will go a long way towards improving the efficient allocation of water, the administratively set economic charge will not be introduced before compulsory licensing is implemented, and then only after consulting the relevant stakeholders and water management institutions. This annual charge will be an add-on to any charges levied for water resource management, depreciation and use of waterworks.

- Market-orientated mechanisms

Where amounts of water are still available for allocation after compulsory licenses have been issued, and there is competition for using this water, the public auction procedure may be followed. The price established in this manner will be based on market clearance principles by allowing applicants to take up the entire available supply through a bidding or tendering process. Before introducing this process, a regulation must be developed in accordance with section 26(1)(n) of the NWA.

Another market-orientated mechanism, which is already in place, is the transfer of water use entitlements via trading transactions in terms of Section 25(2) of the NWA. A procedural guideline has been developed to facilitate trading within and between water use sectors. This may obviate the need of setting economic charges administratively in water-stressed catchments.

## 10 THE WASTE DISCHARGE CHARGE SYSTEM

### 10.1. THE BASIS FOR A WASTE DISCHARGE CHARGE SYSTEM

Section 56 (5) of the National Water Act (NWA) enables the Minister to establish a system for charging waste discharges in terms of the pricing strategy. This Waste Discharge Charge System (WDCS) is based on the polluter pays principle and aims to:

- promote the sustainable development and efficient use of water resources,
- promote the internalisation of environmental costs by waste dischargers,
- create financial incentives for waste dischargers to reduce waste and use water resources in a more optimal manner,
- recover costs associated with mitigating resource quality impacts of waste discharge.

The WDCS charges are distinct from the Water Resource Management (WRM) charges on waste discharge as defined in Chapter 7.4 of the Pricing Strategy. The WDCS provides an economic instrument to support the management of water quality, where problems have been identified.

The WDCS will be implemented in a catchment as part of a water resources management planning process that includes regulatory, economic and other instruments. By so doing, the waste discharge charges are one element of an integrated approach to managing the resource quality problems in that catchment. Where the processes of classifying the water resource [in terms of Section 13 of the NWA] or developing a Catchment Management Strategy (CMS) [in terms of Section 8 of the NWA] have been conducted, the setting of waste discharge charges will support the associated objectives.

The WDCS as an economic incentive mechanism is therefore most appropriate for water quality problems for which the primary:

- impact is associated with the cumulative impacts from a number of dischargers in a catchment, rather than localised impacts from a single discharger (which is better managed through regulatory directives under Section 19 of the NWA), and
- sources are authorised water users, which require authorisation or registration, rather than diffuse sources that are not defined as water users (in terms of Section 21 of the NWA).

The WDCS will be applied at a catchment level, not necessarily at a Water Management Area (WMA) scale. The catchment area will be defined as those areas that have a significant impact on or are impacted by the specific water quality problem. This may therefore be an entire catchment in which a wide-spread water quality problem exists or may be a sub-catchment within a larger basin, which is bounded by reservoirs and/or sub-catchments with insignificant contaminant loading. The potential impact of waste disposal on groundwater resources is recognised, but the WDCS will only be applied to groundwater resources in a future edition of the pricing strategy.

The WDCS may be implemented in catchments for which Resource Quality Objectives (RQOs) are either exceeded or threatened. In the absence of a class and associated resources quality objectives (RQO), Resource Water Quality Objective (RWQO) will be refined and set as part of the WDCS implementation in that catchment. The setting of RWQO must be through a process of consensus-seeking amongst waste dischargers, water users and other relevant stakeholders, with the public trust placing the responsibility on Government to make sure that environmental interests are represented.

The WDCS provides an economic instrument to assist other regulatory tools in moving towards (or maintaining) the desired state represented by these objectives, over a pre-defined time period. In this situation, adaptive management (monitoring and review) of the waste discharges, charges and targets (interim objectives) will be conducted, in order to achieve the RQOs or RWQOs.

The WDCS may include, but not be restricted to, any of the following water quality variables:

- *Nutrients*: phosphate, nitrate & ammonium
- *Salinity*: Total Dissolved Solids, Electrical Conductivity, chloride, sodium & sulphate
- *Heavy Metals*: arsenic, cadmium, chromium, copper, mercury, lead, nickel & zinc
- *Organic material*: Chemical Oxygen Demand

Water quality indicator variables will be selected in terms of the water quality problems and their critical impacts identified in terms of the RWQO and a catchment assessment. Selection and definition of a particular indicator variable will consider the type of waste discharge sources in the catchment, the nature of the waste typically discharged, and the cost-effectiveness of monitoring different variables.

The WDCS consists of two distinct water use charges, either or both of which may be applied in a specific catchment:

- i. Charges to cover the quantifiable costs of administratively implemented measures for the mitigation of waste discharge related impacts (Waste Mitigation Charge)
- ii. Charges that provide a disincentive or deterrent to the discharge of waste, based on the use of the resource as a means of disposing waste (Waste Discharge Levy)

The Waste Mitigation Charge is expanded below. The Waste Discharge Levy charge will be promulgated through Parliamentary Money Bill tabled by the Minister of Finance.

## **10.2. PRINCIPLES FOR THE WASTE MITIGATION CHARGE**

The Waste Mitigation Charge is a user charge established in terms of the pricing strategy to recover the costs of mitigating the impacts of waste discharge on the surface water resources. It is intended for application where mitigation measures provide an economically efficient approach to support the achievement of resource (water) quality objectives in a catchment, in comparison to the costs of waste discharge reduction at source. It must be planned, developed and implemented in terms of a water resources management (and rehabilitation) plan developed to address a water quality problem in a catchment.

The following principles apply to implementation of the Waste Mitigation Charge in terms of the WDCS.

- The Waste Mitigation Charge will be based on load discharge as it avoids the dilution of effluent to avoid cost reduction.
- A constant charge rate will be applied to the waste discharge load, and will not vary against concentration.
- Only registered waste discharge related water use in terms of Sections 21 (e), (f), (g), and (h) of the NWA will be liable for waste mitigation charges.
- Government will be responsible for the costs associated with load that cannot be charged to registered water users.
- The load or concentration associated with the intake of water supplied to the discharger may be deducted from the waste discharge charge.
- The WDCS may be applied to all discharges contributing to the load in an upstream catchment where downstream resource quality objectives are threatened or exceeded, even where incremental upstream resource quality objectives are met.



- The mitigation measures and thus the associated waste discharge charges may be phased in to enable planning by dischargers and to allow adaptive setting of charges as conditions change.
- Minimum load thresholds for charging may be specified on the basis of administrative cost considerations.

There are four situations for which the Mitigation Charge may be considered:

1. *Removal of load from the water resource*: enables the recovery of costs for developing and operating regional mitigation schemes, initiatives or projects for the reduction of water quality loads within the water resource.
2. *Water resource system operation for water quality management*: enables the recovery of costs associated with reduced system yield associated with the management of river-reservoir systems to reduce the impact of water quality problems.
3. *Treatment for downstream water users*: enables the recovery of costs incurred in developing and operating additional treatment requirements for downstream users, particularly where water quality does not meet specified resource quality objectives.
4. *Treatment at source*: enables a group of dischargers to contribute directly to the costs of reducing waste load from a specific source, including regional schemes to collect and treat waste from a number of sources before it enters the water resource.

### **10.3. CALCULATING THE MITIGATION CHARGE RATE**

The aim of the WDCS is to reduce the total pollution load in a catchment by an amount necessary to achieve the resource (water) quality objectives. Feasible mitigation measures are designed to reduce or compensate for the impact of the load at key points in the catchment, either alone or in combination with the source load reduction achieved through application of the Waste Discharge Levy. The Waste Mitigation Charge is set to recover the full financial costs of these measures in a catchment.

The Waste Mitigation Charge rate is calculated as the total annual cost of mitigation divided by the total annual waste discharge load in that catchment. The total cost will be estimated as the equivalent annual operational cost (operations and maintenance), together with any amortised capital cost over the design life of the measure (capital, interest and depreciation).

The total discharge waste load in the catchment will be based on a catchment assessment, distinguishing the contribution from point sources, registered disposal to land or facilities (resulting in non-point impacts) and other anthropogenic non-point sources. Background loads will be excluded from the charge calculation.

The Waste Mitigation Charge for:

- Registered point source dischargers will be calculated as the product of the Waste Mitigation Charge rate and the monitored (or registered) waste load from that point source.
- Registered discharge or disposal to land or facilities (representing non-point sources) will be calculated as the product of the charge rate and a proportion of the monitored (or estimated) waste discharge or disposal – related to the source management system.
- For the (DWA) government contribution related to other non-registered nonpoint sources will be the product of the charge rate and the total remaining nonpoint sources load in the catchment.

Within the catchment, DWA together with other stakeholders are also obliged to implement regulatory and/or non-regulatory approaches to reduce the load from these nonpoint sources areas in terms of the Water Resources Management Plan.

#### **10.4. INSTITUTIONAL ARRANGEMENTS**

The collaborative and potentially long-term implications of implementing a mitigation measure in this manner require clear institutional roles and responsibilities, in terms of both the financing and operation of the measure.

Setting, collection and disbursement of Waste Mitigation Charges are the responsibility of the catchment management agency (CMA) in terms of the WDCS business plan developed in consultation with stakeholders. The DWA acts as the CMA in water management areas in which the CMA is not yet established and functional. This must comply with the requirements of the Public Finance Management Act and this Pricing Strategy, and should align with the Catchment Management Strategy, where this has been established.

The CMA will not necessarily directly implement the measure, but rather this may be done by service providers, infrastructure operators or an independent implementing agent. The CMA will clarify (and establish) the institutional responsibilities through the business plan, in consultation with the waste dischargers. In some cases, an agreement may be required between the implementing agent and the dischargers, while the project funders may require the CMA to enter an agreement in terms of the collection and disbursement of funds.

Depending upon the design life and capital repayment schedule for the mitigation measure, these agreements may be in force for a number of years. This characteristic makes it critical that the mitigation measure is consulted with all dischargers who may be liable for charges.

#### **10.5. IMPLEMENTATION OF THE WDCS**

The Waste Mitigation Charge will be implemented from 2015/16 financial year, after testing the system during the 2013/14 financial year. The WDCS will be applied in suitable priority catchments throughout South Africa, where resource water quality objective are not being met or are threatened.

## **11 APPLICATION OF PRICING STRATEGY TO DIFFERENT CATEGORIES OF WATER USE/USER SECTORS**

Section 56 of the National Water Act, 1998 also provides for the pricing strategy to differentiate on an equitable basis between-

- different types of geographic areas (**S 56 (3) (a) (i)**)
- different categories of water use (**S 56 (3) (a) (ii)**); and
- different water users (**S 56 (3) (a) (iii)**).

Section 56 (6) (c) of the Act provides that in setting a pricing strategy for water use charges, the Minister must consider measures necessary to support the establishment of tariffs by water services authorities in terms of section 10 of the Water Service Act, 1997 and the use of lifeline tariffs and progressive block tariffs.

### 11.1. SUMMARY OF WATER USE CHARGES PER SECTORS

SECTOR	RESOURCE MANAGEMENT CHARGES	RESOURCE DEVELOPMENT CHARGES	WASTE DISCHARGE CHARGES	PHASING IN OF CHARGES
Domestic/Industrial	Full cost recovery on abstraction and waste discharge related costs	On-budget GWS: Depreciation; ROA: O&M Off-budget GWS: CUC, Refurbishment, and O&M; and WRD post payment of loans;	Full costs of mitigation charge	WRM charges in place Waste discharge charges to be implemented after registration of waste users as per catchment specific plans
Stream Flow Reduction Activities Commercial growers	Full recovery of abstraction related costs. Cost of Dam Safety Control and waste discharge related costs not allocated to the forestry sector.	Not applicable, except where negotiated for new development. Then as above.	Not applicable	Charges introduced immediately on registration or authorisation
Stream Flow Reduction Activities Resource poor growers	Full recovery of allocated costs Cost of Dam Safety Control and waste discharge related costs not allocated to the forestry sector.	Not applicable, except where negotiated for new development. Then as above	Not applicable	No charge for forest plantations ≤ 10 hectares. WRMC: Phased in over five years
Irrigation Commercial farmers	Full recovery of allocated costs	GWS: Full recovery of Depreciation plus O&M on existing schemes. Full financial cost recovery for new schemes. Targeted subsidies to be provided where necessary as determined by DWA, DAFF and National Treasury	Not applicable	Full consumptive charges to be phased in over 5 years
Irrigation	Full recovery of allocated costs	GWS:	Not applicable	Consumptive charges

Resource poor farmers		<p>O&amp;M subsidised for a 10-year period on existing and new schemes.</p> <p>Depreciation charges waived for a 10-year period.</p> <p>WMIs:</p> <p>Capital subsidies available under certain conditions.</p> <p>Targeted subsidies to be provided where necessary as determined by DWA, DAFF and National Treasury</p>		<p>Subsidised for 10 years from date of registration. Subsidy starts at 100% for five years, then reduces by 20% annually.</p> <p>WRMC:</p> <p>Phased in over 5 years</p>
Hydropower	Full recovery of allocated costs	<p>On-budget GWS: Depreciation; ROA: O&amp;M</p> <p>Off-budget GWS: CUC, Refurbishment, and O&amp;M; and WRD post payment of loans;</p>	Not applicable	All charges immediate on registration or authorization of water use

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## 11.2. NATURAL DISASTERS

Section 56 (3) (e) of the National Water Act allows the Minister to provide on an equitable basis for some elements of the charges to be waived in respect of specific users for a specified period of time.

In addition to the support offered hereunder, any relief offered by other government departments at the time of the natural disaster could also be applied to offset further water charges.

### 11.2.1. Forest fires and floods

In the event of forest fires or floods, when water resources are not in use as a result of damages caused, the Minister may apply her/his mind to grant some form of relief to affected users and will consider and may apply all or some of the following in determining support:-

- The extent of damage to crops.
- The relief **will in all cases** be limited to the actual Water Resource Management charges.
- Water Resource management charges **could** be fully or partially waived.
- Charges waived will be for a fixed period of time.
- **Under no circumstances will** cash grants be provided as relief.

### 11.2.2. Droughts

During times of droughts when it is necessary to curtail entitlements, the following rules will apply when water restrictions are imposed by the Department on established and emerging farmers on existing Government Water Schemes.

In schemes where the actual available supply is:

- greater than or equal to 70% of the irrigation quota, full charges will apply,
- less than 70% and equal to or above 50% of the irrigation quota, charges will be limited to the WRM charges and the O&M charges, while the Depreciation charges will be waived,
- less than 50% and equal to or above 30% of the irrigation quota, charges will be limited to the WRM charges and 30% of the O&M charges, and the depreciation charges will be waived,
- less than 30% and equal to or above 0%, of the irrigation quota, charges will be limited to the WRM charges, implying that the depreciation and the O&M charges will not apply.

CMA's and WUA's must approach DWA with a motivation for the implementation of these drought measures when appropriate.

When less than 50% of water is available, DWA will approach National Treasury for the shortfall in income to be recovered from the fiscus.

## 11.3. PURCHASE OF "EXTRA WATER"

The policy of allowing scheduled irrigators on Government water schemes to purchase "extra water" under certain conditions at heavily subsidized prices has been discontinued. Only under exceptional circumstance, such as an unexpected heat wave, may irrigators be allowed to purchase additional water over and above the quotas. The charge for such extra water will be the raw water charge for domestic and industrial supply.

#### **11.4. INTEREST ON ARREAR WATER CHARGES**

Arrear water charges will attract interest at rates determined by the Minister from time to time.

### **12 MULTI-YEAR CHARGES**

The Department of Water Affairs and CMAs will introduce with the implementation of this Pricing Strategy a system of multi-year charges. Charges will be set for a period of three years.

For the first three years, these charges will be reviewed annually on a rolling-three year basis to ensure that the mechanisms and tools work effectively. Thereafter, i.e. in year four after the implementation of this strategy, the charges will be set for three years, with the first year fixed and the outer years subject to up to 5% variation. Should a greater than 5% variation be required DWA or the CMA will need to provide substantive motivation to the economic regulator, and water users.

The implementation of the economic regulator for water will assist to ensure that these charges are appropriate.

### **13 TRANSPARENCY AND ACCOUNTABILITY**

In establishing the pricing strategy, every attempt will be made to control costs by the application of sound financial management principles such as strict budgetary control. The revised pricing strategy embraces the principle of transparency, which of itself should promote cost control.

In terms of this principle, the forthcoming three-year sectoral charges that are developed during the budgetary process for each water management area will be forwarded to regional offices for dissemination and discussion with interested parties. Final sectoral charges will then be formalised and disseminated through the accounts receivable system to the water users prior to the commencement of the financial year and in accordance with the multi-year charges process outlined above.

### **14 IMPLEMENTATION DATE**

## 15 ANNEXURE A: GLOSSARY OF TERMS

**Social equity:** In the context of water resources, social equity implies that all user groups have fair and reasonable access to the nation's scarce water resources, and that the allocation of water resources facilitates universal and affordable access to a basic water supply.

**Ecological sustainability:** This concept captures the view that there is a need to treat ecological protection and continuing economic growth as mutually compatible rather than as necessarily conflicting objectives.

**Economic efficiency:** A condition that is achieved when resources are used over a given period of time in such a way as to make it impossible to increase the welfare of any person without harming another.

**Economic value:** The cost that represents the scarcity value of a good that would prevail in competitive markets.

**Externalities:** are essentially activities whose full cost or benefit is not incorporated into an economic decision; hence they lead to sub-optimal social allocation.

**Market approach:** This is an accepted means through which buyers and sellers can communicate and trade at mutually agreed terms.

**Market clearance:** A condition that is attained when the price of the good traded adjusts so that the quantity buyers wish to buy is equal to the quantity which sellers wish to supply.

**Opportunity costs:** The costs of alternatives forgone by using scarce resources in a particular manner.

**Polluter pays principle:** A principle that ensures that a charge per unit of pollution emitted into the ecosystem is charged to those responsible for such pollution in order to internalise the cost thereof.

**Resource Poor Farmers/Forest growers:** Entry-level water users who are citizens of South Africa and who are members of the historically disadvantaged population groups.

**Scarcity:** The situation which arises when demand for any given good outstrips the supply of that good.

**SAPWAT:** A software program providing a crop water requirement model for South Africa.

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