Participatory Course to Activate Water Pricing Learning Networks

Report to the
Water Research Commission

by

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EXECUTIVE SUMMARY

The Ecological Infrastructure for Water Security Project (EI4WS) is funded by the Global Environment Facility (GEF), implemented by the Development Bank of Southern Africa (DBSA), and executed by the South African National Biodiversity Institute (SANBI), in partnership with the Department of Forestry, Fisheries and the Environment (DFFE), Department of Water and Sanitation (DWS), Water Research Commission (WRC), and other implementing partners. This project focuses on improving water security by integrating biodiversity and ecosystem services into planning, finance, and development in the water sector. As part of this project, Prime Africa was contracted to develop a participatory course to activate water pricing learning networks. This training course aims to strengthen learning networks in the water value chain. This is done through a platform that enables decision makers to have robust engagement with stakeholders across the value chain.

South Africa has policies that enable the design and setting of water prices across the water value chain. However, decision makers at different water pricing tier levels have insufficient decision-making knowledge, and this has resulted in water prices not implemented effectively. Lack of understanding governance arrangements, processes and theory and other attributes of underlying water prices setting and the economic regulation of water, has limited authorities in presenting the process of setting water tariff to their customers.

As water pricing is a complex topic, the course also aims to strengthen understanding of the governance arrangements, processes and components that give guidance to developing cost structures of primarily water resource management charges. The aims of this study were therefore as follows:

- Provide participants with a deeper understanding of the concept of water charge setting
- Provide guidance on tools to utilise in water charge setting processes
- Strengthen networks of water charge learnings.

Firstly, a literature review on the subject was conducted to understand the status quo, including identifying gaps and opportunities. The literature review focused on policies and legislation in South Africa that authorises organisations across the water value chain to water charges. (See Appendix A)

Review of the Greater uMngeni and Berg-Breede catchments were done to understand how organisations in the areas manage their water business. The resultant learning formed part of the training needs assessment, as it provides analysis into gaps/limitations that organisations are facing and what opportunities can be explored as a result. (See Appendix B)

Prior to developing training content, it was necessary to understand the needs/gaps as perceived by the relevant stakeholders. This was done through interviewing relevant stakeholders from different organisations. Staff from the identified organisations were contacted through emails and/or

phone calls. The background information and the questionnaire were sent to the staff prior to the meeting. The organisations that were contacted included government organisations, water boards, cma/proto cmas, wass, wua/irrigation boards (IB), and researchers. (See Appendix C.9)

The training needs assessment provided insight into the type of training course to be developed and for which audience. The assessment demonstrated catchment management agencies (CMAs), policy makers, and water users do not have the same understanding on fundamentals of raw water charges. Policy makers indicated that they would like to have discussions with CMA staff, and more particularly with the raw water users, to get a better understanding on how the policies affect them. CMA staff indicated they struggle to communicate with their customers on how the water tariffs are set and lack of platform with regards to grants they receive from government. Water users (farmers) indicated that they don't know the functions of CMA and Department of Water and Sanitation (DWS), and how these water tariffs are calculated. The primary focus of the training course was therefore on WRMC, although there was a description of how raw water charges are linked to the entire water value chain. The training course therefore focuses on:

Activities and costing structure of WRMC from the 2007 Raw Water Pricing Strategy;

Components of the raw water pricing strategy currently being amended;

Definition of public interest function of WRMC;

Agricultural sector caping policy;

Exploring funding mechanisms of EI.

The resultant participatory training course on water pricing development has six modules, with day 1 focusing on 2007 Raw Water Pricing Strategy, including a module that covers the entire water value chain. Day 2 covered how the new 2022 Raw Water Pricing Strategy would affect how CMAs run their water business. The modules developed therefore were:

1. Background on the water value chain
2. Activities and budgeting for WRM done by CMAs
3. Tariff setting of WRMC
4. Public Interest function for WRMC
5. Mechanisms for funding Ecological Infrastructure
6. Importance of Accurate Budgeting for CMAs and a tutorial in charge setting.

The training course was tested at two demonstration catchments (i.e. Greater uMngeni and Berg-Breede). The course was highly participatory in nature and participants were expected to provide inputs into different components based on their expert knowledge. There were activities in each module which promoted robust discussions which included:

Discussion/debates on a particular topic in each module

Quizzes at the end of some modules

Group work exercises

Tutorials.

Participants were expected to log into a Zoom online platform using laptops during the course. This had the following benefits:

To enable higher levels of participation, to answer quizzes and to complete group exercises.

To enable key participants to engage remotely for key sessions (e.g. DWS to offer the relevant modules without the need to travel).

To enable future roll-out of the course via WISA of similar course platforms.

The training at the Greater uMngeni demonstration catchment had 35 participants. Participants from SANBI, DUCT, Wild Trust, and WWF had more ecology background and participants from municipalities had more finance background. Pongola-uMzimkhulu Proto-CMA had more diverse team as they had staff from dam safety, Water Use License, and finance staff members. The training at the Berg-Breede had 26 participants, with participants mainly from BGCMA, 3 staff members from Langeberg LM and two staff members from DWS: National Office (Economic regulation Directorate).

At the workshop, some participants preferred Module 1 which was presented by a DWS official, as they believe it was well-presented with a DWS official doing the presentation; they had the platform to have additional water pricing questions that were not part of the presentation. Other participants preferred Module 6 as there was a spreadsheet tutorial demonstrating that if CMA determine their tariff on long-term basis (30 year), they would be able to fund projects that require large funds, such as rehabilitation of water resource, without huge adjustment on the water tariff.

Some participants who are not directly in the water sector indicated the training course gave them an understanding of the water value chain and the charges associated with it, and some participants indicated that the training course was useful as the information shared on the activities that make up the price and will assist them when they interact with their customers.

Most participants agreed that the training course should be two days, as there was a lot of information to digest.

All participants enjoyed the course being 2 days in duration as it showed them what is currently happening in terms of water pricing in day 1 and how the 2022 raw water pricing will change the functions of the CMA in day 2.

There were intensive discussions on incorporating rehabilitation of Ecological Infrastructure into water resource development charge. DWS officials took note of that and how this input can be incorporated into Raw Water Pricing Strategy going forward.

Based on the course developed and outputs from the two-pilot case studies, the key conclusions were as follows:

The training course bridges the gap between technical and finance team within the catchment. This was observed as the technical team better understood setting of water tariff and finance team better understood the importance of rehabilitating/ restoring of EI, and how these projects provide more revenue to the CMA.

The theory provided during the training course is a tool that CMA officials can use to better communicate to their customers on how the water tariff is set.

As the 2022 Raw Water Pricing Strategy could potentially be implemented, the course will empower CMA officials on how their water business will be amended (i.e. from both technical and finance perspective).

Module 6 of the training course looks at how CMAs can use water tariff to have projects that require large capital (e.g. rehabilitation of EI) without huge tariff adjustment and it is believed participants from both catchments saw this as a powerful tool for CMAs.

Overall, the feedback received from course participants was extremely positive, and this, coupled with the fact that all participants returned on Day 2 of each course, and the rich learning that took place (refer to section 4.4), clearly indicates that this course is a highly useful and important initiative that should be continued through (1) offering it in other catchments, and (2) institutionalising it to be repeated as needed.

It should be noted that a mechanism need to be found to enable continuous update and refreshing of the course. For instance, the training course was developed when 2007 Raw Water Pricing Strategy was implemented and 2022 Raw Water Pricing Strategy still going through approval process. Thus, the course content will need update as soon as the new pricing strategy was finalised. In addition, once the DWS has finalised the WDCS, we recommend that a Module of the WDCS be developed and incorporated.

Finally, we anticipate that a continuous learning process will evolve as the course is presented, and that the course content be updated and refreshed as needed.

This training course may benefit from accreditation. Short learning programmes of this nature may result in participants receiving Continuing Professional Development (CPD) points for their professional registrations (most notably in this case SACNASP) and WISA or tertiary institutions

may both provide these short learning programmes. The project team consulted with both Tshwane University of Technology and WISA to understand the process of accrediting the course and both these institutions have indicated in principle that they will be able to accredit and offer the course.

The next steps in this regard would be to:

The WRC and SANBI, as the owners of the course content [to be confirmed], need to enter into a suitable agreement with the relevant accreditation institutions.

The WRC and SANBI needs to identify suitable course facilitators, i.e. person(s) who have a deep knowledge of the course content, combined with the ability to facilitate and direct discussions in a manner that optimises the learning process.

In conjunction with the relevant accreditation institutions and the relevant course facilitators, develop an implementation plan, including determining course frequency and dates, course budgets and implementation agreements.

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ACRONYMS AND ABBREVIATIONS

BGCMA	Breede Gouritz Catchment Management Agency
CMA	Catchment Management Agency
CMS	Catchment Management Strategy
COGTA	Cooperative Governance and Traditional Affairs
CPD	Continuing Professional Development
CPI	Consumer Price Index
DALRRD	Department of Agriculture, Land Reform and Rural Development
DBSA	Development Bank of Southern Africa
DCF	Discounted Cash Flow
DFFE	Department of Forestry, Fisheries and the Environment
DM	District Municipality
DUCT	Duzi-uMngeni Conservation Trust
DWS	Department of Water and Sanitation
EI	Ecological Infrastructure
EI4WS	Ecological Infrastructure for Water Security
EPWP	Expanded Public Works Programme
GEF	Global Environment Facility
IAP	Invasive Alien Plants
IB	Irrigation Board
LM	Local Municipality
MIG	Municipal Infrastructure Grant
MM	Metropolitan Municipality
MTEF	Medium Term Expenditure Framework
MWIG	Municipal Water Infrastructure Grant
N&S	Norms and Standards
NCA	Natural Capital Accounting
NGO	Non-Governmental Organization
NQF	National Qualifications Framework
NT	National Treasury
NWA	National Water Act
O&M	Operations and Maintenance
PFMA	Public Finance Management Act
RoA	Return on Assets
RQO	Resource Quality Objectives
SA	South Africa
SACNASP	South African Council for Natural Scientific Professions
SALGA	South African Local Government Association
SANBI	South African National Biodiversity Institute

SASQAF	South African Statistical Quality Assessment Framework
SFRA	Stream Flow Reduction Activity
SLKMM	Social Learning, Knowledge Management and Mediation
TCTA	Trans-Caledon Tunnel Authority
TUT	Tshwane University of Technology
UEIP	uMngeni Ecological Infrastructure Partnership
WDCS	Waste Discharge Charge System
WMA	Water Management Area
WRC	Water Research Commission
WRD	Water Resource Development
WRMC	Water Resource Management Charge
WSA	Water Service Authority
WTE	Water Trading Entity
WUA	Water User Association
WWF	World-Wide Fund for Nature

1 INTRODUCTION

1.1 Background

The participatory course to activate water pricing learning networks project, forms part of GEF project entitled: Unlocking Biodiversity Benefits through Development Finance in Critical Catchments, widely referred to as the Ecological Infrastructure for Water Security (EI4WS) Project. This is done through a platform that enables decision makers to have robust engagement with stakeholders across the value chain. As water charges are complex, the course also aims to strengthen understanding of the governance arrangements, processes and components that give guidance to developing cost structures of water charges. The course intends to support knowledge innovation and not just information transfer. The training is intended to focus on tier 1 water charges (raw water) and to some extent tier 2 (bulk water), although tier 3 (retail water) stakeholders are also included.

A note on terminology: Although we commonly use the term “water price” in South Africa, the use of the term is not strictly accurate. In economics, a “price” is a unit value (of a good or service) that is determined by the interaction of a large group of sellers of and buyers in a market. A good example of this is the gold price, which is an accurate reflection of the commodity unit value of gold, and which ultimately balances supply of and demand for gold by many sellers and buyers. Water provision in South Africa has completely different economic characteristics. Water supply is limited by natural availability and by physical constraints of supply. On the demand side, it has the attributes of a public good. Thus, we do not have competitive markets that determine prices for water. Instead, we have a system which is more accurately described as water tariffs. In other words, we have methodologies that set “water charges” to achieve policy purposes. Other synonyms for “water charges” are “water tariff”, or “administered prices”. In the rest of the document below, we will use the term “water charges”.

The setting and implementation of appropriate and accurate water charges is a crucial water management function, as well as a potentially powerful water policy instrument. Water charge setting is therefore a valuable management tool in achieving various objectives in the water sector such as:

- achieving social equity imperatives
- cost recovery
- improving water use efficiency
- making provision for new water infrastructure investments and its financing
- securing environmental sustainability and the provision of aquatic ecosystem services
- securing financial sustainability of all water management function across the value chain.

The above list of objectives has intentionally been listed in alphabetical order. This is because the above objectives are so highly interconnected that none of them individually can be achieved without the other.

It has been demonstrated, on numerous platforms, that, even though good policies and regulations are in place to support the design and setting of water charges in South Africa, they are not always

implemented or implemented effectively. This is due to decision makers of different tier levels having incomplete decision-making knowledge. There is therefore a need to empower decision-makers' knowledge-base of the data, governance arrangements, processes and theory and other attributes of underlying water charge setting and the economic regulation of water.

This would help decision makers across the water value chain engage effectively with the data, concepts and language used in charge setting strategies, research reports, and policymaking and charge-setting processes.

The aims of this study were therefore as follows:

- Provide participants with a deeper understanding of the concept of water charge setting.
- Provide guidance on tools to utilise in water charge setting processes
- Strengthen networks of water charge learnings.

2 DEVELOPMENT OF THE TRAINING COURSE

2.1 Overview

The participatory training course was designed using the Social Learning and Knowledge Mediation and Management (SLKMM) strategy and the SLKMM strategy identifies six core components to enable ongoing social learning in the EI4WS programme. The strategy refers to the following core practices (Cockburn, 2021):

- *Coordinate and convene* - convene key stakeholders across water value chain
- *Clarify context and ideas* - Review and understand framing of EI4WS
- *Engage tensions*- To identify contradictions and tensions which could be used as opportunities for learning and transformational change
- *Build networks* - Identify and track engagements with relevant stakeholders in order to build network
- *Learn and share* - Identify tools and platforms to support learning within the EI4WS project and beyond
- *Evaluate change* - To develop M&E and learning track tool.

2.2 Literature Review on Water Charges

A literature review was done in order to understand current legislation that enables setting of water charges across the value chain. This section also reports on the mandate of different organisations in all three water charges. Another component in this section analyses considerations when applying water charges which incorporates full cost of supply, which includes opportunity and environmental externalities.

2.2.1 Water Value Chain

Three tiers of water charges exist across the value chain, spanning raw water charges, pollution abatement charges, bulk water charges, and various water services charges, and these will be discussed further below. The setting of these charges is governed and influenced by various policies and processes including the Pricing Strategy for Raw Water Use Charges (DWS, 2007), Norms and Standards, National Treasury, municipal by-laws and others. The challenge with getting water charges right is to find a balance between supplying water as a constitutional right; reflecting the total costs of supply (i.e. sustainable service delivery) and also reflecting the scarcity of the resource itself (i.e. minimise wastage and internalising environmental externalities and opportunity costs).

There are many organisations or role players involved in providing water services in South Africa as shown in Figure 2-1 below. The role players are on different levels within the water value chain and are governed by various national acts including:

- National Water Act (DWAF, 1998) as it relates to raw water charges
- National Environmental Management Act (1997) as it relates to dealing with the cost of pollution
- Water Services Act (1997) as it relates to bulk water charges and water services
- Municipal Systems Act (2000) as it relates to water services.

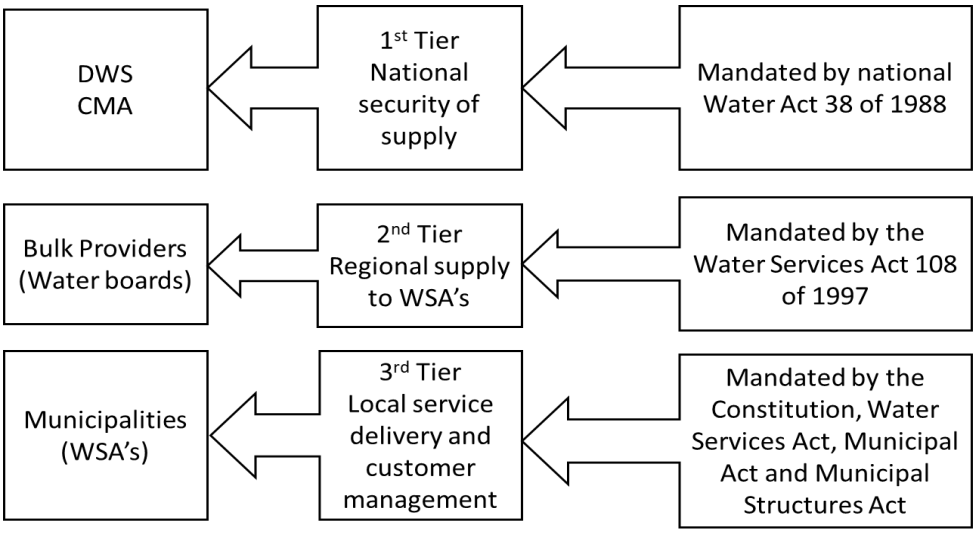

Figure 2-1: Key role players involved in the water value chain of South Africa

The National Water Act (DWS, 1998) identifies three tiers of charges for water management:

- Tier 1: **Raw water charges** – These charges are applicable to all water users and comprises the basic input cost of fresh water supply. The charges are relevant for services that include the use of raw water from the water resource by bulk distributors, large users and irrigators. This may also include a water quality pricing component for dealing with pollution.
- Tier 2: **Bulk water charges** – These charges are applicable to all water users who are customers of bulk water service supply entities. The charges include the cost resulting from raw water charges. These administered prices are relevant for intermediary water services supplied in bulk (often by water boards).
- Tier 3: **Water services charges** – These charges are applicable to all water users who are customers of water service supply entities (mostly municipalities). These charges include the cost resulting from raw water charges and bulk water charges. The charges are relevant for water provision and sanitation services to households and other urban and domestic users (usually via a municipality).

2.2.2 Policy Makers

2.2.2.1 DWS

The mandate of the Department of Water and Sanitation (DWS) is set out in the National Water Act (1998) and Water Service Act (1997). The department mandate is to ensure that the country's water resources are protected, managed, used, developed, conserved, and controlled by regulating and

supporting the delivery of effective water supply that is critical for delivering on the people's right to have access to sufficient food and water, growing the economy and eradicating poverty.

With regards to setting of raw water charges, the Department has an economic regulator, and this regulator imposes economic regulation to prevent monopoly profits, to prevent unjust discrimination and to ensure that consumers are charged "fair and reasonable" rates for services provided. Where CMAs are setting charges, the Department can determine what those charges should be.

2.2.2.2 National Treasury

The National Treasury's legislative mandate is based on Chapter 13 section 216 (1) of the constitution, which calls for the establishment of a National Treasury to ensure transparency. Accountability, and sound financial controls in the management of the country's public finance. This role is further elaborated in the Public Finance Act (1999). The department is mandated to:

- Promote national government's fiscal policy and the coordination of its macroeconomic policy
- Ensure stability and soundness of the financial system and financial services
- Coordinate intergovernmental financial and fiscal relations
- Manage the budget preparation process
- Enforce transparency and effective management in respect to revenue, assets and liabilities, public entities, and constitutional institutions.

National Treasury (2012) provides a comprehensive breakdown of estimated national expenditure by DWS in their document titled "Vote 38" which includes six departmental programs:

- Administration
- Water Sector Management
- Water Infrastructure Management
- Regional Implementation and Support
- Water Sector Regulation
- International Water Cooperation.

2.2.3 Tier 1: Legislative and Policy Framework for Setting Water Charges

Regulation and oversight of the tier 1 implementing agency are facilitated through several mechanisms, which include the following:

- Ministerial and DWS oversight based on the legislation, policy as well as a service level agreement that will be entered into between the Minister and the CMA Board
- The Board is subject to an annual audit of performance, including a review of individual members' performance against clear criteria
- Adherence to the requirements of the PFMA
- Approval of annual charges and the catchment management strategy as being in line with the DWS (2007) Raw Water Pricing Strategy and the National Water Resources Strategy

- Regulation of charges by an economic regulator established within DWS
- Approval of annual business plans by the Minister

2.2.3.1 Raw Water Pricing Strategy

DWS (2007) Pricing strategy for raw water use charges provides the pricing framework for the use of raw water from water resources and government waterworks and discharge of water into a water resource or onto land. The charges can be divided into three main categories: water resource management charge, charge relating to development and use of hard infrastructure (which covers charges related to planning, capital costs, operation and maintenance, depreciation and future infrastructure) as well as waste discharge mitigation charge.

Objectives of the Raw Water Pricing Strategy:

- Ensure that costs of achieving and maintaining Resource Quality Objectives (RQOs) are sufficiently recovered through water use
- Ensure that there is adequate funding for the effective operation, maintenance, and development of hard infrastructure
- Provide an enabling framework for the provision of financial assistance and the use of water charges to support the redress of racial and gender imbalance in access to water, and redistribution of water for the transformation and equity purposes
- Facilitate financial sustainability of water management institutions
- Promote/facilitate water use efficiency.

2.2.3.1.1 Water Resource Development Charge

Water resource development and use of waterworks refers to the planning, design, development, operation, maintenance, refurbishment and betterment (improvement) of Government Water Schemes (GWS) and schemes to be funded by water management institutions such as the Trans-Caledon Tunnel Authority (TCTA) and Water User Associations (WUAs). If water use charges are too low, they will lead to underinvestment, over-consumption and unintended fiscal subsidies. As a result, the Raw Water Pricing Strategy utilises the depreciation, return on assets (RoA), betterments, refurbishment, and off-budget funding approach for setting charges to recover capital cost in respect of schemes owned by government. The funding of off-budget infrastructure developments requires loans.

2.2.3.1.2 Water Resource Management Charge

The Water Resource Management Charge (WRMC) comprises activities that are required to protect, use, conserve, manage and control the water resources and manage water quality located within WMAs, including securing water-related ecosystem services. This charge is intended to cover the WRM related costs of CMAs.

The current WRMC and Water Resource Development Charge (WRDC) together, should theoretically cover the costs of capital, operations and maintenance. The revised 2022 Raw Water Pricing Strategy

envisages expanding some of the CMA activities relating to restoration and rehabilitation of ecological infrastructure.

WRMC is calculated as follows:

- Total budget cost of each activity is divided by registered volumes to arrive at unit charge per activity
- In water resource management areas where water available for use is more than registered volume, a discount will be applied using allocatable yield instead of registered volume to determine unit charge
- The unit charge for all relevant water resource management activities is applied to each use's registered volumes to arrive at water resource management charge.

2.2.4 Tier 1: Implementing Agencies

2.2.4.1 Mandate of DWS: Water Trading Entity

The Water Trading Entity (WTE) was established in 1983 to separate the sale of raw water and related services from appropriate funds in DWS. It was eventually converted to a trading account through the Public Finance Management Act (1999) in 2008. This was done to create an entity that would manage the recovery of usage costs to support the long-term sustainability of the country's water resources. The Entity is mandated to undertake the construction of new water infrastructure and wastewater treatment infrastructure through the water infrastructure build programme, and the rehabilitation and refurbishment of existing water resource infrastructure through the dam safety rehabilitation programme. It does this to ensure a sustainable water supply for both domestic and industrial use. The Entity is further mandated to undertake water resource management, which includes the management of water quality and the allocation of water.

2.2.4.2 Mandate of CMA

The National Water Act (Act No 36 of 1998) (NWA) provides for the establishment of catchment management agencies (CMAs) and specifies their mandate. The CMA is governed by a Board of Directors.

CMAs are established in schedule 3(a) national public entity under the Public Finance Management Act (PFMA) which by implication means they are fully or substitutionally funded either from the national revenue, funds, or by way of tax, levy, or other money imposed by national legislation. The practice is that schedule 3(a) entities are funded by a combination of sources in line with their public interest mandate.

In terms of accountability, CMA as a public entity has to submit the following information to the Director General of DWS and National Treasury:

- A projection of revenue, expenditure and borrowings for that financial year in the prescribed format; and
- A corporate plan in the prescribed format covering the affairs of that public entity or business enterprise for the following three financial years, and, if it has subsidiaries, also the affairs of the subsidiaries.
- An annual report in the prescribed format covering the financial and functional performance of that public entity in the prior financial year, and, if it has subsidiaries, the performance of the subsidiaries.

CMAs are primarily responsible for water resources management in their WMA. Thus, the purpose of CMAs is the delegation of water resource management to a catchment level, within the framework of the National Water Resource Strategy (DWS, 2004) of the Department. The CMA achieves this through developing and implementing a Catchment Management Strategy (CMS). The CMS provides the framework for management of water resources in a WMA.

The policy on establishment and development of CMAs has been based on the concepts of three broad phases of development (DWS, 2012), namely:

- Developing relationships and legitimacy: taking on the CMA initial and early water use management functions as represented by the Proto-CMA in the first two years
- Building capacity and consolidation: taking on information, water resource monitoring and other implementation functions (over the next two years)
- Becoming fully functional: taking on the responsibility authority and other institutional oversight functions (over the following or more years)

The three phases of CMA development are the basis of 5-years functional evolution and costing of CMA development.

Section 84 of the NWA gives the CMA full authority to raise funds for the purpose of exercising its powers and duties from various sources. The Act states that “a CMA must be funded by”:

- Parliamentary appropriation
- Water use charges and
- Money obtained from any other lawful source for the purpose of exercising its powers and carrying out its duties in terms of the NWA (1998).

Money obtained from any other lawful source, may include:

- Recreational concessions;
- License application fees;
- Donor support and sponsorship;
- Contractual payments;
- Return on Investment; and
- In-kind contributions.

Table 2-1: Functions of the CMA (DWS, 2007)

	Activities	Abstraction activities	Waste discharge activities
1	Catchment management strategy and Water resources planning	Resource studies, investigations, and integrated strategy development	
		Allocation plans	Water quality management plan
2	Resource directed measures	Reserve determination, Classification, and Resource quality objectives (RQO)	
3	Water use authorisation	Registration and verification of water use	
		-Abstraction and stream flow reduction activities -Dam safety regulation	Waste discharge activities authorization
4	Control and enforcement of water use	Control Monitoring and enforcement of Water Use	
		-Abstraction and stream flow reduction activities -Dam safety control (private dams)	Waste discharge and marine outfall licensing
5	Disaster management	Flood and drought management	Pollution incident planning and response (management)
6	Water resources management programmes	Integrated water resources programmes	
		Abstraction programmes Water conservation and demand management	Waste discharge programmes (e.g. cleaner technology, dense settlements, waste discharge strategies)
7	Water related institutional development	Stakeholder participation, empowerment, institutional development and coordination of activities	
8	Water weed control	E.g. hyacinth	
9	Terrestrial Invasive Alien Plant (IAP)	Control of invasive plants with acknowledged negative impacts on water resource, e.g. riparian zones, mountain catchment areas, wetlands and in areas where there could be impact on aquifers.	
10	Geo-hydrology and hydrology	-Groundwater and surface water monitoring -Compiling of maps and yield information -Extending and maintaining the hydrological database & compilation of information Water quality monitoring & compilation of information	
11	Administration and Overheads	Administrative, and overheads for regional office or CMA	

2.2.4.3 Public Interest Components of CMA functions

Water resource management functions have an inherent public benefit that extends beyond the immediate users of the water. In South Africa, this is acknowledged in policy and legislation, with the NWA recognising the fact that “water is a natural resource that belongs to all people” and “that the protection of the quality of water resources is necessary to ensure sustainability of the nation’s water resources in the interests of all water users”.

It is therefore necessary to apply the definition of public interest to the different functions and activities of the CMAs as shown in .Table 2-2 The output of this was a percentage of each function that is in the public interest and for which there is therefore a justification for funding through the fiscus.

Table 2-2: Public interest components of CMA functions (Walsh et al., 2020)

No	Function	Activities	Beneficiaries	Classification	Rationale	Function % public
1.	**Catchment management strategy and water resources planning**	Resource studies, investigations and integrated strategy development at catchment level	All	Even mix	The public at large benefits from efficient water resource management planning. Customers experience additional benefits from efficient planning through improved water quality and ensured water resource availability.	67%
		Water allocation administration	All	Public		
		Water quality management plan	All	Even mix		
2.	**Water related institutional development (Stakeholder management empowerment)**	Stakeholder participation, empowerment, institutional development and coordination of activities	All	Mostly private	Customers will benefit from involvement in the stakeholder participation process. There is a public interest in expanding the institutional development to non-customers who are affected by the activities of the CMA.	20%
		Establishment and regulation of water management institutions (e.g. WUAs)	Customers	Private		
		Stakeholder consultations	Customers	Private		
		Capacity and Empowerment of stakeholders	All	Mostly private		
3.	**Disaster management/Pollution**	Planning and preventative management of disaster including risk monitoring (management)	All	Mostly private	This function is largely to do with the planning for disaster management and pollution control. The CMA	30%

No	Function	Activities	Beneficiaries	Classification	Rationale	Function % public
	control and emergency incidents	Pollution incident planning and response (management)	All	Mostly private	participates in municipal processes as the representative of the customers. The municipality is responsible for representing other interests, including those of the Schedule 1 users. Therefore, this function is mostly in the private interest.	
4.	**Maintenance and restoration of ecosystems to improve water resources**	Adopting of rivers by doing the following activities: Removal of solid waste in and around the river. Invasive plants removal on the river banks and within the river. Identify sources of pollution and other impacts to the river like soil erosion; develop interventions to curb further pollution and degradation of rivers. Monitoring (taking samples, in-situ monitoring of water quality, mini SASS, visual assessments) of the rivers. Stabilization and restoration of river	All	Mostly public	Public at large will benefit from improved ecosystem health. Customers benefit additionally in the form of improved water quality.	70%

No	Function	Activities	Beneficiaries	Classification	Rationale	Function % public
		banks by vegetating with indigenous trees. Rehabilitation of the eroded river banks.				
5.	**Water use authorization**	Water use authorization [Registration of water use (include validation and verification of registered water use)]	Customers	Private	Public at large benefits from the economically and socially efficient allocation of water. Customers benefit directly from their water use allocation and should pay for this benefit.	0%
		Maintenance of water management area register of water use	Customers	Private		
		Revenue management with the following charges set, consult and collect WRM charges in the water management area aligned to the pricing strategy	Customers	Private		
		Abstraction and stream flow reduction activities Authorization	Customers	Private		
		Waste discharge activities Authorization	Customers	Private		
6.	**Geo-hydrology and hydrology**	Groundwater and surface water and eco system (quality) monitoring in respective catchment areas	Customers	Mostly private	This is the baseline for monitoring and enforcement, related to water quality and water resource availability. This benefits the public at	30%

No	Function	Activities	Beneficiaries	Classification	Rationale	Function % public
		Maintaining the geo-hydrological database and compilation of information in respective catchment areas	Customers	Mostly private	large. Customers benefit from improved data availability for water resource management activities.	
7.	**Resource directed measures**	Implement programmes to monitor Resource Quality Objectives (RQOs)	Customers	Private	Customers benefit from the improved water quality and should pay for the regulatory and operational activities associated with the management of their own water abstraction.	0%
		Implement source-directed controls to achieve resource quality objectives	Customers	Private		
		Report against the achievement of the Class and RQOs	Customers	Private		
		Report on the water balance per catchment (i.e. water available for allocation after consideration of ecological requirements)	Customers	Private		
8.	**Water resources management programmes**	Integrated Water resources programmes	All	Public	Design, management and implementation of water resource management programmes benefits public at large, international obligations and the ecological reserve.	53%
		Implementing of water management strategies (e.g. Water conservation and demand management)	All	Mostly private		

No	Function	Activities	Beneficiaries	Classification	Rationale	Function % public
		Implementing of Water management strategies (e.g. cleaner technology, dense settlements, waste discharge strategies)	All	Mostly private	Customers benefit additionally from improved water quality and availability and should pay for a portion of the benefit.	
9.	**Control and enforcement of water use**	Compliance promotion and audit sampling (users discharge)	Customers	Private	Public at large benefits from investigations of water crimes occurring in the catchment. Using the polluter-pays principle, the customers should pay for the regulatory functions associated with monitoring their activities.	0%
		Monitoring of water users (per sector: public institutions, mining, industry, agriculture and dam owners)	Customers	Private		
		Enforcement of water use (e.g. enforcing meter installations, suspending entitlements, enforcing licence conditions)	Customers	Private		
		To conduct investigations of water crimes, conducted in accordance with the National Water Act and other relevant legislations.	Customers	Private		
		Implementation of Strategies, SP's tools and guidelines	Customers	Private		
		Compilation, Serve and implement administrative notices	Customers	Private		

No	Function	Activities	Beneficiaries	Classification	Rationale	Function % public
		Abstraction and stream flow reduction activities control	Customers	Private		
		Waste discharge control	Customers	Private		
		Classification of dams	Customers	Private		
10.	**Water weed control**	Aquatic weeds control	All	Mostly public	Public at large will benefit from improved ecosystem health. Customers benefit additionally in the form of improved water quality.	70%
11.	**Administration & Overheads**	Administration and overheads for regional office or CMA	All	Mostly private	The costs of the public interest are already incorporated into the other 10 functions (including staff costs allocated to these functions), so this function is about the management of the institution to benefit customers (billing, management, etc.) so is mostly in the private interest. The small public interest component is to ensure the sustainability of the overhead component of the CMA. By ensuring that the CMA is reliant on the revenue, it encourages the CMA to bill and collect revenue.	30%

2.2.4.4 Mandate of TCTA

Trans-Caledon Tunnel Authority (TCTA) is an agency of DWS responsible for financing and implementing bulk raw water infrastructure projects. It handles the country's water resources in respect of usage, equitable allocation and distribution. To this end, TCTA designs bankable projects, raises funding in capital markets, manages debt and implements infrastructure rollouts. It is a specialised liability management entity that the government uses to finance and build dams and transfer schemes off budget while within an acceptable risk framework and in the most cost-effective manner. This financing mechanism reduces the borrowing requirements of the government and allows it to pass the cost of infrastructure onto the end user in line with the "user-pay principle".

2.2.4.5 Mandate of Water User Association

Water User associations (WUAs) may be established under section 92 of the National Water Act with power delegated to them by the minister under section 63(1)(c). The primary purpose is not water management, but rather a cooperative association of individual water users who wish to undertake water management activities for their mutual benefit at the restricted localized level. However, WUAs may play an important role in catchment management, particularly in recovering water use charges from members and performing localized management activities (Pegramand & Mazibuko, 2003).

Possible functions of water user associations (schedule 5.4), specifically at least S93 (2)**:**

- Details of the principal and ancillary functions of the association
- The procedure and requirement for admitting new members to the association\the voting power of members
- Procedure for terminating membership
- Procedure for electing the management committee of the association
- Procedure requirements for appointment of employees of the association
- Procedural requirement for obtaining loans and
- The financial obligations of members towards the association.

2.2.4.5.1 Subsidies for agriculture and Forestry

Maximum (capping) values are determined on the basis of historical, socio-economic and other considerations and they are supported by the state subsidies. In the current Raw Water Pricing Strategy, various water-use sectors receive blanket subsidization. The purpose of such a large subsidy has not been made clear and as a result its level of success or failure in achieving its objective cannot be measured.

Table 2-3: Rebates and Subsidies for Agriculture and Forestry (DWS, 2007)

SECTOR	SUB SECTOR	PRICING IMPLICATION
FORESTRY	Commercial forestry	WRMC is capped at R10 per hectare plus producer price index rate (%) in April of each year, with 2003-03 financial year as base year.
	Resource poor foresters	Resource poor foresters with the land equal to or less than ten hectares under cultivation will be exempt from the WRMC charge
AGRICULTURE	Irrigation sector	WRMC will be capped in over 1.5 cent per m^3 plus producer price index rate (%) in April of each year, with 2007-08 as base year
	Resource poor farmers	the WRMC will be phased in over 5 years, from the date of registration of water use, through fiscal subsidy of amounts not recovered from the beneficiaries

2.2.5 Tier 2: Legislative and Policy Framework for Setting Water Charges

According to schedule 3 of Norms and Standards, (2015), the Minister has the mandate and power to perform the functions of the Executive Authority of water boards as prescribed by PFMA and those of the Minister in terms of the Water Service Act. Some of the functions includes making rules to control, monitor, and enforce charges for bulk water services that support the government's social, environmental, and economic policies and the technical regulation of water infrastructure.

2.2.5.1 Norms and Standards for Water Charges

A bulk water services provider must consider the following, before determining the charges (DWS, 2015):

(a) Determine the full costs of providing bulk water supply services on a sustainable basis
(b) Estimate the future water consumption for each scheme or bulk water supply area
(c) Estimate the unit cost of supplying water for each bulk scheme or water supply area
(d) Determine the revenue required
(e) Propose a charge that would provide the revenue required
(f) Consult with its WSAs and its other customers on its proposed bulk water charges and the assumptions that it used to determine the proposed charges
(g) Make submissions to SALGA, National Treasury (NT) and DWS on its proposed charges and the assumptions that it used to determine the proposed charges
(h) Submit the documents, together with proposals on how any written comments received from WSAs SALGA, NT, or other relevant stakeholders were considered, to DWS for consideration.

2.2.6 Tier 2: Implementing Agencies: Water boards

Water boards are public entities established in terms of the Water Service Act (Act108 of 1997) with the mission of providing innovative, sustainable, effective, and affordable bulk water and sanitation services.

In performing its activities, exercising its power and carrying out its duties a water board must achieve a balance between:

- Striving to provide efficient, reliable, sustainable water services
- Optimally using available resources
- Striving to be financially viable.

Water board is financially viable if it is able to:

- Repay and service its debts
- Recover its capital, operational, and maintenance costs
- Make reasonable provision for depreciation costs
- Recover the cost associated with the repayment of capital from revenues over time and
- Make reasonable provision for future capital requirement and expansion

2.2.7 Tier 3: Legislative and Policy Framework for Setting Water Charges

Section 155 (7) of the constitution provides national government, subject to section 44, with the legislative and executive authority to see the effective by municipalities of the functions. WSA may not allocate more than 15% of water revenue from water sales to function other than water supply and sanitation services (DWS, 2015).

According to N&S (DWS, 2015), WSA must do the following, before determining charges to its customers:

- Estimate the revenue required to provide water supply services on a sustainable basis over a period of three years for each scheme or supply area
- Estimate the future water consumption over a period of three years for each scheme or water supply area
- Propose structure of charges that would provide the revenue required
- Consult with its consumers on its proposed charges and the assumption that it used to determine the proposed charges
- Submit its assumptions and proposed charges to the Minister

Water and sanitation charge policies must be developed by water service authorities. These are common policies and requirements (Treasury, 2005):

- Costs associated with provision of basic water and sanitation services - All WSAs must plan to provide all households with at least a basic level of water and sanitation services.
- Rehabilitation and system expansion costs - the cost of rehabilitating the system and expanding the system as necessary must be considered.
- Consumer categories - retail water and wastewater charges shall distinguish between at least three categories of consumers: domestic, industrial and other.
- Charges for industrial and other non-domestic consumers – water and sanitation charges for industrial and other categories of consumers shall at least recover the full costs of service provided, considering any external costs and benefits.
- Subsidies for basic water services - where subsidies for water services are applied, these shall be prioritised for the provision of basic water supply and sanitation service in terms of free basic water and free sanitation policies.

2.2.8 Tier 3: Implementing Agencies: Water Service Authorities

Section 11(1) of Water Services Act states that every WSA has a duty to all consumers or potential consumers in its area of jurisdiction to progressively ensure efficient, affordable, economical, and sustainable access to water services. This duty is subject to:

- The availability of resources
- The need of equitable allocation of resource to all consumers and potential consumers
- The need to regulate access to water service in an equitable way
- The duty of consumers to pay reasonable charges, which must be in accordance with any prescribed norms and standards for charges for water services
- The duty to conserve water resources
- The nature, topography, zoning, and situation of the land in question; and the
- Right of the relevant water service authority to limit the provision of water services if there is a failure to comply with reasonable conditions set for provision of such services.

All municipalities receive grants from the National Treasury and these funds are facilitated by Cooperative Governance & Traditional Affairs (COGTA) and DWS as shown in Table 2-4.

Table 2-4: Municipal grant structures

ITEMS	MUNICIPAL INFRASTRUCTURE GRANT (MIG)	MUNICIPAL WATER INFRASTRUCTURE GRANT(MWIG)	WATER SERVICE REGIONAL BULK INFRUSTRUCTUREGRANT (WSRBIG)
STRATEGIC GOAL	Subsidise the capital cost of providing basic services to poor households- priority must be given to meeting basic infrastructure needs to the poor through the provision of appropriate municipal bulk, connector and inter infrastructure for key services	For water service authorities to provide water supply to consumers currently without services, particularly in rural areas	To supplement the financing of the social components of the regional bulk water and sanitation infrastructure
GRANT PURPOSE	To provide capital finance for basic municipal infrastructure backlogs for poor households, micro enterprises and social institutions serving the poor communities	To facilitate planning, acceleration and implementation of various projects that will ensure water supply to communities identified as not receiving basic services	To provide funds for the regional bulk infrastructure for water supply to typically supplement the funding of water treatment works at the resource development
OUTPUTS	Number of additional poor households receiving basic water and sanitation services. Number of created opportunities using EPWP guideline	Number of households provided with water supply. Number of rural schemes that are functional in line with norms and standards. Number of job opportunities.	Planning finalised for several regional bulk projects. Funding arrangement in place for the funding of the economic components

2.2.9 Considerations when Implementing Water Charges

The setting and implementation of appropriate and accurate water charges is a crucial water management function, as well as a potentially powerful water policy instrument. Water charge setting is therefore a valuable management tool in achieving various objectives in the water sector such as:

- achieving social equity imperatives

- cost recovery
- improving water use efficiency
- making provision for new water infrastructure investments and its financing
- securing environmental sustainability and the provision of aquatic ecosystem services
- securing financial sustainability of all water management functions across the value chain

Although water in modern times has become a more scarce commodity, it remains an inexpensive commodity. However, it is also a social good, and the rights to free basic water and to an ecological water reserve are recognized in South African law. Thus, there arises an apparent conflict between the application of economic charges for water, and the social value of water. This results in disagreement about the “right” way of pricing it.

2.2.9.1 Water Charges for Cost Recovery and Environmental Externalities

The Full Supply Cost is defined to include the costs associated with the supply of water to a consumer excluding the externalities imposed upon others, and excluding the alternate uses of the water (i.e. opportunity costs). Full Supply Costs comprises two items: Operation and Maintenance (O&M) Cost, and Capital Charges, both of which are defined to include the full economic cost of inputs.

The Full Economic Cost of water is the sum of the Full Supply Cost, the Opportunity Cost associated with the alternate use of the same water resource, and the Economic Externalities imposed upon others due to the consumption of water by a specific actor.

The Opportunity Cost addresses the fact that by consuming water, the user is depriving another user of the water. If that other user has a higher output production value associated with water use, then there are some opportunity costs experienced by society.

The most common Economic Externalities are those associated with the impact of an upstream diversion of water, or pollution discharge, on downstream users.

The Full Cost of consumption of water is the Full Economic Cost, as defined above, plus the Environmental Externalities. These costs have to be determined based upon the damages caused, or as additional costs of treatment to return the water to its original quality.

Environmental Externalities are those associated with public health and ecosystem maintenance. Thus, if pollution causes increased production or consumption costs to downstream users, it is an Economic Externality, but if it causes public health or ecosystem impacts, then it is defined as an Environmental Externality.

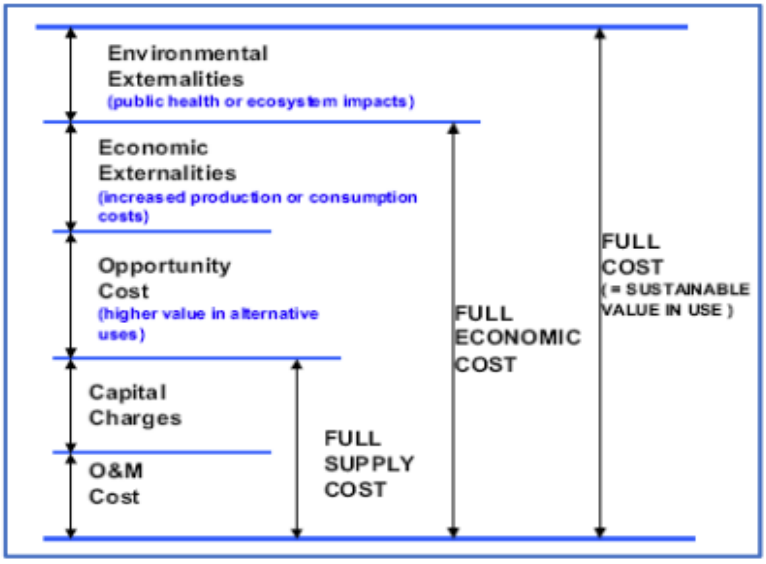

Figure 2-2: General principles for the cost of water services (SOURCE: Prime Africa, 2014)

2.2.9.2 Water Charges to Serve Equity/access

In the South African setting, the Full Supply Cost is already captured in the raw water charges.

Thus, the economic charge would be an additional charge that could capture the opportunity costs, economic externalities, environmental externalities and resource rents associated with water consumption. Or, alternatively, the recovery of Opportunity Cost, Economic Externalities, Environmental Externalities and Resource Rents through water charges mechanisms falls within the domain of economic charges.

The potential conflict between economic charges and social imperatives can be managed within the above definition by securing social imperatives (e.g. basic human and environmental needs) within the Full Supply Cost component. This would “ring-fence” the provision of water for social imperatives within the Full Supply Cost and leave it unaffected by economic charges.

The following principles are proposed as a means of promoting equity (Eberhard, 1999):

- In the allocation of water between sectors, water for basic human need should enjoy priority
- In the allocation of financial resources, the provision of services to meet basic human needs for water should enjoy priority. This implies the effective targeting of subsidies.
- Water and other pricing policies should not jeopardise access to basic human need amount of water, and preferably promote such access
- The impact of water charge reform on inequity with respect to access to water resources, and on income-inequality in general should be recognised and taken into consideration when promising water charge reform
- Water charges reform, at very least, should not increase inequity in access or income, and preferably reduce inequity. This implies targeted subsidies for poor consumers.

2.2.10 Financial Mechanisms for Restoring Ecological Infrastructure

Ecological infrastructure can be defined as the underlying framework of natural elements, ecosystems, and functions and processes that are spatially and temporally connected to supply ecosystem services. It is how capital stocks are organized to provide ecosystem services. Ecological infrastructure to which this framework relates and the services that it provides include mountain catchment, rivers, wetland, and estuaries which for example:

- Provide water for drinking, commercial, agricultural, and industrial purposes
- Absorb and dissipate flood energy, reducing the damage caused
- Purify water by assimilating and decomposing pollutants
- Provide an environment for recreational, spiritual, and cultural activities and
- Sequester carbon.

The SANBI/DBSA (2016) project document indicates that the prevailing mechanisms for investment in ecological infrastructure (EI) are: 1) Development finance such as commercial loan finance options, public sector grant finance (e.g. Water Services Infrastructure Grant and Regional Bulk Infrastructure Grants administered by the DWS) and water bonds (still in development as a mechanism); and 2) Public finance, and EPWP programmes in the Environmental and Culture Sector.

There is evidence on the need for incorporating Ecological infrastructure (EI) into the broader water resource management planning across inter-sectoral agencies. One of the mechanisms for investment in EI, relates to water charges:

- **Water Resource Charge**
  Each catchment management agency would budget annually for the planned costs of ecosystem maintenance and restoration where the investment has direct benefits to water security and the sustainability of supply and disaster management. The cap for agriculture and forestry should be lifted in order to recover full cost.

- **Water Resource Development (infrastructure) charge (WRD)**
  The use of WRD charge to support ecological infrastructure maintenance and restoration can occur in numerous ways, including the following:
  - CMAs and partners (e.g. DFFE and DALRRD,) together with DWS and Department of housing, develop a program to rehabilitate specific, significant ecological infrastructure across each supply system. This cost is recovered from users and invoicing for the costs would be undertaken by DWS.
  - Alternatively, the required cost of the maintenance and restoration of ecological infrastructure are included in the financial planning of all dependent build infrastructure and recovered in the revised WRD charge for that scheme.

- **Water services charges (bulk or retail)**

  Because WRM and WRD charges are relatively small there is strong argument that regional water utilities are obligated to support effective functioning of ecological infrastructure for sustainable delivery of services, with ecological infrastructure options.

  The implementation of this financial mechanism would involve, for example, a regional utility incorporating a charge for specific ecological intervention in the budget and charging the recipient of bulk water accordingly. The amount charged could be determined by an assessment of the ecological intervention planned, according to the annual implementation plan.

The utility must contract suitable implementing agents to conduct the ecological infrastructure rehabilitation according to long term plans in the catchment management strategies or water service development plan. This contract should be on an ecologically appropriate timeframe (5-10 years).

Effective investment of funds for the maintenance and restoration of ecological infrastructure is critical. The environmental outcomes of ecological infrastructure interventions will need careful monitoring and evaluation. Coordination will be required between primary funding providers (e.g. funds from WRM and WRD charge, bulk levies, Land Care, and NRM project)

Criteria for assessing financial mechanisms:

- Stakeholder ownership and buy-in - exists in relation to the implementation of the financial mechanisms and the mechanisms in response to the range in ability to pay among stakeholders (i.e. equity issues are considered)
- Dependability and predictability exist until measured outcomes achieved-– the funds will likely only be available, once the ecological outcomes have been released (including the monitoring and evaluation required), but also not until any required training and awareness raising.
- Administrative feasibility - transactions can happen without significant delay and high transaction costs and transfer between statutory entities and competent implementing agents are possible and streamlined within the existing rules of governance and financial accountability.
- Durability, flexibility, and utility - the funding is flexible and durable enough, not only to support monitoring and evaluation that is a critical part of ensuring sustainable outcomes.
- Sufficiency - the mechanism delivers sufficient financial resources and contribution to the restoration and maintenance of ecological infrastructure to justify the administration and management that it involves.
- Low scope for sustainability - the financial mechanisms do not have the potential to displace long-term budget for the maintenance and restoration of ecological infrastructure.

2.3 Literature Review on Two Demonstration Catchments

The reviews of the Greater uMngeni and Berg-Breede demonstration catchments were done to understand how organisations in the areas run their water business. This background formed part of the training needs assessment, as it provided analyses into gaps/limitations that organisations are facing and what opportunities can be explored as a result.

The demonstration catchments are the Greater uMngeni in Kwazulu-Natal Province and Breede/Berg in the Western Cape Province as shown in Figure 2-3. The Water Resource Management Charges are set on a CMA level, and as a result Pongola-uMzimkhulu Proto CMA is assessed, as the Greater uMngeni falls within its boundaries. Breede/Berg demonstration catchment falls within two CMAs, and as a result, Breede- Gouritz CMA and Berg-Olifants Proto-CMA are assessed.

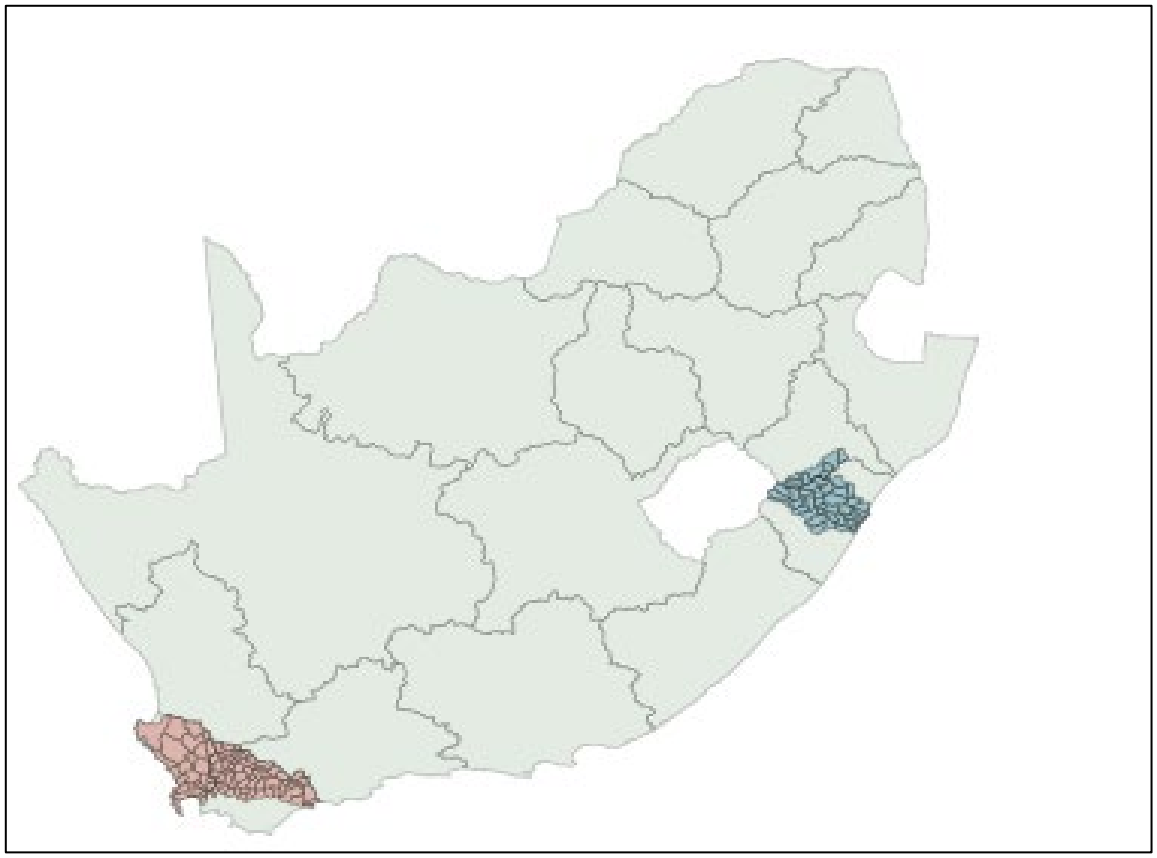

Figure 2-3: Location of two demonstration catchments (i.e. Greater uMngeni and Breede/Berg)

As this project looks at raw water charges and to a certain extent bulk water charges, water boards in the two demonstration catchments are also assessed.

2.3.1 Greater uMngeni Demonstration Catchment

The demonstration catchment has two major cities in KwaZulu-Natal, which are Durban and Pietermaritzburg. The catchment falls within Pongola-uMzimkhulu Proto-CMA, as shown in Figure 2-4.

The water board operating in the area is Umgeni Water, and the WSAs are eThekwini MM and uMgungundlovu DM.

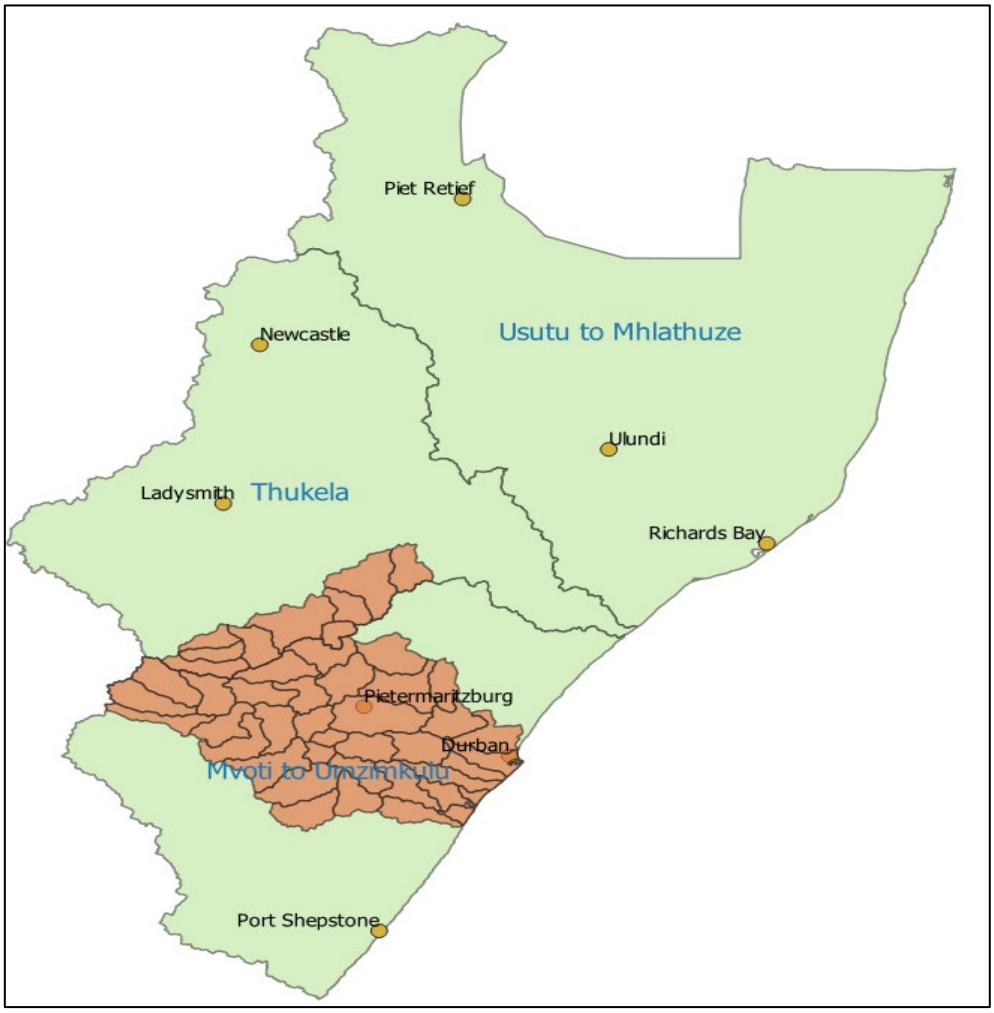

Figure 2-4: Greater uMngeni demonstration catchment which falls within Pongola-uMzimkhulu Proto-CMA

2.3.1.1 Pongola-uMzimkhulu Proto CMA

Pongola uMzimkhulu Proto-CMA performs the following functions of the CMA as outlined in NWA (Walsh et al., 2020):

- Functional support
- Water resource management
- Water use authorisation
- Water resource management planning
- Water weed control.

Even though the water user must pay for water resource management, DWS still supports Pongola-uMzimkhulu Proto-CMA to perform some of the functions due to the following reasons:

- The Proto-CMA performs water resource management that is in the national strategic interest, e.g. large inter-basin transfer to the Vaal which is of great national and strategic importance.
- The Proto-CMA is legally mandated to perform functions of billing and collecting of water use charges and there are a range of institutional and system issues that require attention before this can happen. Therefore, DWS is currently collecting the charges hence the support from DWS is still required.
- The pricing strategy introduced a cap on agricultural charge (1.05 c/Kl plus CPI annual increase). Where the cost of water resources are more than this cap, that portion of the charge which is more than the cap should be provided as a subsidy transfer from DWS.
- A need exists for water allocation reform and readdress within the water resource management as national and regional priority.

2.3.1.1.1 Finances of Pongola-uMzimkhulu Proto CMA

Funds from the WRMC flow directly into the CMA on a regular basis, with some water users billed monthly (characteristically large users) and other users billed six-monthly (characterized as smaller users). Figure 2-5 below shows volume of water per user in the CMA, with total volume of 2 562 000 Ml.

The cost to perform the functions of the CMA as shown in Figure 2-6 is R73 924 274 for the year 2021 (Pongola-uMzimkhulu CMA) and as the CMA has three types of water users (i.e. domestic/industrial, agriculture, and forestry) these costs are shared amongst them, which result in approx. R33 million for domestic/industrial; R33.3 million for agriculture, and R7.5 million for forestry (Pongola-uMzimkhulu CMA, 2021). These shared costs per water user and the volume consumed result in water charges per water user as shown in Table 2-5, which shows that domestic/industrial and agriculture sectors must be charged 3.1 cents/m^3 and 1.8 c/m^3 for the forestry sector. These charges for agriculture and forestry sectors are prior to capping.

Table 2-6 shows revenue to be collected from water users but because of the raw water charges capping policy, agriculture sector is subsidised by 38%, resulting with water users paying 1.91 c/m^3. Forestry sector is subsidized by 1.74% resulting in water users paying 1.77 (c/m^3). Although the forestry sector is not heavily subsidized, they are however not paying for all the CMA functions such as water resources management programmes (which is a function that costs the CMA the most) and water weed control.

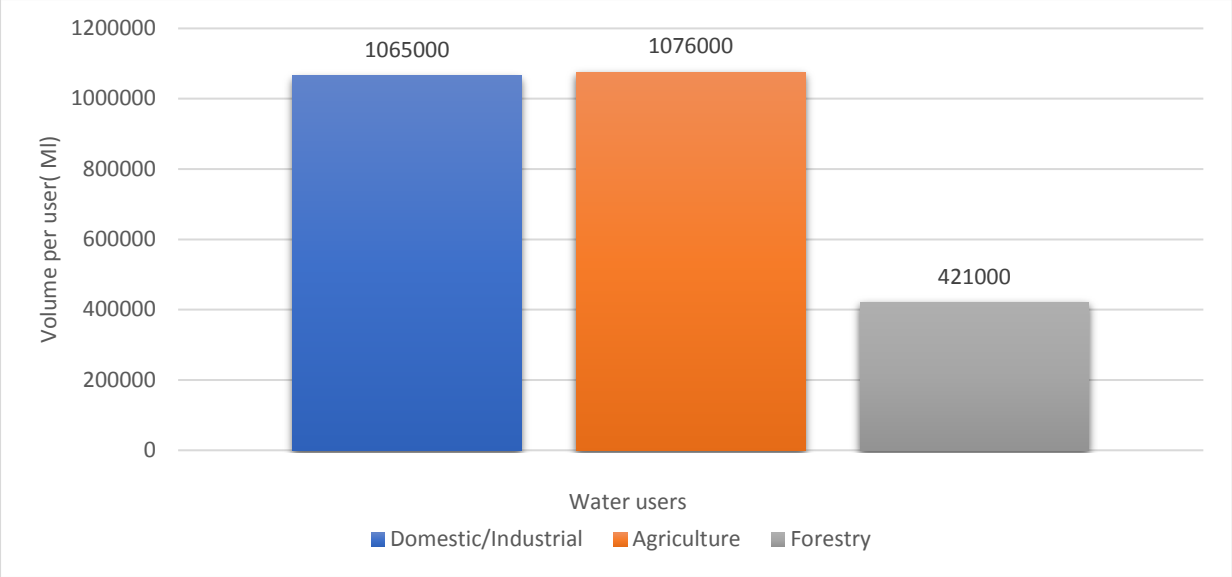

Figure 2-5: Volume of water per user sector in Pongola-uMzimkhulu CMA (Pongola -uMzimkhulu CMA, 2021)

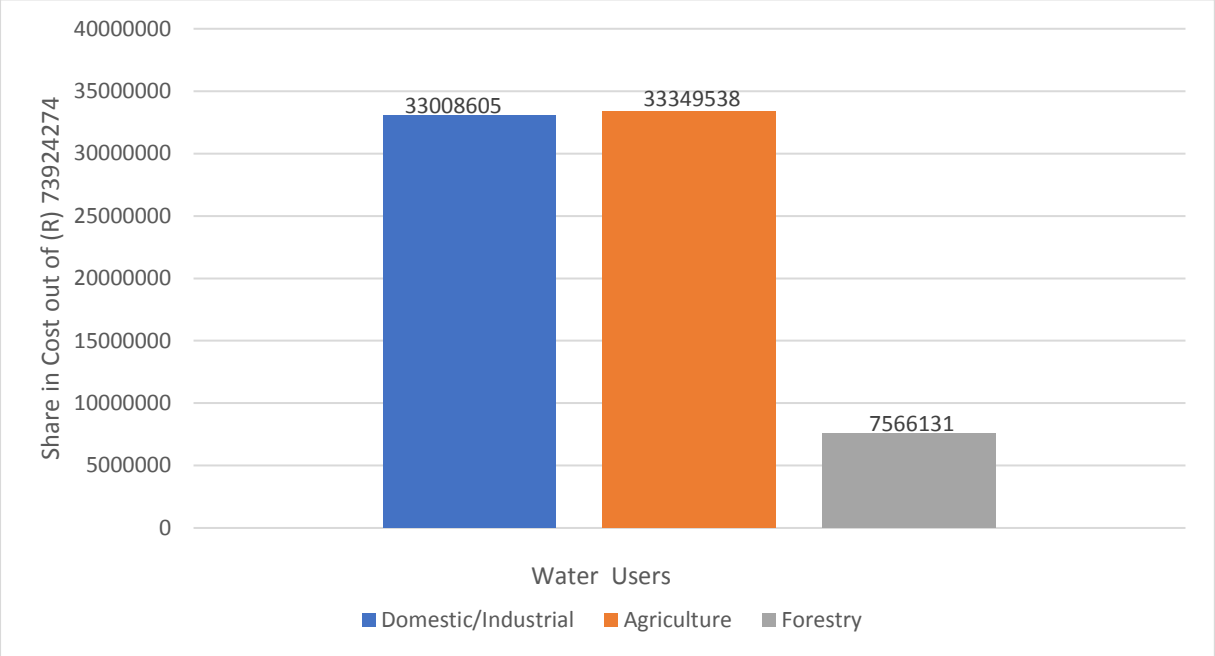

Figure 2-6: Share in costs for CMA to perform its function (Pongola-uMzimkhulu CMA, 2021)

Table 2-5: Water use charge per CMA functions c/m^3 (Pongola uMzimkhulu CMA,2021)

CMA Functions	**Domestic & Industrial (c/m^3)**	**Agriculture (c/m^3)**	**SFRA (c/m^3)**
CMS and WR planning	0.41	0.41	0.41
Water Weed control	0.02	0.02	
Water use Authorization	0.97	0.97	0.97
WRM Program	1.28	1.28	
Control and enforcement of water use	0.03	0.03	0.03
Functional support	0.39	0.39	0.39
Total charge before capping	**3.10**	**3.10**	**1.80**

Table 2-6: Pongola-uMzimkhulu Proto-CMA charge for 2021-22 (Pongola uMzimkhulu CMA,2021)

	Domestic/ Industrial	**Agriculture**	**SFRA**
Revenue prior to capping (R)	33 008 605	33 349 538	7 566 131
Proposed revenue due to capping policy (R)	33 008 605	22 022 955	7 566 131
Approved charges as a result of capping (c/m^3)	3.1	1.91	1.77
Percentage subsidised		38.28%	1.74%

2.3.1.2 Umgeni Water

Umgeni Water is a public entity established in terms of the Water Service Act (Act108 of 1997) with the mission of providing innovative, sustainable, effective, and affordable bulk water and sanitation services. In addition to the primary activity of the water board, section 30 of the National Water Act gives Umgeni Water authority to perform other activities without negatively affecting the primary activity of the water boards. These include:

- Provide management services, training, and support services
- Supplying untreated or non-treated water to end-users who do not use water for household purposes
- Providing catchment management services to or on behalf of the other responsible authority.
- With the approval of water service authority having jurisdiction in the area - supply water directly for industrial use, accepting industrial effluent and acting as a water service provider to consumers

- Provide water service in joint venture with water service authorities
- Perform water conservation functions.

2.3.1.2.1 Finances of Umgeni Water

Umgeni Water expenditure includes chemicals, energy, maintenance, direct staff, and raw water purchases; and indirect cost includes assets impairment, administration, and other costs. The cost of bulk water resulted in R5.02 per m^3 for the year 2020 as shown in Figure 2-7, although the average charge was R7.64 per m^3 for the same year (see Figure 2-8). The entity has generated surplus of R1.3 billion and the earned surplus will be invested in support of future five-year (R16.7 billion) capital investment programme, as well as debt reduction.

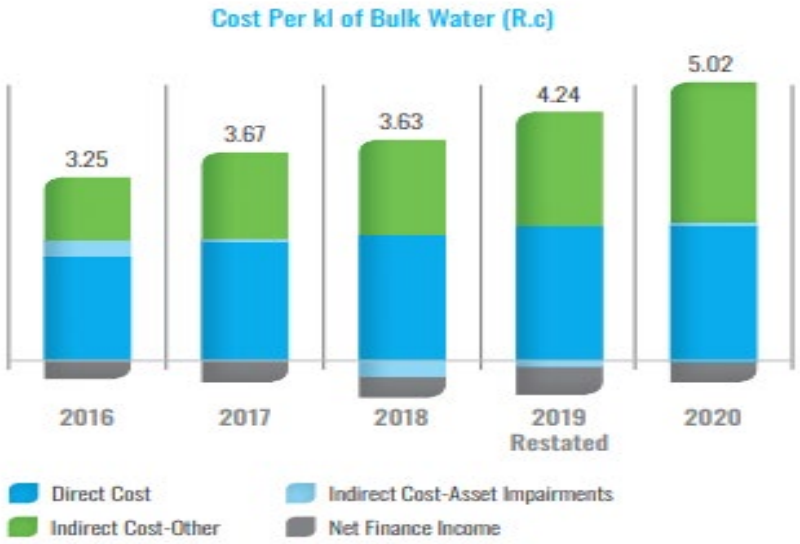

Figure 2-7: Umgeni Water cost per kl of bulk water (Amanzi, 2019/2022)

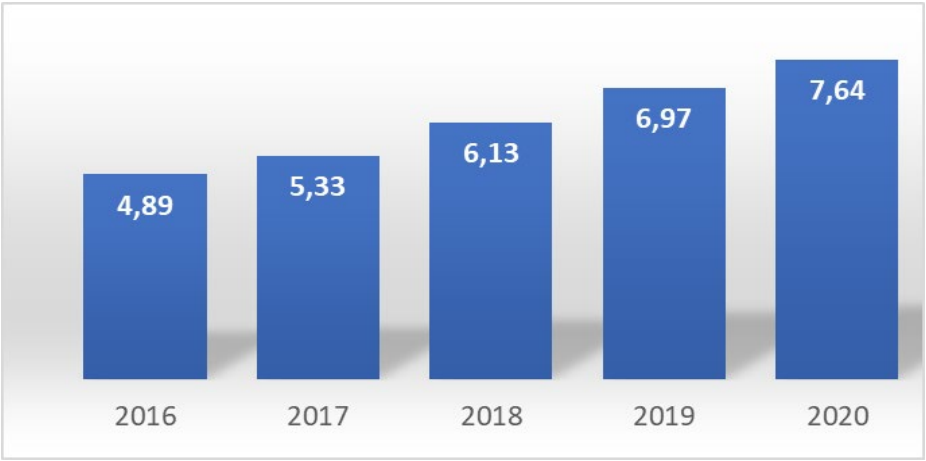

Figure 2-8: Average charge per m^3 (R.C) (Amanzi, 2019/2022)

2.3.2 Breede/Berg Demonstration Catchment

The demonstration catchment falls within two CMAs (Breede-Gouritz and Berg-Olifants) as shown in Figure 2-9 . The Breede WMA falls entirely within the Western Cape Province and is characterised by mountain ranges in the north and west, the wide Breede River valley, and the rolling hills of the Overberg in the south, and the land use is dominated by commercial agriculture. The Berg area is topographically influenced by the high mountain ranges in the Cape Peninsula. Intensive irrigation takes place in the Upper and Lower Berg River valleys, its tributaries and from private dams, as well as in the Eastern region of the Greater Cape Town subarea (along the Eerste and Lourens Rivers), with small pockets of irrigated land mainly for vegetable crops on the Cape Flats. Dryland cultivation of wheat is dominant in both the Upper Berg and Lower Berg sub-areas (including the Diep River), with some dryland vineyards and olive orchards on the hills.

The water board operating in the area is Overberg, and the municipalities in the study area: City of Cape Town Metropolitan Municipality (MM), Stellenbosch Local Municipality (LM), Swartland LM, Saldanha Bay LM, Drakenstein LM, and portions of: Langeberg LM, Theewaterskloof LM, Swellendam LM, Breede valley LM, Witzenberg LM, Hessequa LM and Bergriver LM.

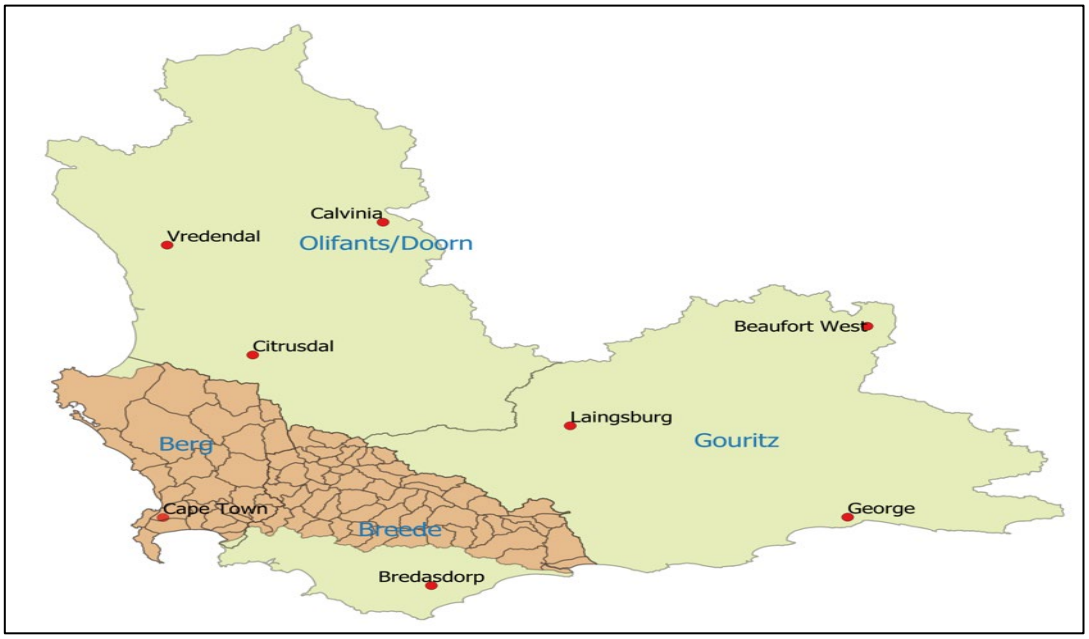

Figure 2-9: Breede/Berg demonstration Catchment in the Western Cape province

2.3.2.1 Breede Gouritz CMA

The Breede-Gouritz Catchment Management Agency (BGCMA) is a water management institution that was established in terms of section 78 of the National Water Act 36 of 1998 and is operational in the Breede- Gouritz Water Management Area (WMA). The BGCMA adopted functions in terms section 80 of the National Water Act as follows: Management activities related to local management, conservation

and monitoring activities, registration, and water use verification in support to improve water use authorization processes and understanding water resource availability.

The BGCMA performs the following functions:

- Catchment Management strategy and water resource planning
- Water related institution development
- Water use authorization
- Geo-hydrology and hydrology
- Resource directed measures
- Invasive alien plants
- WRM programme
- Control and enforcement of water use
- Administration and overheads.

Figure 2-10 shows the volume of water per user sector, which indicates that the agriculture sector is the biggest water user in the area.

The operational costs of BGCMA includes cost of employees, goods and services, capacity outlay, repair and maintenance and board related.

Besides revenue from water resource charges, 43.17% of BGCMA is funded from the fiscus, 12.90% is funded from transfer of water to the Berg catchment.

Table 2-7 shows the proposed charges for the 2022/2023 year and demonstrates that the agricultural sector, which are the biggest customers, are heavily subsidised by 52%.

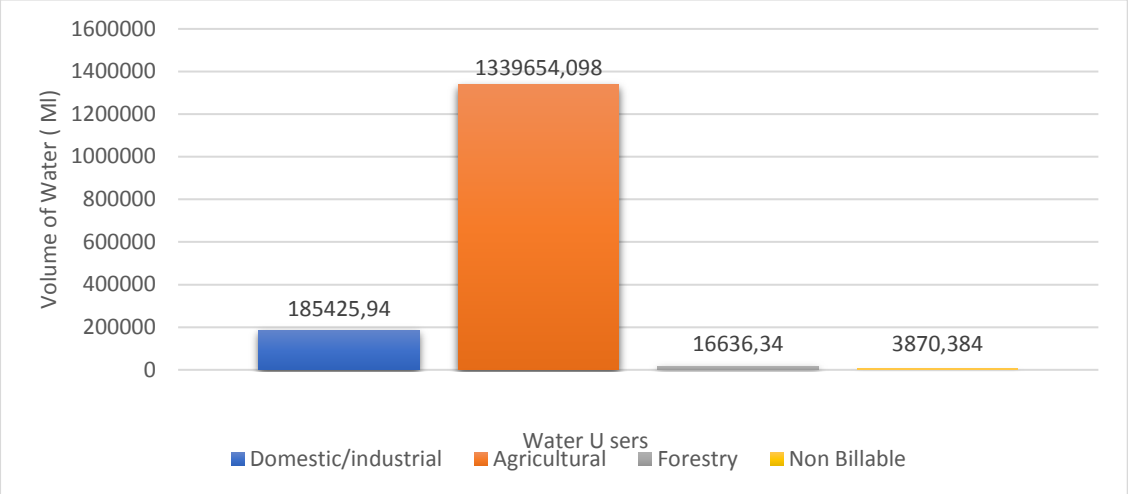

Figure 2-10: Volume of Water Per User Sector (Breede-Gouritz CMA,2021)

Table 2-7: WRM proposed charges for 2022/2023 (Breede-Gouritz CMA,2021)

Sector	2022/23 Full cost recovery	2022/23 Capping charge	Subsidized %
Domestic/Industrial	5.51	5.51	0
Irrigation	5.51	2.66	51.7
SFRA	5.51	1.36	75

2.3.2.2 Berg-Olifants Proto CMA

Berg Olifants CMA, which is a Proto CMA performs the following water resource management functions:

- CMS and WR planning
- Water related institution development
- Water use authority
- Geo-hydrology and hydrology
- Invasive alien plant
- WRM program
- Control and enforcement of water use
- Functional support.

2.3.2.2.1 Finances of Berg-Olifants Proto-CMA

Figure 2-11 below shows volume of water per user in the CMA, with total volume of 1 347 118 Ml. The cost to perform the functions of the Berg-Olifants Proto-CMA as shown in Figure 2-12 is R77 832 641 for the year 2021 and as the CMA has three types of water users (i.e. domestic/industrial, agriculture, and forestry) these costs are shared amongst them, which results in approx. R31 million for domestic/industrial; R46.2 million for agriculture, and R246 thousand for forestry (Berg-Olifants CMA,2021). These shared costs per water user and the volume consumed result in water charges per water user as shown in Table 2-8, which shows that all water users must be charged 5.79 cents/m^3. These charges for agriculture and forestry sectors are prior to capping. Table 2-8 shows the proposed charges for the 2022/2023 year and demonstrates that the agricultural sector, which are the biggest customers, are heavily subsidised, by 60%.

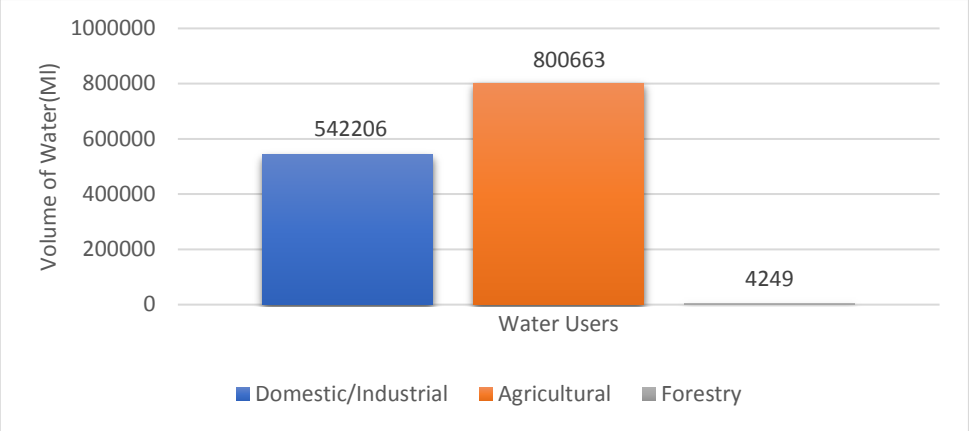

Figure 2-11: Volume of water per user (Berg-Olifants proto-CMA, 2021)

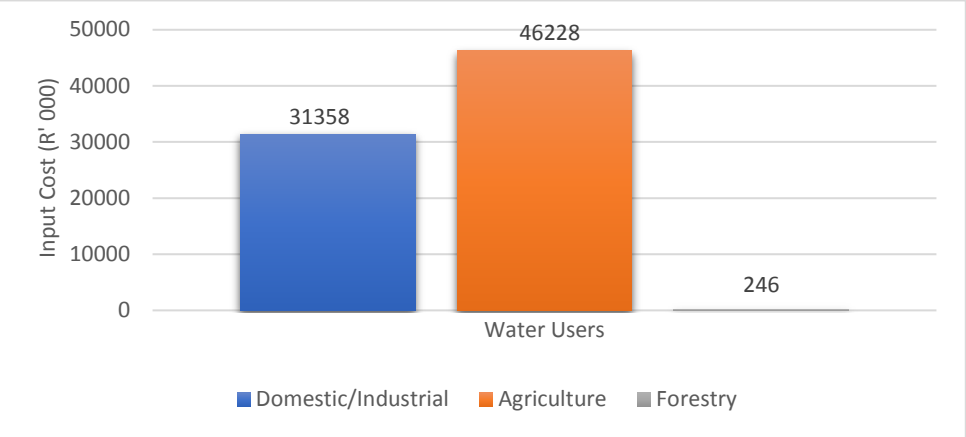

Figure 2-12: Cost per User (Berg-Olifants CMA,2021)

Table 2-8: Water use charge per CMA functions c/Kl (Berg-Olifants CMA,2021)

CMA FUNCTIONS	DOMESTIC & INDUSTRIAL(c/m^3)	AGRICULTURE(c/m^3)	SFRA (c/ m^3)
CMS & WR planning	1.475	1.475	1.475
Water related institution develop	0.349	0.349	0.349
Water use authority	1.010	1.010	1.010
Geo-hydrology and hydrology	3.39	3.39	3.39
Invasive alien plant	0.837	0.837	0.837
WRM program	0.546	0.546	0.546
Control and enforcement of water use	0.602	0.602	0.602
Functional support	0.635	0.635	0.635
Total	5.79	5.79	5.79

Table 2-9: Berg-Olifant charges for 2021/22(Berg-olifants CMA,2021)

sector	2021/22 Full cost recovery	2021/22 Capping charge	Subsidized %
Domestic/Industrial	5.79	5.79	0
Irrigation	5.79	2.34	59.6
SFRA	5.79	2.59	55

2.3.2.3 Overberg Water Board

Overberg water was established in 1993 with the amalgamation of Duiwenhoks and Ruensveld water boards. Overberg is one the national public entities under the DWS. It also exists to complement the work of the department and primarily support the minister as the shareholder.

Overberg Water provides bulk drinking water to Hessequa LM, Theewaterskloof LM Cape Agulhas LM, and its industrial customers. It intends to extend its services to the nearest municipalities and alternatively to the whole Western Cape province, two WMAs and beyond.

2.3.2.3.1 Mandate and performance of Overberg Water

Overberg Water derives its mandates from the Water Service Act 108 of 1998 and the public finance management Act 1 of 1999 and defined by the PFMA as a schedule 3B Public institution and categorised as National governance business enterprise. The primary activities of Overberg Water in terms of section 29 of the Water Service Act, is to provide water services to other service institutions in its service area. In line with Overberg Water growth intention, section 30 of Water Service Act enables Overberg Water to undertake other activities on condition that these activities do not affect the entity's ability to perform its primary function. Such activities in terms of the Water Service Act includes the following:

- Providing management services, training, and other support services institution, in order to promote cooperation in the provision of water services
- Supplying untreated and or non-potable water to end users who do not use water for households
- Providing catchment management services to or on behalf of the responsible authority
- With the approval of the water services authority having jurisdiction in the area. Overberg Water may be charged with supplying water directly for industrial use, accepting industrial effluent and acting as a water service provider to customers
- Providing water services in joint venture with water services authorities and
- Performing water conservation function.

2.3.2.3.2 Finances of Overberg Water

The structure of charges for 2019/2020 year has limited funds and excludes the capital levy that is supposed to be building new infrastructure. Overberg Water has limited funds and is looking at funding mechanisms for the new infrastructure to ensure that sufficient funds are raised to replace existing infrastructure that has aged. The water board has successfully consulted with stakeholders on increase of charges in compliance with the Municipal Finance Management Act, the charges have increased by an average of 10.0% during 2020 to R18 as shown in Table 2-10.

Table 2-10: Volume sold and water charge of Overberg Water 2019/2020

	2019/20
Total volume water sold (m^3)	3625000
Costs of portable water (exclude depreciation)	30 807 493
Cost per m^3	8.50
Average water charge (R/m^3)	18.07

2.4 Training Needs Analysis

The purpose of the training needs assessment was to answer questions why, who, how, what, and when (Kotze et al., 2019):

- Why: Objective of the training course (why is this training being done and how will all participants benefit from these training?)
- Who: the target group should learn from the training?
- How: the training will be performed after the development of the training manual and positively contribute to the improvement of knowledge and skills as required
- What: Identify the best way to perform the required training; and
- When: will training take place. The best timing for training to be performed should be identified.

Key highlights from the needs analyses are set out below (and were taken into the design of the course content).

2.4.1 Process for Identifying Stakeholders

The process for identifying stakeholders was twofold, with identifying staff involved in implementing or setting water charges and researchers in the field, and stakeholders who are customers of the WRMC and NGOs.

The identified organisations therefore included:

- DWS: Economic regulation
- DWS: Water trading Entity
- TCTA: Trans-Caledon Tunnel Authority
- DFFE: Working for Wetlands
- National Treasury (NT)
- Breede Gouritz CMA
- Berg-Olifants Proto-CMA
- Pongola-uMzimkhulu Proto-CMA
- Municipalities
- SANBI
- Rhodes University
- PDG
- WRC
- WWF
- WUAs in all CMAs
- Major industries in all CMAs
- Other NGOs

The staff from the identified organisations were contacted through an email and/or phone call. The background information and the questionnaire were sent to the staff prior to the meeting. The meetings thus far were conducted online.

Please see Appendix A for list of stakeholders interviewed.

2.4.2 Feedback on Training Needs Analysis

Engagement with policy makers (i.e. DWS and NT) provided an opportunity to further understand the process regarding CMA budgets approval and raw water charges setting. The DWS has gazetted Revised Raw Water Pricing Strategy, and as a result, revised components was included in the training course. The BGCMA, Pongola-uMzimkhulu and Berg-Olifants Proto CMAs were interviewed and the staff provided insights into the challenges the CMAs are facing, with regards to lack of funding from the fiscus, revenue ring-fencing, and ways to fund EI activities. Staff from SANBI in the Greater uMngeni

demonstration catchment, also gave insights into challenges the Pongola-uMzimkhulu Proto-CMA and what their customers are facing w.r.t water charges. Both demonstration catchments currently have challenges during the public participation process, as their customers have limited understanding regarding the cost structure that derives the WRMC. Further reflections are discussed in the sections below.

2.4.2.1 Limited Understanding on the Mandate of Implementing Agencies of Raw Water

Feedback from WUAs/IBs, CMAs, SANBI staff working in both demonstration catchments indicated that the relevant stakeholders (i.e. farmers and industries) have limited understanding of the mandate of all the authorities in the catchments and as a result, do not understand why they need to pay certain charges. It was indicated that the customers cannot separate the functions of CMA/Proto-CMA, DWS as the regulator, water boards and WSAs. This confusion has been demonstrated during the public participation processes.

2.4.2.2 Activities of the Current Raw Water Pricing Strategy

The CMAs determine their water costs based on the WRM activities as shown in Table 2-11 and it shows that there is inconsistency in the activities. The table shows that the BGCMA, which is the only established CMA in both catchments (as other CMAs are within DWS), is the CMA that is performing most of WRM activities. There was therefore a need to reevaluate the cost structures of all the CMAs, and to determine affordability, when all activities of WRM are included in the water charges.

Table 2-11: WRM activities taken into account for charge setting (DWS,2007)

WRM activities	BGCMA	Pongola-uMzimkhulu	Berg-Olifants
Catchment management strategy and Water resources planning		Currently in the process of developing it	
Resource directed measures			
Water use authorisation			
Control and enforcement of water use			
Disaster management			
Water resources management programmes			
Water related institutional development (Stakeholder Management empowerment)			
Water weed control			
Terrestrial Invasive Alien Plant (IAP)			
Geo-hydrology and hydrology			
Administration & Overheads			

2.4.2.3 Current capping of water charges on Agricultural Sector

The Agricultural sector is subsidised as a result of the water charges capping policy and during the interview process with NT, it was indicated that money that CMAs receive from the fiscus is meant to also assist in performing other WRM functions and not to subsidise one sector so heavily, as is currently the situation. The CMAs on the other hand have indicated that they do not get the money they request from the fiscus, and as a result, they must prioritise some activities.

The BGCMA indicated that the customers do not understand the items that lead up to water charges, especially if the increment is above inflation.

The BGCMA has also indicated that they spend approx. R4 million/a on alien clearing although it is a fraction of the money, they need to see significant increase in budget for this, but with the water charges capping policy on agriculture sector and limited money they receive from the fiscus, they find it difficult to expand their alien clearing activities.

2.4.2.4 Ring fencing CMA Activities

The Pongola-uMzimkhulu Proto-CMA which is within regional KZN DWS, has a responsibility to have a monitoring programme on water resource management, but currently the responsibility is carried by National Department, although the CMA provides monetary support to the National Department with the revenue they collect. This challenge leads to inefficiency towards enforcement w.r.t. polluters. Ideally, a water monitoring system should be upstream and downstream of a major mine/industry so that should there be non-compliance, CMAs can provide evidence. The current monitoring programme is done on a national level which looks at national priorities and Resource Quality Objectives (RQOs), as opposed to local needs. The CMAs have indicated that they are not benefiting fully from the national monitoring programme.

2.4.2.5 Conflicting Responsibilities on EI activities

Ecological infrastructure (i.e. wet & dry) provides numerous ecosystem services which includes regulatory and provisioning services. There is evidence provided by studies over the years that rehabilitation of EI has direct benefits on water resources. DFFE has the EPWP programme (i.e. working for wetlands and working for water) which performs some of these activities. As EPWP money comes from the fiscus and CMAs also receiving grant from government, NT has seen that as a concern, as it is seen as two departments (i.e. DFFE and DWS) to receive funds for one function. BGCMA understands that although DFFE has such programmes, they are also benefiting from EI rehabilitation hence they would really like to expand their current alien clearing programmes.

2.4.2.6 Revision of Raw Water Pricing Strategy: Capping of Water Charges

The revision of the Raw Water Pricing Strategy aims to amend the current 2007 Raw Water Pricing Strategy and DWS staff indicated that one of the components is to understand which agricultural sector should be subsidised (i.e. poor farmers, commercial farming that form part of food security and farmers that produce ‘’luxury products’’), as currently all types of farmers are subsidised. During the consultation process, CMA staff were asked what will happen if ‘’luxury’’ or wine farmers are no longer subsidised, and they indicated that the grape farming sector provides higher employment compared to other farming sectors, which will trigger employment security, and the Government must take that into consideration.

2.4.2.7 Revision of Raw Water Pricing Strategy: Public Interest Function

The amended Raw Water Pricing Strategy will be used as part of the training course and the revision includes clear definitions on what are public interest functions. In each WRM activity, the revisions also guide on the percentage on how much each activity should be paid by the water users and how much should be paid from the fiscus. This, the so-called public interest function, will empower CMAs in determining their water charges and how much should be collected from the fiscus. The course will therefore include content of what it means when a charge is amended based on the amendment of the WRM activities.

2.4.2.8 Revision of Raw Water Pricing Strategy: EI rehabilitation and restoration

The amendment of the Raw Water Pricing Strategy also includes expanding EI activities, as the current strategy mentions alien clearing while the revised strategy includes EI (i.e. aquatic and non-aquatic) rehabilitation/restoration as CMA’s responsibility. EI rehabilitation requires a substantial amount of investment. Furthermore, according to the public interest function guidance in the revision on WRM, this function is mostly a public interest (i.e. 70%), which implies that only 30% of this function should be recovered from the registered water users, and therefore innovative ways may be needed to fund this activity beyond receiving funds from the fiscus.

2.4.2.9 Summary of Training Needs Assessment

The Training Needs Assessment (TNA) provided insight into the type of training course to be developed and for which audience. The assessment demonstrated that CMAs, policy makers, and water users do not have a shared understanding of fundamentals of raw water charge setting. Policy makers indicated that they would like to have discussions (within the participative course structure) with CMA staff and more particularly with the raw water users, to get a better understanding on how the policies affects them. The CMAs’ staff indicated they struggle to communicate with their customers on how the water charges are set and lack of platform with regards to grants they receive from Government. Water users

(farmers, water boards and local authorities) indicated that they do not understand the functions of CMA and Department of Water and Sanitation (DWS), and how these water charges are calculated.

The course therefore focused predominantly on the WRMC component of the Raw Water Pricing Strategy, however with a demonstration of how it connects to the entire water value-chain. The training course therefore focused on:

- Activities and costing structure of WRMC from the 2007 Raw Water Pricing Strategy
- Components of the Raw Water Pricing Strategy currently being amended:
    - Definition of public interest function of WRMC
    - Agricultural sector caping policy
- Exploring funding mechanisms of EI
- Demonstrating charge setting practices under both of the above charge setting regimes.

3 PARTICIPATORY TRAINING COURSE DESIGN

3.1 Overview

The key purpose of the modules was to address the needs of all the stakeholders involved in the water value chain and in setting up the charges. The course was conducted over two days from 08:30-16:00, with the following structure:

- Day 1: Status quo assessment on water charges across the value chain; budgeting and setting process of charges for Catchment Management Agencies (CMAs)
- Day 2: Assessment of 2022 Raw Water Pricing Strategy and how it will affect the WRMC; funding mechanism for ecological infrastructure rehabilitation; and the importance of accurate budgeting for WRM activities.

The course design consists of six modules:

1. Day 1:
    - Module 1: Background on the water value chain and the 2007 Raw Water Pricing Strategy (presented by DWS)
    - Module 2: Activities and budgets for WRM
    - Module 3: Determination of charges for CMAs under the 2007 Raw Water Pricing Strategy

2. Day 2:
    - Presentation by DWS on the likely changes to the 2007 Raw Water Pricing Strategy
    - Module 4: WRMC: The Public Interest Function
    - Module 5: Funding mechanisms for EI rehabilitation
    - Module 6: The importance of accurate budgeting for CMA activities, and charge determination for CMAs under the revised Raw Water Pricing Strategy, including EI investment.

The course has been designed to be highly participatory in nature and participants are therefore expected to provide inputs into different components based on their expert knowledge. This is a key component of the learning process. There are activities in each module which seeks to promote robust discussions, and these include:

- Presentations by key DWS staff, providing CMAs with a unique platform to learn from direct interaction with the Raw Water Pricing Strategy architects (and vice versa)
- YouTube video clips
- Discussions/debates on particular topics in each module

- Quizzes at the end of some modules
- Group work exercises in a tutorial format.

Participants are requested to log into a Zoom online platform using laptops during the course. This has the following benefits:

- To enable higher levels of participation, to answer quizzes and to complete group exercises.
- To enable key participants to engage remotely for key sessions (e.g. DWS to offer the relevant modules without the need to travel)
- To enable future roll-out of the course via WISA of similar course platforms.

Please see appendix B for the description of the 6 modules, together with the accompanied power point presentation.

3.2 Structure of the Training Course

The training course content was developed as a result of the output of the training needs anal. The sections below provide the objectives of the six modules and how they were piloted using participative methods.

3.2.1 Module 1 Overview: Background on the Water Value Chain

Purpose of Module 1	**Participative methodology**
1. To discuss the water value chain in SA 2. To identify and discuss the variety of all water use charges across the value chain	1. Presentation on (i) water value chain; (ii) implementing agencies; and (iii) water use charges 2. 15 minutes discussion on water value chain 3. Zoom Quiz with 2 questions that will test the participants' knowledge on the key messages 4. Discussion on quiz results chain

3.2.2 Module 2 Overview: Activities and Budgeting Process for WRM

Purpose of Module 2	**Participative methodology**
1. To discuss the structure of CMA budgets 2. To obtain insights into cost items per WRM function 3. To identify typical budget per cost item	1. 15 min discussion on budget of CMAs 2. Presentation on WRM activities and its budget for 40 minutes 3. 15 minutes discussion on overall WRM activities

3.2.3 Module 3 Overview: Determination of WRMC

Purpose of Module 3	Participative methodology
1. To determine how CMAs derive WRMC 2. To discuss and determine how CMAs determine tariff per water use sector 3. To discuss how CMAs deal with the shortfall	1. 15 minutes group work exercise to calculate water tariff per water use sector 2. Presentation on calculation of WRMC 3. 15 minutes discussion CMA's shortfall budget

3.2.4 Module 4 Overview: Impact of Revision of Raw Water Pricing Strategy on WRMC

Purpose of Module 4	Participative methodology
1. To discuss how 2022 raw water pricing strategy affects WRM functions: Public interest function 2. To discuss how the removal of the capping policy will be implemented	1. Presentation on public interest functions of WRM activities 2. Group exercise on determining cost to be covered by water users 3. 15 minutes discussion on removal of the capping policy

3.2.5 Module 5 Overview: Funding Mechanisms for EI rehabilitation

Purpose of Module 5	Participative methodology
1. To discuss activities relating to ecological infrastructure rehabilitation/restoration function of WRM 2. To discuss how DFFE and CMAs will work together to perform this function 3. To learn about current initiatives relating to performing this function 4. Innovative ways to fund these activities	1. Presentation on benefits of EI rehabilitation 2. 3 videos on EI rehabilitation initiatives 3. 20 minutes discussion on funding mechanisms

3.2.6 Module 6 Overview: Recommended Charge setting Determination Process

Purpose of Module 6	Participative methodology
1. Discuss how to optimise tariff setting process for CMAs 2. Understand the importance of accurate costing, record keeping and budgeting 3. Understand the Discounted Cash Flow (DCF) model, what is input into the model and how it is used to assist tariff setting.	1. Discuss how to optimise tariff setting process of WRMC.

4 PILOTING OF PARTICIPATORY TRAINING COURSE AT TWO DEMONSTRATION CATCHMENTS

4.1 Training Course Process

The training course was piloted in two EI4WS demonstration catchments: the Greater uMngeni catchment and the Berg-Breede demonstration catchment. The training course was facilitated by the Prime Africa Consult team, CMA representatives and DWS officials: National Office (Economic Regulation Directorate) as shown in Table 4-1. The course duration was 08:30-16:00 for both days.

As day 1 focused on 2007 Raw Water Pricing Strategy, a DWS official presented Module 1 of the training course, which gives background on the policies and role players of the water value chain. A CMA official presented on the activities the CMA are currently doing w.r.t WRM, accompanied by the budget they receive.

Day 2 focused on the 2022 Gazetted Raw Water Pricing Strategy, where a DWS staff member provided a presentation on how the new strategy differs from the 2007 strategy.

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Please see the accompanied power point presentation with all the modules, and activities that were conducted in each module.

At the end of Day 2 of the training course, participants were requested to fill out a survey form, to capture learning, to provide feedback on how they benefited from the course and if the training course needs to be revised.

4.1.1 Greater uMngeni Training Course

The 2-day training course was conducted in Pietermaritzburg on 14-15 February 2023 at Tsogo Sun Hotel. The invitation with the assistance of SANBI's Greater uMngeni EI co-ordinator, was done through uMngeni Ecological Infrastructure Partnership (UEIP) forum. Prime Africa also invited additional members from outside the forum. The total number of participants was 35 and the organisations that attended the training course included:

- SANBI (6 staff members)
- Pongola-uMzimkhulu Proto CMA (10 staff members)
- DWS: National Office-Economic regulation (2 staff members)
- WRC (2 staff members)
- WWF (2 staff members)
- Umgeni Water (3 staff members)
- eThekwini MM (2 staff members)

- Msunduzi LM (1 staff member)
- KZN EDTEA (3 staff members)
- DUCT (2 staff members)
- Wild trust (1 staff member)
- UEIP (1 staff member)

4.1.2 Berg-Breede training Course

The 2-day training course was conducted in Rawsonville which is near Worcester on 22-23 February 2023 at the Slanghoek Mountain Resort. Invites were sent out through BGCMA. The total number of participants was 26, with participants mainly from BGCMA, 3 staff members from Langeberg LM and 2 staff members from DWS: National Office (Economic regulation Directorate).

Table 4-1: Agenda of the training course: Day 1

Facilitators: Prime Africa Consult team members; DWS official; and CMA official			
Time	**Module**	**Lecture**	**LEAD**
08:30 - 09:00	Arrival and registration		
09:00 - 09:30		Welcome and Introduction	All
09:30 - 10:00		Background of the training	Facilitators
10:00 - 10:30		Background on the catchment	CMA staff
10:30 - 11:30	**Module 1:** Background on water value chain	• Water value chain background • Role players of the water value chain • Different charges in the water value chain	DWS; Facilitators
11:30 - 12:00	**Coffee break**		
12:00 - 13:30	**Module 2:** Activities and budget of WRM	• WRM activities and budget required to perform these activities	Facilitators
13:30 - 14:30	**Lunch**		
14:30 - 15:30	**Module 3: Determination water charges**	• Determination of WRMC	Facilitators
15:30 - 15:45	**Closing of day 1 and objectives for day 2**		

Table 4-2: Agenda of the training course: Day 2

TIME	MODULE	LECTURE	LEAD
	DAY 2		
09:00 - 09:30	Welcome and summary of day 1		
09:30 - 10:00		• Draft Water Pricing Strategy and update on process	DWS
10:00 - 11:00	**Module 4:** WRMC-Public interest function	• Public interest function for WRM activities • Revised agricultural sector capping policy	Facilitators
11:00 - 11:30	**Coffee break**		
11:30 - 13:00	**Module 5**: Funding mechanisms for Ecological Infrastructure (EI) rehabilitation/ restoration	• Introduction of importance of EI for water security • Expansion of EI rehabilitation activities as a result of revised Raw Water Pricing Strategy • Funding mechanisms for EI rehabilitation	Facilitators
13:00 - 14:00	**Lunch**		
14:00 - 15:00	**Module 6**: The Importance of Accurate Budgeting for CMA Activities	• Demonstration of how setting of charges can be done using discounted cash flow, which looks at 30-year period and 5-year mid-term plans	Facilitators
15:00 - 15:30	Additional time for: extended discussion : presentation by CMA or Government official : feedback from participants and how they benefited from the course		
15:30 - 15:45	**Closing of training course and submission of the survey form**		

4.2 Survey Questions

The following survey questions were sent to the participants, using either the Zoom Quiz function, the Google Forms App or hand-written commentary:

1. Describe a meaningful activity or interaction that you have participated in during the course.
2. What specific insights did you gain? What access to useful information or material?
3. How could you use this insight/ resource in your work?
4. Which module did you enjoy the most? and why?
5. Was there a topic that you felt could be addressed more thoroughly or was not addressed at all? Please elaborate.
6. Did the length of the course suit you? Do you think the course should be consolidated into one day?

4.3 Feedback of the Training Course

The participants from the Greater uMngeni were more diverse compared to the Berg-Breede and as a result, the feedback from these areas was different and will be provided separately in the sections below.

4.3.1 Feedback from the Greater uMngeni Demonstration Catchment

Some participants, who are part of the UEIP, from SANBI, DUCT, Wild Trust and WWF had a stronger ecological background. Participants from the eThekwini MM were from a unit that deals with water charges setting. Pongola-uMzimkhulu Proto-CMA had more diverse team as they had staff from dam safety, Water Use License, and finance staff members.

Some participants preferred Module 1 which was presented by a DWS official, as they believe it was well presented and having DWS official doing the presentation, they had the platform to have additional questions that were not part of the presentation. Many participants preferred Module 6 as there was an insightful spreadsheet exercise demonstrating CMA long term determination of water charges (30 year), demonstrating how they would be able to fund projects requiring large capital outlays, such as rehabilitation of water resources, without huge adjustment on the water charges.

Participants who are not directly in the water sector indicated the training course gave them an understanding of the water value chain and the charges associated with it.

Most participants agreed that the training course should be two days, as there was a lot of information to digest.

4.3.2 Feedback from the Berg-Breede Demonstration Catchment

The participants were mostly from BGCMA with a few participants from Langeberg LM and DWS National office. The staff from BGCMA were from different units of the CMA, which included: finance; revenue collection, Water Use Licence, WRM, Ecology, Geohydrology, and Stakeholder Engagement.

Although during the introduction session, some non-finance participants did not understand why they needed to attend the training course (as they believed the course only deals with finance concepts which were not of interest to them), by the end of the course they appreciated the learning and how it could empower their own technical work and budgeting processes.

The participants mostly preferred and gained more knowledge on Module 6 of the course for similar reasons as set out above.

Participants indicated that the training course was useful as the information shared on the activities that make up the WRMC and would assist them when they interact with their customers.

Some CMA participants enjoyed all modules equally as they had not been aware of how the finance team determined the WRMC and indicated that they now better understood how their day-to-day activities fit into the entire function of the CMA, in accordance with Raw Water Pricing Strategy.

All participants enjoyed the course being 2 days as it showed them what is currently happening in terms of water charges in day 1 and how the 2022 Raw Water Pricing Strategy will change the functions of the CMA in day 2.

4.4 Key observations and learning from the Project Team

We noted a high degree of networking taking place during the course, both across organisations and also across functions withing the CMA. This is a highly valuable tacit benefit of the course that will no doubt serve to mitigate many future challenges faced by the relevant CMAs.

We further noted a significant learning process taking place between participants who had a deeper understanding of ecological infrastructure, and those who better understood on the general and financial management of the CMA (CMA participants). There is no doubt that this cross-pollination of knowledge withing the CMAs would be beneficial to improve accuracy in setting of water charges and awareness of the important of investment in ecological infrastructure.

Further to the above, we observed a very distinct “silo” behaviour in CMAs, where few fellow CMA staff had a full understanding of the full cycle of catchment management strategy (CMS) - CMA function – Annual Plan of Operations (APP) - budgeting for APP–setting of water charges cycle. All participants, to varying extent, gained a deeper insight into the overall business case of CMAs, i.e. the value they add to their customers.

Participants with ecological background mostly enjoyed Module 1 as it provided background on the water value chain, which they were not familiar with. The kind participation of DWS staff on both days, and their availability and willingness to engage difficult questions and also take on board learning themselves, was a key success factor of the course.

Participants who are not in the space of EI4WS placed a high value on Module 4 as it provided information on the benefits of investing in ecological infrastructure which also connected how these rehabilitation projects will provide more revenue to the CMAs.

In general, we observed a very low understanding of the concept of investment in EI, including how EI is defined in practical terms, what benefits result from EI and how investment requirements are budgeted for and brought into structure of water charges. The course played a large role improving these understandings.

Furthermore, as the revised Raw Water Pricing Strategy seeks to expand ecological infrastructure rehabilitation/restoration activity from just invasive plant clearing, there were several discussions on how this activity may be approached in future. The key focus here was to pro-actively make very specific EI focused business cases for investment, targeting CMA budgeting process and ring-fenced setting of water charge processes. DWS officials took note of these discussions to interrogate how these learnings could be incorporated into Raw Water Pricing Strategy going forward.

The disaster management function of the CMA was generally the most poorly understood by participants. The course was helpful to allow them to obtain an improved understanding of their potential role here.

The matter of ring-fencing was raised in both courses, but more extensively in the BGCMA sessions. The guidance by DWS that ring-fencing of income and expenditure is an implicit attribute of the revised pricing strategy, received positive attention during the course. Both technical and financial staff acknowledged the power of ring-fending principles to enable, for example, catchment specific EI investment.

A key learning across the two courses, was the observation that the registered water user profile, I.e. the CMA customer base, could play a major role in the financial sustainability of the CMA. The Great uMngeni demonstration catchment is blessed with having the Umgeni Water Board as one of their key customers. The WRMC forms a relatively small component of their overall water management cost and results in this CMA have a customer base with relatively low weighted average WRMC sensitivity. On the other hand, the BGCMA has mostly farmers as their customers, who are benefiting from the capping policy of 2007 WRMC. The new strategy is set to remove the capping policy for farmers, and much debate was focused on how this will affect the CMA customers. Module 6 demonstrated quite powerfully how the CMA could apply its public function grant (of course combined with the capping removal “holiday” (as mentioned by DWS)) to address this challenge.

We noted, and discussed during work sessions, the limitations of applying “MTEF” type budgeting at a CMA level. The CMA operations are so small that capital budget requirements (e.g. for investment in EI) will not be easily leveraged. Module 6 demonstrated powerfully how this problem could be overcome, and both CMA finance colleagues and DWS took note of this.

On comparison of the Greater uMngeni to the BGCMA courses: we noted a distinctly different focus of the participants around the modules dealing with core functions. The BGCMA discussions were much more intense in these modules. This was because the BGCMA has been operational for more than a decade and wanted to understand how the new pricing strategy would lead to them changing their way of working. Nevertheless, the course content used for both these case studies were sufficient and do not require different content for proto-CMAs versus established CMAs.

The WDCS was discussed in Module 1, but not dealt with in detail within the course. We had many questions around the workings of the WDCS, we attended to as best as possible. It is important to note the possible intersection of WDCS mitigation activities and EI investment and this may be a new module that can be brought into the course once the DWS has finalised their position on the WDCS.

The BGCMA raised the matter of recreational water use as a possible new category of registered water user. This proposal was noted by DWS for further consideration in the revision of the Raw Water Pricing Strategy.

A key learning has been the importance of having a suitable course presenter/facilitator. This person(s) must be more than a lecturer or tutor but must have a deep knowledge of the course content, combined with the ability to facilitate and direct discussions in a manner that optimises the learning process.

5 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusions

South Africa has policies and legislation that enable the design and setting of water charges across the water value chain. However, through this project it has been demonstrated that decision makers at different tier levels have insufficient decision-making knowledge, and this has resulted in water charges not implemented effectively.

Lack of understanding governance arrangements, processes and theory and other attributes of underlying water charge setting and the economic regulation of water, has limited authorities in presenting the process of setting water charges to their customers, which then creates hostile environment.

In this assignment, we developed participatory training course on water charges. The 2-day training course has six modules, with day one focusing on 2007 Raw Water Pricing Strategy and including a module that covers the entire water value chain. Day 2 covers how the new 2022 Raw Water Pricing Strategy will affect how CMAs run their water business. The modules developed therefore are:

1. Background on the water value chain
2. Activities and budgeting for WRM done by CMAs
3. Setting of WRMC
4. Public Interest function for WRMC
5. Mechanisms for funding Ecological Infrastructure
6. Importance of Accurate budgeting for CMAs.

The training course support knowledge innovation, not just information transfer. The structure of the training course is therefore participative in nature to allow participants from different levels within the water space, to have robust discussions amongst themselves and therefore creating long lasting networks in the catchment.

The training course was tested at two demonstration catchments (i.e. Greater uMngeni and Berg-Breede). The two catchments have different characteristics such as:

- BGCMA is an established CMA and performing most WRM functions compared to Pongola-uMzimkhulu which is currently a Proto-CMA
- BGCMA customers are predominantly farmers, which results in the CMA heavily affected by the caping policy.

Based on the course developed and outputs from the two-pilot case studies, the key conclusions are as follows:

- The training course bridges the gap between technical and finance team within the catchment. This was observed as the technical team better understood setting of water charges and finance team better understood the importance of rehabilitating/ restoring of EI, and how these projects provide more revenue to the CMA.
- The 2022 Raw Water Pricing Strategy is set to remove the capping policy, and it was noted that the demonstration catchments reacted differently to that, and this is because Greater uMngeni demonstration catchment is blessed with having Water Board as one of their key customers. The WRMC forms a relatively small component of their overall water management cost and results in this CMA have a customer base with relatively low weighted average WRMC sensitivity. On the other hand, the BGCMA has mostly farmers as their customers, who are benefiting from the capping policy, which will have an impact of how the CMA determine their water charges in the future.
- The theory provided during the training course is a tool that CMA officials can use to better communicate to their customers on how the water charge is set.
- As the 2022 Raw Water Pricing Strategy could potentially be implemented, the course will empower CMA officials on how their water business will be amended (i.e. from both technical and finance perspective)
- Module 6 of the training course looks at how CMAs can use water charges to have projects that require large capital (e.g. rehabilitation of EI) without huge adjustment of water charges and it is believed participants from both catchments saw this as a powerful tool for CMAs.

5.2 Recommendations

5.2.1 Future implementation of the course

The course feedback received from participants was extremely positive, and this coupled with the fact that all participants returned on Day 2 of each course, and the rich learning as summarised in section 4.4 clearly indicates that this course is a highly useful and important initiative that should be continued through (1) offering it in other catchments and (2) institutionalising it to be repeated as needed.

The nature of the training course provides a safe space where participants from different organisations can learn from each other through having robust discussions. We recommend the course to be offered physically, as the learning process of the course amongst participants will be lost when offered online. This will also be in line with the SLKMM strategy, in enabling ongoing social learnings amongst participants.

The presence of DWS staff on both days, and their availability and willingness to engage difficult questions and also take on board learning themselves, was a key success factor of the course. As a

result, we recommend that DWS and WRC have a formal agreement on how DWS staff can be involved when offering the course to other catchments.

5.2.2 Future updates of content

The training course was developed when 2007 Raw Water Pricing Strategy was implemented and 2022 Raw Water Pricing Strategy still going through approval process. It is believed that the training course should have same 6 modules until CMAs apply the 2022 Raw Water Pricing Strategy. When the 2022 Raw Water Pricing Strategy is being implemented, some modules will have to be amended. We therefore propose the following modules:

1. Background on the water value chain
2. Activities (including public interest function) and budgeting for WRM done by CMAs
3. Mechanisms for funding Ecological Infrastructure
4. Importance of Accurate budgeting for CMAs.

In addition, once the DWS has finalised the WDCS, we recommend that a Module of the WDCS be developed and incorporated.

Finally, we anticipate that a continuous learning process will evolve as the course is offered, and that the course content be updated and refreshed as needed.

5.2.3 Recommendation on Accreditation of the Course

This training course may benefit from accreditation. A note on duration: the course was designed as a 2-day course, a time-frame that most participants preferred. The course will therefore be a short learning programme. Short courses do not provide formal qualifications; however, they provide skills and knowledge in a particular sector. They are designed to be shorter than a traditional degree programme and cover a specific field of knowledge. According to the South African Qualifications Authority (saqa.org.za), short learning programmes are not registered on the National Qualifications Framework (NQF); hence they do not have NQF levels.

Short learning programmes result in participants receiving Continuing Professional Development (CPD) points for their professional registrations (most notably in this case SACNASP) and WISA or tertiary institutions may both provide these short learning programmes.

The project team consulted with both Tshwane University of Technology and WISA to understand the process of accrediting the course and both these institutions have indicated in principle that they are able to accredit and offer the course.

The next steps in this regard would be to:

1. The WRC and SANBI, as the owners of the course content, need to enter into a suitable agreement with the relevant accreditation institutions.
2. The WRC and SANBI needs to identify suitable course facilitators, i.e. person(s) who have a deep knowledge of the course content, combined with the ability to facilitate and direct discussions in a manner that optimises the learning process.
3. In conjunction with the relevant accreditation institutions and the relevant course facilitators, develop an implementation plan, including determining course frequency and dates, course budgets and implementation agreements.

6 REFERENCES

Berg-Olifants Catchment Management Agency.2021. Zero Budget.

Breede-Gouritz .2022/23. Proposed Charges for the Breede Gouritz Catchment management Agency.

Breede-Gouritz Catchment Management Agency.2021. Zero Budget.

Breede-Gouritz. 2020/2021. Annual performance plan report.

DWAF. 1997.Reblic of South Africa. NATIONAL Service Act (Act No 108 of 1997). Government gazette No: 18522.

DWAF. 1998. Republic of South Africa. National Water Act. Act No 36 of 1998. Government gazette no

DWS. 2007. Pricing Strategy for Raw Water. retrieved from DWAF: https//www.dwaf.gov.za/docoments/Notices/RawWaterpricestrst1jul05full.pfd.

DWS. 2021. Business case for the Pongola Catchment Management Agency.

Eales., K. 2011. Water Services in South Africa 1994-2009. Retrieved from research gate: https//www.researchgate.net/publication/226281922.

Eberhard, R. 1998. Supply pricing on urban water in South Africa. WRC report No; 678/1/99.

Eberhard, R. 2000. Administered priced water. National Treasury report.

European Environmental Agency. 2013. Assessment of cost recovery through water pricing. Technical Report No: 16/2013. ISSN: 1725-2237.

Kotze, C., Bhagwan, J., & Dini, J. 2020. A review on sustainable water pricing and tariff in south Africa. WRC report.

Lotz-Sisitka, H., Cockburn, J., Rosenberg, E., le Roux, L., Zwinkels, M., Mbanjwa, W., Ward, M., Brownell, F., Sithole, N., & Makhaya, Z. 2020. Social Learning, Knowledge Management and Mediation strategy. WRC Project K5-298: Supporting Social Learning and Knowledge Management within the Ecological Infrastructure for water security project.

National Treasury. 2005. Treasury Regulations for departments, trading entities, constitutional institutions and public entities. Issued in terms of the Public Finance Management Act, 19.

Overberg Water. 2019/20. Annual Report. Retrieved online from www.overberg.co.za

Pearce, D., Crafford, J., Burge, A., Pedzisa, T., Mitchel, S. 2014. An analysis of water pricing instruments governed by the DWA water pricing strategy and its potential for generating revenue for CMAs. WRC report No: 2078/1/13. ISBN: 978-1-4312-0518-9

Pegram, G., & Mazibuko, G. 2003. Evaluation of the role of water user associations in water management in South Africa. WRC report No: K5/1140. ISBN: 1-86845-982-9.

Pongola-uMzimkhulu Catchment Management Agency. 2021. Zero Budget.

Prime Africa, 2014 - WRC Report No. 2078/1/13 ISBN 978-1-4312-0518-9

7 APPENDIX A: DEVELOPMENT OF TRAINING NEEDS ASSESSMENT FOR WATER PRICING PARTICIPATORY TRAINING COURSE

7.1 Overview

The purpose of the training needs assessment is to answer questions why, who, how, what, and when (Kotze et al., 2019)

- Why: Objective of the training course (why is this training being done and how will all participants benefit from these training?)
- Who: the target group should learn from the training?
- How: the training will be performed after the development of the training manual and positively contribute to the improvement of knowledge and skills as required
- What: Identify the best way to perform the required training; and
- When: will training take place. The best timing for training to be performed should be identified.

7.2 Process for Identifying Stakeholders.

The process for identifying stakeholders was twofold, with identifying staff involved in implementing or setting water charges and researchers in the field, and stakeholders who are customers of the WRMC and NGOs.

The identified organisations therefore included:

- DWS: Economic regulation
- DWS: Water trading Entity
- TCTA
- DFFE: Working for wetlands
- National Treasury
- Breede Gouritz CMA
- Berg-Olifants Proto-CMA
- Pongola-uMzimkhulu Proto-CMA
- Municipalities
- SANBI
- Rhodes University
- PDG
- WRC
- WWF
- WUAs in all CMAs
- Major industries in all CMAs

- Other NGOs

7.3 Process for Developing Questionnaire

The development of the questionnaire was designed to understand status quo/capacity /gaps and challenges facing policy makers, implementing agencies, researchers in the field and customers of WRMC.

7.3.1 Questionnaire Layout

7.3.1.1 General questions

- What is your general understanding of how water charges is set across the water value chain?
- Do you believe we have the right tools to set the right water charges? (Enabling legislation)
- Do you think the water charges are currently set low or high across the value chain?
- What integration process would you like to see with all stakeholders across the water value chain in order to enable further learning networks?

7.3.1.2 Implementing agencies (CMAs, WSAs, and Water boards)

- Is the current water charge enabling cost recovery?
- Can you provide cost items that lead to your water pricing?
- What is your understanding on water charges as an incentive?
- What is your understanding of how the right water charges can improve water resource management?
- What are the current technical issues the institution is facing regarding setting the right water charge?
- How does the technical team influence/guide the finance team in setting water charges?
- Does the institution do their water balances?
- What challenges do you face during the public consultative process?
- How does DWS, NT, and COGTA policies enable and disable the institution in setting their water charges?
- With the government struggling financially, how is the institution managing cash flow?
- To what extent does non-payment affect setting water charges?
- What are you not clear about in this water sector that you think this training course can assist you with?
- To what extent does institutional arrangements affect setting the water charge right?

7.3.1.3 Additional for CMAs

- Does the institution understand the value of ecosystem services provided by the catchment and does that affect water pricing?
- How does the CMA cover the cost for EI rehabilitation?
- How does the CMA deal with agricultural subsidies?

7.3.1.4 Government (DWS, National Treasury)

- What is the integration process between Economic regulation and water trading entities within DWS?
- How do you think the recent WRC Raw Water Pricing Strategy projects will assist water service providers?
- What is the process of grant application to cover indigent HH and agricultural activities? (NT)
- What are you not clear about in this water sector that you think this training course can assist you with?

7.3.1.5 Water Use Associations/Industries

- What are your general grievances you have towards the public participation process, and do you think they are being considered?
- Do you think the current subsidy structure is sufficient?
- What are you not clear about in this water sector that you think this training course can assist you with?

7.4 Interview Process

This section reports on the interview process that took place in order to report on the training needs, which gives guidance to the training content of water pricing.

The staff from the identified organisations were contacted through an email and/or phone call. The background information and the questionnaire were sent to the staff prior to the meeting. The meetings thus far were conducted online. Table 7-1 shows staff contacted.

7.4.1 UEIP Workshop

Project team attended uMngeni Ecological Infrastructure Partnership (UEIP) workshop held on the 10-11 May 2022 in Pietermaritzburg as shown in Figure 7-1. UEIP is an on-going partnership with different stakeholders within uMngeni demonstration catchment and the partnership purpose is to find ways of integrating EI solutions to support built infrastructure investments in addressing challenges of water security in the catchment. The purpose of attending the workshop was to find out activities relating to EI and to identify relevant stakeholders from uMngeni catchment.

The project team managed to have discussion with staff from Pongola-Umzimkhulu Proto-CMA, and South African Sugar association. The project member also managed to identify the right staff from: Msunduzi LM, eThekwini MM, uMgungundlovu DM, WWF, provincial DFFE.

Table 7-1: Staff contacted and interviewed contracted

Institution	Directorate	Staff	Contacted	Responded	Interviewed	Interview date
DWS	Economic regulation	Staff 1	✓	✓	✓	23 March 2022
		Staff 2	✓	✓	✓	23 March 2022
	Water Trading Entity	Staff 1	✓			
		Staff 2	✓			
National Treasury	Water sector	Staff 1	✓	✓	✓	12 April 2022
		Staff 2	✓	✓	✓	12 April 2022
DFFE		Staff 1	✓	✓	✓	23 May 2022
		Staff 2	✓	✓	✓	23 May 2022
BGCMA		Staff 1	✓	✓	✓	25 March 2022
		Staff 2	✓	✓	✓	21 April 2022
Berg-Olifants		Staff 1	✓	✓	✓	02 August 2022
Pongola uMzimkhulu CMA		Staff 1	✓			13 June 2022
Umgeni Water		Staff 1	✓	✓	✓	20 May 2022

Institution	Directorate	Staff	Contacted	Responded	Interviewed	Interview date
		Staff 2	✓	✓	✓	20 May 2022
eThekwini MM		Staff 1	✓	✓		
Msunduzi LM		Staff 1	✓			
uMgungundlovu DM		Staff 1	✓			
SANBI	Great uMngeni coordinator	Staff 1	✓	✓	✓	06 April 2022
PDG	WRC: Public interest function project	Staff 1	✓	✓	✓	07 April 2022
WRC		Staff 1	✓	✓	✓	07 April 2022
Rhodes University	WRC: EI Training course	Staff 1	✓	✓	✓	28 April 2022
Koekedouw IB		Staff 1	✓	✓	✓	12 July 2022

Figure 7-1: UEIP workshop held on 10 and11 May 2022 in Pietermaritzburg

8 APPENDIX B: PARTICIPATORY WATER PRICING TRAINING COURSE CONTENT

8.1 Module 1: Policy and Regulatory Background

8.1.1 Objective of the module

Address regulations that provide mechanisms for setting water charges. The sections are:

- Water value chain and its implementing agencies
- Policies that enable the value-chain water charges

Purpose of module:

- To discuss the water value chain in SA
- To obtain insight into the mandate and functions of all implementing agencies across the value chain, with a focus on the role of CMAs
- To identify and discuss the variety of all water use charges across the value chain

Key messages:

- Water value chain has three tiers
- DWS, water boards and WSA are major role players in the value chain
- There are numerous charges across the water value chain
- Raw Water Pricing Strategy and norms and standards guide charge setting processes

Participative methodology:

1. Presentation on (i) water value chain; (ii) implementing agencies; and (iii) water use charges
2. 15 minutes discussion on water value chain
3. Zoom Quiz with 3 questions that will test the participants' knowledge on the key messages
4. Discussion on quiz results

8.1.2 Role players in the water value chain

Key learning points: In this section, the key learning points are to understand water value chain and their role players as mandated by National Water Act.

The following organisations or role players are involved in water services in South Africa as shown in Figure 8-1 and

Table *8-1*:

- Tier 1: **Department of Water and Sanitation** (DWS) has the mandate to protect, use, develop, conserve, manage and control the water resources of South Africa in an integrated manner. They are the custodians of the water resources, responsible for policy making and regulation of the resource.
- Tier 1**: Catchment Management Agencies** (CMAs) have been established at catchment level and are responsible for water resource planning and management (DWS performs the function for those areas without a CMA). CMAs issues licenses for water use and discharges and collect the abstraction and discharge fees.
- Tier 2**: Water Boards** (government-owned and regulated by DWS and National Treasury) provide water services (bulk potable and bulk wastewater) to other water service institutions within their respective service areas.
- Tier 3: **Water Service Authorities** (WSAs) or Municipalities are responsible for the provision of water services within their appointed areas and includes metropolitan municipalities, many district municipalities and authorised local municipalities. WSAs may contract out service provision or form joint ventures with other external water service providers.
- Tier 3: **Water Service Providers** (WSPs) have the role of operation provision of water services (bulk or retail service) in accordance with the constitution, National Water Services Act and the by-laws of the WSA and any specific conditions set by the WSA in a contract.
- **Community-Based Organisations** run some small water schemes in rural areas of South Africa.

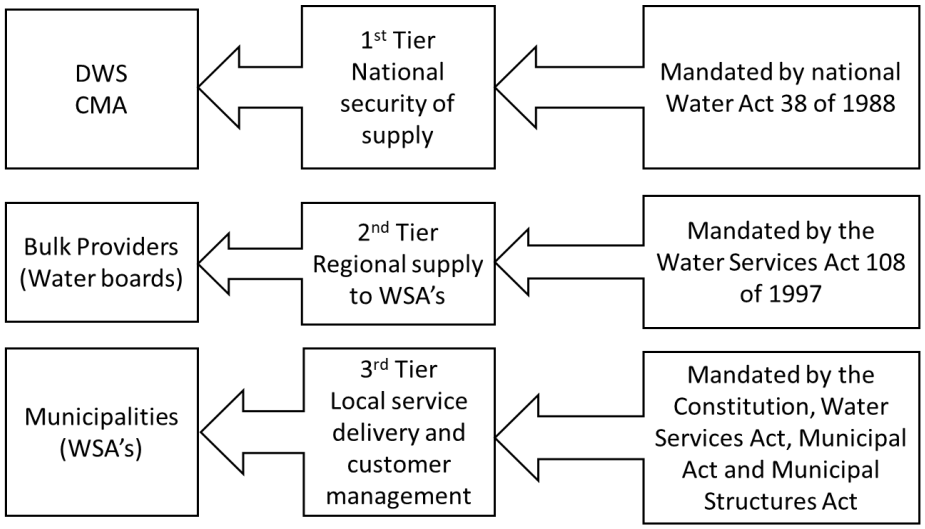

Figure 8-1: key role players involved in the water value chain of South Africa

Table 8-1: Organisational arrangements by water supply function

Agency Water supply function	DWS as regulator	DWS as operator	CMA	WSA	WSP
Regulation					
Water management					
Resource pricing					
Abstraction					
Treatment and transmission					
Distribution					

8.1.3 Water charges across the water value chain

Key learning points: In this section, the key learning points are to understand water charges across the value chain, and their implementing agencies.

Policies

Tier 1: Raw Water Pricing strategy (2007) and updated 2022 strategy

Tier 2 & 3: norms and standards in respect of charges for water service authorities and bulk water service providers (2002)

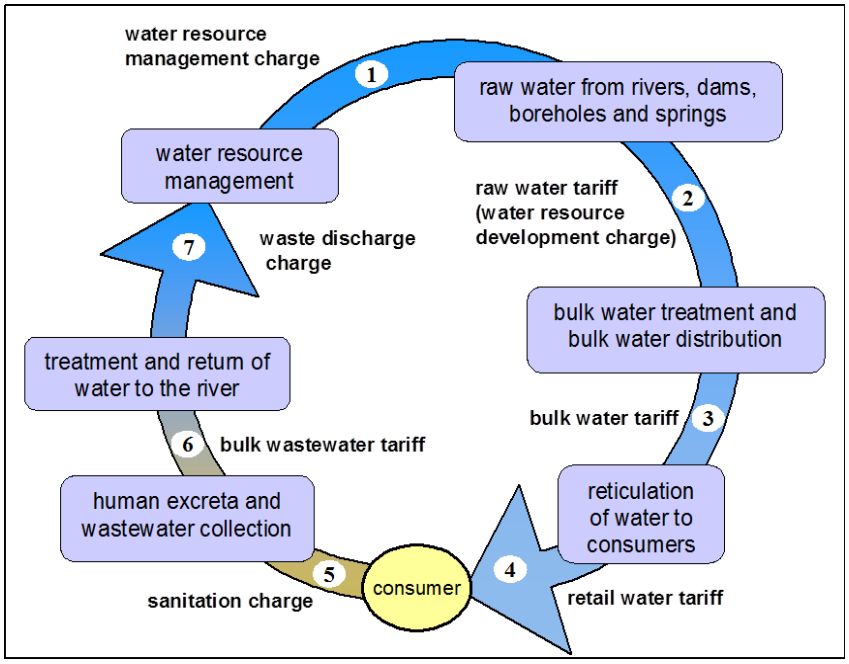

Table 8-2: Water charges across water value chain

8.1.4 Tier 1: Raw water charges

These administered prices are applicable to all water users and comprises the basic input cost of fresh water supply. These administered prices are relevant for services that include the use of raw water from

the water resource by bulk distributors, large users and irrigators. This may also include a water quality pricing component for dealing with pollution.

8.1.4.1 Water Resource Management Charge

Charge that covers activities that are required to protect, use, conserve, manage and control the water resources and manage water quality located within WMAs, including securing water-related ecosystem services.

The charge is set by CMA or Proto-CMA and regulated by DWS.

8.1.4.2 Water resource development charge

Function: Planning, design, construction, operation, maintenance, refurbishment and betterment (improvement) of Government water schemes.

Depreciation component for the purposes of funding refurbishment cost

Return on assets (ROA) component for the purposes of funding development and betterment of waterworks.

Operations and Maintenance (O&M) consists of Direct and Indirect costs and shall be recovered on a scheme or system basis.

Capital unit charge (TCTA) is set to ensure that the debt/loan is fully paid by the end user within a reasonable time period (not longer than the life of the asset), after considering affordability and future augmentation of the scheme.

The charge is set and regulated by DWS.

8.1.4.3 Waste discharge charge

Function: Instrument for recovering costs of mitigation water quality problems. Therefore, when Resource Quality Objectives (RQOs) are exceeded or are threatened, the charge may be deployed.

The charge is set and regulated by DWS. However, charge is not yet active and being piloted in selected catchments.

8.1.5 Tier 2: Bulk water charges

These administered prices are applicable to all water users who are customers of bulk water service supply entities. These prices include the cost resulting from raw water charges. These administered prices are relevant for intermediary water ser-vices supplied in bulk (often by water boards)

Prices for bulk water provided by water boards are set by water boards themselves.

A bulk water services provider must consider the following, before determining the charges (DWS, 2015):

- Determine the full costs on a sustainable basis

- Estimate the future water consumption
- Estimate the unit cost of supplying
- Propose structure of water charges that would provide the revenue required
- Consult with its WSAs on its proposed bulk water charges
- Submit the documents, together with proposals on how any written comments received from WSAs SALGA, NT, or other relevant stakeholders were considered, to DWS for consideration.

8.1.6 Tier 3: Water services charges

These administered prices are applicable to all water users who are customers of water service supply entities (mostly municipalities). These prices include the cost resulting from raw water charges and bulk water charges. These administered prices are relevant for water provision and sanitation services to households and other urban and domestic users (usually via a municipality).

8.1.6.1 Retail water charge

Policy: norms and standards in respect of charges for water service authorities and bulk water service providers (2002)

Water charges for households Includes the bulk water and wastewater charges and recovers the retail costs

Charges set and regulated by water service authority.

8.1.6.2 Sanitation Charge

Policy: norms and standards in respect of charges for water service authorities and bulk water service providers (2002)

Wastewater charges calculated on the volumetric usage of the service to recovers the retail costs.

Charges set and regulated by water service authority.

8.2 Module 2: Functions and Budget for CMAs

8.2.1 Objective of the module

4. To discuss the structure of CMA budgets
5. To obtain insights into functions WRM performed by CMAs
6. To identify typical budget per cost item

Key messages:

• CMAs needs to set a budget for all their 11 WRM functions

- The budget includes salaries, goods and services

Participative methodology:

- 15 min discussion on budget of CMAs
- Presentation on CMA budget for 25 minutes
- 15 minutes discussion

4.4.2 The CMA Mandate

Key learning points: In this section, the key learning points are to understand how CMAs have a mandate to perform functions of water resource management in a catchment.

CMAs are primarily responsible for water resources management in their WMA. Thus, the purpose of CMAs is the delegation of water resource management to a catchment level, within the framework of the National Water Resource Strategy (DWS, 2004) of the Department. The CMA achieves this through developing and implementing a Catchment Management Strategy (CMS). The CMS provides the framework for management of water resources in a WMA.

The policy on establishment and development of CMAs has been based on the concepts of three broad phases of development (DWS, 2012), namely:

- Developing relationships and legitimacy: taking on the CMA initial and early water use management functions as represented by the Proto-CMA in the first two years
- Building capacity and consolidation: taking on information, water resource monitoring and other implementation functions (over the next two years)
- Becoming fully functional: taking on the responsibility authority and other institutional oversight functions (over the following or more years)

The three phases of CMA development are the basis of 5-years functional evolution and costing of CMA development.

Section 84 of the NWA gives the CMA full authority to raise funds for the purpose of exercising its powers and duties from various sources. The Act states that “a CMA must be funded by”:

- Parliamentary appropriation
- Water use charges and

Money obtained from any other lawful source for the purpose of exercising its powers and carrying out its duties in terms of the NWA (1998).

The table below shows a detailed description of how a CMA derives their budgets as a result of the activities that they have to perform to fulfil their mandates. The table shows activities performed per

function and employees they have to hire to perform those activities. Some activities require outsourcing contractors such as alien invasive clearing activities and water weed control. The CMA need to budget for goods, assets and goods and services per CMA function. The table shows that total cost of CMA 1 to perform its functions is approx. R83 million per annum.

Table 8-3: Water Resource Management Activities/ CMA functions and budget

	Functions	Abstraction activities	Waste discharge activities	Budget
1	Catchment management strategy and Water resources planning	Resource studies, investigations, and integrated strategy development		19 823 560
		Allocation plans	Water quality management plan	
2	Resource directed measures	Reserve determination, Classification, & Resource Quality Objectives (RQO)		1 962 509
3	Water use authorisation	Registration and verification of water use		
		-Abstraction & stream flow reduction activities -Dam safety regulation	Waste discharge activities Authorization	
4	Control and enforcement of water use	Control Monitoring and enforcement of Water Use		8 081 636
		-Abstraction & stream flow reduction activities -Dam safety control (private dams)	Waste discharge and marine outfall licensing	
5	Disaster management	Flood & drought management	Pollution incident planning and response (management)	
6	Water resources management programmes	Integrated water resources programmes		7 339 231
		Abstraction programmes Water conservation & demand management	Waste discharge programmes (e.g. cleaner technology, dense settlements, waste discharge strategies)	
7	Water related institutional development	Stakeholder participation, empowerment, institutional development & coordination of activities		4 686 979
8	Water weed control	E.g. hyacinth		11 250 000

	Functions	Abstraction activities	Waste discharge activities	Budget
9	Terrestrial Invasive Plant (IAP)	Control of invasive plants with acknowledged negative impacts on water resource, e.g. riparian zones, mountain catchment areas, wetlands and in areas where there could be impact on aquifers.		
10	Geo-hydrology and hydrology	-Groundwater and surface water monitoring -Compiling of maps and yield information -Extending and maintaining the hydrological database and compilation of information Water quality monitoring and compilation of information		4 550 000
11	Administration & Overheads	Administrative, and overheads for regional office or CMA		8 536 961
				83 295 151

8.3 Module 3: Setting the Water Charges

8.3.1 Module overview

Determine how a CMA derives water charges per user based on their budget.

Purpose of module:

- To determine how CMA derive WRMC
- To discuss and determine how CMAs determine charge per water use sector
- To discuss how CMAs deal with the shortfall

Key messages:

- To determine how CMA derive WRMC
- To discuss and determine how CMAs determine charge per water use sector
- To discuss how CMAs deal with the shortfall

Participative methodology:

- 15 minutes group exercise to calculate water charge per water use sector
- Presentation on calculation of WRMC
- 15 minutes discussion CMA's shortfall budget

8.3.2 Water charge determination

Key learning points: In this section, the key learning points are to determine how CMA derive their WRMC and how they take into consideration subsidy for irrigation and forestry sectors.

WRMC is calculated based on the volume of registered water users and *Table 8-4* shows that in the example CMA (CMA 1), agriculture consume approx. 800 million m^3/a and domestic /industrial water users is approx. 540 million m^3/a, followed by forestry, with only 4.2 million m^3/a. Total cost of CMA 1 is R80 295 151 and based on the total volumes of registered water users of CMA 1, unit cost / m^3 is calculated below:

$$Unit\ cost = volume/total\ cost$$

$$Unit\ cost\ = \frac{R\ 83\ 295\ 151}{1\ 347\ 118\ 003\ kl}$$

$$= 6.17\ cents/kl$$

The table below shows the charges proposed for CMA 1 based on capping policy for agriculture and forestry. This shows that based on the capping policy, the agricultural sector is subsidised by 56% which results in the sector being subsidised by approx. R27 million.

Table 8-4: Volume and charge per water user for CMA1

Water user	Volume (m^3)	Charges according to capping policy (cents/kl)	Amount subsidized (R)
Domestic/Industrial	542 206 142	5.96	0
Agriculture	800 662 785	2.6	27 million
Forestry	4 249 076	1.2	202 thousand
	1 347 118 003		

8.4 Module 4: Public Interest function for WRMC

8.4.1 Module overview

How the revision of Raw Water Pricing Strategy will affect WRMC

The module will cover the following content:

1. Public interest function of WRM activities
2. Agriculture and Forestry subsidy.

Purpose of module:

- To discuss how 2022 Raw Water Pricing Strategy affects WRM functions: Public interest function
- To discuss how the removal capping policy will be implemented

Key messages:

- Each WRM has a percentage attributed to public interest function

- CMAs need to calculate WRMC based on the percentage of public interest function
- Capping policy on WRMC for commercial irrigation and forestry sectors will be removed and customers will pay full cost of WRM

Participative methodology:

1. Presentation on public interest functions of WRM activities
2. Group exercise on determining cost to be covered by water users
3. 15 minutes discussion on removal of capping policy

8.4.2 Public interest function

Key learning points: In this section, the key learning points are to understand what portion of WRM activities should be paid by the customers and what portion should come from grants.

Any water resource management function/activity that only benefits or disbenefits the users should be funded from the user charges. Public interest functions/activities, or the portion of a function/activity that is in the public interest, should be funded from the fiscus. If a function or activity affects non-users, as well as users, there is an argument made for this function having a public interest component. In this case there will be a portion funded from the fiscus, and a portion funded from user charges. Each of these functions is made up of several activities.

These activities, and the respective responsibilities between CMAs/proto-CMAs, the DWS Regional Offices and the DWS Head Office, have been agreed to by the relevant stakeholders. Table 8-5 below describes each of the 11 CMA functions, and their associated activities, as they relate to the public interest. The process above was applied to the CMA functions, whereby the activities within each of the functions were investigated to determine who the beneficiaries of the activity are, the extent to which these beneficiaries can and should be charged for the benefit accrued, and how the different interests can be weighed against one another to determine the proportion of the cost which should be funded from the fiscus as it is in the public interest.

Table 8-5: Public interest components of CMA functions (Walsh et al., 2020)

No	Function	Activities	Beneficia-ries	Classifica-tion	Rationale	Func-tion % public
1	**Catchment management strategy and Water resources planning**	Resource studies, investigations and integrated strategy development at catchment level	All	Even mix	The public at large benefits from efficient water resource management planning. Customers experience additional benefits from efficient planning through	67%
		Water allocation administration	All	Public		

No	Function	Activities	Beneficia-ries	Classifica-tion	Rationale	Func-tion % public
		Water quality management plan	All	Even mix	improved water quality and ensured water resource availability.	
2	**Water related institutional Development (Stakeholder management empower-ment)**	Stakeholder participation, empowerment, institutional development & coordination of activities	All	Mostly private	Customers will benefit from involvement in the stakeholder participation process. There is a public interest in expanding the institutional development to non-customers who are affected by the activities of the CMA.	20%
		Establishment and regulation of water management institutions (e.g. WUAs)	Customers	Private		
		Stakeholder consultations	Customers	Private		
		Capacity and Empowerment of stakeholders	All	Mostly private		
3	**Disaster management /Pollution control and emergency incidents**	Planning and preventative management of disaster including risk monitoring (management)	All	Mostly private	This function is largely to do with the planning for disaster management and pollution control. The CMA participates in municipal processes as the representative of the customers. The municipality is responsible for representing other interests, including those of the Schedule 1 users. Therefore, this function is mostly in the private interest.	30%
		Pollution incident planning and response (management)	All	Mostly private		

No	Function	Activities	Beneficia-ries	Classifica-tion	Rationale	Func-tion % public
4	**Maintenance and restoration of ecosystems to improve water resources**	Adopting of rivers by doing the following activities: Removal of solid waste in and around the river. Invasive plants removal on the river banks and within the river. Identify sources of pollution and other impacts to the river like soil erosion; develop interventions to curb further pollution and degradation of rivers. Monitoring (taking samples, in-situ monitoring of water quality, mini SASS, visual assessments) of the rivers. Stabilization and restoration of river banks by vegetating indigenous trees. Rehabilitation of the eroded river banks.	All	Mostly public	Public at large will benefit from improved ecosystem health. Customers benefit additionally in the form of improved water quality.	70%
5	**Water use authorization**	Water use authorization [Registration of water use (Include Validation and verification of registered water use)]	Customers	Private	Public at large benefits from the economically and socially efficient allocation of water. Customers benefit directly from their water use allocation and should pay for this benefit.	0%
		Maintenance of water management area register of water use	Customers	Private		
		Revenue management with the following charges set, consult and collect WRM charges in the water management area	Customers	Private		

No	Function	Activities	Beneficia-ries	Classifica-tion	Rationale	Func-tion % public
		aligned to the pricing strategy				
		Abstraction & stream flow reduction activities authorization	Customers	Private		
		Waste discharge activities authorization	Customers	Private		
6	**Geo-hydrology and hydrology**	Groundwater and surface water and eco system (quality) monitoring in respective catchment areas	Customers	Mostly private	This is the baseline for monitoring and enforcement, related to water quality and water resource availability. This benefits the public at large. Customers benefit from improved data availability for water resource management activities.	30%
		Maintaining the geo-hydrological database & compilation of information in respective catchment areas	Customers	Mostly private		
7	**Resource directed measures**	Implement programmes to monitor Resource Quality Objectives (RQOs)	Customers	Private	Customers benefit from the improved water quality and should pay for the regulatory and operational activities associated with the management of their own water abstraction.	0%
		Implement source-directed controls to achieve resource quality objectives	Customers	Private		
		Report against the achievement of the Class and RQOs	Customers	Private		
		Report on the water balance per catchment (i.e. water available for allocation after consideration of ecological requirements)	Customers	Private		
8	**Water resources**	Integrated Water resources programmes	All	Public	Design, management and implementation of water	53%

No	Function	Activities	Beneficia-ries	Classifica-tion	Rationale	Func-tion % public
	management programmes	Implementing of Water management strategies (e.g. Water conservation and demand management)	All	Mostly private	resource management programmes benefits public at large, international obligations and the ecological reserve. Customers benefit additionally from improved water quality and availability and should pay for a portion of the benefit.	
		Implementing of Water management strategies (e.g. cleaner technology, dense settlements, waste discharge strategies)	All	Mostly private		
9	**Control and enforcement of water use**	Compliance Promotion and audit sampling (users discharge)	Customers	Private	Public at large benefits from investigations of water crimes occurring in the catchment. Using the polluter-pays principle, the customers should pay for the regulatory functions associated with monitoring their activities.	0%
		Monitoring of water users (per sector: public institutions, mining, industry, agriculture and dam owners)	Customers	Private		
		Enforcement of Water Use (e.g. enforcing meter installations, suspending entitlements, enforcing licence conditions)	Customers	Private		
		To conduct investigations of water crimes are conducted in accordance with the National Water Act and other relevant legislations.	Customers	Private		
		Implementation of Strategies, SP's tools and guidelines	Customers	Private		
		Compilation, serve and implement administrative notices	Customers	Private		

No	Function	Activities	Beneficia-ries	Classifica-tion	Rationale	Func-tion % public
		Abstraction & stream flow reduction activities control	Customers	Private		
		Waste discharge control	Customers	Private		
		Classification of dams	Customers	Private		
10	**Water weed control**	Aquatic weeds control	All	Mostly public	Public at large will benefit from improved ecosystem health. Customers benefit additionally in the form of improved water quality.	70%
11	**Administrati on & Overheads**	Administration& overheads for regional office or CMA	All	Mostly private	The costs of the public interest are already incorporated into the other 10 functions (including staff costs allocated to these functions), so this function is about the management of the institution to benefit customers (billing, management, etc.) so is mostly in the private interest. The small public interest component is to ensure the sustainability of the overhead component of the CMA. By ensuring that the CMA is reliant on the tariff revenue, it encourages the CMA to bill and collect revenue.	30%

8.4.3 Agriculture and Forestry subsidy

Key learning points: In this section, the key learning points are to understand how irrigation and SFRA sectors are currently being subsidised and how the 2022 Raw Water Pricing Strategy talks about full cost recovery from these sectors.

Maximum (capping) values are determined on the basis of historical, socio-economic and other considerations and they are supported by the state subsidies as shown in Table 8-6. In the current Raw Water Pricing Strategy, various water-use sectors receive blanket subsidization. The purpose of such a large subsidy has not been made clear and as a result its level of success or failure in achieving its objective cannot be measured.

Table 8-6: Rebates and Subsidies for Agriculture and Forestry (DWS, 2007)

SECTOR	SUB SECTOR	PRICING IMPLICATION
FORESTRY	Commercial forestry	WRMC is capped at R10 per hectare plus producer price index rate (%) in April of each year, with 2003-03 financial year as base year.
	Resource poor foresters	Resource poor foresters with the land equal to or less than ten hectares under cultivation will be exempt from the WRMC charge
AGRICULTURE	Irrigation sector	WRMC will be capped in over 1.5 cent per m^3 plus producer price index rate (%) in April of each year, with 2007-08 as base year
	Resource poor farmers	The WRMC will be phased in over 5 years, from the date of registration of water use, through fiscal subsidy of amounts not recovered from the beneficiaries

The role of supporting resource poor farmers is primarily that of the Department of Agriculture, Land Reform and Rural Development. This Department has a policy on Land Redistribution for Agricultural Development (2001). This policy appears to focus on the capital cost of obtaining the land and does not explicitly state that it will support the utility costs, such as the cost of water and electricity.

The approach to the capping of charges for agricultural water use and the duration over which charges for emerging farmers should be confirmed in consultation with the Department responsible for Agriculture. It is unlikely that full cost recovery through water use charges will be affordable to the agricultural sector in the short term.

8.5 Module 5: Mechanisms for Funding Ecological Infrastructure Rehabilitation/Restoration

8.5.1 Module Overview

The objective of the module is to determine how revised raw water pricing strategy expanded EI rehabilitation activity; current funding of EI rehabilitation; and innovative ways to fund EI activities.

Purpose of module:

- To discuss activities relating to ecological infrastructure rehabilitation/restoration function of WRM
- To discuss how DFFE and CMAs will work together to perform this function
- To learn about current initiatives relating to performing this function
- Innovative ways to fund these activities

Key messages:

- WRM function: terrestrial alien invasive plants has expanded to maintenance and restoration of ecosystems to improve water resources
- EI rehabilitation require innovative ways of funding

Participative methodology:

1. Presentation on benefits of EI rehabilitation
2. 3 videos on EI rehabilitation initiatives
3. 20 minutes on discussion of funding mechanisms

8.5.2 Background on ecological infrastructure

Naturally functioning ecosystems that deliver valuable services to people (referred to as ecological infrastructure) play an important role in the delivery of services. Ecological infrastructure plays an especially crucial role in the delivery of water-related services such as water provisioning and purification, water flow regulation and disaster risk regulation amongst others (please see Figure 8-2). In a water scarce country such as South Africa, ecological infrastructure can support the country's development path in a range of ways (DEA, 2014).

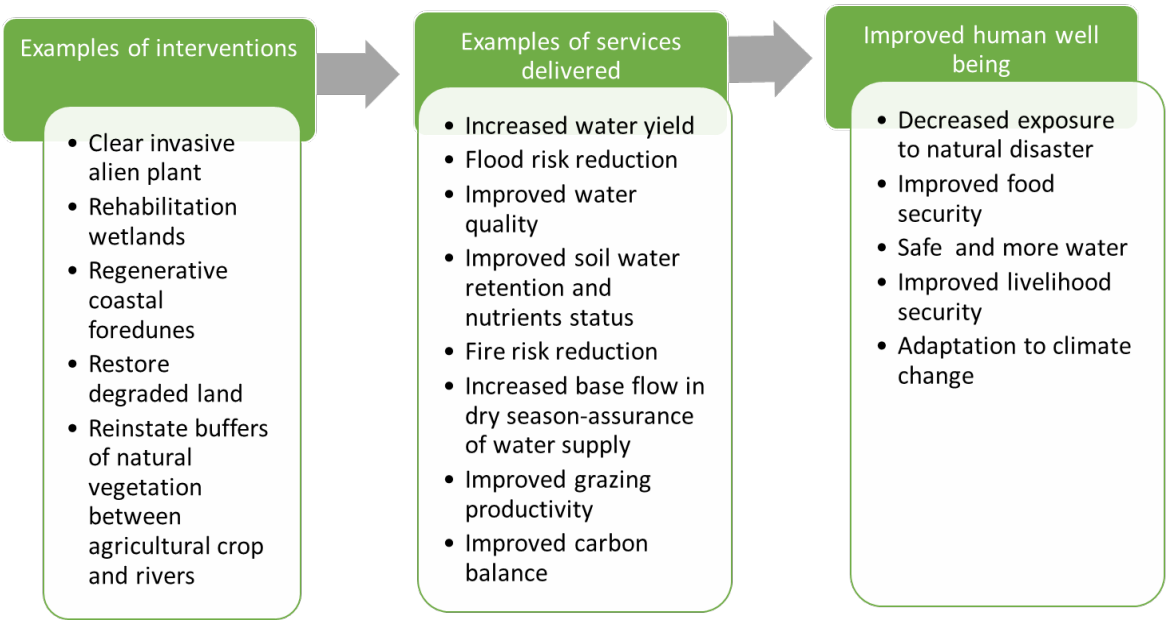

Figure 8-2: Examples of benefits flowing to society from investing in ecological infrastructure

It is insufficient for the maintenance of naturally functioning ecosystems to be seen as the responsibility of conservation authorities and protected areas. The importance of ecological infrastructure in working landscapes and open spaces in contributing to service delivery, the economy and poverty alleviation necessitates that biodiversity and ecosystem services be integrated into all aspects of planning, decision-making and execution of development. This requires management, investment in and maintenance of ecological infrastructure in ways that also support social and economic development objectives.

8.5.3 Opportunities for Financing Ecological Infrastructure

Given the current policy environment, the prevailing financial mechanisms available for investment in ecological infrastructure include development finance and recurrent public finance.

1. Development finance
    - commercial loan finance options,
    - public sector grant finance (e.g. Water Services Infrastructure Grant and Regional Bulk Infrastructure Grants administered by the DWS)

2. Recurrent public finance include:
    - User charges: Raw Water Pricing Strategy provides a supportive framework for ecological infrastructure under the **Water Resource Management Charge** and **Water Resource Development Charge**.
    - Expanded Public Works Programmes (EPWP) in the Environmental and Culture Sector directed at natural resource management, such as Land Care and Working for Water.

Table 8-7: Other opportunities for Financing Ecological Infrastructure

Financing options	Description
Debt for Nature swaps or trades	A type of transaction in which the debt is purchased at a discounted price) and (at least partially) cancelled in exchange for environmental action on the part of the debtor.
Carbon credits	Credits that are equivalent to one tonne of carbon dioxide, can be traded or sold in order to fund projects contributing to carbon sequestration
Wetland offset and banking	Offsets either regulated or voluntary which can be directly offset, traded or banked
Concessions	A right that is granted by the protected area management body to a private operator to undertake an operation (e.g. tourism) inside the protected area or natural site, usually in exchange for a fee
Biodiversity linked loans	Loans designed to encourage businesses to take steps to reduce their own environmental impact by providing them with more

Financing options	Description
	beneficial loan terms if they meet predetermined sustainability targets that are expressly linked to the loan
Environmental taxes and tax rebates	Taxes to control the negative effect of certain activities and products on the environment. Property rate exclusion, which exempts a portion of the land used for nature reserve purposes from paying property rates.
Payments for ecosystem services	Various direct and indirect mechanisms exist where beneficiaries pay for additional value received either through additional water yield, reduced risk levels (these are often difficult to measure)
"Invest in your own property" / "Adopt a spot"	Goodwill investment driven by good practices and suasion programmes
BioCoin	Blockchain technology to leverage biodiversity assets (such as a species in a protected area or the land) and monetize them
Competitions	Various innovative means exist through which to raise funds
Innovative charges (or fines)	Significant scope exist to develop a range of special charges, recovered over a long time period, to fund EI investment activities (Waste Discharge Charge System)
Asset register approach	Developing an asset register with key ecological assets delineated, valued and invested can be an important mechanism through which to enable some of the above mechanisms

8.6 Module 6: The Importance of Accurate Budgeting for CMA Activities and its Linkage to Water Charge Setting

8.6.1 Module Overview

Optimise setting process of water charges for CMAs.

The CMA may use the following process to ensure that there are sufficient funds in order for them to conduct all functional activities needed to fulfil their mandates as a CMA. There are three broad steps to this process as illustrated in the Figure below. These broad steps will be briefly discussed further in the sections that follow in this module.

Purpose of module:

- Discuss how to optimise setting process of water charges for CMAs
- Understand the importance of accurate costing, record keeping and budgeting
- Understand the Discounted Cash Flow (DCF) model, what is input into the model and how it is used to assist setting of water charges
- Understand different revenue sources for proper revenue recovery.

Key message:

By fully understanding CMA revenue, proper planning of revenue recovery can be accomplished

Participative methodology:

- Presentation of process to ensure accurate budgeting for WRMC

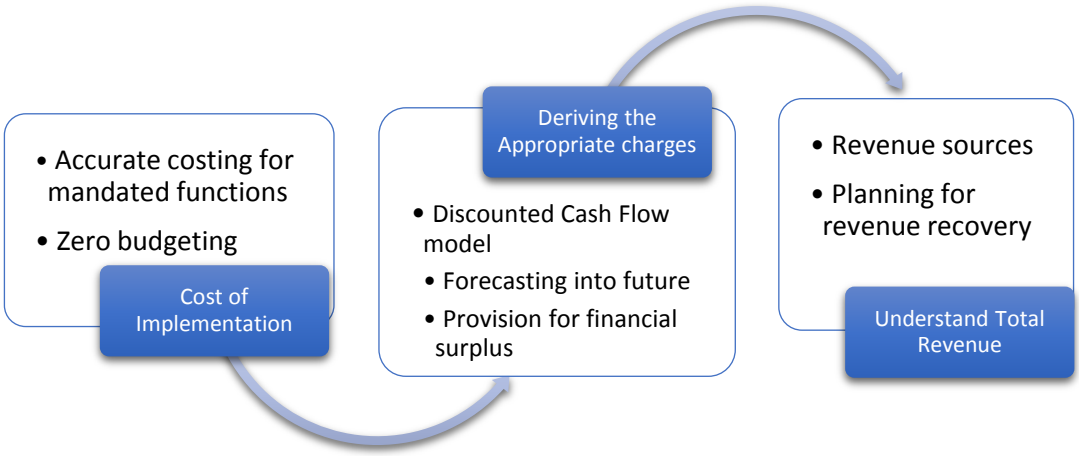

Figure 8-3: The process to ensure accurate budgeting in a CMA

8.6.2 Cost of Implementation

Key learning points: In this section, the key learning points are to understand the importance of accurate costing, record keeping and budgeting.

Without a full and accurate assessment of the costs of executing the CMA mandate, cost recovery will not be possible.

Moreover, to ensure credibility with stakeholders, the costs of implementation needs to be transparent, both in its alignment to CMA mandates, and in terms of efficiency and productivity.

The cost of implementation includes the full costs of the CMA to conduct all its mandated functions. Refer to Module 2 where these functions are described.

Accurate bookkeeping, reporting, and budgeting of all cost items are key to ensure there are sufficient funds to cover all activities and specifically those that are not directly related to salaries or office administration of the CMA. Important costs to be incorporated into the budgets include for example, capital costs provision, depreciation of all assets, costs for ecosystem maintenance and restoration, and others.

The detailed breakdown of a typical CMA budget (zero budget where all expenses are justified for each new period from a zero base), the components thereof and how the budget should be compiled is covered in Module 2.

8.6.3 Deriving the Appropriate Water Charge

Key learning points: In this section, the key learning points are to understand what a Discounted Cash Flow model is, what information and values go into such a model and how it can be used to assist in the process of deriving an appropriate water charges.

A model that may be used to assist in the process of deriving an appropriate water charges to recover costs and one that makes provision for a financial surplus is the Discounted Cash Flow (DCF) model.

The DCF model is a financial model that forecasts the revenues and the costs of the CMA into the future for a set period of time. The DCF model allows the CMA to derive and forecast a structure of water charges that would ensure financial sustainability covering the capital and operating expenses of the CMA. The duration of the forecasting period should be determined on a case by case basis within a CMA. Each CMA would determine their own valid forecast period duration for the DCF model. The basis for determining this forecast period may for example be the specific planning horizons of the CMA. The forecasting period may for example vary from 10 – 30 years, as determined by each CMA.

The DCF is populated with data from the zero budget and investments information of the CMA. The following sections are included in the DCF:

1) All CMA income streams, including revenue collected from charges and grants from various sources

2) Investments or donations

3) All expenses, including capital costs, and fixed and variable operating costs.

The purpose of the DCF is to capture all income and expenses to forecast into the future. Other factors that are taken into account in a DCF include inflation, risk and cost of capital.

Once the DCF model has been developed and DCF analysis has been done, then the water charge can be determined more accurately to ensure that the correct revenue stream is generated for the CMA and that the budget makes provision for a financial surplus for the CMA.

8.6.4 Understanding total revenue

Key learning points: In this section, the key learning points are to understand the different sources of revenue in order to properly plan for revenue recovery.

Understanding the sources of revenue is important and efficient planning processes are needed to ensure that the CMA has sufficient revenue to conduct all its necessary activities. This may include budgeting for a surplus to cover for instance, cash flow requirements, or future investment needs. Other necessary activities or operations such as rehabilitation projects or infrastructure upgrade projects or anything else that may be required to manage the catchment, may also need to be supported by specific revenue streams.

All the revenue sources must be captured. Revenue sources may vary, however, these typically include revenue from:

- grants
- billing system (revenue collected from invoicing) of water charges to the different types of water users within the CMA. These revenues are based on the volumes of water use and the various subsidy regulations for each different type of water user. For details on the water users and user subsidies please refer to Module 1.

By fully understanding the revenue, proper planning of revenue recovery can be accomplished.