Water Quality
Management Series

DEVELOPMENT OF A WASTE DISCHARGE CHARGE SYSTEM

FRAMEWORK DOCUMENT

SECOND EDITION

Department of Water Affairs and Forestry

May 2000

DEVELOPMENT OF A WASTE DISCHARGE CHARGE SYSTEM: FRAMEWORK DOCUMENT

FOREWORD

One of the new approaches to water resource management provided for in the National Water Act, 1998 (Act 36 of 1998) is concerned with the pricing of South Africa's water resources. The Department of Water Affairs and Forestry (DWAF) established a Pricing Strategy for Raw Water Use Charges in 1999, which provides a framework for implementing the charge system for water use. However, water use is defined in the National Water Act not only as taking water from a water resource for usage, but also as any action that may impact on the water resource. Waste discharge charges could therefore be levied for the discharge of waste to and impacts on water resources. In the light of this, the Department of Water Affairs and Forestry initiated a project during January 1999 to develop a Waste Discharge Charge System (WDCS).

The project team responsible for the development of the WDCS consists of two multi-stakeholder committees, namely the Project Steering Committee (PSC) and the Project Task Team (PTT). These committees were established during April and June 1999, respectively. As a first attempt, the two committees developed a Framework Document that describes the legal and technical frameworks for the WDCS, the aims of the system and the guiding principles for the development thereof. The first edition of the Framework Document was published in December 1999, allowing for comment on the principles and approaches adopted in the document.

A Comments Task Team (sub-committee of the PTT) evaluated the comments received and formulated a response to each comment. These were compiled into a Review Document, together with the associated changes made to the Framework Document (Edition 1) and are included as an appendix in this second edition of the Framework Document.

The Framework Document is a dynamic document and will be updated during the process as the WDCS develops, if the need arises, in the light of comments from stakeholders and growing clarity on the charge system.

Mr JLJ van der Westhuizen
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ONTWIKKELING VAN 'N AFVALSTORTING-VORDERINGSISTEEM: RAAMWERK DOKUMENT

VOORWOORD

Een van die nuwe benaderings tot waterhulpbronbestuur waarvoor daar voorsiening gemaak is in die Nasionale Waterwet, 1998 (Wet 36 van 1998), het te make met die waardetoevoeging tot Suid-Afrika se waterhulpbronne. Die Departement van Waterwese en Bosbou (DWWB) het in 1999 'n Prysstrategie vir Rouwatergebruiksvorderings ingestel wat 'n raamwerk voorsien vir die implementering van 'n vorderingsisteem vir watergebruik. Watergebruik is egter nie slegs gedefinieer in die Nasionale Waterwet as die neem van water vanuit 'n waterhulpbron nie, maar ook as enige aksie wat nadelig op 'n waterhulpbron kan inwerk. Afvalstortingvorderings kan dus gehef word vir die storting van afval na, of enige nadelige inwerking op 'n waterhulpbron. In die lig hiervan het die Departement van Waterwese en Bosbou in 1999 'n projek begin om 'n Afvalstortingvorderingsisteem (ASVS) te ontwikkel.

Die projekspan wat verantwoordelik is vir die ontwikkeling van die ASVS bestaan uit twee komitees verteenwoordigend van 'n aantal belanghebbende partye, naamlik die *Project Steering Committee* (PSC) en die *Project Task Team* (PTT). Die komitees is onderskeidelik gestig gedurende April en Junie 1999. As 'n eerste rondte het die twee komitees 'n Raamwerkdokument ontwikkel wat die wetlike en tegniese raamwerk vir die ASVS beskryf, asook die oogmerke van die sisteem en die beginsels vir die ontwikkeling daarvan. Die eerste uitgawe van die Raamwerkdokument is in Desember 1999 gepubliseer en kommentaar is gevra op die beginsels en benaderings wat voorgestel is in die dokument.

Die kommentaar is geëvalueer deur 'n *Comments Task Team* ('n sub-komitee van die PTT) en 'n antwoord op alle kommentaar is geformuleer. Hierdie, tesame met die verwante veranderinge aan die dokument (Eerste Uitgawe), is saamgestel in 'n Revuedokument en is aangeheg as 'n bylaag tot die tweede uitgawe van die Raamwerkdokument.

Die Raamwerkdokument is 'n dinamiese dokument en sal, indien nodig, opgedateer word gedurende die proses, na aanleiding van kommentaar van belanghebbendes en soos toenemende duidelikheid rakende die vorderingsisteem verkry word.

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DEVELOPMENT OF A WASTE DISCHARGE CHARGE SYSTEM

FRAMEWORK DOCUMENT

DOCUMENT INDEX

This document is the first in a series of three documents comprising the Development of a Waste Discharge Charge System.

1. Framework Document

Edition 1 – December 1999
Edition 2 – May 2000

2. Draft Strategy Document (December 2001)

3. Final Strategy Document (December 2002)

DEVELOPMENT OF A WASTE DISCHARGE CHARGE SYSTEM

FRAMEWORK DOCUMENT

ACKNOWLEDGEMENTS

The following individuals and organisations participated during the development of this document. We thank them for their contributions.

Department of Water Affairs and Forestry
Ms BG Schreiner (Chief Director: Water Use and Conservation)
Dr HR van Vliet (Chief Director: Scientific Services)
Mr PF Pretorius (Director: Water Utilisation)
Mr H Karodia (Director: Catchment Management)
Mr D Naidoo (Director: Water Conservation)
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Ms MC Eksteen (WDCS Project Leader)
Mr J van Rooyen (Director: Water Resources Planning)
Mr CL van den Berg (International Liaison)
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Mr J Mkhabela (Resource Economics)
Mr P Viljoen (Water Quality Management)
Mr P Herbst (Water Quality Management)
Mr H Peek (Water Quality Management)
Mr CFB Havenga (Water Resources Planning)
Mr H Sussens (Water Services)
Ms E Bofilatos (Catchment Management)
Mr ME Mokwena (Water Conservation)
Dr Y Xu (Geohydrology)
Dr D van Driel (Institute for Water Quality Studies)
Dr A Kühn (Institute for Water Quality Studies)
Dr M Ligthelm (Mpumalanga Region)
Mr M Keet (Gauteng Region)
Mr D Esterhuizen (Gauteng Region)
Mr L Gravelet-Blondin (KwaZulu-Natal Region)
Mr P Reddy (KwaZulu-Natal Region)
Mr J Streit (Northern Cape Region)
Mr G McConkey (Western Cape Region)
Mr C Reynolds (Free State Region)
Mr V Mongwe (Northern Province)

Water Research Commission
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Department of Finance
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Dr L Lötter – Business South Africa
Dr Z Budnik-Lees – Industrial Environmental Forum
Mr A Pitman – Municipal Sector
Mr A Davis – Municipal Sector
Mr K du Toit – Chemical Industry
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Labour Organisations
Ms S Miller – Chemical, Energy, Pulp, Paper, Wood and Allied Workers Union
Mr J Mawbey – South African Municipal Workers Union

Consultants
Mr S Forster – Development Planning and Research
Ms K Clement – Development Planning and Research
Dr C Herold – Stewart Scott Incorporated
Dr J Oberholzer – Urban-Econ Development Economists
Ms S Parker – Write Connection

In addition to the above list we would like to thank the individuals and organisations who commented on the first edition of the Framework Document, as listed in Appendix B.

DEVELOPMENT OF A WASTE DISCHARGE CHARGE SYSTEM

FRAMEWORK DOCUMENT

EXECUTIVE SUMMARY

We didn't inherit the Earth from our parents.
We're borrowing it from our children.
Chief Seattle (1788 – 1866)
Suquamish/Duwamish Chief

Introduction

Internationally, attention has increasingly turned to the need to protect and sustain the water resources on which everybody depends. Particular emphasis has been given to the sustainable management of water as a limited natural resource. There is also growing recognition that greater emphasis must be placed on managing water as an economic good to ensure that water is utilised as efficiently as possible, both in terms of the quantities of water used and the impacts on water quality. In pursuit of the objectives of water resource management, it is widely agreed that setting an appropriate price for a natural resource such as water can be an effective mechanism to achieve its efficient and productive use.

South Africa is a water-scarce country and the management of water resources in the national interest is a key policy issue, underwriting future economic and social development. One of the new approaches to water resource management provided for in the National Water Act, 1998 (Act 36 of 1998) is concerned with the pricing of South Africa's water resources. The Act provides for the introduction of economic instruments as a means of encouraging water conservation and the reduction of waste. Provision is also made for introducing incentives and disincentives to promote effective and efficient water use.

In light of the above, the Department of Water Affairs and Forestry (DWAF) established a Pricing Strategy for Raw Water Use Charges in November 1999. However, the Pricing Strategy currently focuses mainly on water use in terms of volumes abstracted or discharged, and not on the impact caused by the associated discharge or the waste conveyed in the discharge. The Waste Discharge Charge System (WDCS), which will form a vital component of the Pricing Strategy, will address the latter by introducing financial and economic instruments, designed to internalise costs associated with waste and to encourage the reduction in waste and the minimisation of detrimental impacts on water resources.

The purpose of this document is to define the legal and technical framework for consideration during the development of the WDCS. The document further states the objectives of the WDCS, as well as the principles that will guide the development

of such a system. The anticipated process for developing the WDCS is also addressed. This is a **dynamic document** and will be **updated regularly** during the development of the WDCS, in the light of comments from stakeholders and growing clarity on the charge system.

Legal Framework

Apart from the National Water Act and the Water Services Act, 1997 (Act 108 of 1997), no other legislation refers directly to a WDCS. There are, however, several laws that refer to the principle that the polluter should wholly, or at least in part, pay for relevant impact caused to the environment, as opposed to the State or society carrying the total expenditure of rehabilitation acts. Nearly all laws concerned with environmental protection have regulations stating that any expenditure for rehabilitation work by the State can be recovered from the responsible parties.

The legislation listed below refers to the principle of the *polluter pays* or advocates the objectives and principles of a possible pricing system for waste discharge:

- Constitution of the Republic of South Africa, 1996 (Act 108 of 1996)
- Environment Conservation Act, 1989 (Act 73 of 1989)
- National Environmental Management Act, 1998 (Act 107 of 1998)
- Minerals Act, 1991 (Act 50 of 1991)
- Atmospheric Pollution Prevention Act, 1965 (Act 45 of 1965)
- Local Government Transition Act, 1993 (Act 209 of 1993)

Technical Framework

Traditionally the discipline of economics viewed natural resources as factors of production. In other words, natural resources were considered to be inputs alongside other essential elements of production, such as labour, capital and man-made materials, and were assumed to be renewable over time. However, these models overlooked the fact that the time needed to renew some of these resources is such that they can become depleted and eventually unavailable. Alternatively, the demand for them may be greater than the available supply, making them scarce.

Resource economics seeks to ensure that users of natural resources also pay the opportunity and scarcity costs that arise from their use of natural resources, whether these be soil, land, air, water, flora or fauna, thereby revealing the true costs associated with using these resources.

The notion of an opportunity cost is that whenever a decision is made to undertake one economic activity, another economic activity may be foregone. Where a natural resource is utilised for a particular activity, an opportunity cost arises when it can no longer be used for other economic activities. The use of water for the discharge of waste is one example. The discharge of some waste products into a water resource may result in water users no longer being able to make use of the resource for other

purposes. The cost of the lost opportunity to other water users is the opportunity cost associated with the discharging of waste.

There are two main approaches to pollution control, namely the command-and-control (CAC) approach and the economic approach, which forms part of the field of resource economics. The essential difference between the two approaches to pollution control is that the CAC approach relies on specific regulatory mechanisms to enforce set standards and/or objectives, while the economic approach relies on incentives or disincentives. It is widely accepted that there is a place for both approaches, and the economic approach is often an important supplement to CAC systems.

The "toolkit" of resource economics has various options for controlling pollution. The *polluter pays* principle (PPP) is consistent with the resource economics concept that the opportunity costs and the scarcity costs arising from polluting activities should be paid for by the polluter.

By definition, the process of production involves the transformation of one good or service into another. By-products formed during the process of production that are passed on to third parties and affect their welfare are known as externalities. Unfortunately, many externalities decrease the welfare of third parties (negative externalities). The PPP accords that it is indefensible for the creator of this externality not to pay for the costs incurred as a result of its actions. These costs are invariably borne by individuals, the environment, the economy and/or society as a whole.

The theory behind impactors paying waste discharge charges is that they should pay for the costs incurred as a result of the waste discharge to a water resource. However, if impactors were to pay the full costs of their impacts, the result could be severe enough to cripple many economies. To avoid this, the PPP approach requires that some kind of compromise be reached between the impactor and society (including the environment). This compromise has three objectives: to find a level where the costs associated with the impact caused by the discharge or disposal of waste are bearable to society; to find the level of utilisation at which the costs of using the resource are bearable to the impactor; and to reconcile these to establish the optimum solution to the problem.

The reconciliation of these is referred to as the optimal level of utilisation of a water resource. It is not an actual level that can be readily quantified, but rather a conceptual level, which both the impactor and society can live with. A PPP-based system tries to achieve this by inducing impactors to modify their behaviour (deterrent objective) and by generating revenue to cover some of the impactor’s externalities (revenue objective), i.e. recover some of the costs imposed by the discharge on various parties.

Revenues could be used for a range of purposes, including monitoring impacts, operating the system of charges, water quality management and indirect compensation of victims by subsidisation.

Aims of the waste discharge charge system

The WDCS will introduce financial and economic instruments, aimed at:

- promoting sustainable development and efficient utilisation of water resources;
- promoting the internalisation of environmental costs by impactors;
- recovering some of the costs imposed by the discharge or disposal of waste (financial charge); and
- creating financial incentives to encourage the optimal utilisation of water resources and the reduction in waste (economic charge).

Principles to guide the Waste Discharge Charge System

A number of principles to guide the development of the WDCS have been identified. However, these should be seen as guiding principles only and the reality of the social, economic and political circumstances of the country must be recognised during the development of the system. The main principles are listed below:

- Environmental vs economic efficiency: The system should aim to create a win-win situation where economic and environmental forces combine in aiming for sustainable development.
- Affordability: The economic and social circumstances should be taken into account to ensure affordability of the system.
- Equity: The charge system should not create inequitable impacts on different sectors of society and the associated costs should therefore be equitably distributed.
- Financially viable: The administration of the system should be self-financing and not place additional strain on the general fiscus.
- Simplicity: The system should be understandable to both the agency administering the system, as well as the impactors, and easy to implement, thereby ensuring its effectiveness and limiting the cost of implementation.
- Transparency: Transparency should be ensured during the development and implementation of the system by means of an extensive consultative process and the participation of affected parties.
- Acceptability: The success of the system will be mainly dictated by the acceptance thereof by the affected parties and sufficient care should be taken to ensure adequate acceptance of the system.
- Consistency: The system must be consistent with national macro-economic goals and programmes, as well as any other government initiatives that may impact on the system.
- Dependency: The system should complement and not replace the CAC approach of water resource management and the direct linkages and interaction between these two systems should be addressed to ensure effectiveness and consistency.
- Gradual introduction: The WDCS should be introduced in a phased manner.
- Predictability/stability: The system should, however, be phased-in such that the impactors could anticipate the end result to create a stable costing environment.

- Clearly stated incentive purpose: The system must have a clearly stated incentive purpose in order to reduce waste.
- Double-charging: No double-charging should transpire from the charges levied, and the system should address mechanisms to ensure that double-charging is prevented.
- Revenue disbursement: Use of revenues must be transparent and open for examination. Possible means of employing the revenue obtained from the system should be investigated, taking into account the financial and tax structures of the country.

Other guidelines relating to the calculation of the waste discharge charge and requirements for implementation of the WDCS are addressed in more detail in Section 5 of the main document. It should be noted that it has not yet been determined how the charges will be calculated – this will evolve in the course of the development of the Draft Strategy.

Application of the Waste Discharge Charge System

Since the National Water Act includes watercourses, surface water, estuaries and aquifers in its definition of a water resource, waste discharge charges will apply to both surface and groundwater resources. The WDCS will further be applied to the following water uses as listed in Section 21 of the Act:

(e): *engaging in a controlled activity* – relating to the irrigation of any land and the intentional recharging of an aquifer with any waste or water containing waste, as defined in Section 37(1)(a) and (d) of the Act;
(f): *discharging waste or water containing waste into a water resource;*
(g): *disposing of waste in a manner which may detrimentally impact on a water resource*;
(h): *disposing of water which contains waste from any industrial or power generating process*; and
j): *removing, discharging or disposing of water found underground* – relating only to the discharging or disposing of water containing waste.

Process to develop the WDCS

The WDCS is being developed by a multi-stakeholder Project Task Team (PTT) and overseen and guided by a Project Steering Committee (PSC). The two committees are constituted of representatives of National Government, Industry, Labour organisations, the Water Research Commission and consultants.

It is envisaged that the WDCS will be developed in **four phases**, each of which is linked to outputs, namely:

- **Phase 1:** Initialisation of the process
  - ⇨ Framework Document
  - ⇨ April 1999 – December 1999

- **Phase 2:** Development of draft strategies
  - ⇨ Draft Strategy Document
  - ⇨ Regional Workshops
  - ⇨ January 2000 – December 2001

- **Phase 3:** Development of the final strategy
  - ⇨ Final Strategy Document
  - ⇨ Regional Workshops
  - ⇨ January 2002 – December 2002

- **Phase 4:** Implementation of the final strategy in trial management areas
  - ⇨ Guideline Documents
  - ⇨ January 2003 onwards.

As the WDCS will affect many water users, it is vital that the development of the system takes account of a broad range of issues and stakeholder views, while also running to schedule and within the framework created by the National Water Act. A detailed communication and participation strategy to achieve the above has been developed and includes both an internal strategy to address communication issues within DWAF and an external strategy to reach the broader stakeholder grouping.

The process to develop the WDCS and details of the communication strategy are described more fully in Section 6 of the main document.

ONTWIKKELING VAN 'N AFVALSTORTINGVORDERINGSISTEEM

RAAMWERKDOKUMENT

BESTUURSOPSOMMING

Inleiding

Internasionaal word die aandag toenemend verskuif na die beskerming en behoud van die waterhulpbronne waarvan almal so afhanklik is. Spesiale klem word gelê op die volhoubare bestuur van water aangesien dit 'n beperkte natuurlike hulpbron is. Daar is ook 'n toenemende herkenning dat water bestuur moet word as 'n ekonomiese entiteit om te verseker dat water so doeltreffend as moontlik aangewend word, beide in terme van hoeveelheid van watergebruik en die nadelige inwerking op watergehalte. Dit word wyd erken dat die instelling van 'n toepaslike prys op natuurlike hulpbronne soos water, 'n effektiewe meganisme is om die doeltreffende en produktiewe gebruik daarvan te verseker.

Suid-Afrika is 'n water-skaars land en die bestuur van waterhulpbronne is van nasionale belang om toekomstige ekonomiese en sosiale groei te verseker. Een van die nuwe benaderings tot waterhulpbronbestuur waarvoor voorsiening gemaak is in die Nasionale Waterwet, 1998 (Wet 36 van 1998), het te make met die waardetoevoeging tot Suid-Afrika se waterhulpbronne. Die Wet maak voorsiening vir die instelling van ekonomiese instrumente as 'n wyse om waterbewaring en die vermindering van afval te bevorder. Daar is ook voorsiening gemaak vir die instelling van aansporings en ontmoedigings om die doeltreffende en voordelige gebruik van water te bevorder.

In die lig hiervan het die Departement van Waterwese en Bosbou (DWWB) 'n Prysstrategie vir Rouwatergebruiksvorderings in November 1999 ingestel. Die Prysstrategie fokus egter hoofsaaklik op watergebruik in terme van die hoeveelheid water wat onttrek of gestort word en nie op die nadelige inwerking van die storting daarvan of die afval wat daarin vervoer word nie. Die Afvalstortingvorderingsisteem (ASVS), wat 'n belangrike komponent van die Prysstrategie vorm, sal laasgenoemde aanspreek deur finansiële en ekonomiese instrumente te ontwikkel. Hierdie instrumente sal ontwerp word om kostes wat met afval geassosieer word te *internaliseer* en om die vermindering van afval en die nadelige inwerking op waterhulpbronne te bevorder.

Die doel van hierdie dokument is om die wetlike en tegniese raamwerk wat oorweeg moet word tydens die ontwikkeling van die ASVS te beskryf. Die dokument beskryf verder die oogmerke van die sisteem, asook die beginsels wat die ontwikkeling van die sisteem sal lei. Die beoogde proses wat gevolg gaan word gedurende die

ontwikkeling van die ASVS word ook aangespreek. Hierdie is ‘n dinamiese dokument wat gereeld opgedateer sal word gedurende die proses, na aanleiding van kommentaar van belanghebbendes en soos toenemende duidelikheid rakende die vorderingsisteem verkry word.

Wetlike Raamwerk

Afgesien van die Nasionale Waterwet en die Wet op Waterdienste, 1997 (Wet 108 van 1997), word daar nie direk verwys na ‘n ASVS in enige ander wetgewing nie. Daar word egter in ‘n hele aantal wette verwys na die beginsel dat ‘n besoedelaar ten volle, of ten minste gedeeltelik, moet betaal vir die nadelige inwerking op die omgewing, in teenstelling daarmee dat die Staat of die gemeenskap die totale koste dra vir die rehabilitasie-aksies. Bykans al die wette wat betrekking het op die beskerming van die omgewing het regulasies wat meld dat enige koste wat aangegaan word deur die Staat vir rehabilitasiewerk, teruggeëis kan word van die verantwoordelike partye.

Die wetgewing wat hieronder gelys word verwys na die *besoedelaar betaal*-beginsel of stel doelwitte en beginsels van ‘n moontlike vorderingsisteem vir afvalstorting voor.

- Konstitusie van die Republiek van Suid Afrika, 1996 (Wet 108 van 1996)
- Omgewingsbewaringswet, 1989 (Wet 73 van 1989)
- Nasionale Omgewingsbetuurswet, 1998 (Wet 107 van 1998)
- Mineraalwet, 1991 (Wet 50 van 1991)
- Wet op die Voorkoming van Lugbesoedeling, 1965 (Wet 45 van 1965)
- Oorgangswet op Plaaslike Regering, 1993 (Wet 209 van 1993)

Tegniese Raamwerk

Tradisioneel het ekonome natuurlike hulpbronne gesien as faktore van produksie. Natuurlike hulpbronne is dus ook gesien as insette net soos ander belangrike elemente soos arbeid, kapitaal en vervaardigde materiale. Verder is daar ook aanvaar dat natuurlike hulpbronne hernubaar is oor tyd. Ongelukkig het hierdie modelle nie in ag geneem dat die tyd wat nodig is om sekere van hierdie hulpbronne te hernu sodanig is dat sekere van die bronne uitgeput en uiteindelik onbeskikbaar raak nie. Alternatiewelik kan die aanvraag vir die hulpbronne groter wees as die aanbod, wat hulle dan skaars maak.

Hulpbronekonome streef die doel na dat gebruikers van natuurlike hulpbronne ook betaal vir die geleentheids- en skaarsheidskoste wat vloei uit die gebruik van natuurlike hulpbronne, of dit nou grond, land, lug, water, plante of diere is. Sodoende word die ware koste wat geassosieer is met die gebruik van hierdie hulpbronne bepaal.

Die grondslag van geleentheidskoste behels dat wanneer ‘n besluit geneem word om ‘n sekere ekonomiese aktiwiteit te onderneem, ‘n ander ekonomiese aktiwiteit miskien nie meer moontlik is nie. ‘n Geleentheidskoste ontstaan wanneer ‘n natuurlike hulpbron gebruik word vir ‘n spesifieke aktiwiteit en dit dan nie langer vir

ander ekonomiese aktiwiteite gebruik kan word nie. Die gebruik van water vir die storting van afval is slegs een voorbeeld. Die storting van afvalprodukte in ‘n waterhulpbron kan veroorsaak dat die hulpbron nie langer vir ander doeleindes gebruik kan word nie. Die koste verbonde aan die verlies van ander waterverbruike staan bekend as die geleentheidskoste wat geassosieer word met die storting van afval.

As dit kom by besoedelingsbeheer is daar twee benaderings wat gevolg word, naamlik die *Bevel-en-Beheer* (BeB) benadering en die ekonomiese benadering, wat deel vorm van hulpbronekonomie. Die belangrikste verskil tussen die twee benaderings is dat die BeB-benadering afhanklik is van spesifieke beheermeganismes om spesifieke standaarde en/of doelwitte af te dwing, terwyl die ekonomiese benadering staatmaak op aansporings en ontmoedigings. Dit word algemeen aanvaar dat daar ‘n plek is vir beide benaderings, en dat die ekonomiese benadering dikwels ‘n belangrike aanvulling is vir BeB-sisteme.

Die “gereedskapskas” van hulpbronekonomie het ‘n verskeidenheid van opsies vir die beheer van besoedeling. Die *besoedelaar betaal*-beginsel (BBB) is versoenbaar met die konsep van hulpbronekonomie, naamlik dat die geleentheidskoste en skaarsheidskoste deur die besoedelaar betaal moet word.

Die proses van produksie word gedefinieer as die verandering van een goedere of diens na ‘n ander. Byprodukte wat gegenereer word tydens die proses van produksie, aangeskuif word na ‘n derde party en sodoende hulle welvaart beïnvloed, staan bekend as *eksternaliteite*. Ongelukkig word die welvaart van ‘n derde party in baie gevalle verlaag (negatiewe *eksternaliteite*). Die BBB bepaal dat dit onverdedigbaar is dat die skepper van hierdie *eksternaliteite* nie vir die kostes wat veroorsaak word deur sy/haar aksies, betaal nie. Hierdie kostes word sonder uitsondering gedra deur individue, die omgewing, die ekonomie, of die samelewing as ‘n geheel.

Die teorie rakende die betaling van afvalstortingvorderings is dat impakteerders behoort te betaal vir die kostes wat veroorsaak word deur die storting van afval na 'n waterhulpbron. Die volle kostes verbonde aan die nadelige inwerking van impakteerders is egter genoeg om menigte ekonomieë te verlam. Om dit te verhoed vereis die BBB-benadering dat ‘n kompromie aangegaan word tussen die impakteerder en die samelewing (insluitende die omgewing). Hierdie kompromie het drie doelwitte: om ‘n vlak te vind waar die kostes van die nadelige inwerking, veroorsaak deur die storting of beskikking van afval, aanvaarbaar is vir die samelewing; om die vlak te vind waar die kostes geassosieer met die gebruik van hulpbronne aanvaarbaar is vir die impakteerder; en om hierdie twee vlakke met mekaar te versoen om die optimale oplossing vir die probleem te vind.

Die versoening van hierdie twee vlakke word na verwys as die optimale vlak van gebruik van ‘n waterhulpbron. Hierdie is nie ‘n vlak wat maklik gekwantifiseer kan word nie, en is eerder ‘n konseptuele vlak waarmee beide die impakteerder en die gemeenskap kan saamleef. ‘n BBB-gebaseerde sisteem probeer om hierdie vlak te behaal deur impakteerders oor te haal om hulle optrede te verander (*afskrik*-doelwit), en deur inkomste te genereer om sekere van die impakteerders se *eksternaliteite* te

dek (*inkomste*-doelwit), m.a.w. om sekere van die kostes wat die afvalstorting veroorsaak vir ander partye, te herwin.

Inkomste kan gebruik word vir ‘n verskeidenheid van oogmerke, soos byvoorbeeld die monitering van waterhulpbronne, die teweegbring van die vorderingsisteem, watergehaltebestuur en die indirekte kompensasie van slagoffers deur subsidies.

Doelwitte van die afvalstortingvorderingsisteem

Die ASVS sal finansiële en ekonomiese instrumente daarstel, met die doel om:

- die volhoubare ontwikkeling en doeltreffende gebruik van waterhulpbronne te bevorder;
- die *internalisering* van omgewingskostes deur impakteerders te bevorder;
- ‘n gedeelte van die kostes wat veroorsaak word deur die storting of beskikking van afval te herwin (*finansiële vordering*); en
- finansiële aansporings daar te stel om die optimale gebruik van waterhulpbronne en die vermindering van afval te bevorder (*ekonomiese vordering*).

Beginsels vir die afvalstortingvorderingsisteem

‘n Aantal beginsels is geïdentifiseer om die ontwikkeling van die ASVS te lei. Hierdie beginsels moet egter slegs gesien word as riglyne en die realiteite van die sosiale, ekonomiese en politiese omstandighede van die land moet in ag geneem word gedurende die ontwikkeling van die sisteem. Die belangrikste beginsels word kortliks bespreek.

- Omgewings- vs ekonomiese doeltreffendheid: Die sisteem moet probeer om ‘n wen-wen situasie te skep waar ekonomiese en omgewingsaspekte gekombineer word om volhoubare ontwikkeling daar te stel.
- Bekostigbaarheid: Om te verseker dat die sisteem bekostigbaar is moet die ekonomiese en sosiale omstandighede in aanmerking geneem word.
- Billikheid: Die vorderingsisteem moet nie ongelyke uitwerkings op verskillende sektore van die samelewing hê nie en die kostes verbonde aan die sisteem moet regverdig versprei word.
- Finansiële lewensvatbaarheid: Die administrasie van die sisteem moet finansiëel lewensvatbaar wees en nie addisionele druk op die algemene begroting plaas nie.
- Eenvoudigheid: Die sisteem moet verstaanbaar wees vir beide die agentskap verantwoordelik vir die administrasie van die sisteem en die impakteerders. Om te verseker dat die sisteem doeltreffend is en dat die uitvoerbaarheidskostes tot ‘n minimum beperk word, moet die sisteem verder ook maklik wees om toe te pas.

- Deursigtigheid: Die ontwikkeling en toepassing van die sisteem moet te alle tye deursigtig wees, en om dit te verseker moet ‘n uitgebreide konsultasieproses gevolg word, met die deelname van alle betrokke partye.
- Aanvaarbaarheid: Die sukses van die sisteem sal bepaal word deur die mate waartoe dit aanvaar word deur die betrokke partye en die nodige aandag moet gegee word om aanvaarding van die sisteem te verseker.
- Versoenbaarheid: Die sisteem moet versoenbaar wees met die nasionale makro-ekonomiese doelwitte en programme, asook met enige ander staatsondernemings wat die sisteem moontlik mag beïnvloed.
- Afhanklikheid: Die sisteem moet die *Bevel-en-Beheer* (BeB) benadering van waterhulpbronbestuur aanvul en nie vervang nie. Om te verseker dat die sisteem doeltreffend en versoenbaar is, moet die direkte skakeling en wisselwerking tussen die twee benaderings aangespreek word.
- Geleidelike infasering: Die ASVS moet geleidelik ingefaseer word.
- Voorsienbaarheid/stabiliteit: Die sisteem moet egter so ingefaseer word dat die impakteerders die eindresultaat kan voorsien om sodoende ‘n stabiele kostebepalingsomgewing daar te stel.
- Duidelike aansporingsdoelwit: Die sisteem moet ‘n duidelike aansporingsdoelwit daarstel om afval te verminder.
- Dubbel-vordering: Die sisteem moet dubbel-vordering vermy en meganismes om dubbel-vordering te voorkom moet ontwikkel word as deel van die sisteem.
- Inkomste aanwending: Die gebruik van inkomste moet deursigtig wees en moet gereeld ondersoek word. Moontlike maniere om die inkomste aan te wend, in lyn met die finansiële en belastingstrukture van die land, moet ook ondersoek word.

Ander beginsels wat verband hou met die berekening van die afvalstortingvorderings en die vereistes vir die implementering van die ASVS word in meer besonderhede aangespreek in Afdeling 5 van die dokument. Dit is belangrik om op te let dat dit nog nie vasgestel is presies hoe die vorderings bereken gaan word nie – dit sal ontplooi gedurende die ontwikkeling van die Konsepstrategie.

Toepassing van die afvalstortingvorderingsisteem

Aangesien die Nasionale Waterwet waterlope, bogrondse water, riviermondings en waterdraers insluit in die omskrywing van ‘n waterhulpbron, sal afvalstortingvorderings van toepassing wees op beide bogrondse en ondergrondse water. Die ASVS sal verder van toepassing wees op die volgende watergebruike soos gelys in Artikel 21 van die Wet:

(e): die deelname aan ‘n beheerde bedrywigheid – met betrekking tot die besproeiïng van enige grond en die opsetlike hervulling van ‘n waterdraer met enige afval of water wat afval bevat, soos omskryf in Artikel 37(1)(a) en (d) van die Wet;

(f): die storting van afval of waterbevattende afval in ‘n waterhulpbron;

(g): die beskikking oor afval op ‘n wyse wat nadelig op ‘n waterhulpbron kan inwerk;

(h): die wegdoening van water wat afval bevat van 'n industriële of kragopwekkingsproses; en

j): die verwydering, storting of wegdoening van water wat ondergronds gevind is – slegs met betrekking tot die storting of wegdoening van water wat afval bevat.

Proses om die ASVS te ontwikkel

Die ASVS word ontwikkel deur die *Project Task Team* (PTT), verteenwoordigend van 'n aantal belanghebbende partye, en gestuur en gelei deur die *Project Steering Committee* (PSC). Die twee komitees is saamgestel deur verteenwoordigers van die Nasionale Regering, die industriële sektor, arbeiderspartye, die Waternavorsingskommissie en konsultante.

Dit word beoog om die ASVS in **vier fases** te ontwikkel, waarvan elkeen verbind is met 'n uitset, naamlik:

- **Fase 1:** Daarstelling van die proses
  - ⇨ Raamwerkdokument
  - ⇨ April 1999 – Desember 1999

- **Fase 2:** Ontwikkeling van konsepstrategieë
  - ⇨ Konsepstrategie
  - ⇨ Streekswerkswinkels
  - ⇨ Januarie 2000 – Desember 2002

- **Fase 3:** Ontwikkeling van die finale strategie
  - ⇨ Finale Strategie
  - ⇨ Streekswerkswinkels
  - ⇨ Januarie 2002 – Desember 2002

- **Phase 4:** Implementering van die finale strategie in proefbestuursareas
  - ⇨ Riglyndokumente
  - ⇨ Januarie 2003 voorwaarts

Aangesien die ASVS baie watergebruikers gaan beïnvloed, is dit noodsaaklik dat die ontwikkeling van die sisteem 'n wye reeks kwessies en sienswyses van die belanghebbendes in ag neem, terwyl dit terselfdertyd ontwikkel word volgens skedule en binne die raamwerk wat neergelê word in die Nasionale Waterwet. 'n Uitgebreide kommunikasie- en deelnamestrategie om bogenoemde te bewerkstellig is ontwikkel. Dié strategie bestaan uit beide 'n interne strategie om die kommunikasiefasette binne die Departement aan te spreek, en 'n eksterne strategie wat beoog om die belanghebbendes in te lig oor die projek.

Die proses vir die ontwikkeling van die ASVS, asook die uitgebreide kommunikasiestrategie, word beskryf in Afdeling 6 van die dokument.

DEVELOPMENT OF A WASTE DISCHARGE CHARGE SYSTEM

FRAMEWORK DOCUMENT

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DEVELOPMENT OF A WASTE DISCHARGE CHARGE SYSTEM

FRAMEWORK DOCUMENT

1. INTRODUCTION

South Africa is a water-scarce country and the management of water resources in the national interest is a key policy issue underwriting future economic and social development. It is the overall responsibility of National Government to protect and manage the water resources of the country to achieve the sustainable use of water for the benefit of all users. It is widely recognised that protecting the quality of water resources is necessary to ensure sustainability of the nation's water resources in the interest of all water users.

One of the new approaches to water resource management provided for in the National Water Act, 1998 (Act 36 of 1998) is concerned with the pricing of South Africa's water resources. The Act provides for the introduction of economic instruments as a means of encouraging water conservation and the reduction of waste. Provision is also made for introducing incentives and disincentives to promote effective and efficient water use.

In light of the above, the Department of Water Affairs and Forestry (DWAF) has established a Pricing Strategy for Raw Water Use Charges in November 1999, which provides a framework for implementing the charge system for water use. The Pricing Strategy addresses the following two charges allowed for in the Act, namely:

- the **water resource management charge,** for funding water resource management; and
- the **water resource development charge** for funding water resource development and use of waterworks.

These charges focus mainly on water use in terms of volumes abstracted or discharged and not on the impact caused by the associated discharge or the waste conveyed in the discharge. The **Waste Discharge Charge System (WDCS)** will address the latter by introducing financial and economic instruments such as the *polluter pays* principle (PPP), designed to internalise costs associated with waste and to encourage the reduction in waste and the minimisation of detrimental impacts on water resources.

The WDCS is a subcomponent of the Pricing Strategy and the waste discharge charge should be seen as an extension of the charges already accounted for in the Pricing Strategy. The system will therefore implement

charges associated with the impact caused by discharging or disposing of waste into water resources.

The purpose of this document is to define the legal and technical framework for consideration when introducing the use of economic instruments to manage the impacts on and to protect the water resources of the country. The document further states the objectives of the WDCS, as well as the principles that will guide the development of such a system. The anticipated process of development of the WDCS is also addressed.

This is a **dynamic document** and will be **updated regularly during the process** as the WDCS develops, in the light of comments from stakeholders and growing clarity on the charge system.

2. LEGAL FRAMEWORK

2.1 National Water Act, 1998 (Act 36 of 1998)

Section 56(1) of the Act instructs the Minister of Water Affairs and Forestry to establish a Pricing Strategy for charges for any water use described in Section 21 of the Act, namely:

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

Water use charges may be set for the following (Section 56(2) of the Act):

- funding water resource management, including monitoring and controlling of water resources and its use and gathering of information, as well as water conservation;
- funding water resource development and use of waterworks; and
- achieving the equitable and efficient allocation of water.

Further, differential rates for waste discharges may be set depending on the geographical area, characteristics and amount of waste discharged and the nature and extent of the impact on a water resource and its users (Section 56(5)

of the Act). The latter should take cognisance of the class and resource quality of the water resource in question. The benefit of a specific water use and the economic circumstances, as well as the monitoring requirements associated with the waste discharge should also be taken into account.

In setting water use charges, incentives and disincentives to promote the efficient and beneficial use of water, to reduce the detrimental impacts on water resources and to prevent the waste of water (Section 56(6) of the Act) may be introduced. When setting these charges, the class and resource quality objectives of the water resource should be taken into account.

2.2 Water Services Act, 1997 (Act 108 of 1997)

Section 56(6)(c) of the National Water Act, 1998 stipulates that in setting water use charges, measures necessary to support the establishment of tariffs by Water Services Authorities in terms of the Water Services Act, 1997, and the use of lifeline tariffs and progressive block tariffs, must be considered.

Section 10 of the Water Services Act, 1997, instructs the Minister to prescribe norms and standards in respect of tariffs for water services. These norms and standards may differentiate between different users and types of water services, as well as different geographical areas, taking into account the socio-economic and physical attributes of each area. The norms and standards may further provide for tariffs to be used to promote or achieve water conservation.

Regulations drafted in terms of the tariff norms and standards referred to in Section 10 of the Water Services Act, 1997. These regulations refer to waste discharge, namely discharge of industrial effluent and household sanitation, to a sewage treatment plant. Regulations 4, 10 and 12, which deal with the differentiation of industrial and sanitation effluent by Water Services Authorities and the phasing-in of their respective tariff mechanisms are particularly relevant.

2.3 Other legislation

No other legislation directly referring to a WDCS could be found. There are, however, several laws that refer to the principle that the polluter (impactor) should wholly, or at least in part, pay for relevant impact caused to the environment, rather than the State carrying the total expenditure of rehabilitation acts. Nearly all laws concerned with environmental protection have regulations stating that any expenditure for rehabilitation works by the State can be recovered from the responsible parties. The sections discussed below all refer to the principle of the *polluter pays* or a possible pricing system for waste discharge.

2.3.1 Constitution of the Republic of South Africa, 1996 (Act 108 of 1996)

Although the Constitution does not directly refer to waste discharge charges *per se*, Section 24 states that everyone has the right:

a) to an environment that is not harmful to their health or well-being; and
b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –
   i) prevent pollution and ecological degradation;
   ii) promote conservation; and
   iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development,

thereby advocating the objectives and principles of such a system.

2.3.2 Environment Conservation Act, 1989 (Act 73 of 1989)

General policy in terms of the Environment Conservation Act, 1989, dated 21 January 1994. The general policy on Environmental Conservation states that, in terms of the Environmental Conservation Act and in relation to the economic measures that must be undertaken for the effective conservation of the environment, certain economic measures must be undertaken where appropriate. These environmental resource measures should be employed to:

- support economic growth and social welfare without affecting, overstraining or irreversibly damaging the natural environment and natural resources in the process
- ensure that all communities have equitable access to resources without jeopardising the interests of future generations
- internalise external environmental costs as part of the exploitation and production costs, having due regard to the economic implications
- promote the reduction of waste streams and pollution to levels that can be naturally adsorbed without deleterious effects on the environment
- promote the usage of innovative technologies that can make a specific contribution towards sustainable development.

Determination of policy on Hazardous Waste Management in terms of the Environment Conservation Act, 1989, dated 30 September 1994 - Section 2.7. The principle that the polluter should pay for the negative environmental consequences of his or her actions is to be implemented in practice by recovering from the polluter the direct costs associated with his or her pollution.

2.3.3 National Environmental Management Act, 1998 (Act 107 of 1998)

Chapter 1: National Environmental Management Principles, Section 2(p). Sustainable development requires that the cost of remedying pollution,

environmental degradation and consequent adverse health effects, and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.

2.3.4 Minerals Act, 1991 (Act 50 of 1991)

In terms of Section 38(1) of the Minerals Act, 1991, the rehabilitation of the surface of land concerned in any prospecting or mining operations shall be carried out by the holder of the prospecting permit or mining authorisation concerned–

(a) in accordance with the environmental management programme approved in terms of Section 39, if any;
(b) as an integral part of the prospecting or mining operations concerned;
(c) simultaneously with such operations, unless otherwise determined in writing by the regional director; and
(d) to the satisfaction of the regional director concerned.

Section 9(3) of the said Act provides furthermore that no mining authorisation shall be issued unless the regional director is satisfied-

(a) with the manner in which and scale on which the applicant intends to mine the mineral concerned optimally and safely under such mining authorisation;
(b) with the manner in which such applicant intends to rehabilitate disturbances of the surface which may be caused by his or her mining operations; and
(c) that such applicant has the ability and can make the necessary provision to mine such mineral optimally and safely and to rehabilitate such disturbances of the surface.

The Department of Minerals and Energy's policy concerning financial provision for the rehabilitation of land disturbed by mining activities (Clause 4.3), includes the requirement that the adequacy of the applicant's or holder's financial provision should meet the satisfaction of the regional director, through the mechanism of the Environmental Management Programme (EMP), i.e. that-

(a) the applicant/holder will have the financial means to fulfil the requirements of the EMP;
(b) there will be sufficient financial provision for the final closure of the mine;
(c) such funds are protected from seizure; and
(d) the financial provision made to fulfil the requirements of the EMP will be utilised solely for rehabilitation until a certificate in terms of Section 12 of the Minerals Act, 1991 (closure certificate) has been issued.

The Minerals Act, 1991 is currently under revision.

2.3.5 Atmospheric Pollution Prevention Act, 1965 (Act 45 of 1965)

Section 31: Establishment of a Dust Control Levy Account. The Minister of Environmental Affairs and Tourism may, after consultation with the necessary authorities in certain special circumstances (described in Section 29), decide to establish an account known as the Dust Control Levy Account, from which the expenditure required for the more effective prevention of atmospheric pollution by dust can be provided.

Persons liable for payments or contributions to the account are described in Sections 28 and 30 as:

- Any person who in a dust control area carries out any industrial process, the operation of which in the opinion of the chief officer causes or is liable to cause a nuisance to persons residing or present in the vicinity on account of dust originating from such process becoming dispersed in the atmosphere; or
- Any person who in a dust control area has at any time or from time to time, whether before or after the commencement of this Act, deposited or caused or permitted to be deposited on any land a quantity of matter which exceeds, or two or more quantities that together exceed twenty thousand cubic meters in volume, or such lesser quantity as may be prescribed, and which in the opinion of the chief officer causes or is liable to cause a nuisance to persons residing or present in the vicinity of such land on account of dust originating from such matter becoming dispersed in the atmosphere.

If any of the persons named above fail to comply with the best practicable means for preventing such dust from becoming a nuisance, they become liable for payments made into the account. Payments can be made as a single sum, several instalments or a monthly fee.

Monies from the account may be used for the following:

- The payment of any expenditure incurred in connection with operations undertaken for the prevention of atmospheric dust pollution, if the operations were with the approval of the Minister.
- If the Minister decides that some of the parties involved are unable to pay their dues, the money from the account may be used to pay their parts wholly or in part.
- To meet wholly or in part the expenditure incurred by any person in complying with the best practicable means for the prevention of atmospheric pollution by dust, as described in Sections 28 and 29.

2.3.6 Local Government Transition Act, 1993 (Act 209 of 1993)

Section 10C(2) of the Local Government Transition Act, 1993 states that a metropolitan council shall have the powers and duties listed in Schedule 2.

Schedule 2 (as amended by Section 8 of Act 97 of 1996) states that:

A metropolitan council may:

(a) at rates determined by the council with the concurrence of the MEC responsible for Finance with the concurrence of the Minister of Finance, levy and claim the levies referred to in Section 12(1)(a) of the Regional Services Councils Act, 1985 (Act 109 of 1985), or Section 16(1)(a) of the KwaZulu Natal Joint Services Act, 1990 (Act 84 of 1990), as the case may be;
(b) claim payments from any metropolitan local council to cover the actual costs of any service performed or rendered on behalf of or to such metropolitan local council;
(c) determine and claim an equitable contribution from all metropolitan local councils; provided that such contribution shall be determined, and the utilisation of the sum total thereof shall be, as prescribed.

Services performed include the following (list not exhaustive):

(4): Bulk supply of water, including the determination of bulk tariffs, the determination of a uniform base for the structuring of user tariffs and the conservation of water.
(5): Bulk sewage purification works and main sewage disposal, including the determination of a uniformly structured bulk tariff for the purification and bulk conveyance of sewage and the development of a uniform base for the structuring of user tariffs.

Section 12(1)(a) of the Regional Services Councils Act, 1985 states that subject to certain provisions made in Section 4(1) of this Act, a council shall claim from-

(i) every employer who employs or is deemed to employ employees within its region, and each person carrying on or deemed to be carrying on an enterprise within its region as referred to in Paragraph (b) of the definition of "regional services levy", a regional services levy;
(ii) every person carrying on or deemed to be carrying on an enterprise within its region, a regional establishments levy.

[Also refer to the KwaZulu Natal Joint Services Act, 1990 (Act 84 of 1990), Section 16(1)(a)].

2.4 Future development

Ongoing interaction between the government departments during the development of the WDCS is imperative to ensure coherence between the system and current legislation and government initiatives, as well as future developments thereof. The Framework Document will be updated accordingly.

3. TECHNICAL FRAMEWORK

Internationally, attention has increasingly turned to the need to protect and sustain the water resources on which everybody depends. Particular emphasis has been given to the sustainable management of water as a limited natural resource. There is also growing recognition that greater emphasis must be placed on managing water as an economic good to ensure that water is utilised as efficiently as possible, both in terms of the quantities of water used and the impacts on water quality. In pursuit of the objectives of water resource management, it is widely agreed that setting an appropriate price for a natural resource such as water can be an effective mechanism to achieve its efficient and productive use.

3.1 Introduction to resource economics

Traditionally the discipline of economics viewed natural resources as factors of production. Natural resources were considered to be inputs alongside other essential elements of production such as labour, capital and man-made materials, and were assumed to be renewable over time. However, these models overlooked the fact that the time needed for the renewal of some of these resources is such that they can become depleted and eventually unavailable. Alternatively, the demand for them may exceed the available supply, making them scarce. Resource economics aims to reveal the true costs associated with using scarce natural resources.

The notion of an opportunity cost is that whenever a decision is made to undertake one economic activity, another economic activity may be foregone. Where a natural resource is utilised for a particular activity, an opportunity cost arises because it can no longer be used for other economic activities. Although not all economic activities are mutually exclusive in their use of natural resources, there are many instances where this is the case. The use of water for discharging waste is one example. The discharge of some waste products into a water resource may result in water users no longer being able to make use of the resource for other purposes. This may not be a problem if there is an abundant supply of water, but this is not the case in a water-stressed country such as South Africa. The cost of the lost opportunity to other water users is the **opportunity cost** associated with the discharging of waste. It is this cost that resource economics is concerned with. Resource economics seeks to ensure that users of natural resources also pay the opportunity and scarcity costs that arise from their use of natural resources, whether these be soil, land, air, water, flora or fauna.

There are two broad approaches to pollution control, namely the command-and-control (CAC) approach and the economic approach, which forms part of the field of resource economics. The essential difference between the two approaches to pollution control is that the CAC approach relies on specific regulatory mechanisms to enforce set standards and/or objectives, while the

economic approach relies on incentives or disincentives. The CAC approach thus relies heavily on the proverbial "stick", while the economic approach relies more on the "carrot". It is generally accepted that there is a place for both, and the economic approach is often an important supplement to CAC systems.

The "toolkit" of resource economics contains a number of options for addressing pollution control. Depending on the natural resource concerned and the objectives of the body responsible for managing the resource, one or a combination of these instruments can be applied. The *polluter pays* principle (PPP) is consistent with the resource economics concept that the opportunity costs and the scarcity costs arising from polluting activities should be paid for by the polluter. The PPP does not, however, dictate whether CAC or economic approaches should be taken to control pollution – either is possible in accordance with this principle.

3.2 A brief overview of the philosophy of the *polluter pays* principle and the potential role of waste discharge charges in its application

3.2.1 Introduction

By definition, the process of production involves the transformation of one good or service into another. By-products formed during the process of production that are passed on to third parties and affect their welfare are known as externalities. Unfortunately, many externalities decrease the welfare of the third party (negative externalities). The PPP accords that it is indefensible for the creator of this externality (the impactor) not to pay for the costs incurred as a result of its actions. These costs have invariably been borne by individuals, the environment, the economy and/or society as a whole.

There are six philosophical premises of the PPP:

Ethics: The ethics of the PPP derive from the universal moral principle that, all other things being equal, we ought not to cause harm to others. At present most of the costs related to environmental impacts are borne by society. Implementation of the PPP shifts the responsibility for environmental costs to the impactor and adjusts pricing systems to reflect more accurate costs of production.

Equality: Everybody has an equal right to use environmental resources. A WDCS can protect this right by ensuring, for example, that parties impacting on water quality in the upper reach of a river are responsible for compensating, in some way, parties using or unable to use the affected water lower down the river.

Sustainability: The notion of sustainable economic development requires that at any point in time the present generation has a responsibility towards

meeting the likely needs of future generations. When examined in the light of environmental concerns, this requires the present generation to act as stewards of environmental resources (including water resources). It is up to the current generation to institute systems and safeguards to ensure that these resources are available to and able to be used by future generations.

Economic efficiency: Economic efficiency is improved when waste-generating activities are adjusted so that the social benefits (comprising both the benefits of economic activity and those associated with a protected and functional environmental resource base) are maximised. To maintain economic efficiency, the sustainability of both the economic activity and the natural resource base on which it relies must be ensured.

Transparency: The PPP should be introduced by way of an extensive consultative process and the participation of all affected parties, i.e. regulators, impactors and parties affected by the environmental impacts.

Environmental efficiency: PPP-driven systems should automatically encourage impactors to keep the extent of environmental degradation within acceptable and sustainable limits.

3.2.2 Waste discharge charge systems based on the PPP

The theory behind impactors paying waste discharge charges is that they should pay for the costs incurred as a result of the waste discharge to a water resource or the disposal of waste. However, if impactors were to pay the full costs of their impacts, the result could be severe enough to cripple many economies. To avoid this, some kind of compromise is required to find that level of utilisation of a water resource at which the costs associated with the impact are bearable to society (including the environment) and where the costs of using the resource are bearable to the impactor.

This level is referred to as the **optimal level of utilisation** of a water resource. A PPP-based system tries to do this by inducing impactors to modify their behaviour (deterrent objective) and by generating revenue to cover some of the impactor's externalities (revenue objective).

i) The optimal level of utilisation for the discharge of waste

The optimal level of utilisation is a key feature for the discharge/disposal of waste. Some people would argue that the optimal level of utilisation (with regard to waste discharge/disposal) should be minimal (or zero); however, to aim for such a scenario would, without doubt, have severe economic implications.

The PPP approach requires that some kind of compromise be reached between the impactor and society (including the environment). This compromise has three objectives: to find a level of utilisation where the costs associated with the impact caused by the discharge or disposal of waste are bearable to society; to find the level at which the costs of using the resource are bearable to the impactor; and to reconcile these to establish the optimum solution to the problem. In theoretical terms this point is referred to as the optimal level of utilisation. It is not an actual level that can be readily quantified, but rather a conceptual level, which both the impactor and society can live with.

Figure 3.1 indicates that as the quantity of waste discharged/disposed of increases, so does the cost of the impact associated with the discharge/disposal of waste to society, or the **impact cost**. When the cost of reducing the impact (**control cost**) is plotted, it can be seen that as more money is spent on control, less waste is discharged/disposed of (and hence less likelihood of impact). Where the two curves intersect, control costs are equal to impact costs (point Q*). This quantity of impact represents the optimal level of utilisation that industry can maintain if the money spent controlling impact is to be equal to the costs of the impact caused by the discharge/disposal of waste.

At Q_1 the cost of controlling the impact exceeds the impact caused by the waste discharged/disposed of; in other words the amount spent is greater than the benefits gained from improved water quality. At Q_2 the cost of impact caused by the discharge/disposal of waste to society exceeds the cost to impactors of cleaning up the impacts.

It is clear from Figure 2.1 that the optimal level of utilisation is not zero. It is a point at which impactors can continue to produce goods while an acceptable level of water quality is maintained.

ii) The deterrent objective

A WDCS that deters impactors from impacting on the water quality will probably need to be developed on a trial-and-error basis. So many variables influence the decision making of impactors that the only way to establish the point at which a charge becomes a deterrent to reduce their impacts, is to systematically try different charge levels and monitor the response of impactors. This involves starting with relatively low charges and increasing

them systematically until they provide a sufficient incentive for impactors to reduce their waste discharges. The main drawback of this approach is that while the deterrent level of the charge is being determined, an uncertain investment environment is created for the private sector, in which individual firms have little indication of the level at which the charge will stabilise.

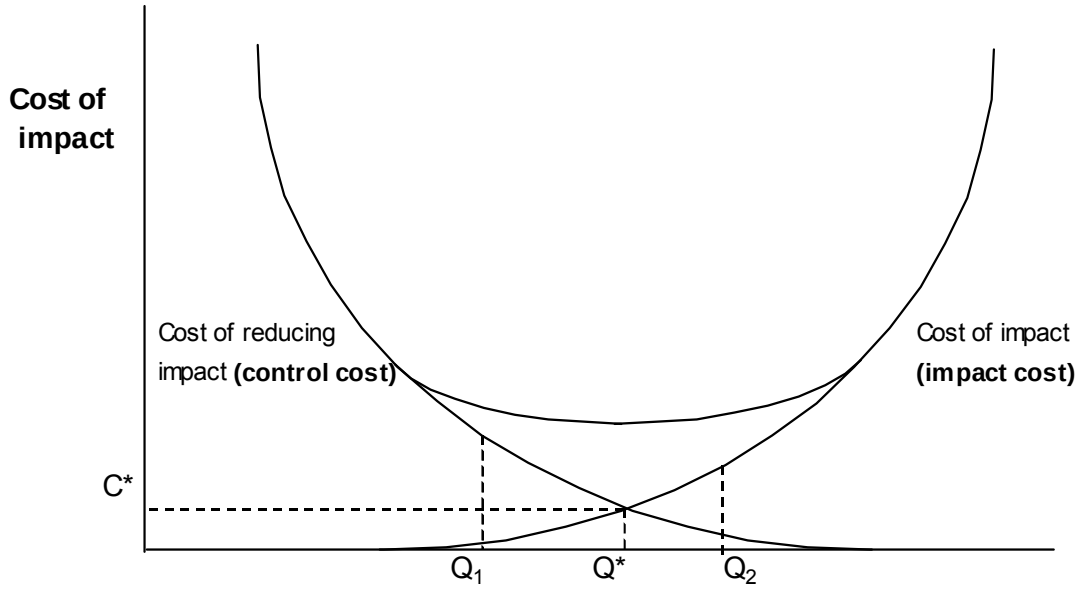


Figure 3.1: The determination of the optimal level of utilisation in terms of the *polluter pays* principle (PPP)

iii) The revenue objective

Waste discharge charges can also recover some of the costs imposed by the discharge/disposal of waste on various parties. In order to adhere to the PPP the revenues should be spent in such a way that those affected by the associated impact benefit. While most of the immediate impacts are likely to be felt within the same water management area (WMA), it is possible that there will also be impacts outside the WMA.

Revenues could be used for a range of purposes in keeping with the PPP, including:

- Monitoring impacts and operating the system of charges
- Water quality management
- Indirect compensation of victims by subsidisation
- Cross-subsidies to assist other impactors to reduce the impacts associated with their discharge/disposal of waste.

Possible means of employing the revenue obtained from the WDCS should be investigated, taking account of the financial and tax structures of the country. No double-charging should, however, transpire from the charges levied, and the charge system should address appropriate mechanisms to ensure that this is prevented.

Cross-subsidisation should be handled with care, and should be employed only in the following cases:

- to mitigate impacts of national importance, or potentially life-threatening situations (but only until basic human needs are met);
- where cross-subsidisation could lead to effective utilisation of the water resource; and
- where cross-subsidisation could lead to improved economic efficiency.

For example, subsidies could be made available for the capital cost of erecting new, or upgrading existing treatment works that would lead to more efficient water use and improved water quality within the same WMA. Revenue could also, for example, be spent on pollution backlogs, such as the rehabilitation of abandoned mines, again within the same WMA. Cross-subsidisation between WMAs could be considered if:

- water is transferred from one WMA to another;
- one WMA flows into another (compensation for the impact caused by the upper WMA); or
- it is in the national interest.

As the cross-subsidisation of some impactors by others may become very contentious, it would be prudent to clarify the basis upon which cross-subsidisation would take place, i.e. it would be necessary to develop scenarios in which cross-subsidisation would be acceptable during the implementation of the WDCS. It would further be necessary to develop mechanisms to evaluate the scenarios in order to employ cross-subsidisation in an equitable manner and on a transparent basis. Because of the contentious nature of this aspect of the WDCS it would be necessary to develop these mechanisms with the participation of various stakeholders to ensure the acceptability thereof, and ultimately, the success of the system.

iv) What is the impactor paying for in a PPP-driven charge system?

The relationship below indicates the costs that the impactor imposes on society as a result of his/her waste discharge to a water resource or disposal of waste:

$$\mathbf{C}_{\text{Total impact}} = \mathbf{C}_{\text{Admin}} + \mathbf{C}_{\text{Direct}} + \mathbf{C}_{\text{Indirect}} + \mathbf{C}_{\text{Oppor}}$$

Where:

$\mathbf{C}_{\text{Total impact}}$ = Total cost impact of waste discharge/disposal on society
$\mathbf{C}_{\text{Admin}}$ = Cost to government of monitoring and policing impacts
$\mathbf{C}_{\text{Direct}}$ = Direct cost of impacts on downstream water users

$\mathbf{C}_{Indirect}$ = Indirect cost to the economy
$\mathbf{C}_{Oppor}$ = Opportunity cost of water which has been impacted upon, i.e. the cost of not being able to use the water for a particular purpose.

It may seem logical for the victims of water quality deterioration to be directly compensated for the complete cost of the impact. In reality, no country has a system in which impactors pay the full value of the externality. Aside from the practical difficulties of always establishing the total value of an externality, forcing impactors to pay for the total costs (including direct and indirect costs) of their externality would cause enormous economic upheavals.

Similarly, the victims of pollution are most probably consumers of products, the manufacturing of which causes an impact. Hence full compensation may not always be warranted. Consequently, the PPP only aims to recover a portion of the total impact cost. Theoretically, this portion should correspond to the optimal level of utilisation. In practice, we have no way of knowing what this is. However, the assumption is made (and studies have shown) that if all the $\mathbf{C}_{Admin}$ costs and a portion of the $\mathbf{C}_{Direct}$ costs are recovered from the impactor in order to meet the deterrent and revenue objectives of the system, then investment will not be discouraged nor economic growth affected.

While it is feasible to establish the cost of mitigating the impact on the water quality (abatement cost), returning a water resource to its original state, it is much more difficult to assess the cost of its impact on the environment. This problem is closely related to the problem of allocating a monetary value to the environment. Two broad approaches for valuing the environment exist, namely:

- *Demand curve approach*: approaches the value of the environment in terms of society's preference for environmental goods and services.
- *Non-demand curve approach:* looks at the actual cost of potential damage, the cost of restoring damage, etc.

Given the assumptions that underpin the various valuation techniques, different techniques will yield different values. There is no local or globally accepted best method of valuing the environment.

3.3 Mechanisms to support a waste discharge charge system

3.3.1 Introduction

The following sections present a range of mechanisms that could be used or developed to support the implementation of a WDCS. This list is, however, not exhaustive and other mechanisms may be required for the successful implementation of the system, depending on the circumstances. They are presented in the following categories:

- Legal framework
- A set of charges
- The setting of charges
- Monitoring and evaluation
- Penalties
- Dispute resolution
- Revenue disbursement
- Training

3.3.2 Legal framework

It is of utmost importance that the legal framework allows for the development and implementation of a WDCS. It the legal system does not support such a charge and its objectives, or the associated penalty systems and disbursement of revenue, the system would err and the value of the system would be diminished.

3.3.3 A set of charges

A set of charges for a WDCS may include the following:

i) Administrative charge

The purpose of an administrative charge is to recover the costs associated with administering the WDCS. The administrative charge is the minimum charge that should be payable by *all* impactors for using the water resource, regardless of the composition of the waste discharged/disposed of.

However, regardless of how the charge is made up it is important that the agency responsible is transparent in determining the administrative charge and that double-charging is not introduced through the system. It is unacceptable to burden impactors with the cost of maintaining an inefficient or bloated bureaucracy, or indeed an overly diligent water quality monitoring system. The costs associated with running the system should be reasonable and wholly justified.

ii) Point source waste load charges

A waste load charge (WLC) can become payable by impactors when they discharge or dispose of waste through water. As its name suggests, a WLC is levied at a fixed rate on the waste load discharged/disposed of. The point at which it becomes payable is debatable; however, it is a WMA-specific charge and is dependent on the requirements of the receiving water resource. Its function is two-fold: firstly to recover a portion of the costs associated with the discharge/disposal of waste, and secondly, to deter impactors from excessive impact. Ideally, the maximum revenue obtained from all WLC payments in a WMA should not exceed the total direct impact costs ($\mathbf{C}_{Direct}$) of the discharge/disposal of waste.

iii) Non-point source waste load charges

A non-point source waste load charge is levied according to an estimate of the non-point source waste load and how that load should be distributed among the known contributors. In many cases, when the locality and the magnitude of a non-point source are known, it is possible to determine its contribution by monitoring the water resource upstream and downstream of the diffuse source. The difference in the measured loads would be the contribution of a conservative waste source. This methodology is applicable only when one impactor is responsible for an activity along a particular stretch of a river, as often happens with mining. However, if a number of impactors share the land draining to the same stretch of river, it would be impossible to separate the contribution of each impactor using this approach.

iv) Non-point source waste load shadow charges

Because of the imprecise or immeasurable character of some non-point waste sources, shadow charges can be levied against a measurable feature of the production process that can be logically linked to the output of non-point waste sources. It is a charge that approximates the level of impact, by targeting a facet of the production process that is related to the level of impact coming from that process. It is, however, not a charge that is easily implemented, due to the difficulty of calculating such a charge. Further, it is not possible to introduce shadow charges under the current legal framework, as they cannot be related to a water use, i.e. before shadow charges can be introduced, the National Water Act would have to be amended to allow for such charges.

3.3.4 The setting of charges

In order to set charges in accordance with the PPP, they must have a direct correlation with actual costs associated with impact caused by the discharge/disposal of waste. In order to set appropriate charges the following must be developed or identified:

- Key representative pollutants
- Methods to determine the direct impact costs of the discharge/ disposal of waste
- Abatement costs for categories of pollutants
- Methodologies for costing WDCS administering agencies
- Charge estimation and distribution models.

3.3.5 Monitoring and evaluation system

There is a need to establish a system that enables the agency responsible for administering waste charges to constantly monitor the WMA. This system must provide information for three purposes:

- to determine whether the charge is acting as a deterrent, thereby reducing the generation of waste and its associated impact;
- to ensure that all impactors are in full compliance with the requirements of the system; and
- to provide a basis for the adjustment of charges, should it be deemed necessary.

In order to determine whether the WDCS is meeting its objectives, regular and transparent performance evaluations (audits) will be required. To ensure compliance, the administering agency will also need to conduct random, periodic, independent audits of the monitoring equipment and records of impactors.

3.3.6 A penalty system

As with any statutory revenue system, misuse, abuse, avoidance, non-payment and negligence on the part of the impactor are all actions that may attract penalties. The point at which system penalties cease and court action starts is a policy decision, but current trends clearly indicate an increase in the scope and magnitude of penalty systems. There is evidence to show that well-developed, harsh penalties can substantially reduce system administration costs and consequently administrative charges.

Weak penalty systems tend to be associated with large bureaucracies and substantial legal costs. The frequent mistake made by governments is in assuming that severe offences should be referred to the courts, where examples can be made of the guilty party. Invariably, deliberate delays and highly competent defence teams can render such systems impotent. Tough penalty systems, on the other hand, have proved to be a far more effective form of punishment and deterrent, and have the added benefit of generating revenue. A penalty system may incorporate the following charges:

i) Non-compliance charge

A non-compliance charge (NCC) is a penalty charge that can be levied on waste discharges that exceed a specified standard or objective (e.g. maximum allowable concentration) for a particular pollutant in a particular WMA.

A NCC could be levied at variable rates based on the degree to which it exceeds the standards/objectives, as determined by the agency administering the charge or a higher authority. The variable aspect of the rate could also increase in equal proportions the higher the pollutant concentration. In situations where the pollutant is highly problematic, an exponential rate increase could be applied.

A further penalty could be imposed should an impactor decline to take remedial action, firstly to mitigate the impacts caused by non-compliance, and secondly to ensure long-term compliance with the standards/ objectives. This

penalty need not necessarily constitute a charge, but could include, for example, withdrawing a water use licence or closing a discharge pipe.

ii) Toxicity charges

Many waste charge systems distinguish between different pollutants according to their toxicity and the requirements of the receiving water resource. The charges are proportionally higher for the more hazardous pollutants. This charge penalises impactors discharging effluent containing hazardous substances and encourages or justifies improved waste treatment.

iii) Late or non-payment penalties

A further possibility is the imposition of a fee for the late or non-payment of charges due.

3.3.7 Dispute resolution mechanisms

It may be that the charges developed are too low and insufficient to compensate affected parties or too high and result in a curtailment of economic development. Similarly, impactors may feel aggrieved at the calculations made by the administering agency regarding their payments. In all cases, affected parties should have the opportunity to appeal. It will be critical to the success of a WDCS to have an agreed upon non-judicial dispute resolution procedure in place from the outset.

3.3.8 Revenue disbursement

In order to redress economic distortions arising from polluting activities, it is important that the revenues derived from waste discharge charges are properly employed. Returning such revenues to the general fiscus has proved extremely problematic in many countries as the charge is removed from the area of impact, thus placing the victims of pollution in an abused and neglected position. Such a move also contravenes the transparency requirement of the PPP, and as such has been rejected as an option in the National Water Act.

Revenues could be used for a range of purposes in keeping with the PPP, including (also refer to Section 3.2.2(iii)):

- Monitoring impacts and operating the system of charges.
- Water quality management.
- Indirect compensation of victims by subsidisation.
- Cross-subsidies to assist other impactors to reduce the impacts associated with the discharge or disposal of their waste.

Generally, one of the first priorities is the implementation of a system for water quality monitoring and control, and the administration of the charge system.

Following this, revenues can be used to mitigate against negative environmental impacts, to implement measures to improve water quality management, and to further develop water quality policy. For a charge system to be acceptable and effective, it should make provision for some of the revenue to directly benefit other water users affected by the impacts of the discharge/disposal of waste.

3.3.9 Training

A training package will need to be developed for the staff of agencies administering and implementing the charge system to enable them to establish and manage the new system effectively. Training for impactors is also important, so that they understand how the system will operate and what it will require of them.

4. AIMS OF THE WASTE DISCHARGE CHARGE SYSTEM

a) Promote sustainable development and efficient utilisation of water resources

Economic development should take place in a sustainable manner, considering the needs of future generations. Water resource conservation, including the efficient and effective use of water, waste reduction and the overall protection of the water resource, should be promoted to ensure transmission to future generations. The system must therefore introduce the use of economic instruments, including incentives and disincentives, to encourage the reduction of waste and to reduce detrimental impacts on water resources, i.e. the system should provide sufficient incentive for impactors to minimise their waste discharge/disposal and deter them from excessive and harmful impacts.

b) Promote the internalisation of environmental costs

Waste discharges should not impose a cost upon society or cause harm to others; therefore, negative externalities, i.e. externalities that decrease the welfare of the third party, should be internalised. The responsibility for environmental costs should be shifted to the impactor, thereby reflecting the true cost of production. The system should therefore aim to promote the internalisation of impact costs caused by the discharge or disposing of waste into a water resource through the use of economic instruments.

c) Revenue objective

One of the main objectives of the system is to recover some of the costs imposed by the discharge or disposal of waste (financial charge). The financial charge should at least recover $\mathbf{C}_{Admin}$ and a portion of $\mathbf{C}_{Direct}$ to meet the revenue objective of the system and should increase with inflation. The

system should, however, be developed within the overall context of the Pricing Strategy, and the waste discharge charges set should dovetail with the charges set in the Pricing Strategy to avoid double-charging.

d) Deterrent objective

Apart from recovering the financial cost associated with the discharge or disposal of waste, the charge should also have an incentive component designed to encourage the optimal utilisation of water resources and the reduction in waste in order to reduce the detrimental impacts on water resources (economic charge). The economic charge should provide for appropriate rebates for the adoption of cleaner technologies and investments in abatement methods. It could also be used, for example, as a deterrent of non-point (diffuse) sources, thereby encouraging point source discharges that are measurable and thus more manageable. This charge should reduce over time as performance increases and should be regularly assessed in terms of the objectives of the incentive instrument. If effective, this will ultimately result in a decline of the generated revenue over time.

5. PRINCIPLES TO GUIDE THE WASTE DISCHARGE CHARGE SYSTEM

In this section, principles to guide the development of the WDCS are described in some detail. The issues discussed are guiding principles only and the reality of the social, economic and political circumstances of the country must be recognised when considering these principles.

a) Environmental vs economic efficiency: The system should aim to create a win-win situation where economic and environmental forces combine in aiming for sustainable development, i.e. the system should maximise the environmental benefits, while taking into consideration the costs and benefits to other parties. A suitable trade-off between economic development and environmental conservation (water resource protection) should be established based on the **optimal level of utilisation**, as described in Section 3.2.2 (i).

b) Affordability: The economic and social circumstances should be taken into account to ensure affordability of the system. The system must be reasonable, justifiable, should not promote economic decline and should maximise social benefits, i.e. sustainability of both the economic activity and the water resource must be ensured.

c) Equity: The charge system should not create inequitable impacts on different sectors of society and the associated costs should be equitably distributed. The charge should be applied to all waste-producing activities impacting on water resources, regardless of the nature of discharge (point vs diffuse, surface vs subsurface). The system should further provide efficiency and equity in the provision of water quality.

d) **Financially viable:** The administration of the system should be self-financing, i.e. sustainable and financially viable in the long-term and should not place additional strain on the general fiscus.

e) **Simplicity:** The system should be understandable to both the agency administering the system as well as the impactors, and easy to implement, thereby ensuring its effectiveness and limiting the cost of implementation. This will further contribute to the financial viability, affordability and ultimately, the acceptance of the system.

f) **Transparency:** In order to ensure transparency during the development and implementation of the system, an extensive consultation process will be required, and the participation of all affected parties, i.e. regulators, impactors and parties affected by the impacts caused by the discharge/disposal of waste. The necessary institutional arrangements and processes to ensure effective consultation should be developed as part of the system, i.e. the identification and establishment of the necessary management structures and communication systems.

g) **Acceptability:** The success of the system will be mainly dictated by its acceptance by the affected parties. To ensure acceptance of the system, the following issues need to be addressed:

- Effective participation by main roleplayers
- Effective decision making
- Sufficient time to facilitate effective participation and decision making
- Adequate technical analyses.

h) **Consistency:** The system must be consistent with national macro-economic goals and programmes, such as job creation, economic growth and international competitiveness. The system should further be consistent with any other initiatives currently being developed in terms of the National Water Act, such as other water use charges, licence fees, etc. It should also take cognisance of other government initiatives that may have an impact on the water resources, for example subsidisation of irrigation schemes in previously disadvantaged communities.

i) **Dependency:** Economic instruments on their own are insufficient for the control of water quality and they should complement and not replace the CAC approach of water resource management. The system should address the direct linkages and interaction between these two systems and ensure that they dovetail. The two systems must further be based on the same information and principles to ensure effectiveness and consistency.

j) **Gradual introduction:** The WDCS should be introduced in a phased manner to i) allow time for adjustment, permitting impactors adequate time to adapt, and to plan and introduce control systems involving capital expenditure; and ii) allow flexibility to first introduce charges for point sources, expanding to non-point sources at a later stage. Follow-up charges could also include charges to enhance the deterrent objective. The manner in which the system is phased in should be devised taking cognisance of the socio-economic impacts of the charge and should not carry with it a gradually increasing cost to the economy. The legal requirements of and time frames specified within legislation other than the National Water Act should also be taken into account (refer specifically to the Water Services Act dealt with in Section 2.2). A maximum time limit for the introductory phase should, however, be set.

k) **Predictability/stability:** The system should be phased in such that the impactors could anticipate the end result, without the frequent shifting of goalposts. It is therefore important to create a stable costing environment that would be conducive to continued planning and investment.

l) **Clearly stated incentive purpose:** The system must have a clearly stated incentive purpose in order to reduce waste. Possible incentives could include discounts on charges for discharges that improve upon the standard, higher charges for non-point sources (as an incentive to convert non-point to point sources) and subsidies for the adoption or use of improved technology and equipment to control or reduce certain waste streams.

m) **Application:** Since the National Water Act includes watercourses, surface water, estuaries and aquifers in its definition of a water resource, waste discharge charges will apply to both surface and groundwater resources. The WDCS will further be applied to the following water uses as listed in Section 21 of the Act (also refer to the Legal Framework, Section 2.1):

(e): *engaging in a controlled activity* – relating to the irrigation of any land and the intentional recharging of an aquifer with any waste or water containing waste, as defined in Section 37(1)(a) and (d) of the Act;

(f): *discharging waste or water containing waste into a water resource;*

(g): *disposing of waste in a manner which may detrimentally impact on a water resource*;

(h): *disposing of water which contains waste from any industrial or power generating process*; and

(j): *removing, discharging or disposing of water found underground* – relating only to the discharging or disposing of water containing waste into a water resource.

n) **Calculation:** During the calculation of the waste discharge charge, the following should be considered:

i) Related to the impact cost: The waste discharge charge should be related to the direct impact cost of the impact caused by the discharge/ disposal of waste. The charge should therefore be proportional to the impact experienced by the affected parties. In circumstances of uncertainty one could resort to the

use of a cost-benefit analysis. If direct impact costs are difficult to estimate, then abatement costs could be used where abatement is viable and feasible. If both costs exist (abatement cost and impact cost), the lessor of the two should be used. The system should be clear on how both the direct impact and abatement costs will be calculated.

ii) Basis for calculation: Distinctions should be made between different pollutants or groups of pollutants according to their toxicity and potential impact. The charge of certain pollutants (salinity) could be based on the total load associated with the discharge/disposal of waste, while that of others (potentially hazardous pollutants) could be based on maximum allowable concentrations. Certain hazardous pollutants or groups of pollutants could be totally banned, and should therefore not be regulated through or form part of the WDCS.

iii) Site-specific: The charge should be calculated on a site-specific basis for each WMA, based on the particular circumstances and the optimal level of utilisation of the water resources within the WMA. Aspects that should be recognised are the resource quality objectives and requirements of the receiving water resource, as well as the direct impact cost associated with the discharge/disposal of waste in the specific WMA.

iv) Double-charging: No double-charging should transpire from the charges levied, and the system should address mechanisms that will ensure that double-charging is prevented.

v) Cross-subsidisation: The system should be clear on the aspect of cross-subsidisation, if and when applicable, and to what degree. The system should also include control systems to manage this effectively (also refer to Section 3.2.2 (iv)).

o) Requirements for implementation:

i) Enforcement: The system must place the onus for monitoring/control systems and accurate measurements of impacts on the impactors (waste producers). However, regular environmental audits of these programmes by the legislators administering the system will still be required.

ii) Resources: The necessary financial and human resources and legal authority to implement the WDCS should be determined as part of the system, i.e. legal, accounting and auditing functions.

iii) Cost: The additional cost to government to implement the charge should be determined, i.e. administrative and auditing costs. The system must preferably be self-financing, putting no strain on the general fiscus, and require minimum costs for implementation.

iv) Revenue disbursement: The possible means of employing the revenue obtained from the system should be investigated, taking into account the financial and tax structures of the country.

v) Opportunity to appeal: All parties, including the impactors, the affected parties and the legislators, should be allowed an opportunity to appeal against a decision made in terms of the WDCS.

vi) Other: The system should identify and list all other actions that are required to implement the WDCS successfully, for example registration of water use (specifically with regard to waste production), application of

licences, establishment of catchment management agencies (CMAs) and catchment management strategies (CMSs), etc. The dependency/linkages between the different systems should be investigated and clearly defined. It must further be ensured that the different systems dovetail with each other to ensure effectiveness and consistency.

p) Allocation of revenue: Use of revenues must be transparent and open for examination. A clear link must be established between the spending and levying of charges. Payments must be placed in dedicated accounts earmarked for activities related to water quality management, and should be used predominantly in the same WMA, but in certain circumstances across WMAs (in the case of water transfers, etc.).

6. WAY FORWARD

6.1 Management of the process

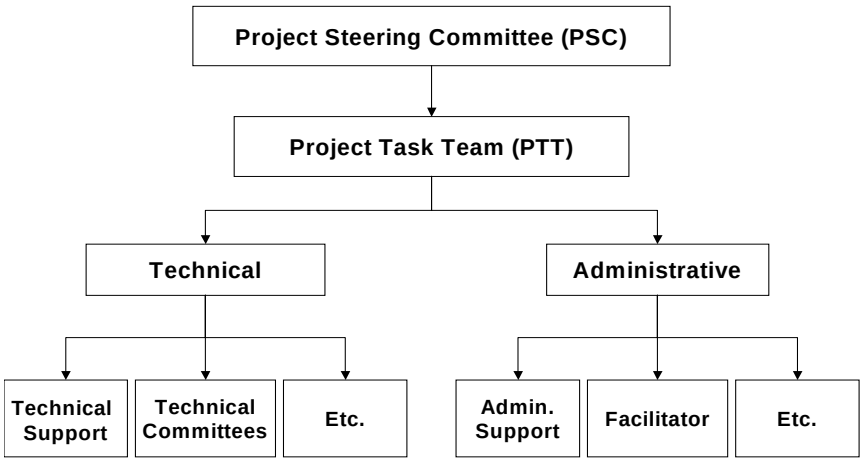
The project team responsible for the development of a WDCS consists of two committees, namely:

Project Steering Committee (PSC): The PSC will to a large extent steer the project by defining the Terms of Reference for the Project Task Team (PTT), monitoring the progress and evaluating the recommendations and final proposal made. The committee will further provide the necessary support and funding to the PTT. The PSC meets every three months.

Project Task Team (PTT): The main objective of the PTT is to develop the WDCS, based on the guidance from the PSC. The PTT meets on a monthly basis.

The structure of the project team responsible for developing the WDCS is shown in the diagram below.

PROJECT MANAGEMENT



6.1.1 Project Steering Committee (PSC)

The PSC is currently constituted as follows:

- Department of Water Affairs and Forestry:
  - Chief Directorate: Water Use & Conservation
  - Chief Directorate: Scientific Services
  - Chief Directorate: Planning
- Water Research Commission
- Department of Finance
- Department of Trade and Industry
- Industry:
  - Mining Sector
  - Business Sector
  - Municipal Sector
  - Chemical Industry
- Labour Sector

The Terms of Reference of the PSC are to:

- define the Terms of Reference for the PTT
- monitor and evaluate functions
- provide necessary support and funding
- evaluate the final proposals
- develop a communication strategy.

6.1.2 Project Task Team (PTT)

The PTT is currently constituted as follows:

- Department of Water Affairs and Forestry:
  - Directorate: Water Quality Management (Project Leader)
  - Chief Directorate: Water Services
  - Directorate: Resource Economics
  - Directorate: Geohydrology
  - Institute for Water Quality Studies
  - DWAF Regional Offices
- Water Research Commission
- Industry:
  - Mining Sector
  - Business Sector
  - Municipal Sector
- Labour Sector
- Government:
  - Department of Finance
  - Department of Minerals and Energy
  - Department of Environmental Affairs and Tourism
- Consultant(s) to assist the PTT

The Terms of Reference for the PTT are to:

- develop a waste discharge charge system
- develop proposals on the implementation thereof
- manage and implement a task list
- manage and update an action plan
- manage budget and finances
- develop and implement a communication strategy, and
- initiate and co-ordinate the public participation process.

6.2 Action Plan

It is envisaged that the WDCS will be developed in **four** phases, each of which is linked to outputs, namely:

- Phase 1: Initialisation of the process
  - ⇨ **Framework Document**
  - ⇨ **April 1999 – December 1999**

- Phase 2: Development of draft strategies
  - ⇨ **Draft Strategy Document**
  - ⇨ ***Regional Workshops*** *(see Section 6.3.2(b) below)*
  - ⇨ **January 2000 – December 2001**

! Phase 3: Development of the final strategy
  - ⇨ **Final Strategy Document**
  - ⇨ ***Regional Workshops*** *(see Section 6.3.2(c) below)*
  - ⇨ **January 2002 – December 2002**

! Phase 4: Implementation of the final strategy in trial WMAs
  - ⇨ **Guideline Documents**
  - ⇨ **January 2003 onwards**

Phase 1 of the project has now been completed, the deliverable being this document. The project is now entering Phase 2, which entails the development of draft strategies for the introduction of a WDCS. The approach to be followed during Phase 2 of the project is summarised below. No processes have yet been devised for Phase 3 and Phase 4 of the project, as these will depend entirely on the outcome of the investigations and the draft strategies developed during Phase 2.

6.2.1 Methodology for Phase 2

The methodology for Phase 2 of the project consists of 13 steps, each of which is linked to a clearly defined product. The approach and its deliverables are summarised below.

- **Step 1 - Problem conceptualisation:** In order to work towards a common understanding, the necessary multi-dimensional background research will be undertaken and a Perspective Report will be produced as discussion document for a technical workshop.

  Deliverable: Perspective Report and interpretation of technical workshop to develop a conceptual framework for the study.

- **Step 2 – Inception report:** Due to the complexity of the problem and to ensure that the knowledge gained during Step 1 is fully accounted for, provision is being made for an Inception Report to define the scope of work for the rest of the project. The Inception Report will be submitted for approval before the work on the next steps will commence.

  Deliverable: Approved Inception Report.

- **Step 3 – International best practices:** In order to maximise the experience gained with similar pollution charge approaches in other countries, this step will be utilised to compare and evaluate different discharge charge options.

  Deliverable: On-going inputs of international best practices with respect to various elements of the study.

- **Step 4 – Investigate target pollutants:** The purpose of this step is to undertake a technical investigation of the different types of pollutants in order to identify which can be targeted for discharge charges. The optimum combination of pollutants to achieve the desired water quality will be identified.

  Deliverable: Recommended configuration of target pollutants or combination of pollutants.

- **Step 5 – Tariff charge structure:** The purpose of this step is to develop a tariff charge structure for the identified target pollutant or combination of pollutant groups. Different options will be investigated. Based on this tariff charge structure, the additional cost to the economy can be determined.

  Deliverable: Different options for tariff charge structures for the identified target pollutants.

- **Step 6 – Economic impact analysis:** During this step the sensitivity of the national economy with respect to the introduction of discharge charges will be investigated. This will be done by simulating the environmental and economic impacts of the targeted pollutants, i.e. quantitative information associated with the different classes of pollutants, discharge rates and impact associated with these pollutants.

  Deliverable: Comparative economic impact results of the different target pollutants, expressed in economic production of employment.

- **Step 7 – Investigate institutional systems:** Concurrent with the technical and economic impact analysis, the institutional make-up of a possible discharge charge system will be investigated. An important input with respect to this analysis is a review of the institutional arrangements of the systems in other countries by means of the international best practice analysis.

  Deliverable: A series of institutional and organisational guidelines with respect to the formulation of an efficient system.

- **Step 8 – Formulate interim discharge charge system options:** The results of the preceding analysis will act as inputs towards the formulation of a series of interim discharge charge systems. A methodology to calculate charges for each pollutant group or combination of groups will also be developed at this stage. These options will be of an interim nature and will have to be refined in future steps.

  Deliverable: A description of different discharge charge options.

- **Step 9 - Financial and environmental impact:** During this step the financial and environmental impacts of the different options compiled will be investigated. The financial implications will be simulated by means of a simplified financial model. The purpose of the model is to determine the potential revenue and expenditure regimes that can be applied with the WDCS. Furthermore, different possibilities of applying the revenue for water management purposes will also be tested.

  Deliverable: A spreadsheet illustrating financial feasibility of different charge systems and a memorandum illustrating the environmental impact of the different options.

- **Step 10 - Revise options:** The purpose of this step is to revise and limit the different options formulated during Step 8. A set of criteria will be compiled and applied to limit the number of options.

  Deliverable: Identification of a limited number of best options.

- **Step 11 - Induced effects and Cost Benefit Analysis (CBA):** The purpose of this step is to identify the preferred charge systems. In order to achieve this, the remaining economic aspects that need to be tested are the induced financial implications. Together with the results of the previous economic impact analysis, these induced economic implications represent the cost elements of a CBA. The benefits of the proposed options will include, for example, socio-economic benefits and improved water quality.

  Deliverable: CBA results of the different discharge charge options. The results will be utilised to identify a best or preferred option(s).

- **Step 12 - Regional consultation:** The purpose of this step is to present the different options to all relevant stakeholders. The objective would be to obtain inputs with respect to the preferred water discharge charge systems. The proceedings of the workshops will be utilised as inputs toward the compilation of the final report.

  Deliverable: Regional inputs with regards to the different discharge charge options.

- **Step 13 - Strategy formulation:** The purpose of this step is to describe the preferred options as a possible waste discharge strategy. This implies that the preferred options will be packaged as implementable actions and published for comments in the *Government Gazette*. Comments received will be utilised during the next phase, i.e. the drafting of the final strategy.

  Deliverable: Description of the preferred discharge charge option.

6.3 Communication Strategy

As the WDCS will affect many water users, it is vital that the development of the system takes account of a broad range of issues and stakeholder views, while also running to schedule and within the framework created by the National Water Act.

The framework for the communication and participation strategy outlines the approach to achieve the above.

The communication strategy is divided into two sections, namely the:

a) **Internal Strategy**, to address communication issues within DWAF, between the PSC and the PTT, and between DWAF and the specialist consultants.

b) **External Strategy**, to reach the broader stakeholder grouping.

6.3.1 Objectives of the strategy

The objectives of the **Internal Strategy** are to ensure:

- that all DWAF initiatives dovetail, and no duplication of effort results;
- effective management of the process, including the involvement of consultants;
- quality control of the information input and output; and
- effective decision making.

The objectives of the **External Strategy** are:

- to inform the broader stakeholder grouping of the strategy;
- to stimulate debate;
- to prompt for feedback and input;
- to reach a wide range of sectoral representatives;
- to ensure that all relevant government departments have input to the development of the strategy, to prevent duplication and/or conflicting approaches;
- to ensure acceptance of the strategy to guarantee successful implementation; and
- to ensure necessary capacity building.

6.3.2 Phases of the communication strategy

The anticipated tasks and outputs associated with the communication strategy are summarised below.

a) Phase 1: Initialisation of the process

The communication aspects of Phase 1 extended from July 1999 to December 1999. The following outputs were indicated for this phase:

- **Proceedings** of PSC and PTT meetings recorded and distributed to members.
- Establishment of a **Stakeholder Database** of representatives of different industry sectors, government representatives (at all tiers), consultants and other stakeholders. The database has been structured into nine provincial listings and one national listing.
- Development and distribution of an **Introductory Newsletter** to all stakeholders, to inform them of the project and gauge the level of interest.
- Development and distribution of a **Framework Document** to those stakeholders who indicated interest.
- *Ad hoc* facilitation of communication between DWAF and consultants as required.

b) Phase 2: Development of draft strategies

The communication aspects of Phase 2 will extend from January 2000 to December 2001. The following outputs are indicated for this phase:

- **Proceedings** of PSC and PTT meetings recorded and distributed to members.
- Nine **Regional Workshops** held for widespread debate on the draft strategies; proceedings of all workshops developed and distributed to participants.
- Two follow-up **Newsletters** developed and distributed to interested parties.
- One **Press Release** to targeted national and provincial print media.
- Development and distribution of **Draft Strategy Document** to interested stakeholders for comment.
- **Publication** of the Draft Strategy Document in the ***Government Gazette*** for public comment.

c) Phase 3: Development of the final strategy

The communication aspects of Phase 3 will extend from January 2002 to December 2002. The following outputs are indicated for this phase:

- **Proceedings** of PSC and PTT meetings recorded and distributed to members.
- Nine **Regional Workshops** held for discussion on the possible implementation of the final strategy; proceedings of all workshops developed and distributed to participants.
- One follow-up **Newsletter** developed and distributed to interested parties.
- One **Press Release** to targeted national and provincial print media.

- Development and distribution of the **Final Strategy Document** to involved stakeholders.
- **Publication** of the Final Strategy Document in the ***Government Gazette***.

d) Phase 4: Implementation in trial Water Management Areas

This phase is planned to start in January 2003. No communication strategy has yet been devised for this phase, and will depend on the outcome of the previous phases.

e) Additional Considerations

- Targeted capacity building. A possible option is informative documents for regions to liaise with community representatives and forums.
- Linking of the regional workshops to CMA/CMF groups and meetings.
- Publication of informative pamphlets and posters for additional distribution.
- More regular press releases.
- Input into the National Water Forum, i.e. using the Forum as a vehicle to disseminate information.

APPENDIX A

TERMINOLOGY AS IT RELATES TO WASTE DISCHARGE CHARGES (TO BE EXPANDED AS NECESSARY)

Abbreviations:

CAC	:	Command-and-Control
CMA	:	Catchment Management Area
CMS	:	Catchment Management Strategy
DWAF	:	Department of Water Affairs and Forestry
NCC	:	Non-Compliance Charge
NWRS	:	National Water Resource Strategy
PPP	:	*Polluter Pays* Principle
PSC	:	Project Steering Committee
PTT	:	Project Task Team
WDCS	:	Waste Discharge Charge System
WLC	:	Waste Load Charge
WMA	:	Water Management Area

Definitions:

Abatement costs

The cost of returning water to its original or an acceptable qualitative state or of ensuring pollution prevention at source. Abatement costs are sometimes expressed in terms of the cost of treating a unit of water (m^3) to a desired quality, or alternatively in terms of the cost of removing a unit of pollutant (kg) from the water. However, abatement cost functions are seldom linear, particularly when treating small volumes of water or treating water containing high concentrations of pollutants.

Administration costs

The costs incurred by the body tasked with administering a WDCS. These costs may include water quality monitoring, determining impact costs, identifying impactors and collecting discharge information, sending out accounts, receiving payments, and maintaining the associated information management system. Depending upon policy direction, administrative costs may include the cost of disbursing a portion of the revenues from a WDCS. In the South African context, it will be important to ensure that such a charge does not include costs associated with bulk water supply, as there are other charges in place to recover such costs.

Catchment

A catchment is the area from which any rainfall will drain into a watercourse or watercourses or part of a watercourse, through surface flow to a common point or points. The use of the term is most prevalent in South Africa, as the international water industry has increasingly adopted the alternative term *drainage basin*.

Catchment Management Agency
Catchment Management Agencies (CMAs) are statutory bodies established under Section 78 of the National Water Act, 1998. The purpose of establishing these agencies is to delegate water resource management to the regional or catchment level and to involve local communities, within the framework of the National Water Resource Strategy (NWRS). CMAs are governed by a Board representing the interests of existing and prospective water users, local and provincial government and environmental interest groups. The role of CMAs is to manage water resources within a defined WMA. Such management is carried out in accordance with a Catchment Management Strategy (CMS), which is prepared by the CMA.

Catchment Management Strategy
Section 8 of the National Water Act, 1998 requires that a CMA progressively establishes a catchment management strategy (CMS) with the co-operation and agreement of all interested and affected parties within its WMA. A CMS must set principles for allocating water to existing and prospective water users, taking into account the protection, use, development, conservation, management and control of water resources. The CMS must be in harmony with the NWRS and must be formally reviewed from time to time.

Charge
A fee, price or tariff imposed under the National Water Act, 1998 in relation to the use of water.

Command-and-control (CAC)
This is the term generally applied to an approach to water resource management that is based on the imposition of defined regulated or legislated standards for waste discharges. Such standards may relate to specific water quality determinants and may be effective in certain geographic areas. Failure to comply with such standards may result in penalties being imposed on the guilty party.

Compliance monitoring point
The purpose of a compliance monitoring point is to ascertain whether or not impactors are complying with agreed discharge limits or in-stream objectives and are in compliance with the waste discharges they declare. A compliance monitoring point can also be used to determine the waste load contribution from a specific source or known combination of sources.

Control cost
The cost to control the impact caused by the discharge or disposal of waste, thereby reducing the discharge of waste to a water resource and its associated impact.

Control monitoring point
A control monitoring point is a point within a water resource where compliance with set objectives (e.g. resource quality objective) is measured. For example, a point in the river at the downstream end of a management area or unit, where the water quality is measured to determine the fitness for use by downstream users or management areas.

Direct costs
Costs incurred by water users as a direct result of impacts on water quality by a third party. The nature of such costs implies that a reasonably precise financial value can be placed upon the impact incurred by a water user as a direct result of the impact on that water.

Earmarking
This refers to the allocation of public revenues for a specific purpose or range of purposes.

Externalities
An externality exists whenever one user's actions affect the well-being of another user, whether for the better or the worse, in ways that are not paid for. An *external diseconomy*, *external cost* or ***negative externality*** results when part of the cost of producing a good or service is borne by a party other than the producer or purchaser. An *external economy*, *external benefit* or ***positive externality*** results when part of the benefit of producing or consuming a good or service accrues to a party other than that which produces or purchases it.

The term "externality" is derived from the fact that these costs, which are borne by third parties, are not reflected in the production costs of the product or its eventual market price. The process of internalising external costs tries to correct this omission and ensure that the true cost of a product is reflected in its market price.

Government regulations or tax policies are often justified as a means of “correcting“ the outcome of the market for goods involving especially sizeable externalities, in particular negative externalities. The government might, for example, place a special levy or licensing fee on the production (or purchase) of a good or service believed to involve significant externalities, with the size of the levy or fee to be determined by some estimate of the total cost being imposed on third parties.

In the case of a good or service involving a positive externality, government might offer to pay subsidies or provide some other incentive to the producers or consumers of the good or service in question in order to encourage an appropriate expansion of production. An important problem with the levy/subsidy approach to remedying externalities is that it may well be impossible or prohibitively expensive for government to determine the size of the external costs or benefits involved, and hence to determine even approximately what an appropriate levy or subsidy rate would be.

Impactor
In the context of this document, an impactor refers to a person or company or organisation that discharges waste to a water resource, or disposes of waste, by means of:

- *engaging in a controlled activity* – relating to the irrigation of any land and the intentional recharging of an aquifer with any waste or water containing waste;
- *discharging waste or water containing waste into a water resource;*

- *disposing of waste in a manner which may detrimentally impact on a water resource*;
- *disposing of water which contains waste from any industrial or power generating process*; and
- *removing, discharging or disposing of water found underground* – relating only to the discharging or disposing of water containing waste into a water resource.

Impact cost
The cost to society as a result of the impact caused by discharging waste to a water resource or disposing of waste.

Indirect costs
Costs incurred by society as an indirect result of impacts on water quality. These might include impact costs that are incalculable or those that cannot easily be attributable to the impact. By virtue of the fact that indirect impacts do exist, but can seldom be quantified definitively or with undisputed causality, indirect costs are often estimated through empirical means.

Intergenerational equity
The capital stock or assets of the country (including natural resources) that should be passed on from one generation to another should not decrease in value. Activities such as pollution, which degrade or devalue the capital stock risk, violate the principle of maintaining intergenerational equity. Such activities are generally conducted on the basis of a hedonistic ethic or the belief that technological advancements will overcome natural resource degradation problems and restore original value.

Management Unit
A river reach with a control point at its downstream end and a number of upstream compliance monitoring points for which water quality guidelines/objectives can be determined in order to ensure downstream fitness of use.

Monitoring and Evaluation
A process whereby a system is established which tracks the ongoing progress of an activity towards achieving specific objectives. Periodic reporting on progress may form a part of this system.

National Water Resource Strategy
The National Water Resource Strategy (NWRS) is established in terms of Section 5 of the National Water Act, 1998, and provides the framework for the protection, use, development, conservation, management and control of water resources for the country as a whole. It further provides the framework within which water will be managed at regional or catchment level, in defined WMAs. The NWRS must be formally reviewed from time to time, and is binding on all authorities and institutions exercising powers or performing duties under the National Water Act, 1998.

Non-point source (also referred to as diffuse source)
Non-point source discharges are those that are not discharged at a single spatial point, but emit waste from a substantial and sometimes diffuse area. Such impacts are generally difficult to measure to a reasonable degree of accuracy. Runoff of fertiliser from ploughed farmland, stormwater runoff from urban areas and leachate from discard dumps and waste disposal sites are examples.

Opportunity cost
This is the cost of a resource not being used in a manner that results in maximum benefits, i.e. the highest-valued alternative that must be sacrificed to attain something or otherwise satisfy a want. For example, if water has been polluted there is a cost associated with not being able to then use that water for a particular purpose, i.e. a lost opportunity.

Optimal level of utilisation of a water resource
The PPP approach requires that some kind of compromise be reached between the impactor and society (including the environment). The dual objectives of this compromise are to find a level of utilisation of a water resource where the costs associated with the discharge or disposal of waste are bearable to society and where the costs of using the resource, are bearable to the impactor. This level is referred to as the **optimal level of utilisation** of a water resource and refers to that level of utilisation of a water resource that achieves the most desirable combination of social, economic and environmental objectives. Internationally, this point is generally also referred to as the *optimal level of pollution*. The optimal level of utilisation is not a quantifiable, but rather a conceptual level, which both the impactor and society can live with, i.e. the level of utilisation that society considers acceptable given the benefits of the activity associated with the discharge or disposal of waste.

Point source discharge
Point source discharges are those that emit waste at a single spatial point through pipes or other man-made channels. Such a waste discharge is generally easier to measure and abate than those from non-point sources.

Polluter Pays Principle (PPP)
This refers to a set of principles developed according to the philosophy that impactors must pay the costs incurred by individuals, institutions and society as a result of their actions in polluting the environment. How much impactors should pay and when they should pay are issues that must be resolved on an individual basis.

Pollution
The direct or indirect alteration of the physical, chemical or biological properties of a water resource, so as to make it:

(a) less fit for any beneficial purpose for which it may reasonably be expected to be used; or
(b) harmful or potentially harmful —
    (i) to the welfare, health or safety of human beings;
    (ii) to any aquatic or non-aquatic organisms;

(iii) to the resource quality; or
(iv) to property.

Regular point source
Point source of waste discharge, which discharges a consistent amount of waste throughout the year, such as from sewage works. It is distinguished from a release (see below).

Release
An irregular point source, such as spillage or controlled release from a dam, or from mine dewatering. Such sources can range from zero during dry periods to quite significant quantities during wet periods.

Scarcity
The limitation that arises when the demand for a given commodity outstrips the supply of that commodity.

Sustainability
This concept captures the view that there is a need to treat environmental protection and continuing economic growth as mutually compatible rather than as necessarily conflicting objectives. It also embodies the principle that activities involving natural resources should be able to be conducted indefinitely and should not be compromised as a result of the availability of the resource or its quality. Sustainable development describes a process in which economic activity/growth is allowed to continue, without allowing the natural resources to deteriorate beyond repair.

Sustainable water use
This occurs where, with effective management, the use of water resources remains within their capacity to recover, thereby ensuring that the level of water use can be sustained in the long term. The intention of sustainable water use is to balance water use with the protection of the resource in such a way that the resources are not degraded beyond recovery. This approach is in keeping with Section 24 of the Constitution, which states that any development and use of our natural resources (including water resources) must be environmentally sustainable.

Waste Discharge Charge
A charge payable in terms of Section 56 of the National Water Act, 1998 for the impacts caused on a water resource by the following water uses, as determined according to Section 21 of the Act:

- engaging in a controlled activity;
- discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
- disposing of waste in a manner which may detrimentally impact on a water resource;
- disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process; and
- removing, discharging or disposing of water found underground.

Water Management Area

A water management area (WMA) is an area established as a management unit in the NWRS within which a CMA will conduct the protection, use, development, conservation, management and control of water resources.

Water resource

According to the National Water Act, 1998, a water resource includes a watercourse, surface water, estuary and aquifer. Waste discharge charges will thus be applicable to both surface and groundwater resources.

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